

**APPENDIX C:  
ECOLOGY BASELINE DATA REPORT  
PALMER ENVIRONMENTAL**

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# AMBERSHAW PROJECT SITE

## ECOLOGY BASELINE DATA REPORT

### ADVANCED EXPLORATION PERMIT

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# Revision History

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# 1 INTRODUCTION

Palmer Environmental Consulting Group Inc. (PECG) was retained by Ambershaw Metallic Inc. (AMI) to complete a baseline terrestrial ecology assessment for the Ambershaw Project Site (the Project) near Ignace, Ontario.

## 1.1 Background

Ambershaw Metallics Inc. (“AMI”) is a Canadian DR-grade magnetite pellet developer company with interests in the Bending Lake Property (“Property” or “site”) located approximately 35 km southwest of Ignace, Ontario and 80 km north of Atikokan, Ontario and accessed via a secondary access road from Highway 622 (**Figure 1-1**). This document is one of a series of environmental baseline reports prepared by Palmer Environmental Consulting Group Inc. (PECG) to describe the existing environmental conditions at the property to support an application to the Ministry of Energy, Northern Development and Mines (ENDM) to support the Bending Lake Advanced Exploration Project (“Project”).

The Project consists of an open pit with the extraction of approximately 100,000 tonnes of iron mineralized rock to allow for an examination of potential development options with respect to the mineralized rocks present and process options to assess the potential of a commercially viable extraction area . To support this project PECG initiated an integrated baseline environmental program in May 2017 to expand upon the limited environmental information available near the site to provide a comprehensive understanding of the existing environmental conditions.

This introduction section is included in each environmental baseline document prepared by PECG such that each report can be read independently. This report presents the Baseline Ecology Conditions for the Project. The other baseline reports in the series are those prepared for the following environmental disciplines:

- Hydrogeology;
- Fish and Aquatic Resources;
- Water Quality; and,
- Terrestrial Ecology.

While each baseline document has been prepared separately, it is recognized that all physical, chemical and biological systems are interconnected. As such, PECG has focused on taking an ecosystem and watershed-based approach to understanding the integrated nature of the existing environmental conditions for the Project.

## 1.2 Project Setting

The Bending Lake property is situated at the southeasterly end of a 30 km long northwest-southeast trending belt of Achaean metamorphosed volcanic and sedimentary rocks which is part of a 70 km long belt of supracrustal rocks referred to as the Manitou-Stormy Lakes greenstone belt. The Project site is located at UTM Zone 15 N 5463800 m, E 559600 m.

Presently, the area is characterized by a wilderness, forestry and mineral exploration land use. Access to the site is along a series of historical exploration and logging roads, accessed from Highway 622 (**Figure 1-2**). The Advanced Exploration site is located on a local topographic high between the Wabigoon Lake Subwatershed and the Bending Lake Subwatershed, with extraction activities focused in the Bending Lake Subwatershed (**Figure 1-3**). Page Lake is located south of the site and Bending Lake is located to the east. Page Lake drains into Bending Lake along a small first order stream located in the southern portion of the Project Development Area. Surface water flow at the site is towards the north towards a wetland and drainage features that ultimately discharges onto Bending Lake.

## 1.3 Overview of the Project

AMI proposes to complete a bulk sampling program as part of an Advanced Exploration Project for the Bending Lake Property. As part of this program, AMI proposes to complete earthworks and bedrock extraction from a small open pit for a ~100,000 tonne bulk sampling program, with crushing and sampling completed on-site. The bulk sample will be trucked off-site for processing at an approved facility to test metallurgical recoveries to assess the commercial viability of the Project. The Project Description prepared by AMI (October 2018) provides additional details on the proposed Project.

The proposed site facilities layout is presented within the Project Development Area on **Figure 1-3**. Preference has been given to utilizing previously disturbed areas and existing access roads to complete the Project. The major proposed Project components are expected to include:

- Open Pit Extraction Area (104 m by 71 m by 10 m deep);
- Stockpiles (e.g., overburden, mineralized rock);
- Portable Crusher;
- Administration and Parking Facilities;
- On-Site Power and Waste Facilities;
- Extraction area Roads; and
- Access Road.

The Project is proposed to be completed in three phases, with an overall project duration of 4 months. A monitoring and mitigation plan will be implemented based on the recommendations from each of the technical environmental disciplines.

## 1.4 Policy Review

### 1.4.1 Federal Species at Risk Act (2002)

The Federal *Species at Risk Act* came into effect in December 2002 and while it provides protection to habitat of aquatic species, habitat protection of most terrestrial species applies primarily to federally owned lands.

Species assessment process under the SARA requires the preparation of a status report. Typically, such reports are prepared by contractors and provided as a draft to the members of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The final report is owned by the committee.

If a species is declared to be Threatened or Endangered, the federal *Species at Risk Act* would apply. The Act works as follows.

*“To ensure the protection of species at risk, SARA contains prohibitions that make it an offence to:*

- *kill, harm, harass, capture, or take an individual of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated;*
- *possess, collect, buy, sell or trade an individual of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated;*
- *damage or destroy the residence (e.g. nest or den) of one or more individuals of a species listed in Schedule 1 of SARA as endangered, threatened or extirpated, if a recovery strategy has recommended the reintroduction of that extirpated species.*

*On private land, these prohibitions apply only to:*

- *aquatic species listed as endangered, threatened or extirpated in Schedule 1 of SARA; and*
- *migratory birds listed in the Migratory Birds Convention Act, 1994 and also listed as endangered, threatened or extirpated in Schedule 1 of SARA.”*

These restrictions are very similar to the Migratory Birds Convention Act (MBCA), in that the “Residence” is protected, this definition is as follows:

*“residence” means a dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding or hibernating.”*

Requirements under the SARA are typically less applicable as habitat protection is specific to federally owned lands and is more commonly addressed if a project screening under the *Canadian Environmental Assessment Act* (CEAA) is required.

### 1.4.2 Provincial Endangered Species Act (2007)

Ontario’s *ESA* came into effect on June 30, 2008 and replaced the former legislation. Under the *ESA* there are over 200 species in Ontario that are identified as Extirpated, Endangered, Threatened, or of Special Concern. Species designated as Threatened or Endangered by the Committee on the Status of Species at Risk in Ontario (COSSARO), otherwise known as Species at Risk in Ontario (SARO), and their habitats (e.g. areas essential for breeding, rearing, feeding, hibernation and migration) are afforded legal protection under the *Endangered Species Act* (ESA) (Government of Ontario 2007).

The protection provisions for species and their habitat within the *ESA* apply only to those species listed as Endangered or Threatened on the SARO list. Special Concern species may be afforded protection through policy instruments respecting significant wildlife habitat as defined by the Province or other relevant authority, or other protections contained in municipal planning policies.

The *Act* prohibits the killing or harming of Threatened and Endangered species, as well as the destruction of their habitat. For Special Concern species, the *Act* does not afford protection to the individual or their habitat.

*There are two key protection provisions in the ESA:*

- Section 9 describes prohibited activities (e.g., kill, harm, harass, possess, collect, buy and sell) for species listed as extirpated, endangered or threatened on the SARO List.
- Section 10 prohibits the damage or destruction of protected habitat of species listed as extirpated, endangered or threatened on the SARO List

*There are provisions for enforcement and penalties under the ESA that include:*

- The Act is binding on everyone including provincial and municipal governments *and* their staff, individuals, corporations, businesses.
- Provisions for appointment of officers, inspections, searches, seizure, forfeiture, stop work orders, and Habitat protection orders.
- The specific requirements of the due diligence defence (sec 39).
- Maximum penalties of \$250K for individuals and \$1M for corporations and/or imprisonment for up to 1 year for first offence.

### 1.4.3 Migratory Birds Convention Act (1994)

The *Migratory Birds Convention Act* (MBCA) and Migratory Birds Regulations (MBR) (2014) protect most species of migratory birds and their nests and eggs anywhere they are found in Canada. General prohibitions under the MBCA and MBR protect migratory birds, their nests and eggs and prohibit the deposition of harmful substances in waters / areas frequented by them. The MBR includes an additional prohibition against incidental take, which is the inadvertent harming or destruction of birds, nests or eggs.

Compliance with the MBCA and MBR is best achieved through due diligence, which identifies potential risk based on a site-specific analysis in consideration of the Avoidance Guidelines and Best Management Practices information on the Environment Canada website.

## 1.5 Designated Areas

### First Nation Communities

The project lies within Treaty #3 watershed defined territorial boundaries shared by 28 independent First Nation communities and several Metis Nation communities, all of whom are signatories to Treaty # 3 (1873) and adhesions of 1874-5.

### MNRF Mapping

As identified within MNRF's online Natural Heritage Area mapping (2018), the majority of the study area is comprised of "woodland" (**Maps A and B**). An abundance of lakes and scattered wetlands classified as "unevaluated" have also been identified. Bending and Page Lakes comprise the only named lakes in the area. The existing woodland and wetland communities of the study area have been investigated as part of this report, as described in Sections 3.0. No wetlands designated as having provincial significance (PSWs) or Areas of Natural and Scientific Interest (ANSIs) have been identified within the study area.



**Map A: MNRF Biodiversity mapping of the overall project study area showing woodlands (solid green), lakes (solid blue) and wetland (textured blue fill).**

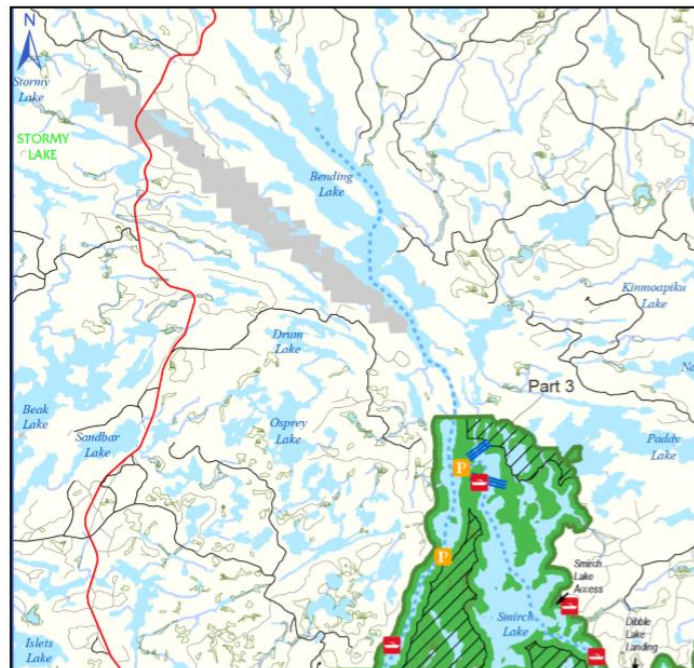


**Map B: MNRF Biodiversity mapping of Project Development Area.**

## Turtle River – White Otter Lake Provincial Park

The study area is located approximately 3.0 km north of the Turtle River – White Otter Lake Provincial Park. As identified within the park’s Management Plan document (2012), the park comprises an area of approximately 49 ha. Vegetation communities throughout the park have been described within the plan as “*representative of the transitional zone between the Great Lakes-St. Lawrence and Boreal forest regions. Boreal forest species such as white spruce, black spruce, balsam fir, jack pine, trembling aspen, and white birch are found interspersed with red and white pine and other species more typical of the Great Lakes-St. Lawrence forest.*”

A major recreational canoe access route extends north from the park and into the study area through Bending Lake. The park is identified as a “Waterway Park”, with management efforts focusing on protection of such recreational water routes and their associated ecosystems. As further shown on **Map C**, Stormy Lake Conservation Reserve is located approximately 1.5 km west of the study area. (Ontario Parks, 2012)



**Map C: Turtle River – White Otter Lake Provincial Park (green) located south of Bending Lake. A recreational canoe access route (blue dashed line) extends through Bending Lake from the park. (Management Plan Map 2A: Existing Development and Adjacent Land Use Map)**

## Past and Current Land Use

The site has been repeatedly disturbed over the course of the past 70 years and includes the following:

- multiple passes of road building
- gravel excavation and usage

- commercial forestry
- surface mineral exploration
- extensive diamond drilling
- seismic line establishment and testing. test mining and bulk sampling
- forest harvesting

The forests on these lands fall within the Wabigoon Sustainable Forest Licence issued by the Ontario Ministry of Natural Resources and Forestry, to Domtar Inc., and managed by Domtar Inc. forestry staff in Dryden, Ontario.

## 2 METHODOLOGY

### 2.1 Background Review

Background information was gathered and reviewed at the outset of the project. This involved existing documentation for the study area, including:

- DST Consulting Engineers Inc. baseline data (2011 – 2012);
- Forest Resource Inventory (FRI) Digital Aerial Imagery (2010, MNRF);
- Land Information Ontario (MNRF, 2018);
- *Terrestrial and Wetland Ecosites of northwestern Ontario* (Racey *et al.*, 1996);
- *Ecosites of Ontario – Boreal Region* (Banton *et al.*, 2009);
- Ontario Breeding Bird Atlas (OBBA);
- The Turtle River – White Otter Lake Management Plan (Ontario Parks 2012); and,
- Natural Heritage Information Centre database (NHIC, 2018).

### 2.2 Ecological Survey Methodology

DST Consulting Engineers Inc. completed environmental baseline surveys in 2011 and 2012 for the Bending Lake Project site. The following ecology surveys were conducted during this period:

- Ecosite surveys and botanical inventory;
- Breeding bird surveys;

- Owl surveys; and,
- Breeding amphibian surveys.

PECG reviewed the field results from these surveys and has incorporated this data into this current study. This data was augmented through further ecological surveys by PECG in 2017-2018. The following ecology surveys were conducted:

- Ecosite surveys, boundary verification, and botanical inventory;
- Breeding bird surveys;
- Owl surveys;
- Crepuscular bird surveys;
- Breeding amphibian surveys.
- Species at Risk bird habitat characterization;
- Waterfowl (nesting and migration) surveys;
- Bat tree snag surveys; and,
- Bat acoustic monitoring.

Refer to **Appendix B** for the full summary of field surveys completed by PECG and DST Consulting Engineers Inc.

### 2.2.1 Vegetation Communities and Flora

PECG obtained from the MNRF the recently completed Forest Resource Inventory (FRI) data for the study area. The digital data included ortho-rectified aerial photography (infrared, black and white), forest and wetland polygons with tree species composition and primary ecosite (based on Banton *et al.*, 2009).

DST Consulting Engineers Inc. identified ecosites in accordance with the *Terrestrial and Wetland Ecosites of northwestern Ontario* (Racey *et al.*, 1996) field guide in 2011 and 2012. PECG has used the *Ecosites of Ontario* (Banton *et al.*, 2009) manual for Boreal ecosites to convert DST's ecosites to the most updated ecosites. PECG's vegetation surveys were conducted in accordance with the *Ecosites of Ontario* (Banton *et al.*, 2009) manual for Boreal ecosites.

PECG completed vegetation plot surveys across the study area to ground truth and update the previous vegetation community data by DST as well as the FRI ecosite data. The ground-truthed data collected by PECG supersedes the Forest Resource Inventory data for polygons where there were discrepancies in the identified ecosite. Vegetation data collected by DST Engineering Inc. and the Forest Resource Inventory (FRI) was used in areas where PECG did not completed vegetation plots. The PECG and DST vegetation plots are illustrated on **Figure 3-1**.

Field surveys involved detailed ground-truthing for the proposed bulk sample and surrounding area. The FRI polygon delineation was used as part of the background review and the basis for



the ecosite delineation within the study area. Data cards were used to record vegetation composition, flora inventory and layering (canopy, sub-canopy, ground cover). The site topography of the plot, aspect, drainage conditions as well as a description of site were documented. Soils were sampled at representative sites with the soil texture, depth to bedrock and the water table recorded where present.

Botanical surveys were completed by recording species observed in the representative vegetation community polygons and while traversing the general study area. As a reference source for plant status and potential rarity, the Thunder Bay Regional Rarity list was used to screen for potential rare/uncommon species at the regional level. Provincial plant status was based on the *Provincially Rare Flora of Ontario* (Oldham and Brinker, 2009) and the Natural Heritage Information Centre (NHIC, 2018).

## 2.2.2 Wildlife

### 2.2.2.1 Owl Surveys (2012 and 2017)

Owl surveys were undertaken at 12 sites on April 2 to April 4, 10 sites on April 10, 2012 and 11 sites around Bending Lake on May 31, 2017. The surveys were started 30 minutes after sunset and ended shortly after midnight. In some cases, these surveys were combined with amphibian surveys. Due to poor weather conditions of April 2, 2012, surveys were re-done on April 3 and 4, 2012 where the sky was clear. At the time of the 2017 survey, the sky was clear with a half moon. A combination of survey protocols was conducted; starting with 2 to 3 minutes of silent listening (protocol #1) and followed by a 12 minutes long playback CD track targeting Northern Saw-wet, Boreal Owl, and Barred Owl (protocol #3) (OBBA, 2002).

### 2.2.2.2 Waterfowl Surveys (2017-2018)

#### **Migratory Waterfowl**

Bending Lake provides suitable opportunities for aquatic stopover and staging areas for migratory waterfowl. These can be considered seasonal concentration areas for wildlife and need to be identified as part of the Significant Wildlife Habitat assessment. The surveys were conducted fall of 2017 (October) in order to identify any important waterfowl and migratory bird use within the study area. Surveys were carried out in suitable habitats (e.g., shallow bays with aquatic vegetation) along the shoreline of Bending Lake and other key waterbodies during the fall migratory period. Stations were established based on suitable habitat and representative sampling effort. Incidental observations of other migratory birds observed within the study area were recorded during all site surveys.

#### **Nesting Waterfowl**

Habitat for nesting waterfowl was surveyed by PECG in spring 2018 through area searches in ponds, lakes and wetland habitats. Species were counted, and any nesting evidence was recorded. Field studies focused on the bays of Bending Lake as well as other suitable habitat, mirroring the route of Migratory Waterfowl surveys completed in the fall.

### 2.2.2.3 Breeding Bird Surveys (2011, 2017-2018)

Open wetlands and waterbodies occur throughout the study area with several located in or near project components (e.g., waste rock stockpile area and potentially the tailings area). As such,

given the previous breeding bird surveys focused on treed/forested sites, marsh/wetland bird surveys and waterfowl nesting surveys were completed to supplement the DST data. Marsh breeding bird surveys were carried out using point-count survey methods. Survey stations targeted for areas with representative habitat opportunities for marsh breeders. The surveys were combined with the Ecosite and vegetation plot inventories in order to maximize survey effort and data collection. Surveys were conducted during the month of June (2017 and 2018) with each marsh station visited once. Field observations were recorded on point count data forms. Suitable shoreline nesting habitat was pre-screened based on the fall 2017 waterfowl staging and stopover surveys. Additional point count surveys for shrub and treed wetlands were completed to target for potential occurrences of SAR birds including Canada Warbler and Olive-sided Flycatcher.

#### 2.2.2.4 Bat Tree Snag Survey and Acoustic Monitoring (2017-2018)

Vegetation communities were mapped based on the recent MNR Forest Resource Inventory (FRI) mapping and tree species composition data, followed by targeted ground truthing. PECO used this data to support background review for the Phase I: Bat Habitat Suitability Assessment and Phase II: Identification of Suitable Maternity Roost Trees according to the *Survey Protocol for Species at Risk Bats within Treed Habitats* (MNR, 2017). Bat surveys in Ontario typically require identification of maternity colonies, hibernacula, and the presence or use of the area by SAR bats (e.g., Little Brown *Myotis* and Northern *Myotis*).

Field investigations for a screening of potential Suitable Maternity Roost Trees was conducted at the bulk sample site, West Hawk Road and Barry's Road, as well as other surrounding areas on June 28 and 29, 2017. This work was completed in order to identify suitable areas for the deployment of acoustic monitors for initial data collection. Phase II surveys were conducted in the proposed bulk sample area in preparation for the 2018 deployment of acoustic monitors on November 7, 8 and 9, 2017. Subsequent to the deployment, the November 2017 Bat Habitat Suitability Assessment results were used to further interpret the June acoustic data results within the West Hawk Road and Barry's Road sites.

Acoustic monitoring was completed using two SM3BAT detectors that were deployed on June 28 and 29, 2017 by PECO to collect bat echolocation calls for the Ambershaw study site. The SM3BAT detector is capable of 16-bit digital high-speed sampling, using ultrasonic microphones designed specifically for recording bat echolocation calls (Wildlife Acoustics Inc., 2011). Two SM3BAT bioacoustics monitors were deployed in 2017, one at West Hawk Road using 1 ultrasonic microphone and one at Barry's Road using 2 ultrasonic microphones to collect acoustic data from June 29 to August 4, 2017 (see **Appendix C**). These sites were not within the proposed bulk sampler area and were chosen based on a screening for areas with potential high quality snag trees. The recorders were programmed to record from dusk to dawn, with recordings triggered when ultrasonic signals from the bats were detected in the vicinity. Ardea Biological Consulting Ltd. (Ardea) was contracted by PECO to provide an analysis of the recordings obtained at the project site.

The results from Phase II surveys completed in November 2017 were used to identify the best suitable maternity roost trees for the deployment of three SM3BAT detectors in 2018. Analysis of the 2018 data is pending and studies will continue following the completion of the bulk sample project. Refer to **Appendix C** for the full results of the SAR bat assessment.

### 2.2.2.5 Breeding Amphibian Surveys (2012, 2017)

Breeding amphibian surveys were completed on April 24, April 25, and April 26, 2012 and on May 31, and June 1, 2017. Breeding surveys were conducted following Gartshore *et al.* (2004) and carried out at least one half hour after sunset and no later than midnight. Weather conditions were recorded including air temperature, wind, and precipitation.

Species were identified by call, and an abundance code for each species heard calling was assessed by the following the Amphibian Monitoring protocol:

- Code 0 No calls heard.
- Code 1 Calls not overlapping or simultaneous, number of individual frogs can be counted
- Code 2 Calls overlapping or simultaneous, number of individuals can still be distinguished, number of individual frogs cannot be counted, but a reliable estimate of numbers can be made based on location and call voices
- Code 3 Full chorus, calls simultaneous and overlapping, numbers of calling males cannot be reasonably counted or estimated

Surveys began 30 minutes after sunset and ended before midnight. Surveys were conducted on calm and warm nights per the Marsh Monitoring Program protocol for surveying of breeding frogs and toads.

In 2017, PEGC targeted wetland habitats for Amphibian Breeding. A total of 11 survey stations across Bending Lake were established to target wetland and open water habitat. Species, calling locations and approximate numbers of calling individuals were recorded and mapped when present. This survey method provides an indication of amphibian abundance during the breeding season.

### 2.2.2.6 Incidental Wildlife and Wildlife Habitat (2017-2018)

Observations of wildlife throughout field investigations were noted and added to all species list including all direct observations or evidence of wildlife, such as nests, tracks, scat observed during the survey.

### 2.2.2.7 Crepuscular Surveys (2017 and 2018)

Crepuscular surveys were conducted for the following two (2) species of nocturnal birds which were believed to be potentially present within the study area due to habitat suitability:

- Common Nighthawk (*Chordeiles minor*) – Special Concern
- Eastern Whip-poor-will (*Caprimulgus vociferus*) – Threatened

Common Nighthawk and Eastern Whip-poor-will both belong to the Nightjar family due to their similarities in terms of preferences for open habitat and nocturnal behavior with increased activity around twilight.

Crepuscular surveys were conducted at various open habitats throughout the study area (e.g., forest clearings, open forests, sand areas, rocky hillsides). The surveys were started 30 minutes before sunrise and ended prior to midnight (WildResearch, 2016). Surveyors listened and observed the night sky for approximately 6 minutes per site (WildResearch, 2016). All lights (i.e.

headlamps, flashlights, and car lights) were off during the survey period and surveys were completed in silence. A total of 16 sites were surveyed in 2017 and 14 sites in 2018.

## 3 EXISTING CONDITIONS

### 3.1 Physiography and Topography

The Ambershaw Project site is located within the Severn Upland physiographic subdivision of James Region of the Canadian Shield (Beak, 1977). The Severn Upland primarily consists of Precambrian bedrock, with a shallow cover of Quaternary glacial deposits. Where present, the overburden comprises lacustrine clays or peat, the Sipiwek moraine, and several esker chains. The Sipiwek moraine is the main feature of the Severn Upland region, and is located west of Sipiwek Lake in Manitoba. The moraine is composed of clay with varying amounts of sands and till deposits. The topography of the region is generally described as undulating to gently rolling. The Project site lies adjacent to the southwestern most arm of Bending Lake. Despite the occurrence of a southwesterly moving glacial ice sheet, the topography at the property consists of a northwesterly trending, sub-parallel series of glacially sculpted ridges and topographic depressions, controlled by underlying geology. A steep escarpment is present trending northwestwards along the southwest shore of Bending Lake, and through the center of the Project site (Fladgate Exploration, 2011).

### 3.2 Landscape Setting

The study area is within the Lake Wabigoon Ecoregion 4S and more specifically in the Manitou Ecodistrict 4S-5 (see **Map D**). The ecosystem of Ecoregion 4S encompasses some 5,958,799 ha and has a relatively dry and cool climate that is significantly influenced by the prairie climate to the west. This can result in substantial periods of summer drought. Land cover is generally represented by mixed forests (25%), sparse forest (24%), coniferous forest (14%) and deciduous forest (2%), with remaining cover including water, sparsely vegetated bedrock-dominated terrain and cut overs. This Ecoregion has a strong boreal affinity with vegetation representation including Jack Pine (*Pinus banksiana*), Black Spruce (*Pinus mariana*), Balsam Fir (*Abies balsamea*), Trembling Aspen (*Populus tremuloides*) and White Spruce (*Picea glauca*) on upland sites. Black Spruce and Tamarack with associates of Black Ash (*Fraxinus nigra*) and Red Maple (*Acer rubrum*) are predominate in lowlands (Crins *et al.* 2009). Land cover representation within the immediate study area includes spruce-pine upland coniferous forest, hardwood-fir-spruce mixed wood forest, and spruce-tamarack swamps. There is also a higher percent of cut overs found in the surrounding landscape compared to Ecoregion 4S as a whole. Soil texture and moisture regimes associated with the identified Ecosites include fresh-moist sandy course loam, fresh fine loamy clay, fresh silty soils and organic soils in wetlands. The general study area for the terrestrial ecology surveys is shown on **Figure 3-1**.



**Map D – Study Area Location in the Manitou Ecodistrict 4S-5 of the Lake Wabigoon Ecoregion 4S.**

## 3.3 Vegetation and Flora

### 3.3.1 Vegetation Communities

Through compilation of field information collected by PECG (2017, 2018), DST (2011) and FRI data, the vegetation communities that comprise the Project Study Area have been classified. Vegetation communities have been identified with ecosite names, in accordance with the *Ecosites of Ontario* (Banton *et al.*, 2009) manual for the boreal area. A compiled list of these ecosites is provided in **Appendix D**.

#### 3.3.1.1 Project Study Area

As shown on **Figure 3-2** to **Figure 3-11**, the study area has been identified as supporting an extensive and variable mixture of vegetation communities. A total of 33 ecosites have been identified as comprising the total study area boundaries (comprising a total area of approximately 8052 ha). These ecosites describe 19 terrestrial communities, primarily comprised of coniferous, deciduous and mixedwood forests. A total of 14 ecosites describe wetland communities, which span all of the typical main wetland types (swamp, marsh, bog, fen).

#### 3.3.1.2 Project Development Area

**Figure 3-12** illustrates the terrestrial and wetland ecosites within the Project Development Area.

#### Terrestrial System

The following 10 terrestrial communities have been identified, comprising the majority of land coverage (approximately 73%, 584 ha) of the development area lands:

- B040: Dry Sandy: Aspen-Birch Hardwood
- B048: Dry to Fresh, Coarse: Red Pine - White Pine Conifer
- B049: Dry to Fresh, Coarse: Black Spruce-Jack Pine Dominated
- B050: Dry to Fresh, Coarse: Pine-Black Spruce Conifer
- B052: Dry to Fresh, Coarse: Spruce-Fir Conifer
- B055: Dry to Fresh, Coarse Aspen-Birch Hardwood
- B070: Coarse Moist Aspen-Birch Hardwood
- B108: Fresh, Silty to Fine Loamy: Mixedwood
- B125: Moist, Fine: Mixedwood
- B165: Open Rock Barren

Based on similarities in community compositions, these communities have been identified as belonging in the general groupings, as described below.

#### Aspen / Birch Dominated Hardwood Forests (Ecosite Codes: B040, B055, B070)

These ecosites comprises approximately 51% of the total terrestrial communities within the development area. The majority of the development works are proposed through a portion of Ecosite B070. Communities that are classified as one of these ecosites typically support canopies (with >50% cover) that are dominated by the deciduous species Trembling Aspen (*Populus tremuloides*) and White Birch (*Betula papyrifera*). Occasional conifer canopy associates may be present and include species such as Spruce (*Picea* spp.), Jack Pine (*Pinus banksiana*) and Balsam Fir (*Abies balsamea*). The understory primarily supports young individuals of such canopy species. Herbaceous groundcover species tend to vary in richness based on substrate types and canopy density. The mineral substrates of these forest types are comprised of coarse materials with moisture regimes that range from dry to moist. (Banton *et al.*, 2009)

PECG identified two (2) ecosites of these types within the development area during their 2017 field investigations. Community conditions were found to be consistent with that described above and were located at the vegetation survey plots P17-8 and P17-9.

#### B048: Dry to Fresh, Coarse: Red Pine - White Pine Conifer

This ecosite comprises only about 5.7% (46 ha) of the development area. It is typically characterized as having a canopy with over 20% coverage by Red and/or White Pine (*Pinus resinosa/strobus*). Common canopy associates include White Birch, Trembling Aspen and Balsam Fir. The common understory tree species are consistent with the canopy. Ecosite varies from poor to rich for shrub and herbs. The understory vegetation is commonly Twinflower (*Linnaea borealis*), Bush Honeysuckle (*Diervilla lonicera*) and Velvet-leaf blueberry (*Vaccinium myrtilloides*). The ground surface is mainly conifer litter with moss, broadleaf litter and moss. The substrate ranges from sandy to coarse loamy. (Banton *et al.*, 2009)

#### Jack Pine/ Black Spruce Dominated Forests (Ecosite Codes: B049, B050)

These ecosites comprise only approximately 4.6% (37.23 ha) and support canopies that are dominated by Jack Pine and/or Black Spruce and have substrates comprised of sandy to coarse loamy mineral materials. Within Ecosite B049, Jack Pine and Black Spruce (*Picea mariana*) typically almost comprise the entirety of the canopy, often providing greater than 90% coverage.

Ecosite B050 supports a canopy with greater than 50% coverage by these coniferous species, with a mixture of tree associates comprising the remainder of canopy cover including White Birch, Trembling Aspen or the coniferous species Balsam Fir and White Spruce. Both Jack Pine/Black Spruce dominated ecosites are described as herb-poor. (Banton *et al.*, 2009)

#### B052: Dry to Fresh, Coarse: Spruce-Fir Conifer

This ecosite comprises an area of less than 1% (4.7 ha) of the development area and is typically characterized as having a canopy with over 50% cover of conifer species and is mostly comprised of Balsam Fir and White Spruce (*Picea glauca*). Common canopy associates include White Birch, Trembling Aspen, and Black Spruce. The common understorey tree species are consistent with the canopy and canopy associates. This ecosite is mainly shrub and herb poor. The understorey vegetation is commonly Twinflower (*Linnaea borealis*), Bush Honeysuckle and Mountain Maple (*Acer spicatum*). The ground surface is mainly moss, woody debris, broadleaf litter and conifer litter. The substrate ranges from sandy to coarse loamy. (Banton *et al.*, 2009)

#### Mixedwood Forests (Ecosite Codes: B108, B125)

These forest ecosites comprise approximately 10% (77 ha) of the development area and are characterized by supporting canopies comprised of a variable mixture of hardwood species. These species typically include birch, aspen, ash, elm, maple and oak. No particular species dominates in abundance/cover. Coniferous species such as Eastern White Cedar, White Pine, White Spruce, Balsam Fir and Black Spruce (occurs in Ecosite B108). Shrub and herbs are described generally as rich. Substrates for both ecosites comprise silty to fine loamy fine-textured mineral materials that range in moisture regimes between dry to fresh (Ecosite B108) and moist (Ecosite B125). (Banton *et al.*, 2009)

#### B165: Open Rock Barren

Open rock barren communities are located on horizontal to sloping bedrock exposures and are generally sparsely vegetated. Typically, vascular plants in these ecosites are restricted to depressions, cracks and crevices where a thin veneer of organic or mineral material has collected (Banton *et al.*, 2009). The ground surface is mostly exposed rock and lichens. PEEG identified this community as existing as a former rock pit. The canopy layer was noted as supporting open conditions with 25 to 60% cover from Speckled Alder (*Alnus incana*). The understorey is composed of herbaceous species including Yellow Hawkweed (*Hieracium pratense*), Red Raspberry (*Rubus idaeus*) and grass species providing greater than 60% cover. The ground cover is composed of Woodland Strawberry (*Fragaria vesca*) and Large leaved Aster (*Eurybia macrophylla*) providing 10 to 25% cover.

### **Wetland System**

A total of 10 wetland ecosites have been identified, comprising a total approximate proportion of 8.1% (65 ha) within the total development area. No portions of the development works are proposed within the boundaries of the identified wetland communities. All four of the main wetland categories (swamp, marsh, bog and fen) are represented within the development area as listed in order of high to low proportion, below:

- Swamps: 34.8 ha (4.3%)
- Marshes: 11.9 ha (1.5%)
- Fens: 16.8 ha (2.1 %)

- Bogs: 1.40 ha (0.17 %)

The individual wetland ecosites that comprise the above general categories are described in further detail, as follows.

#### B127: Organic Poor Conifer Swamp

These ecosites are typically characterized as having canopies dominated by Black Spruce (*Picea mariana*). Abundant ericaceous (acidic soil-growing) shrubs comprise the understorey, and herbaceous establishment is typically low (Banton *et al.*, 2009).

PECG's observations within a B127 ecosite located outside of the development area, described it as supporting conditions consistent with those described above. The canopy/subcanopy was dominated by Black Spruce (providing 60% and up to 35% cover, respectively). Ericaceous shrubs Common Labrador Tea (*Rhododendron groenlandicum*) and Leatherleaf (*Chamaedaphne calyculata*) dominated the understorey (greater than 60% cover). Typical for this ecosite, the herbaceous groundcover diversity was low, comprised primarily of Sphagnum moss and Three-leaved False Solomon's Seal (*Maianthemum trifolium*).

#### B128: Intermediate Conifer Swamp

This is a small community located within an embayment along the southwestern shoreline of Page Lake. It is associated with an inlet of a minor unknown-named tributary into the lake. Canopy cover by Black Spruce is high (>60%). Understorey cover by a mixture of Speckled Alder (*Alnus incana*) and the ericaceous shrubs Leatherleaf and Sweet Gale (*Myrica gale*) are also abundant (>60%). Associated herbaceous/graminoid species include Tufted Loosestrife (*Lysimachia thyrsiflora*), Blue-flag Iris (Iris versicolor), as well as establishment of Wire Sedge (*Carex lasiocarpa*) and Water Horsetail (*Equisetum fluviatile*) along the open water lake edges.

#### B129: Organic Rich Conifer Swamp

This treed ecosite typically supports a canopy (>25% cover) dominated by the coniferous rich swamp indicator species Eastern White Cedar (*Thuja occidentalis*). Conifer canopy associates may also include Black Spruce, Tamarack (*Larix laricina*) and Balsam Fir. The understorey layer typically provides sparse cover, and groundcover herbs and mosses are typically species-rich. (Banton *et al.*, 2009)

#### B135: Organic Thicket Swamp

This forested community is characterized by canopy of Speckled Alder providing 25 to 60% cover. The subcanopy is dominated by Speckled Alder, Willow species (*Salix* spp.) and Broad-leaved Cattail (*Typha latifolia*), providing 25 to 60% cover. The understorey is composed of grasses, providing greater 60% cover. The herbaceous layer primarily consists of Yellow Marsh Marigold (*Caltha palustris*), Spinulose Wood Fern (*Dryopteris carthusiana*) and Red Raspberry (*Rubus idaeus*), providing 10 to 25% cover.

#### B136: Sparse Treed Fen

This community comprises approximately 570 m along the exposed northwestern shoreline of Page Lake. The southern extent of this ecosite is associated with an inlet of a minor unknown-named tributary into the lake. The substrate of this community consists of islands of floating peat



and *Sphagnum* mats. Scattered stunted Tamarack and Eastern White Cedar dominate the canopy/subcanopy layers of the community, providing approximately 40% coverage. The ericaceous shrub Leatherleaf dominated the understory layer (>60% cover). The fen indicator species Wire Sedge was also recorded as abundant throughout the groundcover.

#### B138: Open Bog

This community supports open canopied conditions comprised of stunted Black Spruce (<10% cover). A carpet layer of fibric peat (comprised of *Sphagnum* spp.) comprises the entire substrate. Ericaceous shrubs provided high cover (> 60%) throughout the community and was dominated by Leatherleaf. Abundant shrub associates included Labrador Tea and Bog Rosemary (*Andromeda polifolia*). Overall, herbaceous species richness is low, mainly comprised of Northern Bog Sedge (*Carex gynocrates*), Dense Cottongrass (*Eriophorum vaginatum* spp. *spissum*), Three-leaved False Solomon's Seal (*Maianthemum trifolium*) and the bog indicator species Northern Pitcher-plant (*Sarracenia purpurea*). It is surrounded by the Sparse Treed Fen ecosite (Code: B136), as described above.

#### B142: Mineral Meadow Marsh

This community is typically open-canopied and dominated by graminoid species. Representative sedges that encompass the groundcover of this ecosite within the development area include Wire, Lakebank, and Beaked species. The substrate throughout this community is composed of fixed (not floating mat) mineral soils held together by a root mat of dominant plant species. This community is often associated with edges of lakes or streams (i.e. P18-17) and received regular flooding. Cover by woody understory species varies between non-woody and occasional (typically less than 25%).

#### B146: Open Shore Fen

This community was primarily identified along more sheltered portions of lake shorelines with low wave exposure (i.e. bays along Bending Lake). The organic substrate of this community consists of islands of buoyant floating peat mats, with abundant sphagnum hummocks. Abundant cover (>25%) of ericaceous shrubs mainly including Sweet Gale and Leatherleaf. Abundant cover of sedges was recorded including the fen indicator species Wire Sedge. Additional fen indicators Marsh Cinquefoil was also noted occasionally throughout the groundcover. Within the open water portions between mat islands, establishment of emergent and floating leaved species was noted consisting of Cattail and Common Bladderwort (*Urticularia vulgaris*).

#### B148: Mineral Shallow Marsh

This community is represented within a total of 12 polygon locations that vary in their levels of wave exposure. The majority of these ecosites (10 total) were identified along open lake shorelines. These locations include various shorelines of Bending Lake (vegetation survey plots #P18-1 to P18-8), Drum Lake (P18-24) and the unnamed lake located at P18-29. These locations varied in widths but were generally described as having regular exposure to wave action (minimizing the ability for organics to build-up). Emergent species dominate the vegetative cover (25 to 60%) of these communities and included sedges (i.e. Wire, Lakebank), Water Horsetail, Soft-stemmed Bulrush (*Schoenoplectus tabernaemontani*) and Three-way Sedge (*Dulichium arundinaceum*). An abundance (approximately 25%) of submergent and floating-leaved plants were also recorded such as Common Bladderwort, water/pond lilies, and pondweeds

(*Potamogeton* spp.) Water depths within these communities are shallow (approximately 1 foot deep).

The remaining inland communities are located within areas of less wave/current exposure. They were noted as having denser vegetation cover (over 60%) comprised of a mixture of herbaceous and graminoid species. These include species such as Cattails, sedges and rushes, and Water Horsetail. Abundant submergent and floating-leaved plants similar to the shoreline locations were also recorded.

#### B149: Organic Shallow Marsh

This community was recorded during PEGC's 2018 field investigations at three (3) shoreline locations of Bending Lake. Emergent species were abundant throughout the vegetation community of this ecosite (>25%) such as Water Horsetail and Three-way Sedge. Floating-leaved herbaceous species were abundant and included Yellow Water-Lily (*Nuphar lutea*). Noted submerged species included Tape Grass (*Vallisneria spiralis*). Although receiving high water flows, due to their shoreline locations, these ecosites were also noted as occurring within embayment sheltered from high wave action thus allowing the buildup of organic substrates (decomposing leaf litter).

### 3.3.2 Flora

In total, 157 species of vascular plants were recorded during six summer botanical surveys in 2017 and 2018 combined. As many as 154 species (98%) were native and 3 (2%) were non-native. The low representation of non-native species is indicative of the high quality, diversity, and resilience of the vegetation within the study area. The majority of plants (151 species) are considered to be common (S-rank S5) in Ontario and the remaining 6 species are considered secure (S-rank S4) in Ontario.

The following six (6) species are regionally rare in Thunder Bay district:

- Common Marsh Bedstraw (*Galium palustre*)
- Rice cut grass (*Leersia oryzoides*)
- Cinnamon Fern (*Osmunda cinnamomeum*)
- Hairy Solomon's Seal (*Polygonatum pubescens*)
- Large-leaved Goldenrod (*Solidago macrophylla*)
- Large Cranberry (*Vaccinium macrocarpon*).

Arctic-alpine plants occasionally occur in the Thunder Bay District (Thunder Bay Field Naturalists, 2015) but none were recorded within the study area. A complete list of plant species recorded is provided in **Appendix E**. No provincial or federal Species at Risk was recorded within the study area.

The Co-efficient of Conservatism (CC) facilitates the assessment of ecological sensitivity of the flora recorded on site. The CC values were developed for vegetation in Southern Ontario however it is considered to be a helpful method to qualify the natural environment's sensitivity to

disturbance (Oldham *et al.* 1995). The majority of species recorded from the study area are either highly tolerant, 29 species (18%) have a CC value of 0-3, or moderately tolerant of disturbance, where 47 species (30%) have a CC value of 4-6. Approximately 34 species (22%) have a CC value of 7-8 indicating a moderate sensitivity to disturbance and 17 species (11%) have a CC value of 9-10, indicating these species are highly sensitive to disturbance. The majority of the high CC value species were recorded from wetlands. As many as 30 species (19%) do not have assigned CC values.

## 3.4 Wildlife

### 3.4.1 Amphibians

The results from the 2012 and 2017 breeding amphibian surveys have confirmed that there is an abundance of amphibian breeding habitat within the study area and habitat opportunities are well represented. A total of five frog species were heard calling throughout the study area, including wetland breeding species (i.e. American Toad [*Anaxyrus americanus*], Spring Peeper [*Pseudacris crucifer*], Gray Treefrog [*Hyla versicolor*], and Boreal Chorus Frog [*Pseudacris maculata*]) and woodland breeding species (i.e. American Toad and Wood Frog [*Lithobates sylvatica*]). Spring Peeper was the most abundant species. All species recorded are considered provincially common and widespread in Ontario. All species are considered within their species range.

Amphibian call surveys in targeted habitat recorded sufficient numbers of species to meet the criteria of significant habitat for Amphibian Breeding Habitat (Woodland) solely at the monitoring location BA16 by DST in 2012, where 2 frog species were recorded with calling codes of 3. Locations for breeding amphibian survey stations are found on **Figure 3-13** and the call code results from the surveys are described below in **Table 1**.

**Table 1. Calling Code Results from Breeding Amphibian Surveys**

Monitoring Station	Call Code Results				
	Boreal Chorus Frog	Spring Peeper	Gray Treefrog	Wood Frog	American Toad
<b>2012 (DST)</b>					
BA1	1	3	1	1	0
BA2	1	3	0	0	0
BA3	0	3	1	1	0
BA4	1	3	0	1	0
BA5	0	3	1	1	0
BA6	0	3	0	1	0
BA7	0	2	0	1	0
BA8	1	3	1	1	0
BA9	3	3	0	0	0
BA10	1	3	1	0	0
BA11	1	3	0	0	0
BA12	2	3	0	1	0
BA13	0	3	0	0	0
BA14	2	3	0	1	0
BA15	0	3	0	0	0
BA16	1	3	0	3	0
BA17	0	3	1	0	0
BA18	0	3	1	0	0
BA19	0	3	1	0	0
BA20	0	3	0	2	0
BA21	0	3	0	0	0
BA22	0	3	1	1	0
BA23	0	3	1	0	0
<b>2017 (PECG)</b>					
BA24	0	1	0	0	0
BA25	0	2	0	0	1
BA26	0	2	0	0	1
BA27	0	1	0	0	1
BA28	0	1	0	0	1
BA29	1	2	0	0	0
BA30	0	2	0	0	0
BA31	0	1	0	0	1
BA32	0	1	0	0	1
BA33	0	2	0	0	0
BA34	0	2	0	0	0

### 3.4.2 Owl Survey Results

In 2012, three (3) Northern Saw-wet Owl were heard calling at two locations on April 3 and one (1) Northern Saw-wet Owl was heard on April 10, 2012. The exact location of these records is not known, consequently these results are not mapped on **Figure 3-14**.

No owl was heard during the May 31, 2017 owl survey. The lack of results may have been due to the time of year during which the surveys were conducted. The peak vocalization periods for Owl species ranges from November to April. The recommended survey dates in Northern Ontario is between March 15 and April 30. The protocol does however mention that the surveys can be completed from January through June.

### 3.4.3 Waterfowl

Ten different species of waterfowl were identified through field investigation within the numerous waterbodies in the Project Study Area (**Table 2**). The locations of waterfowl surveys is provided on **Figure 3-14**.

A total of six waterfowl species were observed in 2017 fall migration surveys. The majority of waterfowl observed were in groups of 2-6, however a large congregation of roughly 60 Ring-necked Ducks were observed on Bending Lake during the fall waterfowl stopover survey. Therefore, Bending Lake provides suitable opportunities for aquatic stopover and staging areas for migratory waterfowl.

A total of nine waterfowl species were observed in 2018 spring nesting surveys. No large congregations of waterfowl were observed at any location on Bending Lake, Page Lake, Beak Lake or West Hawk Lake. Typical waterfowl were noted at various locations and included Ring-necked Duck, Common Goldeneye and Mallard. Pairs and individuals were seen in suitable nesting habitat but there was no breeding evidence.

The most commonly observed species was Ring-necked Ducks. All species recorded are ranked S5 (common and secure in the province) or S4 (apparently secure in the province; uncommon but not rare), no species at risk were observed. Bending Lake had the largest abundance and diversity of waterfowl (**Figure 3-14**).

**Table 2. Waterfowl Survey Results (2017-2018)**

Species	SRANK	Survey Type
Ring-necked Duck ( <i>Aythya collaris</i> )	S5	<ul style="list-style-type: none"> <li>• 2017 Fall Waterfowl</li> <li>• 2018 Spring Waterfowl</li> </ul>
Common Goldeneye ( <i>Bucephala clangula</i> )	S5	<ul style="list-style-type: none"> <li>• 2017 Fall Waterfowl</li> <li>• 2018 Spring Waterfowl</li> </ul>
Bufflehead ( <i>Bucephala albeola</i> )	S4	<ul style="list-style-type: none"> <li>• 2017 Fall Waterfowl</li> </ul>

Species	SRANK	Survey Type
		<ul style="list-style-type: none"> <li>• 2018 Spring Waterfowl</li> </ul>
Common Loon ( <i>Gavia immer</i> )	S5	<ul style="list-style-type: none"> <li>• 2017 Fall Waterfowl</li> <li>• 2018 Spring Waterfowl</li> </ul>
Gadwall ( <i>Anas strepera</i> )	S4	<ul style="list-style-type: none"> <li>• 2017 Fall Waterfowl</li> </ul>
Blue-winged Teal ( <i>Anas discors</i> )	S4	<ul style="list-style-type: none"> <li>• 2017 Fall Waterfowl</li> <li>• 2018 Spring Waterfowl</li> </ul>
Mallard ( <i>Anas platyrhynchos</i> )	S5	<ul style="list-style-type: none"> <li>• 2018 Spring Waterfowl</li> </ul>
Hooded Merganser ( <i>Lophodytes cucullatus</i> )	S5	<ul style="list-style-type: none"> <li>• 2018 Spring Waterfowl</li> </ul>
Common Merganser ( <i>Mergus merganser</i> )	S5	<ul style="list-style-type: none"> <li>• 2018 Spring Waterfowl</li> </ul>
Northern Pintail ( <i>Anas acuta</i> )	S5	<ul style="list-style-type: none"> <li>• 2018 Spring Waterfowl</li> </ul>

### 3.4.4 Breeding Birds

A total of 61 species of birds were recorded during breeding bird surveys in 2017 and 2018. The locations of breeding bird surveys is provided on **Figure 3-14**. Breeding birds are generally considered to be abundant throughout the study area and a vast diversity of species were recorded at all breeding bird survey stations. The station with the greatest abundance of species are deciduous and mixed forest. Surveys were completed in both terrestrial and aquatic ecosystems; however the majority of birds were recorded within forest ecosites. Although no breeding evidence was recorded it is probable that all species recorded are breeding within the area. The vast majority of species recorded breeding were common (S-ranked S5) or uncommon (S-rank S4) and none of the species are considered regionally rare.

Area-sensitive species require large areas of continuous habitat for breeding and foraging. The specific habitat requirements vary by species. Approximately half of the survey stations contained at least one, but often numerous, area sensitive species (**Figure 3-14**). There were 16 area-sensitive species were found within the broad study area. The majority of these area sensitive species recorded in the study area at large are mostly woodland species with the exception of Common Loon (*Gavia immer*) and American Bittern (*Botaurus lentiginosus*), which have wetland/lake shore habitat requirements.

Within the focus study area, the following area sensitive birds were observed:

- Common Loon
- American Bittern
- Bald Eagle (*Haliaeetus leucocephalus*)
- Yellow-bellied Sapsucker (*Sphyrapicus varius*)
- Pileated Woodpecker (*Dryocopus pileatus*)
- Least Flycatcher (*Empidonax minimus*)
- Red-breasted Nuthatch (*Sitta canadensis*)
- Winter Wren (*Troglodytes troglodytes*)
- Veery (*Catharus fuscescens*)
- Hermit Thrush (*Catharus guttatus*)
- Northern Parula (*Parula americana*)
- Magnolia Warbler (*Dendroica magnolia*)
- Black-throated Green Warbler (*Dendroica virens*)
- Black-and-white Warbler (*Mniotilta varia*)
- American Redstart (*Setophaga ruticilla*)
- Ovenbird (*Seiurus aurocapillus*)

Five SAR birds were observed during the breeding surveys: Eastern Whip-poor-will, Common Nighthawk, Bald Eagle, Olive-sided Flycatcher and Wood Thrush. These species and their status are further discussed in Section 4.2.

### 3.4.5 Bats

The acoustic monitoring data obtained from the two (2) bioacoustics monitors (Wildlife Acoustic - model SM3BAT) recorded from dawn to dusk during a five-week period between June and July in 2017 was analyzed by Kaleidoscope software and raw data interpretation. The 2017 results identified the presence of the following five (5) species of bats, three of which are common species while the other two (2) are considered as Species at Risk both Federally and Provincially:

- Eastern Red Bat (*Lasiurus borealis*) – Not-at-Risk
- Hoary Bat (*Lasiurus cinereus*) - Not-at-Risk
- Silver-haired Bat (*Lasionycteris noctivagans*) - Not-at-Risk
- Little Brown Myotis (*Myotis lucifugus*) - Endangered
- Northern Myotis (*Myotis septentrionalis*) - Endangered

Additional acoustic monitoring as per the MNR Survey Protocols (2017) was completed in the proposed bulk sample site in 2018 and pending the analysis of this data, the results should provide more sufficient data to determine if Little Brown Myotis, Northern Myotis or any other SAR listed bat species are in the project area. The 2018 data analysis is pending and studies will continue following the completion of the bulk sample project. Refer to **Appendix C** for the full results of the SAR bat assessment.

The three (3) common bat species (i.e., Eastern Red Bat, Hoary Bat, and Silver-haired Bat) are all considered to be uncommon but secure in the province (S-rank of S4). Hoary Bat was the most abundant species recorded at both monitoring locations in 2017 based on the total number of

recordings captured. Silver-haired Bat was more often recorded at Bat Detector #1 (Unit 79) whereas Eastern Red Bat was only present at Bat Detector #2 (Unit 71).

Little Brown Bat was the second most abundant species recorded overall with the vast majority of records from Bat Detector #1 (Unit 79). Alternatively, Northern Myotis was the least frequently recorded species and was only present at Bat Detector #1 (Unit 79).

Both bioacoustics monitors deployed in 2017 captured recordings of numerous bats and both recorded SAR bats. Bat Detector #1 (Unit 79) had a much higher number of bat recordings and collected evidence of the presence of both Little Brown Myotis and Northern Myotis. This forest stand is considered suitable habitat. Bat Detector #2 (Unit 71) was less frequented by bats yet evidence for the presence on Little Brown Bat was recorded. This forest stand is still considered suitable habitat but is generally not as favorable to bats. This unit installation had 2 microphones but the bat data demonstrates that both areas in which the microphones were located were equally used by bats. The locations of bat surveys is provided on **Figure 3-15**

### 3.4.6 Incidental

Numerous incidental wildlife observations were recorded in 2012, 2017 and 2018. Given the mix of aquatic and terrestrial ecosystems in the surrounding area, wildlife habitat opportunities within the study area are generally diverse.

In the spring of 2012, observations of Western Painted Turtles (*Chrysemys picta bellii*), Moose (*Alces americanus*), White-tailed Deer (*Odocoileus virginianus*), and Black Bear (*Ursus americanus*) were noted. All of these species are Not-at-Risk and are considered to be uncommon but secure in the province (S-rank of S4).

In the summer and fall of 2017, the following species were observed: Bald Eagle (*Haliaeetus leucocephalus*), Eastern Whip-poor-will, Common Loon, Moose, American Toad, Gray Treefrog, and Northern Green Frog (*Lithobates clamitans melanota*). All of these species are considered common (S-rank S5) or uncommon but secure (S-rank of S4) within the province, with the exception of Bald Eagle, addressed under the Significant Wildlife Habitat Assessment, and Eastern Whip-poor-will, surveyed as part of the Nightjar Survey efforts.

In the summer of 2018 the observation of Beaver (*Castor canadensis*), River Otter (*Lontra canadensis*), Black Bear, Eastern Chipmunk (*Tamias striatus*), Bald Eagle, Ruffed Grouse, Western Painted Turtles, Gray Treefrog, Wood Frog, Northern Green Frog, Mink Frog (*Lithobates septentrionalis*), and Boreal Chorus Frog were noted. All of these species are considered common (S-rank S5) or uncommon but secure (S-rank of S4) within the province, with the exception of Bald Eagle which was seen at two locations in 2018 where one of the locations was the same location as the 2017 observation.



## 4 ASSESSMENT OF SIGNIFICANCE

### 4.1 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) can be difficult to appropriately determine at the site-specific level, as the assessment must incorporate information from a wide geographic area and consider other factors such as regional resource patterns and landscape effects. To help in more site level assessments, the MNRF has developed the *Significant Wildlife Habitat Criteria Schedules For Ecoregion 3E* (MNRF 2015).

The MNRF identifies several principal components of SWH as described in the *Significant Wildlife Habitat Technical Guide* (OMNR 2000), which have been addressed in the following order based on the *Significant Wildlife Habitat Criteria Schedules For Ecoregion 3E*:

- a) Seasonal Concentration Areas of Animals
- b) Rare Vegetation Communities
- c) Specialized Habitat for Wildlife
- d) Habitat for Species of Conservation Concern
- e) Animal Movement Corridors

Based on background review, field investigations and classification of wetland and terrestrial ecosites, a screening of SWH has been completed for the Project Development Area, which is provided in **Appendix F**. The following sections provide a discussion on the identified candidate or confirmed SWH. Where applicable this information has also been mapped within the Project Development Area based on the SWH categories and subcategories (**Figure 4-1**).

#### 4.1.1 Seasonal Concentration Areas of Animals

Some species of animals gather together from geographically wide areas at certain times of year. This could be to hibernate or to bask (e.g., some reptiles) or to breed (e.g., amphibians). Maintenance of the habitat features that result in these concentrations can be critical in sustaining local or sometimes even regional populations of wildlife.

The *Significant Wildlife Habitat Criteria Schedules For Ecoregion 3E* identifies several sub-categories of seasonal concentration areas such as stopover and staging for waterfowl, migratory stopover areas for shorebirds, raptor and turtle wintering areas, habitat types for bats, snake hibernaculum, and colonially nest. The evaluation criteria for each of these sub-categories has been assessed based on the identified existing conditions, habitat features and functions. The following has been identified.

- **Waterfowl Stopover and Staging Areas (Aquatic):** Habitat occurs in large waterbodies adjacent to wetland communities B142 (meadow marsh), B146 (shore fen) and B148 (shallow marsh) for potential Waterfowl Stopover and Staging Areas.
- **Bat Migratory Stopover Area:** The location and characteristics of stopover habitats are generally unknown but based on the habitat diversity there is potential bat migratory stopover areas.

- **Turtle Wintering Areas:** There is potential wintering areas for turtles along the wetlands that supports open water and shallow marsh habitat with organic and muck substrate. Based on water depth and soft substrate ecosites B129 (conifer swamp), B135 (thicket swamp), B138 (open bog) and B146 (shore fen) would be suitable for turtle overwintering and could qualify as SWH.
- **Reptile Hibernaculum:** A rock barren community is present that may have micro-habitat representation for hibernaculum. It can be expected that common snake species such as Eastern Gartersnake and Northern Brownsnake are present in the study area and habitat requirements including hibernaculum are available. No confirmed hibernaculum has been identified from the study area.

#### 4.1.2 Rare Vegetation Communities

Rare vegetation communities apply to the maintenance of biodiversity and of rare plant communities (rather than individual rare species).

The *Significant Wildlife Habitat Criteria Schedules For Ecoregion 3E* identifies several vegetation community types that may qualify as rare vegetation communities for SWH designation. Examples of these include sand dunes, cliffs and talus slopes or rock barrens. Many of the identified rare communities are not represented in the study area, such as Great Lakes Arctic-Alpine Shoreline Type and Hardwood Swamps. While the study area is dominated by forest including deciduous, coniferous, mixed stands, the development area does not support forest stands with Red and White Pine, Elm, Oak, Red and Sugar Maple, Yellow Birch or Black Ash at the representative percentages required for SWH criteria. A Precambrian rock barren was identified through air photo interpretation and field investigation in ecosite community B165 (open rock barren). This area is greater than 1.0 ha and would qualify as candidate SWH for this rare vegetation community.

#### 4.1.3 Specialized Habitat for Wildlife

Examples of Specialized Habitat for Wildlife sub-categories include waterfowl, raptor and reptile nesting areas, seeps and springs, mineral licks and denning sites for small and large mammals. The evaluation criteria for each of these sub-categories has been reviewed based on background information, field investigations, ELC mapping and an assessment of habitat features and functions. The following has been identified.

- **Waterfowl Nesting Area:** Potential habitat qualification for this category requires the presence of multiple nesting pairs (excluding Mallard pairs). There were pairs of Common Loon, Ring-necked Duck, Common Merganser, Northern Pintail and Common Goldeneye identified during field investigations to allow for the identification of candidate SWH.
- **Bald Eagle & Osprey Nesting, Foraging and Perching Habitat:** Bald Eagles were observed foraging and nesting at Bending Lake during field investigations in 2017 and 2018 (see **Figure 4-1**)

- Active Bald Eagle nest and surrounding area ranging between 400-800 m in radius around the nest is considered SWH. The range in SWH is dependent on sight lines from the nest to the development and inclusion of perching and foraging areas (MNRF, 2015).
- **Woodland Raptor Nesting:** The study area is dominated by suitable forest Ecosite communities that provide nesting habitat opportunities for raptors. Based on our observations, there is potential habitat but there was no evidence to demonstrate that raptor nesting and foraging is present. There were three raptor species recorded during breeding bird field surveys: Red-tailed Hawk, Broad-winged Hawk and Common Raven. No stick nests or territorial raptor behavior was recorded during field surveys in the Project Study Area.
- **Turtle Nesting Areas:** There is potential suitable nesting habitat within the Project Development Area. Several Western Painted Turtle nests were observed near the boat launch area and a single predated nest of an unknown species was observed by Bending Lake.
- **Aquatic Feeding Habitat:** Isolated embayments of Bending Lake provide an abundance of submerged aquatic vegetation adjacent to conifer or mixed woods to provide potential aquatic feeding habitat for moose.
- **Denning Sites for Mink, Otter, Marten Fisher and Eastern Wolf:** Black bear and an otter was observed and are anticipated to be denning in the Project Study Area. There are no known den locations within the Project Development Area.
- **Wolf Rendezvous Sites:** No wolves were observed but there are potential rendezvous sites near isolated open areas including bogs, fens and meadows in the Project Study Area. There are no known rendezvous sites within the Project Development Area.
- **Amphibian Breeding Habitat (Wetlands):** Wetlands and pools >500m<sup>2</sup> are present adjacent to communities B128 (conifer swamp), B129 (conifer swamp), B135 (thicket swamp), B142 (meadow marsh) and B146 (shore fen).
- **Amphibian Breeding Habitat (Woodland):** Breeding Amphibian Surveys indicate the potential for this type of significant habitat however none of the surveyed locations are considered significant based on the number and type of species present as well as call code levels with the exception of one location which is now located outside of the study area (monitoring station B16), surveyed by DST in 2012, where Spring Peepers and Wood Frogs were both recorded with call codes of 3.

#### 4.1.4 Habitats for Species of Conservation Concern

This category is potentially complex and includes species that may be locally rare or in decline, but that have not reached the level of rarity that is normally associated with Endangered or

Threatened designations. The Significant Wildlife Habitat Technical Guide (OMNR 2000) suggests that the highest priority for protection be provided to habitats of the rarest species (on a scale of global through to local municipality); and that habitats that support large populations of a species of concern should be considered significant.

The *Significant Wildlife Habitat Criteria Schedules For Ecoregion 3E* identifies four sub-categories consisting of Marsh Bird Breeding Habitat, Open Country Bird Breeding Habitat, Shrub/Early Successional Bird Breeding Habitat, and Special Concern and Rare Wildlife Species. With the Project Development Area there are many wetland habitats with shallow water and emergent aquatic vegetation present that are suitable for breeding habitat for marsh birds. This includes the following ecosites: B135 (thicket swamp), B136 (treed fen), B138 (open bog), B142 (meadow marsh), B146 (shore fen), B148 (shallow marsh).

There is no open country habitat found within the property or shrub/early successional bird habitats with the species representation listed in the guidelines.

There were four bird species of special concern identified within the study area: Bald Eagle, Common Nighthawk, Olive-sided Flycatcher and Wood Thrush (see **Figure 4-1**) with no special concern plant species observed.

#### 4.1.5 Movement Corridors

Landscape connectivity (often referred to as “wildlife corridors”) is recognized as an important part of natural heritage planning and a wide range of benefits have been attributed to the maintenance or re-connection of the natural landscape. Corridors allow animals to move between areas of high habitat importance. Conservation of distinct habitat types to protect species is not effective unless the corridors between them are also protected. In general, the Northwestern Ontario landscape supports large areas of contiguous forest and wetland habitat and is largely conducive to movement of wildlife. Areas of habitat fragmentation that effect wildlife movement are found in association with roadways and logging. There are potential Amphibian, Cervid and Furbearer Movement Corridors within the Project Development Area.

## 4.2 Species at Risk

Habitat opportunities for Species at Risk were identified throughout the study area. A Species at Risk habitat suitability screening assessment was completed for the identified list of potential SAR provided in **Appendix G**. This includes a full assessment indicating species which are confirmed and potentially present within the greater study area. Based on PEEG’s background review, field survey results and our professional experience in the assessment of SAR habitat, 17 SAR, all of which are fauna species including 12 bird species, one (1) insect species, three (3) mammal species, and one (1) reptile species have been assessed through site surveys and/or habitat screening based on potentially suitable habitat. The results of the screening are summarized in **Table 3**.

Endangered and Threatened species and their habitat are protected under the *Endangered Species Act*. Any potential impacts to a species or its habitat must require consultation with the Ministry of Natural Resources and Forestry and may require approval under the ESA. Special

Concern species and their habitat are not protected under the Endangered Species Act (ESA) however their habitat is to be considered as Significant Wildlife Habitat.

**Table 3. Summary of Species at Risk Screening and Confirmed Presence in Study Area**

Common Name	Scientific Name	Species at Risk in Ontario (SARO)	Species at Risk Act (SARA)	Confirmed Presence (Y/N)
<b>Birds</b>				
Bald Eagle	<i>Haliaeetus leucocephalus</i>	SC	NAR	Y
Common Nighthawk	<i>Chordeiles minor</i>	SC	THR	Y
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	THR	THR	Y
Olive-sided Flycatcher	<i>Contopus cooperi</i>	SC	THR	Y
Black Tern	<i>Chlidonias niger</i>	SC	NAR	N
Eastern Wood-Pewee	<i>Contopus virens</i>	SC	SC	N
Rusty Blackbird	<i>Euphagus carolinus</i>	SC	SC	N
Horned Grebe	<i>Podiceps auritus</i>	SC	SC	N
Canada Warbler	<i>Wilsonia canadensis</i>	SC	THR	N
Wood Thrush	<i>Hylocichla mustelina</i>	SC	THR	Y
<b>Mammals</b>				
Little Brown Myotis	<i>Myotis lucifugus</i>	END	END	Y
Northern Myotis	<i>Myotis septentrionalis</i>	END	END	Y
Caribou - Boreal population	<i>Rangifer tarandus</i>	THR	THR	N
<b>Reptiles</b>				
Snapping Turtle	<i>Chelydra serpentina</i>	SC	SC	N

Species-specific surveys were conducted to determine potential presence/absence. All confirmed observations of SAR have been mapped with associated habitats where applicable (**Figure 4-2**). The following seven (7) species were confirmed to be present in the Project Study Area:

- Eastern Whip-poor-will (*Caprimulgus vociferus*) – Threatened
- Bald Eagle (*Haliaeetus leucocephalus*) – Special Concern
- Common Nighthawk (*Chordeiles minor*) – Special Concern
- Olive-sided Flycatcher (*Contopus cooperi*) - Special Concern
- Wood Thrush (*Hylocichla mustelina*) – Special Concern
- Little Brown Myotis (*Myotis lucifugus*) – Endangered
- Northern Myotis (*Myotis septentrionalis*) – Endangered

Bald Eagle, Wood Thrush and Olive-sided Flycatcher were recorded from the Project Development Area as shown on **Figure 4-2**.

#### 4.2.1 Eastern Whip-poor-will (Threatened)

The Eastern Whip-poor-will is a Threatened species in Ontario. Whip-poor-will breeding habitat is comprised of semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances. Individuals will often feed in nearby shrubby pastures or wetlands with perches. The primary threat to the species is habitat loss and degradation.

Eastern Whip-poor-wills were heard west of Highway 622 in a Dry to Fresh, Coarse: Aspen – Birch Hardwood forest (B055) in 2017 and 2018. The habitat in which they were observed was primarily associated with semi-open habitat where past logging has taken place and regeneration is underway. The area includes interspersions of exposed bedrock due to shallow soils which contributes to habitat suitability for this species. Although surveys were completed in the Project Development Area on the same evenings as the surveys west of Highway 622, no observation of this species was recorded within this area.

#### 4.2.2 Bald Eagle (Special Concern)

The Bald Eagle is a species of Special Concern in Ontario. Bald Eagles nest in large trees such as poplar and pine located in various forest types, usually near a major river or lake. Current populations are threatened by the development of shoreline habitat and pollution (MECP, 2018).

A Bald Eagle was seen foraging and sitting on a nest outside the bulk sample area but at the same location near Bending Lake on two occasions in 2017 and 2018. Additional fly-over sightings of this species were recorded observed within the Project Development Area, north of Page Lake, in 2017 and 2018. These findings confirm that this species is present, specifically near lakes and large wetlands adjacent to deciduous and mixed forests within the study area.

#### 4.2.3 Common Nighthawk (Special Concern)

The Common Nighthawk is a Threatened species, meaning that it is likely to become endangered unless limiting factors are reversed. Common Nighthawk prefers open habitat with little or no ground vegetation and breed in open habitats such as open forests, forest clearings, logged areas, lakeshores, marshes, gravel roads. This species also occurs in coniferous and mixed forests. Degradation of forest habitat is one of the known reasons for population decline.

Common Nighthawk was recorded foraging over recently logged areas at several locations in 2017 and 2018 north of Bending Lake. The previously logged stands included Dry to Fresh forests such as Coarse: Jack-Pine – Black Spruce Dominated forests (B049), Coarse: Pine – Black Spruce Conifer forest (B050), and Coarse: Aspen – Birch Hardwood forest (B055). It is estimated that these stands were logged within the past few years. The habitats in which they were observed were primarily associated with open habitat resulting from logging with adjacent natural forest. Although surveys were completed in the Project Development Area on the same evenings as the surveys north of Bending Lake, no observation of this species was recorded and thus it is concluded that Common Nighthawk are not present due to the lack of suitable habitat.

#### 4.2.4 Olive-sided Flycatcher (Special Concern)

The Olive-sided Flycatcher is a species of Special Concern in Ontario. The Olive-sided Flycatcher is most often found along natural forest edges and openings. It will use forests that have been logged or burned if there are ample tall snags and trees to use for foraging perches. Olive-sided flycatchers' breeding habitat usually consists of coniferous or mixed forest adjacent to rivers or wetlands and commonly nest in conifers such as White and Black Spruce, Jack Pine and Balsam Fir. Population decline is in part due to habitat loss and alteration to breeding habitat (MECP, 2018).

Olive-sided Flycatcher was recorded within the Project Development Area on one occasion in 2017. This species was recorded within an Organic Thicket Swamp (B135). This wetland

vegetation community occurs at various locations throughout the study area and is frequently surrounded by upland mixed forest. This finding is indicative of the likelihood of additional potential habitat opportunities for this species.

#### 4.2.5 Wood Thrush (Special Concern)

Wood Thrush is listed as a species of Special Concern in Ontario. During the breeding season, the Wood Thrush is found in moist, deciduous hardwood or mixed stands, often previously disturbed, such as small-scale logging and ice storm-damaged area, with a dense deciduous undergrowth and with tall trees for singing perches. The primary factors contributing to its status include habitat fragmentation and degradation, as well as high rates of nest predation and cowbird parasitism on the breeding grounds (MECP, 2018).

Wood Thrush was recorded within the Project Development Area on one occasion in 2017. This species was recorded along the edge of a Dry to Fresh, Coarse: Aspen – Birch Hardwood (B055) and Mineral Shallow Marsh (B148). This habitat type is well represented in the study area.

#### 4.2.6 Little Brown Myotis (Endangered)

The Little Brown Myotis is an Endangered Species in Ontario. This species inhabits forested areas where they roost in trees during the day and forage at night. This species hibernates in caves and abandoned mines. The species decline is primarily due to the White-nose Syndrome fungal disease which disrupts hibernation cycles and often results in death (MECP, 2018).

Bat acoustic monitoring identified the presence of this species north of Bending Lake and west of Highway 622 in deciduous and mixed forest such as Dry to Fresh, Coarse: Aspen – Birch Hardwood (B055) and Fresh-Silty to Fine Loamy: Mixedwood (B108) in 2017. Both areas in which this species was found are near previously logged sites leading to believe that nearby openings may provide suitable foraging habitat. While this type of forest habitat with nearby openings is quite common throughout the study area, suitable snag trees must be associated with the forest stands. It can be expected that Little Brown Myotis is present in other locations within the study area. Acoustic monitoring for the determination of species presence within the Project Development Area was undertaken in 2018. The 2018 data analysis is pending and studies will continue following the completion of the bulk sample project.

#### 4.2.7 Northern Myotis (Endangered)

The Northern Myotis is also Endangered Species in Ontario. This species inhabits boreal forests where they roost under loose bark and in tree cavities during the day and forage at night. This species hibernates in caves and abandoned mines. The species decline is primarily due to the White-nose Syndrome fungal disease which disrupts hibernation cycles and often results in death (MECP, 2018).

Bat acoustic monitoring identified the presence of this species west of Highway 622 in a Dry to Fresh, Coarse: Aspen – Birch Hardwood (B055) in 2017. The area in which this species was recorded is near a previously logged site which leads to believe that the nearby openings may provide suitable foraging habitat. While this type of forest habitat with nearby openings is quite common throughout the study area, suitable snag trees must be associated with the forest stands. It is possible that Northern Myotis is present in other locations within the study area. Acoustic monitoring for the determination of species presence within the Project Development Area was

undertaken in 2018. The 2018 data analysis is pending and studies will continue following the completion of the bulk sample project.

## 4.3 Assessment Summary

Locations of provincially significant wildlife habitat candidate types in the study area, as defined by MNRF, are shown on **Figure 4-1**. The locations of observations of Endangered, Threatened and Special Concern SAR and associated habitats are shown on **Figure 4-2**. **Table 4** provides a summary of the terrestrial features of significant with confirmed, potential or unknown presence from within the Project Development Area and Project Study Area.



**Table 4. Summary of Terrestrial Features in the Ambershaw Project Development and Project Study Areas**

Terrestrial Feature	Present in Project Development Area	Present in Project Study Area
Protected Areas (PSW, Conservation/Park Areas)	No	No
Areas of Natural and Scientific Interest (ANSI)	No	No
Habitat for Provincial and Federal Species at Risk		
• Bald Eagle (SC)	Yes	Yes
• Common Nighthawk (SC)	No	Yes
• Eastern Whip-poor-will (SC)	No	Yes
• Olive-sided Flycatcher (SC)	Yes	Yes
• Wood Thrush (SC)	Yes	Yes
• Little Brown Myotis (END)	No	Yes
• Northern Myotis (END)	No	Yes
Wetlands		
• Provincially Significant Wetland (PSW)	No	No
• Evaluated Non-PSW	No	No
• Unevaluated wetlands	Yes	Yes
Candidate Significant Wildlife Habitat		
• Seasonal Concentrations Areas		
- Waterfowl stopover and staging areas (aquatic)	Yes	Yes
- Turtle Wintering Area	Yes	Yes
- Reptile Hibernaculum	Unknown	Yes
• Rare Vegetation Community		
- Rock Barren	Yes	Yes
• Specialized Habitat for Wildlife		
- Waterfowl Nesting Area	Yes	Yes
- Bald Eagle and Osprey Nesting	Yes	Yes
- Woodland Raptor Nesting Habitat	Unknown	Yes
- Turtle Nesting Areas	Yes	Yes
- Denning Sites for Mink, Otter, Marten Fisher and Eastern Wolf	Unknown	Yes
- Wolf Rendezvous Sites	Unknown	Potential
- Amphibian Breeding Habitat (Woodland)	Yes	Yes
- Amphibian Breeding Habitat (Wetlands)	Yes	Yes
• Habitat of Species of Conservation Concern		
- Marsh Bird Breeding Habitat	Yes	Yes
- Special Concern and Rare Wildlife Species	Yes	Yes
• Animal Movement Corridors		
- Amphibian Movement Corridor	Unknown	Yes
- Cervid Movement Corridor	Unknown	Yes
- Furbearer Movement Corridor	Unknown	Yes

# 5 MITIGATION AND MONITORING

## 5.1 Mitigation Recommendations

### **Erosion and Sediment Control**

Numerous wetland communities have been identified within the Project Development Area (**Figure 4-2**). In addition, several lakes and connecting tributaries also exist with associated riparian wetlands. Due to the on-site wetland and aquatic communities, robust erosion and sediment control (ESC) measures should be incorporated into site work designs. The aim of these plans should be to minimize movement of sediment generated during earthworks into adjacent aquatic communities. At a minimum, erection of heavy-duty ESC fencing should be installed where the proposed work footprint is in areas that are in proximity to wetland features. This fencing should remain intact for the duration of the proposed works and should be regularly inspected to ensure appropriate maintenance. To minimize erosion risk, the slopes in the Project Development Area should also be trimmed to stable angles.

### **Wildlife Timing Windows and Other Mitigation**

As the study area has been identified as providing many habitat opportunities for wildlife, it is recommended that vegetation removals and earthworks be scheduled with consideration to general wildlife timing windows. Such timing will aim to conduct work within the least disturbing portions of wildlife species lifecycles.

#### *Breeding Window for Migratory Birds*

As the general annual breeding window for migratory bird species occurs approximately between mid-March and late August, vegetation removals should occur outside of this timeframe (as regulated by the Migratory Birds Convention Act 1994). This will prevent harm to migratory birds and their nests, including those SAR identified as having potential to occur (or are confirmed as occurring) throughout the on-site forested communities. These species include:

#### *Bat Maternal Roosting*

Maternal roosting activity of SAR bats (including Little Brown Myotis, Brown Myotis) generally occurs annually between early April and late October. As such, it is recommended that tree removals be completed outside of this timeframe to avoid harm or impacts to roosting individuals or their offspring. Tree removals should thus take place during the typical bat cave hibernation timeframe between late October and Early April.

In addition to the above wildlife timing window considerations, methods to exclude wildlife from entering the proposed pit should also be incorporated. Such exclusion works may be in the form of physical barriers (i.e. fencing) installed around the perimeter of the proposed pit. This will assist in the prevention of wildlife movement through the proposed pit footprint, and the potential resulting harm.

### *Bald Eagle Nesting and Foraging*

The Significant Wildlife Habitat Criteria (MNRF, 2015) suggests that Bald Eagle nesting habitat ranges from 400 to 800m in radius from the location of the nest based on sight lines from the nest to the development and inclusion of perching and foraging areas.

The extent of the proposed development is at a distance of just under 800m from the Bald Eagle nest (**Figure 4-2**). The area between the nest and the development is mainly comprised of open water which provides suitable foraging habitat and hardwood forest which provide perching sites and blocks line of site between the nest and the proposed development. The development is not proposing to affect woodland habitat present along the shoreline as this type of habitat is important for nesting, perching, roosting and foraging.

A 600m radius is expected to provide suitable range of habitat given the type of development and the protection of the surrounding natural environment (MNRF, 2014). This 600 m radius is considered high risk habitat and should be protected. The furthest extent of SWH (i.e. 800 m radius) is considered as a low risk area of impact to the species (**Figure 4-1**).

## 5.1.1 Monitoring Recommendations

### Terrestrial/Wildlife Monitoring

- Monitor appropriate setbacks from sensitive features
  - Significant Wildlife Habitat
  - Species at Risk and associated habitat through implementation of the timing windows
  - Monitor vegetation removals and ensure appropriate timing windows
  - Wetlands and aquatic environments for sediment monitoring that silt fences are intact

## 6 CERTIFICATION

This report was prepared, reviewed and approved by the undersigned:

**Prepared By:**

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Natalie Dunn, B.Sc., PG[ER]  
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**Reviewed and  
Approved By:**

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Dirk Janas, B.Sc.  
Principal, Senior Ecologist

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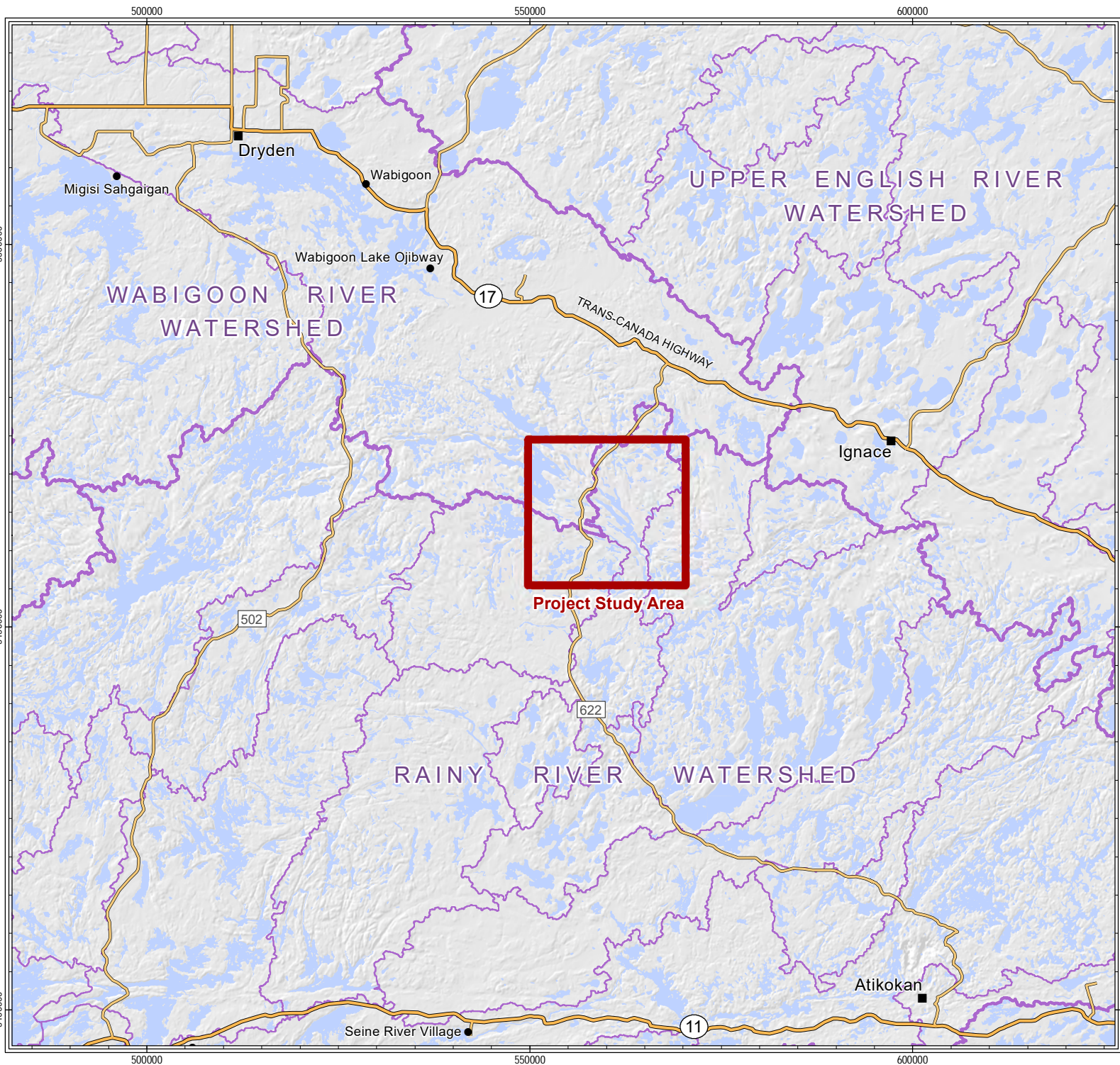
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# Appendix A





## Report Figures

Document Path: C:\Egnyte\Shared\Projects\Active\17018 - Ambershaw\Project Team Folder\3 - Mapping\mxd\17018\_X-1\_ProjectLocn\_BE.mxd



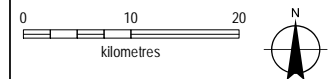
**Ambershaw Metallics, Inc.**

**LEGEND**

-  Major Highway
-  Minor Highway
-  Watershed Boundary
-  Subwatershed Boundary



Data Sources: Ministry of Natural Resources and Forestry (Watersheds), Natural Resources Canada (Roads, Place Names), Esri basemap service (Imagery).



DRAWN: B. Elder/S. Feist  
 CHECKED: J. Cole  
 PROJECT: 17018  
 DATE: Dec 16, 2018

Scale 1:700000  
 UTM Zone 15N  
 NAD 1983



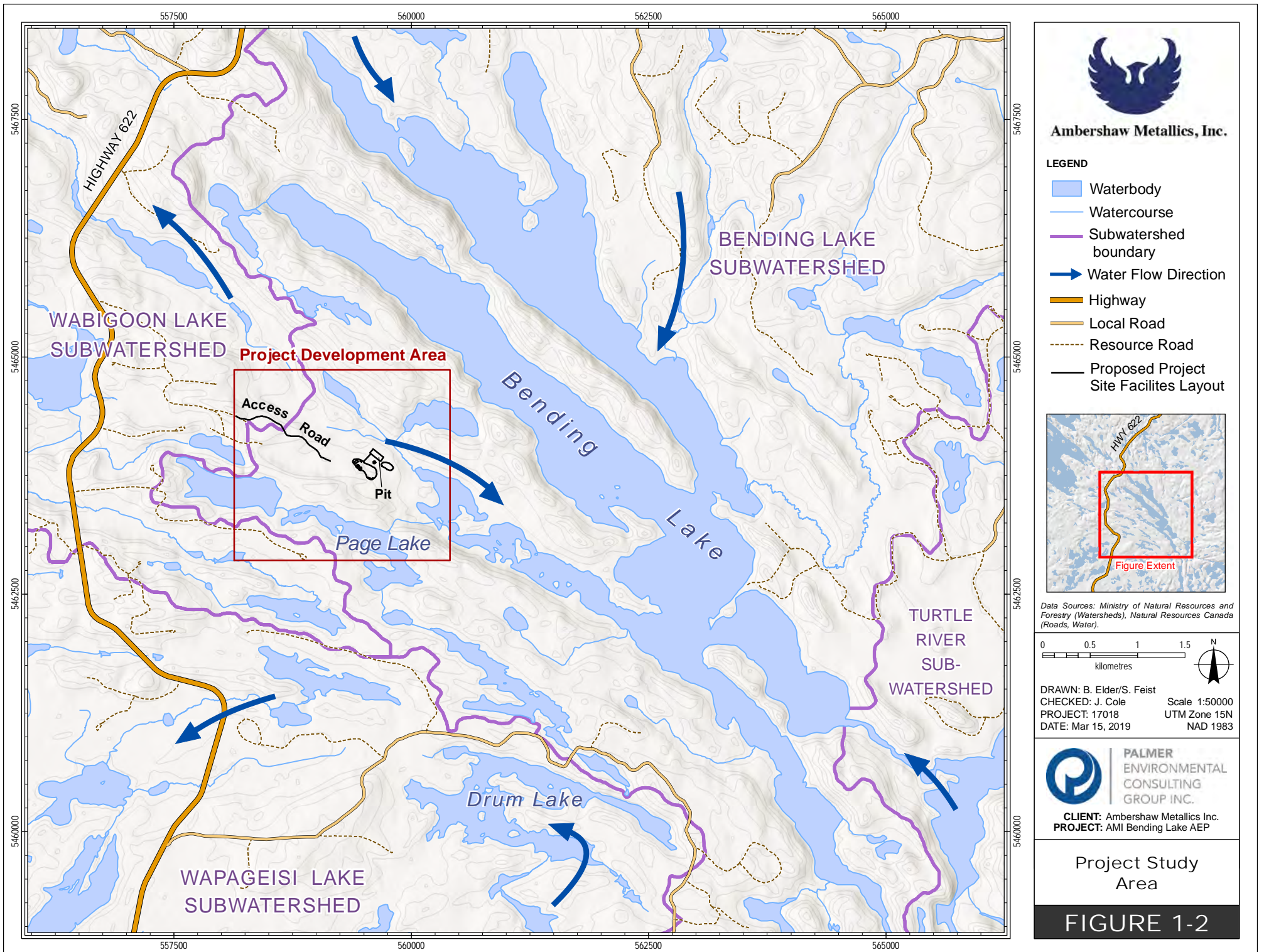
**PALMER  
 ENVIRONMENTAL  
 CONSULTING  
 GROUP INC.**

**CLIENT:** Ambershaw Metallics Inc.  
**PROJECT:** AMI Bending Lake AEP

Project Location

**FIGURE 1-1**

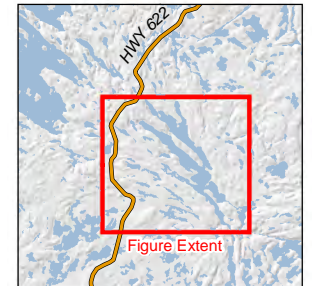




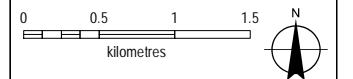
**Ambershaw Metallics, Inc.**

**LEGEND**

- Waterbody
- Watercourse
- Subwatershed boundary
- ➔ Water Flow Direction
- Highway
- Local Road
- - - Resource Road
- Proposed Project Site Facilities Layout



Data Sources: Ministry of Natural Resources and Forestry (Watersheds), Natural Resources Canada (Roads, Water).



DRAWN: B. Elder/S. Feist  
 CHECKED: J. Cole  
 PROJECT: 17018  
 DATE: Mar 15, 2019

Scale 1:50000  
 UTM Zone 15N  
 NAD 1983



**CLIENT:** Ambershaw Metallics Inc.  
**PROJECT:** AMI Bending Lake AEP




Project Study Area

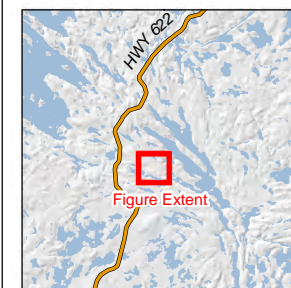
**FIGURE 1-2**



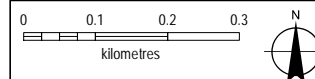
**Ambershaw Metallics, Inc.**

**LEGEND**

-  Watercourse
-  Proposed Project Site Facilities Layout
-  Contour (10 m)



*Data Sources: Natural Resources Canada (Roads, Water, Contours, DEM).*



DRAWN: S. Feist  
 CHECKED: J. Cole  
 PROJECT: 17018  
 DATE: Mar 14, 2019

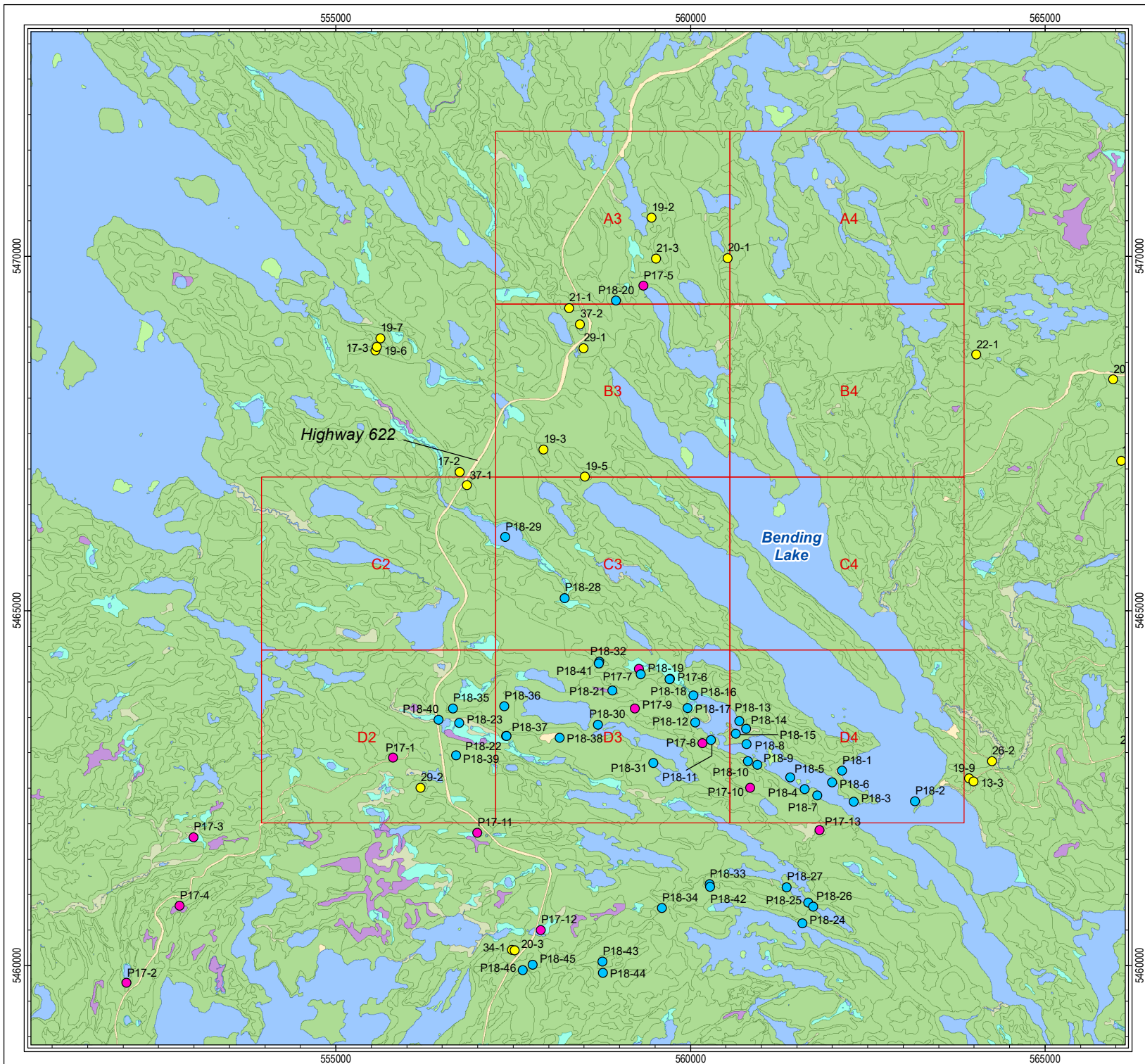
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 UTM Zone 15N  
 NAD 1983



**CLIENT:** Ambershaw Metallics Inc.  
**PROJECT:** AMI Bending Lake AEP

Project  
 Development Area

**FIGURE 1-3**



**Ambershaw Metallics, Inc.**

**LEGEND**

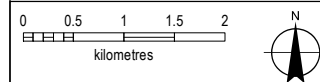
**Surveyor (Year)**

- PECG (2018)
- PECG (2017)
- DST (2011)

Development Area  
Map Index

- Productive Forest
- Brush and Alder
- Open Wetland
- Treed Wetland
- Small Island
- Unclassified / Cleared
- Water

Forest Resources Inventory (FRI) data provided by Ontario Ministry of Natural Resources and Forestry.



DRAWN: B. Elder  
 CHECKED: R. Augustine  
 PROJECT: 17018  
 DATE: Dec 11, 2018

Scale 1:75000  
 UTM Zone 15N  
 NAD 1983



**PALMER**  
 ENVIRONMENTAL  
 CONSULTING  
 GROUP INC.

CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**Vegetation  
 Survey Plots**

**FIGURE 3-1**



Ambershaw Metallics, Inc.

LEGEND

Vegetation Community

Vegetation Plot

- PECG (2018)
- PECG (2017)
- DST (2011)

Boreal Ecosites:

Terrestrial

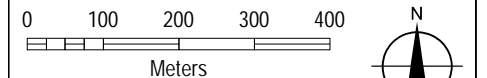
- B007X Active Mineral Barren
- B040 Dry, Sandy: Aspen - Birch Hardwood
- B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
- B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
- B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
- B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
- B054 Dry to Fresh, Coarse: Red Pine - White Pine Mixedwood
- B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
- B065 Moist, Coarse: Pine - Black Spruce Conifer
- B070 Moist, Coarse: Aspen - Birch Hardwood
- B076 Moist, Coarse: Mixedwood
- B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
- B108 Fresh, Silty to Fine Loamy: Mixedwood
- B119 Moist, Fine: Aspen - Birch Hardwood
- B125 Moist, Fine: Mixedwood
- B165 Open Rock Barren
- B197X Pavement/Concrete

Wetland

- B126 Treed Bog
- B127 Organic Poor Conifer Swamp
- B128 Organic Intermediate Conifer Swamp
- B129 Organic Rich Conifer Swamp
- B130 Intolerant Hardwood Swamp
- B134 Mineral Thicket Swamp
- B135 Organic Thicket Swamp
- B136 Sparse Treed Fen
- B138 Open Bog
- B139 Poor Fen
- B142 Mineral Meadow Marsh
- B146 Open Shore Fen
- B148 Mineral Shallow Marsh
- B149 Organic Shallow Marsh

Map Index

	A3	A4
	B3	B4
C2	C3	C4
D2	D3	D4



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Dec 14, 2018

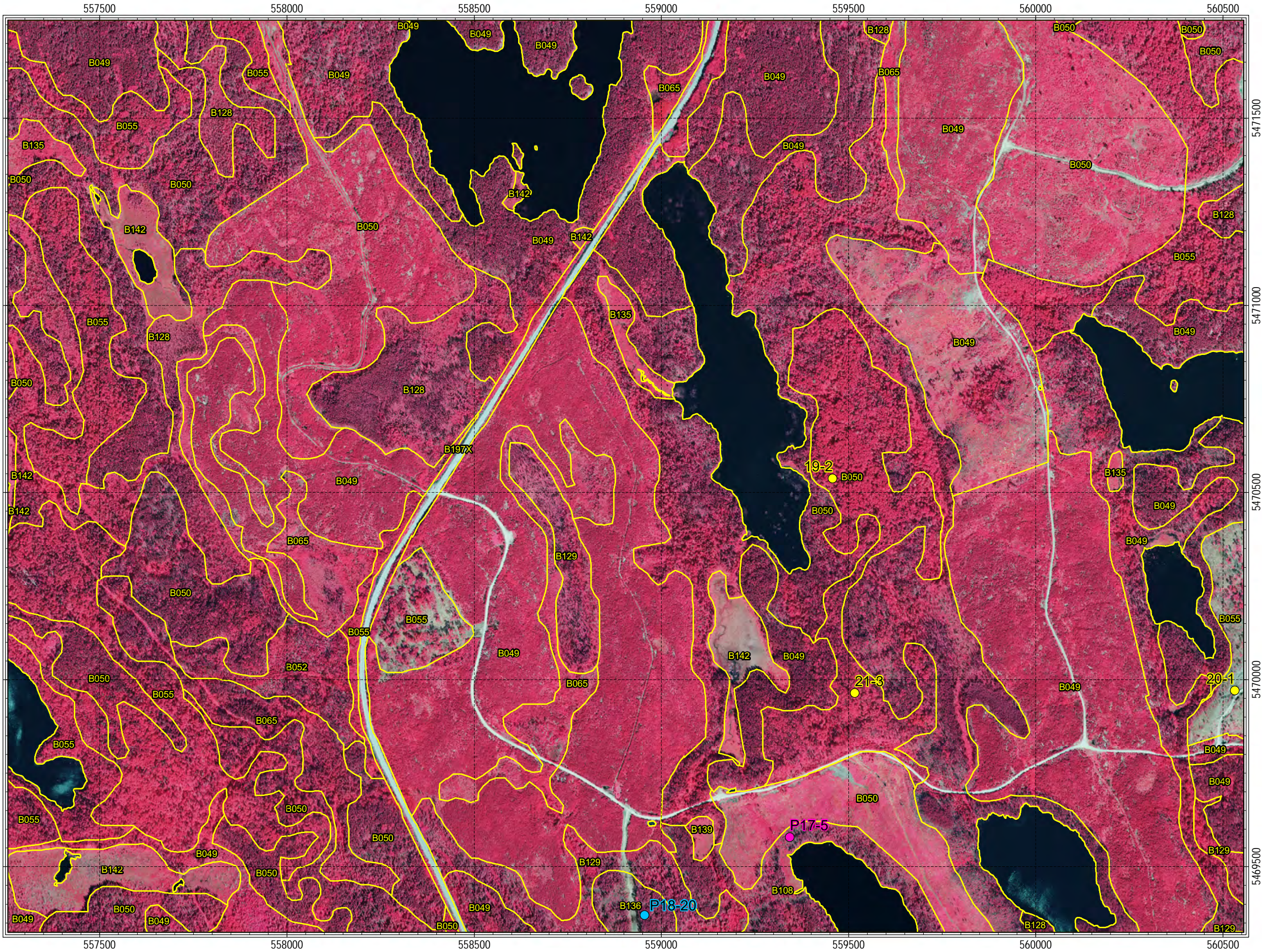
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 UTM Zone 15N  
 NAD 1983



CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**Vegetation  
 Communities - A3**

**FIGURE 3-2**





Ambershaw Metallics, Inc.

LEGEND

Vegetation Community

Vegetation Plot

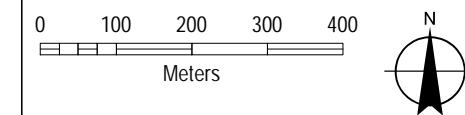
- PEGC (2018)
- PEGC (2017)
- DST (2011)

Boreal Ecosites:

- Terrestrial**
- B007X Active Mineral Barren
  - B040 Dry, Sandy: Aspen - Birch Hardwood
  - B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
  - B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
  - B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
  - B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
  - B054 Dry to Fresh, Coarse: Red Pine - White Pine Mixedwood
  - B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
  - B065 Moist, Coarse: Pine - Black Spruce Conifer
  - B070 Moist, Coarse: Aspen - Birch Hardwood
  - B076 Moist, Coarse: Mixedwood
  - B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
  - B108 Fresh, Silty to Fine Loamy: Mixedwood
  - B119 Moist, Fine: Aspen - Birch Hardwood
  - B125 Moist, Fine: Mixedwood
  - B165 Open Rock Barren
  - B197X Pavement/Concrete
- Wetland**
- B126 Treed Bog
  - B127 Organic Poor Conifer Swamp
  - B128 Organic Intermediate Conifer Swamp
  - B129 Organic Rich Conifer Swamp
  - B130 Intolerant Hardwood Swamp
  - B134 Mineral Thicket Swamp
  - B135 Organic Thicket Swamp
  - B136 Sparse Treed Fen
  - B138 Open Bog
  - B139 Poor Fen
  - B142 Mineral Meadow Marsh
  - B146 Open Shore Fen
  - B148 Mineral Shallow Marsh
  - B149 Organic Shallow Marsh

Map Index

A3	<b>A4</b>	
B3	B4	
C2	C3	C4
D2	D3	D4



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Dec 14, 2018

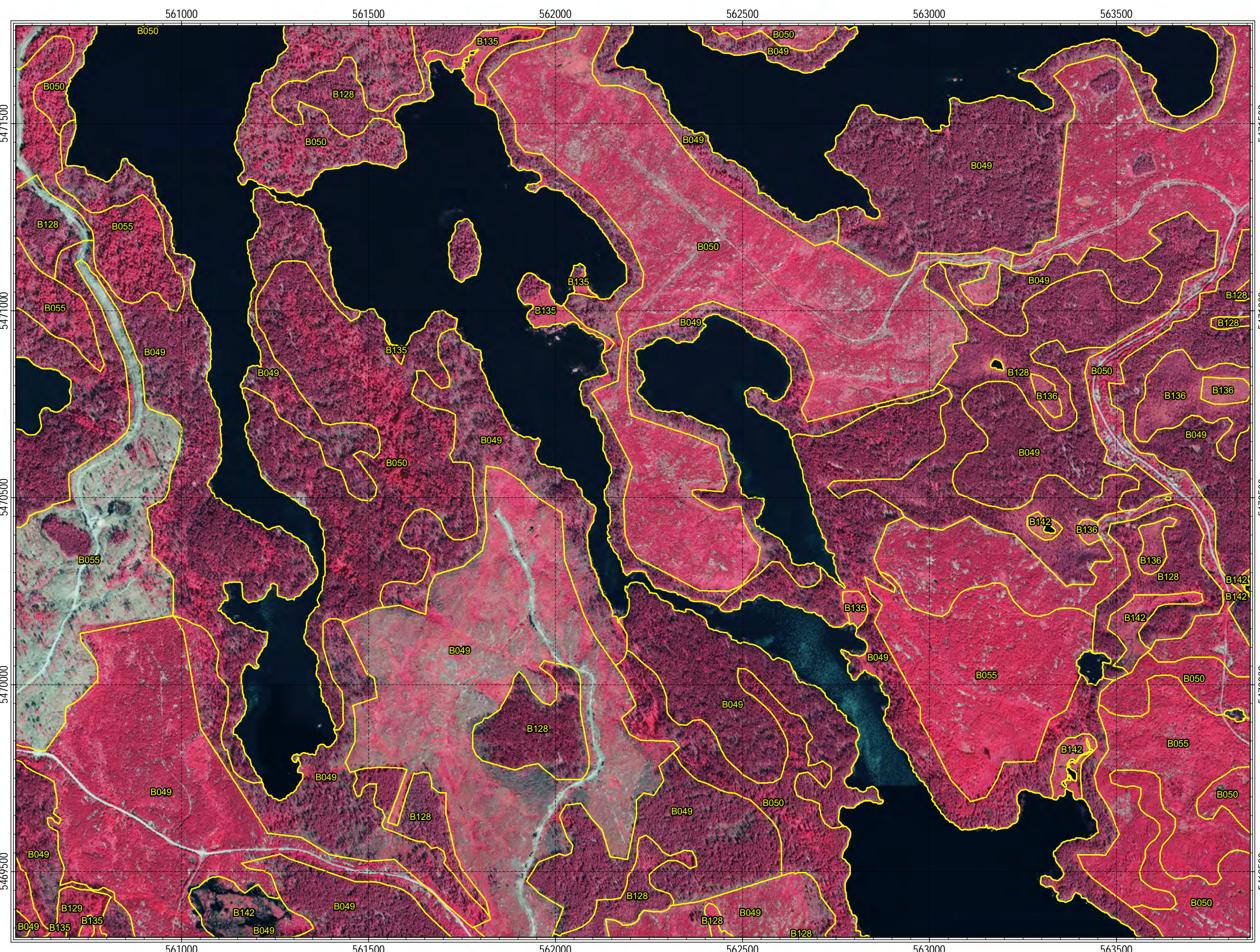
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 UTM Zone 15N  
 NAD 1983



CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**Vegetation  
 Communités - A4**

**FIGURE 3-3**





Ambershaw Metallics, Inc.

**LEGEND**

Vegetation Community

**Vegetation Plot**

- PECG (2018)
- PECG (2017)
- DST (2011)

**Boreal Ecosites:**

**Terrestrial**

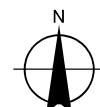
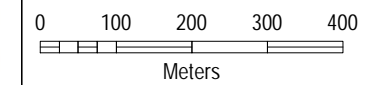
- B007X Active Mineral Barren
- B040 Dry, Sandy: Aspen - Birch Hardwood
- B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
- B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
- B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
- B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
- B054 Dry to Fresh, Coarse: Red Pine - White Pine Mixedwood
- B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
- B065 Moist, Coarse: Pine - Black Spruce Conifer
- B070 Moist, Coarse: Aspen - Birch Hardwood
- B076 Moist, Coarse: Mixedwood
- B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
- B108 Fresh, Silty to Fine Loamy: Mixedwood
- B119 Moist, Fine: Aspen - Birch Hardwood
- B125 Moist, Fine: Mixedwood
- B165 Open Rock Barren
- B197X Pavement/Concrete

**Wetland**

- B126 Treed Bog
- B127 Organic Poor Conifer Swamp
- B128 Organic Intermediate Conifer Swamp
- B129 Organic Rich Conifer Swamp
- B130 Intolerant Hardwood Swamp
- B134 Mineral Thicket Swamp
- B135 Organic Thicket Swamp
- B136 Sparse Treed Fen
- B138 Open Bog
- B139 Poor Fen
- B142 Mineral Meadow Marsh
- B146 Open Shore Fen
- B148 Mineral Shallow Marsh
- B149 Organic Shallow Marsh

**Map Index**

A3	A4
<b>B3</b>	B4
C2	C3
D2	D4



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Dec 14, 2018

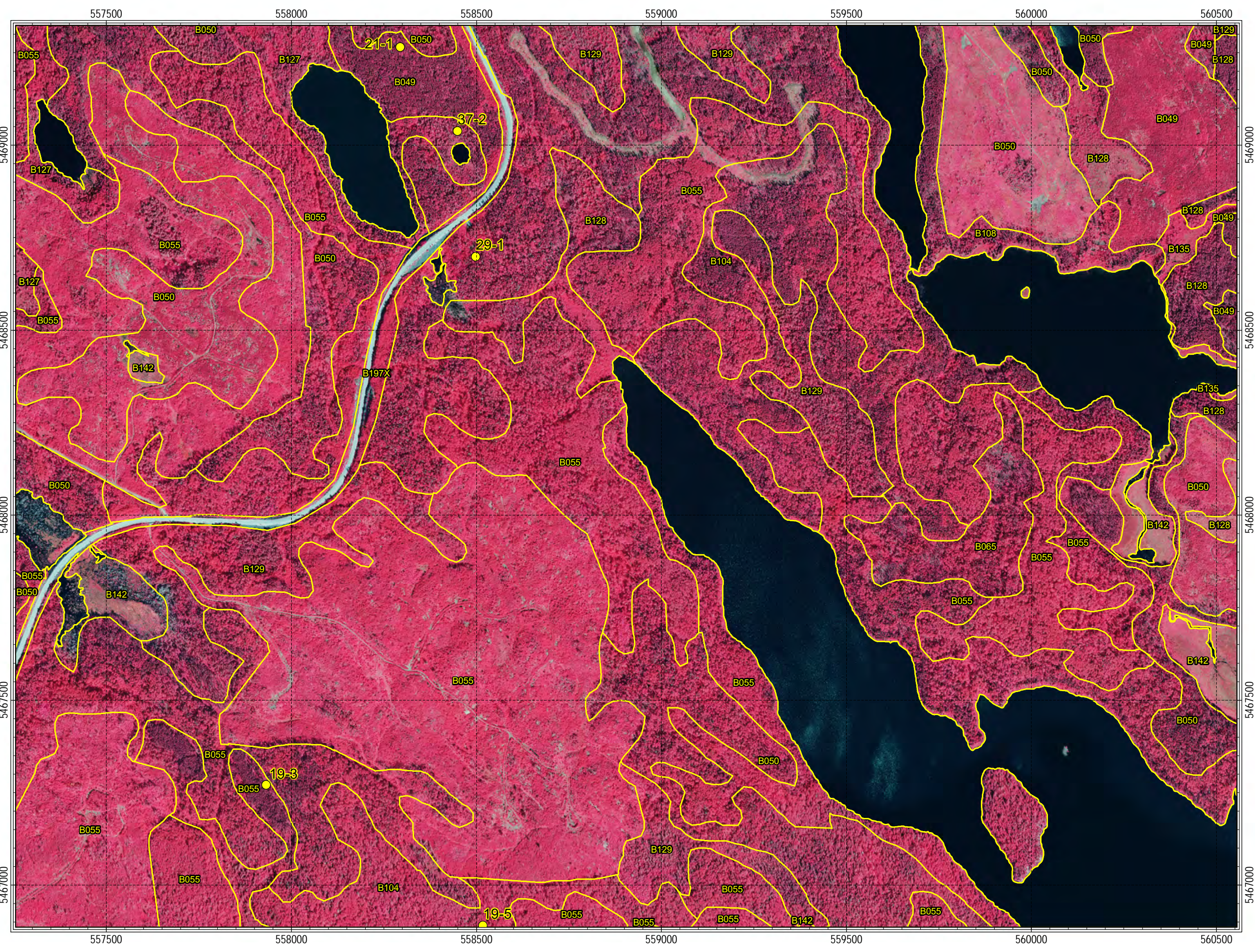
Scale 1:10000  
 UTM Zone 15N  
 NAD 1983



CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**Vegetation Communities - B3**

**FIGURE 3-4**





Ambershaw Metallics, Inc.

LEGEND

Vegetation Community

Vegetation Plot

- PECG (2018)
- PECG (2017)
- DST (2011)

Boreal Ecosites:

Terrestrial

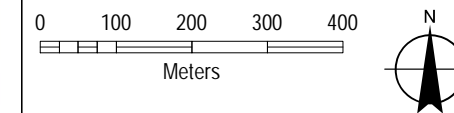
- B007X Active Mineral Barren
- B040 Dry, Sandy: Aspen - Birch Hardwood
- B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
- B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
- B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
- B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
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- B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
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- B070 Moist, Coarse: Aspen - Birch Hardwood
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- B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
- B108 Fresh, Silty to Fine Loamy: Mixedwood
- B119 Moist, Fine: Aspen - Birch Hardwood
- B125 Moist, Fine: Mixedwood
- B165 Open Rock Barren
- B197X Pavement/Concrete

Wetland

- B126 Treed Bog
- B127 Organic Poor Conifer Swamp
- B128 Organic Intermediate Conifer Swamp
- B129 Organic Rich Conifer Swamp
- B130 Intolerant Hardwood Swamp
- B134 Mineral Thicket Swamp
- B135 Organic Thicket Swamp
- B136 Sparse Treed Fen
- B138 Open Bog
- B139 Poor Fen
- B142 Mineral Meadow Marsh
- B146 Open Shore Fen
- B148 Mineral Shallow Marsh
- B149 Organic Shallow Marsh

Map Index

A3	A4
B3	<b>B4</b>
C2	C3
D2	D4



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Dec 14, 2018

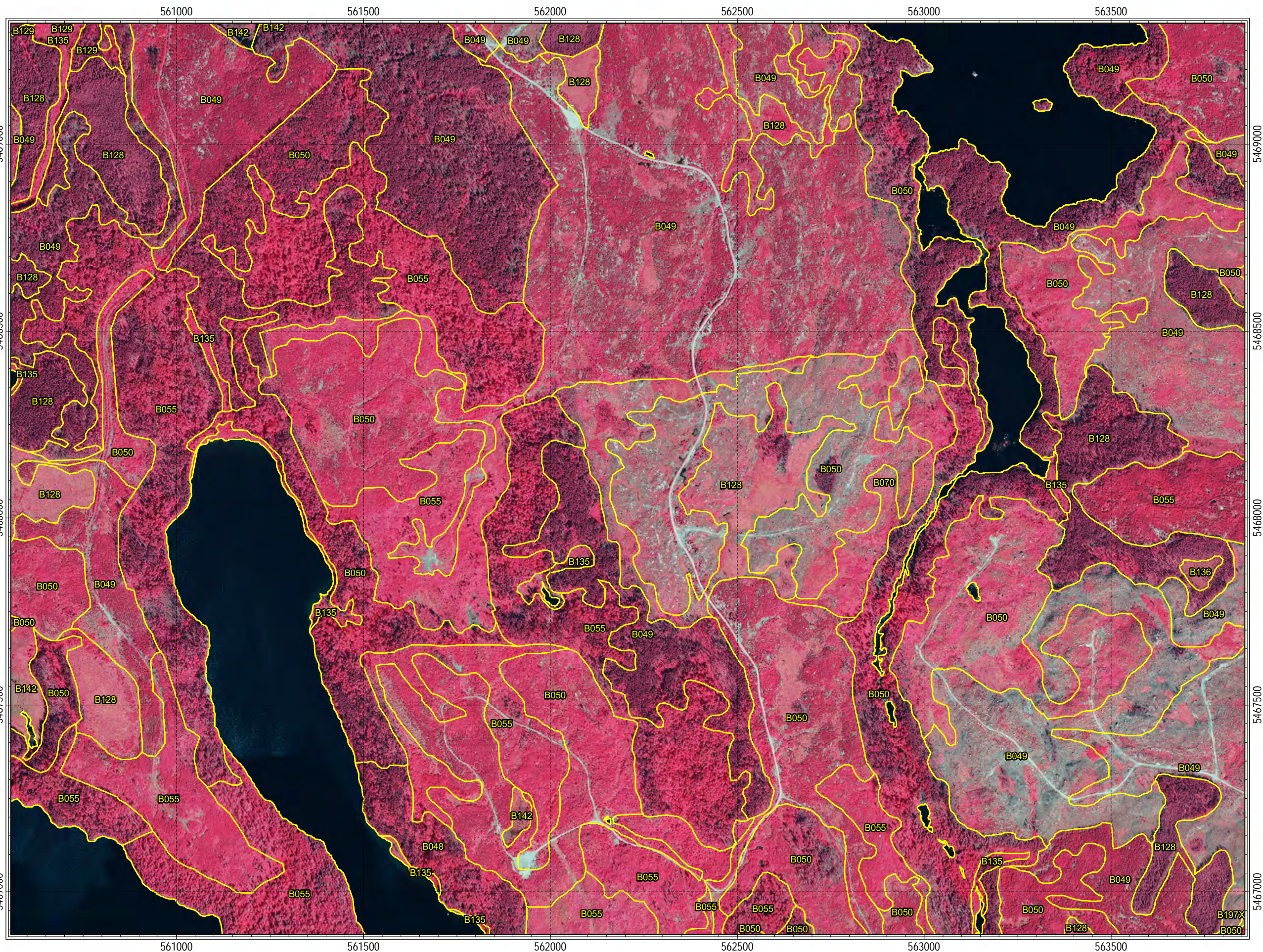
Scale 1:10000  
 UTM Zone 15N  
 NAD 1983



CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**Vegetation  
 Communités - B4**

**FIGURE 3-5**





Ambershaw Metallics, Inc.

LEGEND

Vegetation Community

Vegetation Plot

- PECC (2018)
- PECC (2017)
- DST (2011)

Boreal Ecosites:

Terrestrial

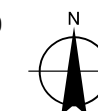
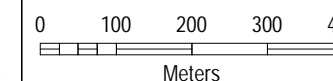
- B007X Active Mineral Barren
- B040 Dry, Sandy: Aspen - Birch Hardwood
- B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
- B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
- B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
- B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
- B054 Dry to Fresh, Coarse: Red Pine - White Pine Mixedwood
- B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
- B065 Moist, Coarse: Pine - Black Spruce Conifer
- B070 Moist, Coarse: Aspen - Birch Hardwood
- B076 Moist, Coarse: Mixedwood
- B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
- B108 Fresh, Silty to Fine Loamy: Mixedwood
- B119 Moist, Fine: Aspen - Birch Hardwood
- B125 Moist, Fine: Mixedwood
- B165 Open Rock Barren
- B197X Pavement/Concrete

Wetland

- B126 Treed Bog
- B127 Organic Poor Conifer Swamp
- B128 Organic Intermediate Conifer Swamp
- B129 Organic Rich Conifer Swamp
- B130 Intolerant Hardwood Swamp
- B134 Mineral Thicket Swamp
- B135 Organic Thicket Swamp
- B136 Sparse Treed Fen
- B138 Open Bog
- B139 Poor Fen
- B142 Mineral Meadow Marsh
- B146 Open Shore Fen
- B148 Mineral Shallow Marsh
- B149 Organic Shallow Marsh

Map Index

A3	A4
B3	B4
<b>C2</b>	C3
D2	D4



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Dec 14, 2018

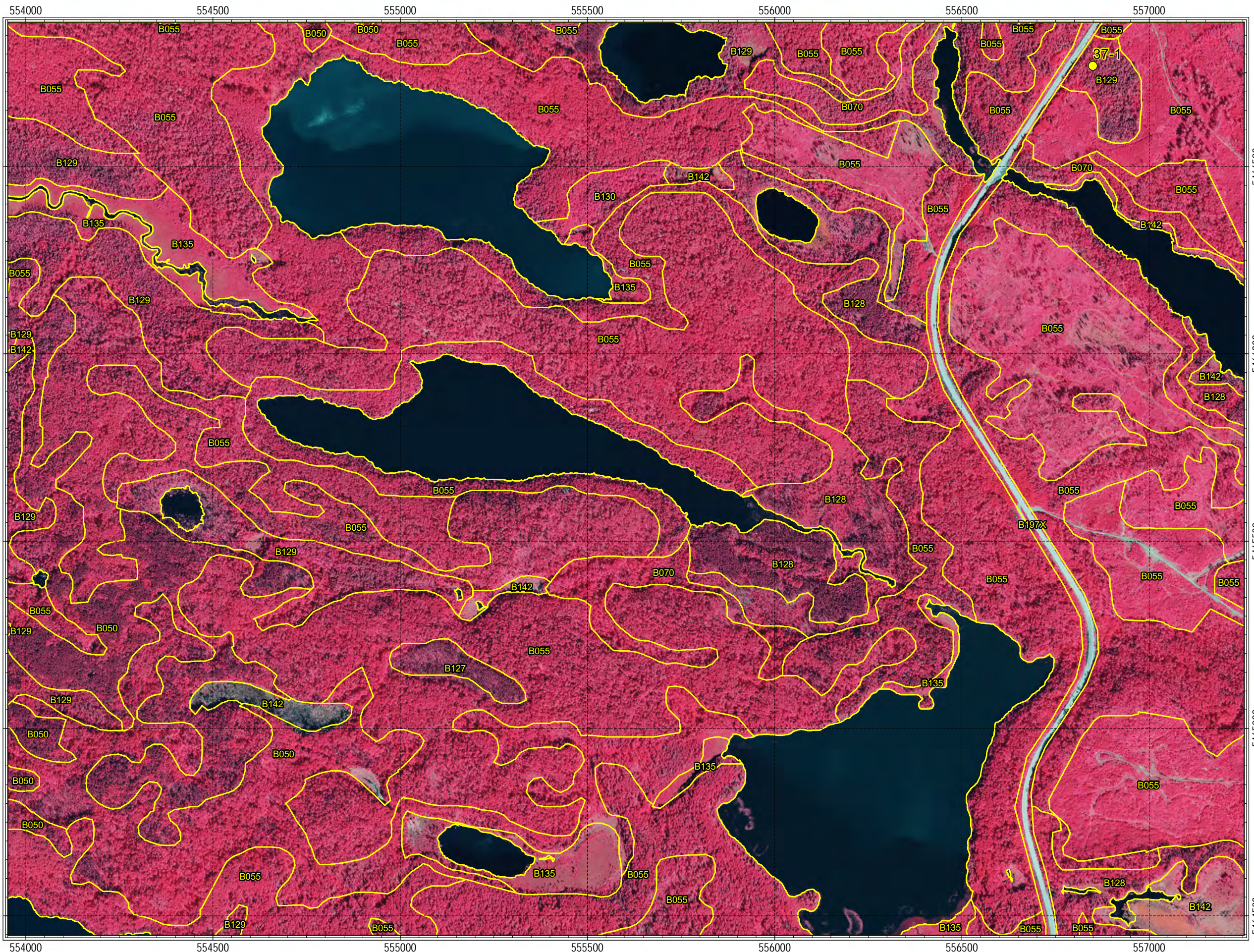
Scale 1:10000  
 UTM Zone 15N  
 NAD 1983



CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

Vegetation Communities - C2

FIGURE 3-6







Ambershaw Metallics, Inc.

**LEGEND**

Vegetation Community

**Vegetation Plot**

- PECG (2018)
- PECG (2017)
- DST (2011)

**Boreal Ecosites:**

**Terrestrial**

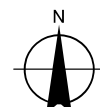
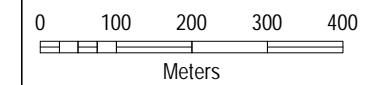
- B007X Active Mineral Barren
- B040 Dry, Sandy: Aspen - Birch Hardwood
- B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
- B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
- B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
- B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
- B054 Dry to Fresh, Coarse: Red Pine - White Pine Mixedwood
- B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
- B065 Moist, Coarse: Pine - Black Spruce Conifer
- B070 Moist, Coarse: Aspen - Birch Hardwood
- B076 Moist, Coarse: Mixedwood
- B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
- B108 Fresh, Silty to Fine Loamy: Mixedwood
- B119 Moist, Fine: Aspen - Birch Hardwood
- B125 Moist, Fine: Mixedwood
- B165 Open Rock Barren
- B197X Pavement/Concrete

**Wetland**

- B126 Treed Bog
- B127 Organic Poor Conifer Swamp
- B128 Organic Intermediate Conifer Swamp
- B129 Organic Rich Conifer Swamp
- B130 Intolerant Hardwood Swamp
- B134 Mineral Thicket Swamp
- B135 Organic Thicket Swamp
- B136 Sparse Treed Fen
- B138 Open Bog
- B139 Poor Fen
- B142 Mineral Meadow Marsh
- B146 Open Shore Fen
- B148 Mineral Shallow Marsh
- B149 Organic Shallow Marsh

**Map Index**

	A3	A4
	B3	B4
C2	C3	C4
D2	D3	D4



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Dec 14, 2018

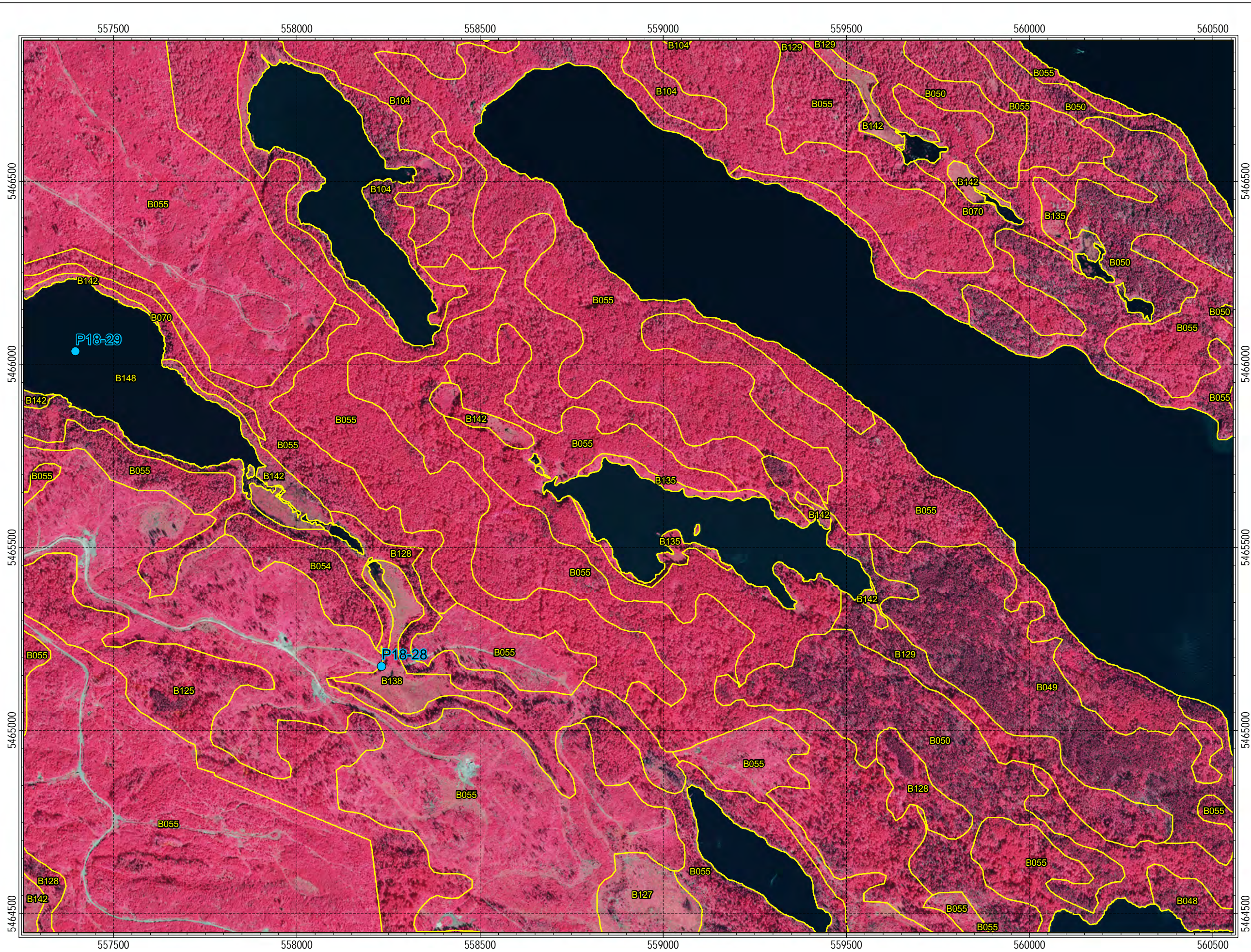
Scale 1:10000  
 UTM Zone 15N  
 NAD 1983



CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**Vegetation Communities - C3**

**FIGURE 3-7**





Ambershaw Metallics, Inc.

**LEGEND**

Vegetation Community

**Vegetation Plot**

- PECG (2018)
- PECG (2017)
- DST (2011)

**Boreal Ecosites:**

**Terrestrial**

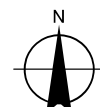
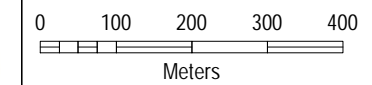
- B007X Active Mineral Barren
- B040 Dry, Sandy: Aspen - Birch Hardwood
- B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
- B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
- B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
- B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
- B054 Dry to Fresh, Coarse: Red Pine - White Pine Mixedwood
- B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
- B065 Moist, Coarse: Pine - Black Spruce Conifer
- B070 Moist, Coarse: Aspen - Birch Hardwood
- B076 Moist, Coarse: Mixedwood
- B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
- B108 Fresh, Silty to Fine Loamy: Mixedwood
- B119 Moist, Fine: Aspen - Birch Hardwood
- B125 Moist, Fine: Mixedwood
- B165 Open Rock Barren
- B197X Pavement/Concrete

**Wetland**

- B126 Treed Bog
- B127 Organic Poor Conifer Swamp
- B128 Organic Intermediate Conifer Swamp
- B129 Organic Rich Conifer Swamp
- B130 Intolerant Hardwood Swamp
- B134 Mineral Thicket Swamp
- B135 Organic Thicket Swamp
- B136 Sparse Treed Fen
- B138 Open Bog
- B139 Poor Fen
- B142 Mineral Meadow Marsh
- B146 Open Shore Fen
- B148 Mineral Shallow Marsh
- B149 Organic Shallow Marsh

**Map Index**

	A3	A4
	B3	B4
C2	C3	<b>C4</b>
D2	D3	D4



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Dec 14, 2018

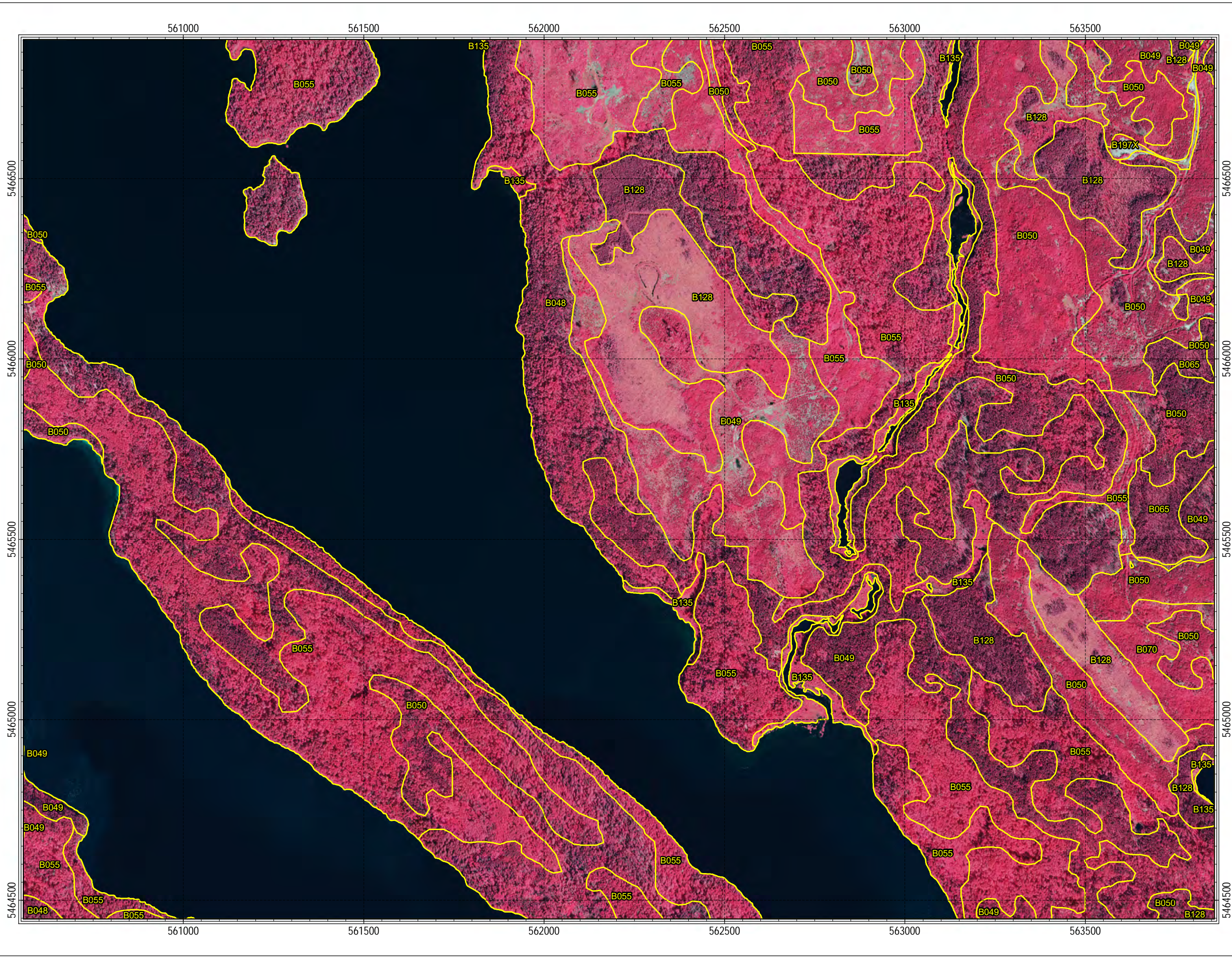
Scale 1:10000  
 UTM Zone 15N  
 NAD 1983



CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**Vegetation Communités - C4**

**FIGURE 3-8**





Ambershaw Metallics, Inc.

LEGEND

Vegetation Community

Vegetation Plot

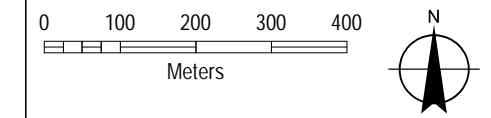
- PECO (2018)
- PECO (2017)
- DST (2011)

Boreal Ecosites:

- Terrestrial**
- B007X Active Mineral Barren
  - B040 Dry, Sandy: Aspen - Birch Hardwood
  - B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
  - B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
  - B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
  - B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
  - B054 Dry to Fresh, Coarse: Red Pine - White Pine Mixedwood
  - B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
  - B065 Moist, Coarse: Pine - Black Spruce Conifer
  - B070 Moist, Coarse: Aspen - Birch Hardwood
  - B076 Moist, Coarse: Mixedwood
  - B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
  - B108 Fresh, Silty to Fine Loamy: Mixedwood
  - B119 Moist, Fine: Aspen - Birch Hardwood
  - B125 Moist, Fine: Mixedwood
  - B165 Open Rock Barren
  - B197X Pavement/Concrete
- Wetland**
- B126 Treed Bog
  - B127 Organic Poor Conifer Swamp
  - B128 Organic Intermediate Conifer Swamp
  - B129 Organic Rich Conifer Swamp
  - B130 Intolerant Hardwood Swamp
  - B134 Mineral Thicket Swamp
  - B135 Organic Thicket Swamp
  - B136 Sparse Treed Fen
  - B138 Open Bog
  - B139 Poor Fen
  - B142 Mineral Meadow Marsh
  - B146 Open Shore Fen
  - B148 Mineral Shallow Marsh
  - B149 Organic Shallow Marsh

Map Index

	A3	A4
	B3	B4
C2	C3	C4
D2	D3	D4



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Dec 14, 2018

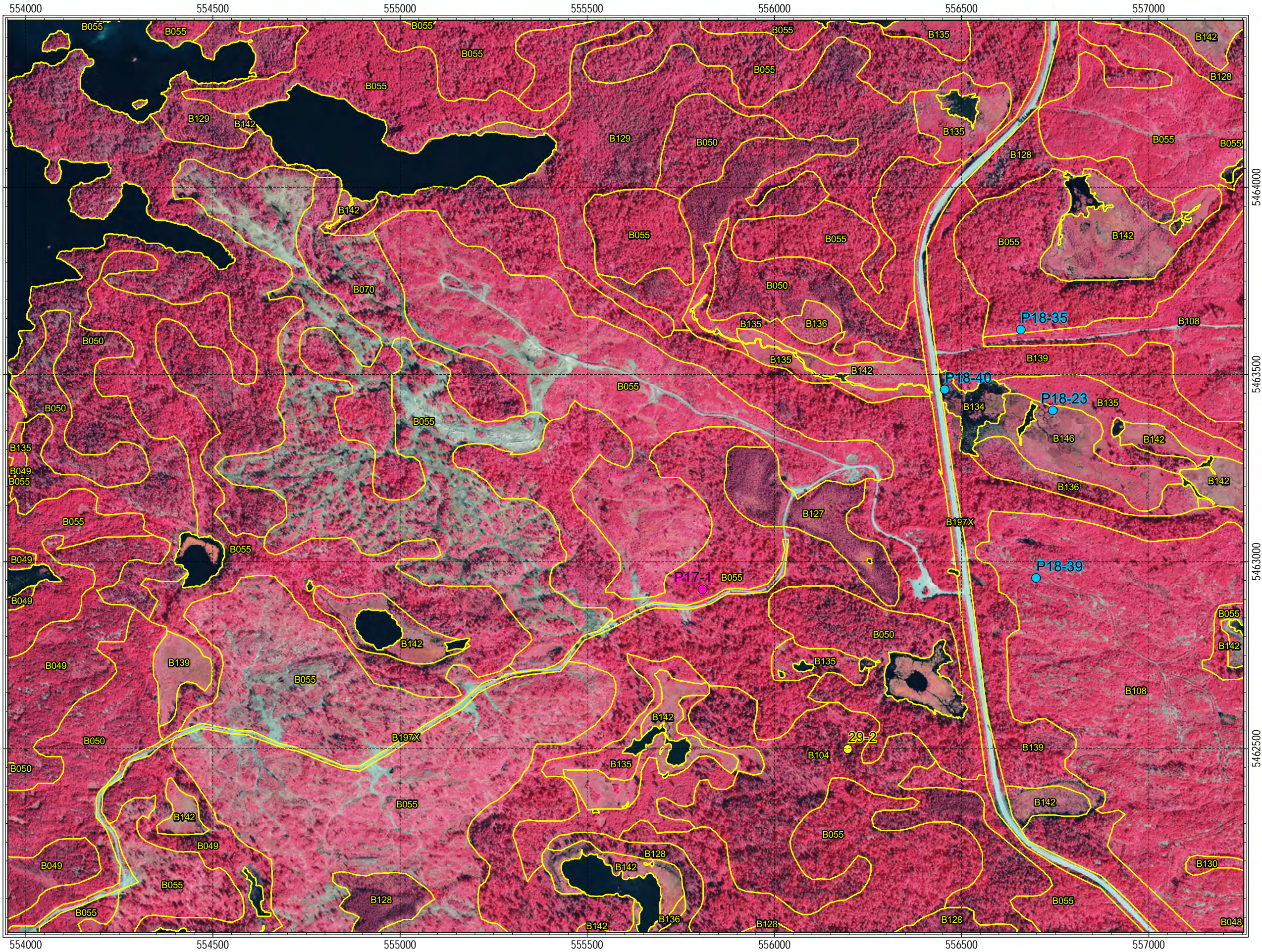
Scale 1:10000  
 UTM Zone 15N  
 NAD 1983



CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

Vegetation Communités - D2

FIGURE 3-9





Ambershaw Metallics, Inc.

LEGEND

Vegetation Community

Vegetation Plot

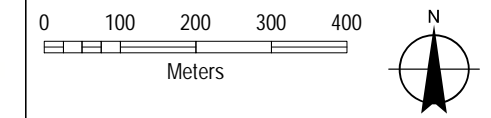
- PECG (2018)
- PECG (2017)
- DST (2011)

Boreal Ecosites:

- Terrestrial**
- B007X Active Mineral Barren
  - B040 Dry, Sandy: Aspen - Birch Hardwood
  - B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
  - B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
  - B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
  - B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
  - B054 Dry to Fresh, Coarse: Red Pine - White Pine Mixedwood
  - B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
  - B065 Moist, Coarse: Pine - Black Spruce Conifer
  - B070 Moist, Coarse: Aspen - Birch Hardwood
  - B076 Moist, Coarse: Mixedwood
  - B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
  - B108 Fresh, Silty to Fine Loamy: Mixedwood
  - B119 Moist, Fine: Aspen - Birch Hardwood
  - B125 Moist, Fine: Mixedwood
  - B165 Open Rock Barren
  - B197X Pavement/Concrete
- Wetland**
- B126 Treed Bog
  - B127 Organic Poor Conifer Swamp
  - B128 Organic Intermediate Conifer Swamp
  - B129 Organic Rich Conifer Swamp
  - B130 Intolerant Hardwood Swamp
  - B134 Mineral Thicket Swamp
  - B135 Organic Thicket Swamp
  - B136 Sparse Treed Fen
  - B138 Open Bog
  - B139 Poor Fen
  - B142 Mineral Meadow Marsh
  - B146 Open Shore Fen
  - B148 Mineral Shallow Marsh
  - B149 Organic Shallow Marsh

Map Index

	A3	A4
	B3	B4
C2	C3	C4
D2	D3	D4



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Dec 14, 2018

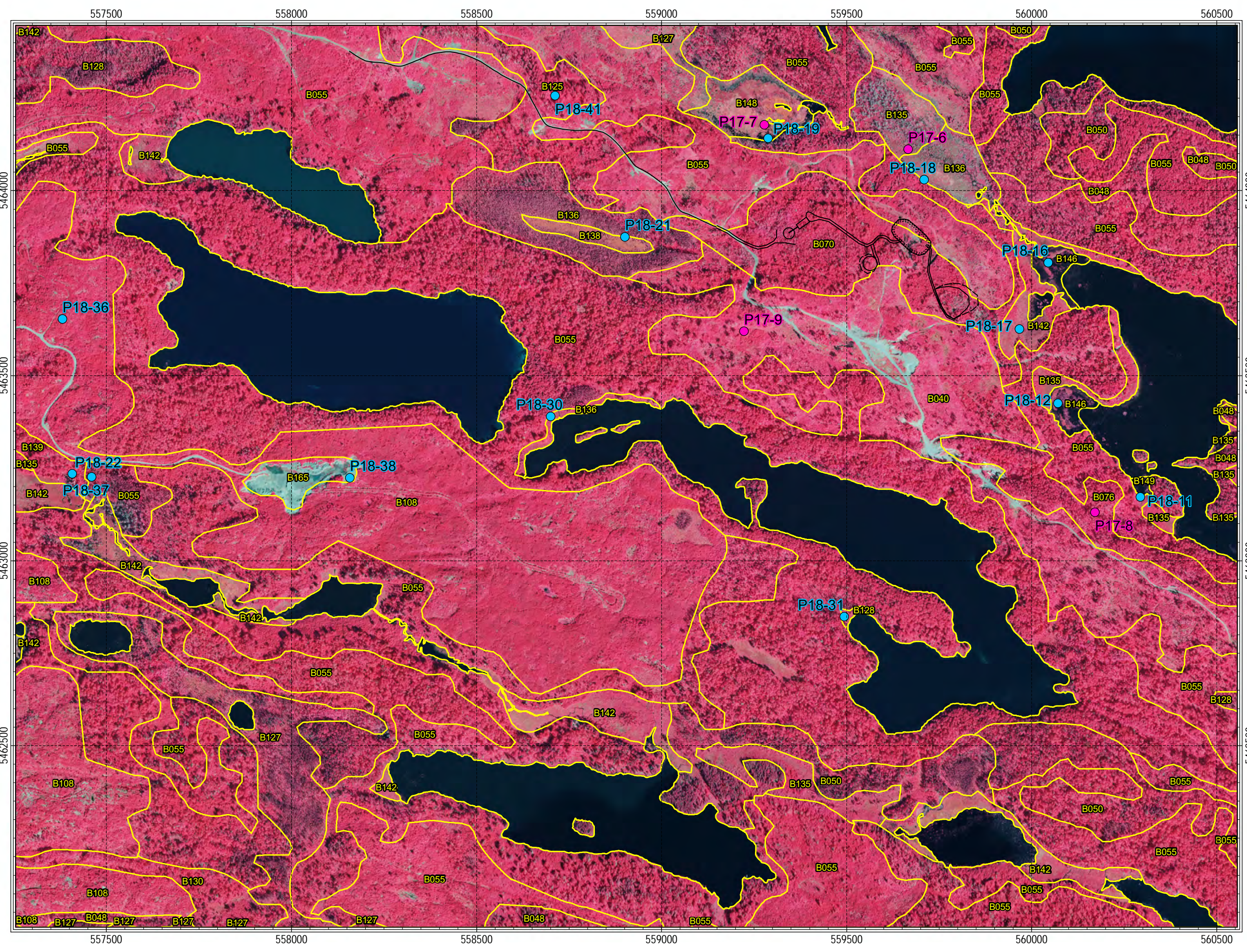
Scale 1:10000  
 UTM Zone 15N  
 NAD 1983



CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

Vegetation Communités - D3

FIGURE 3-10





Ambershaw Metallics, Inc.

**LEGEND**

Vegetation Community

**Vegetation Plot**

- PECG (2018)
- PECG (2017)
- DST (2011)

**Boreal Ecosites:**

*Terrestrial*

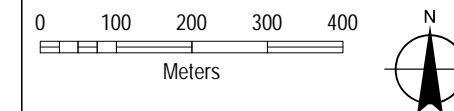
- B007X Active Mineral Barren
- B040 Dry, Sandy: Aspen - Birch Hardwood
- B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
- B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
- B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
- B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
- B054 Dry to Fresh, Coarse: Red Pine - White Pine Mixedwood
- B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
- B065 Moist, Coarse: Pine - Black Spruce Conifer
- B070 Moist, Coarse: Aspen - Birch Hardwood
- B076 Moist, Coarse: Mixedwood
- B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
- B108 Fresh, Silty to Fine Loamy: Mixedwood
- B119 Moist, Fine: Aspen - Birch Hardwood
- B125 Moist, Fine: Mixedwood
- B165 Open Rock Barren
- B197X Pavement/Concrete

*Wetland*

- B126 Treed Bog
- B127 Organic Poor Conifer Swamp
- B128 Organic Intermediate Conifer Swamp
- B129 Organic Rich Conifer Swamp
- B130 Intolerant Hardwood Swamp
- B134 Mineral Thicket Swamp
- B135 Organic Thicket Swamp
- B136 Sparse Treed Fen
- B138 Open Bog
- B139 Poor Fen
- B142 Mineral Meadow Marsh
- B146 Open Shore Fen
- B148 Mineral Shallow Marsh
- B149 Organic Shallow Marsh

**Map Index**

	A3	A4
	B3	B4
C2	C3	C4
D2	D3	<b>D4</b>



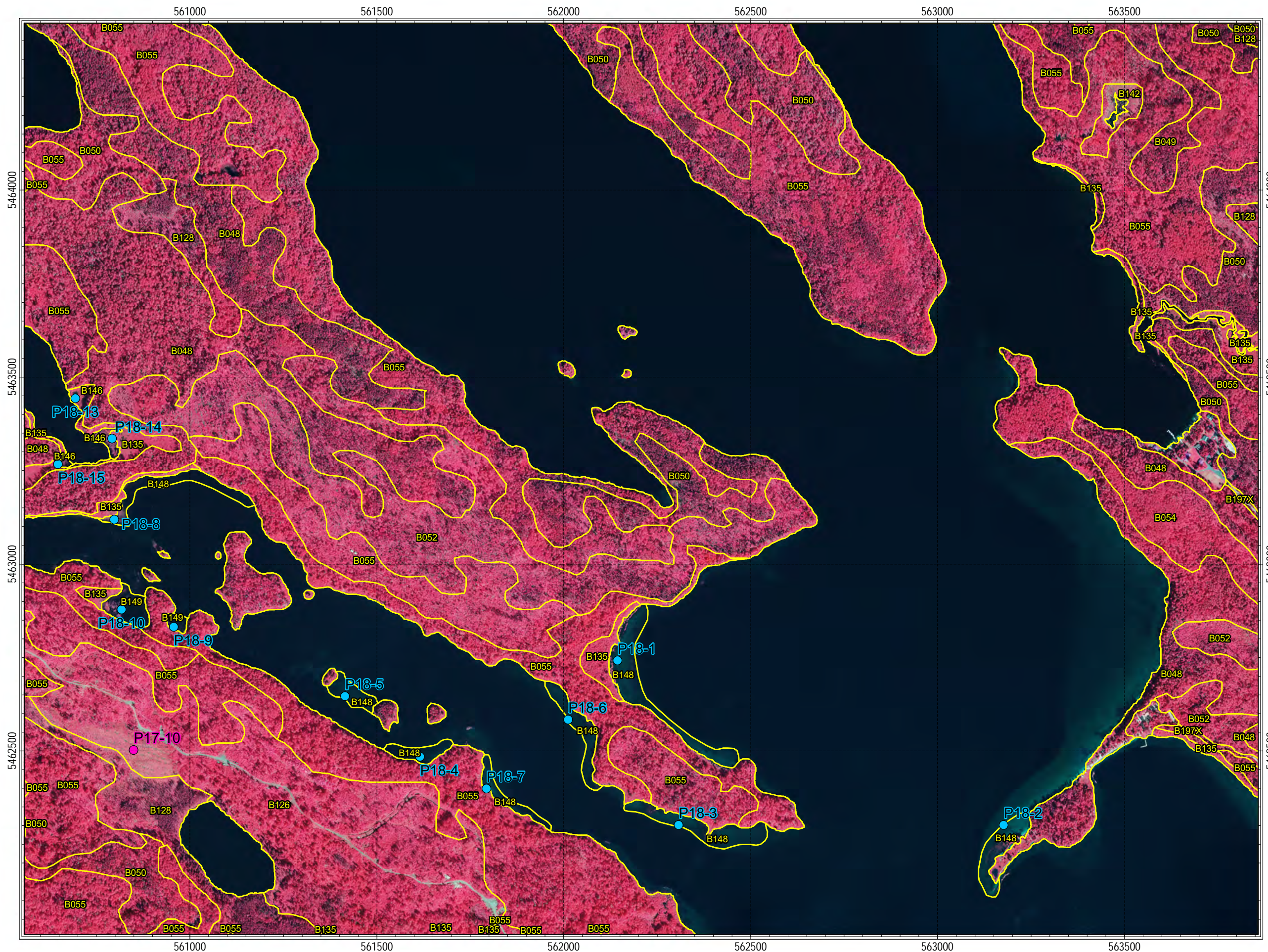
DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Dec 14, 2018  
 Scale 1:10000  
 UTM Zone 15N  
 NAD 1983



CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**Vegetation Communities - D4**

**FIGURE 3-11**





Ambershaw Metallics, Inc.

LEGEND

- Vegetation Community
- Proposed Project Site Facilities Layout

Terrestrial Communities

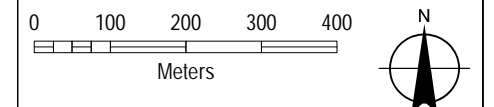
- Aspen / Birch Dominated Hardwood Forest
- Red Pine / White Pine Dominated Forest
- Jack Pine / Black Spruce Dominated Forest
- White spruce / Balsam Fir Dominated Forest
- Mixedwood Forest
- Open Rock Barren

Wetland Categories

- Swamp
- Bog
- Fen
- Marsh

Boreal Ecosites\*

- Terrestrial**
- B040 Dry, Sandy: Aspen - Birch Hardwood
  - B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
  - B049 Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated
  - B050 Dry to Fresh, Coarse: Pine - Black Spruce Conifer
  - B052 Dry to Fresh, Coarse: Spruce - Fir Conifer
  - B055 Dry to Fresh, Coarse: Aspen - Birch Hardwood
  - B065 Moist, Coarse: Pine - Black Spruce Conifer
  - B070 Moist, Coarse: Aspen - Birch Hardwood
  - B104 Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood
  - B108 Fresh, Silty to Fine Loamy: Mixedwood
  - B125 Moist, Fine: Mixedwood
  - B165 Open Rock Barren
- Wetland**
- B127 Organic Poor Conifer Swamp
  - B128 Organic Intermediate Conifer Swamp
  - B129 Organic Rich Conifer Swamp
  - B135 Organic Thicket Swamp
  - B136 Sparse Treed Fen
  - B138 Open Bog
  - B142 Mineral Meadow Marsh
  - B146 Open Shore Fen
  - B148 Mineral Shallow Marsh
  - B149 Organic Shallow Marsh



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Mar 15, 2019

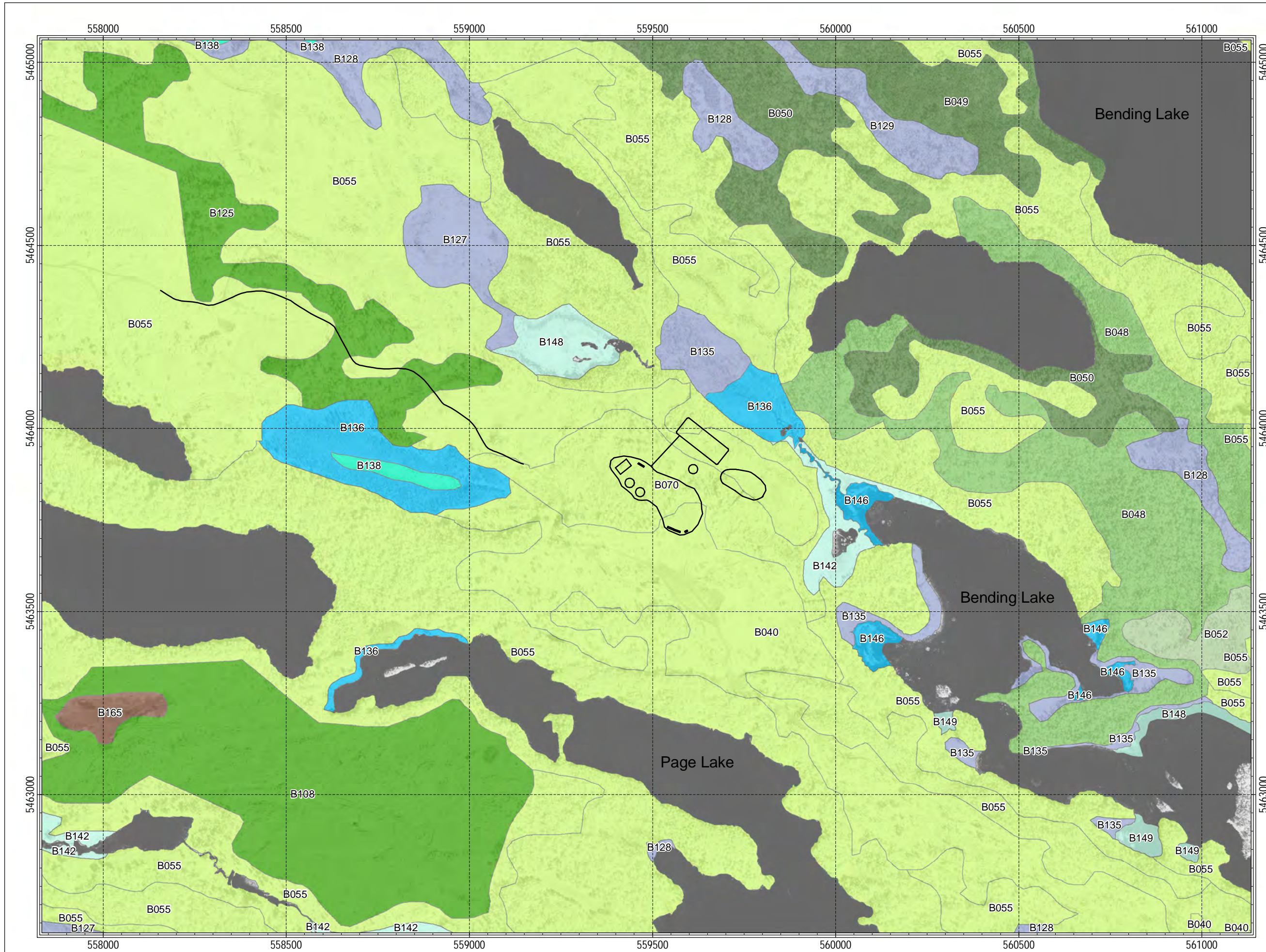
Scale 1:10000  
 UTM Zone 15N  
 NAD 1983

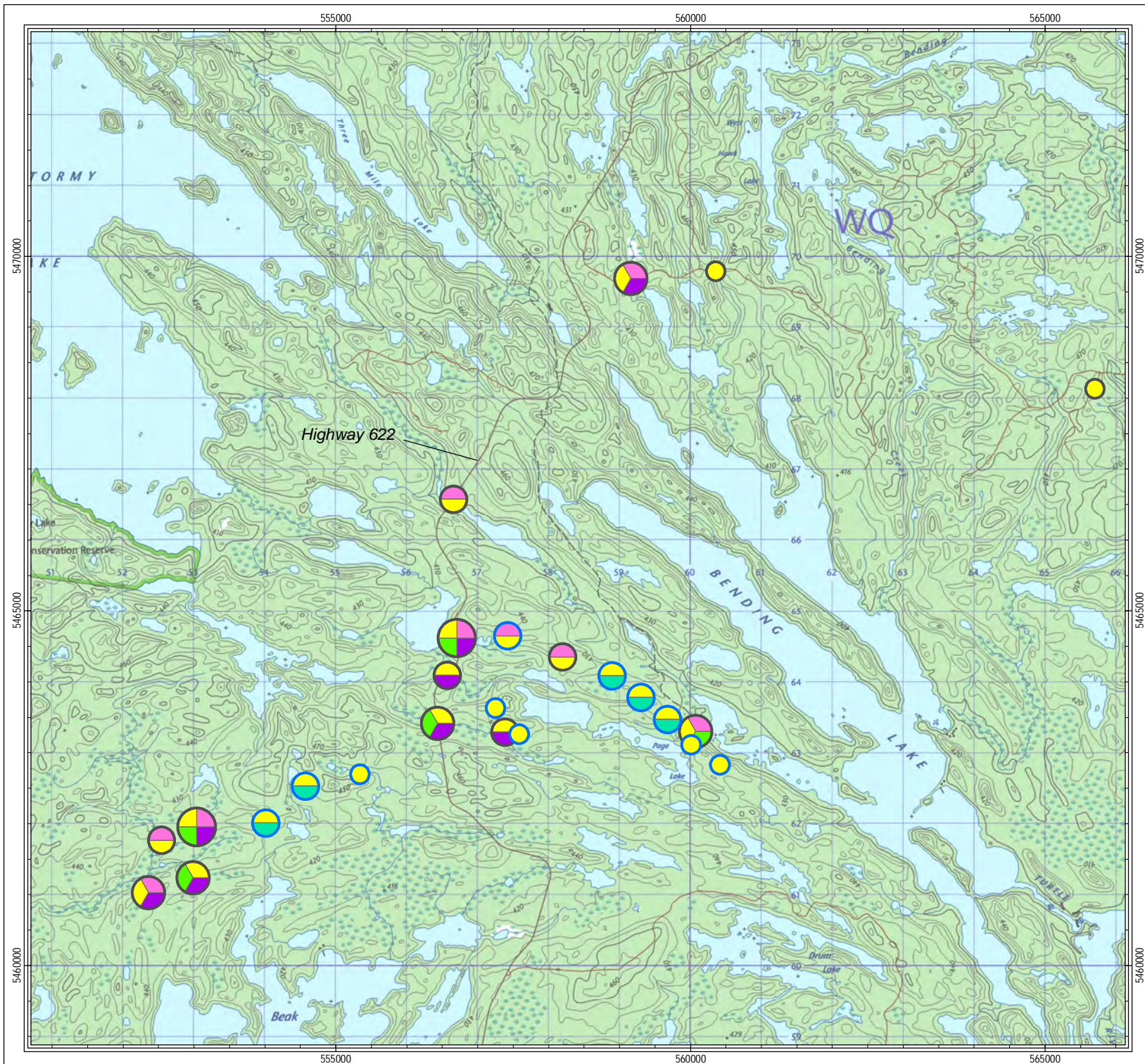


CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**Vegetation Ecosites  
 Summary  
 - Development Area**

FIGURE 3-12






**Ambershaw Metallics, Inc.**

**LEGEND**

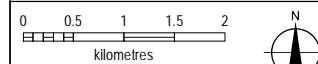
**Surveyor and Year**

 PECG 2017

 DST 2012

**Amphibian Species Surveyed**

-  Chorus Frog
-  Spring Peeper
-  American Toad
-  Gray Treefrog
-  Wood Frog



DRAWN: B. Elder  
 CHECKED: N. Dunn  
 PROJECT: 17018  
 DATE: Dec 13, 2018

Scale 1:75000  
 UTM Zone 15N  
 NAD 1983

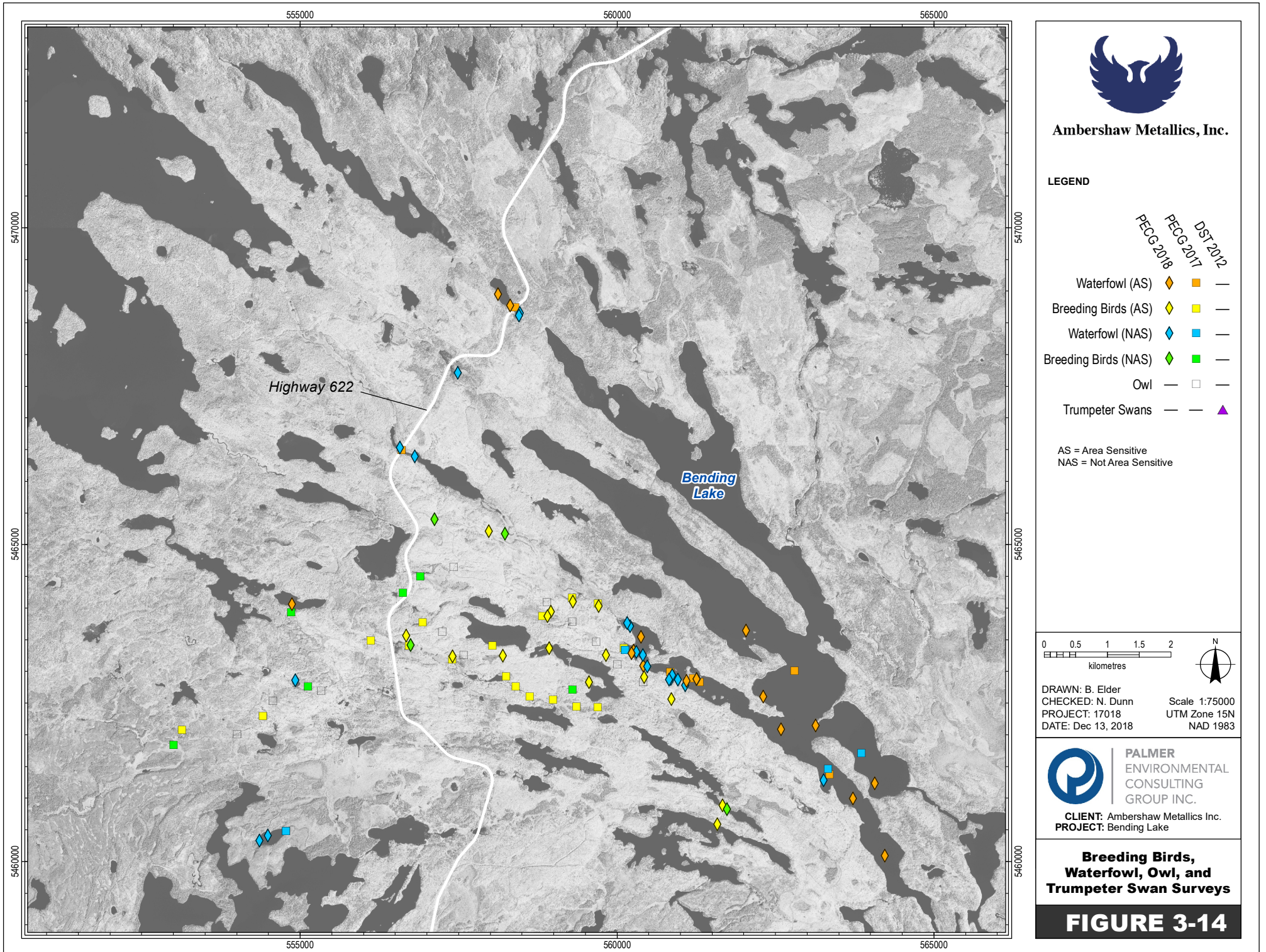


**PALMER  
 ENVIRONMENTAL  
 CONSULTING  
 GROUP INC.**

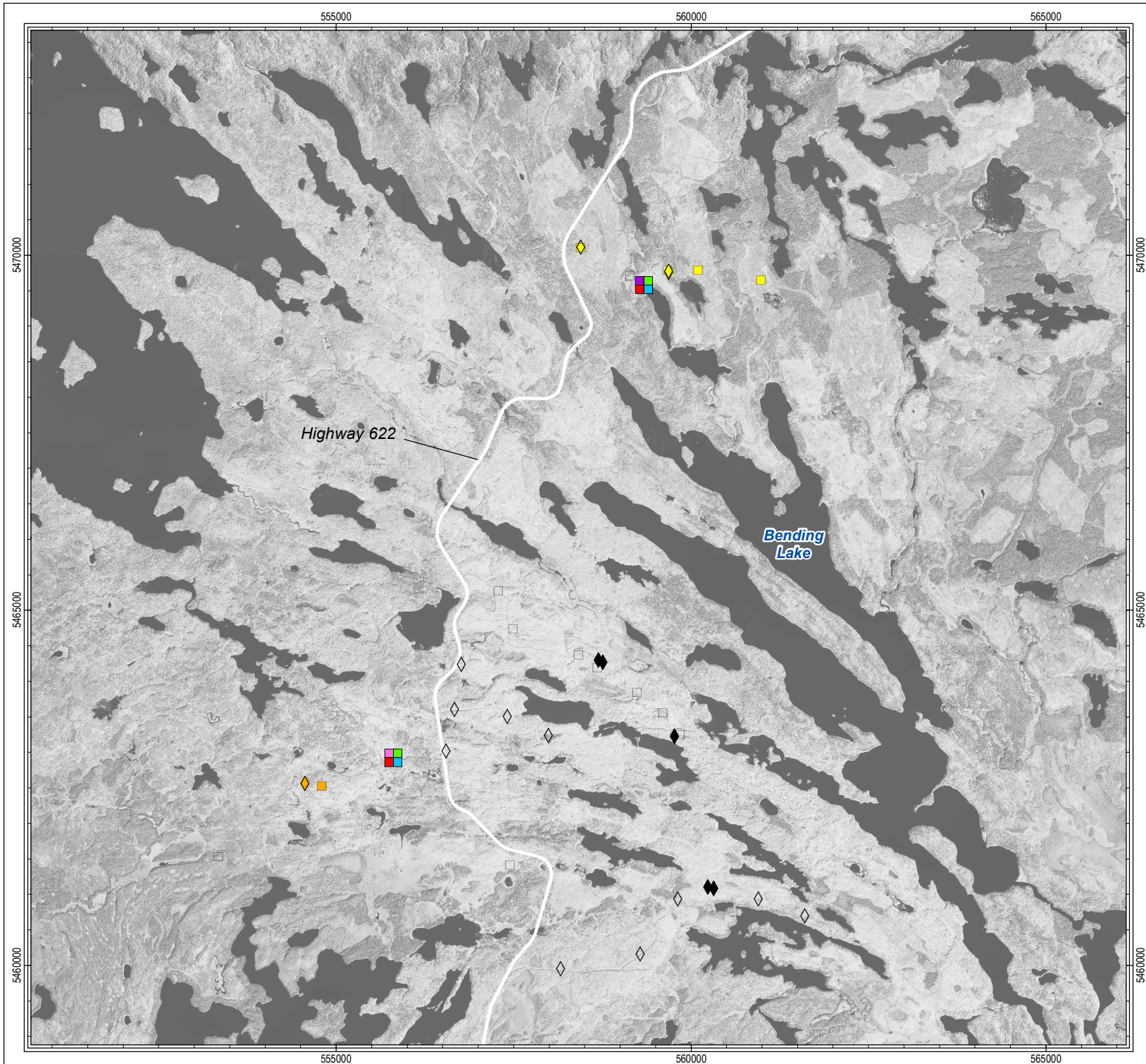
**CLIENT:** Ambershaw Metallics Inc.  
**PROJECT:** Bending Lake

**Amphibian Surveys**

**FIGURE 3-13**







**Ambershaw Metallics, Inc.**

**LEGEND**

**PECG 2018**

- ◆ Eastern Whip-poor-will
- ◆ Common Nighthawk
- ◆ Bats (data to be analysed)
- ◇ N/A (i.e. none)

**PECG 2017**

- Eastern Whip-poor-will
- Common Nighthawk
- Hoary Bat
- Silverhaired Bat
- Northern Myotis
- Eastern Red Bat
- Little Brown Bat
- N/A (i.e. none)

**Mosaic\_1m.tif**

Value



DRAWN: B. Elder  
 CHECKED: N. Dunn  
 PROJECT: 17018  
 DATE: Dec 13, 2018

Scale 1:75000  
 UTM Zone 15N  
 NAD 1983



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 CONSULTING  
 GROUP INC.

CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**Bat and Nightjar Surveys**

**FIGURE 3!**



Ambershaw Metallics, Inc.

**LEGEND**

- Vegetation Community
- Proposed Project Site Facilities Layout
- Trumpeter Swan (2 adults, 6 juveniles)
- Waterfowl Nesting Area Limit
- Category 1: Seasonal Concentration Areas of Animals
- Category 2: Rare Vegetation Communities
- Category 3: Specialized Habitat for Wildlife
- Category 4: Habitat of Species of Conservation Concern

**Boreal Ecosites\*:**

**Terrestrial**

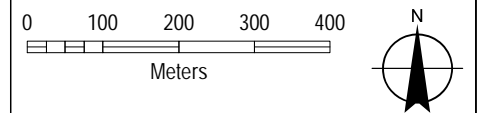
- B040 Dry Sandy Aspen-Birch Deciduous
- B048 Dry to Fresh, Coarse: Red Pine - White Pine Conifer
- B049 Coarse Dry/Fresh Black Spruce-Jack Pine Conifer
- B050 Coarse Dry/Fresh Pine-Black Spruce Conifer
- B052 Coarse Dry/Fresh Spruce-Fir Conifer
- B055 Coarse Dry/Fresh Aspen-Birch Deciduous
- B070 Coarse Moist Aspen-Birch Deciduous
- B108 Fresh, Silt to Fine Loam Mixedwood
- B125 Moist-fine Mixedwood
- B165 Open Rock Barren

**Wetland**

- B127 Poor Conifer Swamp
- B128 Intermediate Conifer Swamp
- B129 Rich Conifer Swamp
- B135 Organic Thicket Swamp
- B136 Sparse Treed Fen
- B138 Open Bog
- B142 Mineral Meadow Marsh
- B146 Open Shore Fen
- B148 Mineral Shallow Marsh
- B149 Organic Shallow Marsh

**Candidate SWH sub-categories**

- TWA Turtle Wintering Area [1]
- RH Reptile Hibernaculum [1]
- WSS Waterfowl Stopover and Staging Areas (Aquatic) [1]
- RB Rock Barren [2]
- WNA Waterfowl Nesting Area [3]
- MBB Marsh Bird Breeding Habitat [4]



DRAWN: B. Elder  
 CHECKED: D. Janas  
 PROJECT: 17018  
 DATE: Mar 14, 2019

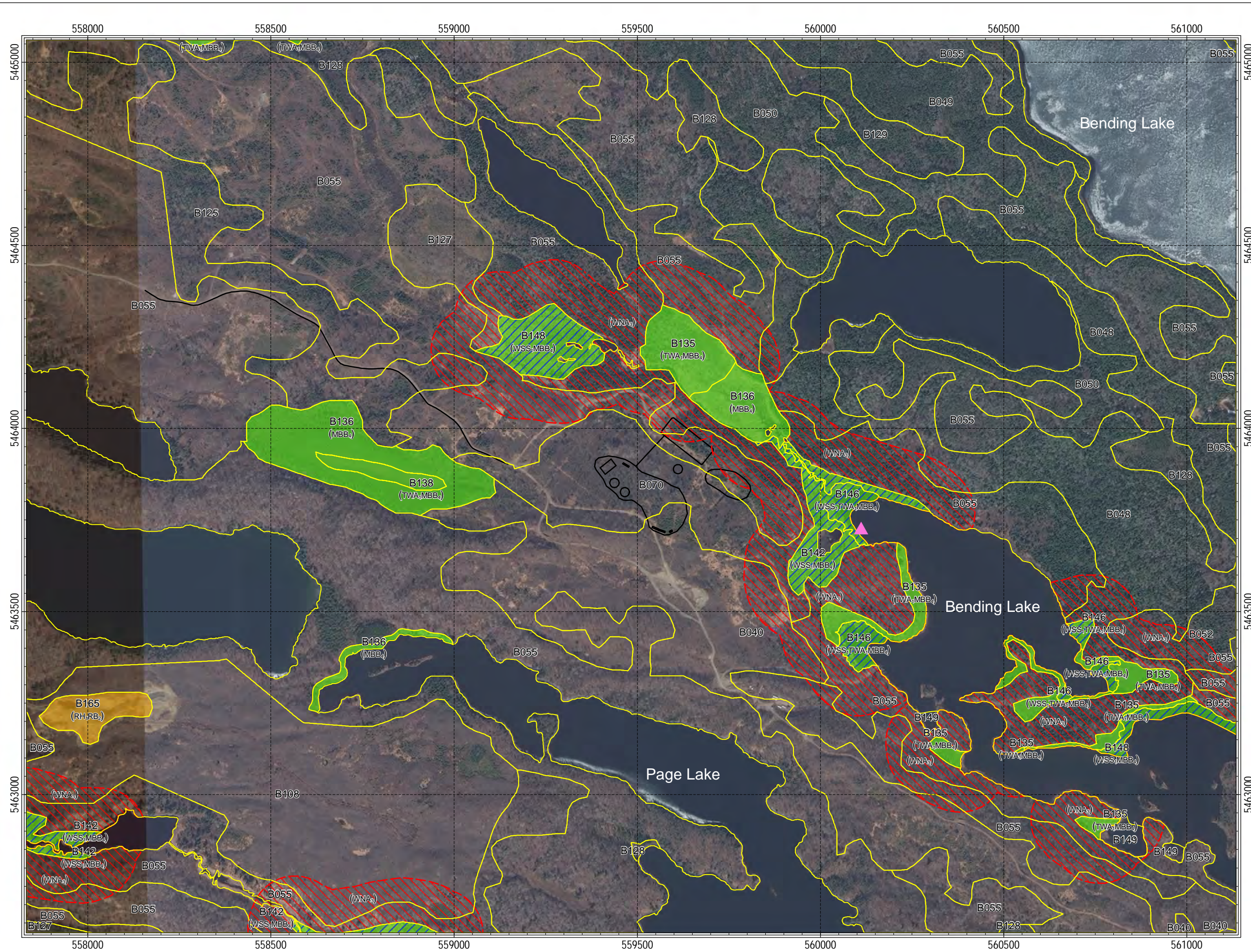
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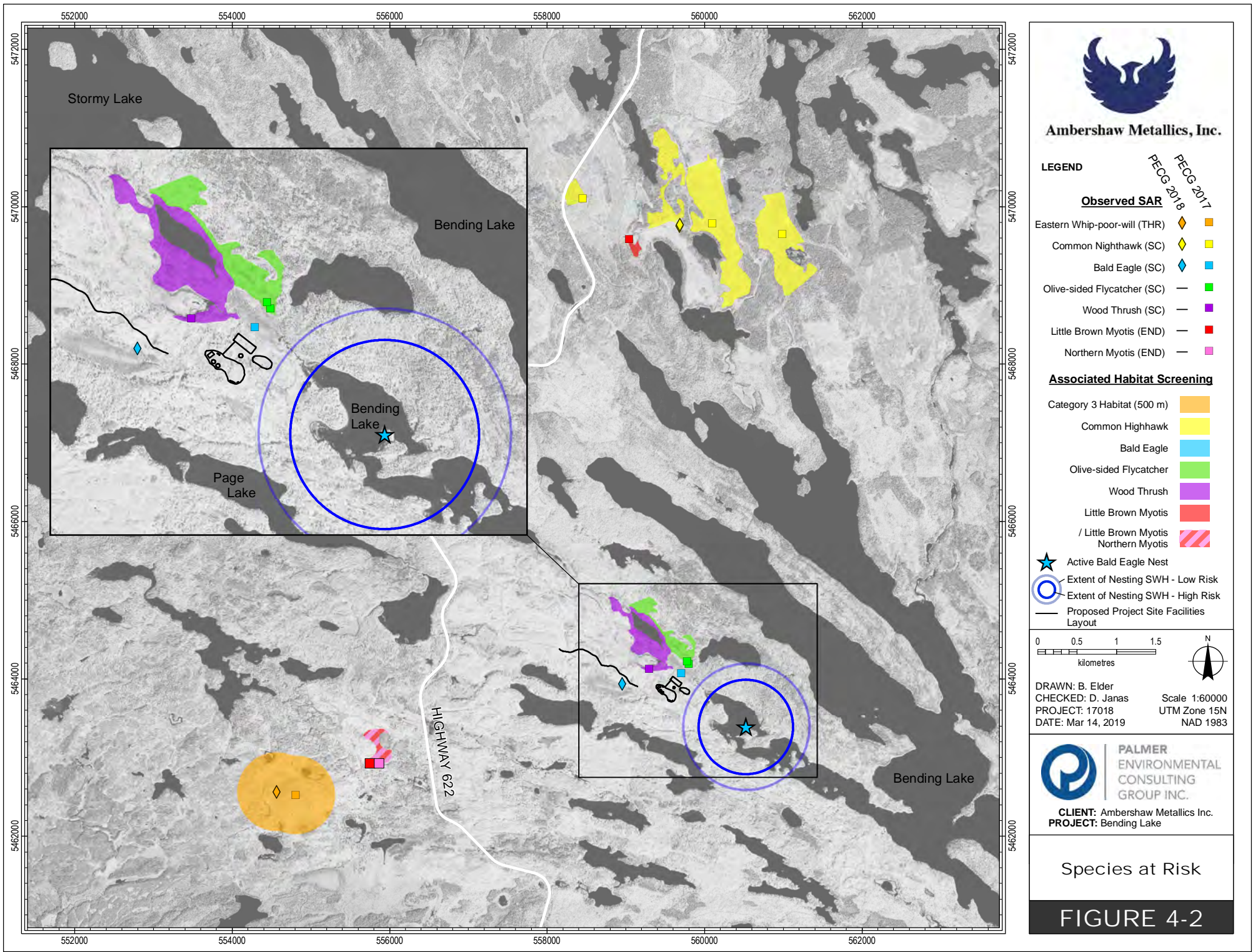


**CLIENT:** Ambershaw Metallics Inc.  
**PROJECT:** Bending Lake

# Significant Wildlife Habitats

## FIGURE 4-1





# Appendix B

Field Surveys completed by PEGC and DST Consulting Engineers Inc.

**Field Survey Details- Ambershaw Mining Project**

<b>Survey Date/Time</b>	<b>Surveyor(s)</b>	<b>Survey Type</b>	<b>Survey Details</b>
<b><i>DST Consulting Engineers</i></b>			
<b>VEGETATION SURVEYS</b>			
July 26, 2011	DST Staff	Ecosite verification; botanical inventory	23°C; 15 km/h wind*
July 27, 2011	DST Staff	Ecosite verification; botanical inventory	17°C; 15 km/h wind*
July 28, 2011	DST Staff	Ecosite verification; botanical inventory	26°C; 42 km/h wind*
July 29, 2011	DST Staff	Ecosite verification; botanical inventory	25°C; 17 km/h wind*
August 9, 2011	DST Staff	Ecosite verification; botanical inventory	15°C; 24 km/h wind*
August 10, 2011	DST Staff	Ecosite verification; botanical inventory	22°C; 11 km/h wind*
August 11, 2011	DST Staff	Ecosite verification; botanical inventory	25°C; 13 km/h wind*
August 12, 2011	DST Staff	Ecosite verification; botanical inventory	22°C; 15 km/h wind*
September 28, 2011	DST Staff	Ecosite verification; botanical inventory	24°C; 22 km/h wind*
September 29, 2011	DST Staff	Ecosite verification; botanical inventory	15°C; 30 km/h wind*
<b>WILDLIFE SURVEYS</b>			
<b><i>Birds</i></b>			
June 8, 2011	DST Staff	Breeding Birds	8°C; 18 km/h wind*
June 9, 2011	DST Staff	Breeding Birds	5°C; 8 km/h wind*
June 21, 2011	DST Staff	Breeding Birds	13°C; 18 km/h wind*
June 22, 2011	DST Staff	Breeding Birds	16°C; 26 km/h wind*
June 23, 2011	DST Staff	Breeding Birds	14°C; 26 km/h wind; rain*
April 2, 2012	DST Staff	Owls	5°C; 0 km/h wind; 100% cloud cover
April 3, 2012	DST Staff	Owls	4°C; 0 km/h wind; 0% cloud cover
April 4, 2012	DST Staff	Owls	4°C; 0 km/h wind; 0% cloud cover
April 10, 2012	DST Staff	Owls	0°C; 6-11 km/h wind; 20% cloud cover
July 11, 2012	DST Staff	Trumpeter Swans	
<b><i>Amphibians</i></b>			
April 24, 2012	DST Staff	Breeding Amphibians	6°C; 0 km/h wind; 100% cloud cover
April 25, 2012	DST Staff	Breeding Amphibians	5°C; 31-39 km/h wind; 100% cloud cover
April 26, 2012	DST Staff	Breeding Amphibians	-1°C; 0 km/h wind; 0% cloud cover
<b><i>Palmer Environmental Consulting Group</i></b>			
<b>VEGETATION SURVEYS</b>			
June 28, 2017	Natalie Dunn, Dirk Janas	Ecosite verification; botanical inventory	23°C; 13 km/h wind*

### Field Survey Details- Ambershaw Mining Project

June 29, 2017	Natalie Dunn, Dirk Janas	Ecosite verification; botanical inventory	20°C; 15 km/h wind*
June 30, 2017	Natalie Dunn, Dirk Janas	Ecosite verification; botanical inventory	20°C; 5 km/h wind*
June 19, 2018	Natalie Dunn, Shila Morin, Erin Donkers	Ecosite verification; botanical inventory	20°C; 10 km/h wind; 10% cloud cover
June 20, 2018	Natalie Dunn, Shila Morin, Erin Donkers	Ecosite verification; botanical inventory	26°C; 10 km/h wind; 0% cloud cover
June 21, 2018	Natalie Dunn, Shila Morin, Erin Donkers	Ecosite verification; botanical inventory	28°C; 10 km/h wind; 10% cloud cover

#### **WILDLIFE SURVEYS**

##### ***Birds***

May 31, 2017	Ken MacIntosh	Owls	5°C; 0 km/h wind; 0% cloud cover
June 21, 2017	Ken MacIntosh	Breeding Birds	12°C; 9 km/h wind*
June 22, 2017	Ken MacIntosh	Breeding Birds	14°C; 11 km/h wind, 0% cloud cover*
June 29, 2017	Natalie Dunn, Dirk Janas	Breeding Birds	20°C; 15 km/h wind*
June 29, 2017	Natalie Dunn, Dirk Janas	Nocturnal Birds	18°C; 5 km/h wind; 20% cloud cover
June 30, 2017	Natalie Dunn, Dirk Janas	Breeding Birds	20°C; 5 km/h wind*
June 30, 2017	Natalie Dunn, Dirk Janas	Nocturnal Birds	16°C; 0 km/h wind; 80% cloud cover
September 14, 2017	Ken MacIntosh, Shila Morin	SAR Bird Habitat Characterization	12°C; 18 km/h wind*
September 15, 2017	Ken MacIntosh, Shila Morin	SAR Bird Habitat Characterization	9°C; 17 km/h wind*
October 17, 2017	Ken MacIntosh	Waterfowl (Migration)	5°C; 9 km/h wind*
October 25, 2017	Ken MacIntosh	Waterfowl (Migration)	-1°C; 8 km/h wind*
October 25, 2017	Ken MacIntosh	Trumpeter Swans	-1°C; 8 km/h wind
May 22, 2018	Carly Van Daele, Ken MacIntosh	Waterfowl (Nesting)	23°C; 5 km/h wind; 10% cloud cover
May 23, 2018	Carly Van Daele, Ken MacIntosh	Waterfowl (Nesting)	22°C; 8 km/h wind; 60% cloud cover
May 24, 2018	Carly Van Daele, Ken MacIntosh	Waterfowl (Nesting)	26°C; 5 km wind; <1mm rain
June 19, 2018	Ken MacIntosh	Breeding Birds	23°C; 10 km/h wind; 25% cloud cover
June 19, 2018	Natalie Dunn, Erin Donkers, Ken MacIntosh	Nocturnal Birds	15°C; 8 km/h wind*
June 20, 2018	Natalie Dunn, Erin Donkers, Ken MacIntosh	Nocturnal Birds	26°C; 5 km/h wind; 0% cloud cover
June 20, 2018	Ken MacIntosh	Breeding Birds	23°C; 4 km/h wind; 0% cloud cover*
June 21, 2018	Ken MacIntosh	Breeding Birds	21°C; 18 km/h wind*

##### ***Mammals***

### Field Survey Details- Ambershaw Mining Project

June 28, 2017	Natalie Dunn, Dirk Janas	Bat tree snag; Bat acoustic monitoring deployment	23°C; 13 km/h wind*
June 29 to August 4, 2017	Wildlife Acoustic SM3BAT Detector	Bat acoustic monitoring	Ranged from 9.7 to 30.9°C; wind gusts from <31 to 72 km/h*
November 7, 2017	Regan Augustine, Ken MacIntosh	Bat tree snag	-7.5°C; 24 km/h wind; snow*
November 8, 2017	Regan Augustine, Ken MacIntosh	Bat tree snag	-9°C; 15 km/h wind; snow*
November 9, 2017	Regan Augustine, Ken MacIntosh	Bat tree snag	-16°C; 13 km/h wind; snow*
June 19, 2018	Natalie Dunn, Shila Morin	Bats acoustic monitoring deployment	20°C; 10 km/h wind; 10% cloud cover
June 19 to July 23, 2018	Wildlife Acoustic SM3BAT Detector	Bat acoustic monitoring	Ranged from 12 to 31.8°C; wind gusts from <31 to 78 km/h*
<b><i>Amphibians</i></b>			
May 31, 2017	Ken MacIntosh	Breeding Amphibians	9°C; 9 km/h wind

\*Note: This weather data was obtained from historical records on the Weather Network and Environment Canada. Cloud cover was not available.

# Appendix C

Ambershaw Species at Risk Bat Assessment – 2017 Data





**PALMER**  
ENVIRONMENTAL  
CONSULTING  
GROUP INC.

74 Berkeley Street, Toronto, ON M5A 2W7  
Tel: 647-795-8153 | www.pecg.ca

# Memorandum

Date: September 27, 2018

Project #: 170181

To: AMI Metallics

From: Dirk Janas, Natalie Dunn, and Regan Augustine

cc: Rob Frizzell

Re: **Ambershaw Species at Risk Bat Assessment**  
2017 Field Survey Data

---

Palmer Environmental Consulting Group (PECG) is pleased to provide this technical memorandum that contains the results of Phase I: Bat Habitat Suitability Assessment, Phase II: Identification of Suitable Maternity Roost Trees, Phase III: Acoustic Surveys and Phase IV: Snag Density Survey as part of the baseline environmental investigations for the proposed AMI Mine located near Ignace, Ontario. The information provided in this technical memo is based on following:

- the deployment of acoustic monitors in two locations in June-July 2017 in the general study area (but outside of the proposed bulk sample locations)
- the analysis of the acoustic monitoring 2017 data
- bat maternity roost survey (snag trees) in and adjacent to the proposed bulk sample area in November 2017
- Overview of 2018 field survey and data collection (acoustic data analysis pending)

The proposed bulk sample pit site was chosen for surveys as there will be disturbance occurring at this site. The 2017 field survey data for bat habitat includes the deployment of two bat detectors and snag surveys to quantify the presence and significance of bats in comparison to the proposed bulk sample pit site.

## 1. Background and Methods

### 1.1 Vegetation Community Classification for Treed Habitats

Vegetation communities were mapped based on the recent MNRF Forest Resource Inventory (FRI) mapping and tree species composition data, followed by targeted ground truthing. PECG used this data to support background review for the Phase I: Bat Habitat Suitability Assessment and Phase II: Identification of Suitable Maternity Roost Trees.



## 1.2 Bat Maternity Roost Survey

A bat maternity roost survey was undertaken based on assessing tree cavities in accordance with methods outlined in the *Survey Protocol for Species at Risk Bats within Treed Habitats* (MNRF 2017). Given the presence of forest cover in the study area, there are potential habitat opportunities for bats and therefore the objective of the assessment was to identify the extent and quality of potential habitat opportunities for Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*).

The specific survey methods based on the 2017 MNRF protocol consisted of:

- Phase I: Bat Habitat Suitability Assessment
- Phase II: Identification of Suitable Maternity Roost Trees
- Phase III: Acoustic Surveys

Field investigations for a screening of potential Suitable Maternity Roost Trees was conducted at the bulk sample site, West Hawk Road and Barry's Road, as well as other surrounding areas on June 28 and 29, 2017. This work was completed in order to identify suitable areas for the deployment of acoustic monitors for initial data collection. Phase II surveys were conducted in the proposed bulk sample area (**Figure A**) in preparation for the 2018 deployment of acoustic monitors on November 7, 8 and 9, 2017.

## 1.3 Bat Acoustic Monitoring and Data Acquisition

Acoustic monitoring was completed using two SM3BAT detectors that were deployed on June 28 and 29, 2017 by PEGC to collect bat echolocation calls for the Ambershaw study site. The SM3BAT detector is capable of 16-bit digital high-speed sampling, using ultrasonic microphones designed specifically for recording bat echolocation calls (Wildlife Acoustics Inc. 2011). Two SM3BAT bioacoustics monitors were deployed in 2017, one at West Hawk Road using 1 ultrasonic microphone and one at Barry's Road using 2 ultrasonic microphones to collect acoustic data from June 29 to August 4, 2017 (see **Figure B** and **C**). These sites were not within the proposed bulk sampler area and were chosen based on a screening for areas with potential high quality snag trees. The recorders were programmed to record from dusk to dawn, with recordings triggered when ultrasonic signals from the bats were detected in the vicinity. Ardea Biological Consulting Ltd. (Ardea) was contracted by PEGC to provide an analysis of the recordings obtained at the project site. Ardea has completed numerous studies using the SM3BAT and Kaleidoscope software.

## 2. Existing Conditions and Results

### 2.1 Vegetation Community Classification

The survey sites were at the proposed bulk sample site (east of Highway 622), an area along Barry's Road (west of Highway 622) and another area along West Hawk Road (east of Highway 622). The two 2017 sites for deployment of the acoustic monitors are primarily comprised of areas of more mature Red Ash (*Fraxinus pennsylvanica*) and Trembling Aspen (*Populus tremuloides*), as well as White Birch (*Betula papyrifera*) dominated mixedwood forests along with occasional Black Spruce (*Picea mariana*) at the Barry's Road site; and, Jack Pine (*Pinus banksiana*) dominated coniferous forest at the West Hawk Road site. The bulk sample site consisted of a broad representation of deciduous and mixedwood forest and well as coniferous

swamp (**Photos 1 to 3**). Descriptions of each vegetation communities are provided below in **Table 1** and correspond to plots shown on **Figure A, B and C**.

**Table 1. Vegetation Communities Classifications of 2017 data collection sites for bat surveys**

Location	Site	Forestry Code	NW Ontario Code	Description
Bulk Sampling Pit	Survey Plots 1 to 6	White Birch (Bw)	Hardwood – Fir – Spruce Mixedwood: Fresh, Fine Loamy – Clayey Soil (ES29)	The canopy is dominated by White Birch ( <i>Betula papyrifera</i> ). The sub-canopy is composed of Mountain Maple ( <i>Acer spicatum</i> ) and Eastern White Cedar ( <i>Thuja occidentalis</i> ) The understory consists of Cinnamon Fern ( <i>Osmunda cinnamomeum</i> ) and Northern Bush-honeysuckle ( <i>Diervilla lonicera</i> ). The herbaceous layer primarily consists of Clubmoss ( <i>Lycopodium</i> sp.), Wild-lily-of-the-valley ( <i>Maianthemum canadense</i> ), Yellow Clintonia ( <i>Clintonia borealis</i> ) and Large-leaved Aster ( <i>Eurybia macrophylla</i> ).
	Survey Plots 7 to 8	Black Spruce (Bs)	Intermediate Swamp: Black Spruce (Tamarack): Organic Soil (ES36)	The canopy is composed of Black Spruce ( <i>Picea mariana</i> ) and Tamarack. The sub-canopy is composed of Balsam Willow ( <i>Salix pyrifolia</i> ), Broad-leaved Cattail ( <i>Typha latifolia</i> ) and Speckled Alder ( <i>Alnus incana</i> spp. <i>rugosa</i> ). Other herbaceous species include sphagnum, Bluejoint Reedgrass ( <i>Calamagrostis canadensis</i> ) and sedge species ( <i>Carex</i> ) species.
	Survey Plots 9 to 25	White Birch (Bw)	Hardwood – Fir – Spruce Mixedwood: Sandy Soil (ES16)	The canopy is dominated by White Birch and Balsam Poplar. The sub-canopy is composed of Bebb's Willow ( <i>Salix bebbiana</i> ), Trembling Aspen and Alder species ( <i>Alnus</i> ). The understory consists of Eastern Bracken Fern, North American Red Raspberry ( <i>Rubus idaeus</i> ssp. <i>strigosus</i> ). The herbaceous layer primarily consists of wild strawberry ( <i>Fragaria virginiana</i> ssp. <i>virginiana</i> ) and pearly everlasting ( <i>Anaphalis margaritacea</i> ).
Barry's Road	Bat Detector and Survey Plots 44 to 47	White Birch (Bw)	Hardwood – Fir – Spruce Mixedwood: Sandy Soil (ES16)	The canopy is composed of White Birch and White Ash ( <i>Fraxinus americana</i> ). The sub-canopy is composed of Mountain Maple and Choke Cherry ( <i>Prunus virginiana</i> ). The understory consists of Eastern Bracken Fern ( <i>Pteridium aquilinum</i> var. <i>latiusculum</i> ) Mountain Maple and White Ash. The herbaceous layer primarily consists of yellow clintonia ( <i>Clintonia borealis</i> ) and Large-leaved Aster ( <i>Eurybia macrophylla</i> ).
West Hawk Road	Bat Detector and Survey Plot 51 and 52	Jack Pine (Pj)	Spruce-Pine: Fresh, Sandy-Coarse Loamy Soil (ES22)	The canopy is dominated by Jack Pine ( <i>Pinus banksiana</i> ). The sub-canopy is composed of White Birch and White Spruce ( <i>Picea glauca</i> ). The understory consists of Northern Bush-honeysuckle and Wild Sarsaparilla ( <i>Aralia nudicaulis</i> ). The herbaceous layer primarily consists Yellow Clintonia, sphagnum moss and Bunchberry ( <i>Cornus canadensis</i> ).



*Photo 1. Barry's Road Site*



*Photo 2. West Hawk Road Site*



*Photo 3. Bulk Sample Pit Site*

## 2.2 Phase 1: Bat Habitat Suitability Assessment

A Bat Habitat Suitability Assessment was completed using aerial photography of the study area and the MNRF Forest Resources Inventory (FRI) polygon mapping and data. Where available, the plots were chosen in areas representative of more mature forest with snag tree representation that may be suitable for bat habitat and open areas of past disturbance to compare habitat availability. SAR bats establish maternity roosts in treed areas consisting of deciduous, coniferous or mixed tree species. The trees should be considered as potential suitable maternity roost habitat if they are at least 10 cm dbh in any deciduous, coniferous or mixed wood ecosite (MNRF 2017). The Ecosite communities identified for the study area, as described above, include deciduous and coniferous ecosites, with the presence of larger trees at least 10 cm dbh, thus the potential habitat opportunities for bat maternity roost habitat are found at each of the sites.

## 2.3 Phase II: Identification of Suitable Maternity Roost Trees

According to the *Survey Protocol for Species at Risk Bats within Treed Habitats* (MNRF, 2017), the definition of a snag is “any standing live or dead tree greater than 10 cm dbh with cracks, crevices, hollows, cavities, and/or naturally exfoliating bark”.

Little Brown Myotis and Northern Myotis, choose roosting locations in trees with loose or naturally exfoliating bark, cavities, hollows or cracks. The study area was surveyed at 25 designated plots for the proposed bulk sampling pit (**Figure A**), 2 plots at the West Hawk Road site (**Figure C**), and 5 plots at the Barry’s Road site (**Figure B**). The results from the November 2017 survey identified 42 trees in the general area of the

proposed bulk sampling site as potential maternity roost habitat for bat species. At the West Hawk Road site there were no suitable snag trees identified, and 4 snag trees recorded at the Barry's Road site.

## 2.4 Phase III: Acoustic Surveys

### 2017

As discussed in Section 1.3, two SM3BAT detectors that were deployed on June 28 and 29, 2017. One monitor was set up at West Hawk Road using 1 ultrasonic microphone and one at Barry's Road using 2 ultrasonic microphones to collect acoustic data from June 29 to August 4, 2017. These sites were not within the proposed bulk sampler area and were chosen based on a generally screening for areas with potential high quality snag trees (i.e., Phase II surveys were not completed prior to deploying the monitors). Subsequent to the deployment, the November 2017 Bat Habitat Suitability Assessment results were used to further interpret the June acoustic data results within the West Hawk Road and Barry's Road sites.

### 2018

The results from Phase II surveys completed in November 2017 were used to identify the best suitable maternity roost trees for the deployment of three SM3BAT detectors in 2018. Analysis of the data collect is pending. An addendum will be provided to discuss this assessment and the 2018 acoustic monitoring results, see **Figure A** and **Figure D** for locations.

## 2.5 Data Analysis

The following overview and summary of the acoustic data analysis completed by Ardea is provided. A detailed discuss of the analysis will be provided in the final baseline report.

### 2.5.1 Bat Call Classification

The Kaleidoscope software was used by Ardea to process WAV format files recorded by the bioacoustic equipment deployed in the field. The file filter function in the software was set to an echolocation call signal-of-interest range from 8 to 120 kHz and a call duration time range of 2 to 500 milliseconds. The automatic bat species classifier selected in the software was the *Ontario* option from *Bats of North America ver. 4.3.0.*, contained within the Kaleidoscope software, and included the eight species outlined in **Table 2**.

**Table 2. Bat species analyzed by the Kaleidoscope™ Pro (ver. 4.3) classification software and their conservation status in Ontario.**

Common Name	Scientific Name	Conservation Status		
		COSEWIC <sup>1</sup>	SARA <sup>2</sup>	SARO <sup>3</sup>
Big Brown Bat	<i>Eptesicus fuscus</i>			
Eastern Red Bat	<i>Lasiurus borealis</i>			
Hoary Bat	<i>Lasiurus cinereus</i>			
Silver-haired Bat	<i>Lasionycteris noctivagans</i>			
Eastern Small-footed Bat	<i>Myotis leibii</i>	Endangered	Endangered	Endangered
Little Brown Myotis	<i>Myotis lucifugus</i>	Endangered	Endangered	Endangered

Common Name	Scientific Name	Conservation Status		
		COSEWIC <sup>1</sup>	SARA <sup>2</sup>	SARO <sup>3</sup>
Northern Myotis	<i>Myotis septentrionalis</i>	Endangered	Endangered	Endangered
Tricolored Bat	<i>Perimyotis subflavus</i>	Endangered	Endangered	Endangered
Notes: 1: Committee for the Status of Wildlife in Canada (Federal) 2: Species at Risk Act (Federal) 3: Species at Risk in Ontario (Provincial)				

A total of 132 full spectrum recording files were created by the units - 72 files from Unit 71 and 60 files from Unit 79. Recordings were obtained from dawn to dusk during a five-week recording period from June 29<sup>th</sup> to August 4<sup>th</sup>, 2017.

### 2.5.2 Kaleidoscope™ Pro Software Analysis

The 63 files were obtained from the recording units from June 29 to August 4, 2017 in the Ambershaw project area were analyzed and a total of 132 output files were created by the Kaleidoscope software. A breakdown of the analysis for identified bat species, NoID and Noise output files will be summarized in the baseline report. The number of recordings varied over the dates, with the maximum recordings occurring on July 24<sup>th</sup>.

Five bat species were identified in the Ambershaw project area by the Kaleidoscope software: Eastern Red bat (*Lasiurus borealis*), Hoary bat (*Lasiurus cinereus*), Silver-Haired bat (*Lasionycteris noctivagans*), Little Brown Myotis and Northern Myotis. No files were identified by the software for Big Brown bat (*Eptesicus fuscus*), Eastern Small-footed bat (*Myotis leibii*), or Tricolored bat. The two listed species identified by the software are Little Brown Myotis and Northern Myotis, which are listed as Endangered.

During the review of the classified recording files, the two bat recording units as well as the individual ultrasonic microphones on the recorders had different numbers of bats identified. These differences are assumed to be a function of microphone placement on the Barry's Road acoustic monitor, which had two microphones, with one of the microphones recording calls more frequently than the other. Based on the file data, it appears that the West Hawk Road acoustic monitor was within an area used more frequently by bats.

Two of the bat species (Hoary Bat and Silver-Haired Bat) identified by the Kaleidoscope software are generally difficult to distinguish from each other as their calls overlap to some degree in frequency range and call duration (HSU Bat Lab 2011). Little Brown Myotis is also a species that can overlap with a number of other Myotis species, as well as with Eastern Red and Tri-colored bats. In nearly all cases, the software provided alternative identifications for the call pulses analyzed, suggesting that multiple species were within the acoustic monitoring sites.



## 2.6 Recorded SAR Bats

### 2.6.1 *Little Brown Myotis*

Little Brown myotis was classified in 365 pulses within 25 files and represents the second highest number of detections during the five-week recording period. The number of pulses within the files ranged from 7 to 48 with an overall high number of pulses in each file in comparison to some of the other species. The vast majority (90%) of the pulses were detected at the Barry's Road site suggesting a concentration of abundance within this habitat type and location.

### 2.6.2 *Northern Myotis*

Northern Myotis was classified in 2 pulses within 1 file and represents the least abundant number of detections during the five-week recording period. This single detection was captured by the acoustic monitor at the West Hawk Road site. The limited amount of data for this species does not allow for significant comparisons to published call characteristics; however, the similarity in Fc, Fmin and duration suggests these pulses are likely Northern Myotis.

The visual review of the single auto identified Northern Myotis file confirmed the pulses match call pulse characteristics of this species. The frequency range of these pulses distinguish this species from the misidentified Eastern Red bat identified pulses within this file. One of the pulses was matched to a reference pulse (MYOSEP.2) and looked to be a very close match.

Overall, based on the software classification and visual review of the files, Northern Myotis was identified as potentially present, but it may not be a resident as it was only detected once during the sampling period and may have been moving through the area.

## 3. Conclusions

Based on the results of the Kaleidoscope software classification and the review of the classification outputs and sonograms, three species of bats were conclusively identified as being present in the general study area: Hoary bat, Silver-Haired bat and Little Brown Myotis. Eastern Red bat and Northern Myotis, were also identified as statistically present through the classification software, with the visual review finding several pulses that matched reference pulses for those species. These species were identified as being likely present, but the very low number of pulses identified, suggests that these species may not be resident or regular users of the project area.

Of the four-bat species listed as species at risk in Ontario (Eastern Small-Footed bat, Little Brown Myotis, Northern Myotis and Tricolored bat) only Little Brown Myotis was identified as being present, while Northern Myotis was identified as potentially being present. Other listed species were classified by the Kaleidoscope software but could not be conclusively identified through a visual review of the files. These results are specific to the two acoustic monitoring sites (Barry's Road site and West Hawk Road site), which are located outside of the proposed bulk sample site.

Additional acoustic monitoring as per the MNRF Survey Protocols (2017) was completed in the proposed bulk sample site in 2018 and pending the analysis of this data, the results should provide more sufficient



**Memorandum**

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data to determine if Little Brown Myotis, Northern Myotis or any other SAR listed bat species are in the project area.

Should you have any questions regarding this technical memorandum, please do not hesitate to contact Dirk Janas at 705-607-0182 (ext. 112) or [dirk@pecg.ca](mailto:dirk@pecg.ca).

Yours truly,

**Palmer Environmental Consulting Group Inc.**

**Prepared By:** <Original signed by>

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Regan Augustine, B.Sc.  
Ecologist

**Reviewed By:** <Original signed by>

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Natalie Dunn, B.Sc., PG[ER]  
Ecologist, Certified Arborist

**Approved By:** <Original signed by>

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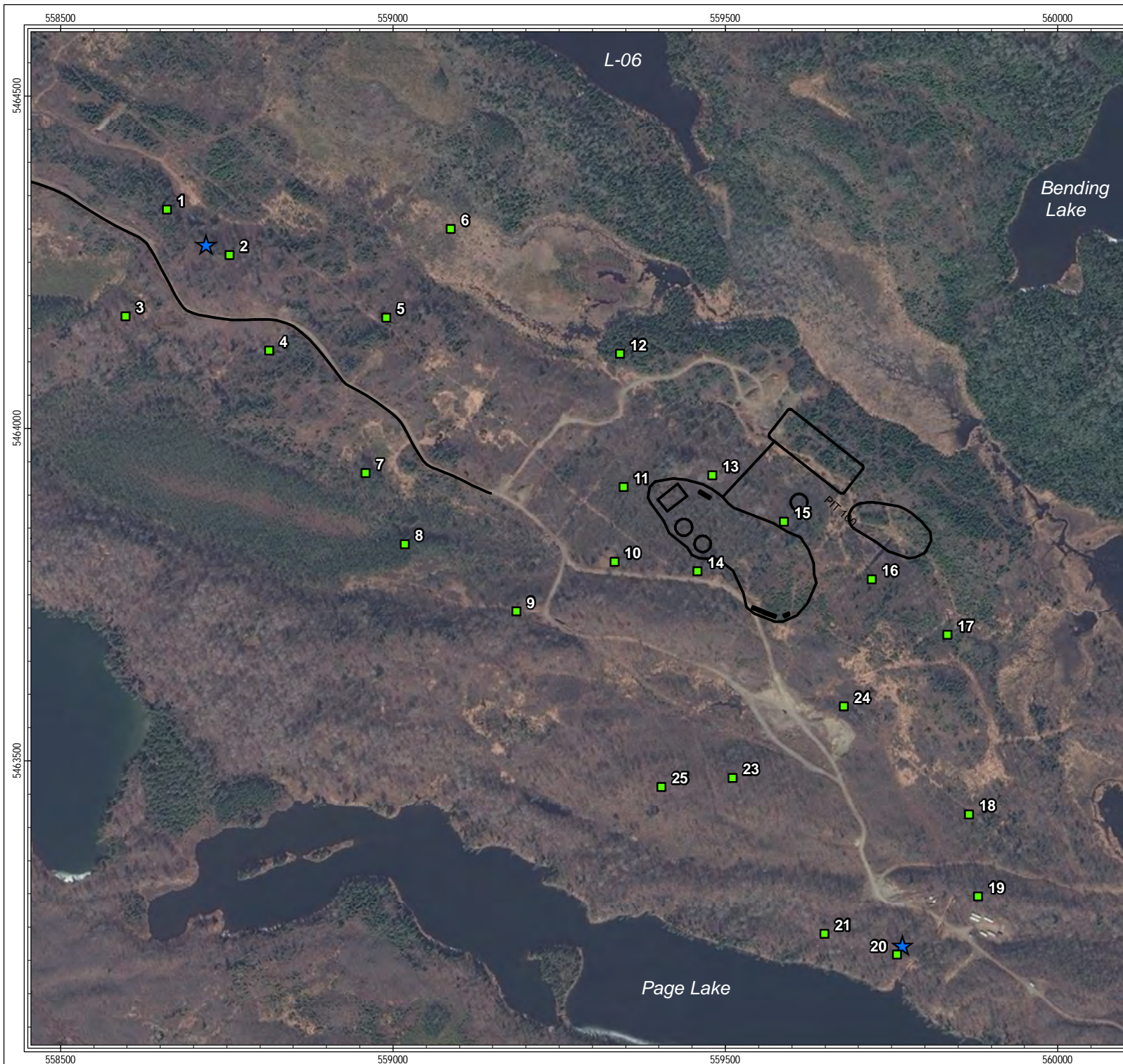
Dirk Janas, B.Sc.  
Principal, Senior Ecologist



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## References

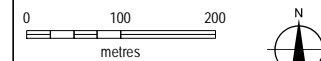
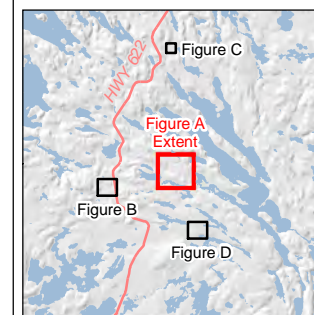
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**Ambershaw Metallics, Inc.**

**LEGEND**

- Bat tree survey plot centre
- ★ Acoustic monitoring location (2018)
- Proposed Project Site Facilities Layout



DRAWN: B. Elder  
 CHECKED: N. Dunn  
 PROJECT: 17018  
 DATE: Mar 15, 2019

Scale 1:8000  
 UTM Zone 15N  
 NAD 1983



**PALMER ENVIRONMENTAL CONSULTING GROUP INC.**

CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**DRAFT**

Bat Snag Survey - Bulk Sampling Pit

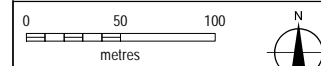
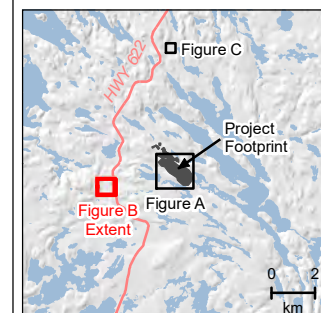
**FIGURE A**



**Ambershaw Metallics, Inc.**

**LEGEND**

- Bat tree survey plot centre
- ★ Acoustic monitoring location (2017)



DRAWN: B. Elder  
 CHECKED: R. Augustine  
 PROJECT: 17018  
 DATE: Sep 26, 2018

Scale 1:4000  
 UTM Zone 15N  
 NAD 1983



**PALMER ENVIRONMENTAL CONSULTING GROUP INC.**

CLIENT: Ambershaw Metallics Inc.  
 PROJECT: Bending Lake

**DRAFT**

Bat Snag Survey - Barry's Road

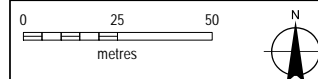
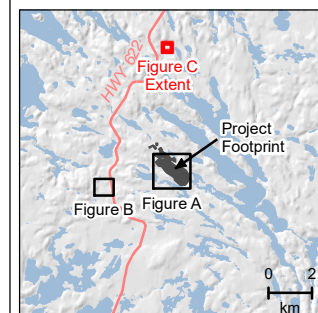
**FIGURE B**



**Ambershaw Metallics, Inc.**

**LEGEND**

- Bat tree survey plot centre
- ★ Acoustic monitoring location (2017)



DRAWN: B. Elder  
 CHECKED: R. Augustine  
 PROJECT: 17018  
 DATE: Sep 26, 2018

Scale 1:2000  
 UTM Zone 15N  
 NAD 1983



**PALMER ENVIRONMENTAL CONSULTING GROUP INC.**

**CLIENT:** Ambershaw Metallics Inc.  
**PROJECT:** Bending Lake

**DRAFT**

Bat Snag Survey -  
 West Hawk Road

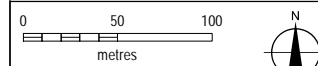
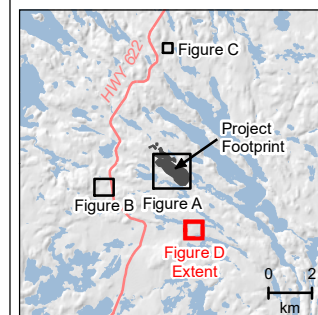
**FIGURE C**



**Ambershaw Metallics, Inc.**

**LEGEND**

- ★ Acoustic monitoring location (2018)



DRAWN: B. Elder  
 CHECKED: N. Dunn  
 PROJECT: 17018  
 DATE: Sep 27, 2018

Scale 1:4000  
 UTM Zone 15N  
 NAD 1983



**PALMER ENVIRONMENTAL CONSULTING GROUP INC.**

**CLIENT:** Ambershaw Metallics Inc.  
**PROJECT:** Bending Lake

**DRAFT**

**Bat Snag Survey**

**FIGURE D**

# Appendix D

Compiled List of *Ecosites of Ontario* (Banton *et al.*, 2009) for Project Study Area

**Appendix C - Compiled List of *Ecosites of Ontario* (Banton *et al.*, 2009) for Project Study Area**

<b>Ecosite Code</b>	<b>Ecosite Name</b>	<b>Associated Vegetation Survey Plots</b>
<i>Terrestrial Ecosites</i>		
B007X	Active Mineral Barren	
B012	Very Shallow Dry/Fresh Pine-Black Spruce Conifer	12-2, P17-2
B034	Dry Sandy Black Spruce-Jack Pine Dominated	13-3, 21-5
B040	Dry, Sandy: Aspen - Birch Hardwood	P17-9
B048	Dry to Fresh, Coarse: Red Pine - White Pine Conifer	
B049	Dry to Fresh, Coarse: Jack Pine - Black Spruce Dominated	20-7, 21-1
B050	Dry to Fresh, Coarse: Pine - Black Spruce Conifer	21-3
B052	Dry to Fresh, Coarse: Spruce - Fir Conifer	
B054	Dry to Fresh, Coarse: Red Pine - White Pine Mixedwood	
B055	Dry to Fresh, Coarse: Aspen - Birch Hardwood	17-2, 19-2, 19-6, 19-7, 20-1, P17-1, P17-8, P18-35, P18-43
B065	Moist, Coarse: Pine - Black Spruce Conifer	22-1, 22-2
B070	Moist, Coarse: Aspen - Birch Hardwood	19-9
B076	Moist, Coarse: Mixedwood	P17-8
B104	Fresh, Silty to Fine Loamy: Aspen - Birch Hardwood	20-3, 29-1, 29-2, 19-5
B108	Fresh, Silty to Fine Loamy: Mixedwood	P17-5, P18-39
B119	Moist, Fine: Aspen - Birch Hardwood	P18-32
B125	Moist, Fine: Mixedwood	P18-38, P18-41
B165	Open Rock Barren	
B197X	Pavement/Concrete	
<i>Wetland Ecosites</i>		
B126	Treed Bog	P17-4, P17-10, P18-33, P18-34, 34-1
B127	Organic Poor Conifer Swamp	37-2, P18-44, P18-45
B128	Organic Intermediate Conifer Swamp	36-1, P18-31
B129	Organic Rich Conifer Swamp	37-1
B130	Intolerant Hardwood Swamp	
B134	Mineral Thicket Swamp	P18-40
B135	Organic Thicket Swamp	P17-6
B136	Sparse Treed Fen	P18-18, P18-20, P18-30
B138	Open Bog	P18-21
B139	Poor Fen	P17-3, P18-17, P18-22
B142	Mineral Meadow Marsh	P17-12, P18-12, P18-13, P18-14, P18-15, P18-16
B146	Open Shore Fen	P18-23, P18-25, P18-26, P18-27
B148	Mineral Shallow Marsh	P17-7, P18-2, P18-19, P18-24
B149	Organic Shallow Marsh	P18-9, P18-10, P18-11



# Appendix E

List of Plant Species recorded from Project Study Area

## Appendix D - List of Plant Species recorded from the Project Study Area

Scientific Name	Common Name	SRANK	Regional Rarity Thunderbay	cc	cw
<i>Acer rubrum</i>	Red Maple	S5		4	0
<i>Acer spicatum</i>	Mountain Maple	S5		6	3
<i>Acorus americanus</i>	American Sweetflag	S5		8	-5
<i>Alnus alnobetula</i> ssp. <i>crispa</i>	American green Alder	S5			
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder	S5		6	-5
<i>Anaphalis margaritacea</i>	Pearly Everlasting	S5		3	5
<i>Andromeda polifolia</i> var. <i>latifolia</i>	Glaucous-leaved bog Rosemary	S5		10	-5
<i>Apocynum cannabinum</i>	Hemp Dogbane	S4?			
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	S5		4	3
<i>Aster macrophyllus</i>	Large-leaved Aster	S5		5	5
<i>Aster</i> sp.	Aster species				
<i>Athyrium filix-femina</i> var. <i>angustum</i>	Northeastern Lady Fern	S5		4	0
<i>Betula papyrifera</i>	Paper Birch	S5		2	2
<i>Brasenia schreberi</i>	Watershield	S5		7	-5
<i>Calamagrostis canadensis</i>	Bluejoint Reedgrass	S5		4	-5
<i>Calla palustris</i>	Wild Calla	S5		8	-5
<i>Caltha palustris</i>	Yellow Marsh Marigold	S5		5	-5
<i>Calystegia</i> sp.	Bindweed species				
<i>Capnoides sempervirens</i>	Pink Corydalis	S5		7	5
<i>Carex aquatilis</i>	Water Sedge	S5		7	-5
<i>Carex canescens</i> ssp. <i>canescens</i>	Hoary Sedge	S5		7	-5
<i>Carex cephaloidea</i>	Oval-headed Sedge	S5		6	2
<i>Carex gynocrates</i>	Northern Bog Sedge	S5		10	-5
<i>Carex hystericina</i>	Porcupine Sedge	S5		5	-5
<i>Carex intumescens</i>	Bladdar Sedge	S5		6	-4
<i>Carex lacustris</i>	Lakebank Sedge	S5		5	-5
<i>Carex pauciflora</i>	Few-flowered Sedge	S5		10	-5
<i>Carex rostrata</i>	Beaked Sedge	SU			
<i>Carex</i> sp.	Sedge species				
<i>Carex stipata</i>	Awl-fruited Sedge	S5		3	-5
<i>Carex stricta</i>	Tussock Sedge	S5		4	-5
<i>Carex tenax</i>	Wire Sedge				
<i>Carex trisperma</i>	Three-seeded Sedge	S5		9	-5
<i>Chamaedaphne calyculata</i>	Leatherleaf	S5		9	-5
<i>Clintonia borealis</i>	yellow clintonia	S5		7	-1
<i>Coptis trifolia</i>	Goldthread	S5		7	-3
<i>Cornus canadensis</i>	Bunchberry	S5		7	0
<i>Cornus sericea</i>	Red-osier Dogwood	S5		2	-3
<i>Corylus cornuta</i> ssp. <i>cornuta</i>	Beaked Hazelnut	S5		5	5

Appendix D - List of Plant Species recorded from the Project Study Area

<i>Cypripedium acaule</i>	Pink Lady's-slipper	S5		7	-3
<i>Dichanthelium lanuginosum</i>	Woolly Panicgrass	S5		2	0
<i>Diervilla lonicera</i>	Northern Bush-honeysuckle	S5		5	5
<i>Diphasiastrum</i> sp.	Clubmoss Species				
<i>Drosera rotundifolia</i>	Round-leaved Sundew	S5		7	-5
<i>Drosera</i> sp.	Sundew species				
<i>Dryopteris carthusiana</i>	Spinulose Wood Fern	S5		5	-2
<i>Dryopteris clintoniana</i>	Clinton's Wood Fern	S4		7	-4
<i>Dryopteris</i> sp.	Wood Fern species				
<i>Dulichium arundinaceum</i>	Three-way Sedge			7	-5
<i>Eleocharis palustris</i>	Common Spikerush	S5		6	-5
<i>Elymus repens</i>	Quackgrass	SE5		0	3
<i>Equisetum fluviatile</i>	Water Horsetail	S5		7	-5
<i>Equisetum palustre</i>	Marsh Horsetail	S5		10	-3
<i>Equisetum pratense</i>	Meadow Horsetail	S5		8	-3
<i>Equisetum scirpoides</i>	Dwarf-scouring Rush	S5		7	-1
<i>Equisetum sylvaticum</i>	Woodland Horsetail	S5		7	-3
<i>Eriophorum</i> sp.	Cotton-grass species				
<i>Eriophorum vaginatum</i> ssp. <i>spissum</i>	Dense Cottongrass	S5		10	-5
<i>Eutrochium maculatum</i> var. <i>maculatum</i>	Spotted Joe-pye Weed	S5		3	-5
<i>Fragaria vesca</i> ssp. <i>americana</i>	Woodland Strawberry	S5		4	4
<i>Fragaria virginiana</i> ssp. <i>virginiana</i>	wild Strawberry	SU		2	1
<i>Fraxinus americana</i>	White Ash	S5		4	3
<i>Fraxinus pennsylvanica</i>	Green Ash	S5		3	-3
<i>Galium aparine</i>	Common Bedstraw	S5		4	3
<i>Galium asprellum</i>	Rough Bedstraw	S5		6	-5
<i>Galium palustre</i>	Common Marsh Bedstraw	S5	R	5	-5
<i>Galium triflorum</i>	three-flowered bedstraw	S5		4	2
<i>Gaultheria hispidula</i>	Creeping Snowberry	S5		8	-3
<i>Glyceria striata</i>	Fowl Manna Grass	S5		3	-5
<i>Gymnocarpium dryopteris</i>	Common Oak Fern	S5		7	0
<i>Hieracium praealtum</i>	King Devil Hawkweed	SE1			
<i>Hieracium</i> sp.	Hawkweed species				
<i>Hypericum fraseri</i>	Fraser's St. John's-wort	S5		7	-5
<i>Impatiens capensis</i>	Spotted Jewelweed	S5		4	-3
<i>Iris versicolor</i>	Blue Flag	S5		5	-5

Appendix D - List of Plant Species recorded from the Project Study Area

<i>Juncus filiformis</i>	Thread Rush	S4S5		8	-3
<i>Juncus</i> sp.	Rush species				
<i>Larix laricina</i>	Tamarack	S5		7	-3
<i>Leersia oryzoides</i>	Rice cut grass	S5	R	3	-5
<i>Lemna minor</i>	Small Duckweed	S5		2	-5
<i>Linnaea borealis</i> ssp. <i>longiflora</i>	Long-tube Twinflower	S5		7	0
<i>Lysimachia borealis</i>	Northern Starflower	S5		6	-1
<i>Lysimachia thyrsoiflora</i>	Tufted Yellow Loosestrife	S5		7	-5
<i>Maianthemum canadense</i>	Wild-lily-of-the-valley	S5		5	0
<i>Maianthemum trifolium</i>	Three-leaved false Solomon's Seal	S5		10	-5
<i>Mentha arvensis</i>	Field Mint	S5		3	-3
<i>Myrica gale</i>	Sweet Gale	S5		6	-5
<i>Nuphar</i> sp.	Pond lily species				
<i>Onoclea sensibilis</i>	Sensitive Fern	S5		4	-3
<i>Osmundastrum cinnamomeum</i>	Cinnamon Fern	S5	R	7	-3
<i>Parthenocissus vitacea</i>	Thicket Creeper	S5		3	3
<i>Petasites frigidus</i> var. <i>sagittatus</i>	Arrow-leaved coltsfoot	S5			
<i>Picea glauca</i>	White Spruce	S5		6	3
<i>Picea mariana</i>	Black Spruce	S5		8	-3
<i>Pilosella aurantiaca</i>	Orange Hawkweed	SE5		0	5
<i>Pinus banksiana</i>	Jack Pine	S5		9	3
<i>Pinus resinosa</i>	Red Pine	S5		8	3
<i>Pinus strobus</i>	Eastern White Pine	S5		4	3
<i>Poa</i> sp.	Grass species				
<i>Polygonatum pubescens</i>	Hairy Solomon's Seal	S5	R	5	5
<i>Polygonum cilinode</i>	Fringed Black Bindweed	S5		2	5
<i>Polypodium virginianum</i>	Rock Polypody	S5		6	5
<i>Populus balsamifera</i>	Balsam Poplar	S5		4	-3
<i>Populus tremuloides</i>	Trembling Aspen	S5		2	0
<i>Potamogeton</i> sp.	Pondweed species				
<i>Potentilla palustris</i>	Marsh Cinquefoil	S5		7	-5
<i>Prunus pensylvanica</i>	Pin Cherry	S5		3	4
<i>Prunus serotina</i>	Black Cherry	S5		3	3
<i>Prunus</i> sp.	Cherry species				
<i>Prunus virginiana</i> var. <i>virginiana</i>	Choke cherry	S5		2	1
<i>Pteridium aquilinum</i> var. <i>latiusculum</i>	Bracken Fern	S5		2	3
<i>Pyrola minor</i>	Lesser Pyrola	S4			
<i>Pyrus decora</i>	Pear			0	5

Appendix D - List of Plant Species recorded from the Project Study Area

<i>Ranunculus flammula</i> var. <i>reptans</i>	Creeping Spearwort	S5		8	-5
<i>Rhododendron groenlandicum</i>	Common Labrador Tea	S5		9	-5
<i>Rhynchospora alba</i>	White Beakrush			10	-5
<i>Ribes americanum</i>	American Black Currant	S5		4	-3
<i>Ribes lacustre</i>	Bristly Black Currant	S5		7	-3
<i>Rosa multiflora</i>	Multiflora Rose	SE4		0	3
<i>Rubus chamaemorus</i>	Cloudberry	S5			
<i>Rubus idaeus</i> ssp. <i>strigosus</i>	Red Raspberry	S5		0	-2
<i>Rubus pubescens</i>	Dwarf Raspberry	S5		4	-4
<i>Sagittaria latifolia</i>	Broad-leaved Arrowhead	S5		4	-5
<i>Sagittaria</i> sp.	Arrowhead species				
<i>Salix bebbiana</i>	Bebb's Willow	S5		4	-4
<i>Salix discolor</i>	Pussy Willow	S5		3	-3
<i>Salix pedicellaris</i>	Bog Willow	S5		9	-5
<i>Salix pyrifolia</i>	Balsam Willow	S5		10	-4
<i>Salix</i> sp.	Willow species				
<i>Sambucus canadensis</i>	Common Elderberry	S5		5	-2
<i>Sarracenia purpurea</i>	Northern Pitcher-plant	S5		10	-5
<i>Schoenoplectus acutus</i> var. <i>acutus</i>	Hard-stemmed Bulrush	S5		6	-5
<i>Schoenoplectus tabernaemontani</i>	Soft-stemmed Bulrush	S5		5	-5
<i>Scirpus cyperinus</i>	Cottongrass Bulrush	S5		4	-5
<i>Scirpus microcarpus</i>	Red-tinged Bulrush	S5		4	-5
<i>Smilax</i> sp.	Greenbrier Species				
<i>Solidago macrophylla</i>	Large-leaved Goldenrod	S5	R		
<i>Solidago</i> sp.	Goldenrod species				
<i>Sorbus americana</i>	Mountain-ash	S5		0	0
<i>Spiraea alba</i>	white meadowsweet	S5		3	-4
<i>Spiraea</i> sp.	Meadow-sweet Species				
<i>Streptopus amplexifolius</i>	Clasping-leaved Twisted-stalk	S4S5		10	-1
<i>Symphyotrichum cordifolium</i>	Heart-leaved Aster	S5		5	5
<i>Thuja occidentalis</i>	Eastern White Cedar	S5		4	-3
<i>Trillium</i> sp.	Trillium species				
<i>Tsuga canadensis</i>	Eastern Hemlock	S5		7	3
<i>Typha latifolia</i>	Broad-leaved Cattail	S5		3	-5
<i>Utricularia intermedia</i>	flat-leaved bladderwort	S5		8	-5

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<i>Utricularia vulgaris ssp. macrorhiza</i>	Greater Bladderwort			4	-5
<i>Vaccinium angustifolium</i>	early lowbush blueberry	S5		6	3
<i>Vaccinium macrocarpon</i>	Large Cranberry	S4S5	R	10	-5
<i>Vaccinium myrtilloides</i>	Velvet-leaved Blueberry	S5		7	-2
<i>Vaccinium oxycoccos</i>	Small Cranberry	S5		10	-5
<i>Vicia cracca</i>	Tufted Vetch	SE5		0	5
<i>Vicia</i> sp.	Vetch species				
<i>Viola renifolia</i>	Kidney-leaved Violet	S5		7	-3
<i>Viola</i> sp.	Violet species				

# Appendix F

Significant Wildlife Habitat Screening

SWH Type	Candidate SWH		Candidate (Y/N)	Rationale	Evaluation of Significance
	ELC Eco-sites	Habitat Criteria			
<b>Seasonal Concentration Areas of Animals</b>					
Moose Late Winter Cover	B036 - 038, B049-053, B065-068, B081-087, B098-102, B114-117	Late winter moose habitat is characterized by dense conifer cover with greater than 60% canopy closure and >6m in height. Upland sites are preferred.	N	B049, B050 and B052, are communities present with dense conifer canopy with greater than 60% canopy cover and >6m in height but conifer stands <50ha	
Waterfowl Stopover and Staging Areas (Terrestrial)	B060-062, B077-079, B093-095, B109-111	Fields with sheet water during Spring (mid March to May). Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl and flood plains (flooded river banks).	N	No habitat present.	None
Waterfowl Stopover and Staging Areas (Aquatic)	B142-152	Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration.	Y	Communities B142, B146 and B148 are present, which include bays connected to large bodies of water such as Bending Lake for Waterfowl Stopover and Staging Areas. Observation of 60 in the area supports the conclusion of Candidate SWH	Aggregations of 100 or more individuals were not observed.
Shorebird Migratory Stopover Area	B005-006, B160-162, B170-172, B176-178, B186-188, B204, B207	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats.	N	No habitat present.	None
Bat Hibernacula	Hibernacula may be found in abandoned caves, mine shafts, underground foundations (Karsts) and these ecosites: B158-159, B164-165, B174-175, B180-181	Hibernacula may be found in abandoned caves, mine shafts, underground foundations and karsts.	N	Ecosite B165, rock barren is present on site but no caves, mine shafts, underground foundations or karsts are present.	None
Bat Maternity Colonies	Maternity colonies are found in treed Ecosites. B015-019, B023-028, B039-043, B054-059, B069-076, B087-092, B103-108, B118-125	Maternity colonies can be found in tree cavities, vegetation and often in buildings. Maternity colonies located in Mature (dominant trees > 80yrs old) deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees.	N	Ecosites B040, B055, B070 and B108 are present on site but there is not a significant amount of trees > 80yrs old.	A bat maternity roost survey was undertaken based on assessing tree cavities following an approach using methods outlined the Survey Protocol for Species at Risk Bats within Treed Habitats (MNR 2017) to determine snag density. There was not 21 snags/ha.



Bat Migratory Stopover Area	No specific ELC types.	Long distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. The location and characteristics of stopover habitats are generally unknown.	Y	The site is not located near the Great Lakes and there are no landforms present (ex. Ridges or peninsulas) present that would concentrate bats.	Criteria is not currently defined.
Turtle Wintering Area	B128-142, B145-152	Wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. Over-wintering sites are permanent water bodies with adequate Dissolved Oxygen.	Y	Ecosites B128, B129, B135, B138 and B146 which include permanent, large waterbodies deep enough not to freeze and have soft substrate are present on site. Turtle wintering area is not present in B136, B142 and 148 as they have mineral substrate.	Numerous Western Painted turtles were observed basking in Bending Lake bay in June. Turtle wintering area is present.
Reptile Hibernaculum	For all snakes, habitat may be found in any forested ecosite in northern Ontario. Talus, rock barren, crevice and caves are more typically related to these habitats: B008-028, B128-139, B158-159, B164-165, B167-172, B174-175, B180-181, B183-188	For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions.	Y	Ecosites B128, B129, B135, B136, B138 and B165 are present.	No snakes were observed and no areas of visible rock crevices were identified but it is assumed hibernaculum are present.
Colonially-nesting Bird Breeding Habitat (Bank and Cliff)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles (Bank Swallow). Cliff faces, bridge abutments, silos, barns (Cliff Swallows). B001-004, B157-159, B173-175	Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area.	N	No habitat present.	None
Colonially-nesting Bird Breeding Habitat (Tree/Shrubs)	May include a wide variety of tall treed ecosites. Habitat selection based on close proximity to water body or on island: B045-059, B064-076, B081-092, B097-108, B113-137, B161-162, B177-178	Most nests in trees are 11 to 15 m from ground, near the top of the tree.	N	Ecosites with mature trees include B049, B050, B052, B055, B070, B076, B108, B125, B127-B129, B135 and B136 but there are no standing dead trees	None

Colonially-nesting Bird Breeding Habitat (Ground)	Any rocky island or peninsula (natural or artificial) within a lake or large river: B160-165, B169-172, B176-181, B185-188. Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird): B008, B020-021, B030-031, B045-046, B061-062, B078-079, B094-095, B110-111, B142-144	Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas, lakes or large rivers. Brewers Blackbird colonies are found loosely on the ground or in low bushes in close proximity to streams and irrigation ditches within farmlands. Double-crested Cormorants prefer to nest in trees but will nest on the ground as well where trees are limited or have died and fallen.	N	Ecosite B165 is present but this rock barren is not an island or associated with water.	Field investigations did not identify any colonial nesting birds.
<b>Rare Vegetation Communities</b>					
Cliffs and Talus Slopes	Cliffs: B157-159, B173-175, B201-203. Talus: B166-168, B182-184	Cliffs: Vertical consolidate bedrock communities with a minimum height of 3 m and a slope of >60° or 173%. Talus: Rock accumulations at the base of cliffs, or former cobble beaches left behind after lake levels drop.	N	No cliffs and/or talus slopes were identified during background data review and field investigations.	Community type is not present on Site.
Rare Treed Type: Red and White Pine Stands	B011, B015, B023, B027, B033, B039, B048, B054, B064, B069, B081, B087, B097, B103, B113, B118	Red and White Pine stands attain their northern limit near the northern margin of the Clay Belt. They occur as sporadic, small stands and are generally found on dry, often exposed, and rocky sites.	N	Ecosite mapping and field investigations did not show community type.	Community type is not present on Site.
Rare Treed Type: Black Ash	B019, B028, B056, B059, B071, B076, B089, B092, B105, B108, B120, B125	Black Ash stands are found within low lying, predominantly alluvial material throughout the Clay Belt.	N	Ecosite mapping and field investigations did not show community type.	Communities B108 and B125 are present but there were no Black Ash trees observed.
Rare Treed Type: Elm	B019, B043, B056, B059, B071, B076, B089, B092, B105, B108, B120, B125	Elm stands are found within low lying, predominantly alluvial material throughout the Clay Belt.	N	Ecosite mapping and field investigations did not show community type.	Communities B108 and B125 are present but there were no Elm species observed.
Rare Treed Type: Oak	B017, B019, B028, B041, B043, B057, B059, B072, B076, B090, B092, B106, B108, B121, B125	Hardwood canopy within lower topographic positions. Fresh to moist moisture regimes with variable substrate textures.	N	Ecosite mapping and field investigations did not show community type.	Communities B108 and B125 are present but no Oak trees were observed.

Rare Treed Type: Red and Sugar Maple	B018, B019, B028, B042, B043, B058, B059, B073(Mh), B074(Mr), B075, B076, B091, B092, B107, B108, B122(Mh), B123(Mr), B124, B125	Hardwood canopy containing red and/or sugar maple. Generally on warmer-than-normal sites with a higher nutrient regime.	N	Ecosite mapping did not show community type.	Communities B108 and B125 are present with rare occurrences of Red Maple.
Rare Treed Type: Yellow Birch	B019, B028, B040, B043, B055, B059, B070, B076, B088, B092, B0104, B108, B119, B125	Hardwood canopy consisting mostly of yellow birch. Generally on warmer-than-normal sites with a higher nutrient regime.	N	Ecosite mapping and field investigations did not show community type.	Communities B040, B055, B070, B108 and B125 are present but there were no Yellow Birch observations.
Rock Barren	Calcareous Rock Barren: B179, B180, B181. Precambrian Rock Barren: B163, B164, B165	Exposed bedrock areas (mostly exposed rock with < 5 cm mineral or < 10 cm organic material) and < 25% vascular vegetation.	Y	Field investigation identify precambrian rock barren community B165 is present.	
Sand Dune	B005, B006, B142	Exposed mineral material community often associated with shorelines of lakes or exposed inland mineral material that has been shaped by eolian (wind) processes.	N	Ecosite B142 is present but the community type is not present on Site.	No sand dunes were identified and no characteristic plant species were recorded.
Great Lakes Arctic-Alpine Shoreline Type	B161, B162	Found on the shoreline of Lake Superior on open basic bedrock. Vegetation consists mostly of arctic-alpine species.	N	Ecosite mapping and field investigations did not show community type.	Community type is not present on Site.
Hardwood Swamps	B130-133	Dominant hardwood canopy that is located within lower topographic positions and subject to flooding. Nutrient regime is rich and substrate is mostly moderately deep to deep with variable textures.	N	Ecosite mapping and field investigations did not show community type.	Community type is not present on Site.
<b>Specialized Habitat for Wildlife</b>					

Waterfowl Nesting Area	All upland habitats located adjacent to ELC ecosites; B129-135, B140-152, B224	A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. Wood Ducks, Bufflehead, Common Goldeneye and Hooded Mergansers utilize large diameter trees in woodlands for cavity nest sites.	Y	Communities B129, B135, B142, B146 and B148 are present, providing suitable nesting habitat.	Numerous nesting pairs of waterfowl species were observed during spring nesting season.
Bald Eagle & Osprey Nesting, Foraging and Perching Habitat	Treed communities directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.	Nests are associated with lakes, ponds, rivers or wetlands along treed shorelines, islands, or on structures over water.	Y	An active Bald Eagle nest observed at Bending Lake.	
Woodland Raptor Nesting Habitat	May be found in all forested ELC Ecosites.	All natural or conifer plantation woodland/forest stands.	Y	Woodland raptors observed during field investigations include: Red-tailed Hawk, Broad-winged Hawk and Common Raven	These species are anticipated to be nesting in the study area, although exact nest locations are unknown.
Turtle Nesting Areas	B003, B006-007, B031, B171-172, B187-188	Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation. It must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas.	Y	A predated turtle egg was observed at the access road of Bending Lake.	Specific searches for nesting areas were not conducted. It is assumed nesting habitat is present.
Seeps and Springs	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system.	N	Ecosite mapping and field investigations did not show community type.	No habitat present.
Aquatic Feeding Habitat	Habitat may be found in all forested ecosites adjacent to water.	Wetlands and isolated embayments in rivers or lakes which provide an abundance of submerged aquatic vegetation such as pondweeds, water milfoil and yellow water lily are preferred sites. Adjacent stands of lowland conifer or mixed woods will provide cover and shade.	Y	Habitat is present within the bays of Bending Lake.	

Mineral Lick	Habitat may be found in all treed ecosites.	This habitat component is found in upwelling groundwater and the soil around these seepage areas. It typically occurs in areas of sedimentary and volcanic bedrock. In areas of granitic bedrock, the site is usually overlain with calcareous glacial till.	N	No habitat present.	None.
Denning Sites for Mink, Otter, Marten Fisher and Eastern Wolf	Habitat may be found in all treed ecosites.	Mink prefer shorelines dominated by coniferous or mixed forests with dens usually underground. Otters prefer undisturbed shorelines along water bodies that support productive fish populations with abundant shrubby vegetation and downed woody debris for denning. Marten and fisher require large tracts of coniferous or mixed forests of mature or older age classes. Wolves prefer a more interior forest condition for their den sites. Lynx den sites are most often associated with the presence of downed woody debris. Black bears, will often den in the base of hollow trees.	Y	Black bear and an otter was observed but no dens located.	These species are anticipated to be denning in the study area, although exact nest locations are unknown.
Wolf Rendezvous Sites	Isolated open areas including bogs, fens, meadows, clearcuts.	Rendezvous sites may be found in a variety of habitats such as open bogs, burns, clearcuts, beaver meadows, and open forest.	Y	Isolated open areas including bogs, fens and meadows are present.	No wolf species were recorded during site investigations but it is that rendezvous sites are present.
Amphibian Breeding Habitat (Wetlands)	Rich swamps and thickets, vernal/seasonal pooling, riparian and variety of wetland interiors and margins: B128-135, B141-152, B223-22	Wetlands and pools (including vernal pools) >500m <sup>2</sup> (about 25m diameter) supporting high species diversity are significant. Wetlands and pools need to persist until mid-July.	Y	Large, permanent wetlands were recorded that could support amphibian breeding habitat were conducted during vegetation surveys. Amphibian call count surveys were conducted.	Communities B128, B129, B135, B142, B146 and B148 are present
Amphibian Breeding Habitat (Woodland)	All treed upland ecosites, however more likely on fine textured moist ecosites (e.g., B119-125)	Presence of a wetland or pond of area >500m <sup>2</sup> (about 25m diameter) within or adjacent (within 120m) to a woodland (no minimum size).	Y	Searches for potential woodland pools that could support amphibian breeding habitat were conducted during vegetation surveys. Amphibian call count surveys were conducted.	Community B125 is present

Mast Producing Areas	All shrub and treed ecosites capable of producing mast.	Significant tree species include mountain ash and pin cherry. Significant shrub species include blueberries, raspberries, beaked hazel and choke cherry. Permanent open sites providing long-term food sources are more significant.	N	All significant tree and shrub species listed are present. Large quantities with dominant cover of mast shrubs/trees not confirmed.	Unconfirmed
Sharp-tailed Grouse Leks	B029-031, B044-046, B060-062, B077-079, B093-095, B109-111, B126, B136-141	Leks are typically a grassy field/meadow separated by >15ha from adjacent shrublands and >30ha from adjacent treed areas. Field/meadows are to be >15ha when adjacent to shrubland and >30ha when adjacent to deciduous stands.	N	Communities B136 and B138 are present on site but do not meet the size requirements.	Sharp-tailed Grouse Leks were not identified
<b>Habitat of Species of Conservation Concern</b>					
Marsh Bird Breeding Habitat	B134-B152	Nesting occurs in wetlands. All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present.	Y	Communities B135, B136, B138, B142, B146, B148 are present which include shallow bay within Bending Lake. American Bittern, Ring-necked Duck and Trumpeter Swan were observed during various field investigations.	Habitat supporting marsh breeding birds are present.
Open Country Bird Breeding Habitat	All Field, Meadow and Sparse Shrub ecosites: B08-09, B20-21, B29-31, B44-46, B60-62, B77-79, B93-95, B109-111	Large field/meadow areas (includes natural and cultural fields and meadows) >30 ha.	N	No habitat present.	Field, meadow and sparse shrub ecosites are absent.
Shrub/Early Successional Bird Breeding Habitat	All sparse shrub and shrub ecosites: B09-10, B21-22, B31-32, B46-47, B62-63, B79-80, B95-96, B111-112, B134-135	Large natural field areas succeeding to shrub and thicket habitats >30 ha in size.	N	Communities B135 are present but do not meet the size requirement.	No fields are present.
Special Concern and Rare Wildlife Species	All plant and animal element occurrences.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or rare species.	Y	SARO fauna include Bald Eagle, Common Nighthawk, Whip-poor-will and Wood Thrush. No special concern plant species were observed.	Species of Special Concern are known to occur within the site
<b>Animal Movement Corridors</b>					

Amphibian Movement Corridors	Corridors may be found in all ecosites associated with water. Corridors will be determined based on identifying the significant breeding habitat.	Movement corridors between breeding habitat and summer habitat.	Y	Corridors may be found in all ecosites associated with water. Numerous amphibian species observed.	
Cervid Movement Corridor	Corridors may be found in all treed ecosites.	Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges).	Y	Corridors may be found in all treed ecosites. White-tailed Deer and Moose were observed.	
Furbearer Movement Corridor	All treed Ecosites adjacent to or within shoreline habitats.	Mink and Otter den sites are typically found within a riparian area of a lake, river, stream or wetland.	Y	All treed Ecosites adjacent to or within shoreline habitats.	Otter and beavers were furbearing species observed on site.

# Appendix G

## Species at Risk Screening and Habitat Assessment



Species at Risk Habitat Screening and Assessment							
Species Grouping	Common and Scientific Name	MNRF Ontario Status (COSSARO)	National (COSEWIC) status	Provincial ESA General or Regulated Habitat	Habitat requirements/description	Habitat Suitability in Project Study Area	Habitat Assessment for Study Area and Proposed Bulk Sample Site. Mitigation Recommendations where Applicable
Birds	Eastern Whip-poor-will ( <i>Caprimulgus vociferus</i> )	Threatened	Threatened	General Habitat protection applies. General habitat description on MNR website.	Whip-poor-will breeding habitat is not dependent upon species composition, but rather on forest structure, although common tree associations in both summer and winter are pine and oak. The species shuns both wide-open spaces and dense forest. It prefers to nest in semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances. Individuals will often feed in nearby shrubby pastures or wetlands with perches.	Confirmed Habitat Present	Nocturnal Bird surveys have identified existing occurrences in the Project study area outside the bulk study area, west of Highway 622. <u>There are no recorded occurrences or confirmed habitat in the proposed bulk sample area.</u>
	Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	Special Concern	Not at risk	Special concern species do not receive species or habitat protection.	Bald eagles nest in a diversity of habitats and forest types, usually near a major river or lake where they hunt. The main source of food of Bald eagles is fish, but they can eat prey up to the size of ducks. They frequently feed on dead animals, such as White-tailed Deer. They nest in large trees such as poplar and pine.	Confirmed Habitat Present	A Bald Eagle was seen foraging and sitting on a nest outside the bulk sampling area near Bending Lake. Overhead and perching sightings were recorded in the vicinity of the bulk sample area. <u>There are no nests or foraging habitat in the proposed bulk sample area. A portion of the bulk sample area within 800 m of a nest.</u>
	Common Nighthawk ( <i>Chordeiles minor</i> )	Special Concern	Threatened	Habitat protection does not apply to Special Concern Species.	Common Nighthawk breeding habitat includes open habitats such as, beaches, sand dunes, logged areas, forest clearings, open forests, pastures, lakeshores, marshes, gravel roads etc. This species also occurs in coniferous and mixed forests. This species can use habitats provided by urban areas, but prefer natural areas.	Confirmed Habitat Present	Nocturnal Bird surveys have identified existing occurrences within the Project study area north of Bending Lake and west of Highway 622. <u>There are no recorded occurrences or confirmed habitat in the proposed bulk sample area.</u>
	Olive-sided Flycatcher ( <i>Contopus cooperi</i> )	Special Concern	Threatened	Habitat protection does not apply to Special Concern Species.	The Olive-sided flycatcher is most often found along natural forest edges and openings. It will use forests that have been logged or burned, if there are ample tall snags and trees to use for foraging perches. Olive-sided flycatchers' breeding habitat usually consists of coniferous or mixed forest adjacent to rivers or wetlands. In Ontario, Olive-sided flycatchers commonly nest in conifers such as White and Black Spruce, Jack Pine and Balsam Fir.	Confirmed Habitat Present	Breeding Bird surveys have identified existing occurrence of Olive-sided Flycatcher within the Project study area along forest edges with shrub layers, and deciduous and mixed forest adjacent to wetlands. <u>There is no habitat in the proposed bulk sample area.</u>
	Black Tern ( <i>Chlidonias niger</i> )	Special Concern	Not at risk	Habitat protection does not apply to Special Concern Species.	Black Terns build floating nests in loose colonies in shallow marshes, especially in cattails.	Potential Habitat Present	This species was not recorded during PECO field work. However, there is habitat potential in the Project study area in the marsh communities (i.e B142, B148, B149) with dense cattails and emergent vegetation. <u>There is no habitat in the proposed bulk sample area.</u>

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	Eastern Wood-Pewee ( <i>Contopus virens</i> )	Special Concern	Special Concern	Habitat protection does not apply to Special Concern Species.	In Canada, the Eastern Wood-pewee is mostly associated with the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in forest stands of intermediate age and in mature stands with little understory vegetation. During migration, a variety of habitats are used, including forest edges, and early successional clearings.	Potential Habitat Present	This species was not recorded during PEGC field work. However there is habitat potential in the Project study area in the deciduous and mixed forest communities (i.e B108 and B125) with little understory vegetation. <u>There are no recorded occurrences or confirmed habitat in the proposed bulk sample area.</u>
	Rusty Blackbird ( <i>Euphagus carolinus</i> )	Special Concern	Special Concern	Habitat protection does not apply to Special Concern species.	The Rusty Blackbird breeds in habitats that are dominated by coniferous forest with wetlands nearby including bogs, marshes and beaver ponds.	Potential Habitat Present	This species was not recorded during PEGC field work. There is habitat potential in the Project study area in the coniferous forests with nearby wetlands. <u>There are no recorded occurrences or confirmed habitat in the proposed bulk sample area.</u>
	Horned Grebe ( <i>Podiceps auritus</i> )	Special Concern	Special Concern	Habitat protection does not apply to Special Concern Species.	The Horned Grebe breeds primarily in temperate zones such as the Prairies and Parkland Canada, but can also be found in more boreal and subarctic zones. It generally breeds in freshwater and occasionally in brackish water on small semi-permanent or permanent ponds, but it also uses marshes and shallow bays on lake borders. Breeding areas require open water rich in emerging vegetation, which provides nest materials, concealment and anchorage, and protection for the young.	Potential Habitat Present	This species was not recorded during PEGC field work and is not likely to occur in the Project study area based on the distribution of this species and absence of suitable habitat.
	Canada Warbler ( <i>Wilsonia canadensis</i> )	Special Concern	Threatened	Habitat protection does not apply to Special Concern Species.	The Canada Warbler uses a wide range of deciduous, coniferous and mixed forests, with a well-developed shrub layer and a structurally complex forest floor. It is most abundant in moist, mixed forests. It also occurs in riparian shrub forest on slopes and in ravines, in stands regenerating after natural and anthropogenic disturbances and in old-growth forests with canopy openings and a well-developed shrub layer. In its wintering range, the Canada Warbler uses primarily mature cloud rainforests located at an altitude of 1,000 to 2,500 m, as well as second-growth forests, forest edges, coffee plantations, agricultural field edges and semi-open areas.	Potential Habitat Present	This species was not recorded during PEGC field work. There is habitat potential in the Project study area in the deciduous, coniferous and mixed forest communities (i.e B108 and B125) with dense understory vegetation. <u>There are no recorded occurrences or confirmed habitat in the proposed bulk sample area.</u>

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	Wood Thrush ( <i>Hylocichla mustelina</i> )	Special Concern	Threatened	Habitat protection does not apply to Special Concern Species.	During the breeding season, the Wood Thrush is found in moist, deciduous hardwood or mixed stands, often previously disturbed (e.g., small-scale logging and ice storm damage), with a dense deciduous undergrowth and with tall trees for singing perches (Gauthier and Aubry 1995; Friesen et al. 1999; Holmes and Sherry 2001; Friesen 2007; Evans et al. 2011; Suarez-Rubio et al. 2011). Peck and James (1987) found that in Ontario, the Wood Thrush prefers second-growth over mature forests. ( <a href="http://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&amp;n=D62E83CD-1#_Toc350244571">http://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&amp;n=D62E83CD-1#_Toc350244571</a> )	Confirmed Habitat Present	Breeding Bird surveys have identified existing occurrences of Wood Thrush in the Project study area. This species was recorded immediately to the north of the proposed bulk sample area. <u>There are no recorded occurrences or confirmed habitat in the proposed bulk sample area.</u>
<b>Mammals</b>	Little Brown Myotis ( <i>Myotis lucifugus</i> )	Endangered	Endangered	General Habitat Protection as of January 24, 2013.	Bats are nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Little brown bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing.	Confirmed Habitat Present	Bat acoustic monitoring identified the presence of this species within the Project study area west of the highway and north of Bending Lake. Given the high forest cover in the Project study area and representation of cavity trees, it can be assumed that there are habitat opportunities for this species. Proximity to wetlands and aquatic features would provide productive insect feeding areas. While these habitats are present, they are very well represented locally and in the surrounding area and therefore the habitat is not limiting to the successful use of the area. The quality and abundance of potential bat snag trees in the proposed bulk sample area is low. <b>Mitigation: As SAR bats hibernate in caves generally from late October to early April, tree removal should occur within this period to avoid harm or impacts to individuals that may be using snag trees.</b>
	Northern Myotis ( <i>Myotis septentrionalis</i> )	Endangered	Endangered	General Habitat Protection as of January 24, 2013.	Northern long-eared bats are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines.	Confirmed Habitat Present	Bat acoustic monitoring identified the presence of this species within the Project study area west of the highway. Given the high forest cover in the Project study area and representation of cavity trees, it can be assumed that there are habitat opportunities for this species. Proximity to wetlands and aquatic features would provide productive insect feeding areas. While these habitats are present, they are very well represented locally and in the surrounding area and therefore the habitat is not limiting to the successful use of the area. The quality and abundance of potential bat snag trees in the proposed bulk sample area is low. <b>Mitigation: As SAR bats hibernate in caves generally from late October to early April, tree removal should occur within this period to avoid harm or impacts to individuals that may be using snag trees.</b>

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	Caribou - Boreal population ( <i>Rangifer tarandus</i> )	Threatened	Threatened	General habitat protection as of June 30, 2013.	At the broad landscape scale, caribou require large, undisturbed areas of old or mature conifer upland forest and lowlands dominated by jack pine and/or black spruce. At smaller scales, caribou seasonally select specific habitat features and areas that support successful reproduction and calf rearing, provide summer and/or winter forage, and/or facilitate movement between discrete areas of use.	Potential Habitat Present	This species was not recorded during PECG field work and based on background review the Project Study Area appears to be south of the range of this species.
<b>Reptiles</b>	Snapping Turtle ( <i>Chelydra serpentina</i> ) -	Special Concern	Special Concern	Habitat protection does not apply to Special Concern Species.	Snapping turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their noses exposed to the surface to breathe. During the nesting season, from early to mid summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams. Snapping turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	Potential Habitat Present	There are suitable wetlands for foraging, basking and overwintering as well as adjacent sandy areas for nesting that provide habitat opportunities in the Project study area, including adjacent to the proposed bulk sample area. <b>Mitigation: Areas of wetlands with potential habitat opportunities will be protected. Mitigation measures include sediment fence installation where construction is in areas adjacent to wetland surface water features to prevent sediment.</b>

<b>Habitat Description Source</b>
<p>Government of Canada. 2011a. Species Profile: Eastern Whip-poor-will.  Retrieved from: <a href="https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1047">https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1047</a></p>
<p>Ministry of the Environment, Conservation and Parks. 2018. Bald Eagle.  Retrieved from: <a href="https://www.ontario.ca/page/bald-eagle">https://www.ontario.ca/page/bald-eagle</a></p>
<p>Government of Canada. 2018a. Species Profile: Common Nighthawk.  Retrieved from: <a href="https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=986">https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=986</a></p>
<p>Ministry of the Environment, Conservation and Parks. 2018b. Olive-sided Flycatcher. Retrieved from: <a href="https://www.ontario.ca/page/olive-sided-flycatcher">https://www.ontario.ca/page/olive-sided-flycatcher</a></p>
<p>Ministry of the Environment, Conservation and Parks. 2013. Black Tern.  Retrieved from: <a href="https://www.ontario.ca/page/black-tern">https://www.ontario.ca/page/black-tern</a></p>

<p>Government of Canada. 2017. Species Profile: Eastern Wood-Pewee. Retrieved from: <a href="https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1198">https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1198</a></p>
<p>Government of Canada. 2017b. Species Profile: Rusty Blackbird. Retrieved from: <a href="https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=907">https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=907</a></p>
<p>Government of Canada. 2017c. Species Profile: Horned Grebe (western population). Retrieved from: <a href="https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1045">https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1045</a></p>
<p>Government of Canada. 2011d. Species Profile: Canada Warbler. Retrieved from: <a href="https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1008">https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1008</a></p>

Government of Canada. 2017d. Species Profile: Wood Thrush. Retrieved from: [https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails\\_e.cfm?sid=1197](https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1197)

Government of Canada. 2014a. Species Profile: Little Brown Myotis. Retrieved from: [https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails\\_e.cfm?sid=1173](https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1173)

Government of Canada. 2014b. Species Profile: Nothern Myotis. Retrieved from: [https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails\\_e.cfm?sid=1175](https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1175)

Government of Canada. 2014c. Species Profile: Caribou Boreal population.  
Retrieved from: [https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails\\_e.cfm?sid=636](https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=636)

Ministry of the Environment, Conservation and Parks. 2012b. Snapping turtle.  
Retrieved from: <https://www.ontario.ca/page/snapping-turtle>