

Overall, the observations made at the Project were in general alignment with radar and acoustic monitoring completed in other areas of Nova Scotia in that migration was focused on a few nights during the season when tailwinds were light to moderate.

### 6.2.3 Bats and Bat Habitat

Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*M. septentrionalis*), and the Tri-Colored bat (*Pipistrellus subflavus*) are known bat species that reside in Nova Scotia. All three are small-bodied bats typical of the plain-nosed bats and all three are listed provincially and federally as Endangered. The listing is the result of drastic bat population declines that have occurred due to a fungal infection (white nose syndrome) that appears to severely affect hibernating bats. It is believed that mortalities affecting up to 90% of populations result from interference with hibernation and starvation during the winter period. The syndrome was first observed in 2006 in New York and has been since confirmed in Ontario, Quebec, New Brunswick and Nova Scotia (EC 2014b). One other bat species, *Eptesicus fuscus*, commonly called the Big Brown Bat, is also known to reside in Nova Scotia however, few sightings have been recorded. The Hoary Bat (*Lasiurus cinereus*), Eastern Red Bat (*Lasiurus borealis*), and the Silver-haired Bat (*Lasionycteris noctivagans*) are migratory bat species that are less common in Nova Scotia, but are known to live in the province for a portion of the year (Moseley, 2007).

The Little Brown Myotis are distributed throughout much of Canada, with the exception of northern Canada. They are also found in southern Alaska, across the United States from coast to coast, and the higher elevation forested regions of Mexico. There is also a population of this species in Iceland; however, they are presumed to have been accidentally transported there on ships by humans. Mating occurs in the fall and they have litter sizes ranging from one to two pups, but most commonly one (Havens, A. 2006). Northern Myotis are distributed across southern Canada and as far north as Newfoundland. They also inhabit much of the United States, extending through to Florida. Mating occurs during the autumn months and they are known to only have one offspring (Ollendorff, J. 2002). The Tri-Colored Bat inhabits the southern edge of Canada, eastern United States, eastern edge of Mexico, extending as far south as northern Honduras. Mating occurs between August and October, and they are known to have one set of twins in each litter (Hamlin, M. 2004). The Big Brown Bat is known to reside as far north as southern Canada, as far south as northern South America, and the West Indies (Mulheisen, M. and K. Berry 2000).

Resident bats live in three different roosting sites: day roosts, night roosts, and hibernacula. Day and night roosts are used during the spring, summer and fall months whereas hibernacula sites are used during the winter months. Common hibernacula sites are typically caves and old mining shafts; whereas day and night roosts commonly include tree hollows, spaces between tree bark, rock crevices, buildings, and tree foliage.

The Hoary Bat (migratory) has been spotted as far north as Southampton Island in Nunavut as well as Iceland, and as far east as Bermuda and the Orkney Islands off Scotland, during the summer months. They commonly spend the winter months in California, southeastern United States, Mexico, and Guatemala. Hoary bats are thought to mate around the time of autumn migration, and their litter size can range from one to four, but are most commonly two (Anderson, S. 2002). The Eastern Red Bat

(migratory) is widely distributed between southern Canada, Central America, Chile, and Argentina. Like the Hoary bat, mating takes place during autumn migration and their litter size can range from one to four, but are most commonly two (Myers, P. and J. Hatchett 2000). The Silver-haired Bat (migratory) is known to inhabit the lower south-central part of Alaska, the west coast of Canada, and the entire lower third of Canada; as well as most of the United States except for the south eastern and south western coasts, and as far south as the Victoria province of Mexico. Like the Hoary Bat, they have also been documented as far east as Bermuda. Their litter size ranges from one to two, but are most commonly litters of two (Bentley, J. 2017).

The migratory bats that have been spotted in Nova Scotia are known as solitary tree bats, and prefer to roost in a large variety of forested habitats with minimal human activity. They have; however, also been known to roost in mildly populated areas as well (Moseley, 2007).

There are at least 21 caves with recorded bat populations on main land Nova Scotia, and 16 of them are within 100 km from the Project Study Area, as detailed in **Table 15**.

**TABLE 15: DISTANCE OF KNOWN HIBERNACULA AND APPROXIMATE DISTANCE TO THE PROJECT SITE.**

Hibernacula	Approximate Distance from Site (km)	Direction from Site
Frenchman’s Cave	19	E/NE
Frenchman’s II	19	E/NE
Miller’s Creek Cave	N/A: Quarried away in 1981	NE
Cheverie Cave	25	N/NE
Woodville Ice Cave	26	E/NE
Centre Rawdon Gold Mine	32	E/NE
Walton Barite Mine	40	NE
Peddler’s Tunnel	46	NE
Minasville Ice Cave	52	NE
Vault Cave	55	W/NW
The Ovens	59	S
Cave of the Bats	63	E
Hayes Cave	67	E/NE
Black Brook	75	E
Gays River Gold Mine	75	E
Lear Shaft	79	NE

Source: Moseley, 2007

Frenchman’s Cave and Frenchman’s II, which is part of the same cave system, is the closest known hibernaculum to the Site. It is considered a small hibernaculum with bat populations ranging from 10 – 50 bats. However, a survey of the population size and species type present may indicate a larger

population than previously thought. In 2003, 66 bats were identified with the majority (71%) being Northern Myotis, 26% being Little Brown Myotis and 3% being the Tri-Colored bat (Moseley, 2007).

Hayes Cave is the most significant hibernaculum in NS, having bat populations in the thousands; it is located approximately 67 km from the edge of the Site. Bat population size at this hibernaculum have been monitored for several decades, spanning back to 1963. All three resident bat species that are known to be in NS have been recorded at this location, with the majority of species being Little Brown Myotis and Northern Myotis. Interestingly, this location has the only recorded sighting of the Big Brown Bat in Nova Scotia (Moseley, 2007).

Lastly, no observations of potential bat hibernacula were identified in the Study Area during site visits and field surveys.

#### 6.2.3.1 Previously Recorded Bat Species According to ACCDC Database

The ACCDC databases were queried for known observation data of provincial and federal bat SAR or SoCC within close proximity of the Project site. Bat hibernaculum and bat species occurrences are recorded within 10 km of the Project site.

#### 6.2.3.2 Observed Bat Species










Acoustic bat surveys were conducted in 2021 across the Project Site from June 1 through to October 15 (the survey period). Six acoustic survey stations were installed at within the Study Area of the proposed Project as a mechanism to capture the various terrain and habitat types within the Study Area. Details of the survey methodology, analysis and results are presented in **Appendix J**. A summary of the selected survey locations and habitat description is provided below in **Table 16**, while station location are shown on **Figure 16**.

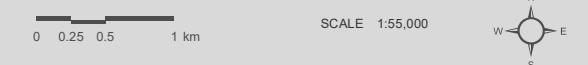
**TABLE 16: DESCRIPTION OF ACOUSTIC BAN MONITORING STATIONS**

Bat Monitor Location	Microphone Elevation (above ground level)	Surrounding Habitat Description
Bat A	1.8 m	Open area with some small immature birch trees and next to a sizable cliff of bedrock outcropping, which could be a potential bat roosting location. Northeast corner of the subject property.
Bat D	2.3 m	Open area that was part of a clear-cut hardwood stand. The area is revegetated by immature deciduous trees and shrubs. Northwest corner of the subject property in the vicinity of proposed WTG 15.
Bat E	1.8 m	Open area adjacent to a treed swamp and a watercourse. South of the subject property, between proposed WTG 27 and 28.
Bat F	1.8 m	Open area next to the road with exposed boulders and adjacent to mature softwood trees. East side of the subject property.
MET Tower	1.2 m	Relatively flat and open area that was recently clear-cut with minimal re-vegetation. Attached to the MET tower near the centre of the Site and the proposed location of WTG 21.
MET Tower	30 m	

**ACOUSTIC BAT SURVEY LOCATIONS**

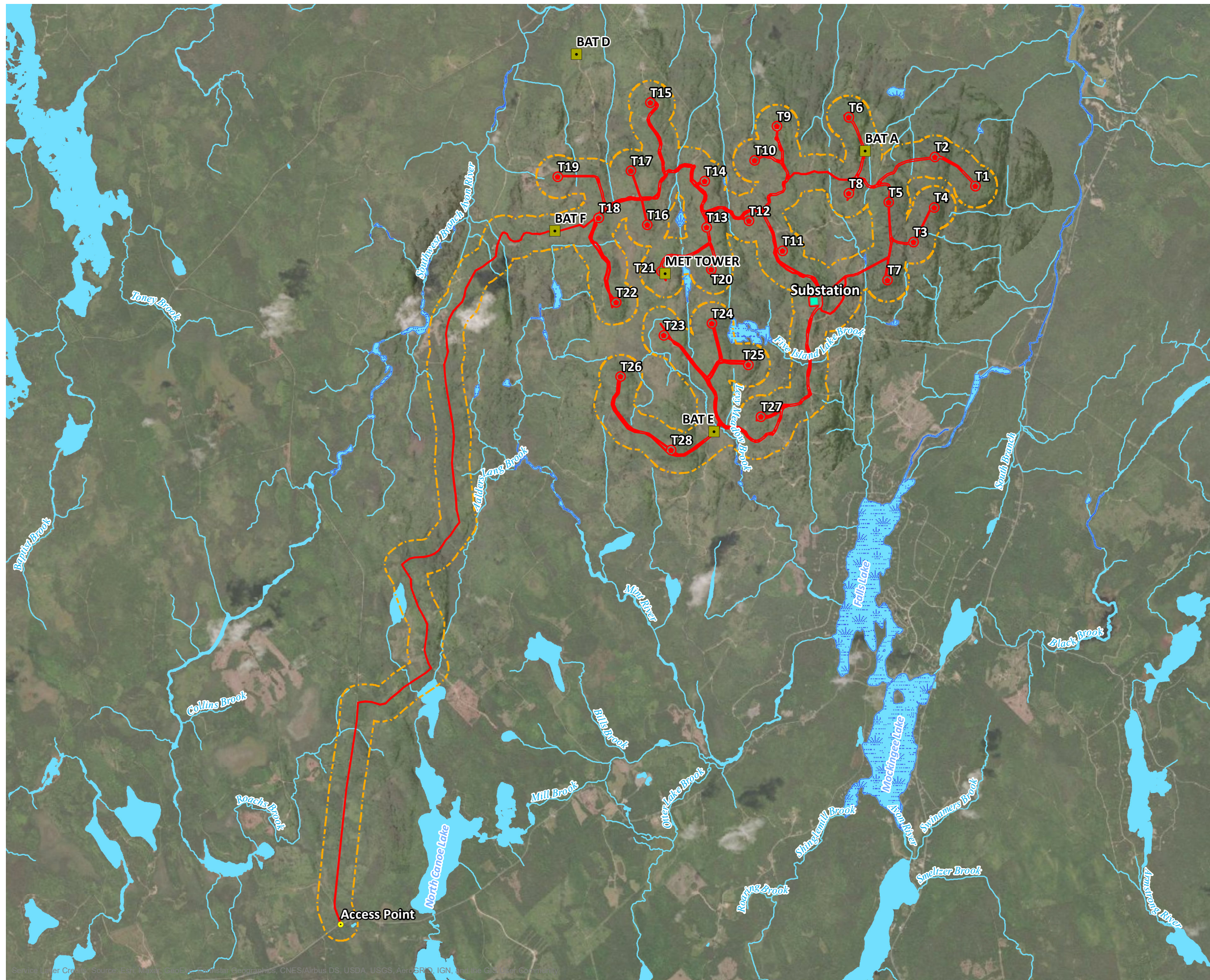
FIGURE 16

-  Proposed Access Point
  -  Proposed Turbine Location
  -  BM Substation
  -  Watercourse
  -  Waterbody
  -  Wetland
  -  Local Assessment Area
  -  Project Development Area
- Bat Observation**
-  Bat Survey Location



MAP DRAWING INFORMATION:  
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: MEC  
MAP CHECKED BY: KB  
MAP PROJECTION: NAD 1983 UTM ZONE 20N



Service User Credits: Source: Esri, Maxar, GeoEye, AeroGRID, IGN, and the GIS User Community

The following bat species/species groups were captured during the 2021 bat acoustic survey program, and carried forward as part of the bat acoustic analysis:

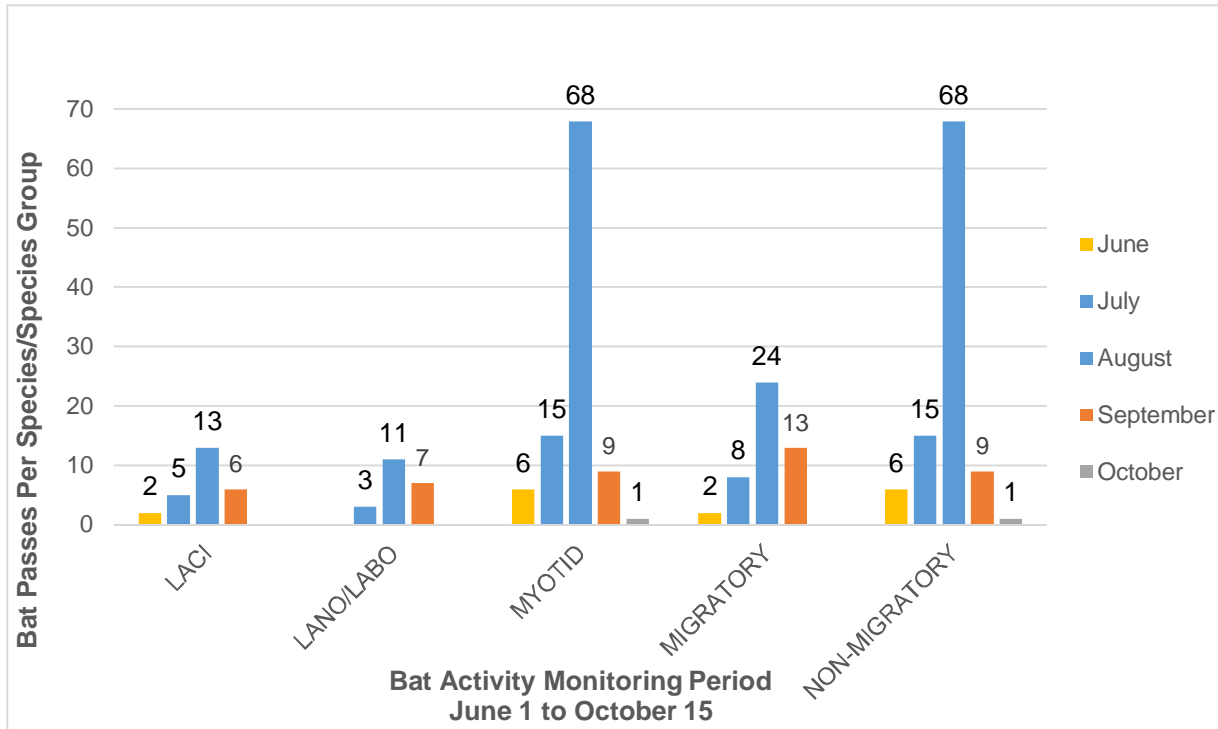
- Silver-haired Bat (abbreviated LANO) and Eastern red bat (abbreviated LABO). Both of these species are migratory and were assessed together as a group based on similarities of their calls. Silver-haired Bats produce calls with a constant frequency (CF) tail around 22 – 25 kHz. Although
- Eastern Red Bats produce calls with a minimum frequency between 30 – 35 KHz, they also produce calls with lower minimum frequencies within the range of Silver-haired Bats. Although Big Brown Bat (abbreviated EPFU) also produce calls with a CF similar to Silver-haired Bat and are generally reported as EPFU/LANO, given the few sightings reported to date in Nova Scotia all potential EPFU/LANO calls were assumed LANO; hence the species grouping of LANO/LABO.
- Hoary Bat (abbreviated LACI) is a migratory bat with calls that are reliably differentiated from all other species. Hoary bat calls have lower frequency (ranging from 25 to 18 kHz) and are noticeably longer in duration compared to other bat species known to occur within the Project area.
- Myotid Bat species (abbreviated MYOTID) is a species group that includes residential (i.e., non-migratory) bat species in Nova Scotia including Little Brown Myotis, Northern Myotis, and the Tri-Colored Bat. Unlike the migratory species outlined above, the Myotid species group of bats produce shorter duration calls with a minimum frequency between 40 – 45 kHz, and maximum frequencies ranging between 120 kHz and 80 kHz. Occasionally, Myotis calls can have a minimum call frequency of 35 kHz.

A total of 146 bat passes were recorded during the survey period, of which 94% (or 137 bat passes) were recorded during the months of July through September (inclusive). The month of August alone was responsible for 63% (or 92 bat passes) of the 146 recorded bat passes. A total of eight bat passes were recorded in the month of June, with only a single bat pass recorded between October 1 and October 15. The number of monthly bat passes detected at each acoustic monitoring station is detailed in **Table 17**.

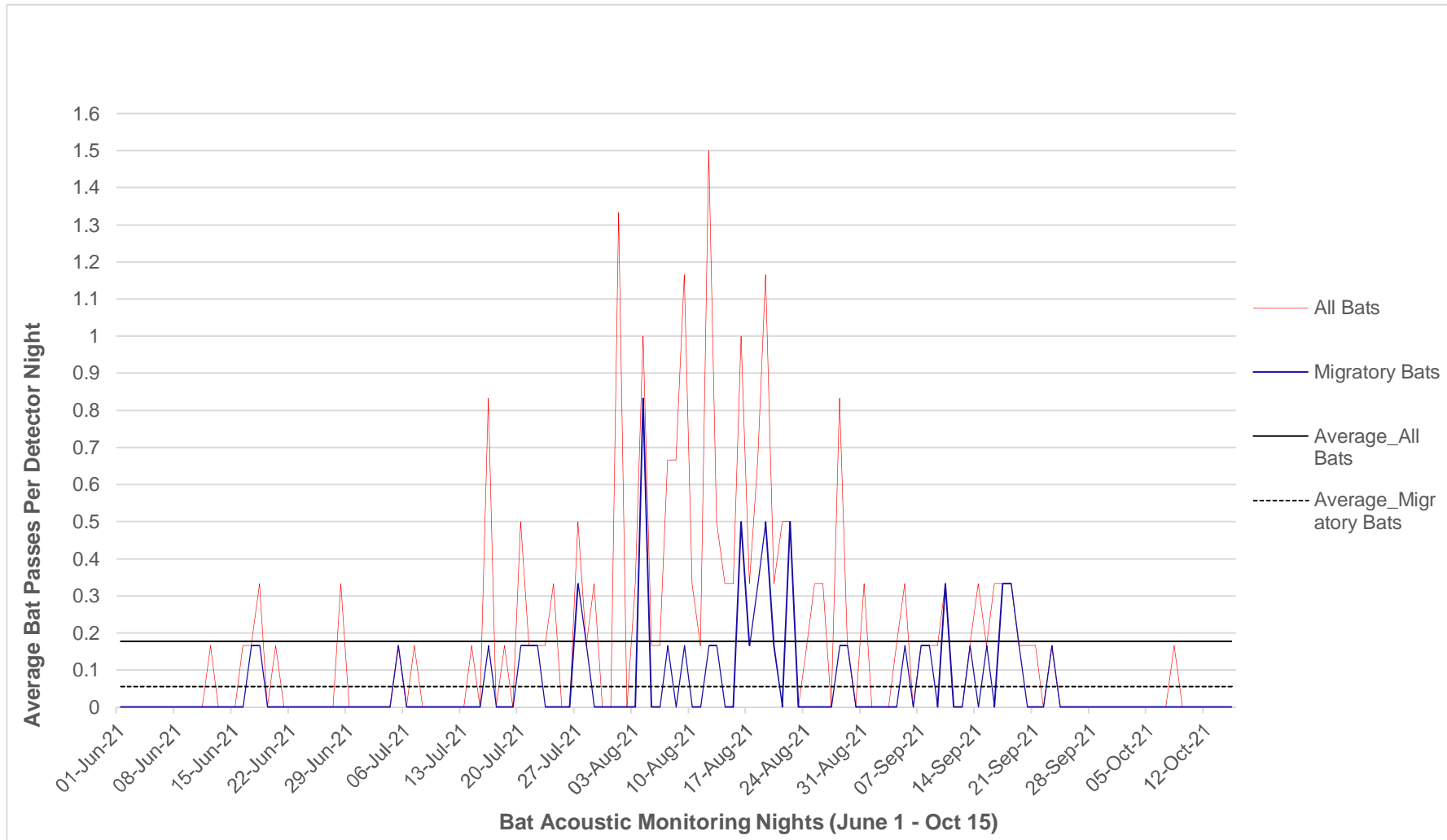
The total number of bat passes per species/species group (and broken down by migratory and non-migratory species) during each monitoring month in 2021 is presented in **Figure 17**. Similarly, the total number of bat passes per species/species group per monitoring station per month is presented in **Figure 18**. As illustrated in **Figures 17** and **18**, the MYOTID species group accounts for 68% (or 99 passes) of the 146 bat passes recorded during the survey period, of which 69% (or 68 passes) of the 99 MYOTID passes occurred during the month of August alone.

**TABLE 17: TOTAL NUMBER OF BAT PASSES DETECTED AT EACH MONITORING STATION PER MONTH BY SPECIES GROUP**

LOCATION A						
	June	July	August	September	Oct 1-15	Total
LACI		1	3			4
LANO/LABO		1	1			2
MYOTID	1	2	13	2	1	19
total	1	4	17	2	1	25
LOCATION D						
	June	July	August	September	Oct 1-15	Total
LACI		2		4		6
LANO/LABO			1	2		3
MYOTID		3	19	2		24
total	0	5	20	8	0	33
LOCATION E						
	June	July	August	September	Oct 1-15	Total
LACI	2	2	3	1		8
LANO/LABO			4	1		5
MYOTID	4	3	6	1		14
total	6	5	13	3	0	27
LOCATION F						
	June	July	August	September	Oct 1-15	Total
LACI			3	1		4
LANO/LABO		1	2	2		5
MYOTID	1	3	7	2		13
total	1	4	12	5	0	22
LOCATION MET						
	June	July	August	September	Oct 1-15	Total
GROUND LEVEL						
LACI			2			2
LANO/LABO				1		1
MYOTID		4	13	1		18
total	0	4	15	2	0	21
-30 m ABOVE GROUND						
LACI			2			2
LANO/LABO		1	3	1		5
MYOTID			10	1		11
total	0	1	15	2	0	18
TOTAL	8	23	92	22	1	146



**FIGURE 17: TOTAL NUMBER OF BAT PASSES PER MONTH BY SPECIES GROUP**



**FIGURE 18: AVERAGE NUMBER OF BAT PASSES PER NIGHT**



Figure 18 illustrates the number of bat passes (illustrated as All Bats and Migratory Bats) per detector night throughout the survey period, as well as the average number of bat passes per detector night for the entire monitoring period (illustrated as Average\_All Bats and Average\_Migratory Bats). The average “All Bats” passes per detector night for the duration of survey period was calculated at 0.18 bat passes, whereas the average “Migratory Bats” passes per detector night for the duration of the survey period was calculated at 0.06 bat passes. If we assume a breeding period of June 1 through July 31, and a fall migration period of August 1 through Oct 15, then the average “All Bats” and “Migratory Bats” passes per detector night for those period equates to 0.08 and 0.03 bat passes, and 0.25 and 0.08 bat passes, respectively.

Based on Dillon’s experience on similar bat acoustic programs throughout the country, both the total number of bat passes and the average bat passes per detector night (during the breeding period, fall migration, and entire survey period) are considered very low.

### 6.2.3.3 Bat Species at Risk

As mentioned previously, species associated with the MYOTID species group of bats (which include Little Brown Myotis, Northern Myotis, and Tri-Colored Bats) were detected during the 2021 bat surveys. These bats are known to inhabit much of Nova Scotia, and all three are listed provincially and federally as endangered.

## 6.2.4 Aquatic Environment

### 6.2.4.1 Fish and Fish Habitat

The proposed Project is situated within the Avon River secondary watershed (1DE-2, NSE 2011) which encompasses a drainage area of 460 square kilometers and includes three main river branches (South, West, and Southwest (Isaacman, 2005)). The mapped watercourses that fall within the area of the proposed Project include the Mint River, Levy Meadow Brook, and Five Island Brook. Lakes in the vicinity of the Project Area include Five Island Lake, Bennett Lake, Duck Ponds, Pine Lake, and Splash Dam Lake. According to Department of Fisheries and Oceans (DFO) SAR mapping review, Atlantic salmon, Inner Bay of Fundy population (*Salmo salar*) are identified throughout the Avon River watershed (DFO, 2021). Although suitable Atlantic salmon habitat was not identified during initial field studies, watercourses that may be impacted by the final design will undergo additional detailed assessments to ensure that potential impacts to the species are considered and appropriately mitigated.

A baseline fish habitat survey was conducted in October 2021 and the methods and results are presented in Appendix K, Table K-1. Twenty-three watercourses and waterbodies intersect with the proposed or existing access roads, though none of the turbine locations intersect watercourse (since these locations were selected to avoid encroachment of watercourses). Mapped water features within the LAA are shown above on Figure 6. The results of the aquatic habitat assessment are summarized in the following sections.

There were no watercourses (mapped or unmapped) identified within the assessment area of any of the proposed turbine locations. Table 18 lists the watercourses, presented on Figure 6, that were observed within the assessment area surrounding the proposed access roads

**TABLE 18 WATERCOURSES WITHIN THE AQUATIC LAA**

Watercourse	Mapped	Characterization	Fish habitat Possible
Unnamed Tributary - Watercourse 1 (WC 1)	Yes	A permanent defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 2 (WC 2)	Yes	Intermittent, defined channel with fine substrate and stable banks. The channel flows through shrubs and grasses.	May provide seasonally accessible fish habitat.
Unnamed Tributary - Watercourse 3 (WC 3)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 4 (WC 4)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest.	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 5 (WC 5)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest.	Likely provides direct fish habitat
Gleason Brook - Watercourse 6 (WC 6)	Yes	Intermittent, defined channel with boulder substrate and stable banks. The channel flows through mature mixed forest	May provide seasonally accessible fish habitat.
Unnamed Tributary - Watercourse 7 (WC 7)	Yes	Intermittent, defined channel with fine substrate and stable banks. The channel flows through shrubs and grasses	Yes
Unnamed Tributary - Watercourse 8 (WC 8)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest with evidence of beaver activity within the watercourse	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 9 (WC 9)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 10 (WC 10)	No	Ephemeral watercourse with intermittent subsurface flow through a wetland	Unlikely that due to the subsurface and ephemeral flow.
Unnamed Tributary - Watercourse 11 (WC 11)	Yes	Permanent, defined channel with fine substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 12 (WC 12)	Yes	Intermittent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest.	May provide seasonally accessible fish habitat
Unnamed Tributary - Watercourse 13 (WC 13)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 14 (WC 14)	Yes	Permanent, defined channel with fine substrate and stable banks. The channel flows through mature mixed forest. High gradient cascades may act as an impediment to upstream fish passage	Likely provides direct fish habitat

Watercourse	Mapped	Characterization	Fish habitat Possible
Unnamed Tributary - Watercourse 15 (WC 15)	No	Ephemeral drainage feature	Does not provide direct fish habitat
Unnamed Tributary - Watercourse 16 (WC 16)	No	Ephemeral drainage feature	Does not provide direct fish habitat
Unnamed Tributary - Watercourse 17 (WC 17)	No	Ephemeral drainage feature	Does not provide direct fish habitat
Unnamed Tributary - Watercourse 18 (WC 18)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 19 (WC 19)	Yes	Permanent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 20 (WC 20)	Yes	Permanent, braided channel with fine substrate and stable banks. The channel flows through mature mixed forest	Likely provides direct fish habitat
Unnamed Tributary - Watercourse 21 (WC 21)	Yes	Intermittent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest.	May provide seasonally accessible fish habitat.
Unnamed Tributary - Watercourse 22 (WC 22)	Yes	Intermittent, defined channel with gravel substrate and stable banks. The channel flows through mature mixed forest	May provide seasonally accessible fish habitat.
Unnamed Tributary - Watercourse 23 (WC 23)	Yes	Intermittent, defined channel with fine substrate and stable banks. The channel flows through mature mixed forest.	May provide seasonally accessible fish habitat.

Of the watercourses surveyed within the assessment area, five watercourses are ephemeral and do not provide seasonal or permanent direct fish habitat. The remaining watercourses may provide habitat for freshwater species that have been documented within the Avon River watershed (Daborn and Brylinsky, 2004; see Table 19 below). All of the assessed watercourses were acidic, with pH levels below the Canadian Council of Ministers of the Environment (CCME) recommended range for the protection of aquatic life (i.e., 6.5-9.0). Watercourses with a pH of 5.0, as was the case with Fourteen of the assessed watercourses, are expected to have low fish densities and little to no acid-sensitive species (including juvenile salmon and cyprinids) (Lacroix, 2011). Based on the aquatic habitat present and watercourse acidity throughout the Assessment Area, the dominant fish species expected within the watercourses are likely to be acid-tolerant species, such as white sucker (Lacroix, 2011).

**TABLE 19: SUMMARY OF FRESHWATER FISH SPECIES DOCUMENTED IN THE AVON RIVER WATERSHED**

Scientific Name	Common Name
Gasterosteus aculeatus	Three Spine Stickleback*
Apeltes quadracus	Four Spine Stickleback
Pungitius pungitius	Nine Spine Stickleback
Fundulus diaphanus	Banded Killifish
Perca flavescens	Yellow Perch*
Micropterus dolomieu	Smallmouth Bass*
Catostomus commersonii	White Sucker*
Chrosomus eos	Northern Redbelly Dace
Couesius plumbeus	Lake Chub*

\*Indicates an acid-tolerant species

According to the ACCDC records review, there are no records of aquatic SAR or SOCC that have been historically observed within 10 km of the proposed project area. However, according to DFO SAR mapping review, Atlantic salmon, Inner Bay of Fundy population (*Salmo salar*) are identified throughout the Avon River watershed (DFO, 2021). Although suitable Atlantic salmon habitat was not identified during initial field studies, any watercourses that may be impacted by the final design will undergo additional detailed assessments to ensure that potential impacts to the species are considered and appropriately mitigated.

### 6.2.5 Species at Risk

The proposed Project is located in primarily forested area that has the potential to provide habitat for some species at risk (SAR) and species of conservation concern (SoCC) wildlife populations. Natural Forces is committed to protecting SAR, SoCC, and their habitat as important features and VECs related to the proposed Project.

Priority species and habitats for targeted species surveys were identified through a desktop analysis following the recommendations described in "A Guide to Addressing Wildlife Species and Habitat in an EA Registration Document". Surveys were conducted between April and October 2021 to characterize site-specific environmental conditions for wildlife and vegetation. For this EA, the following definitions of SAR and SoCC apply:

- **Species at Risk** (abbreviated SAR): A species that is determined to be Endangered, Threatened, or Vulnerable/Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Nova Scotia Endangered Species Act (NSESA), or the federal Species at Risk Act (SARA); and,
- **Species of Conservation Concern** (abbreviated SoCC): those species that are not SAR but are identified as regionally vulnerable or imperilled by the Atlantic Canada Conservation Data Centre (ACCDC) (i.e., those species with ACCDC S-ranks of S1: Critically imperilled in province; S2: Imperilled in province; and S3: Vulnerable in province of Nova Scotia.

Dillon reviewed readily-available information from reputable sources. The information was reviewed to evaluate the potential for flora and fauna SAR and SoCC within 100 km of the Project. Dillon completed a review of the following sources and data lists for the purpose of characterizing existing conditions at the Project site:

- A custom ACCDC report (ACCDC 2021; refer to Appendix L);
- The federal SAR registry;
- The provincial Endangered Species registry;
- Publicly-available governmental Geographic Information Systems (GIS) map layers and databases;
- High resolution aerial photography; and
- Nova Scotia Provincial Landscape Viewer mapping resource.

Other available background information sources and mapping reviewed to identify and assess SAR and SoCC and their habitats within the LAA included:

- Provincial Parks and Protected Areas mapping;
- Environmentally Sensitive Areas (ESAs) database;
- Atlas of Breeding Birds of the Maritime Provinces (MBBA);
- Important Bird Areas (IBAs) of Canada;
- Federally-designated Migratory Bird Sanctuaries;
- Provincially-identified Deer Wintering Areas (DWAs); and
- Identified Protected Natural Areas and Wildlife Management Zones (WMZ).

Following a review of the ACCDC and the results of the 2021 biological VEC surveys, a list of historical SAR and SoCC flora and fauna detected at or within 10 km of the Project site were compiled. Tables 20 and 21 present the SAR and SoCC reported, respectively. SAR or SoCC within 100 km of the Project site are included in Appendix L.

**TABLE 20: SPECIES AT RISK DETECTED OR REPORTED WITHIN 10 KM OF THE PROJECT SITE**

Common Name	Scientific Name	Legal Protection Status	S-RANK	Observations
<b>MAMMALS</b>				
Little Brown Myotis	<i>Myotis lucifugus</i>	SARA: E COSEWIC: E NSES: E	S1	Bat hibernaculum or bat species occurrence ACCDC report within 10 km.
Moose	<i>Alces americanus</i>	NSES: E	S1	ACCDC report within 10 km.
Northern/ Long-eared Myotis	<i>Myotis septentrionalis</i>	SARA: E COSEWIC: E NSES: E	S1	Bat hibernaculum or bat species occurrence ACCDC report within 10 km.

Common Name	Scientific Name	Legal Protection Status	S-RANK	Observations
Tri-colored Bat	<i>Perimyotis subflavus</i>	SARA: E COSEWIC: E NSES: E	S1	Bat hibernaculum or bat species occurrence ACCDC report within 10 km.
REPTILES				
Eastern Painted Turtle	<i>Chrysemys picta picta</i>	SARA: SC COSEWIC: SC COSEWIC: SC	S4S5	ACCDC report within 10 km.
BIRDS				
Bank Swallow	<i>Riparia riparia</i>	SARA: T COSEWIC: T NSES: E	S2S3B	ACCDC report within 10 km.
Barn Swallow	<i>Hirundo rustica</i>	SARA: T COSEWIC: SC NSES: E	S2S3B	ACCDC report within 10 km.
Bobolink	<i>Dolichonyx oryzivorus</i>	SARA: T COSEWIC: T NSES: V	S3S4B	ACCDC report within 10 km.
Canada Warbler	<i>Cardellina canadensis</i>	SARA: T COSEWIC: SC NSES: E	S3B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Chimney Swift	<i>Chaetura pelagica</i>	SARA: T COSEWIC: T NSES: E	S2B,S1M	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Common Nighthawk	<i>Chordeiles minor</i>	SARA: T COSEWIC: SC NSES: T	S2B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Eastern Wood-Pewee	<i>Contopus virens</i>	SARA: SC COSEWIC: SC NSES: V	S3S4B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	SARA: SC COSEWIC: SC NSES: V	S3S4B,S3N	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Olive-sided Flycatcher	<i>Contopus cooperi</i>	SARA: T COSEWIC: SC NSES: T	S2B	Observed during the 2021 surveys. ACCDC report with 10 km.
Peregrine Falcon - anatum/tundrus	<i>Falco peregrinus</i> pop. 1	SARA: SC NSES: V	S1B SNAM	Observed during the 2021 bird surveys.
Rusty Blackbird	<i>Euphagus carolinus</i>	SARA: SC COSEWIC: SC NSES: E	S2B	Observed during the 2021 bird surveys in wetlands. ACCDC report within 10 km.
PLANTS and LICHENS				
Frosted glass-whiskers	<i>Sclerophora peronella</i> Atlantic pop.	SARA: SC COSEWIC: SC	S1?	2021 Observance on a hardwood tree in a mixed-wood forest.

Common Name	Scientific Name	Legal Protection Status	S-RANK	Observations
Wrinkled Shingle Lichen	<i>Pannaria lurida</i>	SARA: T COSEWIC: T NSESA: T	S1S2	ACCDC report within 10 km.

Notes: 1 Atlantic Canada Conservation Data Centre (ACCDC) S-Ranks as follows: S1: Critically imperiled in province; S2: Imperiled in province; S3: Vulnerable in province; S4: Apparently secure, uncommon but not rare in province; S5: Secure: Common, widespread and abundant in province S#S# = a numeric range rank used to indicate any range of uncertainty about the status of the species or community. B= Breeding, N = Nonbreeding, M = Migrant, U = Unrankable. (ACCDC 2021) 2 Species at risk are those species that are listed as E: Endangered, T: Threatened, V: Vulnerable or SC: Special Concern on Schedule 1 of the federal Species at Risk Act (SARA), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the Nova Scotia Endangered Species Act (NSESA) and species of conservation concern are those species not listed as SAR and ranked as S1-S3 by the ACCDC.

**TABLE 21: SPECIES OF CONSERVATION CONCERN DETECTED OR REPORTED WITHIN 10 KM OF THE PROJECT SITE**

Common Name	Scientific Name	S-Rank	Observations
<b>INVERTEBRATES</b>			
Eastern Tailed Blue	<i>Cupido comyntas</i>	S3?	ACCDC report within 10 km.
Juvenal's Duskywing	<i>Erynnis juvenalis</i>	S3S4	ACCDC report within 10 km.
Pepper and Salt Skipper	<i>Amblyscirtes hegon</i>	S2S3	ACCDC report within 10 km.
<b>MAMMALS</b>			
Fisher	<i>Martes americana</i>	S3	Observed on a Benjamins Mill logging road in May 2021.
<b>BIRDS</b>			
American Kestrel	<i>Falco sparverius</i>	S3B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
American Robin	<i>Turdus migratorius</i>	S5B, S3N	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Baltimore Oriole	<i>Icterus galbula</i>	S2S3B	ACCDC report within 10 km.
Bay-breasted Warbler	<i>Setophaga castanea</i>	S3S4B	Observed during the 2021 bird surveys in. ACCDC report within 10 km.
Black-backed Woodpecker	<i>Picoides arcticus</i>	S3S4	ACCDC report within 10 km.
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	S3B	Observed during the 2021 bird surveys.

Common Name	Scientific Name	S-Rank	Observations
Blackpoll Warbler	<i>Setophaga striata</i>	S3S4B	Observed during the 2021 bird surveys.
Boreal Chickadee	<i>Poecile hudsonicus</i>	S3	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Brown-headed Cowbird	<i>Molothrus ater</i>	S2B	ACCDC report within 10 km.
Canada Jay	<i>Perisoreus canadensis</i>	S3	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Cape May Warbler	<i>Setophaga tigrina</i>	S2B	Observed during the 2021 bird surveys.
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	S2S3B	ACCDC report within 10 km.
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S3B	ACCDC report within 10 km.
Gray Catbird	<i>Dumetella carolinensis</i>	S3B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Indigo Bunting	<i>Passerina cyanea</i>	S1?B	ACCDC report within 10 km.
Killdeer	<i>Charadrius vociferus</i>	S3B	ACCDC report within 10 km.
Nelson's Sparrow	<i>Ammospiza nelsoni</i>	S3S4B	ACCDC report within 10 km.
Northern Goshawk	<i>Accipiter gentilis</i>	S3S4	Observed during the 2021 surveys. ACCDC report within 10 km.
Northern Harrier	<i>Circus hudsonius</i>	S3S4B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Pine Siskin	<i>Spinus pinus</i>	S2S3	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Purple Finch	<i>Haemorhous purpureus</i>	S4S5B,S3S4N	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Red Crossbill	<i>Loxia curvirostra</i>	S3S4	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Red-breasted Nuthatch	<i>Sitta canadensis</i>	S3	Observed during the 2021 bird surveys. ACCDC report with 10 km.
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	S2S3B	ACCDC report within 10 km.
Ruby-crowned Kinglet	<i>Regulus calendula</i>	S3S4B	Observed during the 2021 bird surveys. ACCDC report within 10 km.
Scarlet Tanager	<i>Piranga olivacea</i>	S2B	ACCDC report within 10 km.
Spotted Sandpiper	<i>Actitis macularius</i>	S3S4B	ACCDC report within 10 km.
Swainson's Thrush	<i>Catharus ustulatus</i>	S3S4B	Observed during the 2021 bird surveys. ACCDC report within 10 km.



Common Name	Scientific Name	S-Rank	Observations
Turkey Vulture	<i>Cathartes aura</i>	S2S3B	Observed during the 2021 bird surveys.
Veery	<i>Catharus fuscescens</i>	S3S4B	Observed during the 2021 bird surveys. ACDC report within 10 km.
Wilson's Snipe	<i>Gallinago delicata</i>	S3B	ACDC report within 10 km.
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	S3S4B	Observed during the 2021 bird surveys. ACDC report within 10 km.
PLANTS and LICHENS			
Drummond Moss	<i>Drummondia prorepens</i>	S3?	ACDC report within 10 km.
Acadian Jellyskin Lichen	<i>Leptogium acadiense</i>	S3S4	2021 Observance on a hardwood tree in hardwood and mixed-wood forests.
Black Rock-wafer Lichen	<i>Phyllicum demageonii</i>	S2?	ACDC report within 10 km.
Blistered Tarpaper Lichen	<i>Collema nigrescens</i>	S3	2021 Observance on a hardwood tree in a mixed-wood forest.
Blue Vervain	<i>Verbena hastata</i>	S3	ACDC report within 10 km.
Dwarf Bilberry	<i>Vaccinium cespitosum</i>	S3	ACDC report within 10 km.
Eastern Candlewax Lichen	<i>Ahtiana aurescens</i>	S2S3	ACDC report within 10 km.
Large Round-Leaved Orchid	<i>Platanthera macrophylla</i>	S2	ACDC report within 10 km.
Lesser Sulphur-cup Lichen	<i>Cladonia deformis</i>	S2S3	ACDC report within 10 km.
Mixed-up Pixie-cup	<i>Cladonia mateocyatha</i>	S2S3	ACDC report within 10 km.
Muehlenbeck's Bryum Moss	<i>Bryum muehlenbeckii</i>	S1?	ACDC report within 10 km.
Salted Shell Lichen	<i>Coccocarpia palmicola</i>	S3S4	ACDC report within 10 km.
Shaggy Fringed Lichen	<i>Anaptychia palmulata</i>	S3S4	2021 Observance on a hardwood tree in a mixed-wood forest.
Silvery-flowered Sedge	<i>Carex argyrantha</i>	S3S4	ACDC report within 10 km.
Triangular-valve Dock	<i>Rumex triangulivalvis</i>	S2	ACDC report within 10 km.
Valley Oakmoss Lichen	<i>Evernia prunastri</i>	S3S4	ACDC report within 10 km.
Hooker's Orchid	<i>Platanthera hookeri</i>	S3	ACDC report within 10 km.
Powdered Fringe Lichen	<i>Heterodermia speciosa</i>		2021 Observance on a hardwood tree in a mixed-wood forest.

Common Name	Scientific Name	S-Rank	Observations
Notes:			
Atlantic Canada Conservation Data Centre (ACDC) S-Ranks as follows: S1: Critically imperiled in province; S2: Imperiled in province; S3: Vulnerable in province; S4: Apparently secure, uncommon but not rare in province; S5: Secure: Common, widespread and abundant in province S#S# = a numeric range rank used to indicate any range of uncertainty about the status of the species or community. B= Breeding, N = Nonbreeding, M = Migrant, U = Unrankable. (ACDC 2021)			
Species at risk are those species that are listed as E: Endangered, T: Threatened, V: Vulnerable or SC: Special Concern on Schedule 1 of the federal Species at Risk Act (SARA), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the Nova Scotia Endangered Species Act (NSES) and species of conservation concern are those species not listed as SAR and ranked as S1-S3 by the ACDC.			

With respect to SAR or potential SAR that has the potential to be present at the Project site, the following section provides a brief description of the preferred habitat for SAR that have historically been reported at or near the Project site.

Mainland Moose (*Alces americanus*) are listed as Endangered by the NS ESA. Moose can reside in a variety of forest habitats; however, they require an abundance of mature forest for security and thermal cover, as well as areas of interspersed young deciduous trees and shrubs for browsing (NSDNR 2021). Although not encountered, mainland moose were reported by the ACCDC as being observed within 10 km of the Project site and potential habitat is available at the site.

Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*) are listed as Endangered (SARA, COSEWIC and NSES) and ranked by the ACCDC as S1 for critically imperiled in Nova Scotia. The bats were detected using acoustic bat monitors and, although the exact species of bat could not be determined, it is likely that all were Myotis bats. The Little Brown Myotis is the most common bat species in Nova Scotia and is the most likely species to occur the area; however, Northern Myotis may also be present, but in lower numbers. Both species are expected to occur with patchy distribution reflecting favourable habitat conditions and, in particular, available insect food sources. Habitat requirements for these bats include winter hibernacula such as caves or old mine openings that maintain a relatively stable temperatures (2-10°C) and high humidity levels (>80 %) throughout the winter, as well as summer day-roosting and maternity-roosting habitat such as abandoned woodpecker cavities, loose bark, knot holes, cracks or hollows. Bats exhibit high site fidelity to known hibernacula in the region, although, there are no known hibernacula within the LAA for the Project. Summer day-roost and maternity-roost sites may occur in suitable tree features, such as abandoned woodpecker cavities, loose bark, knot holes, cracks or hollows. Additionally, bats may also use cavities and crevices in or on human infrastructure as roosting sites. However, most of the time roost sites are mature trees (dead or alive) with a large hollowed-out cavity or cavities.

Canada Warbler (*Wilsonia canadensis*) is listed as threatened (SARA), special concern (COSEWIC), endangered (NSES) and ranked by the ACCDC as S3B for vulnerable in Nova Scotia for the breeding population. Canada Warblers typically breed throughout Maritimes and southeastern Canada. This species prefers wet mixed forests with well-developed shrub layers, as well as regenerating areas. Canada Warblers were detected within the Project site and suitable nesting habitat does exist within the

PDA. Most observations of Canada Warblers were reported during the spring and summer surveys with 8 and 15 reported observations, respectively; however one observation was noted early during the fall migratory period (late August). Detections were noted as at Point Count (PC) locations that spanned the site and multiple habitat types.

Bobolink (*Dolichonyx oryzivorus*) is listed as threatened (SARA and COSEWIC), vulnerable (NSESAs) and ranked by the ACCDC within Nova Scotia as S3S4B for apparently secure to vulnerable for the breeding population. Bobolinks typically occur in grassland habitats. This species was detected within 10 km of the Project site according to ACCDC records; however no observations were reported during the 2021 surveys. Suitable habitat for Bobolink was limited and they are not expected to occur frequently at the site.

Chimney Swift (*Chaetura pelagica*) is listed as threatened (SARA and COSEWIC), endangered (NSESAs), special concern (COSEWIC) and ranked by the ACCDC within Nova Scotia as S2B for imperiled for the breeding population and S1M as critically imperiled for the migratory population. Historically, the Chimney Swift used mainly large hollow trees for nesting sites but have adopted chimneys as preferred nesting sites. They are generally associated with urban and rural areas where chimneys are available for nesting and roosting. Chimney Swifts are aerial foragers and tend to concentrate near water where insects are abundant. This species was detected within the Project site in 2021 and is likely to use the site for foraging purposes. Suitable nesting habitat for chimney swifts was not observed on the Project site. Most observations of Chimney Swift were reported during the fall migration with 5 reported observations on September 24, 2021 from a single location in a previously forested area of the site. One additional bird was observed during a summer breeding survey on June 3, 2021.

Common Nighthawk (*Chordeiles minor*) is listed as Threatened (SARA and NSESAs), Special Concern (COSEWIC) and ranked by the ACCDC as S2B for imperiled in Nova Scotia for the breeding population. They typically nest on the ground in open or sparsely vegetated habitats. This species was detected within the Project site and suitable nesting habitat does exist. Most observations of common nighthawks were reported during the summer surveys with 9 reported observations between June 3 and 24, 2021; however one bird was observed during a spring migratory survey (May 28, 2021) and an additional two were observed early during the fall migration period (on August 12, 2021).

Eastern Wood-Pewee (*Contopus virens*) is listed as Special Concern (COSEWIC/SARA) and Vulnerable (NSESAs) and ranked by the ACCDC as S3S4B for vulnerable to apparently secure in Nova Scotia for the breeding population. Eastern Wood-pewee breed throughout Nova Scotia during the summer months before migrating to northern South America for wintering. This species breeds in open woodland of all types in Nova Scotia, but shows a preference for forests with a dominance of deciduous trees. The Eastern wood-pewee forages on flying insects in the middle canopy. This species was detected within the Project site in 2021 and is likely to use the site for foraging and nesting purposes.

Evening Grosbeak (*Coccothraustes vespertinus*) is listed as Special Concern (SARA and COSEWIC), Vulnerable (NSESAs) and ranked by the ACCDC as S3S4B S3N in Nova Scotia for vulnerable to apparently secure for the breeding population and vulnerable for the non-breeding population. Evening grosbeaks tend to nest in older growth and second-growth conifer-dominated forests. They primarily prey on insects and their larvae during the breeding season, on a wide variety of seeds and the leaf buds of many deciduous tree and shrub species over winter. Evening grosbeaks were identified during the 2021

late-winter, spring summer and fall bird surveys. Potential breeding habitat for the evening grosbeak does exist in forested areas with mature trees present on the Project site.

Olive-sided Flycatcher (*Contopus cooperi*) is listed as Threatened (SARA and NSESA), Special Concern (COSEWIC) and ranked by the ACCDC as S2B for imperiled in Nova Scotia for the breeding population. This species nests in open, forested areas, often with many conspicuous perches. Olive-sided Flycatchers were detected within the Project site and suitable nesting habitat does exist. Most observations of olive-sided flycatchers were reported during the spring and summer surveys with 20 and 21 reported observations, respectively; however 5 observations were noted early during the fall migratory period (late August) at locations that spanned the site and multiple habitat types.

Peregrine Falcon - *anatum/tundrius* (*Falco peregrinus*) is listed as Special Concern (SARA), Vulnerable (NSESA) and ranked by the ACCDC as S1B for critically imperiled in Nova Scotia for the breeding population. They typically nest on cliff ledges along coasts, and major rivers and are known to reuse nesting location. This species has been known to nest on tall buildings, apparently finding them suitable replacements for cliffs. Two Peregrine Falcons were observed at the Project site during the fall migratory surveys. Although this species was not detected during the breeding season, there are numerous bedrock outcroppings that could provide potential nesting habitat for Peregrine Falcons.

Rusty Blackbird (*Euphagus carolinus*) is listed as special concern (SARA and COSEWIC), endangered (NSESA) and ranked by the ACCDC as S2B for imperiled in Nova Scotia for the breeding population. Rusty blackbirds nest in conifer-dominated forests, wetlands, bogs and wet meadows. This species may occur within the Project site as suitable nesting habitat does exist. During the 2021 bird surveys, 2 Rusty Blackbirds were detected during the spring migration window in wetlands (i.e., on May 5, 2021).

Bank Swallow (*Riparia riparia*) is listed as threatened (SARA and COSEWIC), endangered (NSESA) and ranked by the ACCDC as S2S3B for vulnerable to imperiled in Nova Scotia for the breeding population. Bank swallows are a colonial breeder that is found across Nova Scotia in lowlands along rivers, streams and ocean coasts and nest around vertical, or near vertical cliffs or banks. These birds are aerial insectivores catching nearly all their prey in flight which requires open areas. This species was detected within 10 km of the Project site according to ACCDC records; however no observations were reported during the 2021 surveys. Suitable habitat for bank swallows is limited and they are not expected to occur frequently at the site.

Barn Swallow (*Hirundo rustica*) is listed as threatened (SARA and COSEWIC), endangered (NSESA) and ranked by the ACCDC as S2S3B for vulnerable to imperiled in Nova Scotia for the breeding population. Barn Swallows typically inhabit open areas near human settlements and land uses including parks, ball fields, golf courses and agricultural fields where they forage for flying insects. These birds will typically construct their nests on human-made structures, and rarely in more natural locations such as cliffs, caves or hollowed trees. Barn swallows are migratory and winter in Central and South America. This species was detected within 10 km of the Project site according to ACCDC records; however no observations were reported during the 2021 surveys. Suitable habitat for bank swallows is limited and they are not expected to occur frequently at the site.

Eastern Painted Turtle (*Chrysemys picta picta*) is listed as Special Concern (SARA and COSEWIC) and ranked by the ACCDC as S4S5. Painted Turtles prefer wetland and water bodies habitats with slow

moving, relatively shallow and abundant vegetation, as well as basking sites (COSEWIC 2018). Suitable nesting habitat includes open sloped areas with sandy-loamy and/or gravel substrate that is generally within 1200 m of a waterbody (COSEWIC 2018). Suitable overwintering habitat requires shallow water bodies with deep sediment (COSEWIC 2018). This species was detected within 10 km of the Project site according to ACCDC records; however no observances were reported during the 2021 surveys. Suitable habitat for nesting, basking and overwintering was observed on the Project site during the 2021 surveys.

Two lichen SAR were observed on the Project site during the 2021 field surveys. Both lichens are typically found growing on the bark of mature hardwood trees. Frosted Glass Whiskers Atlantic population (*Sclerophora peronella*) is listed as Special Concern (SARA and COSEWIC) and ranked by the ACCDC as S1? for potentially critically imperiled in Nova Scotia; however the numeric rank is considered to be inexact or uncertain. Wrinkled Shingle Lichen (*Pannaria lurida*) is listed as Threatened (SARA, COSEWIC and NSESA) and ranked by the ACCDC as S1S2 for imperiled to critically imperiled in Nova Scotia. Suitable habitat for lichen SAR is limited to areas of the list that have not been previously harvested such as the Crown land at the north of the Project site.

#### 6.2.5.1 Environmentally Sensitive or Managed Areas

Based on a desktop review, the following is a summary of environmentally sensitive or managed areas with 10 km of the Project site:

- The ACCDC report identified three managed areas and one environmentally sensitive area within 10 km of the Project Site, which are:
  - The Falmouth Municipal Water Supply and the Falmouth Water Supply are located to the north and Mill Lakes Watershed is located to the north east of the Project, approximately seven and five kilometers from the nearest proposed WTG locations, respectively.
  - The Southern Bight Minas Basin Important Bird Area is located north west of the Project site and is approximately 4.1 km away from the nearest proposed WTG. Details of bird surveys are presented in **Section 6.2.2** and in Appendix H.
- Falls Lake and Mockingigh Lake of the Avon River Watershed are designated as habitat for significant habitat for a species of concern. Falls Lake is located approximately 2 km southeast of the nearest proposed WTG.
- The nearest Provincial Park (Falls Lake Provincial Park) is 4.3 km from the nearest proposed WTG.
- The nearest Provincially Protected Nature Reserves (Panuke Lake Nature Reserve) and Wilderness Areas (South Panuke Wilderness Area); are located >5 km from the nearest proposed WTG locations.
- There are no provincially identified Deer Wintering Areas (DWAs) or Protected Natural Areas (PNAs) within the Project site.
- Lastly, no part of the Project site was identified as Core Habitat or federally identified Critical Habitat with respect to species listed as Endangered or Threatened under either the federal SARA or provincial NSESA.

### 6.3 Socioeconomic VECs

The Project is located in the West Hants area of Hants County, approximately 13 km southwest of Windsor, Nova Scotia. Impacts and benefits from the Project will be attributed to communities across the West Hants Municipal District, shown on Figure 19. The latest Statistics Canada data was reviewed to obtain information on the population and local economy of the West Hants Municipal District, as well as an overview of the tourism/recreation industry within the area. This allows the Proponent to evaluate how the Project may affect the community and local economy. Background on the area and populations of the municipal district and nearby centres are summarized below.

#### Demographic Overview

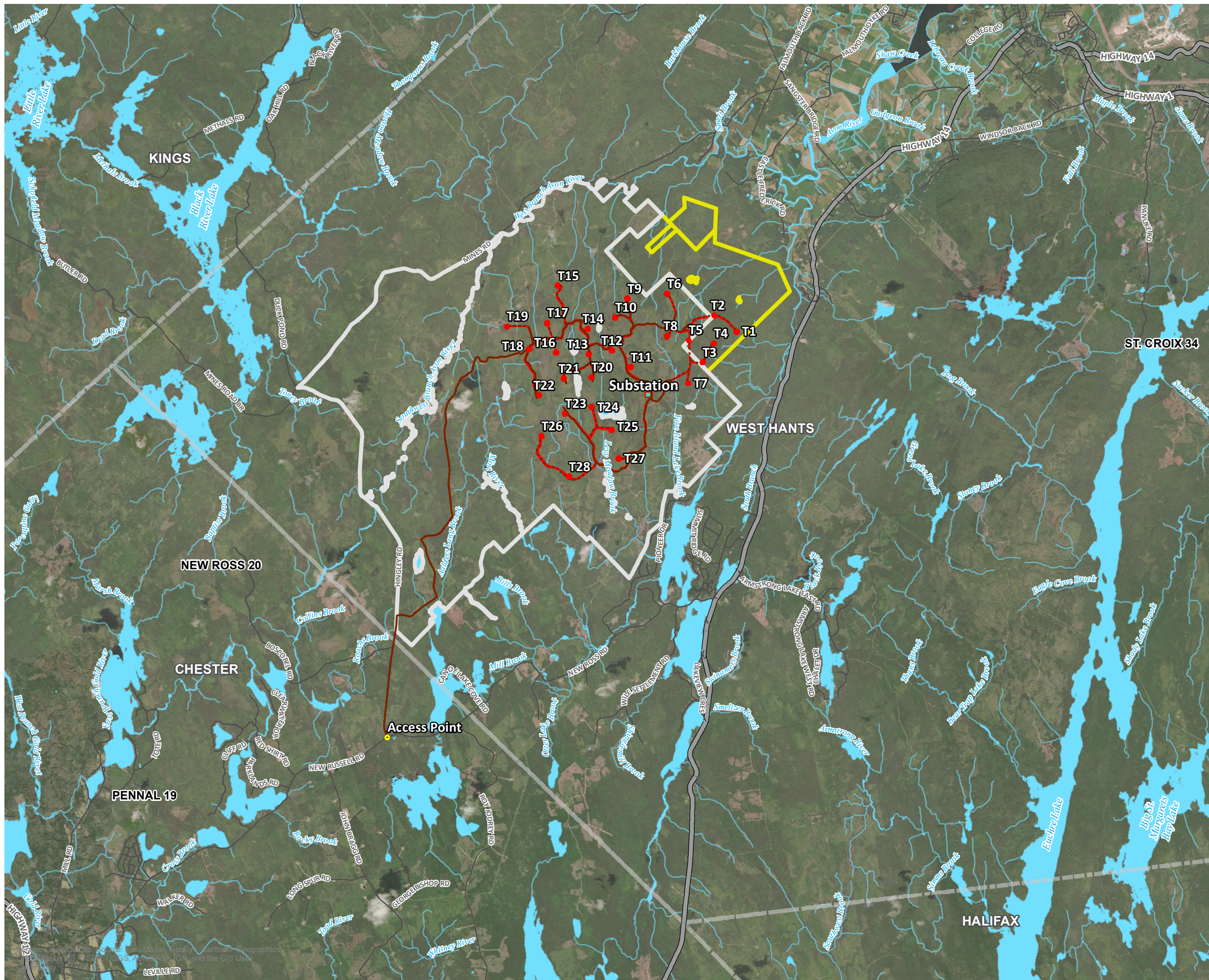
In 2016, the population of the West Hants Municipal District Census Subdivision (CS) was 15,368 (Statistics Canada 2017). Overall, the population of West Hants is growing at a rate of 0.77% per year over the past 15 years of census data (from 2001 to 2016). Statistics on the population and demographics of the West Hants Municipal District and Nova Scotia are presented in Table 22.

**TABLE 22: POPULATION AND DEMOGRAPHICS FOR WEST HANTS CS AND NOVA SCOTIA**

	West Hants CS	Nova Scotia
Population in 2016	15,368	923,598
Population in 2011	15,324	921,727
2011-2016 Population Change (%)	0.3	0.2
Total private dwellings (2016)	7,175	458,568
Total number of households (2016)	6,426	401,990
Population density per square km (2016)	12.4	17.4
Land area (square km) 2016	1,244.09	52,942.27
Median Age of the Population (2016)	46.6	45.5

The population of the West Hants Municipal District is similar to the provincial median age of 45.5, with a median age of 46.6. This data is in line with the Province of Nova Scotia's trends of urbanizing and aging populations. The population by age cohort in West Hants is presented in Figure 20.

Police and hospital services are available in West Hants to service the needs of the community. The West Hants Detachment of the RCMP is located in Windsor Nova Scotia. The nearest hospital with emergency services to the Project site is the Hants Community Hospital, also located in Windsor, NS.

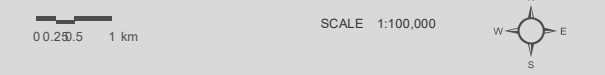


BENJAMINS MILL WIND PROJECT

**LOCAL ASSESSMENT AREA FOR THE SOCIOECONOMIC ENVIRONMENT**

FIGURE 19

- Proposed Access Point
- Proposed Turbine Location
- Highway
- Local Road
- Substation
- Watercourse
- Waterbody
- Municipality
- Crown Land
- Privately Owned Land
- Project Development Area
- Existing Site Road
- New Site Road

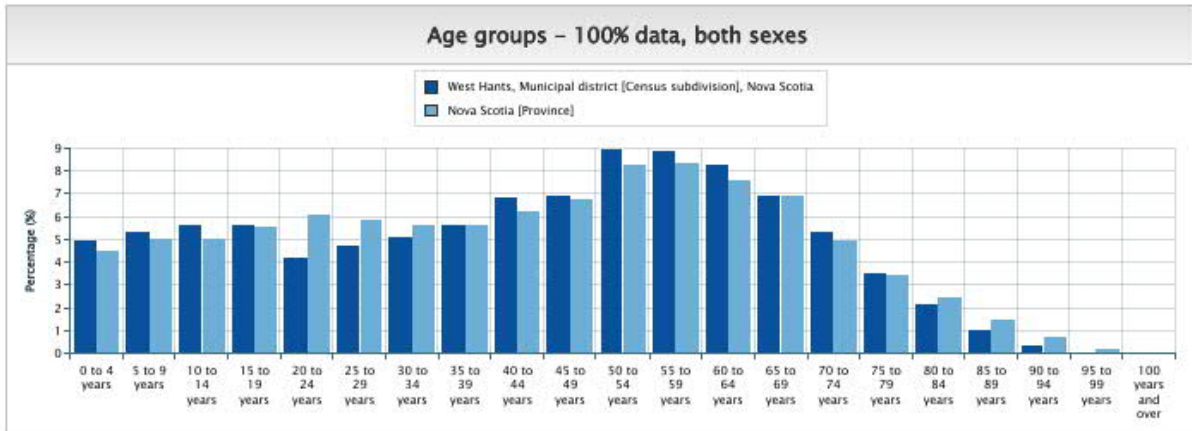


MAP DRAWING INFORMATION:  
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: MEC  
MAP CHECKED BY: KB  
MAP PROJECTION: NAD 1983 UTM ZONE 20N



PROJECT: 21-1329  
STATUS: DRAFT  
DATE: 2022-01-10



Source: Statistics Canada 2016 Census of Population Community Profiles

**FIGURE 20: POPULATION BY AGE COHORT, WEST HANTS CS AND NOVA SCOTIA**

### 6.3.1 Economy

The Project is located within the Province’s West Hants Economic Region (the Region) which includes Benjamins Mill, Mill Section, Vaughan, and Windsor Forks Counties. Statistics Canada identified that there are approximately 7000 residents actively employed, representing a participation (employment) rate of 59.5% (Statistics Canada 2017). This participation rate is slightly lower than the provincial average of 61.3%.

The West Hants employment profile is dominated by work in the trades, transport and equipment operators, sales and service occupations, and business, finance, and administration occupations. These industries account for more than 58% of the total employment in the Region. Labour Force by Industry statistics are provided for the West Hants Municipal District in Table 23.

**TABLE 23: LABOUR FORCE BY INDUSTRY, WEST HANTS MUNICIPAL DISTRICT**

Industry	Total (%)
Agriculture, forestry, fishing and hunting	3.5
Mining, quarrying, and oil and gas extraction	0.8
Utilities	0.7
Construction	13.1
Manufacturing	9.0
Wholesale trade	4.4
Retail trade	10.7
Transportation and warehousing	4.4
Information and cultural industries	0.9



Industry	Total (%)
Finance and insurance	2.7
Real estate and rental leasing	0.9
Professional, scientific and technical services	5.5
Management of companies and enterprises	0
Administrative and support, waste management and remediation services	6.4
Educational services	7.7
Health care and social assistance	13.6
Arts, entertainment and recreation	1.9
Accommodation and food services	4.9
Other services (except public administration)	4.3
Public administration	6.2

Natural Forces remains committed to engaging local service providers where possible during each phase of the Project. The Project has the potential to stabilize costs for Nova Scotia Power customers and increase property tax revenues for the Windsor-West Hants Regional Municipality.

### 6.3.2 Land Use and Value

The Project area is proposed on predominantly privately-owned land parcels with a smaller footprint located on provincial Crown lands. The privately owned site lands have been recently and historically used for forestry activities and have a network of existing forestry roads. Crown land in the area, which is open to a variety of uses, is predominantly composed of mature forest growth. Existing development in the area is concentrated along Highway 14 and is generally limited to the small communities in the areas of Smiths Corner (southeast of the Project area) and Windsor Forks (northeast of the Project area). There are various land uses to consider on the Project lands and Natural Forces remains committed to working with land owners and users to maintain safe use and enjoyment of these lands. Further details on the public consultation completed is detailed in Section 4.0.

The primary building type in the West Hants Municipal District is residential dwellings. There are 6,425 private dwellings in the district, of which 5,750 are single-detached homes. According to Statistics Canada (2017), the average value of a property within the West Hants Census Subdivision in 2016 was \$219,394, the majority of which are single detached houses. Property value in the CS is slightly lower than the provincial average of \$230,441. The Project is not expected to impact property values based on a review of the available literature which found that there were no correlating negative associations between wind farms and property value. In 2010 a study in the Municipality of Chatham-Kent, Ontario was prepared to assess the effects of wind energy on real estate values. This report was prepared in accordance with the Canadian Uniform Standards of Professional Appraisal Practice for the Appraisal Institute of Canada (Canning et al. 2010). The study found that it was highly unlikely that a relationship exists between wind farms and the market values of rural residential real estate. Additionally, a study analyzing more than 7,000 home and farm sales from 2002 to 2010 in the Melancthon Township and 10

surrounding counties found that Ontario's first and largest wind farm (133 turbines) had "no statistically significant effect" on property values (Vyn and McCullough 2014). Further, the study found a lack of significant effect is similar across both rural residential properties and agricultural properties (Vyn and McCullough 2014).

There are existing radiocommunication systems near the Project lands. Of the various types of radiocommunication towers, the three that are within 20 km of the Project are fixed (point-to-point), broadcast, and land mobile towers. The point-to-point (PTP) towers within 20 km of the Project have three links that cross or come near to the proposed turbine locations. The nearest broadcast tower is approximately 13 km away from the closest wind turbine. The nearest land mobile tower is approximately 2.5 km away from the closest wind turbine. These distances are illustrated on the maps included in the Radiocommunication System Impact Study included in Appendix M.

The center of the Project area is approximately 5 km from both the communities of Smiths Corner and those surrounding Falls Lake, and the community of Windsor Forks. These communities are composed of various residential, agricultural, industrial and commercial properties. The nearest structure to the site is a single-detached residential dwelling located approximately 1.6 km from the nearest proposed turbine location.

### 6.3.3 Transportation

Delivery of materials and equipment will be phased throughout the construction period depending upon the specific construction activity. The vehicles likely to be involved include:

- Large trucks with trailers for delivery of materials, earth-moving equipment and cargo containers for storage of tools and parts;
- Dump trucks to deliver and/or move stone for constructing the internal site road;
- Concrete trucks for constructing WTG foundations;
- One 600 tonne main lift crane;
- One 500 tonne base and mid install crane;
- One 60 tonne pre-assembly crane;
- WTG component delivery vehicles; and
- Miscellaneous light vehicles including cars and pickup trucks.

Of these predicted vehicle movements, some will be oversized loads associated with the delivery of the WTG component parts (towers, blades, nacelles) and the cranes required for erection. These deliveries will be subject to movement orders and permits as agreed upon with governing authorities.

In addition to private roads on private land, publicly managed roads will be used for transportation to the Project site and any potential modifications to intersections for access to the Project Area will follow appropriate traffic controls and permitting. The site is currently accessed via Hingley Road, a one lane gravel forestry road that branches out into a network of other forestry roads throughout the Project area. Access to Hingley Road is located on the north side of New Russell Road, approximately 8.5 km

southwest of the site. Existing access roads will need to be widened to support heavy equipment and material movements and turning radii.

The construction delivery route will be decided after a review of the local road network and through consultation with local authorities in each jurisdiction. Roads used for the construction phase of the Project will comply with intermediate and maximum weight road restriction lists (provided online on the Nova Scotia *Roads Designation* website). If required, a Transportation Plan will be provided to the Nova Scotia department of transportation.

Wind turbines are required to be setback from public highways, roads, and streets, which includes roads and streets within boundaries of a city, designated highways, and areas designated for those purposes in a community plan. The Project layout does not infringe on the minimum setbacks from public roads or transportation routes.

#### 6.3.4 Recreation and Tourism

Nova Scotia markets itself as a tourism destination, with a tourism industry that generated an estimated \$2.7 billion in tourism revenues in 2017. The province also contributed more than \$2.2 billion to tourism-related GDP, and generated 39,500 direct and spinoff jobs in 2017. In 2017, tourism revenues were an estimated \$2.7 billion for the province as a whole (Tourism Nova Scotia 2018). The Nova Scotia tourism industry has a goal of reaching \$4 billion in tourism revenues by 2024.

West Hants Municipal District falls into the Annapolis Valley tourist region, which accounts for approximately 15% of the province's tourism revenues (Tourism Nova Scotia 2018). Tourism in the southern part of the county, which encompasses the Project site, includes a variety of lakes and recreational cottaging areas (Annapolis Valley Tourism 2019). There are no recreational parks or areas on or adjacent to the Study Area. Recreational activities associated with the forestry related land use in the area include hunting, snowmobiling, and ATV use. It is assumed that these activities may be occurring within the Project area.

Falls Lake, located approximately 5 km from the centre of the Project, is a popular tourist destination that provides various recreational activities such as boating, swimming, canoeing, and sport fishing. Numerous cottages, campgrounds and a provincial park also reside on this lake.

Interactive mapping from Nova Scotia Trails was reviewed for recreational trails that may be locally present. The mapping does not show any trails on the Project area, but it does show hiking trails in the area surrounding the Project lands, including Moses Mountain Trail, Falls Lake Municipal Land Trail, the Falls Lake Provincial Park Trail, and the Castle Frederick Farms recreational trails.

Federal, provincial, and local recreational sites, tourism features, and parks within a 5 km radius of the Project site are provided below in Table 24.

**TABLE 24: RECREATIONAL AND TOURISM FEATURES NEAR THE PROJECT SITE**

Feature	Distance to nearest WTG
Moses Mountain Trail	1.9 km
Falls Lake Cottages and Campground	2.1 km
Falls Lake Provincial Park	4.3 km
Ski Martock	5.3 km

### 6.3.5 Human Health and Safety

A review of possible health and safety concerns has been included in this assessment. Effects to human health associated with construction, operation, or decommissioning of wind turbines are considered minimal or non-existent due to the size and location of the Project, mitigation, and setback distances.

The wind turbine models under consideration have been selected in order to comply with international wind class standards, and to help reduce the risk of ice build-up, lightning strikes and general malfunctions. Natural Forces has an in-house construction manager who oversees construction activities and will encourage safe practices for worker safety. A copy of the Occupational Health and Safety (OHS) Act will also be located on site at all times.

Many of the mentioned assessments are conducted to ensure the construction and operation of the Project will occur in the safest manner possible and will often reduce many of the concerns and risks before construction begins such as possible noise and shadow flicker annoyance.

The public can be concerned about the potential for impacts to human health from wind turbines. Common concerns include:

- Risk of ice throw (addressed in **Section 8.3**);
- Sound (addressed in **Section 7.1.1.4**);
- Shadow flicker (addressed in **Section 7.1.3.1**);
- Infrasound;
- Electromagnetic fields (EMF); and
- Effects to air quality from dust and air emissions (addressed in **Section 7.1.1.3**).

Low frequency sound is defined as sound with a frequency less than 200 Hertz (Hz) or cycles per second. Infrasound, also referred to as low-frequency sound, is sound that is not audible to humans, which is typically below a frequency of 20 Hz (MOE, 2010).

Infrasound levels created by wind turbines are often comparable to the ambient levels prevalent in the natural environment, such as levels created by the wind itself. In terms of health, at sufficiently high levels, infrasound can be dangerous; however, it is inaccurate to conclude that infrasound from wind turbines causes health risks (MOE, 2010).

A recent study conducted by the Massachusetts Institute of Technology found that infrasound near wind turbines does not exceed audibility thresholds. Epidemiological studies have shown a relationship between living near turbines and annoyance. Annoyance appears to be strongly related to individual characteristics rather than noise from turbines. However, infrasound and low-frequency sound do not present unique health risks. (McCunney et. al., 2014).

Electromagnetic fields (EMFs) are a type of energy that occurs naturally and is created through the use of electrical appliances and equipment (City of Toronto 2011). A guidebook to Wind Energy Development was produced in 2011 and identified transmission lines, wind turbine generators, generator transformers and underground cables as the four potential sources of EMFs as a result of wind farm operations (Canadian Wind Energy Association [CanWEA] 2011). The guidebook goes on to suggest that EMF exposure is not significant due to low emission levels produced by wind farm operations and indicates that generator transformers likely generate the highest levels of EMFs, although still low levels, relative to all other wind farm operational components. Similar conclusions have been made by Health Canada and the World Health Organization (Chief Medical Officer of Health of Ontario 2010).

## 6.4 Cultural and Heritage VECs

Based on the proximity to the Avon River (approximately 2 km), there is potential for Indigenous cultural heritage resources (both pre-contact and historic) or Euro-Canadian resources to exist within the Project area, despite their disturbed nature. However, the Project area has been described as having a low potential for encountering archaeological resources (Appendix N). Areas with higher potential for archaeological and cultural resources may be found along the shoreline of waterbodies such as the Avon River.

### 6.4.1 Archaeological and Cultural Resources











An Archaeological Resource Impact Assessment (ARIA) was conducted by Cultural Resource Management (CRM) Group Limited. The purpose of the assessment was to determine the potential for archaeological resources within the Project area and to provide recommendations for further mitigation if required.

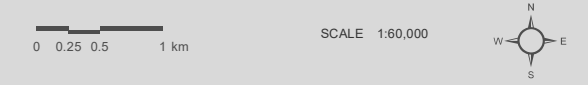
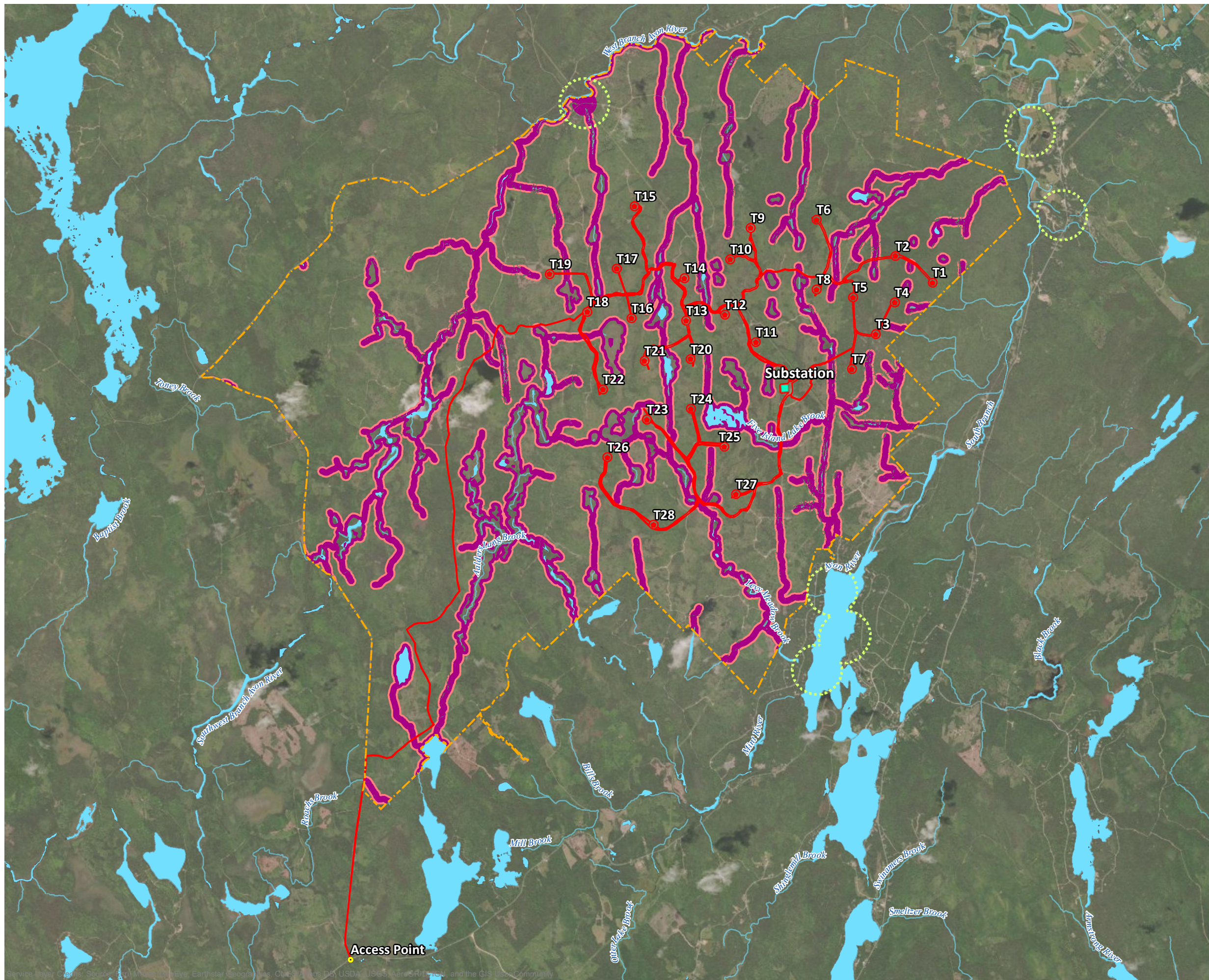
According to the 2021 ARIA conducted for the Project in October 2021, there is one registered archaeological site within the proposed Project area. The registered site is of an isolated ground slate point recovered near a tributary of the Avon River, near the northernmost portion of the study area, shown on Figure 21. Despite the site being registered as an isolated find, its full extent is currently unknown; therefore, the 200 metre buffer has been established out of an abundance of caution. The isolated find, including the 200 m buffer are located outside of the PDA. In addition, 13 registered sites are located within a one-kilometre radius of the Project lands, all of which are Historic or Mi'kmaq in nature (CRM Group 2021; Appendix N). Background research of the Project Area yielded no evidence of National Historic Sites, Special Places, Protected Areas, National or Provincial Parks within the PDA.

Historical mapping from approximately 1871 revealed that no historic period settlement or development has occurred within the study area, aside from possible sawmill activity along the northern boundary in the late nineteenth to early twentieth centuries and the creation of modern logging roads.

**FINDINGS WITHIN THE CULTURAL AND HERITAGE LOCAL ASSESSMENT AREA**

FIGURE 21

-  Proposed Access Point
  -  Proposed Turbine Location
  -  Substation
  -  Project Development Area
  -  Local Assessment Area
  -  Watercourse
  -  Waterbody
  -  200 m Buffer of a Registered Archaeological Site
- Areas of Moderate Archaeological Potential**
-  Moderate
  -  High



MAP DRAWING INFORMATION:  
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: MEC  
MAP CHECKED BY: KB  
MAP PROJECTION: NAD 1983 UTM ZONE 20N

Service Layer Credits: Source: Esri, Maxar, DeLorme, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

The study area was therefore ascribed low potential for encountering early Euro-Canadian archaeological resources (CRM Group 2021).

An Archaeological Reconnaissance consisting of a walkover of portions of the Project Area with a specific focus on proposed turbine locations and impact areas is recommended by CRM Group prior to any ground disturbance activity.

#### 6.4.2 Existing and Historic Land Uses

Archaeological records indicate that the proposed Project area and vicinity were utilized and occupied by the Mi'kmaq from at least the Archaic Period to the historic period (10,000 B.P. to present) and by European settlers from at least the second half of the seventeenth century. From 1896 to 1911, businessman S.P. Benjamin operated a sawmill on the West Branch Avon River. As part of the history of forestry in the region, in 1937, several woodlots within the Project Area were transferred from the Windsor Lumber Company to the Crown (CRM Group 2021).

Today, the Project Area consists of both privately-owned lands and Crown Lands owned by the Province of Nova Scotia. Presently, the privately-owned lands are used for forestry activities and Crown Lands are open to a variety of uses.

## 7.0 Effects of the Undertaking on the Environment

The potential interactions with the surrounding environment have been considered in terms of each distinct Project phase and corresponding activities associated with the Project as planned. Interactions due to accidents, malfunctions and unplanned events can be found in **Section 7.5**.

The initial screening (i.e., project interaction matrix) provided in Table 25 assists in determining if an interaction between the activities being carried out in each Project phase and the VEC. A qualitative rating system was used to evaluate the potential for interactions is possible between the Project and the environment. One of the following two ratings was prescribed for each individual VEC:

- An interaction between the Project and the environment could occur (which is identified with as 'x' in the matrix below), which are carried forward for further assessment; or
- No interaction occurs between the Project and the environment (which is identified by a blank cell in the matrix below), and therefore no further assessment is required and the interaction is not discussed further.

Based on the Project description (refer to **Section 2.0**), the VECs (refer to **Section 6.0**), and the scope of the EA, the potential interactions between the Project and the environment are summarized in Table 25 below.