DILLON CONSULTING

OSCO AGGREGATES LIMITED

2023 Baseline Environmental Surveys

Pit No. 4 Extension, Glenholme, Colchester County, Nova Scotia

June – 23-6113

June 6, 2024

OSCO Aggregates Limited
17 Estate Drive, 400 Chesley Drive
Lower Sackville, Nova Scotia
B4C 2R5

Attention: Chris Yurchesyn, General Manager,
General Manager, OSCO Aggregates Limited

2023 Baseline Environmental Surveys for the Pit No. 4 Extension Environmental Assessment

Dillon Consulting Limited (Dillon) is pleased to provide the results of the biophysical surveys conducted in 2023 in support of the Pit No. 4 Extension Environmental Assessment registration.

We trust the following meets your present needs. I Please contact the undersigned if you have any questions or require additional information.

Sincerely,

DILLON CONSULTING LIMITED

Jonathan Oliver, P.Geo., M.Sc.
Project Manager, Associate

Kelly Regan, M.Sc
Biologist, Associate

KSR:vrt

Our file: 23-6113

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1.0 Introduction

Dillon Consulting Limited (Dillon) is pleased to present the results of the environmental studies conducted throughout 2023 in support of an environmental assessment (EA) registration document for the proposed Extension of Pit No. 4 (the Project) in Glenholme, Colchester County, Nova Scotia (NS). The following sections describe background information, survey methodology, and results of each survey and assessment conducted by Dillon on behalf of OSCO Aggregates Limited (OSCO).

1.1 Background

OSCO has engaged Dillon to prepare an Environmental Assessment Registration Document (EARD) for the proposed extension of its existing Pit No. 4 aggregate operation (the Project). The Project is located on Little Dyke Road in Colchester County, Nova Scotia. The proposed Project will expand on operational activities currently occurring within Pit No. 4. Current operations include producing high quality aggregate (i.e., stone and sand) for use in concrete and construction projects. Specific activities in Pit No. 4 have included aggregate extraction, screening, mobile crushing, stockpiling of aggregate, and transport of aggregate to the existing Glenholme Wash Plant facility located at Pit No. 2, approximately 700 m away on Little Dyke Road.

The proposed Project will involve the continued excavation of aggregate material from the reserve within the current Pit No. 4 property, as well as expanding to the south, east, and north of the pit. The proposed Project will also include the addition of an electric wash plant, eliminating the need of transporting aggregate material to Pit No. 2.

The Project will allow OSCO to remain operational within the community of Glenholme and continue to contribute to the natural resource sector of the economy and provide essential raw materials to the province's construction industry.

2.0 Scope of Work

Dillon's proposed scope of work, outlined below, is based on our understanding of the Project objectives, the nature of the proposed Project area, our experience in assessing similar landscapes, and our experience in developing and conducting community and Indigenous engagement programs.

The details of the assessments, including methodology, and results are presented herein; however, a detailed effects assessment and discussion are presented in the EARD. The following surveys and assessments are included in this Appendix:

- Screening for species at risk;
- Terrestrial habitat and vegetation assessment;
- Wildlife and wildlife habitat assessment;
- Bird and bird habitat surveys;
- Watercourse and fish habitat survey; and
- Wetland field delineation and functional assessments.

3.0 Methods

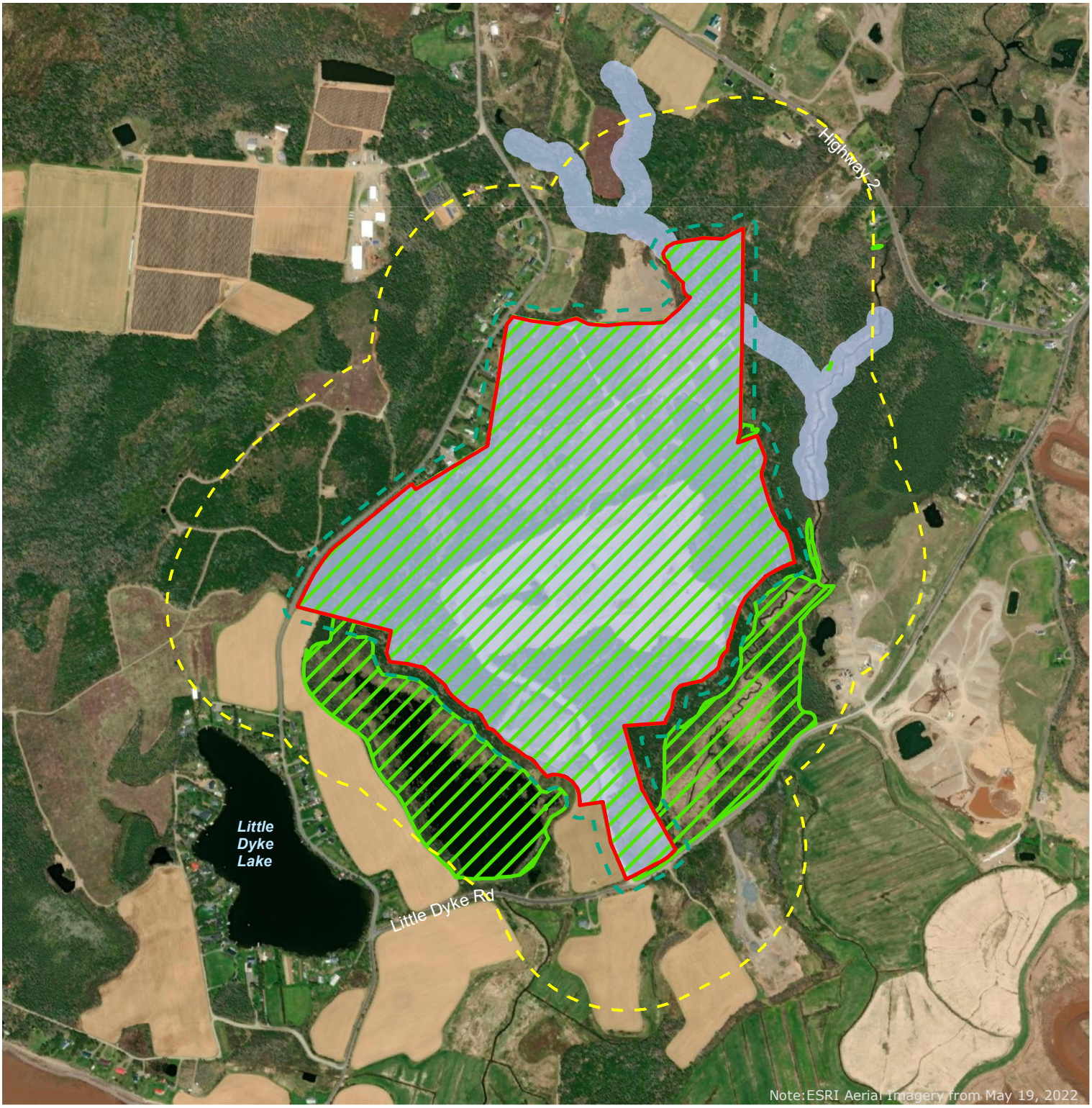
Desktop and field-based assessments of valued environmental components (VECs) are required for the EA of the Project. Dillon's methods are outlined below, are based on our understanding of the Project objectives, the nature of the proposed Project area, our experience in assessing similar landscapes, and our experience in developing and conducting community and Indigenous engagement programs.

For these surveys, the study boundaries are based spatial boundaries for VECs which are defined in the EA. VECs are those components of the biophysical and socioeconomic environments that are of value or interest to regulatory agencies, the public, other stakeholders, and Indigenous peoples. VECs are typically selected for assessment on the basis regulatory issues, scientific concern, legislation, guidelines, policies, and requirements; input arising from consultation with regulatory agencies, the public, stakeholder groups, and First Nations; field reconnaissance; and professional judgment. For the biophysical assessments presented in this report, the applicable spatial boundaries are defined below in **Table 1** and shown on **Figure E1**. The spatial boundaries to be defined for the EA will include:

- The Project Development Area (PDA) is the area of physical disturbance (or physical footprint) associated with the Project. Although the total land area of the properties associated with the Project is approximately 91 ha, the entirety of that area will not be disturbed by the Project, with only the areas of these properties that will be physically used to accomplish the Project. Therefore, the PDA consists of an area of approximately 77 ha upon which Project activities will be carried out. The PDA that is subject to this EARD was shown in **Figure E1**. The PDA is the same for all VECs discussed within this EARD.
- The Local Assessment Area (LAA) is the maximum area where Project-specific environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence (i.e., the zone of influence of the Project phases on each VEC). The LAA will vary by VEC.

Table 1: Spatial Boundaries for the Glenholme Biophysical Assessments

Boundary	Description
PDA	An area of approximately 77 ha that includes the open pit and all related surface facilities located on the properties.
LAA for Vegetation	The PDA plus a buffer of 30 m surrounding the PDA.
LAA for Wildlife (including Birds)	The PDA and areas within approximately 300 m beyond the PDA where Project-related environmental effects could be expected to occur.
LAA for Wetlands	The PDA and nearby wetlands where a portion of the wetland extends within 30 m of the PDA.
LAA for Watercourses and Fish Habitat	The PDA, as well as 500 m of watercourses that extend off the property and, including a 30 m buffer around such watercourses.



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PIT NO. 4 EXTENSION

- Project Development Area
- Local Assessment Area for Watercourses and Fish Habitat
- WetlandLAA
- Local Assessment Area for Wildlife (including Birds)
- Local Assessment Area for Vegetation

SPATIAL BOUNDARIES FOR THE GLENHOLME BIOPHYSICAL ASSESSMENTS

FIGURE E-1

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MAP DRAWING INFORMATION:
DATA PROVIDED BY
OSCO Aggregates Limited, ESRI, GeoNova

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N W E S

SCALE 1:12,500
0 75 150 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: \\dillon.ca\DILLON_DFS_projects\GIS\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F_E1_SpatialBoundariesfortheGlenholmeBiophysicalAssessments.mxd

3.1 Screening for Potential Species at Risk

Dillon reviewed available information (Atlantic Canada Conservation Data Centre [AC CDC] report and geographic information system [GIS] databases, etc.) to define known habitats and potential for rare species within the PDA. Using our wet-areas model (WAM), a site-specific map was developed to identify potential watercourse and wetland crossings that may not be mapped in provincial wetland and watercourse datasets. The following sources were reviewed:

- A site-specific AC CDC report (AC CDC 2023a);
- Reports from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- Department of Fisheries and Oceans (DFO) species at risk (SAR) mapping;
- Google Earth satellite imagery;
- The Nova Scotia Wetlands Inventory (NSDNRR 2023); and
- Publicly-available GIS map layers.

The PDA was evaluated using desktop analysis methods for historical records of observations of species at risk (SAR) and species of conservation concern (SOCC) that might be present within the PDA, as well as the presence or absence of habitat used by those species. For this assessment, the following definitions apply:

- Species at risk (abbreviated SAR): A species that is listed as Extirpated, Endangered, Threatened, or Special Concern on Schedule 1 of the federal *Species at Risk Act* (SARA) or by the Nova Scotia *Endangered Species Act* (NSESA); and
- Species of conservation concern (abbreviated SOCC): those species that are not SAR but are listed in other parts of SARA, NS ESA, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or as regionally vulnerable or imperilled by the AC CDC (i.e., those species with AC CDC S-ranks of S1: Critically imperiled in province; S2: Imperiled in province; and S3: Vulnerable) in province of Nova Scotia.

3.2 Terrestrial Habitat and Vegetation Assessment

The PDA was visually surveyed by Dillon biologists with plant identification experience during the 2023 field survey, which coincided with the growing period when many priority species are expected to flower (i.e., August 1-3, 2023). Special attention was paid in areas where suitable habitat would occur for priority plant species identified during the desktop analysis. A list of plant species for key habitats encountered within the PDA was collected as a record of the baseline plant community. The procedure for rare plant of conservation status observation would include to record, its location with coordinates recorded and identified according to their status (e.g., SAR or SOCC).

3.3 Wildlife Assessment

Field surveys were conducted in concert with other terrestrial surveys within the PDA with an emphasis on targeting terrestrial habitats with the potential to support sensitive species. During the field surveys, Dillon biologists recorded wildlife and signs of wildlife in the form of dens, scat, browse marks, wintering areas and/or visual observations.

The Project is located within a Mainland Moose concentration area. During the field assessments for other biophysical aspects of the environment, Dillon biologists noted signs of moose or direct observations, if observed.

3.4 Bird and Bird Habitat Assessments

The methods selected for the bird surveys were based on the potential presence of SAR and SOCC and available habitat within the PDA. Field surveys were performed by experienced specialists skilled at identifying birds by song, call and sight. Survey design was informed and developed based on professional experience, knowledge of the Project area, recommended techniques from Canadian Wildlife Service (CWS) guidance documents (CWS 2007), and the results from previously completed bird studies for the existing Pit No. 4 (Dillon. 2017). Recommendations described in "*A Guide to Addressing Wildlife Species and Habitat in an EA Registration Document*" (NSE 2009) was also consulted. Based on a preliminary review of the Project site, point count surveys were selected as the appropriate survey method and surveys were conducted during the spring migration and breeding seasons for most birds. Additionally, one nocturnal survey for owls and nighthawks targeting the full moon between June 15 and July 15, 2023.

A desktop review of available online sources and databases was conducted to assess the bird species that are known to migrate through and breed in the region. Sources reviewed include the second Maritime Bird Breeding Atlas (MBBA) (Stewart 2015), Birds Canada, and AC CDC.

The timing of field surveys was informed based on the second MBBA (Stewart et al. 2015). The surveys were scheduled so that data was collected across important seasonal periods for birds in Nova Scotia that are relevant to the Project (i.e., spring migration and peak breeding season). Additional targeted surveys were conducted in 2023 for nocturnal owls and breeding Common Nighthawks. Considerable effort was made such that surveys were conducted when weather conditions were appropriate for viewing and listening for birds (i.e., on days or nights with minimal forecasted fog, precipitation and forecasted wind speeds ≤ 20km/h).

3.4.1 Point Count Surveys

Point count stations were established over the PDA and surveys from these locations were repeated during the 2023 migration and breeding bird surveys. The point count locations are shown on **Figure E2** and a description of the habitat at each location is summarized in **Table 2**. Point counts were conducted at locations that were determined following a preliminary desktop assessment of the habitat types present within the LAA Point counts were ten minutes in length during which all birds seen or heard were recorded. Point counts typically began 30-60 minutes after sunrise.

Table 2: Habitat Descriptions and Survey Years for the Point Count Survey Locations

Point Count Location	Primary Habitat
PC1	Treed swamp and mixedwood forests bordering cleared area.
PC2	Coniferous treed bog adjacent to cleared area.
PC3	Cleared area near gravel pile.
PC4	Cleared area, crop field, distant mixedwood forest.
PC5	Patchy coniferous trees and cleared area. ATV trail sheltered by coniferous trees.
PC6	Patchy mixed-wood forest near industrial area and cleared areas.
PC7	Thinned mixedwood forest and cleared patch.
PC8	Scattered mixedwood, cleared area and gravel road near residential properties.
PC9	Treed swamp and watercourse bordering conifer tree plantation.
PC10	Conifer plantation bordering treed swamp and farmers field

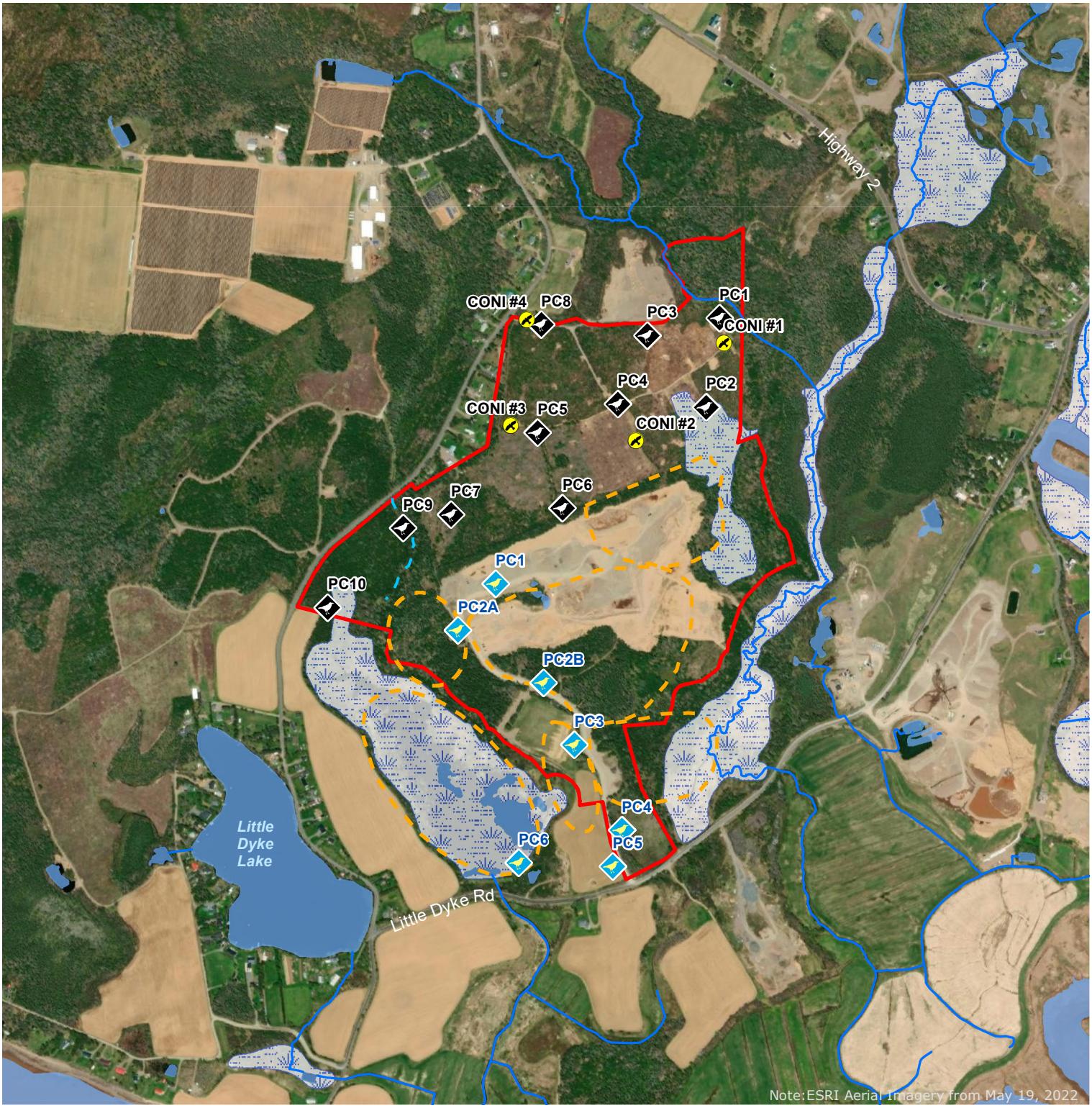
Bird surveys were conducted for the existing Pit No 4 in 2016 and 2017 as part of the previously approved Environmental Assessment (Dillon 2017). For reference, the locations of bird survey point counts from the 2016-2017 bird surveys are also shown on **Figure E1**. Birds observed during the 2016-2017 within or near the PDA are included in the assessment as they are considered to potentially be returning to the LAA, regardless of if they were detected during the 2023 surveys.

Bird surveys were conducted between May and August 2023, representing the spring migration and breeding windows for many bird species within Nova Scotia. The purpose of surveys is to estimate the number and species of birds that land in the study area. The dates of the surveys and the locations sampled are summarized in **Table 3**.

Table 3: Summary of Point Count Surveys Conducted within the LAA

Survey Window*	Survey Dates	Locations Surveyed
Spring Migration (April 15 to May 31)	May 9, 16, 23, and 30, 2023	**PC1-PC8**
Breeding (June 1 to July 31)	June 22, 2023	**PC1-PC8**
	August 3, 2023	**PC1-PC10**

Note:
*Based on Second Atlas of the Breeding Birds of the Maritime Provinces (Stewart et al. 2015)



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PIT NO. 4 EXTENSION

- Nighthawk Survey Location (2023)
- Point Count Location (2023)
- Avian Point Count Locations (2017)
- Owl Observation Area (2017)
- Project Development Area
- Field Delineated Watercourse
- Mapped Watercourse
- Open Water
- Wetland (NS Topographic Database)

BIRD SURVEY LOCATIONS

FIGURE E2

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MAP DRAWING INFORMATION:
DATA PROVIDED BY
OSCO Aggregates Limited, ESRI, GeoNova

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N W E S

SCALE 1:12,500
0 75 150 m

PROJECT: 23-6113
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FILE LOCATION: \\dillon.ca\DILLON_DFS_projects\GIS\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F_E2_BirdSurveyLocations.mxd

The use of targeted playback (i.e., broadcasting recorded bird sounds) was used occasionally at the discretion of the observer during the Breeding Bird Survey to detect possible SAR or SOCC in their vicinity. This would occur to either confirm a possible detection (when there was uncertainty) or to simply elicit a response from a particular species when surveying appropriate habitat. The detrimental impact of playback recordings on breeding birds is noted, and, as such, the use of playback recordings was limited and employed sparingly to avoid undue disturbance to breeding birds.

3.4.2 Targeted Breeding Nightjar Survey

Targeted Timing: June 15 to July 15
Occurred: July 5, 2023
Purpose: Nocturnal surveys were conducted to estimate abundance and to identify breeding bird species in the PDA that are not readily detectable during daylight hours.

A targeted Breeding Nightjar Survey was conducted on July 5, 2023, with special consideration given to completing this survey within seven days of the June full moon phase when nighthawks are most active and readily detectable. The peak full moon phase occurred on the night of July 3, 2023. This survey was conducted from the same pre-determined Nocturnal Survey Locations (NSL) and these are shown on **Figure E2**. The methodology employed for the breeding Common Nighthawk (*Chordeiles minor*) survey followed the protocols described in the *Canadian Nightjar Survey Protocol* (Bird Studies Canada 2019) and consists of periods of silent listening and targeted playback.

Eastern Whip-poor-wills (*Antrostomus vociferus*) are most vocal during clear nights in June/July when the moon is at least half full and can repeat their characteristic “whip-poor-will” call up to 100 times without stopping. They begin calling about 30 minutes after sunset and call for about 90 minutes each night. Common Nighthawks become active approximately 30 minutes before sunset and remain active until 60 or 90 minutes after sunset.

3.4.3 Diurnal Bird Assessment

Diurnal bird species, including raptor species, were recorded as they were observed incidentally during the surveys that were conducted within the PDA for wetlands, watercourses, and vegetation. When observed, the date and location that the bird was observed from were recorded along with noted behavioural observations and gender or age of the bird if discernable.

3.5 Watercourse and Fish Habitat Survey

Field surveys of the aquatic habitats were conducted on August 1, 2023, by Dillon biologists experienced in aquatic/fish habitat surveys. Assessment criteria included:

- **Description of aquatic habitat type:**
  Habitat type within each watercourse was described as riffle, run, pool or flat, where possible in the area of the proposed project;
- **Dominant substrate type and embeddedness:**
  Dominant substrate types were described and documented by percent of relative abundance. Substrate type (e.g., gravel or silt) is especially important for fish spawning habitat;
- **Stream channel characteristics:**
  Stream channel characteristics including average wet width, approximate bankfull width, average wetted depth and maximum wetted depth were measured in the field;
- **Instream cover and overhead canopy cover ratings**:
  Instream cover such as submerged woody debris, cobble, boulders, aquatic vegetatation was documented, and overhead canopy cover ratings (percent covered by shrubs and trees) were scored;
- **Fish habitat suitability:**
  Habitat suitability for fish is assessed (based on the evaluation of habitat type, substrate type, instream cover, overhead cover and other ecological observations);
- **Environmental Conditions and Water Level:**
  Environmental conditions (e.g., drier than normal seasonal conditions) were noted during the assessment and water level was rated as “low, moderate or high”. Hotter and drier environmental conditions resulting in lower water levels will stress salmonid fish populations.
- **Bank stability:**
  Bank stability and presence of eroding banks (potential for natural and anthropogenic sources) was assessed within the area of the project; and
- **Riparian vegetation community:**
  In addition to the vegetation species list provided in the “Vegetation Summary” report (Dillon 2018c), the riparian vegetation community was described by percent trees, shrubs grasses and bare ground.

The presence and/or the potential presence of fish in each aquatic feature was evaluated based on visual confirmation of the presence of fish during field surveys, watercourse characterizations conducted during low and mid-stage flow conditions, and the desktop evaluation for fish species potentially present within the LAA. The biophysical characteristics of each watercourse were evaluated for fish habitat potential based on the habitat requirements for brook trout (*Salvelinus fontinalis*) and other acid-tolerant fish species with the potential to occur within the watercourses that enter the PDA.

Suitable habitat characteristics, along with water quality to support aquatic species and direct observations of fish, were the basis of considerations on the likelihood of watercourses to support fish habitat. Watercourses were classed with the following descriptors:

- Unlikely to provide suitable fish habitat;
- May provide seasonally accessible fish habitat;
- Likely provides fish habitat; or
- Confirmed (i.e., fish visually observed).

An explanation was provided where fish habitat is possible but unconfirmed. Ephemeral streams and watercourses with barriers to fish passage were typically given a low rating, whereas permanent watercourses with direct observations of fish were given a higher rating for presence of fish habitat. Permanent or intermittent watercourses where fish were not observed that were considered likely to provide fish habitat, and/or contained seasonally accessible fish habitat are also identified as such.

Water quality parameters (e.g., dissolved oxygen (DO), conductivity, temperature, and pH) were measured in-situ using a hand-held YSI Professional Plus multimeter. The Canadian Council of Ministers of the Environment (CCME) has published guidelines for pH and DO, which were used as indicators of suitability for aquatic life. Watercourses with pH and DO within the recommended range from the CCME for the protection of aquatic wildlife were considered to have a higher likelihood to provide suitable fish habitat. The CCME freshwater aquatic life (FWAL) range for pH is 6.5-9 and a minimum DO concentration of 6.5 mg/L is recommended for a watercourse to support cold water biota life stages (excluding early life stages) (CCME 1999).

3.6 Wetlands Assessments

3.6.1 Wetland Delineation

The methods of wetland determination and delineation used in the wetland surveys were based upon established protocols for wetland delineation by the U.S. Army Corps of Engineers' (USACE) "*Corps of Engineers Wetland Delineation Manual*" (Environmental Laboratory 1987). Wetland Delineation Data Sheets that were adapted from U.S. Army Corps of Engineers form for Northeast-North Central Regional Supplement for use in Nova Scotia (USACE 2012) were used to record data collected in the field. Wetland determination and delineation primarily focused on establishing the wetland-upland edge and was based on the presence of positive indicators for three parameters:

- Hydric (wet) soil conditions;
- Hydrophytic (wet adapted) vegetation; and
- Wetland hydrology.

3.6.2 Wetland Functional Assessment

Wetland functional assessments followed a standardized method for assessing natural wetland functions and benefits called the "*Wetland Ecosystems Services Protocol for Atlantic Canada*" (WESP-AC) (NSECC N.D.). WESP-AC represents a standardized approach to the way data is collected and interpreted to indirectly yield relative estimates of a wide variety of important wetland functions and their associated benefits. The functional assessments were completed within the growing season (approximately June 1 – September 30). The results of the WESP-AC functional assessment provided a classification for assessed wetlands based on their functionality as well as the identification of Wetland of Special Significance (WSS).

The WESP-AC scoring (i.e., 0 to 10) and ratings (i.e., "Lower", "Moderate", or "Higher") were assigned to a variety of wetland functions based on visual assessments of weighted ecological indicators (Adamus 2018). The number of ecological indicators applied to estimate a particular wetland function depended on which functions were assessed as part of the field surveys. The indicators were then combined in a spreadsheet using logic-based, mathematical models to generate the score and rating for each wetland function and benefit (NSECC N.D.). Together, this information provided a profile of functions and benefits provided by each assessed wetland.

Wetlands within the LAA were evaluated for their potential for meeting the criteria of a WSS. WSS are defined within Nova Scotia's Wetland Conservation Policy as wetlands that play particularly important roles in providing ecosystem services or functions (NSECC 2019).

3.6.3 Determination of Determination of Wetlands of Special Significance

The wetlands were evaluated for the potential of being WSS in addition to functional assessment using the WESP-AC. Although the excel model used for the WESP-AC assessments includes an interpretation tool to classify WSS based on wetland functionality, it is recognized that the tool currently does not consider all aspects of WSS that are considered under the provincial Wetland Conservation Policy. As such, following completion of WESP-AC assessment wetlands were reviewed to see if they fall under the definition of WSS per the provincial Wetland Conservation Policy.

4.0 Results

4.1 Screening for Potential Species at Risk

The AC CDC report (AC CDC 2023a) included 206 historical records of rare and endangered flora and fauna comprised of 49 species within the 5 km radius of the centre of the PDA. Excluding location sensitive species, this included 4 records of 3 vascular plant species; 1 record of 1 non-vascular plant species; 191 records of 40 vertebrate fauna species; and 11 records of 5 invertebrate fauna species. A summary of priority species with AC CDC within 5 km of the centre of the PDA are listed in **Table 4**.

High-resolution Google Earth imagery was available for the site from May 2020, September 2018, June 2017, August 2017, August 2013, and April 2007. The imagery was primarily reviewed for recent changes in land use (e.g., logging) and to identify landscape level features (e.g., topography and changes in vegetation regime) which could indicate a wetland.

The Department of Natural Resources in each of the Maritime Provinces considers some species to be location sensitive. Concerns about exploitation of location-sensitive species precludes inclusion of precise coordinates in the AC CDC data report. According to the AC CDC (2023a) report for the PDA, no location sensitive SAR were historically recorded within 5 km of the PDA. The AC CDC considers black ash (*Fraxinus nigra*), the Nova Scotia population of Blanding's turtle (*Emydoidea blandingii*), wood turtle (*Glyptemys insculpta*), anatum/tundrius population of the peregrine falcon (*Falco peregrinus* pop. 1), and bat hibernaculum or bat species (i.e., *Myotis lucifugus*, *Myotis septentrionalis*, and *Perimyotis subflavus*) to be location sensitive; however, no historical observations of any of these species were reported in the AC CDC report.

Table 4: Historical Observations of SAR and SOCC within 5 km of the PDA (AC CDC 2023a)

Common Name	Scientific Name	Ranking	Number of Observations	Distance from Site Centre
Birds				
American Bittern	*Botaurus lentiginosus*	AC CDC: S3S4B,S4S5M	1,016	2.6 ± 7.0
American Kestrel	*Falco sparverius*	AC CDC: S3B,S4S5M	569	2.6 ± 7.0
Bank Swallow	***Riparia***	**SARA: T NS ESA: E COSEWIC: T AC CDC: S2B**	**2,611**	**0.8 ± 1.0**
Barn Swallow	***Hirundo rustica***	**SARA: T NS ESA: E COSEWIC: SC AC CDC: S3B**	**1,834**	**1.6 ± 0.0**

Common Name	Scientific Name	Ranking	Number of Observations	Distance from Site Centre
Black-backed Woodpecker	*Picoides arcticus*	AC CDC: S3S4	198	2.6 ± 7.0
Black-bellied Plover	*Pluvialis squatarola*	AC CDC: S3M	2,002	1.1 ± 0.0
Blue-winged Teal	*Spatula discors*	AC CDC: S3B	470	2.6 ± 7.0
Bobolink	***Dolichonyx oryzivorus***	**SARA: T NS ESA: V COSEWIC: SC AC CDC: S3B**	**2,011**	**2.6 ± 7.0**
Brown-headed Cowbird	*Molothrus ater*	AC CDC: S2B	238	2.6 ± 7.0
Canada Warbler	***Cardellina canadensis***	**SARA: T NS ESA: E COSEWIC: SC AC CDC: S3B**	**1,246**	**1.6 ± 0.0**
Cape May Warbler	*Setophaga tigrina*	AC CDC: S3B,SUM	330	2.6 ± 7.0
Common Nighthawk	***Chordeiles minor***	**SARA: SC NS ESA: T COSEWIC: SC AC CDC: S3B**	**473**	**2.6 ± 7.0**
Eastern Bluebird	*Sialia sialis*	AC CDC: S3B	144	1.2 ± 0.0
Eastern Kingbird	*Tyrannus tyrannus*	AC CDC: S3B	472	2.6 ± 7.0
Eastern Wood-Pewee	***Contopus virens***	**SARA: SC NS ESA: V COSEWIC: SC AC CDC: S3S4B**	**1,205**	**2.6 ± 7.0**
Horned Lark	*Eremophila alpestris*	AC CDC: SHB,S4S5N,S5M	21	2.6 ± 7.0
Hudsonian Godwit	*Limosa haemastica*	COSEWIC: T AC CDC: S2S3M	203	2.1 ± 0.0
Indigo Bunting	*Passerina cyanea*	AC CDC: S1?B,SUM	36	0.3 ± 0.0
Killdeer	*Charadrius vociferus*	AC CDC: S3B	987	1.1 ± 0.0
Least Sandpiper	*Calidris minutilla*	AC CDC: S1B, S4M	1,432	1.1 ± 0.0
Nelson's Sparrow	*Ammospiza nelsoni*	AC CDC: S3S4B	870	1.8 ± 0.0
Northern Shoveler	*Spatula clypeata*	AC CDC: S2B, SUM	248	0.9 ± 0.0
Olive-sided Flycatcher	***Contopus cooperi***	**SARA: T NS ESA: T COSEWIC: SC AC CDC: S3B**	**1,096**	**0.7 ± 0.0**
Pine Siskin	*Spinus pinus*	AC CDC: S3	625	2.6 ± 7.0

Common Name	Scientific Name	Ranking	Number of Observations	Distance from Site Centre
Red Knot rufa subspecies	***Calidris canutus rufa***	**SARA: E NS ESA: E COSEWIC: E AC CDC: S2M**	**579**	**1.1 ± 0.0**
Red-necked Phalarope	***Phalaropus lobatus***	**SARA: SC NS ESA: SC AC CDC: S2S3M**	**15**	**2.1 ± 0.0**
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	AC CDC: S3B	683	2.6 ± 7.0
Ruddy Turnstone	*Arenaria interpres*	AC CDC: S3M	702	1.1 ± 0.0
Sanderling	*Calidris alba*	AC CDC: S2N,S3M	1,528	1.1 ± 0.0
Semipalmated Plover	*Charadrius semipalmatus*	AC CDC: S1B,S4M	2,073	1.1 ± 0.0
Semipalmated Sandpiper	*Calidris pusilla*	AC CDC: S3M	2,445	1.1 ± 0.0
Short-billed Dowitcher	*Limnodromus griseus*	AC CDC: S3M	1,517	2.1 ± 0.0
Spotted Sandpiper	*Actitis macularius*	AC CDC: S3S4B,S5M	1,006	2.6 ± 7.0
Tennessee Warbler	*Leiothlypis peregrina*	AC CDC: S3S4B,S5M	670	2.6 ± 7.0
Virginia Rail	*Rallus limicola*	AC CDC: S2S3B	262	0.9 ± 0.0
Willet	*Tringa semipalmata*	AC CDC: S3B	1,404	2.6 ± 7.0
Wilson's Snipe	*Gallinago delicata*	AC CDC: S3B,S5M	1,402	2.6 ± 7.0
Fish				
American eel	*Anguilla rostrata*	COSEWIC: T AC CDC: S3N	54	3.3 ± 0.0
Atlantic salmon - Inner Bay of Fundy population	***Salmo salar pop. 1***	**SARA: E COSEWIC: E AC CDC: S1**	**50**	**3.3 ± 0.0**
brook trout	*Salvelinus fontinalis*	AC CDC: S3	68	3.3 ± 0.0
Invertebrates				
green comma	*Polygonia faunus*	AC CDC: S3S4	20	1.6 ± 2.0
Milbert's tortoiseshell	*Aglais milberti*	AC CDC: S2S3	24	1.6 ± 2.0
northern cloudywing	*Cecropterus pylades*	AC CDC: S3S4	18	4.5 ± 2.0
question mark	*Polygonia interrogationis*	AC CDC: S3B	219	4.5 ± 2.0
taiga bluet	*Coenagrion resolutum*	AC CDC: S2	11	0.9 ± 0.0

Common Name	Scientific Name	Ranking	Number of Observations	Distance from Site Centre
Plants (Vascular)				
mountain firmoss	*Huperzia appressa*	AC CDC: S3S4	18	2.6 ± 7.0
pale-spiked lobelia	*Lobelia spicata*	AC CDC: S1	13	2.6 ± 7.0
woods-rush	*Juncus subcaudatus*	AC CDC: S3S4	25	0.5 ± 5.0
Plants (Non-Vascular)				
blue felt lichen	***Pectenia plumbea***	**SARA: SC NS ESA: V COSEWIC: SC AC CDC: S3**	**184**	**2.3 ± 5.0**

Notes:
Rows in **bold** represent an SAR, others are SOCC.
From AC CDC (2023b):
S-rank refers to the Sub-national (Provincial) rank provided by the AC CDC and includes the following: S1 Critically Imperiled, S2 Imperiled, S3 Vulnerable, S4 Apparently Secure, S5 Secure, and SU Unrankable. Rankings are frequently paired with the following breeding status qualifiers: B Breeding, N Non-breeding, and M Migrant.
Conservation Status Categories: E Endangered, T Threatened, V Vulnerable, SC Special Concern.

A previous environmental assessment report for Glenholme pit surveys was reviewed for observations of SAR and SOCC on or near the PDA, including for the existing Pit No. 4 (Dillon 2017). SOCC and SAR that were identified near the existing Pit No. 4 in 2016 are presented in **Table 5**.

Table 5: SAR and SOCC Observed During the 2016-2017 Previous Environmental Assessment

Common Name	Scientific Name	Ranking	Observation
American Bittern	*Botaurus lentiginosus*	AC CDC: S3S4B,S4S5M	Observed on Existing Pit No. 4 property in 2017.
American Robin	*Turdus migratorius*	AC CDC: S5B,S3N	Observed on Existing Pit No. 4 property in 2017.
Bank Swallow	***Riparia***	**SARA: T NS ESA: E COSEWIC: T AC CDC: S2B**	**Observed off-site at the Ducks Unlimited Canada (DUC) pond in 2017 (Dillon 2017).**
Canada Jay	*Perisoreus canadensis*	AC CDC: S3	Observed on Existing Pit No. 4 property in 2016
Common Nighthawk	***Chordeiles minor***	**SARA: SC NS ESA: T COSEWIC: SC AC CDC: S3B**	**Observed off-site at the DUC pond heard to the north of the property in 2017 (Dillon 2017).**
Gadwall	*Mareca strepera*	AC CDC: S2B, SUM	Observed offsite at the DUC pond in 2016 (Dillon 2017).
Killdeer	*Charadrius vociferus*	AC CDC: S3B	Observed on-site in 2017

Common Name	Scientific Name	Ranking	Observation
Long Eared Owl	*Asio otus*	AC CDC: S2S3	Observed on-site in 2017.
Purple Finch	*Carpodacus purpureus*	AC CDC: S4S5B, S3S4N, S5M	Observed on-site in 2017
Virginia Rail	*Rallus limicola*	AC CDC: S2S3B	Observed on Existing Pit No. 4 property in 2017.
Wilson's Snipe	*Gallinago delicata*	AC CDC: S3B, S5M	Observed on Existing Pit No. 4 property in 2017.
Wilson's Warbler	*Wilsonia pusilla*	AC CDC: S3B, S5M	Observed on Existing Pit No. 4 property in 2017.

Note:
Rows in **bold** represent an SAR, others are SOCC.
From AC CDC (2023b):
S-rank refers to the Sub-national (Provincial) rank provided by the AC CDC and includes the following: S1 Critically Imperiled, S2 Imperiled, S3 Vulnerable, S4 Apparently Secure, S5 Secure, and SU Unrankable. Rankings are frequently paired with the following breeding status qualifiers: B Breeding, N Non-breeding, and M Migrant.
Conservation Status Categories: E Endangered, T Threatened, V Vulnerable, SC Special Concern.

Although not observed by OSCO personnel or reported by the AC CDC within 5 km of the PDA's centre, the Ecological Landscape Analysis for the Minas Lowlands Ecodistrict (NSDNR 2015a) report mentions several other species at risk have been documented for the Minas Lowlands Ecodistrict:

- Black ash (*Fraxinus nigra*) is currently under consideration for SARA Schedule 1 and listed under the NS ESA and COSEWIC as Threatened. This species is ranked by the AC CDC as S1S2 for being Imperilled to Critically Imperilled within the province of Nova Scotia;
- Eastern white cedar (*Thuja occidentalis*) is currently listed under the NS ESA as Vulnerable and ranked by the AC CDC as S2S3 for being Imperilled within the province of Nova Scotia;
- Monarch butterfly (*Danaus plexippus*), listed by COSEWIC as Special Concern, listed under SARA and NS ESA as Endangered, and ranked by the AC CDC as S2?BS3M for being Potentially Imperilled breeding population and a Vulnerable migratory population within the province of Nova Scotia;
- Wood turtle (*Glyptemys insculpta*), listed by the SARA and NS ESA as Threatened, listed by COSEWIC as Special Concern, and ranked by the AC CDC as S2 for being Imperilled within the province of Nova Scotia;
- Snapping turtle (*Chelydra serpentina*), listed by SARA and COSEWIC as Special Concern, listed by NS ESA as Vulnerable, and ranked by the AC CDC as S3 for being Vulnerable within the province of Nova Scotia;
- Mainland moose (*Alces alces americana*) are listed by NS ESA as Endangered and ranked by the AC CDC as S1 for being Critically Imperilled within the province of Nova Scotia; and
- Piping plover melodus subspecies (*Charadrius melodus melodus*) is listed on NS ESA and SARA as Endangered and is ranked by the AC CDC as S1 for being Critically Imperilled within the province of Nova Scotia.

During the site visits that were conducted in 2023, four SOCC and two SAR were identified within the LAA. SOCC observed within the LAA in 2023 included:

- Lesser brown sedge (*Carex adusta*) in one location;
- Houghton's sedge (*Carex houghtoniana*) in two locations;
- American Robin (*Turdus migratorius*) at point count locations 1, 3, 4, 5, 7, 8 and 10, all of which are adjacent to open habitats (i.e., crop field, cleared area, etc.); and
- Purple Finch (*Carpodacus purpureus*) at point count locations 2, 3, 6, 7, and 8.

Lesser brown sedge and Houghton's sedge are both considered SOCC and are ranked by the AC CDC as S2S3 for being Imperilled within the province of Nova Scotia. Non-breeding populations of American Robin and Purple Finch that are considered Vulnerable by the AC CDC (i.e., ranked as S5B,S3N and S4S5B, S3S4N, S5M, respectively).

SAR observed within the LAA in 2023 included:

- Black ash (*Fraxinus nigra)* in Wetland 7, outside the PDA and within the LAA for vegetation; and
- Canada Warbler (*Cardellina canadensis*) in Wetland 7 from point count location 1 on May 20, 2023. Wetland 7 is a mixed-wood treed swamp with abundant speckled alder (*Alnus incana*) shrubs, cinnamon fern (*Osmundastrum cinnamomeum*), abundant woody debris, and hummocks which make for suitable breeding habitat for the species.

Two SAR were observed in the LAA during 2023 surveys and suitable habitat was identified within the PDA for three additional SAR species. An additional five SAR were identified as having the potential to be present (either incidentally or occasionally foraging) due to the presence of suitable habitat adjacent to the PDA. For SAR with the potential to interact with the PDA, a brief description of their suitable habitat requirements and available suitable habitat on the PDA is provided in **Table 6**.

Table 6: Suitable Habitat Descriptions for Potential SAR

Species	Suitable Habitat Description	Available Suitable Habitat within the PDA	Species on Site
Bank Swallow (*Riparia riparia*)	Bank Swallow nests in colonies within Burrows in vertical or near-vertical faces (ECCC 2022a). Nesting colonies are generally located along vertical faces of river bluffs, lakeshores, coastlines, aggregate pits, road-cuts, retaining walls and within piles of sand, gravel, or sawdust (ECCC 2022). Feeds primarily on flying insects (ECCC 2022a).	Observed near the DUC Pond in 2016 (Dillon 2017). Suitable nesting habitat with the vertical faces of the aggregate pit.	AC CDC Records within 5 km
Barn Swallow (*Hirundo rustica*)	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 (COSEWIC 2021).	Suitable nesting habitat is not present within the PDA. Suitable habitat is adjacent to the PDA and the species could potentially forage on the PDA.	AC CDC Records within 5 km
Bobolink (*Dolichonyx oryzivorus*)	Nest in lush meadows, open grassland and hayfields (COSEWIC 2022). Bobolink is an obligate grassland specialist and a consumer of agricultural insects (COSEWIC 2022).	Unlikely to be present within the PDA. The agricultural field within the PDA for row crops may provide habitat for bobolink.	AC CDC Records within 5 km
Canada Warbler (*Cardellina canadensis*)	**Preferred breeding habitat includes wet, mixed deciduous-coniferous forests with a well-developed shrub layer but will breed in stands regenerating after natural and anthropogenic disturbances (COSEWIC 2020).**	**A Canada Warbler was observed singing in Wetland 7 on May 20, 2023. Wetland 7 is a mixed-wood treed swamp with suitable breeding habitat for the species.**	**Observed within the LAA in 2023, AC CDC Records within 5 km**
Common Nighthawk (*Chordeiles minor*)	**Common Nighthawk may nest in open gravel areas including anthropogenic clearings (EC 2016a) in late June to early August. The recovery strategy (EC 2016a) identifies potential threats to the population including factors affecting insect prey and natural succession reducing open habitats. Critical habitat has not been identified to date.**	**Potential to nest within cleared areas of the PDA.**	**AC CDC Records within 5 km**
Eastern Wood-Pewee (*Contopus virens*)	**Eastern Wood-pewee lives in most forest types across its range and nests in a wide variety of deciduous tree species (ECCC 2023a).**	**Potential to nest within mature forested areas of the PDA.**	**AC CDC Records within 5 km**

Species	Suitable Habitat Description	Available Suitable Habitat within the PDA	Species on Site
Olive-sided Flycatcher (*Contopus cooperi*)	**Nests in open, forested areas, often with many conspicuous perches (i.e., tall trees or snags alongside open areas) (EC 2016b).**	**Potential to nest within forested areas of the PDA.**	**AC CDC Records within 5 km**
Piping Plover (*Charadrius melodus melodus*)	Piping Plovers prefer beaches in marine coastal areas for most life processes (ECCC 2022b). The Piping Plover (*melodus* subspecies) nests on wide sand, gravel, or cobble beaches, barrier island sandspits, or peninsulas in marine coastal areas (ECCC 2022b).	Suitable habitat for Piping Plovers is not present within the PDA and the PDA is located over 1 km from important bird habitats in Cobequid Bay.	Identified within the Ecodistrict (NSDNR 2015a)
Red Knot rufa subspecies (*Calidris canutus rufa*)	Nest in the Arctic in barren habitats. Migratory stopovers and wintering grounds include tidal coastal zones, usually sandflats but sometimes mudflats (ECCC 2017).	Suitable habitat is not present within the PDA.	AC CDC Records within 5 km
Red-necked Phalarope (*Phalaropus lobatus*)	Nest in Arctic and Sub-Arctic coastal areas. While migrating and during the winter months, Red-necked Phalaropes concentrate at sea (ECCC 2023b).	Suitable habitat is not present within the PDA.	AC CDC Records within 5 km
Mainland moose (*Alces alces americana*)	Mainland moose are known for the Cobequid Highlands and the PDA falls within a Mainland Moose concentration area and within the core habitat for the Cumberland/Colchester mainland moose population (NSDNRR 2021).	The potential for moose to be present within the PDA is low. Existing anthropogenic activities within and surrounding the PDA such as public roads, Highway 2, the existing pit, agricultural fields are likely contributing factors that reduce the likelihood of moose occupation within the LAA. Moose have, however, been observed in the region, which is connected to and is present within their core habitat (NSDNRR 2021); therefore, it is possible for moose to travel through the LAA.	Identified within the Ecodistrict (NSDNR 2015a)

Species	Suitable Habitat Description	Available Suitable Habitat within the PDA	Species on Site
Snapping turtle (*Chelydra serpentina*)	Snapping turtles are fairly widespread, with a preferred habitat characterized by slow moving water with a soft mud bottom and dense aquatic vegetation. Nesting may occur in soft gravel areas including road shoulders (ECCC 2020a).	Suitable habitat is not present within the PDA. Due to the presence of the DUC pond and McCurdy Creek at the borders of the LAA, potential habitat is present in the general area, but snapping turtles are not known for the Glenholme area, and the potential is low.	Identified within the Ecodistrict (NSDNR 2015a)
Wood turtle (*Glyptemys insculpta*)	Wood turtles are semi-aquatic and are associated with rivers/streams with sand or gravel bottom, preferring clear meandering streams with moderate current. Nesting habitat consists of sand or gravel beaches or stream banks, but they also use anthropogenic sites such as gravel pits and roads (ECCC 2020b). Critical habitat has been partially defined based on known occurrences and habitat suitability (ECCC 2020b). There are not known occurrences within the LAA.	Suitable habitat is not present within the PDA.	Identified within the Ecodistrict (NSDNR 2015a)
Atlantic Salmon - Inner Bay of Fundy population *(Salmo salar* pop. 1)	Requires rivers or streams that are generally clear, cool, and well-oxygenated (COSEWIC 2010).	Suitable habitat is not present within the PDA.	AC CDC Records within 5 km
Eastern White Cedar (*Thuja occidentalis*)	Cedar is an uncommon tree in Nova Scotia and currently only 32 stands in five counties have been identified. The population is fragmented and comprised of mostly small stands that appear genetically separate from each (NSDNR 2010).	Not identified within the PDA and unlikely to be present.	Identified within the ELC region
Black Ash (*Fraxinus nigra*)	**Black ash is predominantly a wetland species with intermediate light requirement and a tendency toward greater abundance in more alkaline sites (NSDNR 2015b).**	**Potential within forested wetlands in the PDA, confirmed outside of the PDA in WL7.**	**Identified offsite in WL7.**
Blue felt lichen *(Pectenia plumbea)*	Hardwood trees with mature bark and high humidity in woodlands (ECCC 2022c).	Suitable habitat is not present within the PDA.	AC CDC Records within 5 km

Species	Suitable Habitat Description	Available Suitable Habitat within the PDA	Species on Site
Monarch (*Danaus plexippus*)	Monarch butterflies rely on habitats with milkweeds (numerous species) which grow predominantly in open and periodically disturbed habitats such as roadsides, fields, wetlands, prairies, and open forests (ECCC 2016c).	Although milkweed has not been identified within the PDA, the PDA provides suitable habitat for milkweed; therefore, monarch butterfly may migrate through the area on the way to breeding and wintering grounds but the Project area is not expected to provide key habitat.	Identified within the Ecodistrict (NSDNR 2015a)

Notes:

Bold denotes SAR with potential suitable habitat on the PDA

Grey highlight indicates SAR with potential suitable habitat near the PDA, may incidentally be present on the PDA.

4.2 Terrestrial Habitat and Vegetation Assessment

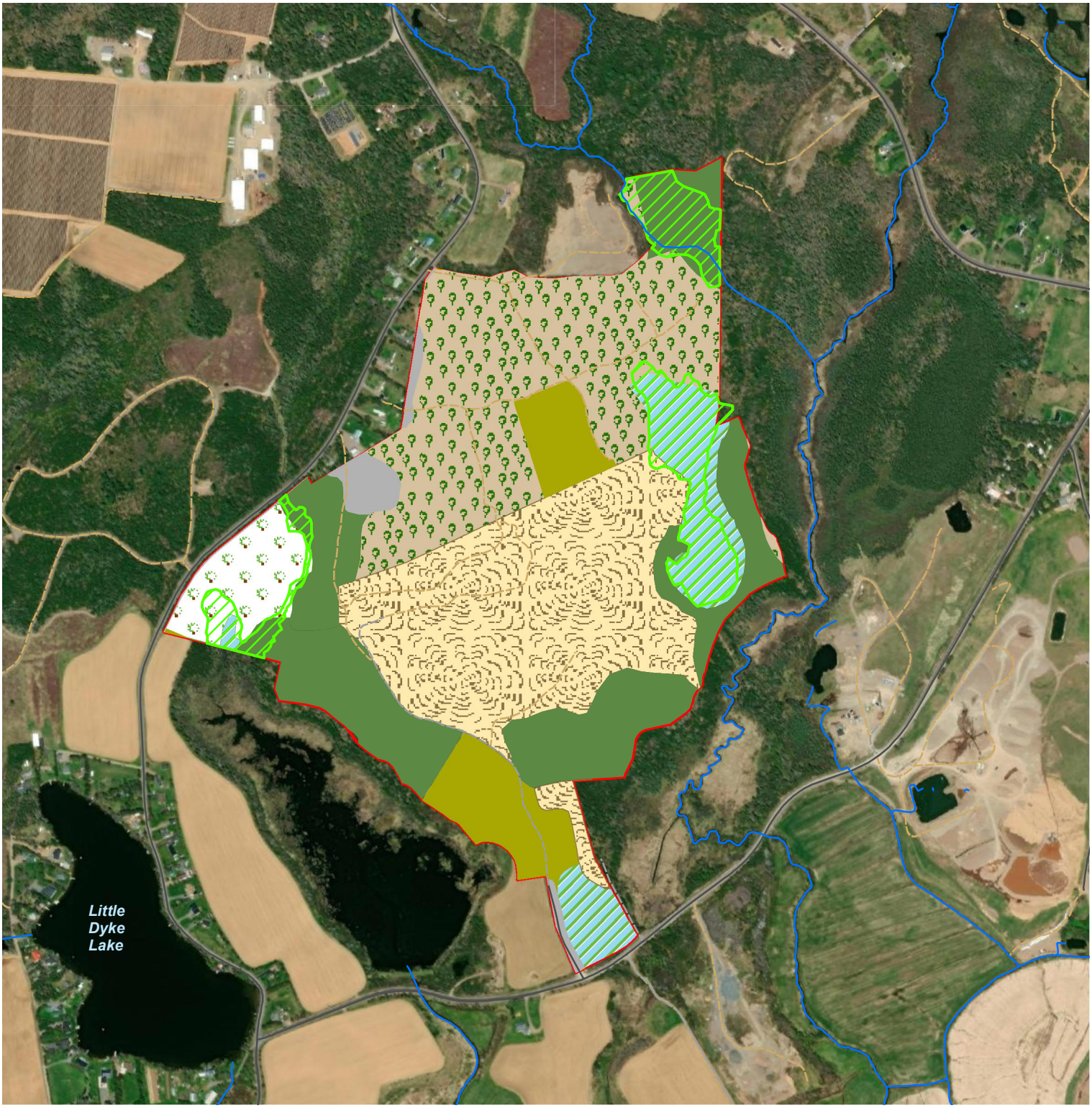
The regional vegetation of the Central Lowlands ecoregion and, more specifically, within the Minas Lowlands ecodistrict is generally dominated by softwood forest tree species. Ecoelements within the LAA are spruce, hemlock, pine hummocks and hills within the central area, and grasslands/wetlands at the adjacent DUC pond and bordering McCurdy Creek. The landscape is further characterized as hummocky with well drained coarse-grained soils (Neily et al. 2017), which consists of well-drained coarse-grained soils.

Approximately two-thirds of the LAA has forest cover, including regenerating forests that were previously logged, treed wetlands, and softwood plantations. The remaining habitats present are agricultural fields and disturbed habitats (primarily related to the existing pit development within the southern portion of the LAA) (**Figure E3**). **Table 7** summarizes the general habitat types (note that plants are listed by common name and full scientific name in **Table 8**).

Table 7: Summary of Generalized Habitat Types Within the LAA

Habitat	Character	Key Forest Species	Key Under-story/Ground Cover	Area within PDA (ha)
Softwood forest	Mature forest	Red and black spruce, white spruce	Balsam fir, mosses	17.3
Regenerating forest	Mature and regenerating with extensive blowdown is some areas	Red spruce, white pine, red maple, poplar, white birch	Bracken fern, sarsaparilla, bunchberry, ericaceous shrubs	22.6
Softwood plantation	The plantation is in a relatively mature stage	Spruce with gray birch, and red maple	Sheep laurel and bracken fern	3.8
Wetlands	Variety of wetland types are present within the PDA (i.e., swamps (treed and shrub), bog (treed and shrub), fen, marsh/open water)	Black spruce, tamarack/larch where present	Various – see wetland **Section 4.5**	10.1*
Agricultural	Agricultural land to the west of the on-site access road was being used for feed other crops	Not applicable	Not applicable	3.9
Disturbed - Previous Pits/Road	Open disturbed habitat with little or weedy vegetation	Not applicable	Not applicable	23.3

Note:
*Delineated wetland area overlaps with some forested habitats



OSCO AGGREGATES LIMITED

PIT NO. 4 EXTENSION

Watercourse

Project Development Area (Pit No. 4 Extension)

LandCover/Habitat Type

Forest Plantation

Past Cut Over/Regenerated Forest

Wetland

Agricultural

Built Area/Developed

Aggregate Pit Area

Softwood Dominant Stand

Field Delineated Wetlands (2023)

TERRESTRIAL HABITATS AND VEGETATION

FIGURE E3

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY OSCO Aggregates Limited,ESRI, GeoNova, NSDNRR

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N W E S

SCALE 1:10,000

0 85 170 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: \\dillon.ca\DILLON_DFS_projects\GIS\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F_E3_TerrestrialHabitatsandVegetation.mxd

Softwood Forest: much of the forest stands within the PDA that are mature are dominated by softwood tree species and often associated with wetlands (i.e., treed swamps). The forested areas throughout, and particularly south of the existing pit, have extensive pockets of depressions and alternating raised areas. Large portions of the forest are regenerating from historical cutting (selective cutting in the 1930s and more recently). Dominant vegetation observed within softwood forests of the LAA were black spruce (*Picea mariana*) with woody shrubs, including deciduous tree saplings. Depending on the presence of open spaces, some locations had an understory of fern, grasses and asters, and other hardy flowering plants. At the northeast extent of the property, just northeast of Wetland 7, there is a relatively undisturbed patch of balsam fir (*Abies balsamea*)-dominant upland forest. One plant SAR, black ash (*Fraxinus nigra*), was recorded in the vicinity of this area. The location of this SAR observed in the LAA is shown on **Figure E3** and discussed below.

Photo: Softwood Forests within the PDA

Regenerating Forest: Most of the regenerating forest habitat is located on the northern portions of the PDA and consists of young trees including red spruce (*Picea rubens*), white pine (insert scientific names for all species at their first mention in the text…if it's been mentioned previously, no need to add), gray birch, red maple (*Acer rubrum*) as well as shrubs (mainly sheep laurel [*Kalmia angustifolia*]). Much of the upland areas in the PDA appear to have been recently (approximately 5-10 years ago) cleared and are intersected by unpaved access roads. This land is covered in very young birch, spruce, maple, trees. Two sedges considered to be SOCC were observed in regenerating forest habitat: lesser brown sedge (*Carex adusta*) and Houghton's sedge (*Carex houghtoniana*). The locations of SOCC observed in the PDA are shown on **Figure E3** and discussed below.

Photo: Regenerating forests and previously logged area within the PDA

Softwood plantation: The softwood forests in the PDA included conifer plantations in locations that may have been historically harvested. This patch is located in the northwest area of the PDA and south of Little Dyke Road. During the 2023 surveys, tree species in this patch included spruce, gray birch, and red maple trees with sheep laurel and bracken fern (*Pteridium aquilinum*) dominant in the shrub and herbaceous stratum, respectively.

Photo: Softwood plantation with mature spruce with white pine and grey birch.

Wetlands: Wetlands occur throughout the low-lying areas of the PDA include treed swamps and bogs, often associated with watercourses, and are discussed further in **Section 4.6**.

Photo: Treed swamp and bog habitat (WL1, left) and treed swamp with a stream (WL3, right) within the PDA

Agricultural: An area to the west of the existing site access road within the PDA has been cleared and turned into cropland.

Photos 1 and 2: Agricultural field in the PDA

Dillon biologists Zacharye Simai, Christopher Pepper carried out a vegetation survey of the LAA from August 1-3, 2023. In addition to plants identified within the PDA in 2023, plants recorded within the PDA during earlier surveys conducted in 2016 and 2017 as part of the EA for Pit No. 4 are included below in the plant master list for the PDA (**Table 8**).

Table 8: Plant Species Master List (2023)

Common Name	Scientific Name	S-Rank	Habitat Type				Year Observed	
			Soft/ Regen Forest	Wetland	Field	Disturbed Pit/Road	2023	2016-17
A St. John's-Wort	*Hypericum perforatum*	SNA				X		X
Allegheny Blackberry	*Rubus allegheniensis*	S5				X		X
Allegheny Service-Berry	*Amelanchier laevis*	S5				X		X
American Bugleweed	*Lycopus americanus*	S5						X
American Bur-Reed	*Sparganium americanum*	S5						X
American Mountain-Ash	*Sorbus americana*	S5	X			X		X
Arrow-Leaved Tearthumb	*Polygonum sagittatum*	S5		X				X
Balsam Fir	*Abies balsamea*	S5		X		X	X	X
Black Bentgrass	*Agrostis gigantea*	SNA			X			X
Black Ash	***Fraxinus nigra***	**S1S2**		**X**				
Black Chokeberry	*Photinia melanocarpa*	S5				X		X
Black Huckleberry	*Gaylussacia baccata*	S5		X				X
Black Spruce	*Picea mariana*	S5	X	X		X	X	X
Blueflag	*Iris versicolor*	S5				X		X
Bluejoint Reed Grass	*Calamagrostis canadensis*	S5		X		X	X	X
Boreal Bog Sedge	*Carex magellanica*	S5				X		X
Bracken Fern	*Pteridium aquilinum*	S5	X				X	X
Bramble	*Rubus sp (not a sp at risk)*	-	X	X				X
Bristly-Stalk Sedge	*Carex leptalea*	S5	X					X
Brittle-Stem Hempnettle	*Galeopsis tetrahit*	SNA			X			X
Broad-leaved Cattail	*Typha latifolia*	S5		X		X	X	X
Brown-Fruited Rush	*Juncus pelocarpus*	S5						X
Bunchberry	*Cornus canadensis*	S5	X	X		X	X	X
Canada Goldenrod	*Solidago canadensis*	S5		X		X		X
Canada Manna-Grass	*Glyceria canadensis*	S5				X		X
Choke Cherry	*Prunus virginiana*	S5				X		X
Cinnamon Fern	*Osmundastrum cinnamomeum*	S5		X		X	X	X
Common Butter-Cup	*Ranunculus acris*	SNA		X		X		X
Common Evening-Primrose	*Oenothera biennis*	S5			X			X

Common Name	Scientific Name	S-Rank	Habitat Type				Year Observed	
			Soft/ Regen Forest	Wetland	Field	Disturbed Pit/Road	2023	2016-17
Common Labrador Tea	*Rhododendron groenlandicum*	S5		X		X	X	X
Common Lady Fern	*Athyrium filix-femina*	S5		X			X	X
Common Lamb's Quarters	*Chenopodium album*	SNA			X			X
Common Marsh Bedstraw	*Galium palustre*	S5				X	X	X
Common Starwort	*Stellaria media*	SNA			x			X
Common Winterberry	*Ilex verticillata*	S5		X		X	X	X
Common Woodrush	*Luzula multiflora*	S5				X		X
Common Woolly Bulrush	*Scirpus cyperinus*	S5		X		X	X	X
Common Yarrow	*Achillea millefolium*	S5			X	X		X
Creeping Buttercup	*Ranunculus repens*	SNA				X	X	
Creeping Snowberry	*Gaultheria hispidula*	S5		X			X	X
Crested Shield-Fern	*Dryopteris cristata*	S5	X	X				X
Cyperus-Like Sedge	*Carex pseudocyperus*	S5						X
Daisy Fleabane	*Erigeron strigosus*	S5						X
Downy Goldenrod	*Solidago puberula*	S5				X		X
Dwarf Red Raspberry	*Rubus pubescens*	S5		X		X	X	X
Eastern Hay-Scented Fern	*Dennstaedtia punctilobula*	S5	X					X
Eastern White Pine	*Pinus strobus*	S5	X				X	X
Epilobium sp	*Epilobium sp(not a species at risk)*	-						X
Eurasian Black Bindweed	*Fallopia convolvulus*	SNA			X			X
Few-Seeded Sedge	*Carex oligosperma*	S5						X
Field Horsetail	*Equisetum arvense*	S5		X		X	X	
Field Speedwell	*Veronica agrestis*	SNA			X			X
Finely-Nerved Sedge	*Carex leptonervia*	S5	X					X
Flat-Top Fragrant-Golden-Rod	*Euthamia graminifolia*	S5		X		X		X
Fowl Manna Grass	*Glyceria striata*	S5		X			X	X
Fox Sedge	*Carex vulpinoidea*	S4						X
Fresh Water Cordgrass	*Spartina pectinata*	S5		X		X		X
Gray Birch	*Betula populifolia*	S5	X			X	X	X
Greater Bladder-Wort	*Utricularia macrorhiza*	S5						X

Common Name	Scientific Name	S-Rank	Habitat Type				Year Observed	
			Soft/ Regen Forest	Wetland	Field	Disturbed Pit/Road	2023	2016-17
Green Keeled Cottongrass	*Eriophorum viridicarinatum*	S5				X		X
Grove Sandwort	*Moehringia lateriflora*	S5				X		X
Gypsy-Weed	*Veronica officinalis*	S5				X		X
Hairy Flat-top White Aster	*Doellingeria umbellata*	S5		X		X	X	X
Hardhack Spiraea	*Spiraea tomentosa*	S5				X		X
Hedge Bindweed	*Calystegia sepium*	S5						X
Hemlock Water-Parsnip	*Sium suave*	S5						X
Hoary Sedge	*Carex canescens*	S5		X		X		X
Houghton's Sedge	*Carex houghtoniana*	S2S3					X	
Lake Sedge	*Carex lacustris*	S4						X
Large Cranberry	*Vaccinium macrocarpon*	S5		X		X		X
Large-Tooth Aspen	*Populus grandidentata*	S5	X					X
Late Lowbush Blueberry	*Vaccinium angustifolium*	S5	X					X
Least Spike-Rush	*Eleocharis acicularis*	S5						X
Leatherleaf	*Chamaedaphne calyculata*	S5		X		X		X
Lesser Brown Sedge	*Carex adusta*	S2S3					X	
Lesser Duckweed	*Lemna minor*	S5						X
Little Prickly Sedge	*Carex echinata*	S5				X		X
Marsh Seedbox	*Ludwigia palustris*	S5				X		X
Marsh Blue Violet	*Viola cucullata*	S5				X		X
Marsh Cinquefoil	*Comarum palustre*	S5				X		X
Marsh Fern	*Thelypteris palustris*	S5		X		X		X
Marsh St. John's-Wort	*Triadenum fraseri*	S5				X		X
Marsh Willow-Herb	*Epilobium palustre*	S5				X		X
Meadow Timothy	*Phleum pratense*	SNA			X	X		X
Mountain Holly	*Ilex mucronata*	S5		X			X	X
Mouse-Ear Chickweed	*Cerastium arvense*	SU			X	X		X
Mouse-ear Hawkweed	*Pilosella officinarum*	SNA			X	X		X
Narrow-Leaved Meadow-Sweet	*Spiraea alba*	S5		X		X		X
New Belgium American-Aster	*Symphyotrichum novi-belgii*	S5				X		X

Common Name	Scientific Name	S-Rank	Habitat Type				Year Observed	
			Soft/ Regen Forest	Wetland	Field	Disturbed Pit/Road	2023	2016-17
Nipple-Seed Plantain	*Plantago major*	S5			X	X		X
Northern Bayberry	*Myrica pensylvanica*	S5				X		X
Northern Bush-Honeysuckle	*Diervilla lonicera*	S5	X			X		X
Northern Evening-Primrose	*Oenothera parviflora*	S5						X
Northern Pitcher-Plant	*Sarracenia purpurea*	S5		X				X
Northern Red Oak	*Quercus rubra*	S5	X					X
Northern Starflower	*Lysimachia borealis*	S5	X				X	X
Northern Wild Raisin	*Viburnum cassinoides*	S5	X	X		X	X	X
Nuttall Pondweed	*Potamogeton epihydrus*	S5						X
Old-Field Cinquefoil	*Potentilla simplex*	S5				X		X
Oxeye Daisy	*Leucanthemum vulgare*	SNA			X	X		X
Pale St. John's-Wort	*Hypericum ellipticum*	S5						X
Paper Birch	*Betula papyrifera*	S5	X				X	X
Pearly Everlasting	*Anaphalis margaritacea*	S5				X		X
Pickerel Weed	*Pontederia cordata*	S5						X
Pink Lady's-Slipper	*Cypripedium acaule*	S5	X	X				X
Quaking Aspen	*Populus tremuloides*	S5				X		X
Red Clover	*Trifolium pratense*	SE			X			X
Red Elderberry	*Sambucus racemosa*	S5	X					X
Red Maple	*Acer rubrum*	S5	X			X	X	X
Red Raspberry	*Rubus idaeus*	S5				X	X	X
Red Spruce	*Picea rubens*	S5	X				X	X
Rhodora	*Rhododendron canadense*	S5		X		X		X
Rose	*Rosa sp(not a species at risk)*			X		X		X
Rough-stemmed Goldenrod	*Solidago rugosa*	S5		X		X	X	X
Roundleaf Sundew	*Drosera rotundifolia*	S5				X		X
Sensitive Fern	*Onoclea sensibilis*	S5		X			X	X
Sheep Laurel	*Kalmia angustifolia*	S5	X	X			X	X
Sheep Sorrel	*Rumex acetosella*	SNA			X	X		X
Shore Sedge	*Carex lenticularis*	S5						X

Common Name	Scientific Name	S-Rank	Habitat Type				Year Observed	
			Soft/ Regen Forest	Wetland	Field	Disturbed Pit/Road	2023	2016-17
Small Forget-Me-Not	*Myosotis laxa*	S5						X
Soft Rush	*Juncus effusus*	S5						X
Speckled Alder	*Alnus incana*	S5		X		X	X	X
Spotted Jewel-Weed	*Impatiens capensis*	S5		X				X
Spotted Lady's Thumb	*Persicaria maculosa*	SNA			X			X
Spotted Water-Hemlock	*Cicuta maculata*	S5						X
Stalk-Grain Sedge	*Carex stipata*	S5		X				X
Sugar Maple	*Acer saccharum*	S5				X		X
Swamp Aster	*Symphyotrichum puniceum*	S5				X		X
Swamp Loosestrife	*Lysimachia terrestris*	S5		X		X		X
Sweet Bayberry	*Myrica gale*	S5		X		X		X
Sweet Fern	*Comptonia peregrina*	S5	X			X		X
Sweet Vernal Grass	*Anthoxanthum odoratum*	SNA	X					X
Tall Hawkweed	*Pilosella piloselloides*	SNA				X		X
Tall Meadow-Rue	*Thalictrum pubescens*	S5		X			X	X
Tamarack	*Larix laricina*	S5	X	X		X	X	X
Tawny Cotton-Grass	*Eriophorum virginicum*	S5		X		X		X
Three-leaved False Soloman's Seal	*Maianthemum trifolium*	S5		X		X	X	X
Three-seeded Sedge	*Carex trisperma*	S5		X			X	X
Three-Way Sedge	*Dulichium arundinaceum*	S5		X				X
Tufted Vetch	*Vicia cracca*	SNA			X	X		X
Tufted Yellow Loosestrife	*Lysimachia thyrsiflora*	S4		X				X
Tussock Sedge	*Carex stricta*	S5		X		X		X
Twinflower	*Linnaea borealis*	S5	X	X				X
Velvetleaf Blueberry	*Vaccinium myrtilloides*	S5	X					X
Vetchling Peavine	*Lathyrus palustris*	S5		X				X
Virginia Strawberry	*Fragaria virginiana*	S5				X		X
Wapatum Arrowhead	*Sagittaria cuneata*	S5		X				X
Water-shield	*Brasenia schreberi*	S5		X				X
White Clover	*Trifolium repens*	SNA			X			X

Common Name	Scientific Name	S-Rank	Habitat Type				Year Observed	
			Soft/ Regen Forest	Wetland	Field	Disturbed Pit/Road	2023	2016-17
White Spruce	*Picea glauca*	S5		X		X	X	X
White Turtlehead	*Chelone glabra*	S5		X				X
Whorled Wood Aster	*Oclemena acuminata*	S5	X			X	X	
Wild Black Cherry	*Prunus serotina*	S5	X					X
Wild Lily-of-The-Valley	*Maianthemum canadense*	S5	X				X	X
Wild Sarsaparilla	*Aralia nudicaulis*	S5	X	X			X	X
Willow	*Salix sp. (not a sp at risk)*	-				X		X
Yellow Birch	*Betula alleghaniensis*	S5	X	X				X

Notes:

Rows in bold represent a SAR or SOCC

From AC CDC (2023b):

S-rank refers to the Sub-national (Provincial) rank provided by the AC CDC and includes the following: S1 Critically Imperiled, S2 Imperiled, S3 Vulnerable, S4 Apparently Secure, S5 Secure and SU Unrankable.

The following rare plants were identified within the LAA during the field assessments conducted in 2023:

- Lesser brown sedge (*Carex adusta*) is considered by the AC CDC as S2S3 for being Imperilled within the province of Nova Scotia; and
- Houghton's sedge (*Carex houghtoniana*) is considered by the AC CDC as S2S3 for being Imperilled within the province of Nova Scotia.

Additionally, black ash was identified just outside of the PDA within wetland 7 (WL7). Black ash is an SAR that is currently under consideration for being added to Schedule 1 of SARA and is listed under the NS ESA and COSEWIC as Threatened. This species is ranked by the AC CDC as S1S2 for being Imperilled to Critically Imperilled within the province of Nova Scotia.

Photo: Black Ash Found Just Outside the PDA Boundary within WL7 (August 1, 2023)

Photo: *Carex adusta* (left) and *Carex houghtoniana* (right) (August 3, 2023)

4.2.1 Exotic Species

Approximately 5 percent of the plant species observed within the PDA from surveys conducted in 2016/2017 and in 2023 are not native to the province of Nova Scotia. Exotic plants identified (Hill and Blaney 2010) as potentially problematic invasive species were not observed. Most of the exotic plants identified common and widespread throughout Nova Scotia, and none of the species identified are considered by the Nova Scotia Invasive Species Council to be invasive in the province.

4.3 Wildlife Assessment

A terrestrial wildlife assessment was conducted by Dillon for the Project and the following managed or protected habitats have been identified within 5 km of the PDA. Habitats identified within the LAA considered by the Nova Scotia Department of Natural Resources and Renewables (NSDNRR) as significant include:

- Mainland moose concentration areas (outside the area shown in **Figure E3**) – the entire Cobequid Highlands from east of Truro to the Nova Scotia/New Brunswick border is identified as an area of mainland moose habitat. Core moose populations typically occur in the area to the west of Economy, with lower densities between Economy and Truro. The LAA may occasionally provide a portion of the larger moose habitat in the area. However, this largely disturbed coastal area is not expected to provide key habitat for moose and moose observations have not been reported near the existing Glenholme facility. The Nova Scotia *Endangered Species Act* Recovery Plan (NSDNRR 2021) does not identify this coastal area, including the PDA, as part of core moose habitat.
- Cobequid Bay Important Bird Area (IBA) is located within approximately 1 km of the coast, which includes the southern tip of the LAA. This IBA is identified as important due to the vast areas of coastal mud and sand flats and salt marshes that provide food supply for migrating shorebirds. A diversity of shorebird species depends on this IBA as a fall migration staging area, including large numbers of Semipalmated Sandpipers. Shorebirds are not anticipated to use the PDA.
- Lower Debert Protected Beach, as well as Lower Debert SES Significant Ecological Area (site) (SES) and Little Dyke SES are considered to be a Significant Ecological Area sites by NSDNRR for migratory birds (AC CDC 2023a). There areas are located over 1 km south of the PDA, along the shoreline of Cobequid Bay.
- The eastern side of the LAA is identified as significant habitat by NSDNRR as other habitat due to various records of Bald Eagle nests from 1993 to 2009 (pers. comm., NSDNR GIS Analyst, 2016). Two nests were identified just north of the property (AMEC 2007), and one was evident within the LAA at the time of October 2016 field surveys (Dillon 2017).
- Wetlands are identified in the NSDNRR database within the riparian area of McCurdy Creek and associated with the DUC pond. Wetlands are further discussed in **Section 4.6**.

Dillon biologists Zacharye Simai, B. Sc. recorded incidental observations or detections of wildlife during surveys conducted for other species throughout the 2023 field season. Such detections are rarely direct

observations or vocalizations, but rather proxy evidence that is left behind and remains identifiable to species for some time after the animal has moved on. This includes more readily detectable indicators such as animal tracks in snow/mud, or animal scat, but also less obvious indicators such as browse marks, dens, and/or burrow structures. Observations of terrestrial wildlife, including sightings and evidence of their presence are presented in the following sections.

4.3.1.1 Mammals

NNDNRR's General Status of Wild Species (NSDNRR 2023) reports that there are 50 species of mammals known to occur within Nova Scotia. A review of the AC CDC database (AC CDC 2023a) indicated that there are no historical records of federally or provincially protected mammals observed within 5 km of the PDA, and that no hibernaculum has been reported to have been historically observed within 5 km of the PDA. Although a few mammals are known to occur within the region the PDA occupies (e.g., mainland moose), mammal SAR or SOCC species or evidence of their presence was not observed during 2023 field visits.

The wildlife mammal species observed have Apparently Secure and Secure populations (i.e., ranked as S4 or S5) within Nova Scotia according to the AC CDC (2023b). Several mammal species have been observed within the region and indirect observations including scat from a white-tailed deer, along with a small mammal burrow were reported during the 2023 terrestrial field surveys. The mammals observed in the vicinity of the Project are summarized in **Table 9**.

Table 9: Mammals Observed During EA Studies for the Project (2016 and 2023)

Common Name	Scientific Name	AC CDC S-Ranks	Habitat	Distribution	Observed in PDA
Coyote	*Canis latrans*	S5	Wooded areas to farmland	Throughout NS	Scat
Red squirrel	*Tamiasciurus hudsonicus*	S5	Softwood/ mixedwood forest edges	Common throughout NS	Yes
White-tailed deer	*Odocoileus virginianus*	S5	Forest edges, fields, and cutovers	Common throughout NS	Yes

Notes:
Rows in **bold** represent a SAR or SOCC
From AC CDC (2023b): S-rank refers to the Sub-national (Provincial) rank provided by the AC CDC and includes the following: S1 Critically Imperiled, S2 Imperiled, S3 Vulnerable, S4 Apparently Secure, S5 Secure and SU Unrankable.

4.3.1.2 Herptiles

NSDNRR's General Status of Wild Species database (NSDNRR 2023) reports that there are 9 reptile and 13 amphibian species known to occur in Nova Scotia. A review of the AC CDC database (AC CDC 2023a) indicated that there are no records of federally or provincially protected herptiles historically observed within 5 km of the PDA. Although a few SAR and SOCC reptiles are known to occur within the region the

PDA occupies (i.e., snapping turtle, wood turtle), no turtle species or evidence of turtle presence were observed during 2023 field visits, and the habitat within the PDA is not suitable for wood turtles. The only confirmed herptile observed during field surveys within the PDA during the 2023 surveys was a Maritime garter snake (*Thomnophis sirtalis pallidulus*) which is considered by the AC CDC to have a Secure population within Nova Scotia (i.e., ranked S5). The DUC pond and riparian areas near McCurdy Creek, both located downstream of the PDA, are expected to provide habitat for herptiles including turtles, salamanders, and frogs.

4.4 Bird and Bird Habitat Assessments

4.4.1 Desktop Screening

A desktop review to identify bird species within the region was conducted and included a review of available information and data from the Second MBBA (Stewart et al. 2015), Important Bird Areas Canada (Birds Canada 2023), and the AC CDC (2023a).

Maritime Breeding Bird Atlas

The Maritime Breeding Bird Atlas (MBBA) database (Stewart et al. 2015) provides information on the presence of breeding bird species in counts conducted between 2006 and 2010. Within the MBBA Second Atlas, the PDA lies within Square #20MR52 (Glenholme) within Region #21 (Cobequid). During the MBBA period of 2006-2010, a total of 96 species of birds were recorded within Square #20MR52. Of these species, 56 were confirmed as breeding, 24 were probable breeders, and 16 were possible breeders. There were six SAR, 16 SOCC, and four exotic species detected during the most recent MBBA period in this square. The species at risk included: Bank Swallow (*Riparia riparia*), Barn Swallow (*Hirundico rustica*), Bobolink (*Dolichonyx oryzivorus*), Canada Warbler (*Cardellina canadensis*), Common Nighthawk (*Chordeiles minor*), and Olive-sided Flycatcher (*Contopus cooperi*) (Stewart et al. 2015).

Important Bird Areas

The closest IBA to the PDA is the Cobequid Bay IBA in the Bay of Fundy (NS019) (Birds Canada 2023), which is approximately 1 km south of the PDA. The habitat in this area consists of salt marshes/brackish marshes, tidal rivers/estuaries, mud or sand flats (saline), inlets/coastal features (marine), arable and cultivated lands (Birds Canada 2023). With the high tides in the Bay of Fundy, it creates a large, open area for shorebirds to forage for invertebrates, in particular the Fundy mud shrimp (*Corophium volutator*). These areas are particularly important for shorebirds, including: Semipalmated Plovers (*Charadrius semipalmatus*), Purple Sandpiper (*Calidris maritima*), and Savannah Sparrow (*Passerculus sandwichensis*) during their fall migration, and significant numbers of Semipalmated Sandpipers (*Calidris pusilla*). Other species that use these areas for an important stopover during migration include Sanderlings (*Calidris alba*), Short-billed Dowitchers (*Limnodromus griseus*), Least Sandpipers (*Calidris minutilla*), Dunlins (*Calidris alpina*), White-rumped Sandpipers (Calidris fuscicollis), and Red Knots (*Calidris canutus rufa*), which are listed as Endangered pursuant to SARA, NS ESA, and COSEWIC (Birds Canada 2023).

4.4.2 Field Surveys

Bird field surveys were conducted by Dillon biologists Zacharye Simai, Michael Benson and Christopher Pepper to determine the bird species using the LAA. Between May 9 and August 3, 2023, four spring migration bird surveys, two breeding bird surveys, and one targeted nightjar/other nocturnal bird breeding survey were completed on-site. Between these seven surveys, 758 individuals belonging to 40 different species were observed, as detailed in **Table 10**. Of these 40 species, two were SOCC (i.e., American Robin and Purple Finch) and one was an SAR (i.e., Canada Warbler).

Table 10: Bird Species Master List (2023)

Common Name	Scientific Name	AC CDC S-Rank/ Conservation Status	Spring Migration	Early Breeding	Late Breeding
Alder Flycatcher	*Empidonax alnorum*	S5B			X
American Crow	*Corvus brachyrhynchos*	S5	X	X	X
American Goldfinch	*Spinus tristis*	S5	X		X
American Redstart	*Setophaga ruticilla*	S5B			X
American Robin	*Turdus migratorius*	SOCC (S5B, S3N)	X	X	X
Bald Eagle	*Haliaeetus leucocephalus*	S5	X		
Black-and-White Warbler	*Mniotilta varia*	S5B	X	X	X
Black-capped Chickadee	*Poecile atricapilla*	S5	X	X	X
Black-throated Green Warbler	*Setophaga virens*	S5B	X	X	X
Blue Jay	*Cyanocitta cristata*	S5	X	X	X
Blue-headed Vireo	*Vireo solitarius*	S5B	X	X	X
Brown Creeper	*Certhia americana*	S5	X		
Canada Goose	*Branta canadensis*	SUB, S4N, S5M	X		
Canada Warbler	***Cardellina canadensis***	**SAR (AC CDC: S3B, SARA: T, COSEWIC: SC, NS ESA: E)**	**X**		
Cedar Waxwing	*Bombycilla cedrorum*	S5B			X
Chipping Sparrow	*Spizella passerina*	S4B, S5M	X	X	
Common Grackle	*Quiscalus quiscula*	S5B	X		X
Common Loon	*Gavia immer*	S4B		X	
Common Raven	*Corvus corax*	S5	X	X	X
Common Yellowthroat	*Geothlypis trichas*	S5B	X	X	X
Dark-eyed Junco	*Junco hyemalis*	S4S5	X	X	
Golden-crowned Kinglet	*Regulus satrapa*	S5	X		X
Hairy Woodpecker	*Dryobates villosus*	S5	X	X	
Hermit Thrush	*Catharus guttatus*	S5B	X	X	X

Common Name	Scientific Name	AC CDC S-Rank/ Conservation Status	Spring Migration	Early Breeding	Late Breeding
Magnolia Warbler	*Setophaga magnolia*	S5B	X	X	X
Mallard	*Anas platyrhynchos*	S5B, S5N	X		
Mourning Dove	*Zenaida macroura*	S5	X	X	X
Nashville Warbler	*Leiothlypis ruficapilla*	S4B, S5M	X	X	
Northern Flicker	*Colaptes auratus*	S5B	X		X
Northern Parula	*Setophaga americana*	S5B	X	X	X
Palm Warbler	*Setophaga palmarum*	S5B	X		
Purple Finch	*Haemorhous purpureus*	SOCC – (S4S5B, S3S4N, S5M)	X		
Red-breasted Nuthatch	*Sitta canadensis*	S4S5	X	X	X
Red-eyed Vireo	*Vireo olivaceus*	S5B		X	X
Ruby-throated Hummingbird	*Archilochus colubris*	S5B		X	
Song Sparrow	*Melospiza melodia*	S5B	X		X
White-throated Sparrow	*Zonotrichia albicollis*	S4S5B, S5M	X	X	X
Winter Wren	*Troglodytes hiemalis*	S5B	X		X
Yellow-rumped Warbler	*Setophaga coronata*	S5B	X		
Yellow Warbler	*Setophaga petechia*	S5B	X		X

Notes:

SOCC = Species of Conservation Concern.

SAR = Species at Risk.

From AC CDC (2023b): S-rank refers to the Sub-national (Provincial) rank provided by the AC CDC and includes the following: S1 Critically Imperiled, S2 Imperiled, S3 Vulnerable, S4 Apparently Secure, S5 Secure and SU Unrankable. Rankings are frequently paired with the following breeding status qualifiers: B Breeding, N Non-breeding, and M Migrant. Conservation Status Categories: E Endangered, T Threatened, V Vulnerable, SC Special Concern.

The Canada Warbler (*Cardellina canadensis*) is a SAR listed as Threatened under Schedule 1 of SARA, as Special Concern under COSEWIC, and as Endangered under the NS ESA. Additionally, this species is ranked by the AC CDC as S3B in Nova Scotia, indicating that it's breeding population in the province is Vulnerable (AC CDC 2023a). Canada Warblers are found breeding in Nova Scotia in forests with dense and complex understories (i.e., extensive hummocks, dense shrubs, abundant cinnamon fern, etc.) and are often associated with wetlands containing these features (COSEWIC 2020). A Canada Warbler was observed singing in Wetland 7 (outside the PDA) from point count location 1 on May 20, 2023. Wetland 7 is a mixed-wood treed swamp with abundant speckled alder (*Alnus incana*) shrubs, cinnamon fern (*Osmundastrum cinnamomeum*), abundant woody debris, and hummocks which make for suitable breeding habitat for the species.

Two bird SOCC observed on-site during the surveys were American Robin (*Turdus migratorius*) and the Purple Finch (*Haemorhous purpureus).* American Robins are found in open habitats where they forage for invertebrates and fruit (The Cornell Lab 2023a). American Robins were observed within the PDA at point count locations 1, 3, 4, 5, 7, 8 and 10, all of which are adjacent to open habitats (i.e., crop field, cleared area, etc.). The conservation rank for American Robins in Nova Scotia is S5B, S3N, which indicates that the non-breeding population in the province is Vulnerable. Purple Finches are found in Nova Scotia year-round where they most often inhabit moist, cool, coniferous forests (The Cornell Lab 2023b). Purple Finches will also use mixed-wood forests, wooded streams, and treed anthropogenic habitats (i.e., suburbs) to forage for seeds, berries, and fruit. Within the PDA, they were observed at point count locations 2, 3, 6, 7, and 8, all of which have these habitat features within 200 m of the PDA. The conservation rank for Purple Finch in Nova Scotia is S4S5B, S3S4N,S5M, indicating the non-breeding population is Vulnerable.

Other SAR and SOCC birds have been observed on or near the PDA during surveys conducted between 2016 and 2017 for the existing Pit No. 4. More information on these birds and their potential or confirmed habitat within the PDA is presented above in **Section 4.1**.

4.4.3 Point Count Surveys

Spring and summer bird surveys were comprised of point count surveys. During the spring point count surveys, which were conducted over four days in May 2023, 150 individual birds representing 32 species were recorded. During two point count surveys conducted during the summer, 132 individuals from 32 unique species were identified. The results of the spring and summer bird point count surveys are summarized below by point count location in **Tables 11** and **12**, respectively. A description of the habitat for each survey location in presented above in **Table 2** and the survey locations are shown above in **Figure E2**.

Table 11: Spring Migration Bird Point Count Survey Results (2023)

Species	09-May-23								16-May-23								23-May-23								30-May-23								Grand Total
	Point Count Location								Point Count Location								Point Count Location								Point Count Location								
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	
American Crow	5	6	3	3	2	2		2		1		3	2				1	2		2	1	1	1		2	1	2	2	1	1		1	**47**
American Goldfinch			2						2		3						2	2			2	1	1	2	1			2					**20**
American Robin					1			1							1				1					1	1		1	1			1	1	**10**
Bald Eagle	1						1																										**2**
Black-and-White Warbler									2					2	2	2					1	2				3				2	1	1	**18**
Black-capped Chickadee	2				2	2		2	2						2		2			1	2		2	2	3	1			3				**28**
Black-throated Green Warbler															1							1									1	1	**4**
Blue Jay		1	4		1		1	1	2	1	2	2	2	2		2	4	4	4	4	4	2	3		2	2	2	2	2	1	1	1	**59**
Blue-headed Vireo														2	1								1	1					1		1		**7**
Brown Creeper																	1																**1**
Canada Goose		6																		2				2									**10**
Canada Warbler																									1								**1**
Chipping Sparrow				2	1	1													1												1		**6**
Common Grackle									5																								**5**
Common Raven	2						1	1	1																							1	**6**
Common Yellowthroat										1							2	3	2	2	2		2		2	2	2	3	3	2	2		**30**
Dark-eyed Junco			2	1	1	1	1	1	1	1		1	3	1		1	1	2	3	2	2	1	1	1		1	4	2	1	1		1	**38**
Golden-crowned Kinglet																	1						2										**3**
Hairy Woodpecker	1																																**1**
Hermit Thrush					1					1					1		1		1	2	2	2	1		1		1	1	2	2		2	**21**
Magnolia Warbler																1					1	1	2	1					1		3	**10**
Mallard			1							3	1								1								1					**7**
Mourning Dove		1								1					1										1	1						1	**6**
Nashville Warbler																							2	2							3	1	**8**
Northern Flicker	2																											1					**3**
Northern Parula									2						2		1	1				1	2	2				1	1		2		**15**
Palm Warbler														2		2		1	2		1	2							1	2	1	1	**15**
Purple Finch						1	1											1	1				1	1								1	**7**
Red-breasted Nuthatch																							2		1								**3**
Song Sparrow										2	1			1	1		1				1			1									**8**
White-throated Sparrow	5	8	7	4	6	4	4	3	4	5	9	7	7	8	3	5	5	8	11	8	10	5	6	5	4	6	9	8	5	4	3	5	**191**
Winter Wren	1								1																								**2**
Yellow Warbler																																1	**1**
Yellow-rumped Warbler				1			1		1			1	2		2			1			1	1	1	1		1						1	**15**
Grand Total	**19**	**22**	**19**	**11**	**15**	**11**	**10**	**11**	**23**	**16**	**16**	**14**	**16**	**18**	**17**	**13**	**22**	**25**	**27**	**23**	**30**	**20**	**30**	**22**	**19**	**18**	**22**	**23**	**20**	**16**	**17**	**23**	**608**

Table 12: Summer Breeding Bird Point Count Survey Results (2023)

Species	22-Jun-23								03-Aug-23				Grand Total
	Point Count Location								Point Count Location				
	1	2	3	4	5	6	7	8	1	2	9	10	
Alder Flycatcher										1		1	**2**
American Crow			2	1	3		1	3			2		**12**
American Goldfinch									2			1	**3**
American Redstart												1	**1**
American Robin			1	1	2		1		5			1	**11**
Black-and-white Warbler	1										1		**2**
Black-capped Chickadee	1								2				**3**
Black-throated Green Warbler						1	1				1	1	**4**
Blue Jay	1					3			1	1	2	2	**10**
Blue-headed Vireo	1	1							1	1			**4**
Cedar Waxwing									1				**1**
Chipping Sparrow				1									**1**
Common Grackle											1		**1**
Common Loon			1										**1**
Common Raven			1					1			1		**3**
Common Yellowthroat	1	1		2	1	2		1	1			1	**10**
Dark-eyed Junco	1	2	2	1	1		1	2					**10**
Golden-crowned Kinglet										1	1	2	**4**
Hairy Woodpecker								1					**1**
Hermit Thrush	1		2	1	1	1		1		1	2	1	**11**
Magnolia Warbler							1				1		**2**
Mourning Dove		1	1							1		1	**4**
Nashville Warbler		1											**1**
Northern Flicker												1	**1**
Northern Parula	1						1				1	1	**4**
Red-breasted Nuthatch		2									1		**3**

Species	22-Jun-23								03-Aug-23				Grand Total
	Point Count Location								Point Count Location				
	1	2	3	4	5	6	7	8	1	2	9	10	
Red-eyed Vireo		1				1		1	1		1	2	**7**
Ruby-throated Hummingbird							1						**1**
Song Sparrow										1			**1**
White-throated Sparrow	1	3	3	4	2	3	1	7	1	2	1		**28**
Winter Wren											1	1	**2**
Yellow-rumped Warbler											1		**1**
Grand Total	**9**	**12**	**13**	**11**	**10**	**11**	**8**	**17**	**15**	**9**	**18**	**17**	**150**

4.4.4 Targeted Breeding Nightjar Survey

Common Nighthawks nest in open, often anthropogenically cleared, areas such as beaches, recently logged cut blocks, rocky barrens, etc. (EC 2016a). Although no nightjars or other nocturnal species were observed during the July 5, 2023 nightjar breeding surveys, the PDA does contain recently logged areas, gravel pits, dirt roads, infilled areas, etc. that are suitable breeding habitat. Additionally, Common Nighthawks have been historically observed within 5 km of the PDA (AC CDC 2023a) and were previously observed at the DUC pond off-site to the north of the PDA (Dillon 2017).

4.4.5 Diurnal Bird Assessment

Diurnal birds, particularly raptor species, were recorded as they were observed incidentally during surveys for other VECs as part of the biophysical surveys for the Project. During the 2023 surveys, the only raptor species recorded was a Bald Eagle (*Haliaeetus leucocephalus*) observed soaring above the property at point count locations 1 and 7 during the spring migration surveys.

Additionally, the following raptors are expected to occasionally be present or fly over the PDA as they are known to have resided in the region, based on the Migratory Breeding Bird Atlas (Stewart et al. 2015), known historical observations of SAR/SOCC within 5 km of the PDA (AC CDC 2023a), and the Cobequid Bay Important Bird Area (located 1 km to the south of the PDA):

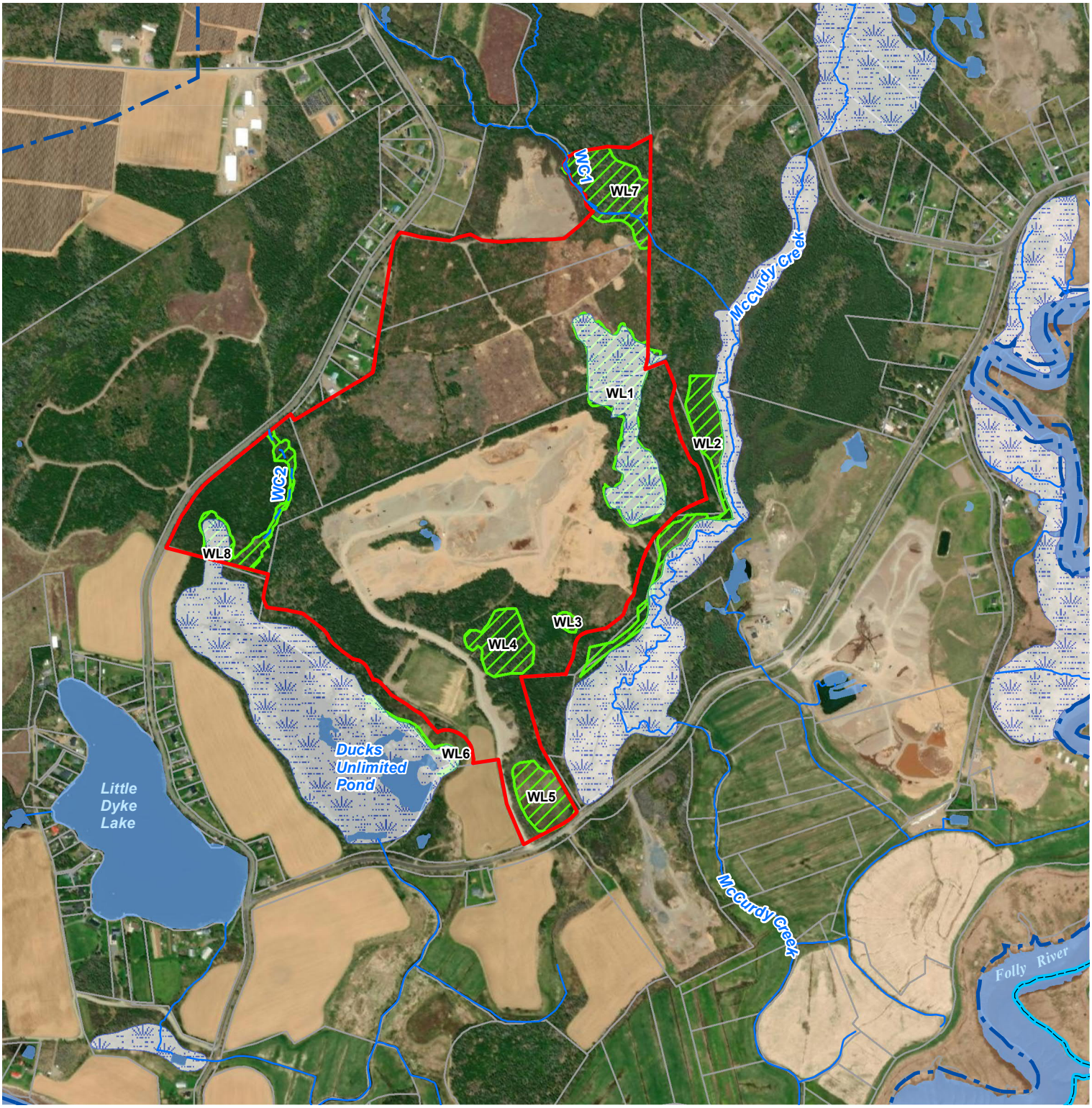
- American Kestrel (*Falco sparverius)*;
- Barred Owl (*Strix varia*);
- Broad-winged Hawk (*Buteo platypterus*);
- Cooper's Hawk (*Accipiter cooperii*);
- Great Horned Owl (*Bubo virginianus*);
- Merlin (*Falco columbarius*);
- Northern Goshawk (*Accipiter genitilis*);
- Northern Harrier (*Circus hudsonius*);
- Northern Saw-whet Owl (*Aegolius acadicus*);
- Osprey (*Pandion haliaetus*);
- Peregrine Falcon (*Falco peregrinus*);
- Red-tailed Hawk (*Buteo jamaicensis*);
- Rough-legged Hawk (*Buteo lagopus*);
- Sharp-shinned Hawk (*Accipiter striatus*);
- Short-eared Owl (*Asio flammeus*);
- Snowy Owl (*Bubo scandiacus*); and
- Turkey Vulture (*Cathartes aura*).

4.5 Watercourse and Fish Habitat Assessment

The Project is located within the Salmon River/Debert River primary watershed (NSECC designation 1DH) and the Debert River secondary watershed (NSECC designation 1DH-2). These watersheds ultimately drain south, to the Bay of Fundy via Folly River, McCurdy Creek, and via overland flow. Locally, water collected within the existing pit infiltrates to groundwater or drains southward and eastward to McCurdy Creek. McCurdy Creek originates approximately 3 km to the north of the PDA, and generally flows in a southeasterly direction to Cobequid Bay within the Bay of Fundy, approximately 1 km downstream of the PDA. The watershed receives run-off from agricultural, other aggregate operations, and woodlots, as well as a residential development. The portion of the watershed downstream of Little Dyke Road is predominately farmland created by historical dykes.

A small portion of the western part of the PDA drains toward a DUC pond. The pond borders approximately 500 m of the Project property. The pond's sub-watershed originates within 0.5 km upstream. The land bordering the DUC pond is used for agriculture, except the northeastern shore, which is forested. The southern end of the pond has historically been modified to allow DUC to manage water levels. Downstream of the DUC pond, a watercourse drains southward through the agricultural dyke lands and discharges to Cobequid Bay, approximately 1 km downstream of Little Dyke Road.

Two watercourses intersect with the PDA and are assessed below and referred to as Watercourse 1 (WC1) and Watercourse 2 (WC2). Watercourse 1 is a small unnamed tributary to McCurdy Creek, which is generally associated with wetland features on the Project site. Watercourse 2 is a small ephemeral tributary that flows towards the DUC pond. The locations of watercourses and other surface water features are identified on **Figure E4** and discussed below.



OSCO CONCRETE & AGGREGATES LIMITED

PIT NO. 4 EXTENSION

- Field Delineated Watercourse
- Watercourse
- Salmon River/Debert River Primary Watershed
- Debert River Secondary Watershed
- Project Development Area (Pit No. 4 Extension)
- Waterbody
- Wetland (NS Topographic Database)
- Field Delineated Wetlands
- Property Parcels

WATERCOURSES, WATERBODIES AND WETLANDS

FIGURE E4

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI, GeoNova, NSDNRR

MAP CREATED BY: SCM
MAP CHECKED BY: JTO
MAP PROJECTION: NAD 1983 CSRS UTM Zone 20N

N W E S

SCALE 1:11,500
0 100 200 m

PROJECT: 23-6113
STATUS: FINAL
DATE: 2024-03-08

FILE LOCATION: \\dillon.ca\DILLON_DFS_projects\GIS\2023\236113\Product\Client\EA\SubmissionFigures\Final Figures\F_E4_WatercoursesWaterbodiesandWetlands.mxd

Watercourse 1 (WC1) is classified as a small permanent watercourse forming a tributary to McCurdy Creek flows through the PDA in the vicinity of WL7. Overall, within the PDA, the watercourse habitat was flat with a small gravel substrate and has abundant instream cover from overhanging forest canopy. The average characteristics recorded for the watercourse are summarized below in **Table 13**. In-situ water quality readings were recorded by Dillon biologist Zacharye Simai on September 20, 2023 and are summarized in **Table 14**. During the assessment, the watercourse was at a moderate to high stage using a handheld YSI professional plus multimeter. The pH and DO levels were within the recommended CCME FWAL guideline for the protection of aquatic life (CCME 1999). During the assessment, small fish were observed within the watercourse. Although the stream is relatively small, the stream has the potential to provide foraging and limited rearing habitat for some fish species, as well as access from the Bay of Fundy via McCurdy Creek. Representative photos of WC1 are shown below.

Photo: Watercourse 1 (WC1), Unnamed Tributary to the McCurdy Creek

Table 13: Watercourse Assessment Summary

Characteristic	Units	Assessment Location	
		WC1	WC2
Habitat Type	% Pool	0	0
	% Flat	10	10
	% Run	80	80
	% Riffle	10	10
Substrate	% Fines	20	25
	% Gravel	70	75
	% Cobble	10	0
	% Boulder	0	0
	% Bedrock	0	0
	% Detritus	0	0
Channel Characteristics	Wetted Width (m)	2.0	0.5
	Wetted Depth (m)	0.20	0.2
	Channel Width(m)	2.3	1.0
	Bankfull Depth(m)	0.3	0.3
Instream Cover	% Undercut Banks	5	0
	% Boulders	0	0
	% Cobble	0	0
	Instream Woody Debris	0	5
	% Overhanging Woody Debris	5	5
	% Organic Debris	0	0
	% Instream Vascular Plants	0	5
	% Overhanging Vascular Plants	50	50
	% Stream Shaded	30-60%	60-90%
Habitat Type	% Pool	0	0
	% Flat	10	10
	% Run	80	80
	% Riffle	10	10
Substrate	% Fines	20	25
	% Gravel	70	75
	% Cobble	10	0
	% Boulder	0	0
	% Bedrock	0	0
	% Detritus	0	0
Channel Characteristics	Wetted Width (m)	2.0	0.5
	Wetted Depth (m)	0.20	0.2
	Channel Width(m)	2.3	1.0
	Bankfull Depth(m)	0.3	0.3

Characteristic	Units	Assessment Location	
		WC1	WC2
Instream Cover	% Undercut Banks	5	0
	% Boulders	0	0
	% Cobble	0	0
	Instream Woody Debris	0	5
	% Overhanging Woody Debris	5	5
	% Organic Debris	0	0
	% Instream Vascular Plants	0	5
	% Overhanging Vascular Plants	50	50
	% Stream Shaded	30-60%	60-90%

Table 14: Water Quality Assessment Summary

Parameter	Units	Assessment Location		
		WC1-T1	WC2-T1	WC2-T2
pH	-	7.6	6.4	6.6
Temperature	°C	15	19	19
Conductivity	µS/cm	141	85	80
Dissolved Oxygen	mg/L	12.7	10.5	9.9
	% Sat.	128	116	108

Watercourse 2 (WC2) is an unnamed tributary with flow towards the DUC Pond. The portion of WC2 that was assessed in 2023 is not considered to provide optimal fish habitat, noting that some hardy acid tolerant species could be present within the PDA seasonally. The average characteristics recorded for the watercourse are summarized above in **Table 13**. At the time of the assessment, the water level was at a high stage, water quality readings that were collected during the assessment are summarized in **Table 14**. The pH was slightly below the CCME FWAL recommended pH range of 6.5-9 and DO was above the recommended CCME minimum DO concentration of 6.5 mg/L to support cold water biota life stages (excluding early life stages) (CCME 1999).

Photo 7: Watercourse 2 (WC2), Unnamed Tributary to the DUC Pond

Three small ponds that receive drainage from the existing pit area and were likely human-made. These ponds appear to be present throughout the year, but drainage from them was not observable during the 2016 or 2023 field visits. Given the aggregate substrate nature and the potential for infiltration, run-off is expected to be limited. No defined connections between the ponds or downstream were observed; however, storm flow is expected to travel from one pond to the next, and extreme flows likely discharge toward the access road ditch. No fish were observed. The lack of passage to a permanent watercourse limits potential fish access, and it is unlikely that these ponds provide suitable habitat for fish.

4.6 Wetland Assessments

Wetlands in the LAA were surveyed and assessed by Dillon biologist Zacharye Simai (who is certified in wetland delineation and functional assessments in Nova Scotia) within the growing season (i.e., June 1-September 30) in 2023. At the time of the wetland assessments, Project development was underway.

Eight wetlands were identified and delineated within the LAA, six of which intersect the PDA. Field delineation and function assessments were completed or are planned to be completed for wetlands that are proposed to be altered. To assess the functions and benefits of the wetlands on-site, a functional assessment following the Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC) was performed for each delineated wetland. Each of the six wetlands identified to intersect with the PDA were field delineated with a total wetland area in the PDA of 11 ha. Due to changes to the Project layout that occurred after the completion of the wetland survey, the functional assessment of three wetlands was completed in 2023 with the remaining assessments scheduled for early summer 2024.

The Eight wetlands of the LAA are described below.

4.6.1 Wetland Delineation

During the field analysis, eight wetlands were identified and delineated within the LAA (refer to **Figure E4**, above). The delineated wetlands are summarized in **Table 15** and described below. Only the portion of the wetlands present within the PDA was delineated. An assessment and delineation was conducted on wetlands within the current PDA; however, the functional assessment of a few wetlands (indicated below) is planned for the spring and summer of 2024, prior to construction.

Table 15: Summary of Wetland Characteristics

ID	Dominant Type	Delineated Area within PDA (ha)[1]	Total Wetland Area[2]	Landscape Position	Water Flow Path	Landform	Water Regime	Comments
WL1	Treed bog	3.93	3.93	Terrene	Isolated	Basin	Permanently saturated	Forest harvest to north.
WL2	Fen/ Swamp	0	2.07[2]	Lotic	Through -flow	Floodplain	Permanently saturated to Seasonally flooded	Outside PDA.
WL3	Bog	0.13	0.13	Terrene	Isolated	Basin	Permanently saturated/ Seasonally flooded	Black spruce snags present
WL4	Bog/ Treed Swamp	1.34	1.34	Terrene	Isolated	Basin	Permanently saturated	Trail along north border, access road along west border, historic pit development to south.
WL5	Swamp/ Bog	1.29	1.29	Terrene	Outflow	Basin	Permanently saturated/ Seasonally flooded	Historic hydrologic disturbance – berm/road to east affecting connection with McCurdy Creek. Historic pit to north.
WL6	Marsh	0	0.23[2]	Lentic	Outflow	Fringe (Pond)	Seasonally to permanently flooded	Outside PDA, enhanced wetland, managed for waterfowl habitat.
WL7	Treed swamp	2.15	2.15	Terrene	Through flow	Slope	Seasonally to permanently saturated	Associated with WC1
WL8	Treed swamp	1.24	1.24	Terrene	Inlet	Slope	Seasonally to permanently saturated	Associated with WC2

Notes:
WC=Watercourse; WL = Wetland
[1]indicates that wetland extends beyond the PDA, the projected area beyond the PDA is included in the total area
[2]Based on USFWS (2014).

Wetland 1 is a treed bog and is characterized by black spruce (*Picea mariana*) dominating the tree stratum; Labrador tea (*Rhododendron groenlandicum*), mountain holly (*Ilex mucronata*), sheep laurel (*Kalmia angustifolia*), stunted black spruce (*Picea mariana*), and wild raisin (*Vibernum nudum*) in the shrub stratum; cinnamon fern, three-leaved false solomon's-seal (*Maianthemum trifolium*), three-seeded sedge (*Carex trisperma*), and creeping snowberry (*Gaultheria hispidula*) in the herbaceous stratum. The soil in Wetland 1 is generally characterized as being dominated by deep decomposing organic material (histosol) that is fibric in texture. Typical bog hydrological indicators are present including a high water table, soil saturation, and stunted plants. **Table 16** summarizes the conditions found in Wetland 1.

Table 16: Wetland 1 (WL1) – Wetland Determination Data Form Summary

Wetland Characteristic	3.39 ha Treed Bog
Vegetation	
Dominant Species	*Picea mariana, Larix laricina, Kalmia angustifolia, Rhododendron groenlandicum, Maianthemum trifolium*
Prevalence Index	2.19
Hydrology	
Primary Indicators	High water table, saturation
Secondary Indicators	Stunted or stressed plants
Hydric Soil	
Hydric Soil Indicators	Histosol

Notes:
A prevalence index ≤ 3 indicates hydrophytic vegetation. A minimum of one primary indicator or two secondary indicators are required for wetland hydrology.

Wetland 2 is a wetland complex associated with McCurdy Creek. Directly adjacent to the creek the wetland consists of graminoid fen, blue-joint (*Calamagrostis canadensis*) dominated meadow and cattail (*Typha latifolia*) dominated swamp components. Inland from the creek, the wetland grades into bog components dominated by black spruce, sheep laurel and Labrador tea, and treed swamp components dominated by red maple (*Acer rubrum*), black spruce, balsam fir (*Abies balsamea*), winterberry (*Ilex verticillata*), mountain holly speckled alder (*Alnus incana*), black huckleberry (*Gaylasaccia baccata*), and wild raisin, with mosses and sedges dominating the ground/ herbaceous cover. **Table 17** summarizes the conditions found in Wetland 2.

Table 17: Wetland 2 (WL2) - Wetland Determination Data Form Summary

Wetland Characteristic	2.07 ha Wetland Complex
Vegetation	
Dominant Species	*Abies balsamea, Picea mariana, Ilex mucronata, Alnus incana, Carex stricta, Kalmia angustifolia, Osmundastrum cinnamomeum, Rhododendron groenlandicum*
Prevalence Index	1.9
Hydrology	
Primary Indicators	High water table, saturation
Secondary Indicators	FAC-Neutral Test
Hydric Soil	
Hydric Soil Indicators	Histic Epipedon

Notes:
A prevalence index ≤ 3 indicates hydrophytic vegetation. A minimum of one primary indicator or two secondary indicators are required for wetland hydrology.

Wetland 3 is a small open bog with sparse tree cover that is dominated by winterberry, leatherleaf (*Chamaedaphne calyculata*), and Labrador tea in the shrub stratum, and tawny cottongrass (*Eriophorum virginicum*) in the herbaceous stratum. **Table 18** below details the conditions in Wetland 3.

Table 18: Wetland 3 (WL3) - Wetland Determination Data Form Summary

Wetland Characteristic	0.13 ha Bog
Vegetation	
Dominant Species	*Eriophorum virginicum, Chamaedaphne calyculata, Rhododendron groenlandicum*
Prevalence Index	1.5
Hydrology	
Primary Indicators	High water table, saturation
Secondary Indicators	FAC-Neutral Test
Hydric Soil	
Hydric Soil Indicators	Histosol

Notes:
A prevalence index ≤ 3 indicates hydrophytic vegetation. A minimum of one primary indicator or two secondary indicators are required for wetland hydrology.

Wetland 4 is a coniferous treed swamp that is dominated by balsam fir and black spruce in the tree stratum; mountain holly and wild raisin in the shrub stratum; and sheep laurel, Labrador tea, bunchberry (*Cornus canadensis*), and three-leaved false Solomon's-seal in the herbaceous stratum. Ground cover is dominated by mosses. **Table 19** below details the conditions found within Wetland 4.

Table 19: Wetland 4 (WL4) - Wetland Determination Data Form Summary

Wetland Characteristic	1.34 ha Treed Swamp
Vegetation	
Dominant Species	*Abies balsamea, Picea mariana, Ilex mucronata, Viburnum nudum Kalmia angustifolia, Cornus canadensis, Rhododendron groenlandicum, Maianthemum trifolium*
Prevalence Index	2.2
Hydrology	
Primary Indicators	High water table, saturation
Secondary Indicators	FAC-Neutral Test
Hydric Soil	
Hydric Soil Indicators	Histosol

Notes:
A prevalence index ≤ 3 indicates hydrophytic vegetation. A minimum of one primary indicator or two secondary indicators are required for wetland hydrology.

Wetland 5 is a graminoid and cattail dominated swamp with abundant standing water. In areas with more standing water cattails are present. In areas with less standing water, ground cover is dominated by sphagnum and cranberry. **Table 20** below details the conditions found in Wetland 5.

Table 20: Wetland 5 (WL5) - Wetland Determination Data Form Summary

Wetland Characteristic	1.29 ha Swamp
Vegetation	
Dominant Species	*Viburnum nudum, Aronia melanocarpa, Ilex verticillata, Calamagrostis Canadensis, Myrica gale*
Prevalence Index	1.9
Hydrology	
Primary Indicators	High water table, saturation
Secondary Indicators	FAC-Neutral Test
Hydric Soil	
Hydric Soil Indicators	Histosol

Notes:
A prevalence index ≤ 3 indicates hydrophytic vegetation. A minimum of one primary indicator or two secondary indicators are required for wetland hydrology.

Wetland 6 is a marsh associated with a pond that is managed by Ducks Unlimited (DU). Along the edge of the pond are speckled alder shrubs. Emergent vegetation along the edge of the wetland is dominated by sedges, such as wiregrass sedge (*Carex lasiocarpa*), pickerelweed (*Pontederia cordata*), and rushes. The open water areas are dominated by pond lillies (*Nymphaea* spp.). **Table 21** details the conditions found along the edge of the pond in Wetland 6.

Table 21: Wetland 6)WL6) - Wetland Determination Data Form Summary

Wetland Characteristic	0.23 ha Pond
Vegetation	
Dominant Species	*Alnus incana, Carex lasiocarpa*
Prevalence Index	1.6
Hydrology	
Primary Indicators	High water table, surface water, saturation
Secondary Indicators	FAC-Neutral Test
Hydric Soil	
Hydric Soil Indicators	Histosol

Notes:
A prevalence index ≤ 3 indicates hydrophytic vegetation. A minimum of one primary indicator or two secondary indicators are required for wetland hydrology.

Wetland 7 vegetation is characterized by black spruce (*Picea mariana*), red maple (*Acer rubrum*), and balsam fir (*Abies balsamea*) in the tree stratum; speckled alder (*Alnus incana*) and immature tree stratum species in the shrub layer; and fowl manna grass (Glyceria striata), scattered cinnamon fern (*Osmundastrum cinnamomeum*), sensitive fern (Onoclea sensibilis), and other various plants in the herbaceous layer. The soil in the treed swamp sections is generally characterized as having a layer of decomposing organics (histosol) above sandy soil. Typical hydrological indicators are present and include a high-water table, soil saturation, water-stained leaves, drainage patterns, aquatic fauna, and stunted/stressed plants. **Table 22** summarizes the conditions found in Wetland 7.

Table 22: Wetland 7 (WL7) – Wetland Determination Data Form Summary

Wetland Characteristic	2.15 ha Treed Swamp
Vegetation	
Dominant Species	*Acer rubrum, Alnus incana, Glyceria striata, Osmundastrum cinnamomeum*
Prevalence Index	2.31
Hydrology	
Primary Indicators	High water table, saturation, water-stained leaves, aquatic fauna
Secondary Indicators	Drainage Patterns, stunted or stressed plants
Hydric Soil	
Hydric Soil Indicators	Histosol

Notes:
A prevalence index ≤ 3 indicates hydrophytic vegetation. A minimum of one primary indicator or two secondary indicators are required for wetland hydrology.

Wetland 8 is a treed swamp and is characterized by abundant red maple with scattered balsam fir and tamarack (*Larix laricina*) in the tree stratum; abundant speckled alder with other scattered shrubs such as winterberry holly (*Ilex verticillata*) in the shrub stratum; and abundant cinnamon fern, three-seeded sedge, fowl manna grass, three-leaved false Solomon's seal, dwarf raspberry, and various other plants in the herbaceous stratum. The soil in Wetland 8 is generally characterized as being dominated by an

uppermost layer of decomposing organic material (histosol) on top of sandy soil. Typical swamp hydrological indicators are present including standing water, a high water table, soil saturation, water-stained leaves, and drainage pattern. **Table 23** summarizes the conditions found in Wetland 8.

Table 23: Wetland 8 (WL8) - Wetland Determination Data Form Summary

Wetland Characteristic	1.24 ha Treed Swamp
Vegetation	
Dominant Species	*Acer rubrum, Alnus incana, Osmundastrum cinnamomeum*
Prevalence Index	2.44
Hydrology	
Primary Indicators	Surface water, high water table, saturation, water-stained leaves
Secondary Indicators	Drainage patterns
Hydric Soil	
Hydric Soil Indicators	Histosol

Notes:
A prevalence index ≤ 3 indicates hydrophytic vegetation. A minimum of one primary indicator or two secondary indicators are required for wetland hydrology.

4.6.2 Wetland Functional Assessment Results

The WESP-AC datasheet summary scores for the assessed wetland are included in below and include a numerically weighted score for functions and benefits of 21 wetland functions and other attributes. WESP-AC functional assessment applies a three-level categorical rating (i.e., Lower, Moderate, or Higher) and is based on natural breaks in the statistical distribution of scores among the calibration wetlands for each function or benefit, determined objectively using a statistical procedure known as Jenks Optimisation (Jenks 1967).

WESP-AC guidance states that the primary focus should be upon the normalized function scores; however, normalized benefit scores are included as they include data associated with the context within which the associated function is being performed currently (e.g., they are influenced by current land uses).

As stated above, at the time of the wetland assessments, Project development was underway and the functional assessment of a few wetlands (i.e., WL3, WL4 and WL5) is planned for the spring of 2024, prior to construction.

The following discussion includes a summary of the five grouped wetland functions considered by WESP-AC in the non-tidal calculator for wetland functional assessment. The normalized function ratings for grouped wetland functions for the areas of the three wetlands on-site are summarized in **Table 24**. A summary report of the functional assessment results, including normalized benefit ratings for the wetland, is provided at the end of this section.

Table 24: Summary of Normalized Function Ratings for Grouped Wetland Functions for Wetlands Within the PDA

Wetland ID	Hydrologic Group	Water Quality Support	Aquatic Support	Aquatic Habitat	Transition Habitat
WL1	9.49	8.45	4.66	0.57	6.67
WL7	2.79	4.21	6.93	1.54	6.73
WL8	1.90	2.33	6.75	4.83	7.17

Notes:
The higher the score between 1 and 10, the higher the wetland function.
Bold = Normalized Benefits Rating of "Higher"

Lower	Moderate	Higher

Hydrologic Group

The hydrologic function of a wetland is defined by a wetland's contribution to ground and surface water resources. Although many non-tidal wetlands in Atlantic Canada perform important function for water storage and delay, WESP-AC assessment gives Higher scores to wetlands with the capability to store or delay the downslope movement of surface water (e.g., wetlands that do not have surface water outlets) (Adamus 2018). Wetland 1, a treed bog without an outlet, received a Higher score for hydrologic functions. Both Wetland 7 and 8, with flow leaving the LAA via a watercourse and through diffuse surface water flow, received a Lower score for hydrologic functions.

Water Quality Support Group

The water quality support group is defined as a wetland's contribution to the quality of surface and groundwater of an area. This group considers the following four functions:

- Sediment retention and stabilization;
- Phosphorus retention;
- Nitrate removal; and
- Carbon sequestration.

Similar to the hydrologic group, wetlands with Higher water quality support function scores typically do not have a surface water outlet and instead are isolated from flowing surface water. As such, Wetland 1 also received a Higher water quality support group function score, whereas Wetlands 7 and 8 received Moderate and Lower scores, respectively.

Aquatic Support Group

The aquatic support function of a wetland determines a wetland's ability to support ecological stream functions that promote habitat health. This group considers the following four functions:

- Stream flow support (SFS);
- Aquatic invertebrate habitat (INV);
- Organic nutrient export (OE); and
- Water cooling (WC).

As both Wetlands 7 and 8 are associated with streams and support water cooling and nutrient export to downslope waters, these wetlands received Higher scores for the aquatic support group function. As Wetland 1 lacks significant aquatic features, it received a Lower score for this group function.

Aquatic Habitat Group

The aquatic habitat group considers the following five different functions:

- Anadromous fish habitat;
- Resident fish habitat;
- Amphibian and turtle habitat;
- Waterbird feeding habitat; and
- Waterbird nesting habitat.

The assessed areas of Wetland 8 in 2023 received a Moderate score for aquatic habitat group functions, while both Wetland 1 and 7 received Lower group function scores.

Transition Habitat Group

The main function of the collective group is to evaluate the wetland's ability to support healthy habitat for birds, mammals, and native plants. The transition habitat group comprises three different functions:

- Songbird, raptor, and mammal habitat (SBM);
- Native plant habitat (PH); and
- Pollinator habitat (POL).

The assessed area of Wetland 8 within the property boundary received a Higher function score for the transition habitat group while both Wetlands 1 and 7 received Moderate function scores for the group. The functional assessment of a few wetlands (i.e., WL3, WL4 and WL5) will be submitted under an addenda prior to construction, noting that alterations to WL5 for the Project are not anticipated.

4.6.3 Determination of Wetlands of Special Significance

The wetlands within the property boundary were evaluated for their potential for meeting the NSECC criteria of a wetland of special significance (WSS). The wetlands were evaluated for their potential of being considered a WSS in addition to functional assessment using the WESP-AC. Although the WESP-AC assessment includes an interpretation tool to classify WSS based on wetland functionality, it is recognized that the tool currently does not consider all aspects of WSS that are considered under the provincial Wetland Conservation Policy. The results of the WESP-AC WSS interpretation tool are included in below with the WESP-AC functional assessment summary for Wetlands 1, 7, and 8 within the PDA.

During the biophysical surveys for the Project between May and September of 2023, plant and songbird species at risk (SAR) were identified near Wetland 7, making it a potential WSS. In addition, black ash (*Fraxinus nigra)* was observed in Wetland 7 during wetland delineation surveys on August 1, 2023, just outside of the property boundary, and a Canada Warbler (*Cardellina canadensis*), was observed during a point count bird surveys on May 30, 2023.

Assessment Area (AA) Results:

Wetland ID: WL1

Date: August 3, 2023

Observer: Zacharye Simai

Latitude & Longitude (decimal degrees): 45.394383°N 63.547681°W

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	9.49	Higher	10.00	Higher	9.03	4.46
Stream Flow Support (SFS)	0.00	Lower	0.00	Lower	0.00	0.00
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.15	Higher	2.36	Moderate	7.78	1.16
Phosphorus Retention (PR)	2.40	Lower	4.29	Higher	5.25	3.33
Nitrate Removal & Retention (NR)	10.00	Higher	5.00	Moderate	10.00	5.00
Carbon Sequestration (CS)	8.01	Higher			8.99	
Organic Nutrient Export (OE)	6.75	Moderate			4.41	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	3.48	Moderate	0.78	Lower	4.91	1.67
Amphibian & Turtle Habitat (AM)	0.95	Lower	1.45	Lower	3.62	2.96
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.32	Moderate	2.50	Lower	6.37	2.50
Pollinator Habitat (POL)	7.09	Moderate	0.00	Lower	5.88	0.00
Native Plant Habitat (PH)	3.61	Moderate	4.08	Lower	5.34	4.08
Public Use & Recognition (PU)			0.98	Lower		0.97
Wetland Sensitivity (Sens)			10.00	Higher		5.33
Wetland Ecological Condition (EC)			4.78	Moderate		7.50
Wetland Stressors (STR) (higher score means more stress)			7.50	Higher		3.78
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	9.49	Higher	10.00	Higher	9.03	4.46
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	8.45	Higher	4.44	Moderate	9.00	4.08
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.66	Moderate	0.52	Lower	3.62	1.11
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	0.57	Lower	0.87	Lower	2.17	1.77
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	6.67	Moderate	3.14	Lower	6.12	3.14
WETLAND CONDITION (EC)			4.78	Moderate		7.50
WETLAND RISK (average of Sensitivity & Stressors)			8.75	Higher		4.56

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among all the NS calibration wetlands that were assessed previously.

NOVA SCOTIA - Functional WSS Interpretation Tool

1. General Description of Tool:

This interpretive tool automatically determines whether the subject wetland will be regulated as a Wetland of Special Significance (WSS). This determination is made based on the WESP-AC functional results, per the Nova Scotia *Wetland Conservation Policy* .

A 'Function-Benefit Product' (FBP) is calculated based upon the Grouped Functions, and has a theoretical maximum of 100. Threshold values for the FBP are applied, in order to categorize the FBP scores into 'Low', 'Moderate' or 'High' scores. Thresholds are determined based upon the statistical distribution of WESP-AC scores compiled from various sites across the Province (N=442). These categories are subsequently used to apply various 'Functional WSS Rules', as described below.

For the purpose of defining and applying the Functional WSS rules, two supergroups are defined based on grouped functions, as follows: **(1) Support Supergroup** - includes Hydrologic, Water Quality Support, and Aquatic Support grouped functions. **(2) Habitat Supergroup** - includes Aquatic Habitat and Transition Habitat grouped functions.

2. Functional WSS Rule Definitions:

Habitat Rule: In consideration of the Habitat Supergroup, the subject wetland is a WSS if either of the following sub-rules are satisfied:

(HAB 1) Two 'High Scores' OR

(HAB 2) One 'High' and one 'Moderate' score

Support Rule: In consideration of the Support Supergroup, the subject wetland is a WSS if either of the following sub-rules are satisfied:

(SUP 1) Three 'High' scores OR

(SUP 2) Two 'High' and one 'Moderate' score

Habitat/Support Hybrid Rule: In consideration of both the Habitat and Support Supergroups, the subject wetland is a WSS if the following is satisfied:

(HYB 1) One 'High' Habitat score **AND** Two or three 'High' Support scores

3. Functional WSS Interpretation Results

Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	94.92006023	High
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	37.51225621	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	2.433330639	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	0.496409823	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	20.93196952	Low

3a. Functional WSS Determination: Automatic Method

Habitat Rule Satisfied?	NO
Support Rule Satisfied?	NO
Habitat/Support Hybrid Rule Satisfied?	NO
CONCLUSION:	**Site is not a WSS**

Assessment Area (AA) Results:

Wetland ID: WL7

Date: August 3, 2023

Observer: Zacharye Simai

Latitude & Longitude (decimal degrees): 45.397683°N 63.547681°W

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.79	Lower	10.00	Higher	4.03	4.49
Stream Flow Support (SFS)	4.76	Higher	1.73	Moderate	3.83	1.15
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	5.44	Moderate	9.74	Higher	6.44	4.77
Phosphorus Retention (PR)	0.64	Lower	8.84	Higher	4.14	6.88
Nitrate Removal & Retention (NR)	2.34	Lower	10.00	Higher	4.47	10.00
Carbon Sequestration (CS)	3.46	Moderate			6.83	
Organic Nutrient Export (OE)	9.13	Higher			5.97	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.02	Moderate	0.68	Lower	5.54	1.61
Amphibian & Turtle Habitat (AM)	2.57	Lower	1.99	Lower	4.47	3.40
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	5.97	Moderate	10.00	Higher	5.20	10.00
Pollinator Habitat (POL)	7.66	Moderate	0.00	Lower	6.34	0.00
Native Plant Habitat (PH)	3.79	Moderate	3.85	Lower	5.41	3.85
Public Use & Recognition (PU)			1.07	Lower		1.03
Wetland Sensitivity (Sens)			9.48	Higher		4.87
Wetland Ecological Condition (EC)			7.10	Higher		8.61
Wetland Stressors (STR) (higher score means more stress)			7.13	Higher		3.61
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	2.79	Lower	10.00	Higher	4.03	4.49
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	4.21	Moderate	9.76	Higher	6.15	8.61
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.93	Higher	1.27	Lower	4.90	1.27
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.54	Lower	1.19	Lower	2.68	2.04
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	6.73	Moderate	7.31	Moderate	6.00	7.31
WETLAND CONDITION (EC)			7.10	Higher		8.61
WETLAND RISK (average of Sensitivity & Stressors)			8.31	Higher		4.24

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among all the NS calibration wetlands that were assessed previously.

NOVA SCOTIA - Functional WSS Interpretation Tool

1. General Description of Tool:

This interpretive tool automatically determines whether the subject wetland will be regulated as a Wetland of Special Significance (WSS). This determination is made based on the WESP-AC functional results, per the Nova Scotia *Wetland Conservation Policy* .

A 'Function-Benefit Product' (FBP) is calculated based upon the Grouped Functions, and has a theoretical maximum of 100. Threshold values for the FBP are applied, in order to categorize the FBP scores into 'Low', 'Moderate' or 'High' scores. Thresholds are determined based upon the statistical distribution of WESP-AC scores compiled from various sites across the Province (N=442). These categories are subsequently used to apply various 'Functional WSS Rules', as described below.

For the purpose of defining and applying the Functional WSS rules, two supergroups are defined based on grouped functions, as follows: **(1) Support Supergroup** - includes Hydrologic, Water Quality Support, and Aquatic Support grouped functions. **(2) Habitat Supergroup** - includes Aquatic Habitat and Transition Habitat grouped functions.

2. Functional WSS Rule Definitions:

Habitat Rule: In consideration of the Habitat Supergroup, the subject wetland is a WSS if either of the following sub-rules are satisfied:

(HAB 1) Two 'High Scores' OR

(HAB 2) One 'High' and one 'Moderate' score

Support Rule: In consideration of the Support Supergroup, the subject wetland is a WSS if either of the following sub-rules are satisfied:

(SUP 1) Three 'High' scores OR

(SUP 2) Two 'High' and one 'Moderate' score

Habitat/Support Hybrid Rule: In consideration of both the Habitat and Support Supergroups, the subject wetland is a WSS if the following is satisfied:

(HYB 1) One 'High' Habitat score **AND** Two or three 'High' Support scores

3. Functional WSS Interpretation Results

Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	27.90234262	Low
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	41.07061256	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	8.792889664	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	1.839187348	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	49.19147036	Low

3a. Functional WSS Determination: Automatic Method

Habitat Rule Satisfied?	NO
Support Rule Satisfied?	NO
Habitat/Support Hybrid Rule Satisfied?	NO
CONCLUSION:	**Site is not a WSS**

Assessment Area (AA) Results:

Wetland ID: WL8

Date: August 3, 2023

Observer: Zacharye Simai

Latitude & Longitude (decimal degrees): 45.390895°N 63.558378°W

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	1.90	Lower	10.00	Higher	3.37	4.48
Stream Flow Support (SFS)	1.59	Moderate	1.50	Moderate	1.28	1.00
Water Cooling (WC)	4.13	Moderate	1.42	Lower	2.75	0.77
Sediment Retention & Stabilisation (SR)	1.58	Lower	8.70	Higher	3.43	4.26
Phosphorus Retention (PR)	0.96	Lower	8.14	Higher	4.35	6.33
Nitrate Removal & Retention (NR)	2.54	Lower	10.00	Higher	4.61	10.00
Carbon Sequestration (CS)	2.72	Lower			6.48	
Organic Nutrient Export (OE)	9.03	Higher			5.90	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	3.18	Lower	4.06	Moderate	4.79	3.43
Amphibian & Turtle Habitat (AM)	6.55	Moderate	3.61	Moderate	6.55	4.73
Waterbird Feeding Habitat (WBF)	5.75	Moderate	3.33	Moderate	4.38	3.33
Waterbird Nesting Habitat (WBN)	3.22	Moderate	2.50	Moderate	2.34	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	8.40	Higher	2.50	Lower	7.32	2.50
Pollinator Habitat (POL)	6.33	Moderate	0.00	Lower	5.24	0.00
Native Plant Habitat (PH)	3.07	Lower	4.19	Lower	5.13	4.19
Public Use & Recognition (PU)			1.16	Lower		1.09
Wetland Sensitivity (Sens)			9.06	Higher		4.75
Wetland Ecological Condition (EC)			4.78	Moderate		7.50
Wetland Stressors (STR) (higher score means more stress)			6.26	Higher		3.19
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	1.90	Lower	10.00	Higher	3.37	4.48
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.33	Lower	9.47	Higher	5.60	8.43
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.75	Higher	3.19	Lower	4.79	2.58
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.83	Moderate	2.75	Moderate	4.60	3.42
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.17	Higher	3.21	Lower	6.61	3.21
WETLAND CONDITION (EC)			4.78	Moderate		7.50
WETLAND RISK (average of Sensitivity & Stressors)			7.66	Higher		3.97

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among all the NS calibration wetlands that were assessed previously.

NOVA SCOTIA - Functional WSS Interpretation Tool

1. General Description of Tool:

This interpretive tool automatically determines whether the subject wetland will be regulated as a Wetland of Special Significance (WSS). This determination is made based on the WESP-AC functional results, per the Nova Scotia *Wetland Conservation Policy*.

A 'Function-Benefit Product' (FBP) is calculated based upon the Grouped Functions, and has a theoretical maximum of 100. Threshold values for the FBP are applied, in order to categorize the FBP scores into 'Low', 'Moderate' or 'High' scores. Thresholds are determined based upon the statistical distribution of WESP-AC scores compiled from various sites across the Province (N=442). These categories are subsequently used to apply various 'Functional WSS Rules', as described below.

For the purpose of defining and applying the Functional WSS rules, two supergroups are defined based on grouped functions, as follows: **(1) Support Supergroup** - includes Hydrologic, Water Quality Support, and Aquatic Support grouped functions. **(2) Habitat Supergroup** - includes Aquatic Habitat and Transition Habitat grouped functions.

2. Functional WSS Rule Definitions:

Habitat Rule: In consideration of the Habitat Supergroup, the subject wetland is a WSS if either of the following sub-rules are satisfied:

(HAB 1) Two 'High Scores' OR

(HAB 2) One 'High' and one 'Moderate' score

Support Rule: In consideration of the Support Supergroup, the subject wetland is a WSS if either of the following sub-rules are satisfied:

(SUP 1) Three 'High' scores OR

(SUP 2) Two 'High' and one 'Moderate' score

Habitat/Support Hybrid Rule: In consideration of both the Habitat and Support Supergroups, the subject wetland is a WSS if the following is satisfied:

(HYB 1) One 'High' Habitat score **AND** Two or three 'High' Support scores

3. Functional WSS Interpretation Results

Function-Benefit Product (FBP)	FBP SCORE	FBP SCORE CATEGORY
SUPPORT SUPERGROUP - HYDROLOGIC	19.03447256	Low
SUPPORT SUPERGROUP - WATER QUALITY SUPPORT	22.10801363	Low
SUPPORT SUPERGROUP - AQUATIC SUPPORT	21.57818868	Low
HABITAT SUPERGROUP - AQUATIC HABITAT	13.25425417	Low
HABITAT SUPERGROUP - TRANSITION HABITAT	22.9969867	Low

3a. Functional WSS Determination: Automatic Method

Habitat Rule Satisfied?	NO
Support Rule Satisfied?	NO
Habitat/Support Hybrid Rule Satisfied?	NO
CONCLUSION:	**Site is not a WSS**

5.0 Summary and Conclusion

This report has been prepared to provide additional information in support the Environmental Assessment (EA) for the Pit No. 4 Extension (the Project). The Project is located just south of the community of Glenholme on Little Dyke Road in Colchester County, Nova Scotia. The proposed Project will expand on operational activities currently occurring within Pit No. 4. Current operations include producing high quality aggregate (i.e., stone and sand) for use in concrete and construction projects. Specific activities in Pit No. 4 have included aggregate extraction, screening, mobile crushing, stockpiling of aggregate, and transport of aggregate to their existing Glenholme Wash Plant facility located at Pit No. 2, approximately 700 m away on Little Dyke Road.

The following surveys and assessments were conducted in 2023:

- Screening for species at risk;
- Terrestrial habitat and vegetation assessment;
- Wildlife and wildlife habitat assessment;
- Bird and bird habitat surveys;
- Watercourse and fish habitat survey; and
- Wetland field delineation and functional assessments.

An assessment of SAR was completed and included the results of field surveys and a review of databases. Two SAR were observed in the LAA during 2023 surveys: black ash (*Fraxinus nigra)* and Canada Warbler (*Cardellina canadensis*); and suitable habitat was identified within the PDA for three additional SAR. An additional five SAR were identified as having the potential to be present (either incidentally or occasionally foraging) due to the presence of suitable habitat adjacent to the PDA.

A terrestrial wildlife assessment was conducted for the Project. Several managed or protected habitats have been identified within 5 km of the PDA. The eastern side of the LAA is identified as significant habitat by NSDNRR as other habitat due to various records of Bald Eagle nests from 1993 to 2009 (pers. comm., NSDNR GIS Analyst, 2016).

Bird field surveys were conducted to determine the bird species using the LAA. Between May 9 and August 3, 2023, four spring migration bird surveys, two breeding bird surveys, and one targeted nightjar/other nocturnal bird breeding survey were completed on-site. Between these seven surveys, 758 individuals belonging to 40 different species were observed. One bird SAR (i.e., Canada Warbler) and two SOCC (i.e., American Robin and Purple Finch) were observed; however, the majority of birds were from species considered have secure populations within Nova Scotia. One Canada Warbler was observed within the LAA in May 2023. American Robins and Purple Finches were observed throughout

the spring and summer point count surveys in the LAA, noting that only the non-breeding populations of these species are considered to be Vulnerable.

Two watercourses intersect with the PDA. Watercourse 1 (WC1) is classified as a small permanent watercourse forming a tributary to McCurdy Creek flows through the PDA in the vicinity of WL7. During the assessment, small fish were observed within this watercourse. Although the stream is relatively small, the stream has the potential to provide foraging and limited rearing habitat for some fish species, as well as access from the Bay of Fundy via McCurdy Creek. Watercourse 2 (WC2) is a small, ephemeral tributary that flows towards the DUC pond. The portion of WC2 that was assessed in 2023 is not considered to provide optimal fish habitat, noting that some hardy acid tolerant species could be present within the PDA seasonally.

During the field analysis, eight wetlands were identified and delineated within the LAA. Field delineation and function assessment were completed or are planned to be completed for wetlands that are proposed to be altered. Each of the six wetlands identified to intersect with the PDA were field delineated with a total wetland area in the PDA of 11 ha. Due to changes in the layout that occurred after the completion of the wetland survey, the functional assessment of three wetlands was completed in 2023 with the remaining assessments schedules for early summer 2024. One WSS was identified within the PDA (i.e., WL7), which will not be altered as part of the Project.

6.0 Closure

This report was prepared by Dillon Consulting Limited (Dillon) for OSCO Aggregates Limited in support of the Pit No. 4 Extension Project. Dillon has used the degree of care and skill ordinarily exercised under similar circumstances at the time the work was performed by reputable members of the environmental consulting profession practicing in Canada. Dillon assumes no responsibility for conditions which were beyond its scope of work. There is no warranty expressed or implied by Dillon.

The material in the report reflects Dillon's best judgment in light of the information available to Dillon at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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