Renewable Energy Project
Submission Report

Sunnyacres Solar Project

Prepared for:

Ascent Energy Partners Ltd.

Prepared By:

McCallum Environmental Ltd. &
Bear Tracks Environmental Services Ltd.

April 19th, 2024

McCallum Environmental Ltd.

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Maps

Project Overview

This section asks for a general overview of the project including information about the proponent, project type, location, and infrastructure.

1. What type of project is being proposed (wind, photovoltaic solar or other)?

   Photovoltaic (PV) solar.

2. What is the name of the project?

   Sunnyacres Solar Project (SSP) (hereinafter referred as the Project) (Map 1 and Map 2).

3. WIND PROJECTS ONLY: What type of application is being proposed (standard submission, buildable area, preferred and alternate turbine locations, other)?

   N/A

4. What is the contact information for the proponent?

   Ascent Energy Partners Ltd.
   Jennifer Traichel
   (587) 216-0696
   jennifer@ascentpartners.ca

5. What is the wildlife consultant contact information?

   McCallum Environmental Ltd.
   Robert McCallum, P. Biol (President)
   2 Bluewater Rd Suite 115
   Bedford, NS, B4B 1G7
   Attention: Robert McCallum
   (902) 292-0514
   rmccallum@strum.com

   Bear Tracks Environmental Services (2015) Ltd.
   220, 376 1st Ave South
   Lethbridge, AB, T1J 0A5
   Attention: Darryl Jarina
   (403) 942-0067 (office); (403) 894-4210 (cell)
   darryl.jarina@beartracksenv.ca

6. Provide the legal land description, township, and county name for the project.

   The Project is located approximately 10 kilometers (km) northeast of the city of Fort Saskatchewan, Alberta, within Strathcona County. See Table 1 (below) for the legal land locations.

Table 1. Project Location for the Sunnyacres Solar Project

Quarter	Section	Township	Range	Meridian
SE	21	56	21	4

7. Provide the total MW (AC) size of the Project.

   4.99 MW. The SSP will also be paired with a Battery Energy Storage System (BESS), currently designed as 5MW/10MWh.

8. What is the size of the project construction footprint (include all infrastructure, temporary workspace or other related project related space) in hectares?

   The Project construction footprint is approximately 8.66 ha and includes temporary workspaces and laydown areas.

9. What is the size of project operation footprint (include all infrastructure and other project related space) in hectares?

   The Project operation footprint is approximately 3.38 ha.

10. WIND PROJECTS ONLY: Provide locations of all proposed wind turbines in a table with the following headings, using as many rows as needed. If applicable, indicate if the turbine location is a preferred or alternate location.

    N/A

11. WIND PROJECTS ONLY: Provide the below turbine details in a table with the below format.

    N/A

12. Provide any general information about the proponent, or the project that may be applicable to the GOA-Wildlife review.

    Ascent Energy Partners Ltd. proposes the construction of a photovoltaic (PV) solar power electrical generation project approximately 10 km northeast of the city of Fort Saskatchewan, Alberta (hereafter the Project, Sunnyacres Solar Project, or SSP) within Strathcona County. The proposed development will have a capacity of 4.99 MWac.

    The project is located on private land in SE-21-56-21W4M. The project lands are zoned Heavy Industrial and the lands are within the Industrial Heartland area in Alberta (https://industrialheartland.com/). The Industrial Heartland is a 582 km^2 energy cluster developed to improve industrial efficiencies.

The lands are a mixture of forested and grazing lands with a high voltage transmission line within the quarter section, and a number of oil and gas facilities, pipelines and access roads. The lands immediately adjacent to the east boundary of the project quarter section are listed as the Northwest of Bruderheim Natural Area. (https://www.albertaparks.ca/parks/central/northwest-of-bruderheim-na/). This area has existing oil and gas facilities, oil well batteries, oil and gas pipelines and access roads, and allows hunting and geocaching, among other uses.

Four (4) wellsites are present within the Project lands (SE 21-56-21 W4M); one is still active (7-21-56-21 W4M) and is currently designated as 'CR-OIL PUMP' (crude oil pumping), and three wellsites are abandoned (8-21-56-21 W4, 2-21-56-21 W4 and 1-21-56-21 W4M) (AbaData 2023).

Adjacent to (immediately west of) the Project within SW 21-56-21 W4M is a reclaimed site that is assumed to have been historically used as a holding/settling pond area. Additionally, an abandoned well and a few abandoned pipelines are present within 3-21-56-21 W4M.

The Project is sited in the vicinity of (within four kilometers of) an existing PV solar power station, located southwest of the Project. The Project is also sited within one kilometer of an oil refinery complex, located northwest of the Project. An auditory wildlife deterrent system was continuously heard during 2023 environmental surveys, presumed to be used to deter wildlife from landing on the settling ponds associated with the refinery (located 1.2 km to the west of the SSP). Other refinery complexes are located south and southwest of the Project, within five kilometers of the Project.

Wildlife Habitat Land Cover

This section asks for information about the project siting and general risks to wildlife and wildlife habitat. Ensure setbacks are measured as per the Directive, which states a setback is to be measured from the edge of the feature to the nearest edge of the project footprint (i.e. temporary disturbance and all project related permanent infrastructure).

13. Land Cover within the project area: Provide the amount of each type of land cover within the project area, as identified within the project area map (refer to the Maps and Figures section below) in a table with the below format. For each habitat type, provide the total number of hectares within the entire project area, the number of hectares that will be disturbed during construction (include all temporary work spaces) and the number of hectares that will be used to support the operation of the proposed facility. Ensure the reported permanent and temporary footprint for all infrastructure (i.e., turbines, solar arrays, access roads, collection lines, substation etc.) aligns with the definition as per the Directive. Additional rows may be added for land cover types not already identified in the below table. If an identified habitat type does not occur in the proposed project area, clearly state that it does not occur in the project footprint.

    See Map 3 and Map 4.

Table 2. Habitat Types within the SSP

Habitat Type	Total Assessed Area (ha)	Total Project Area (ha)	Construction (Temporary) Project Footprint (ha)	Operation (Permanent) Project Footprint (ha)
Tame Grassland	20.91	10.30	6.03	2.40
Aspen Forest	20.24	0.16	0.81	0.28
Wetlands	10.62	1.87	0.98	0.37
Watercourse	-	-	-	-
Other - Road /Trail	0.93	0.10	0.06	0.01
Other - Reclaimed Well Site	1.27	-	-	-
Other – Abandoned farmyard	1.39	1.39	0.75	0.31
Other – Powerline ROW	3.20	-	-	-
Other – Well Site	0.24	0.24	0.02	-
Total number of hectares	**58.81**	**14.06**	**8.66**	**3.38**

14. As per the Directive, provide details in the table below if any part or portion of the project is sited in: native grassland, native parkland, old growth forest, named waterbodies, valley breaks/coulee breaks, valleys of a large watercourse or in the eastern slopes.

Table 3. Table of Habitat Infringements

Habitat Type	Location of infrastructure	Type of infrastructure	Amount of area impacted (ha)
Aspen Forest	SE 21-56-21 W4M	Operation: Fence Area and Solar Modules	0.28
		Construction: Fence Area and Solar Modules	0.81

Detail the rationale for siting the project in an area identified as higher risk by GOA-Wildlife policy and any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive. If the proposed project will impact more than one of the identified habitat types, provide the details for each habitat type separately.

Solar modules and a perimeter fence are proposed to be constructed within aspen forest within one quarter section (see Table 3). Construction will either occur outside of the breeding bird and any applicable sensitive species' breeding and nesting window (April 15 – August 15), so minimal effects to wildlife are anticipated during the breeding and nesting season OR trees will be removed outside the same April 15 – August 15 nesting window to allow for construction during that season.

Wildlife Zones and Critical Habitat

15. As per the Directive, provide details in the table below if any part or portion of the project is sited in the following wildlife zones: Greater-sage Grouse Range (inclusive of the area covered by Environment Canada's Emergency Protection Order), Trumpeter Swan Waterbodies and Watercourses (inclusive of 800 m setback from waterbody and watercourse), Caribou Zones, Mountain Goat and Sheep Zones, Piping Plover Waterbodies (inclusive of 200 m setback from waterbody).

    N/A

    Detail the rationale for siting the project in an area identified as higher risk by GOA-Wildlife policy and any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive. If the proposed project will impact more than one of the identified wildlife zones, provide the details for each type of wildlife zone separately.

    N/A

16. If the project is sited within federally designated Critical Habitat (*Species at Risk Act*), provide details in the table below.

    N/A

    Detail the rationale for siting the project in an area identified as higher risk by GOA-Wildlife policy. If the proposed project will impact more than one of the identified Critical Habitats, provide the details for each species Critical Habitat that will be impacted separately.

    N/A

17. If the project is sited within 100 m of a valley or coulee break, provide the details in the table below.

    N/A

Detail the rationale for siting the project in an area identified as higher risk by GOA-Wildlife policy and any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

N/A

Lakes, Wetlands and Watercourses

18. Provide details of the methods used to identify and classify wetlands. Note the term wetland is inclusive of natural wetlands, wetlands that have been altered by humans and/or man-made wetlands (i.e., dugout). Is the project sited within 100 m of any wetland class (bog, fen, marsh, shallow open water, swamp), other than those wetland classes with water permanence listed as temporary in the Alberta Wetland Classification System? If the project is sited within a wetland setback, provide a summary of the details (location, type of infrastructure, and amount of area impacted) and rationale for the siting decision in a table with the following headings.

Potential wetlands, waterbodies, and watercourses occurring in the Project study area were identified and preliminarily classified through the use of current and historic satellite imagery, as well as geospatial datasets characterizing hydrology in the area. A subsequent field assessment for the Project was conducted on July 6th, 2023, to delineate and field verify any wetlands, waterbodies, and watercourses occurring in this portion of the proposed Project area and to verify the boundaries of these wetland areas. Expected wetland boundaries (from the satellite imagery review) were verified at the site based on the presence of wetland attributes including the presence of hydrophytic plants and/or soil conditions exhibiting evidence of prolonged saturation (gleying, mottling, iron and manganese concretions etc. within 30 cm of the soil surface). Soil inspections were conducted at an approximate interval of 50-100 m along the expected wetland boundary. The boundary of identified wetlands was considered the interface between upland and wetland soils. The field delineated wetland boundaries were recorded using a hand-held Global Positioning System (GPS) unit. Field verification and delineation of wetlands were further confirmed with the use of a drone, used to provide high-resolutions photos and videos of site characteristics to aid in precise mapping of the Project.

Classification of wetlands at the Project followed the Alberta Wetland Classification System (ESRD 2015) and included an evaluation of biophysical conditions at the site to determine the type of wetland that best represents on site conditions. The classification included an evaluation of soil conditions, dominant wetland vegetation species/communities, and a determination of water permanency. Additional wetland information relative to the requirements of the Government of Alberta - Alberta Wetland Rapid Evaluation Tool Actual (ABWRET-A) (2015b) was also collected for each wetland identified during the assessment for the purpose of potential regulatory applications (if applicable).

Table 4. Table of Wetlands for which GOA-Wildlife Setbacks are Infringed

Wetland Name/ID number	Wetland Class	Proposed infrastructure type within setback	Proximity of infrastructure to the nearest edge of the wetland (m)	Rationale/justification for siting decision
Wetland 1	Temporary Graminoid Marsh [M-G-II]	Access Road	0	Access road, fence, solar modules, and inverters within wetland boundary. No unique wildlife features identified. WAIF application will be submitted.
		Fence	0	
		Solar Modules	0	
		Inverters	0	
Wetland 2	Seasonal Shrubby Swamp [S-S-III]	Fence	13	Solar modules within wetland boundary. No unique wildlife features identified. WAIF application will be submitted.
		Solar Modules	0	
		XMR	97	
Wetland 3a	Semi-permanent Shallow Open Water, Aquatic Vegetation [W-A-IV]	Fence	17	Wetland is located outside the fence line of Project but fenceline within 100 metres. No unique wildlife features identified. WAIF application will be submitted.
		Solar Modules	60	
Wetland 3b	Semi-permanent Shallow Open Water, Aquatic Vegetation [W-A-IV]	Fence	0	Fence runs through wetland. No unique wildlife features identified.
		Solar Modules	7.5	
Wetland 3c	Seasonal Shrubby Swamp [S-S-III]	Fence	0	Fence and solar modules withing wetland boundary. No unique wildlife features identified. WAIF application will be submitted.
		Solar Modules	0	
Wetland 3d		Fence	0	

Wetland Name/ID number	Wetland Class	Proposed infrastructure type within setback	Proximity of infrastructure to the nearest edge of the wetland (m)	Rationale/justification for siting decision
	Temporary Graminoid Marsh [M-G-II]	Solar Modules	0	Fence and solar modules withing wetland boundary. No unique wildlife features identified. WAIF application will be submitted.
Wetland 3e	Seasonal Graminoid Marsh [M-G-III]	Access Roads	40	Fence and solar modules within wetland boundary. No unique wildlife features identified. Wetland is open grassland area previously disturbed by farming / grazing. WAIF application will be submitted.
		Fence	0	
		Solar Modules	0	
		Inverters	35	
		XMR	29	
		MV Cable	32	
		BESS Area	72	
Wetland 3f	Permanent Shallow Open Water, Aquatic Vegetation [W-A-V]	Fence	75	Solar modules within wetland boundary. No unique wildlife features identified. Wetland is open grassland area previously disturbed by farming / grazing. WAIF application will be submitted.
		Solar Modules	0	
		Inverters	96	
		XMR	85	
		MV Cable	90	
Wetland 4a	Seasonal Shrubby Swamp [S-S-III]	Fence	53	Wetland is located outside the fence line of Project but happens to be within the recommended setback. Forested lands around wetland expected to continue to act as a buffer and maintain hydrology and wetland habitat.
		Solar Modules	90	

Wetland Name/ID number	Wetland Class	Proposed infrastructure type within setback	Proximity of infrastructure to the nearest edge of the wetland (m)	Rationale/justification for siting decision
Wetland 4b	Seasonal Shrubby Swamp [S-S-III]	Fence	75	Wetland is located outside the fence line of Project but happens to be within the recommended setback. Forested lands around wetland expected to continue to act as a buffer and maintain hydrology and wetland habitat.
		Solar Modules	81	
Wetland 5	Seasonal Shrubby Swamp [S-S-III]	Access Road	0	Fence and solar modules within wetland boundary. No unique wildlife features identified. Wetland is open grassland area previously disturbed by farming / grazing. WAIF application will be submitted.
		Fence	0	
		Solar Modules	0	
		Inverters	0	
		Control House	0	
		XMR	7	
		MV Cable	0	
		BESS Area	0	
Wetland 6	Seasonal Shrubby Swamp [S-S-III]	Fence	0	Fence and solar modules within wetland boundary. No unique wildlife features identified. WAIF application will be submitted.

*Excludes ephemeral waterbodies (Class I).
**Excludes wetlands greater than 100 m from infrastructure.

Provide details of construction and operational mitigation the proponent will implement to meet the intent of the Directive.

Development is planned to occur within the required 100 m setback of 10 wetlands as follows: 6 seasonal shrubby swamp [S-S-III] wetlands, 1 seasonal graminoid marsh [M-G-III] wetlands, 2 semi-permanent wetlands (Wetlands 3a, and 3b), and 1 permanent wetland (Wetland 3f).

Nine wetlands (Wetlands 1, 2, 3b, 3c, 3d, 3e, 3f, 5, and 6) will be directly disturbed by project activities and infrastructure, and therefore additional mitigation is recommended. Direct disturbance, either temporary or permanent, of Class II wetlands or higher will require applications in the form of WAIF applications under the Alberta *Water Act*.

Two wetlands classified as temporary marsh wetlands (i.e., Class II) are within 100 m of the Project boundary or will be directly disturbed by Project activities. One ephemeral waterbody will also be adjacent to or directly impacted by Project activities. The disturbance of temporary marsh wetlands and ephemeral waterbodies will trigger the need for application under the Alberta *Water Act*.

In order to construct fencing through wetlands, installation will occur when conditions are suitable. If equipment used for pole and fence installation may result in rutting or affects to soils, then temporary matting may be used across wetlands during fence installation. Following fence installation, all temporary matting will be removed.

During construction, sedimentation and the deposition of deleterious substances present the greatest risk to water quality degradation in the Project area. Temporary erosion and sediment control measures, such as silt fencing, will therefore be installed to control potential silt and other debris from entering seasonal marsh, semi-permanent marsh/open water, and permanent open water wetlands during construction.

Although 100 m setbacks are not maintained to wetlands, the remaining area between the infrastructure and the wetlands are existing either treed vegetated buffers or existing vegetation being maintained between the Project infrastructure and associated wetlands to the extent feasible, aiding in the protection of these features from the deposition of deleterious substances, as well as maintaining existing habitat.

A Stormwater Management Plan will be developed to adequately manage surface water runoff associated with the SSP, in order to ensure that existing hydrologic patterns are not compromised. Post-construction drainage patterns will match those observed pre-construction where feasible to minimize the alteration of downstream flows.

See Map 5 and Map 6 for details on infringements and identified wetlands.

19. Is the project sited within 1000 m of a named lake or waterbody? If the project is sited within a waterbody setback, provide the details of the project infrastructure (location, type of infrastructure, and amount of area impacted) within the setback and the rationale for siting the project in an area identified as higher risk by GOA-Wildlife policy. Provide details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

    No.

20. Amphibian Surveys: Were amphibian surveys completed? If no, continue to question 22.

    No. All proposed Project infrastructure is outside of sensitive amphibian range; therefore, no amphibian surveys were conducted.

    a. Provide details of the amphibian surveys completed including if the established survey protocols within the EPA-WM Sensitive Species Inventory Guidelines were followed, search area, survey

duration, time of day, how survey points were chosen, and the number of visits to each survey point.

N/A

b. Provide the survey dates.

N/A

c. Provide the number of survey points.

N/A

d. The location of survey points must be provided in a map (refer to the Maps and Figures section below); provide the name of this map.

N/A

e. Provide weather conditions during each survey in a table with the following headings.

N/A

f. Provide details of the survey conditions (recent rainfall amount and temperature) and confirm if the conditions met the required conditions for Great Plains Toad and Plains Spadefoot surveys, as per the EPA-WM Sensitive Species Inventory Guidelines.

N/A

g. Provide the total survey time (time spent actively conducting survey).

N/A

h. Results: Were amphibians found?

N/A

i. If a required setback is not being met, provide the details of the project disturbance (location, type of infrastructure, and amount of area impacted), rationale for siting decision and any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive. Note as there is a direct link between question 20 and question 21, include alternative mitigations for sensitive amphibians in the Proponent's response to question 20.

N/A

j. Discussion of results. Provide additional information such as habitat characteristics that support or inhibit amphibian presence and any amphibian observations that were not associated with wetlands.

N/A

21. Provide details in the table below for any project infrastructure sited within:

    a. 45 metres from the top of the break of intermittent watercourses or springs

    N/A

    b. 45 metres from the top of the break of small permanent watercourses

    N/A

    c. 100 metres from the top of the break of large permanent watercourses

    N/A

    Detail the rationale for siting the project in an area deemed higher risk by GOA-Wildlife policy. Provide details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

    N/A

Pre-Assessment Wildlife Surveys

22. Were all wildlife surveys completed by an experienced wildlife biologist as defined by the Directive?

    Yes.

Table 5. Sunnyacres Solar Project Surveyors

Name	Credentials	Experience	Surveys Completed
Michelle Fournier	B.Sc., P. Biol	9 years	Spring and Fall Migration, Breeding Bird, Raptor Surveys
Tara Evenson	B.Sc., P. Biol	7 years	Spring and Fall Migration Surveys
Emmett Ganser	B.Sc., P. Ag.	18 years	Wetland Delineation, Land Use
Robert McCallum	B.Sc., P.Biol	26 years	Land Use

23. Provide all Research and Collection license numbers that apply to this project.

    No permits apply to this project as no intrusive surveys were conducted.

24. Has all pre-assessment wildlife survey data been submitted to GOA-Wildlife in a FWMIS load form? Provide the date(s) of FWMIS Submission to GOA-Wildlife.

Yes. Data has been submitted along with this report.

Spring and Fall Bird Migration Surveys

25. For spring and fall bird migration surveys:

a. Provide details of survey protocols including the search area, the survey duration, how survey points were chosen, and the number of visits to each survey point. In addition, describe what was considered an incidental observation and if these observations were recorded and reported. Clearly state adherence to existing Environment and Protected Areas survey protocols. If alternative survey methods were used provide details of the survey methods with justification and rational for using alternative methods.

The migration surveys were designed to assess spring bird use within proximity to the SSP study area. The primary objective was to identify areas of high flight activity or staging activity, as well as to quantify flight paths in relation to the Project. Surveys followed the Government of Alberta's Bird Migration Survey Protocol (2020).

Five (5) rounds of surveys were conducted (5 – 11 days apart) for the spring migratory period to ensure the various stages of migration (i.e., early, mid, late) were documented. Three (3) pre-determined survey locations were plotted in the Project study area. Survey point locations were chosen to provide appropriate coverage of the Project and surrounding area. Survey points consisted of three distance classes (0 – 200 m; 200 – 500 m; beyond 500 m) where all individuals detected (visual and auditory) within the distance class and indefinite column of airspace above the point were counted. The information collected included: weather conditions (temperature, wind speed, direction, cloud cover, precipitation), date, time of day, species, number of individuals observed, number of flocks observed, distance category from survey point center (first observed and closest distance), whether the observation was within the Project boundary, direction from survey point center, direction of travel, and activity (staging, flying, etc.).

Each location was surveyed twice during each visit, once in the morning (between the period of sunrise and 3-4 hours after sunrise) for 20 minutes, and once in the afternoon/evening (3-4 hours before sunset) for 20 minutes to allow surveyors to capture both nocturnal migrants, diurnal migrants, and to document waterfowl during 'foraging flights'. This resulted in approximately 3.3 hours of survey time per location over the course of the migration surveys. The order of survey points was changed for each survey round to ensure that an unbiased representation of migration activity within the study area was documented. Observations of flocks of staging or migrating birds that were outside of the dedicated survey time were recorded as incidentals. Stopover counts were also conducted to identify locations of preferred migratory bird habitats not accounted for in the point count surveys. One stopover count location was

assessed for the SSP – once each round for five minutes – based on habitat suitability and the size of the assessment area.

In instances where the ability to accurately count individual birds became unfeasible, the block counting method was used. This method consists of blocking off a group of individuals, counting them, and then extrapolating the results to the entire flock to estimate the number of individuals. For example, in a flock of several thousand geese, the assessor would count by the lowest common denominator (often 10 or 50) to determine a "block". The size and shape of the "block" was then extrapolated to the remainder of the group to estimate the total number of birds. This is the method typically used to provide a conservative estimate when counting large flocks of birds.

b. Provide the survey dates.

- April 18th, 2023
- April 28th, 2023
- May 8th, 2023
- May 19th, 2023
- May 23rd/24th, 2023

c. Provide the time of day surveys were conducted.

Between the period of sunrise and 3-4 hours after sunrise (morning migration), and 3-4 hours before sunset (afternoon/evening migration).

d. Provide the number of survey points.

Three point count locations and one stopover point.

e. Provide the total survey time (time spent actively conducting survey).

10.4 hours (625 minutes).

f. The location of survey points must be provided in a named map (refer to the *Maps and Figures* section below).

Map 7. Sunnyacres Solar Project – Migration Survey Point Locations

g. Provide weather conditions during each survey date and time in a table with the following headings.

Table 6. Weather Conditions – Spring Migration Bird Surveys

Survey Date	Weather Conditions	Comments
April 18th, 2023	Temperature: -1°C to 0°C Wind: 15 km/hr No precipitation	morning survey
April 18th, 2023	Temperature: 12°C Wind: 12 km/hr No precipitation	afternoon/evening survey
April 28th, 2023	Temperature: 10°C to 11°C Wind: 10 to 20 km/hr No precipitation	morning survey
April 28th, 2023	Temperature: 19°C to 20°C Wind: 19 to 20 km/hr No precipitation	afternoon/evening survey
May 8th, 2023	Temperature: 9°C to 10°C Wind: 5 km/hr No precipitation	morning survey
May 8th, 2023	Temperature: 10°C to 11°C Wind: 11 km/hr No precipitation	afternoon/evening survey
May 19th, 2023	Temperature: 24°C to 25°C Wind: 14 to 18 km/hr No precipitation	morning survey
May 19th, 2023	Temperature: 16°C to 17°C Wind: 12 km/hr No precipitation	afternoon/evening survey
May 23rd, 2023	Temperature: 9°C to 11°C Wind: 7 to 8 km/hr No precipitation	afternoon/evening survey
May 24th, 2023	Temperature: 10°C to 11°C Wind: 11 km/hr No precipitation	morning survey

h. Describe the habitat type or land use within the surveyed area.

Table 7. Land Cover within the Surveyed Areas – Spring Migration

Survey Point	Land Cover	Topography
SS-S1	80% Wetland 20% Treed	Flat to gently rolling
SS-M1	70% Tame Pasture 20% Treed/Shrub 20% Wetland	Gently rolling
SS-M2	20% Cultivated 70% Tame Pasture 10% Treed	Gently rolling
SS-M3	70% Tame Pasture 20% Treed 10% Cultivated	Gently rolling

i. Results: Provide the survey results in tables using the following format. The tables must provide an understanding of the number of observations at each survey location and during each round of surveys, a list of the species observed and a summary of the observations per bird guild. Provide a brief written description of the results.

The number of avian observations, identified species, and number of individuals (abundance) was greatest in the third round of surveys (incidentals removed). Approximately 31% of individuals were recorded in round 3 (n=184), and 23 species were identified. The second round of spring migration surveys had the lowest number of individuals recorded (n=51), and the lowest number of species identified (n=12).

Migration point SS-M3, located approximately 800 m south of the Project, was observed to have the greatest number of individuals (n=213). Migration points SS-M3 and SS-M2 had the greatest species diversity, both with 28 species observed over spring migration. The lowest individual abundance of the migration points was observed at SS-M1 (located along the western boundary of the Project area) with 162 individuals observed. The stopover location, located approximately 400 m north of the Project, had the lowest number of individuals observed overall (n=26), and eight species recorded during spring migration.

Table 8. Observations by Survey Location and Round: Number of individuals detected at each survey location (point surveys and stopover points during each survey round) during spring migration.

Survey Location	Round 1 (April 18th, 2023)	Round 2 (April 28th, 2023)	Round 3 (May 8th, 2023)	Round 4 (May 19th, 2023)	Round 5 (May 23rd/24th, 2023)	Total Number of Individuals Detected*
SS-M1	47	12	58	19	26	162
SS-M2	52	15	49	30	42	188
SS-M3	33	24	74	46	36	213
SS-S1 (Stopover)	4	0	3	8	11	26
Total	**136**	**51**	**184**	**103**	**115**	**589**

*Total number of birds includes individuals that were only able to be classified to guild.
** Total number of birds does not include incidentals (i.e., birds observed outside 500 m of the PC or survey period).

Two (2) species of management concern were observed during the spring migration period; bald eagle (*Haliaeetus leucocephalus*) and eastern kingbird (*Tyrannus tyrannus*) are both listed as 'Sensitive' under the Alberta General Status. All other species observed are listed as 'Secure', except for three species listed as 'Exotic/Alien' under the Alberta General Wildlife Status - European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and rock pigeon (*Columba livia*).

Twenty-six (26) of the 35 bird species detected (69%) are also protected under the *Migratory Birds Convention Act* [excludes raptors, corvids, Galliformes (grouse, quail, pheasants, ptarmigan), cormorants, pelicans, and kingfishers]. A list of the species observed during the surveys and their provincial general status are presented in Table 9.

Table 9. Observations by Species (Spring Migration)

Species	Provincial General Status*	Number of Individuals**	Number of Flocks (>2 birds of the same species)	# of individuals observed within 0-200m	# of individuals observed within 200-500m	# of individuals observed greater than 500 m
American Crow	Secure	14	0	6	5	0
American Goldfinch	Secure	3	0	3	0	0
American Robin	Secure	40	3	40	0	0
Bald Eagle	**Sensitive**	1	0	0	1	0
Black-billed Magpie	Secure	22	1	22	0	0

Species	Provincial General Status*	Number of Individuals**	Number of Flocks (>2 birds of the same species)	# of individuals observed within 0-200m	# of individuals observed within 200-500m	# of individuals observed greater than 500 m
Black-capped Chickadee	Secure	8	1	8	0	0
Brewer's Blackbird	Secure	2	0	2	0	0
Brown-headed Cowbird	Secure	9	2	9	0	0
Canada Goose	Secure	70	9	43	24	0
Chipping Sparrow	Secure	6	0	6	0	0
Clay-colored Sparrow	Secure	23	2	22	0	0
Dark-eyed Junco	Secure	4	0	4	0	0
Eastern Kingbird	**Sensitive**	3	0	3	0	0
European Starling	Exotic/Alien	22	2	22	0	0
Franklin's Gull	Secure	4	1	4	0	0
House Sparrow	Exotic/Alien	10	1	10	0	0
House Wren	Secure	7	0	6	0	0
Killdeer	Secure	6	0	6	0	0
Le Conte's Sparrow	Secure	4	0	4	0	0
Mallard	Secure	17	3	17	0	0
Merlin	Secure	1	0	1	0	0
Mountain Bluebird	Secure	2	0	2	0	0
Northern Flicker	Secure	9	0	8	1	0
Purple Finch	Secure	1	0	1	0	0
Red-winged Blackbird	Secure	125	9	111	8	0
Ring-billed Gull	Secure	49	5	49	0	0
Rock Pigeon	Exotic/Alien	12	2	12	0	0
Savannah Sparrow	Secure	20	1	16	0	0
Song Sparrow	Secure	7	0	7	0	0
Tree Swallow	Secure	52	3	42	0	0
Vesper Sparrow	Secure	18	0	12	0	0

Species	Provincial General Status*	Number of Individuals**	Number of Flocks (>2 birds of the same species)	# of individuals observed within 0-200m	# of individuals observed within 200-500m	# of individuals observed greater than 500 m
White-throated Sparrow	Secure	4	0	4	0	0
Wilson's Snipe	Secure	2	0	2	0	0
Yellow Warbler	Secure	7	0	7	0	0
Yellow-rumped Warbler	Secure	2	0	2	0	0
Mammals						
Coyote	Secure	4	N/A	-	-	-

* Provincial status is based on the most recent status report (2015)

**Incidental observations in brackets

The 'Passerines' guild accounted for the greatest proportion of species observed, with 24 different species accounting for approximately 69% of all species detected. The most abundant passerine species detected was red-winged blackbird *(Agelaius phoeniceus)*, of which 125 individuals were observed. Tree swallow (*Tachycineta bicolor*) was the next most observed species from this guild (n=52). The Passerine guild also had the greatest number of flocks, with 24 observed (Table 10). The majority of passerines (n=163) were observed at SS-M3, and the majority of passerine observations were recorded within 0-200 m of the survey points (n=275). One species of management concern was recorded from this guild, eastern kingbird (n=3).

The 'Waterfowl' guild had the second highest number of individuals recorded (n=89), but only two species were observed during spring migration surveys. The most abundant waterfowl species observed was the Canada goose (*Branta canadensis*), of which 70 individuals were observed, followed by mallard (*Anas platyrhynchos*) (n=17) (Table 9). The majority of all waterfowl observations were recorded 0-200 m from the survey point. The Waterfowl guild also had the second greatest number of flocks, with 12 flocks observed (Table 10). Approximately 46% of waterfowl observations (n=41) were recorded at SS-M1.

The 'Shorebirds/Waterbirds' guild accounted for the second highest proportion of species observed, with four different species recorded, accounting for approximately 11% of all species detected. The most abundant shorebird/waterbird species detected was the ring-billed gull *(Larus delawarensis)*, of which 49 individuals were observed. Approximately 36% of observations from this guild were recorded at SS-M1, and approximately 34% were recorded at SS=M2 (n=21).

Three (3) species from the 'Others' guild were recorded during spring migration, accounting for approximately 9% of all species observations, and totaling 48 individuals. The most prevalent species observed was black-billed magpie (*Pica hudsonia*) (n=22), followed by rock pigeon with

12 individuals recorded. Approximately 56% of observations were recorded at migration point SS-M2, and the majority were recorded within 200 m of the survey points (n=33).

The 'Raptors' guild also had the lowest number of species recorded during spring migration (n=2) and the lowest number of individuals recorded (n=3). The two species observed in this guild were the bald eagle (n=1) and merlin (*Falco columbarius*) (n=1). One additional raptor individual was recorded that could not be identified to species. Bald eagle is currently listed as 'Sensitive' in Alberta.

No observations from the 'Obligate Waterbirds' or 'Grouse and allies' guilds were observed during spring migration surveys.

Table 10. Bird Guild Summary (Spring Migration)

Bird Guild	Number of Individuals	Number of Flocks	# of individuals observed within 0-200m	# of individuals observed within 200-500m	# of individuals observed greater than 500 m
Waterfowl	89	12	36	27	26
Passerines	388	24	275	102	11
Others	48	3	33	10	5
Shorebirds/Waterbirds	61	6	28	33	0
Raptors	3	0	1	0	2
Grouse	0	0	0	0	0
Obligate Waterbirds	0	0	0	0	0

*Number of individuals observed during designated survey period (point counts and stopover).

j. Provide the total number of individuals observed during the surveys.

a. Point Count

563 individuals were observed at the dedicated point count survey points during the dedicated survey time (incidentals removed).

b. Stopover count

26 individuals were observed at the stopover during the dedicated survey time (incidentals removed).

c. Combined

589 individuals were observed at both the dedicated point count locations and the stopover count location during the dedicated survey time (incidentals removed).

k. Provide the number of species observed.
   a. Point count

34 species were observed at the dedicated point count survey locations during the dedicated survey time (incidentals removed).

   b. Stopover count

8 species were observed at the stopover location during the dedicated survey time (incidentals removed).

   c. Combined

35 distinct species were observed between the dedicated point count locations and the stopover count location during the dedicated survey time (incidentals removed).

l. Provide the number of bird observations per minute of survey time.

Based on 589 individuals observed and 625 minutes of dedicated survey time, 0.94 birds per minute were documented during spring migration surveys.

m. Discussion of results–Provide additional information such as the spatial or temporal trends of bird observations. Other relevant information may include average flight height, notes on behaviour (long distance flight, short distance flights between local features or foraging in area), if there were certain survey points with more bird activity than others or habitat features that may have attracted (or reduced) activity and a summary of incidental observations including total numbers and species.

Of the 35 avian species observed during spring migration surveys, two species are listed as 'Sensitive' in Alberta – bald eagle and eastern kingbird. Overall, migration point SS-M3, located approximately 800 m south of the Project, was observed to have the greatest number of individuals (n=213). No obvious temporal trends were observed throughout the migration survey rounds in terms of number of individuals or species observed. The majority of individuals were recorded in long-distance flight (approximately 62%), compared to the remaining observations staging in fields, perched in trees, foraging or local movements.

All observations were recorded during dedicated survey times and within the survey buffer, therefore no incidental observations were observed during spring migration surveys.

There is an auditory wildlife deterrent system being utilized at the refinery settling ponds located approximately 1,200 metres west of the SSP. The deterrent system was very distinct and audible throughout spring migration surveys and is anticipated to have some influence on local wildlife use of the study area.

Non-avian species were incidentally recorded during the survey rounds, including four coyote (*Canis latrans*) observations.

Fall Migration Bird Surveys

a. Provide details of survey protocols including the search area, the survey duration, how survey points were chosen, and the number of visits to each survey point. In addition, describe what was considered an incidental observation and if these observations were recorded and reported. Clearly state adherence to existing AEP survey protocols. If alternative survey methods were used provide details of the survey methods with justification and rational for using alternative methods.

The migration surveys were designed to assess fall bird use within proximity to the Sunnyacres Solar Project study area. The primary objective was to identify areas of high flight activity or staging activity, as well as to quantify flight paths in relation to the Project. Surveys followed the Government of Alberta's Bird Migration Survey Protocol (2020).

Five (5) rounds of surveys were conducted (10 – 15 days apart) for the fall migratory period to ensure the various stages of migration (i.e., early, mid, late) were documented. Three (3) pre-determined survey locations were plotted in the Project study area. Survey point locations were chosen to provide appropriate coverage of the Project and surrounding area. Survey points consisted of three distance classes (0-200 m; 200 – 500 m; beyond 500 m) where all individuals detected (visual and auditory) within the distance class and indefinite column of airspace above the point were counted. The information collected included: weather conditions (temperature, wind speed, direction, cloud cover, precipitation), date, time of day, species, number of individuals observed, number of flocks observed, distance category from survey point center (first observed and closest distance), whether the observation was within the Project boundary, direction from survey point center, direction of travel, and activity (staging, flying, etc.). Each location was surveyed twice during each visit, once in the morning (between the period of sunrise and 3-4 hours after sunrise) for 20 minutes, and once in the afternoon/evening (3-4 hours before sunset) for 20 minutes to allow surveyors to capture both nocturnal migrants, diurnal migrants, and to document waterfowl during 'foraging flights'. This resulted in approximately 3.3 hours of survey time per location over the course of the migration surveys. The order of survey points was changed for each survey round to ensure that an unbiased representation of migration activity within the study area was documented. Observations of flocks of staging or migrating birds that were outside of the dedicated survey time were recorded as incidentals. Stopover counts were also conducted to identify locations of preferred migratory bird habitats not accounted for in the point count surveys. One stopover count location was assessed for the SSP – once each round for five minutes – based on habitat suitability and the size of the assessment area.

In instances where the ability to accurately count individual birds became unfeasible, the block counting method was used. This method consists of blocking off a group of individuals, counting them, and then extrapolating the results to the entire flock to estimate the number of individuals. For example, in a flock of several thousand geese, the assessor would count by the lowest common

denominator (often 10 or 50) to determine a "block". The size and shape of the "block" was then extrapolated to the remainder of the group to estimate the total number of birds. This is the method typically used to provide a conservative estimate when counting large flocks of birds.

b. Provide the survey dates.

- August 2nd/3rd, 2023
- August 15th/16th, 2023
- August 28th/29th, 2023
- September 7th, 2023
- September 22nd, 2023

c. Provide the time of day surveys were conducted.

Between the period of sunrise and 3-4 hours after sunrise (morning migration) and 3-4 hours before sunset (afternoon/evening migration).

d. Provide the number of survey points.

Three point count locations and one stopover points.

e. Provide the total survey time (time spent actively conducting survey).

10.4 hours (625 minutes).

f. The location of survey points must be provided in a named map (refer to the *Maps and Figures* section below).

Map 7. Sunnyacres Solar Project – Migration Survey Point Locations

g. Provide weather conditions during each survey date and time in a table with the following headings.

Table 11. Weather Conditions – Fall Migration Bird Surveys

Survey Date	Weather Conditions	Comments
August 2nd, 2023	Temperature: 22°C to 24°C Wind: 18-19 km/hr No precipitation	Afternoon/evening survey
August 3rd, 2023	Temperature: 14°C to 16°C Wind: 5-6 km/hr No precipitation	Morning survey

Survey Date	Weather Conditions	Comments
August 15th, 2023	Temperature: 21°C to 23°C Wind: 13 km/hr Light precipitation	Afternoon/evening survey
August 16th, 2023	Temperature: 14°C to 17°C Wind: 11 km/hr o precipitation	Morning survey
August 28th, 2023	Temperature: 29°C to 31°C Wind: 3-6 km/hr No precipitation	Afternoon/evening survey
August 29th, 2023	Temperature: 16°C to 19°C Wind: 6 km/hr No precipitation	Morning survey
September 7th, 2023	Temperature: 13°C to 14°C Wind: 5 km/hr No precipitation	Morning survey
September 7th, 2023	Temperature: 13°C to 14°C Wind: 5 km/hr No precipitation	Afternoon/evening survey
September 22nd, 2023	Temperature: 5°C to 11°C Wind: 5 km/hr No precipitation	Morning survey
September 22nd, 2023	Temperature: 15°C to 17°C Wind: 0-5 km/hr No precipitation	Afternoon/evening survey

h. Describe the habitat type or land use within the surveyed area.

Table 12. Land Cover within the Surveyed Areas – Fall Migration

Survey Point	Land Cover*	Topography
SS-S1	80% Wetland 20% Treed	Flat to gently rolling
SS-M1	70% Tame Pasture 20% Treed/Shrub 20% Wetland	Gently rolling
SS-M2	20% Cultivated 70% Tame Pasture 10% Treed	Gently rolling

Survey Point	Land Cover*	Topography
SS-M3	70% Tame Pasture 20% Treed 10% Cultivated	Gently rolling

i. Results: Provide the survey results in tables using the following format. The tables must provide an understanding of the number of observations at each survey location and during each round of surveys, a list of the species observed and a summary of the observations per bird guild. Provide a brief written description of the results.

The number of avian observations identified species, and number of individuals (abundance) varied between the first and fifth round of surveys. Round 4 had the greatest number of identified individuals, approximately 25% (n=72), while the final round of fall migration surveys had the lowest number of identified individuals, approximately 13% (n=38). Round 1 had the greatest number of identified species (n=17), while rounds 3 and 4 had the lowest species diversity with eight species recorded each round.

SS-M3 was observed to have the overall greatest number of individuals (n=112). Migration point SS-M2 had the lowest number of individuals observed (n=69), while the stopover point SS-S1 had the lowest overall number of individuals observed (n=3). Species diversity across the migration points were similar; SS-M1 and SS-M3 both had 17 species recorded, while SS-M2 had 16 species recorded, and the stopover point SS-S1 had just one species recorded – European starling.

Table 13. Observations by Survey Location and Round: Number of individuals detected at each survey location (point surveys and stop over points during each survey round) during fall migration.

Survey Location	Round 1 (August 2-3, 2023)	Round 2 (August 15-16, 2023)	Round 3 (August 28-29, 2023)	Round 4 (September 7, 2023)	Round 5 (September 22, 2023)	Total Number of Individuals Detected*
SS-M1	30	26	13	20	11	100
SS-M2	12	12	11	23	11	69
SS-M3	29	26	15	29	13	112
SS-S1 (Stopover)	0	0	0	0	3	3
Total	**71**	**64**	**39**	**72**	**38**	**284**

*Total number of birds includes individuals that were only able to be classified to guild.
** Total number of birds does not include incidentals (i.e., birds observed outside 500 m of the PC or survey period).

Three (3) avian species of management concern were observed during the fall migration period: alder flycatcher (*Empidonax alnorum*), eastern kingbird, and sandhill crane (*Grus canadensis*). All three species are provincially listed as 'Sensitive' under the Alberta General Status of Wild Species.

Eighteen (18) of the 27 bird species detected (67%), incidentals included, are also protected under the *Migratory Birds Convention Act* [excludes raptors, corvids, Galliformes (grouse, quail, pheasants, ptarmigan), cormorants, pelicans, and kingfishers]. A list of the species observed during the surveys and their provincial general status are presented in Table 14.

Table 14. Observations by Species (fall migration)

Species	Provincial General Status	Number of Individuals	Number of Flocks (>2 birds of the same species)	# of individuals observed within 0-200m	# of individuals observed within 200-500m	# of individuals observed greater than 500 m
Alder Flycatcher	**Sensitive**	**2**	**0**	**2**	**0**	**0**
American Crow	Secure	14	0	13	1	0
American Goldfinch	Secure	6	0	6	0	0
American Robin	Secure	10	0	10	0	0
Black-billed Magpie	Secure	27	0	27	0	0
Black-capped Chickadee	Secure	6	0	6	0	0
Brewer's Blackbird	Secure	3	1	3	0	0
Canada Goose	Secure	45	4	26	19	0
Cedar Waxwing	Secure	16	2	16	0	0
Chipping Sparrow	Secure	9	1	9	0	0
Common Raven	Secure	1	0	0	1	0
Eastern Kingbird	**Sensitive**	**17**	**0**	**17**	**0**	**0**
European Starling	Exotic/Alien	41	7	41	0	0
Mourning Dove	Secure	8	2	8	0	0
Northern Flicker	Secure	6	0	6	0	0
Pine Siskin	Secure	3	1	3	0	0
Red-eyed Vireo	Secure	2	0	2	0	0
Rock Pigeon	Exotic/Alien	2	0	2	0	0
Red-tailed Hawk	Secure	1	0	1	0	0
Ruffed Grouse	Secure	1	0	1	0	0
Red-winged Blackbird	Secure	4	1	4	0	0
Sandhill Crane	**Sensitive**	**14**	**2**	**0**	**0**	**14**
Song Sparrow	Secure	2	0	2	0	0
Savannah Sparrow	Secure	10	1	10	0	0
Tree Swallow	Secure	9	3	12	0	0

Species	Provincial General Status	Number of Individuals	Number of Flocks (>2 birds of the same species)	# of individuals observed within 0-200m	# of individuals observed within 200-500m	# of individuals observed greater than 500 m
Vesper Sparrow	Secure	4	0	4	0	0
Yellow Warbler	Secure	1	0	1	0	0
Mammals						
Coyote	Secure	1	N/A	-	-	-

*Incidental observations in brackets

The 'Passerines' guild had both the greatest number of species and individual abundance during fall migration surveys; 18 species were detected at the migration survey points (67% of all species observations) and 171 individuals were recorded. European starling was the most abundant passerine species recorded (n=41) and were observed at all point count locations, and the only species observed at the stopover location. Eastern kingbird was the second most abundant passerine species (n=17) observed during the fall migration surveys. The Passerine guild had the highest number of flocks observed (n=20) with European starlings accounting for the greatest number of flocks within the guild (n=7). The majority of passerine observations were made at migration points SS-M1 (n=76) and SS-M3 (n=58). The majority of passerines (98%) were recorded within 200 m of the survey points.

The 'Others' species guild had the second greatest abundance, with 52 individuals recorded. This guild also had the second greatest species diversity, with five species recorded. Black-billed magpie was the most abundant other species (n=27) recorded at all migration point locations. The species observed in the second greatest abundance within this guild was the American crow with (n=14).

The 'Waterfowl' guild had the third greatest individual abundance of all the guilds, with 45 individuals observed. Canada goose was the only species recorded within this guild. The majority of Canada goose observations (80%) were recorded at migration point SS-M3 (n=36), with the remainder of observations being made at SS-M1. The majority of observations from the waterfowl guild were recorded within 200 m of the migration survey points (approximately 58%).

Fourteen (14) individuals were recorded from the 'Shorebirds/Waterbirds' guild, accounting for approximately 5% of observations. Sandhill crane was the only species recorded within this guild; individuals were observed from migration points SS-M1 and SS-M2, at distances greater than 800 m and migrating overhead.

One (1) species from the 'Raptors' guild was observed during the migration surveys – red-tailed hawk (*Buteo jamaicensis*) (n=1). This observation was recorded at migration point SS-M3 during round 2 of fall migration.

One (1) species from the 'Grouse and allies' guild was observed during the final round of migration surveys from migration point SS-M1; one ruffed grouse (*Bonasa umbellus*) was recorded that flushed from the ditch.

No species were observed from the 'Obligate Waterbirds' guild during fall migration surveys.

Table 15. Bird Guild Summary (Fall Migration)

Bird Guild	Number of Individuals	Number of Flocks	# of individuals observed within 0-200m	# of individuals observed within 200-500m	# of individuals observed greater than 500 m
Waterfowl	45	4	0	26	19
Passerines	171	20	165	4	2
Others	52	2	46	3	3
Shorebirds/Waterbirds	14	2	0	0	14
Grouse	1	0	1	0	0
Raptors	1	0	1	0	0
Obligate Waterbirds	0	0	0	0	0

*Number of individuals observed during designated survey period.
*Incidental observations in brackets

j. Provide the total number of individuals observed during the surveys.
   a. Point Count

281 individuals were observed at the dedicated point count survey points during the dedicated survey time (incidentals removed).

   b. Stopover count

3 individuals were observed at the dedicated survey points during the dedicated survey time (incidentals removed).

   c. Combined

284 individuals were observed at both the dedicated point count locations and the stopover count location during the dedicated survey time (incidentals removed).

k. Provide the number of species observed.
   a. Point count

27 species were observed at the dedicated point count survey points during the dedicated survey time (incidentals removed).

b. Stopover count

1 species were observed at the dedicated stopover count survey points during the dedicated survey time (incidentals removed).

c. Combined

27 distinct species were observed between the dedicated point count locations and the stopover count locations during the dedicated survey time (incidentals removed).

l. Provide the number of bird observations per minute of survey time.

Based on 284 individuals observed and approximately 625 minutes of dedicated survey time, 0.45 birds per minute were documented during fall migration surveys.

m. Discussion of results–Provide additional information such as the spatial or temporal trends of bird observations. Other relevant information may include average flight height, notes on behaviour (long distance flight, short distance flights between local features or foraging in area), if there were certain survey points with more bird activity than others or habitat features that may have attracted (or reduced) activity and a summary of incidental observations including total numbers and species.

Three (3) avian species of management concern were observed during the fall migration period; all of these species are designated as 'Sensitive' in Alberta, and observations were recorded at all points, except the stopover point.

Overall, SS-M3 (located approximately 800 m south of the Project) had the greatest number of individuals (n=112), followed by SS-M1 (located at the Project) (n=100). Species diversity across the migration points were similar; SS-M1 and SS-M3 both had 17 species recorded, while SS-M2 had 16 species recorded, and the stopover point SS-S1 had just one species recorded. Migration point SS-M2 had the lowest individual abundance (n=69), while the stopover point had the lowest overall abundance (n=3). Overall, individual observations decreased from the first round of fall migration surveys (n=71) to the final round of surveys (n=38). The majority of individuals were recorded in long-distance flight (approximately 71%), compared to the remaining observations (approximately 29%) recorded locally perched on fenceposts, in trees, or on the ground.

All observations were recorded during dedicated survey times and within the survey buffer, therefore no incidental observations were observed during fall migration surveys.

The auditory wildlife deterrent system being utilized at the nearby refinery settling ponds was again very distinct and audible throughout fall migration surveys and is anticipated to have some influence on local wildlife use of the study area.

Non-avian species were incidentally recorded during the survey rounds, including one coyote (*Canis latrans*) observation.

Breeding Bird Surveys

26. For breeding bird surveys:

a. Were the established survey protocols within the GOA-Wildlife Sensitive Species Inventory Guidelines followed? Provide details of the survey protocol including the search area, the survey duration, how survey points were chosen, and the number of visits to each survey point. In addition, describe what was considered an incidental observation and if these observations were recorded and reported.

Breeding bird surveys were conducted in accordance with the Sensitive Species Inventory Guidelines (2013). Two (2) breeding bird survey (BBS) rounds were completed in the spring/summer of 2023 under survey appropriate weather conditions. Eight (8) BBS locations, spaced approximately 800 m apart, were placed throughout the proposed Project.

A ten-minute point count was conducted at each location between sunrise and 10:00 a.m., during which all bird species occurrences (visual and auditory identification) within 200 m of the surveyor's location were recorded. Incidental observations (i.e., occurrences not observed during the dedicated point count survey, or outside of the 200 m point radius) were also recorded. This included the documentation of all wildlife species (i.e., birds, mammals, amphibians, etc.) and habitat features (i.e., nests, dens, etc.). The maximum provincially or federally recommended setback distance for a species of concern feature likely to occur in the regional vicinity of the Project is 1000 m. Therefore, lands within 1000 m of the Project were searched for sensitive habitat features. Within the study area, the surveyor would search high value habitat areas (waterbodies, shrub rows, trees, grassland, etc.) by foot or vehicle, scanning these areas with binoculars and/or spotting scope. Where adjacent lands were not accessible due to land ownership, a thorough visual scan in place of ground search was conducted.

b. Provide the survey dates.

- June 12th, 2023
- July 2nd, 2023

c. Provide the time of day surveys were conducted.

Surveys were conducted between the hours of 30 minutes before sunrise and 10:00 am.

d. Provide the number of survey points

Eight (8) BBS points.

e. Provide the total survey time (time spent actively conducting survey).

160 minutes (2.67 hours).

f. Location of survey points must be provided in a reference map (refer to the *Maps and Figures* section below). Provide name of reference map.

Map 8. Sunnyacres Solar Project – Breeding Bird Survey Point Locations

g. Provide weather conditions during each survey date and time in a table with the following headings.

Table 16. Weather Conditions during Breeding Bird Surveys

Survey Date	Weather Conditions	Comments
June 12th, 2023	Temperature: 10 °C Wind: 0 km/hr Precipitation: None	None
July 2nd, 2023	Temperature: 10 °C Wind: 13 to 25 km/hr Precipitation: None	100% cloud cover

h. Provide a description of the habitat type or land use within the surveyed area.

Table 17. Land Cover within the Surveyed Area

Survey Point	Approximate Land Cover	Topography
SSBBS1	33% wetland, 33% tame pasture, 34% treed	Flat to gently rolling
SSBBS2	50% tame pasture, 25% wetland, 25% treed	Flat to gently rolling
SSBBS3	50% powerline ROW (tame pasture),	Flat to gently rolling
SSBBS4	50% powerline ROW (tame pasture), 20% reclaimed well site (tame pasture), 30% treed	Flat to gently rolling
SSBBS5	50% powerline ROW (tame pasture), 25% wetland, 25% treed	Flat to gently rolling
SSBBS6	50% wetland, 50% treed	Flat to gently rolling
SSBBS7	75% tame pasture, 25% wetland	Flat to gently rolling
SSBBS8	95% tame pasture, 5% treed	Flat to gently rolling

i. Results: Provide the survey results in tables using the following format. Provide a brief written description of the results.

A total of 312 individuals were recorded during BBS, with 40 avian species observed. One additional species was observed incidentally that was not recorded during surveys – Swainson's thrush (*Catharus ustulatus*). Round 1 of BBS had the greatest number of individual observations (n=188) in comparison to the second round of BBS (n=124). Species richness was also higher in round 1 with 36 species observed, while 22 species were observed during round 2.

The greatest individual abundance was observed at SSBBS7, located in the center-west portion of the Project and consisting mostly of tame pasture; 64 individuals were recorded during the two rounds of surveys at this point. The point with the lowest individual abundance was SSBBS3 (n=25), a point located in the southeast corner of the Project, consisting of mixedwood forest and cleared powerline ROW. Of all locations surveyed, SSBBS7 had the highest species richness, with 19 unique species identified, accounting for 48% of species observations. SSBBS4 had the lowest diversity with 9 species documented.

Table 18. Survey Location and Round Summary: number of individuals detected at each survey location during each round (Breeding Bird Surveys).

Survey Location	Round 1 June 12th/23	Round 2 July 2nd/23	Total Number of Individuals Detected
SSBBS1	26	8	34
SSBBS2	29	15	44
SSBBS3	12	13	25
SSBBS4	22	12	34
SSBBS5	29	15	44
SSBBS6	17	8	25
SSBBS7	33	31	64
SSBBS8	20	22	42
BBS Total	**188**	**124**	**312**

Forty (40) avian species were identified during BBS; four of these species are listed as 'Sensitive' in Alberta, while one is listed as 'May Be at Risk'. A complete list of species detected during BBS point counts, along with their provincial general status, can be found in Table 19 below.

The 'Passerine' guild was the most prevalent guild, accounting for approximately 85% (n=34) of the species documented. This guild also had the greatest abundance of individuals detected during BBS (n=267). Cedar waxwing (*Bombycilla cedrorum*) was the most common passerine species with 38 individuals observed. The second most prevalent guild was 'Shorebird/Waterbird', of which three species were observed, and 38 individuals were recorded. Of these, Franklin's gull (*Leucophaeus pipixcan*) was the most abundant species, with 32 individuals recorded. One 'Waterfowl' species was recorded, Canada goose (n=4), and one species from the 'Others' guild,

common raven (*Corvus corax*) (n=2). One 'Raptor' species was recorded – American kestrel (*Falco sparverius*) (n=1), which is designated as 'Sensitive' in Alberta.

Table 19. Observations by Species (Breeding Bird Surveys)

Species	Provincial General Status	Number of Individuals (Incidentals)
Alder Flycatcher	Secure	4
American Goldfinch	Secure	10
American Kestrel	**Sensitive**	1
American Robin	Secure	30
Black-and-white warbler	Secure	1
Black-capped Chickadee	Secure	2
Brown-headed Cowbird	Secure	9
Canada Goose	Secure	4
Cedar Waxwing	Secure	38
Chipping Sparrow	Secure	1
Clay-colored Sparrow	Secure	21
Common Raven	Secure	2
Common Yellowthroat	**Sensitive**	4
Dark-eyed Junco	Secure	3
Eastern Kingbird	**Sensitive**	2 (2)
European Starling	Exotic/Alien	2
Franklin's Gull	Secure	32
Hermit Thrush	Secure	1
House Wren	Secure	14
Least Flycatcher	Secure	15
Le Conte's Sparrow	Secure	2
Lincoln's Sparrow	Secure	8
Northern Flicker	Secure	3
Ovenbird	Secure	1
Philadelphia Vireo	Secure	1

Species	Provincial General Status	Number of Individuals (Incidentals)
Purple Finch	Secure	3
Red-breasted Nuthatch	Secure	1
Red-eyed Vireo	Secure	10
Red-winged Blackbird	Secure	16
Rose-breasted Grosbeak	Secure	1
Savannah Sparrow	Secure	12
Song Sparrow	Secure	5
Sora	**Sensitive**	1
(Swainson's Thrush)	(Secure)	(1)
Tree Swallow	Secure	21
Vesper Sparrow	Secure	2
Warbling Vireo	Secure	2
Western Wood-Pewee	**May Be at Risk**	4
White-throated Sparrow	Secure	6
Wilson's Snipe	Secure	5
Yellow Warbler	Secure	12

*Incidental observations in brackets

j. Provide of the total number of individuals observed during the surveys.

312 individuals were observed during BBS.

k. Provide the number of species observed.

40 species were identified during surveys (incidentals not included).

l. Provide the number of bird observations per minute of survey time.

Based on 312 individuals observed and 160 minutes of total survey time, approximately two birds were observed per minute.

m. Discussion of results–Provide additional information such as the spatial or temporal trends of bird observations. Other relevant information may include if there were certain survey points with more

bird activity than others or habitat features that may have attracted or detracted activity and a summary of incidental observations including total numbers and species.

A total of 40 distinct species and 312 individuals were identified during BBS conducted in 2023. One (1) species was only observed incidentally during BBS – Swainson's thrush (n=1). The greatest number of individuals were observed during round 1 (n=188) of BBS surveys, while round 2 had 122 individuals. Species richness was not comparable in round 1 and round 2, with 36 and 22 species observed, respectively (Table 18).

The greatest individual abundance was observed at BBS7 (n=64), located in the center-west portion of the Project and consisting of tame pasture. This survey location accounted for approximately 20% of total individual observations. BBS7 also had the greatest species richness, accounting for 47% of total species observed in the SSP (n=19). SSBBS2 and SSBBS5 had the second greatest proportion of individuals recorded (n=44). The lowest individual abundance was observed at SSBBS3 (located along the powerline ROW, with a mixture of tame pasture and treed habitat) and SSBBS6 (located in the north-center of the Project, with a mixture of treed and wetland habitat); both of these points had a total of 25 individuals recorded (n=25). SSBBS4, located along the eastern powerline ROW with a mixture of tame pasture and treed habitat, had the lowest species richness of all the survey points (n=9).

Two (2) active tree swallow nests were observed within nest boxes on the fenceline along the west side of the Project; adult pairs were observed utilizing the nest boxes during BBS. The nest boxes are located at: 12U 364345E 5968872N and 12U 364341E 5968721N.

n. If the project is sited within native habitats, such as native grassland or parkland, identify if construction activities will avoid the restricted activity period for breeding birds (April 1 to July 15)? If no, detail any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

Yes, construction activities will avoid the restricted activity period for breeding birds.

Raptor Nest Surveys

27. Raptor nest surveys must be conducted for the entire project area plus 1000 m from the edge of the project boundary. For raptor nest surveys:

a. Were the established survey protocols within the GOA-Wildlife Sensitive Species Inventory Guidelines followed? Provide details of the survey protocol including the search area, the survey duration, time of day and search method.

Raptor nest surveys were conducted as per the Sensitive Species Inventory Guidelines methodology. Targeted searches were conducted on June 12th and July 2nd, 2023, in conjunction with BBS. The surveyor conducted a meander search of the Project area and adjacent lands out to

1000 m for areas of suitable nesting habitat (e.g., trees, wetlands, anthropogenic structures), and evidence of raptors actively nesting in the area (e.g., stick nests, breeding pairs, defensive behavior). Each survey was completed over approximately a three-hour period between sunrise and sunset. Nest sites were identified using binoculars or a spotting scope, and nesting activity was confirmed by observing raptors on the nest and/or the display of defensive behavior by one or more raptors in the immediate vicinity of a suspected nesting location.

b. Provide the survey dates.

- June 12th, 2023 (survey in conjunction with BBS - round 1)
- July 2nd, 2023 (survey in conjunction with BBS - round 2)

c. Provide weather conditions during each survey in a table using the following format.

Table 20. Weather Conditions during Targeted Raptor Nest Surveys

Survey Date	Weather Conditions	Comments
June 12th, 2023	Temperature: 10 °C Wind: 0 km/hr Precipitation: None	None
July 2nd, 2023	Temperature: 10 °C Wind: 13 to 25 km/hr Precipitation: None	100% cloud cover

d. Survey Results: Were raptor nests found? If so, provide locations of all raptor nests detected in a table using the following format. Identify if the required setback is met and the distance in metres from the edge of the nest to the nearest edge of project related disturbance.

No active raptor nests were observed during raptor surveys.

e. Nest locations and associated setbacks must be provided in a named map (refer to the Maps & Figures section below).

N/A

f. If a required setback is not being met, provide the details (location, type of infrastructure, and amount of area impacted), rationale for siting decision and any proposed alternative mitigations identified. For the purpose of GOA-Wildlife review, infringement from any temporary workspace must be included.

N/A

g. Discussion of results. Provide additional information such as a description of the habitat/land use that may attract or detract raptor activity in the area and a summary of incidental observations of raptors including total numbers, behaviour and species.

No active raptor stick nests were observed within the Project boundary during the raptor nest search, or within accessible lands within 1000 m of the surrounding area. A low number (n=6) of raptors were observed throughout 2023 surveys; two raptor species were observed during spring migration (bald eagle [n=1] and merlin [n=1]), one species during fall migration surveys (red-tailed hawk [n=1]), and one species during BBS/raptor surveys (American kestrel [n=1]). There was no sign of recent raptor nesting activity within the area.

During all environmental assessments conducted at the Project site, the auditory wildlife deterrent system being utilized at the nearby refinery settling ponds was very distinct and audible and is anticipated to have some influence on local wildlife use of the study area.

Acoustic Bat Surveys: WIND PROJECTS ONLY

28. For acoustic bat surveys:

a. Were the established GOA-Wildlife survey protocols followed? Provide details of survey protocols including the detector locations, the detector deployment duration, how detector locations were chosen, and a brief description of the analysis of the audio files.

N/A

b. Surveys Dates, provide the acoustic survey period for both the spring and fall surveys.

N/A

c. Provide the total number of detectors during spring and fall surveys.

N/A

d. Provide the number of raised detectors (30 m) during spring and fall surveys.

N/A

e. Provide the total number of detector nights (i.e. excluding nights that a detector malfunctioned) during spring and fall surveys.

N/A

f. Provide location of survey points in a named map (refer to the Maps and Figures section below). Detector location must be included and the detector height must be identified.

N/A

g. Describe the habitat type or land use near each detector location.

N/A

h. If surveys were completed for hibernacula/maternal colonies, provide the results.

N/A

i. Identify any issues encountered during the survey or analysis that impacted the results.

N/A

j. Survey Results: Provide details of the survey results in tables using the following format.

N/A

k. Results Graphs: Provide a bar or line graph of bat activity by night with the date on the x-axis and mean number of bat passes on the y-axis. Data must be separated into the categories of all bat passes per detector night and migratory bat passes per detector night.

N/A

l. Results Summary: Provide a brief written summary of the results including, total bat passes, mean bat passes per detector night, a subset of the migratory bat passes per detector night and a list of species that were detected. Provide other relevant information such as the spatial or temporal trends of bat activity or if there were certain survey points with more bat activity than others or habitat features that may have attracted or reduced activity.

N/A

m. Provide a summary of the survey results in a table using the following format.

N/A

n. Based on the risk of bat mortality, as per GOA-Wildlife policy, is pre-emptive mitigation being applied to the project? If yes, provide the details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

N/A

o. Discussion of results–Provide additional information such as a description of the habitat/ land use that may attract or reduce bat activity in the area, interpretation of the data collected or general information on bat activity and the proposed project.

N/A

Refer to the Post-Construction Monitoring and Mitigation section to provide details on post-construction monitoring, analysis and general results based on mitigation needs.

Site Specific Wildlife Surveys

The following section asks for information for the surveys conducted if the project is sited within an identified wildlife range or wildlife layer, as defined in the applicable Directive.

29. Is any part or portion of the project within the wildlife range of:

a. Burrowing Owl
No

b. Sharp-tailed Grouse
No

c. Eastern Short-horned Lizard
No

d. Sensitive Snake Hibernacula Range
No

e. Ord's Kangaroo Rat
No

f. Swift Fox
No

g. Endangered and Threatened Plants
No

For any species where the answer is no, move to Question 30. For any species where the answer is yes, please continue to Question 29 and provide responses for each applicable species.

a. Were surveys conducted following the established survey protocols within the GOA-Wildlife Sensitive Species Inventory Guidelines? Provide details of the surveys completed including search area, time of day, how survey points were chosen, and the number of visits to each survey point.

N/A

b. Provide the survey dates.

N/A

c. Provide the time of day each survey was conducted.

N/A

d. Provide the number of survey points.

N/A

e. Provide the total survey time (time spent actively conducting survey).

N/A

f. The location of survey points must be provided in a named map (refer to the Maps and Figures section below).

N/A

g. Provide weather conditions during each survey date and time in a table using the following format.

N/A

h. Describe the habitat type or land use within the surveyed area.

N/A

i. Survey Results: Was the species found or was species activity seen? If yes, complete table below.

N/A

j. Species or feature locations and associated setbacks must be provided in a named map (refer to the Maps and Figures section below).

N/A

k. If a required setback is not being met, provide a summary of the project disturbance details (location, type of infrastructure, and amount of area impacted), rationale for siting decision and details of any proposed alternative mitigation(s) the proponent will implement to meet the intent of the Directive.

N/A

l. Discussion of results including any species observations or signs (including burrows, runways, feces, tracks, etc., if appropriate) that were not associated with a nest/hibernacula/den or any potential

nest/hibernacula/den sites and a description of habitat (soil characteristics, slope, vegetation details, etc.).

N/A

30. The proponent must commit to ensuring that wildlife data is kept current as per the Directive. Confirm that the following surveys will be repeated at a minimum once every two years until the project is commissioned by indicating yes, no, or not applicable by each:

a. Burrowing owl

N/A

b. Sensitive raptors

Yes.

c. Sharp-tailed grouse

Yes.

d. Swift fox

N/A

e. Ord's kangaroo rat

N/A

f. Grizzly bear den surveys

N/A

g. Endangered and Threatened Plants

N/A

Provide details of the proposed surveys and what process will be followed if a new wildlife site is identified and how it will be mitigated.

Sensitive raptor survey: Two rounds of surveys will be conducted every two years until the Project is commissioned. The survey will be conducted during the nesting season for boreal raptors, generally mid-June to late August. The Project area and surrounding lands out to 1000 m will be searched for raptor activity during the survey, and any potential nesting sites (e.g., trees, tall shrubs, anthropogenic structures) will be investigated for evidence of nesting activity and nest status (e.g., hatchlings present,

adults brooding, etc.). Historic nest locations within the search area will also be revisited to confirm activity.

In the event that a new wildlife feature is identified within the associated setback distance from the SSP (e.g., sensitive raptor nest within 1000 m), the proponent will notify the GOA-Wildlife of the new wildlife feature once mitigation for the feature in question is proposed. Mitigation will vary depending on feature-specific factors such as line of sight, distance to the SSP boundary, location of nearest foraging grounds, etc. Examples of potential mitigation may include adjusting the timing of construction and/or future maintenance activities, active monitoring during construction/maintenance, and adjustment of the SSP layout.

31. Projects for which construction has not begun within 5 years of the completion of the GOA-Wildlife Renewable Energy Referral Report must repeat all surveys and a new GOA-Wildlife Renewable Energy Referral Report will be completed. Confirm this process will be followed.

If construction of the SSP has not begun within five years of completion of the GOA - Wildlife Renewable Energy Referral Report, all required site-specific surveys will be repeated and a new GOA-Wildlife Renewable Energy Referral Report will be completed.

Construction and Operation within Other Key Wildlife Zones

32. As per the Directive is the project sited in any of these wildlife zones:

    a. Special Access Zones?

       No

    b. Key Wildlife and Biodiversity Zones?

       Yes

    c. Grizzly Bear Zones?

       No

    If yes, will the project meet the required standards identified in the Directives for the associated zone? Provide details of the proposed standard or alternative mitigations if proposed.

    The SSP falls within a Key Wildlife and Biodiversity Zone, with a proposed timing restriction for areas north of Hwy #1 – no construction between January 15th and April 30th. However, due to the existing level of disturbance on the project lands, active oil and gas, the wildlife calls being used to the west, the presence of large industrial facilities in this area, and the requirement to clear brush outside the April 15-August 15 timing window, this timing restriction is not deemed appropriate for this particular location.

33. If the proposed project is sited within the Grizzly Bear Zones, do the project related access roads in addition to the existing roads in the area meet with the open road thresholds defined within the Alberta Grizzly Bear Recovery Plan? If no has been selected, provide a summary of the details (location, type of access roads, and amount of area impacted), rationale for siting decision and any proposed alternative mitigation to meet the intent of the Directive.

    N/A.

Minimizing Impacts on Wildlife and Wildlife Habitat

34. Have guy wires been designed to meet the requirements outlined in the Directive. Provide details of mitigation that is proposed.

    Not applicable. No guy wires required for the Project.

35. Are all collection lines sited underground? Provide details of construction techniques and how impacts to wildlife and wildlife habitat will be minimized.

Yes, collector lines will be sited underground. The proponent will use general trenching techniques for the installation of collector lines. To minimize impacts to wildlife and wildlife habitat, trenches will only be left open for a limited time and will be checked daily to ensure no entrapment of wildlife. If trenches are left open, they will be backsloped at 3:1 on one side or end of the trench to allow for the escape of wildlife. If entrapped wildlife are documented, an environmental professional with an appropriate permit will be required to remove and relocate individuals to suitable habitat in the immediate area if possible.

36. Provide details on any other wildlife or wildlife habitat risk identified by the proponent and proposed mitigations to reduce this risk. This may include mitigations for the reduction of noise and light pollution, prevention of predator nests on anthropogenic features, minimization of collision risk, mitigations for clearing vegetation attractive to breeding birds or other project associated wildlife risks.

Risks to wildlife may include collisions, predation, habitat loss, and visual/physical disturbance. Therefore, the proponent will implement the following mitigation measures to reduce these primary concerns, as well as address other potential concerns:

- Noise and light: Where feasible, construction will occur during the daylight hours to avoid light disturbance to wildlife. During operations, lighting of the SSP will be minimized and controlled by sensors as much as possible.
    - If security lighting on buildings or inverters is installed, SSP commits to using motion-activated lighting to minimize the duration that lighting is used and also commits to using down-shielding and directional lighting to restrict the area illuminated to the ground immediately within the building area.

- Vegetation removal and habitat loss:
    - Construction will either occur outside of the breeding bird and any applicable sensitive species' breeding and nesting window (April 15 – August 15), so minimal effects to wildlife are anticipated during the breeding and nesting season OR trees will be removed outside the same April 15 – August 15 nesting window to allow for construction during that season.
    - If vegetation removal is required during the breeding season, a nest sweep will be conducted by a qualified biologist to identify any active nests. If a nest is documented, no construction activities will occur until the young has fledged or the nest is no longer active (confirmed by a biologist).
    - If vegetation is to be mowed for vegetation maintenance during operation of the SSP, nest sweeps will be conducted prior to mowing to prevent nest destruction or abandonment during the active boreal bird breeding season (April 15 – August 15). If a nest is found active, the vegetation near the nest (minimum 30 m buffer) will not be disturbed until the young have fledged or nest has been confirmed inactive by a qualified biologist.

- Mortality: A follow-up monitoring program will be implemented after construction of the SSP to determine the rates and causes of mortalities which in turn would identify possible mitigation measures (Huso et al., 2016).

- Predation: Deterrents will be installed on the infrastructure to prevent perching and nest building from avian predators (e.g., raptors, ravens) such as bird spikes.

- Contamination: In order to minimize and prevent potential spills and leaks and contamination of habitat, a spill prevention and response plan will be in place. Emergency spill kits will be on site and hazardous waste will be disposed in a safe manner. Fueling of equipment will occur more than 100 m from any wetland, and fuel and/or other potential contaminants will be stored within appropriate containment at a designated staging area.

37. SOLAR PROJECTS ONLY: Provide details of the proposed fence including type, shape, height, ground clearance and layout. Provide any wildlife mitigations that are proposed as per the requirements in the Directive. Refer to Maps and Figures for information on required map submissions.

SSP confirms the fence around the perimeter of the Project will be in compliance with the Canadian Electrical Code, specifically Section 26-300 to 26-310. The fence will be 1.8m (6') high and topped with three strands of barbed wire. SSP will attempt to maintain between a 5-15 cm clearance under the fenceline, however EPA-WM should be aware that micro-topographic changes will result in variable heights above ground and fence engineering and construction to meet a minimum clearance might not be consistent. Sunnyacres Solar must at all times abide by relevant law/regulations on fencing specifications imposed by the Electrical Safety Authority or other similar regulator.

This will limit wildlife movement through the Project lands for mammals. Birds and amphibian movement would not be expected to be significantly impacted. Due to the presence of the roads and surrounding residential areas, no gaps will be placed at the bottom of the fences to allow for movement through the area by larger mammals such as coyotes.

See Map 1 and Map 2 (Sunnyacres Solar Project Layout), and associated kmz files.

Construction and Operation Mitigation Plan

The following section asks for information about methods that will be implemented to reduce negative impacts on wildlife and wildlife habitat during construction and operation.

38. For projects sited in the Sensitive Snake Hibernacula Range, Sensitive Snake Habitat or in close proximity of either area, provide details of the project's Snake Protection Plan to protect snakes and on-site worker safety. This is a requirement for solar projects, but is strongly recommended for wind projects as well.

N/A.

39. Provide details about how injured or dead wildlife observed by on-site workers during construction or operation will be reported.

During construction, workers will report injured or dead wildlife observed on-site to the Project Manager, who will then report to an environmental consultant (for dead wildlife – for subsequent reporting to EPA), or to EPA directly (for any injured wildlife).

40. Provide details of the proposed reclamation of the project area, both temporary and long-term disturbances that will occur. Include information of the amount of area that will be reclaimed or restored following construction, methods that will be used and details of seed mixes if working in areas of native grasslands. Will an approved native seed mix be used to revegetation disturbed native habitats?

Temporary disturbances will include areas for staging, laydown area, parking, and equipment storage. Areas of long-term disturbances will include the installation of the permanent infrastructure such as roads, inverters, solar panels, and perimeter fence. Removal of vegetation and stripping of soils will be minimal, however some localized stripping, grading, and levelling may occur. The two-lift soil stripping method will be used in areas where soil removal is required during construction at SSP (Pettapiece and Dell, 1996).

The most appropriate method for soil handling and mitigation will be determined once the Pre-Disturbance Site Assessment (PDSA) is completed as per the requirements outlined in the Conservation and Reclamation Directive for Renewable Energy Operations (Government of Alberta - Alberta Environment and Parks 2018).

Interim and final reclamation will follow the Conservation and Reclamation Directive for Renewable Energy Operations (Government of Alberta - Alberta Environment and Parks 2018) and the 2010 Reclamation Criteria for Wellsites and Associated Facilities for Cultivated Lands – updated 2013 (Environment and Sustainable Resource Development 2013). Areas of temporary disturbances will be reclaimed to previous land use (tame pasture; seeds approved by landowner), including site and debris clean-up, slope stabilization, recontouring of subsoil, and spreading of topsoil where required. During the life of the project, current vegetation communities will remain relatively intact. Soil/vegetation disturbance is not anticipated throughout much of the project, as panels will be screwpiled into the ground, and soil salvage will be limited. In areas where soils salvage is required, these will be seeded to perennial grass approved by the landowner. The perennial vegetation will have a positive impact on the soil as it will prevent erosion and loss of topsoil and increase carbon stores. Some wildlife such as small mammals and generalist birds could also use the areas seeded to perennial vegetation for breeding and foraging habitat.

When the project is decommissioned, reclamation will occur as required and currently outlined in the Conservation and Reclamation Directive for Renewable Energy Operations (Government of Alberta - Alberta Environment and Parks 2018) to soils have been replaced, ensure vegetation has established, erosion has been controlled, and landowner concerns have been mitigated.

41. Provide details of any construction and operation mitigations or methods to reduce the impact to wildlife or wildlife habitat not identified in an above section.

SSP confirms it will comply with Stages 3 and 4 of the *2017 Wildlife Directive for Alberta Solar Energy Projects.* Additionally, SSP will comply with the *Environmental Protection & Enhancement Act, the Wildlife Act, the Weed Control Act, the Water Act, Public Lands Act* and all the associated regulations.

The Project has to comply with not only the *Wildlife Act*, but the *Weed Control Act*, in addition to any municipal requirements. SSP is also planning the following mitigation methods to reduce impact to wildlife.

- If any important wildlife feature (i.e., den, nest, breeding pond, etc.) is found to be active, SSP confirms that no equipment, trucks, or other access related to the construction of the SSP, will be permitted within any recommended setback of the feature during any sensitive wildlife timing restrictions unless otherwise agreed to by EPA.
- During operations of the solar project, SSP confirms that:
    - If any raptor nest (e.g., red-tailed hawk or great horned owl) is found to be active, no large equipment, trucks or other access, except by foot, will be permitted in the recommended minimum 100 m setback between April 1 - July 15. Signage will be provided or the solar array, panels or their racking will be marked (i.e., with survey flagging, or paint on the foundation) to show where the 100 m boundary exists. Other raptor species may have different setback distances.
    - SSP and its environmental consultant recognize that there is limited information on the potential effects of any operating solar project on nesting birds. Therefore, during mortality surveys completed by a qualified professional, behavior notes will be collected on nest activity during the three-year mortality monitoring surveys. The intent of this information would be to support GOA-Wildlife, and the industry more generally, with information on the potential operational effects of an active solar project on the behavior of nesting raptors.
    - Ground nests encountered during construction (i.e., ground nests within cultivated lands, cavity nests within trees) will be flagged and buffered by a minimum of 30 m from all construction activities. Work can only resume once nests are confirmed by a qualified wildlife professional to be inactive.

SOLAR PROJECTS ONLY: Questions 42 to 44 are specific to solar energy projects only.

42. Provide details on any levelling or grading of the project site.

Minimal site grading is anticipated to be required for the Project. The majority of grading is expected to be used for internal access roads; existing drainage areas are generally expected to be maintained. The site grading will be documented in a Stormwater Management Plan which is typically developed prior to construction by the contractor selected to construct the Project. The most appropriate method for soil handling and mitigation will be determined once the PDSA is completed.

43. Will the ground under solar panels be stripped or vegetation removed? If yes, provide details of the methods, wildlife mitigations and type of seed mix if areas will be revegetated.

It is anticipated that panels will be installed without the need for soil or vegetation removal. During operation of the SSP, disturbed areas will be re-seeded as necessary. There will be annual monitoring of bare ground cover and distribution as per the requirements in the *Conservation and Reclamation Directive for Renewable Energy Operations* (Government of Alberta - Alberta Environment and Parks 2018) with periodic monitoring, reporting, and immediate eradication of noxious weed or invasive species occurring within all managed areas.

44. If there is vegetation under the panels, provide details about how and when it will be maintained. Detail all mitigation measures that will be used during vegetation maintenance (including mechanical and chemical methods) to protect wildlife (e.g., survey sweeps for ground nesting birds).

All vegetation and weed control will be completed by an experienced applicator/contractor who will be required to comply with all weed control requirements. SSP will rely upon contractor expertise and fire control best practices for the timing and method of vegetation and weed control. SSP is considering a number of options for weed control. One is the planting of a strong native perennial seed mix to outcompete weeds. The second will be targeted spraying of weeds. The third option is mowing. If mowing of vegetation is to occur between April 15-August 15th, a nest sweep is required to be completed by a qualified biologist a minimum of 7-10 days prior to mowing. Ground nests encountered prior to mowing will be flagged and buffered by a minimum of 30 m. Work can only resume once nests are confirmed by a qualified wildlife professional to be inactive.

At all times, Sunnyacres Solar will comply with the *Wildlife Act* and the *Migratory Birds Convention Act*. Vegetation re-establishment with perennial species will be promoted. If bare soil areas are present, vegetation will continue to be monitored and re-established. Addition of soils amendments may be required in specific areas.

Post-Construction Monitoring and Mitigation Plan

The following section asks for information about the monitoring and, if required, the mitigation methods that the proponent commits to implementing during operation.

45. State that the post-construction surveys will be completed as directed by the Environment and Protected Areas Post-Construction Survey Protocols for Wind and Solar Energy Projects?

Post-construction surveys will be completed as directed by the EPA *"Post- Construction Survey Protocols for Wind and Solar Energy Projects, January 2020"*.

46. If mortality is deemed higher than acceptable by GOA-Wildlife, the proponent will be required to mitigate the mortality to acceptable levels as per GOA-Wildlife Policy. Identify the proposed mitigation methods that will be implemented by the proponent if mortality is determined to be high.

Adaptive management may be implemented in the event where post-construction surveys determine that wildlife mortalities exceed acceptable levels (as determined by EPA) (Standard 100.4.9). Adaptive management will include determining the reason of mortality. Once mortality is determined, mitigation may include:

- Visual markers added to the PV panels to mitigate collisions by birds, and indirectly reducing attraction from insects. These markers may include UV-reflective or solid contrasting bands spaced no further than 28 cm apart (Kagan et al. 2014). However, GOA-Wildlife should be aware this mitigation option has not been confirmed with a solar panel supplier. SSP is aware that some manufacturers may not allow this as it potentially voids the panel warranties. SSP will investigate this option once a supplier is confirmed.
- In the event of high mortality, SSP would propose adding poles with flagging. The poles would be at least 25% taller than the panel tops and spaced at regular intervals throughout the project infrastructure. The intent would be to provide contrast to bird species to prevent further mortality.
- Anti-nesting spikes may be installed on buildings, inverters, or other areas if there is evidence of high bird use in a specific area of the SSP and if the observed mortality appears in the same area(s).

Maps and Figures

Maps and figures are important to help GOA-Wildlife understand the proposed project. The following maps and figures are required by GOA-Wildlife in all renewable submissions. Additional maps/figures may be submitted at the discretion of the proponent.

47. Map and a KMZ file of the overall project area: map must include project boundary line, photo imagery, boundary line for the 1000 m setback of the project boundary, identification of all wildlife habitat types as identified in this submission (i.e. native grassland, cultivation, etc.). Provide the name of file(s).

    Map 3. Sunnyacres Solar Project Area and Habitat Types – Overview
    Map 4. Sunnyacres Solar Project Area and Habitat Types

    Files:

    SunnyacreSolar_WildlifeHabitat-Overview.pdf
    SunnyacreSolar_WildlifeHabitat.pdf
    SunnyacresSolar_LandCover.kml
    SunnyacresSolar_1000mSurveyArea.kml
    SunnyacresSolar_TotalAssessedArea.kml
    SunnyacresSolar_ProjectArea.kml

48. Map and a KMZ file of survey locations: Map must include project boundary line, photo imagery, and each wildlife survey point for all required surveys. To enable GOA-Wildlife review, if the map is cluttered it is recommended that multiple maps be used with files labelled appropriately. Depending on the size of the project, it may improve clarity of information by providing a separate map for the survey locations of each type of survey conducted. Provide the name of file(s).

Map 7. Sunnyacres Solar Project – Migration Survey Point Locations

Files:
SunnyacresSolar_MigrationSurveyLocations.pdf
SunnyacresSolar_200mMigrationSurveyArea.kml
SunnyacresSolar_500mMigrationSurveyArea.kml
SunnyacresSolar_MigrationSurveyLocations.kml

Map 8. Sunnyacres Solar Project – Breeding Bird Survey Point Locations

Files:
SunnyacresSolar_BBSPoints.pdf
SunnyacresSolar_BBSpoints.kml

49. Map and a KMZ file of the project layout: Map must include project boundary line, photo imagery, infrastructure locations including but not limited to turbines or solar arrays, access roads, collections lines, substations, temporary work spaces and fences. To enable GOA-Wildlife review, if the map is cluttered it is recommended that multiple maps be used with files labelled appropriately. Provide the name of file(s).

Map 1. Sunnyacres Solar Project Layout - Overview
Map 2. Sunnyacres Solar Project Layout

Files:
SunnyacresSolar_Layout-Overview.pdf
SunnyacresSolar_Layout1.pdf
SunnyacresSolar_TotalAssessedArea.kml
SunnyacresSolar_ProjectArea.kml
SunnyacresSolar_ProjectLayout.kmz

50. Map and a KMZ file of Lake/Wetland/Waterbody/Watercourse Features: Map must include project boundary line, photo imagery, all classified wetlands and setback distance from nearest project infrastructure. To enable GOA-Wildlife review, if the map is cluttered it is recommended that multiple maps be used with files labelled appropriately. Provide the name of file(s).

Map 5. Sunnyacres Solar Project Wetlands - Overview
Map 6. Sunnyacres Solar Project Wetlands

Files:
SunnyacresSolar_WaterFeatures.pdf
SunnyacresSolar_100mWetlandSetback.kml
SunnyacresSolar_Wetlands.kml

51. Map and a KMZ file of Wildlife Features: Map must include project boundary line, photo imagery, all identified wildlife features (house, nests, dens, leks, etc.) and associated setback boundary line, and setback distance from nearest project infrastructure. Labelling of wildlife features must match identification number of feature referenced in above section(s) of this submission. To enable GOA-Wildlife review, if the map is cluttered it is recommended that multiple maps be used with files labelled appropriately. Provide the name of file(s).

    Map 9. Sunnyacres Solar Project – Wildlife Features

    Files:
    SunnyacresSolar_WildlifeFeatures.pdf
    SunnyacresSolar_WildlifeFeatures.kml

52. Other associated maps and figures: (insert jpeg/pdf map file). Provide any other maps referenced by the proponent in the body of this submission. Additional maps or figures must be provided as a KMZ file, in addition to a figure in the submission. GOA-Wildlife review, if map is cluttered it is recommended that multiple maps be used with files labelled appropriately. Provide the name of file(s).

    N/A

Other Comments

This section allows the proponent to provide wildlife or wildlife habitat related information that has not already been addressed in any of the above sections.

53. If there is any additional wildlife related information that the proponent would like to include in the submission, provide the information here (e.g., photographs).

Photo 1. Overview of the proposed Project area facing east from the western boundary of the Project area (migration point SS-M1), April 2023.

Photo 2. Facing north from the northwest corner of the proposed Project area (BBS point 8).

Photo 3. Facing south from the northwest corner of the proposed Project area (BBS point 8).

Photo 4. Facing west from the north-central portion of the proposed Project area (BBS point 6).

Photo 5. Facing south from the northeast corner of the proposed Project area (BBS point 5).

Photo 6. Facing north from the center-west portion of the proposed Project area (BBS point 7).

Photo 7. Facing south from the center-west portion of the proposed Project area (BBS point 7)

Photo 8. Facing west from the center-west portion of the proposed Project area (BBS point 7).

Photo 9. Facing west from the center of the proposed Project area (BBS point 1).

Photo 10. Facing east from the center of the proposed Project area (BBS point 1).

Photo 11. Facing south from the center-east portion of the proposed Project area (BBS point 4).

Photo 12. Facing west from the center-east portion of the proposed Project area (BBS point 4).

Photo 13. Facing north from the south-central portion of the proposed Project area (BBS point 2).

Photo 14. Facing east from the south-central portion of the proposed Project area (BBS point 2).

Photo 15. Facing south from the south-central portion of the proposed Project area (BBS point 2).

Photo 16. Facing west from the south-central portion of the proposed Project area (BBS point 2).

Photo 17. Facing north from the southeast corner of the proposed Project area (BBS point 3).

Photo 18. Facing west from the southeast corner of the proposed Project area (BBS point 3).

Final Statement of Compliance

Upon completion of the submission form, the applicant or applicant's representative must fill out the following and submit as part of their application.

Once the GOA-Wildlife has received all required documents the submission will be forwarded to the local area Biologist for review and comment. A final referral report will be completed by the AEP-Wildlife Biologist and forwarded to the AUC for inclusion within the AUC application.

I, Robert McCallum*, as an authorized representative of* Ascent Energy Partners Ltd*., ensure that this application meets the Environment and Protected Areas requirements as detailed in the Wildlife Directive for Alberta Wind or Solar Energy Projects. Deviations from the Directive (if any) are outlined in this submission form and include proposed mitigations and any formal discussions or agreements with GOA-Wildlife. All other supporting documents and materials for this project will abide with the statements made is this submission form.*

Signature: 

Date: April 19th, 2024

Once signed, the entire submission form, including all supporting documents identified in the submission form, must be emailed by the proponent to the appropriate GOA-Wildlife representative.

References

AbaData. 2023. AbaData2 Mapping. Accessed November 2023. Available at: https://abadata.ca/AbaData2/Account/Logon?returnUrl=%2Fabadata2

Environment and Sustainable Resource Development. 2013. 2010 Reclamation Criteria for Wellsites and Associated Facilities for Cultivated Lands (updated July 2013). Edmonton.

Government of Alberta. 2008. Weed Control Act. Page 20. Alberta King's Printer, Canada.

Government of Alberta. 2013. Sensitive Species Inventory Guidelines. Edmonton AB.

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Government of Alberta. January 2020. Post-Construction Protocols for Wind and Solar Energy Projects. Available at: https://open.alberta.ca/publications/post-construction-survey-protocols-for-wind-and-solar-energy-projects

Government of Alberta. January 2020. Bird Migration Survey Protocol. Available at: https://open.alberta.ca/publications/bird-migration-survey-protocol

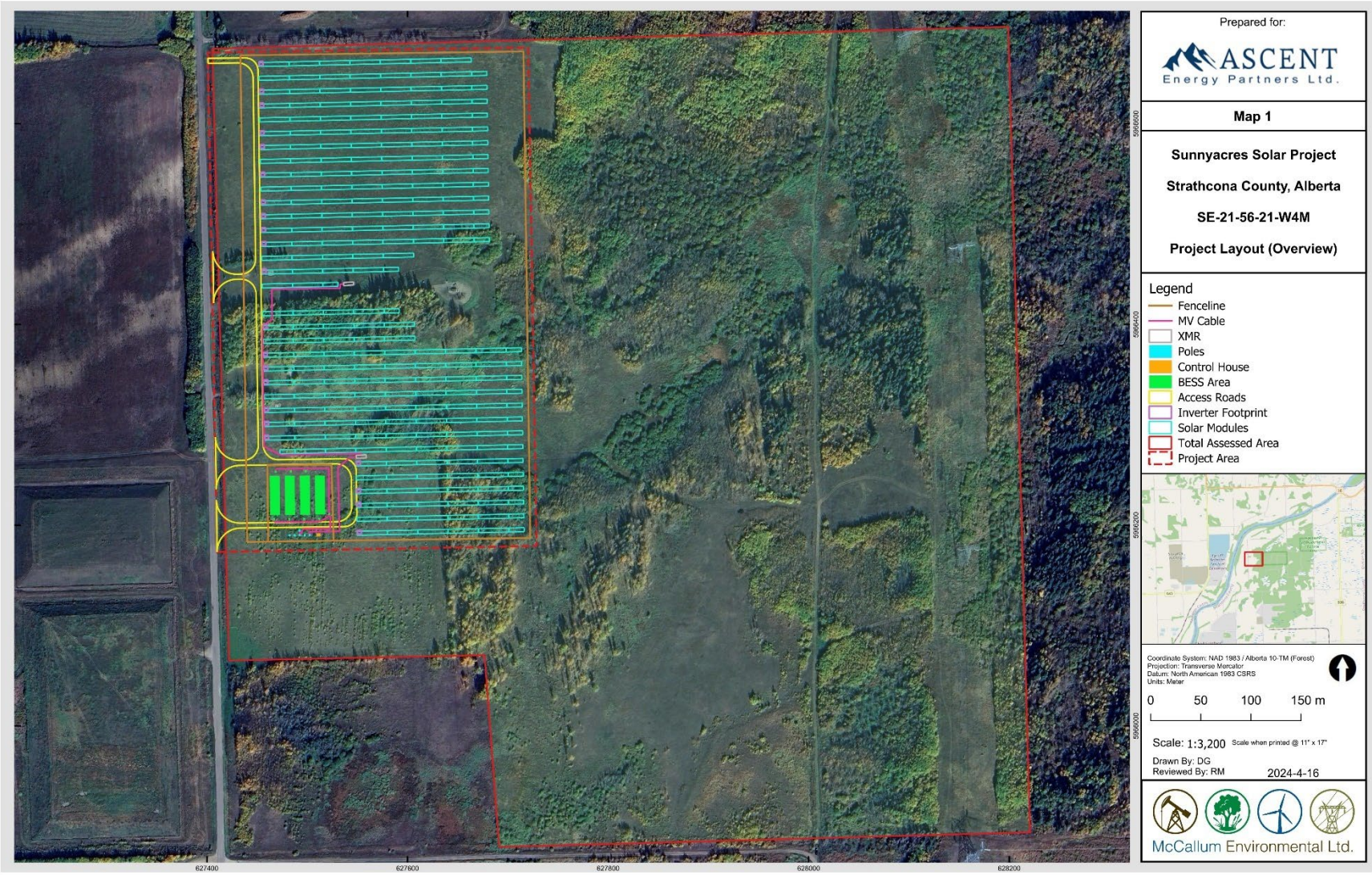
Government of Alberta - Alberta Environment and Parks. 2018. Conservation and Reclamation Directive for Renewable Energy Operations. Edmonton AB.

Huso, Manuela, Dietsch, Thomas, and Nicolai, Chris. Mortality Monitoring Design for Utility-Scale Solar Power Facilities. Prepared with U.S. Fish and Wildlife Service. Open-File Report 2016-1087. Available at: https://pubs.usgs.gov/of/2016/1087/ofr20161087.pdf

Kagan, R.A., Viner, T.C., Trail, P.W. and Espinoza, E. O. 2014. Avian mortality at solar energy facilities in southern California: a preliminary analysis.

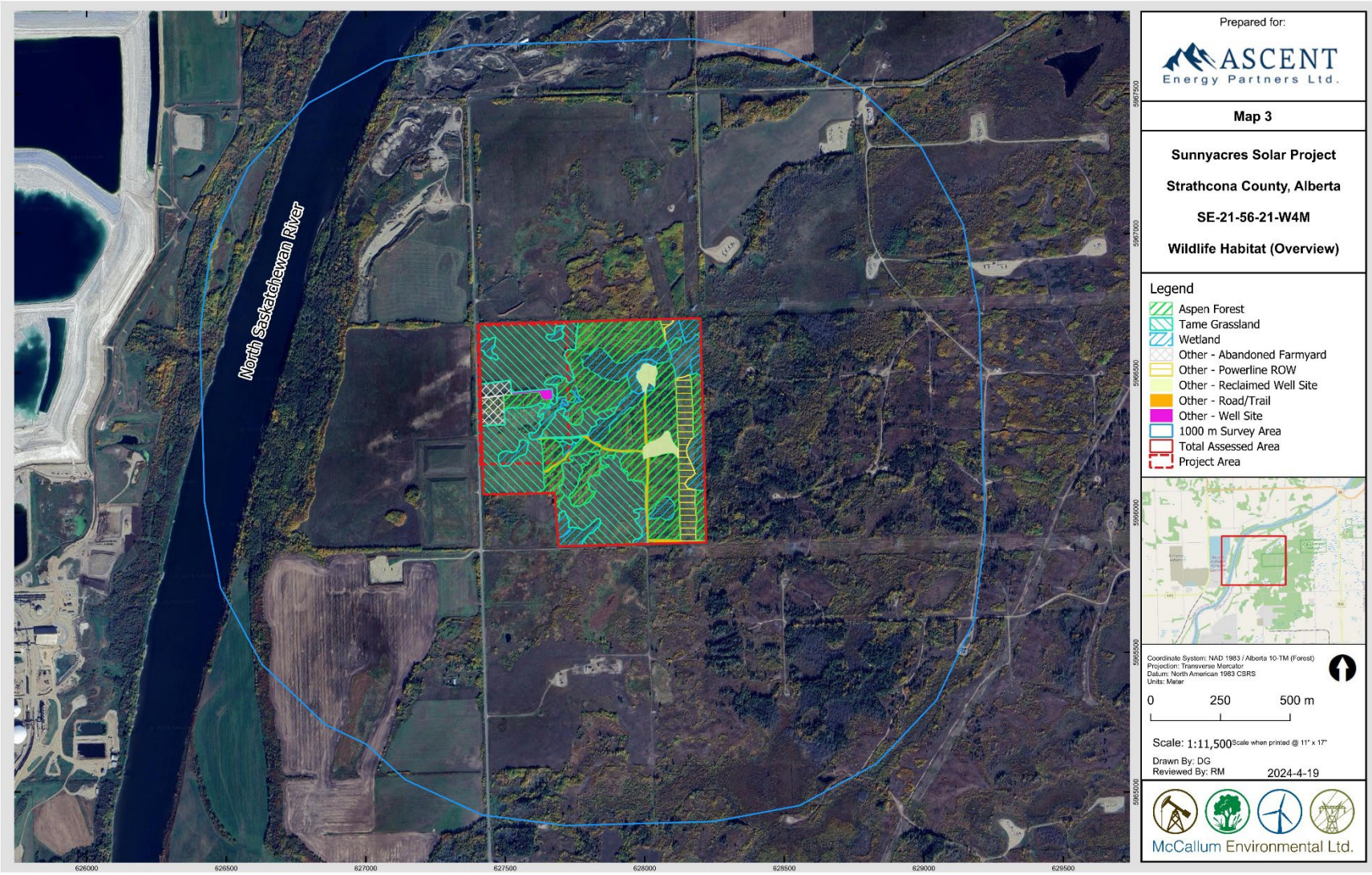
Pettapiece, W. W., and M. W. Dell. 1996. Guidelines for Alternative Soil Handling Procedures During Pipeline Construction

Appendix A - Maps

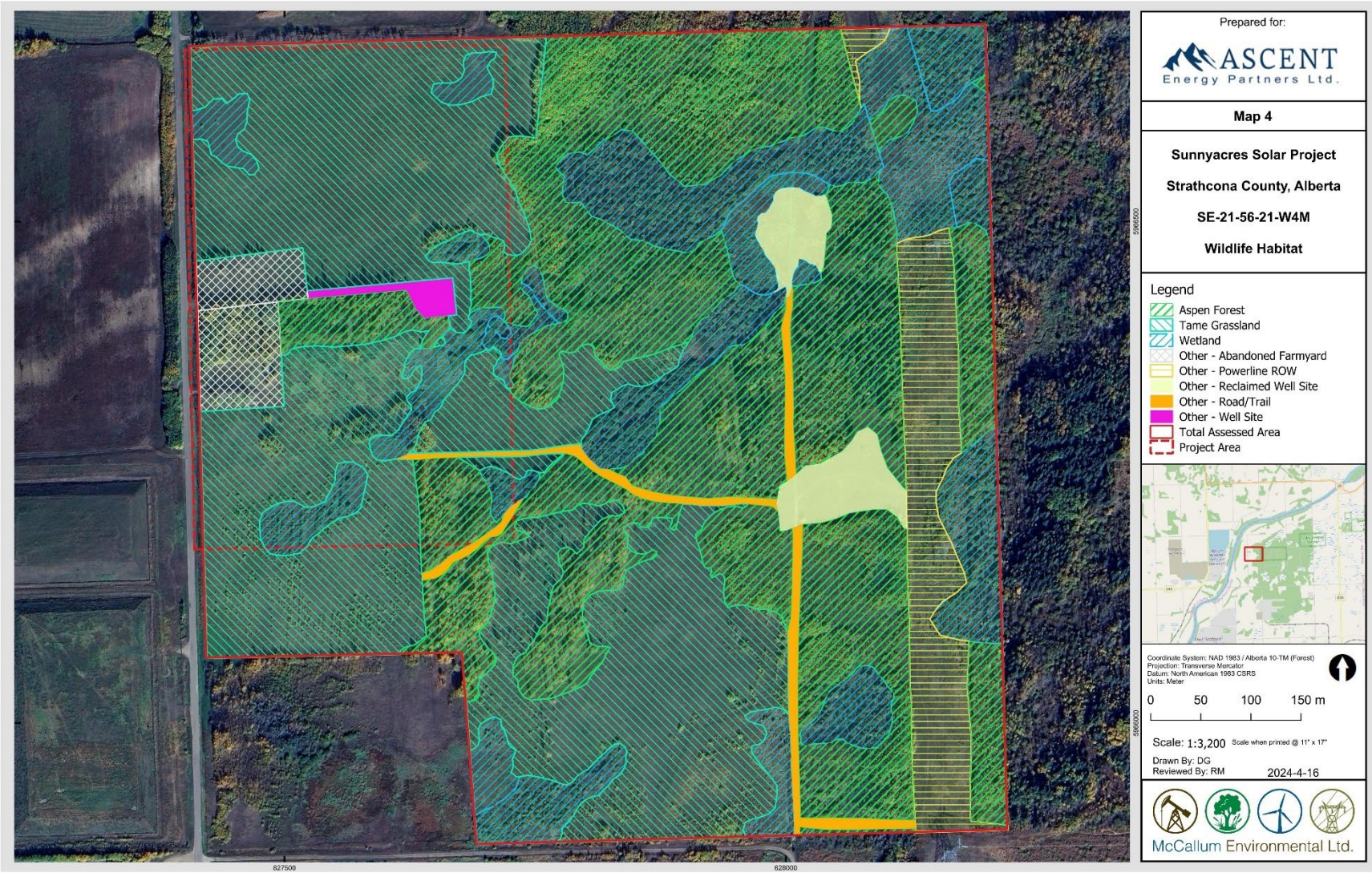


Map 1. Sunnyacres Solar Project Layout - Overview

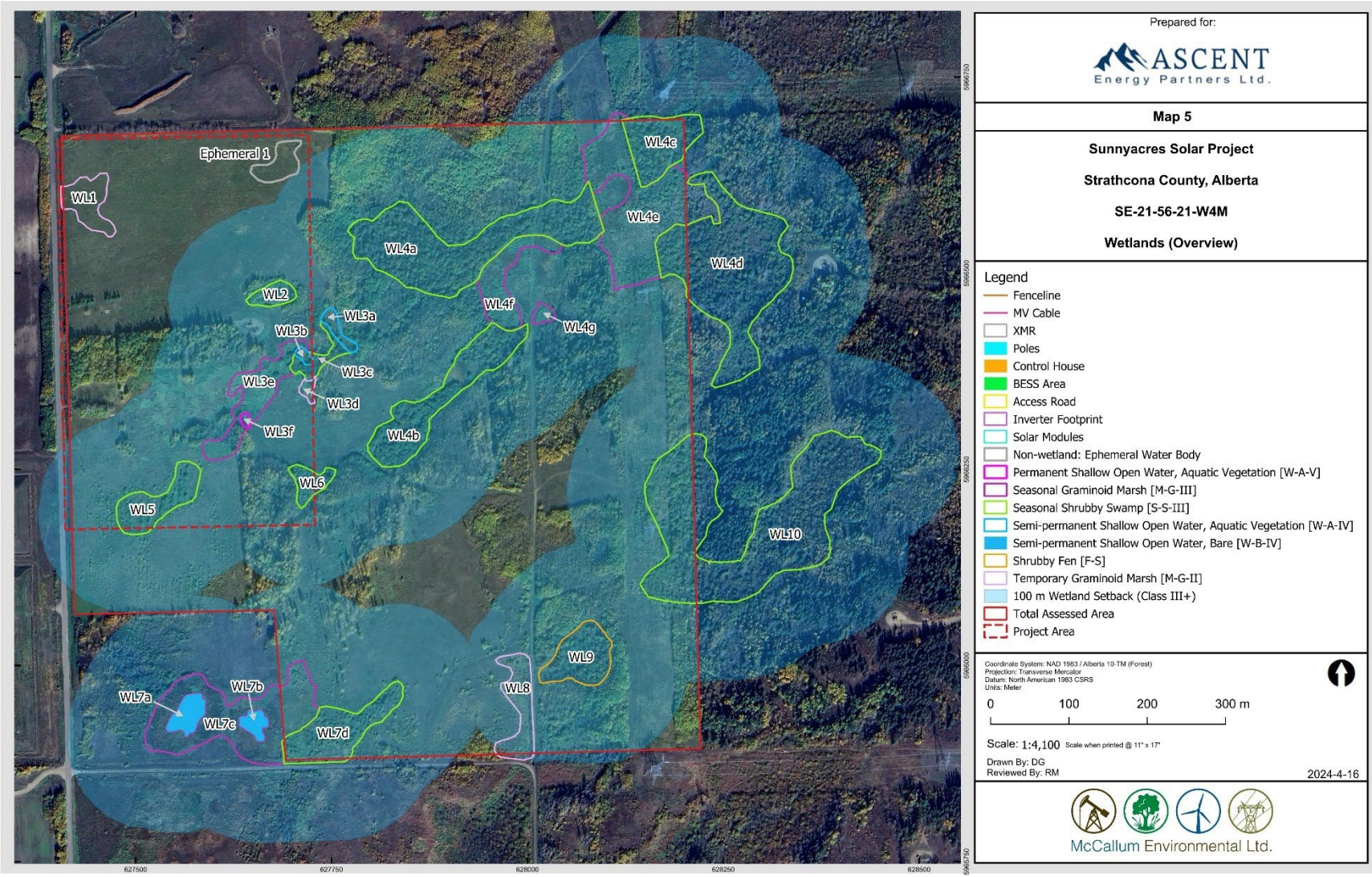
Map 2. Sunnyacres Solar Project Layout



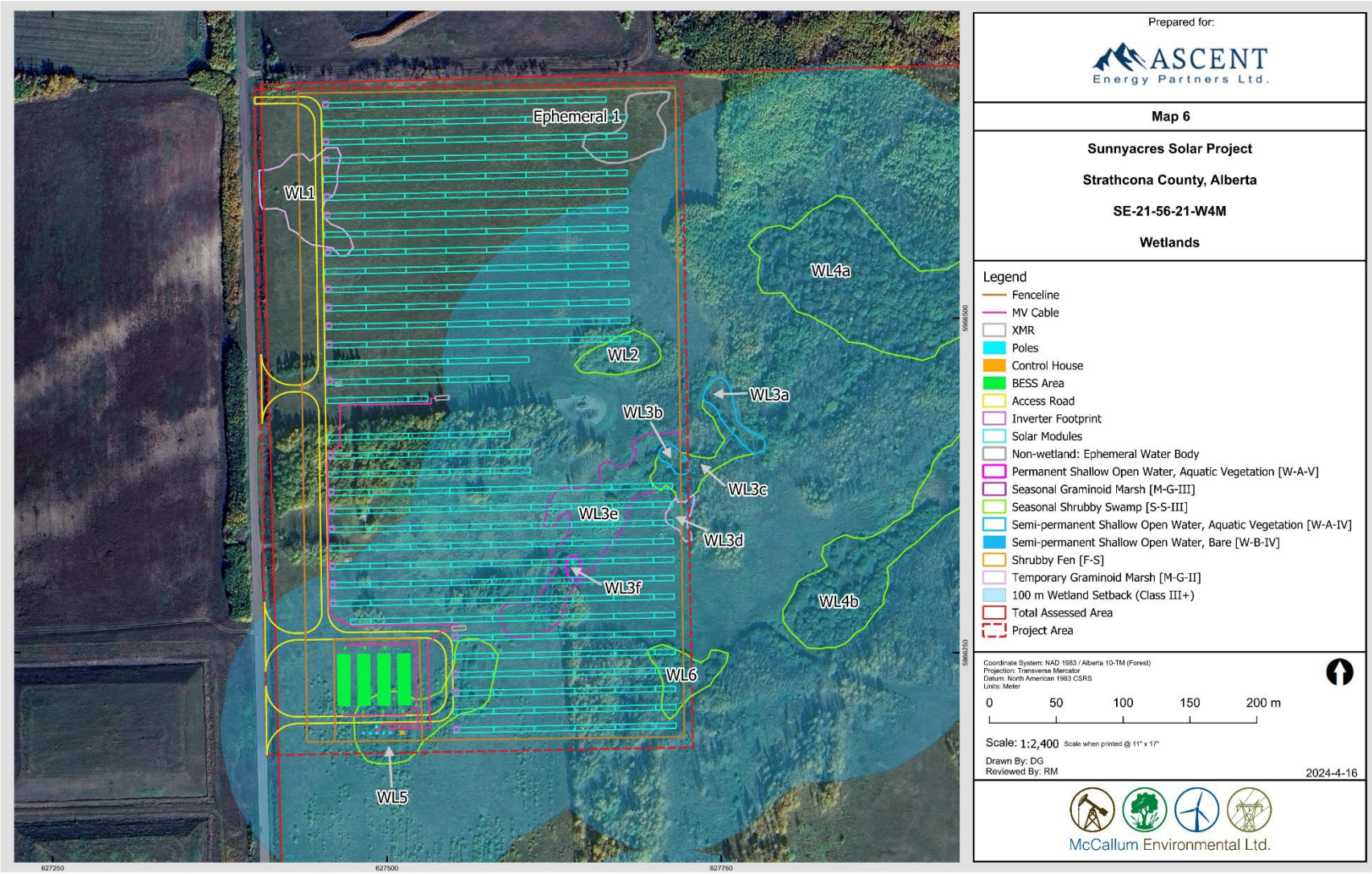
Map 3. Sunnyacres Solar Project Area and Habitat Types – Overview



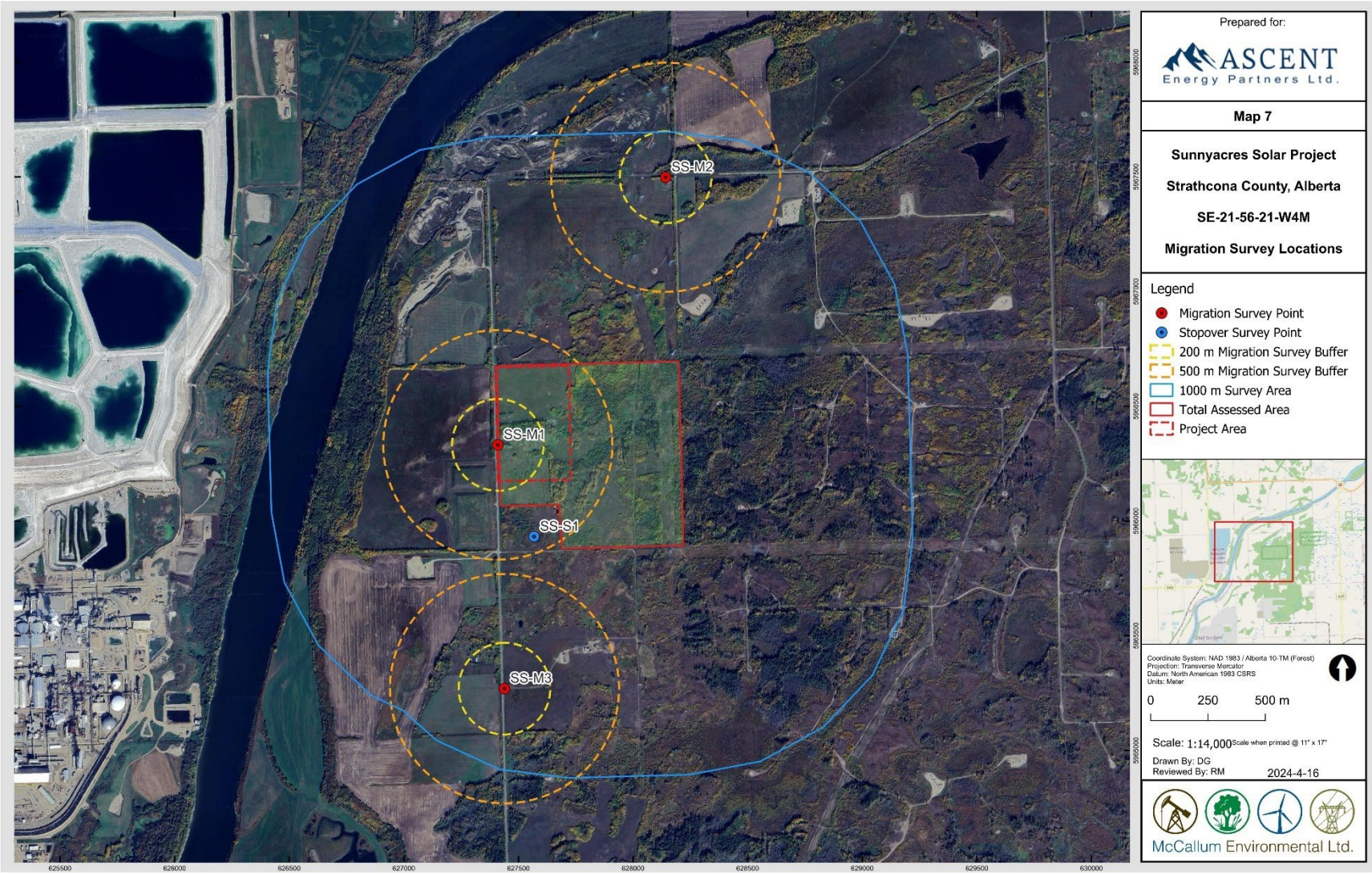
Map 4. Sunnyacres Solar Project Area and Habitat Types



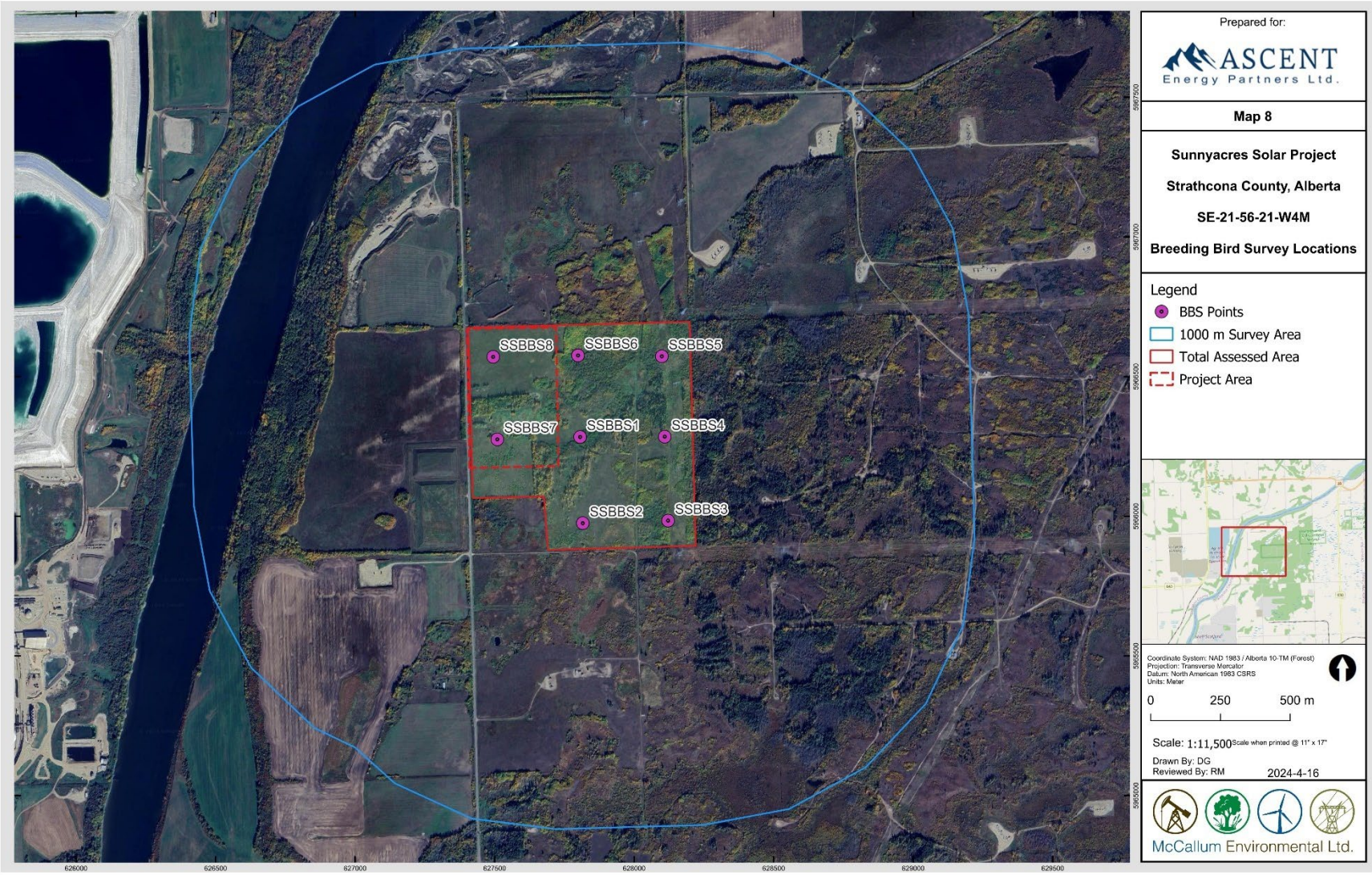
Map 5. Sunnyacres Solar Project Wetlands - Overview



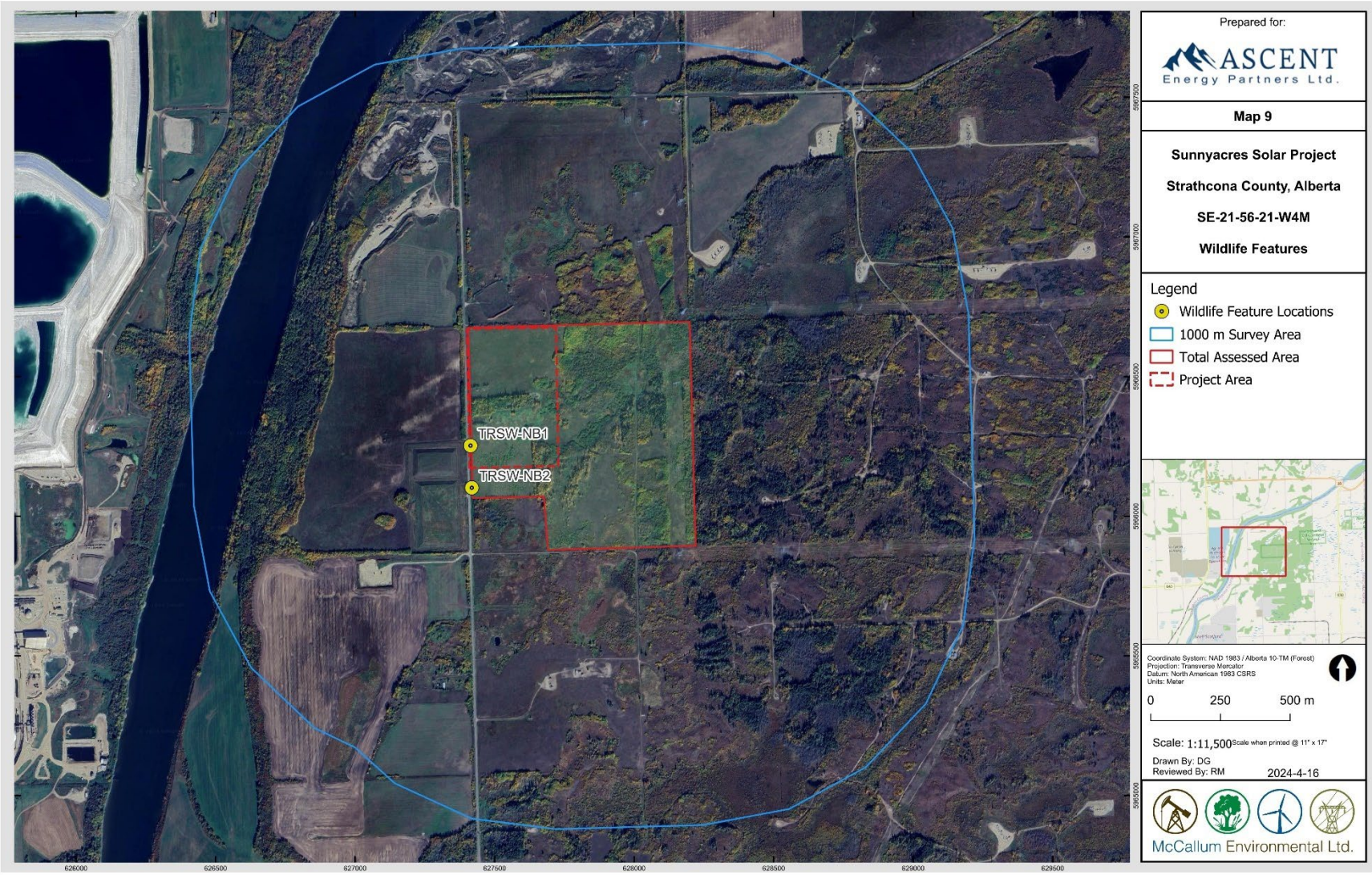
Map 6. Sunnyacres Solar Project Wetlands



Map 7. Sunnyacres Solar Project – Migration Survey Point Locations



Map 8. Sunnyacres Solar Project – Breeding Bird Survey Point Locations



Map 9. Sunnyacres Solar Project – Wildlife Features