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Avifauna Management Plan for Southland Wind Farm

Contract Report No. 6656e

Providing outstanding ecological services to sustain and improve our environments

Wildlands

Avifauna Management Plan for Southland Wind Farm

Contract Report No. 6656e

August 2025

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1.0 Introduction

1.1 Overview

Contact Energy Ltd (Contact) engaged Wildland Consultants Ltd (Wildlands) to undertake pre-construction avifauna and habitat surveys at the proposed Southland Wind Farm Site (Wind Farm Site). Wildlands completed a preliminary survey in April 2023 and identified potentially important avifauna habitats, and notable bird species were observed at the Wind Farm Site. Additional surveys have been undertaken in February 2024, October/November 2024[1], February 2025[2], and May 2025[3].

The Southland Wind Farm Project (the Project) involves the construction and operation of a wind farm consisting of up to 55 wind turbines over an area of approximately 5,800 hectares.

This draft Avifauna Management Plan (AMP or Plan) adheres to the legislation and principles outlined by the Resource Management Act 1991 (RMA). Potential impacts from wind farms on avifauna include direct and indirect harm and/or mortality from collision, habitat loss and habitat displacement due to the construction and/or turbine barrier effects. This Plan describes the proposed methods to address the actual and potential adverse effects of the wind farm on avifauna.

This AMP is set out as follows:

- Section 1 – Introduction (this section);
- Section 2 – Responsibilities and competencies;
- Section 3 – Summary of effects and proposed management actions;
- Section 4 – Pre-construction surveys;
- Section 5 – Protocols for managing vegetation clearance effects;
- Section 6 – Kārearea/falcon nest discovery;
- Section 7 – Post-construction monitoring;
- Section 8 – Bird injury and mortality protocols;
- Section 9 – Incidental discovery protocol (Threatened or At Risk birds); and
- Section 10 – Compliance monitoring and reporting.

1.2 Plan purpose

This AMP sets out methods to avoid, minimise, or remedy potential adverse effects on indigenous avifauna associated with the construction and operation of the Project (Table 1).

[1] Southland Wind Farm Avifauna Survey Results 2024. Wildland Consultants Contract Report No. 7362b. Prepared for Contact Energy Ltd. 20pp.

[2] Avifauna Survey Results February 2025 for Southland Wind Farm. Wildland Consultants Contract Report No. 7362e. Prepared for Contact Energy Ltd. 20pp.

[3] Avifauna Survey Results May 2025 for Southland Wind Farm. Wildland Consultants Contract Report No. 7362h. Prepared for Contact Energy Ltd. 22pp.

Table 1 – Purpose, specific objectives, performance measures, and monitoring relevant to this AMP.

Purpose	This AMP outlines how avifauna management during project construction and operation meets the requirements of condition EC27 to EC38E of the proposed resource consent conditions.
Scope	This AMP applies to indigenous avifauna only.
Specific Objectives	The objective of this AMP is to avoid, remedy, or mitigate for the potential adverse effects, and where required, offset and compensate for residual adverse effects, of the construction and operation of the Project on avifauna.
Performance Outcomes	This AMP includes provisions for bird breeding protection and effects minimisation including: **Construction Phase Outcomes** • Bird nest survey and checks within vegetation clearance areas *if* this is undertaken during breeding season (September – March, inclusive). • Proposed controls for maintaining a 50-metre setback of vegetation clearance from active nests of 'Threatened', 'At Risk' indigenous bird species, and a 25m setback for non-threatened indigenous bird species until chicks have fledged (noting that the setbacks for all bird species other than kārearea/eastern falcon can be reduced on a case-by-case basis by a suitably qualified ecologist, if deemed appropriate). • Proposed controls for maintaining a 200-metre setback of vegetation clearance or turbine construction from kārearea/eastern falcon (*Falco novaeseelandiae novaeseelandiae*; Threatened – Nationally Vulnerable) nests specifically, during bird breeding seasons, until chicks have fledged. If deemed appropriate this setback can be reduced on a case-by-case basis. **Operational Phase Outcomes** • Protocols to monitor and manage the effects of turbine blade strike on avifauna including measures to further avoid, minimise, remedy, offset, or compensate associated adverse effects as required.
Monitoring	**Construction Phase Monitoring** • Compliance monitoring to ensure that relevant consent conditions have been met and protocols set out in the AMP have been adhered to. • Pre-clearance nest checks to be completed no earlier than eight (8) working days before the commencement of vegetation clearance or earthworks during the breeding season. • Monitoring of kārearea/falcon nests if they are found during pre-clearance checks and consequently setbacks are applied. Monitoring will be undertaken for nests detected up to 200m from the Project footprint. **Operational Phase Monitoring** • Bird collision monitoring protocol for 36 months (3 annual reports) post-commissioning of the wind turbines.
Reporting	**Construction Phase Reporting** • A pre-construction avifauna monitoring report will be provided to Southland District Council no later than ten working days prior to commencement of construction activities. Incident based reporting will be provided to consent authority(s) within ten working days of an unforeseen event occurring. **Operational Phase Monitoring** • An annual (1 July to 30 June) avifauna collision monitoring report will be provided to the consent authority(s) by 30 September that includes adaptive management recommendations as required. This is required for 36 months (3 annual reports) post-commissioning of the wind turbines and every five years thereafter.

1.3 Proposed consent condition scope

This AMP has been developed in accordance with the proposed consent conditions for the Project (EC27-EC38E).

The requirements of these consent conditions will be addressed through the implementation, monitoring, and reporting protocols and procedures set out in this AMP and the interlinking plans outlined below. The term 'vegetation clearance' in this AMP refers to ***all*** vegetation clearance proposed to enable construction of the Project. For clarity, this includes both indigenous and exotic vegetation.

Further measures to address and minimise effects on avifauna are detailed in the following plans:

- **The Vegetation Management Plan (VMP)**, which provides detail on how adverse effects associated with vegetation clearance (including effects on breeding birds) will be avoided or minimised through vegetation clearance protocols.
- **The Construction Environmental Management Plan (CEMP)**, and in particular the Earthworks Management Plan (EMP), which provides detail on erosion and sediment controls and mitigation protocols relating to the mitigation of sediment impacts on wetland bird habitat.
- **Habitat Restoration and Enhancement Management Plan (HREP)**, which provides detail on the location, magnitude, and type of indigenous habitat restoration and enhancement measures that are proposed to offset or compensate for significant residual effects on terrestrial ecological values, and adverse effects on natural inland wetland values affected by the wind farm, including for avifauna.

Table 2 summarises the avifauna management measures along with proposed consent conditions, and the relevant management plans that address each effect. Each measure is described in the section below.

Table 2 – Summary of avifauna management measures, the associated proposed consent condition(s), and primary management plans relevant to each measure.

Avifauna management measures	Relevant consent conditions	Primary management plan(s)
Engage, report to, and seek feedback from TAMI	TW1-TW11, MP1	AMP and Tuia Te Mana ō Pawakataka
Vegetation clearance protocol to minimise potential for incidental habitat loss outside Project Footprint	EC5(a)	AMP, VMP
Bird nest checks during the breeding season (excluding kārearea/eastern falcon)	EC31-EC32	AMP
Kārearea/eastern falcon nest discovery	EC33	AMP
Bird injury and mortality protocol	EC81	AMP
Incidental discovery protocol	EC29(b)	AMP
Compliance monitoring and reporting	EC35-EC39	AMP

2.0 Responsibilities and competencies

The Environmental Manager is responsible for implementing and complying with this Plan. The technical lead role will be performed by a suitably qualified and experienced ecologist in consultation with the Environmental Manager.

The responsibilities of the Environmental Manager include but are not limited to:

- Reading and understanding the AMP;
- Facilitating a project start-up meeting with the site manager, site engineer(s), and the vegetation clearance contractors before vegetation clearance commences for each construction stage. The purpose of this meeting is to establish the areas scheduled for clearance to enable forward planning and avoid delays in the construction schedule;
- Contacting the Project Ecologist(s) a minimum of 20 working days before each stage of vegetation is scheduled for clearance;
- Inviting Te Ao Marama Incorporated (TAMI) to participate in and support any survey deemed necessary so that TAMI can exercise kaitiakitanga responsibilities and so that cultural concerns are addressed;
- Maintaining clear lines of communication with the Project Ecologist(s), site manager, site engineer(s) and the vegetation clearance contractors regarding changes in the works schedule; and
- Briefing new personnel about the contractor's responsibilities under this plan.

All personnel working on site are responsible for alerting the site engineer(s) and Environmental Manager to the discovery of any 'Threatened' or 'At Risk' birds not otherwise identified in this Plan.

The Environmental Manager is responsible for reporting the discovery of 'Threatened' or 'At Risk' bird species to the Local Area Manager (Department of Conservation) and for maintaining a database with an incident register and file log of actions taken for each such discovery.

3.0 Summary of Effects on Avifauna and Effects Management

3.1 Effects on avifauna

Detailed information on potential effects on avifauna and proposed effects management is provided in the Assessment of Terrestrial and Wetland Ecological Impact Assessment (EcIA) (Wildland Consultants 2025).

The Project has the potential to result in adverse effects on avifauna within the Project Site. These effects include:

- Habitat loss, fragmentation, degradation and general disturbance through earthworks and vegetation clearance.
- Direct mortality or injury during vegetation clearance or earthworks, including harm to adults, eggs, and chicks during breeding season.
- Direct harm or death of forest or wetland birds through blade strike and collisions with transmission lines, notably kārearea/eastern falcon (Falco novaeseelandiae novaeseelandiae; Threatened – Nationally Vulnerable), koekoeā/long-tailed cuckoo (Eudynamys taitensis; Threatened – Nationally Vulnerable), and kererū/New Zealand pigeon (Hemiphaga novaeseelandiae; Not Threatened).

- Noise and lighting disturbance associated with wind farm operations.
- Increased accessibility and movement of mammalian predators via vegetation loss and the construction of new roads and tracks.

3.2 Effects management

In summary, these effects will be avoided, minimised, or remedied through:

Construction phase effects management

- Pre-construction surveys (prior to vegetation clearance) during bird breeding seasons (September – March, inclusive) within potential indigenous bird nesting habitat. The survey will assess whether indigenous birds are breeding within the proposed work site. A Suitably Qualified and Experienced Ecologist must undertake a survey no more than eight working days prior to works commencing to confirm that no indigenous bird species are nesting within the Project Footprint and surrounding area. Vegetation up to 50 metres from the construction footprint should be searched during each survey round. Surveying up to eight working days prior to vegetation clearance activities commencing reduces the possibility that a bird will start nesting and producing a clutch of eggs. This covers the breeding range of birds that may be nesting within the Project Site.
- Protocols for vegetation clearance during breeding season. Construction activities should not commence if nesting birds are detected within specified setbacks, and not resume until all chicks have fledged and the nests have been abandoned. In particular, the following setbacks between vegetation clearance and active nests will be imposed in accordance with Conditions EC31-33.
  - A 50-metre setback from active nests of 'Threatened', 'At Risk' indigenous bird species, and a 25m setback for non-threatened indigenous bird species (noting that the setbacks can be reduced on a case-by-case basis, if deemed appropriate by a Suitably Qualified and Experienced Ecologist).
  - A 200-metre setback from active nests of kārearea/eastern falcon (which can be reduced on a case-by-case basis, if deemed appropriate by a Suitably Qualified and Experienced Ecologist).
- Deployment and maintenance of sediment control measures to protect wetlands, as detailed in the Earthworks Management Plan.

Operational phase effects management

- Use of bird flight diverters (dynamic flappers) on sections of transmission lines that cross high quality bird habitat, at the southern rātā (Metrosideros umbellata)-kāmahi (Pterophylla racemosa) forest and the Port Blakely Forest wetlands (Figure 2).
- Protocols for managing accidental bird injury and mortality. All injured birds, live chicks and undamaged eggs displaced from a non-viable nest should be taken to a veterinarian for assessment and relocation to a rehabilitation centre.
- Bird collision monitoring.

Additionally, the HREP addresses significant **residual** adverse effects on avifauna and other terrestrial biodiversity values that cannot be avoided, minimised, or remedied. The HREP provides details on the location, type, and magnitude of introduced mammalian predator control, as well as proposed restoration and enhancement to offset or compensate for significant residual effects on avifauna associated with the Project.

All measures to address effects on indigenous avifauna (including residual effects) are summarised in Table 3 below.

Table 3 – Summary of avifauna effects management.

Avifauna	Effect to be managed	Key timeframes	Effects management	Relevant Management plans
Forest and wetland avifauna	**Construction impacts** Vegetation clearance	Bird breeding season (September to March inclusive)	Protocols to avoid loss of vegetation/habitat outside the required Project footprint (e.g., clear delineation of Project footprint boundary). Bird nest checks during bird breeding season (September to March inclusive). If nests are found, construction activities should be avoided within the required setback until all chicks have fledged and the nests have been abandoned. The following setbacks for the various indigenous avifauna species (by threat classification) between vegetation clearance and active nests will be imposed as follows: • a 50-metre setback (in all directions) from active nests for all indigenous bird species with a 'Threatened' and 'At Risk' classification (noting that the 50-metre setback can be reduced on a case-by-case basis, if deemed appropriate by a suitably qualified ecologist); • a 25-metre setback (in all directions) for all indigenous bird species that are classified as 'Not Threatened' (noting that the 25-metre setback can be reduced on a case-by-case basis, if deemed appropriate by a suitably qualified ecologist); and • A 200-metre setback (in all direction) from active nests of kārearea/eastern falcon). These setback distances may be altered depending on the recommendations during site surveys by a suitably qualified and experienced ecologist.	AMP and VMP
Threatened or At Risk species	**Operational impacts** Blade strike, collision with transmission lines	All year	Use of visual deterrents (dynamic flappers) to minimise bird collisions/interactions with transmission lines at two key habitats within the Project Site: (i) section of transmission line that crosses the large gully of southern rātā-kamahi forest and (ii) section of transmission line that crosses the Port Blakely Forest marsh wetlands. Collision mortality monitoring shall commence immediately following the date any wind turbine first generates electricity and continue for a minimum of 36 months post-commissioning of all wind turbines at the Southland Wind Farm. An adaptive management approach will be implemented based on the results of the collision monitoring.	

Avifauna	Effect to be managed	Key timeframes	Effects management	Relevant Management plans
All avifauna	**Construction and operational impacts** All significant residual effects that cannot be avoided, minimised, or remedied	All year	• Habitat restoration and enhancement measures including stock exclusion and deer control within indigenous habitats at Jedburgh Station, including the 245-hectare Jedburgh Station Ecological Enhancement Area. • Aerial control of mammalian pests across the 1,400-hectare Jedburgh Station Pest Control Area. • Intensive control of rodents within the 55-hectare Plateau Fauna Enhancement Area. • Deploying traps alongside all wind farm roads within the 1,400-hectare Jedburgh Station Pest Control Area to target pests such as mustelids, rats, hedgehogs, and if required, feral cats.	HREP

4.0 Pre-Construction Surveys

4.1 Overview

A preliminary field survey was undertaken in April 2023 to assess the presence of avifauna within the Wind Farm Site. Follow-up quarterly surveys were undertaken in February 2024, October/November 2024, February 2025, and May 2025, which included repeat five-minute bird counts (5MBCs), fixed point falcon surveys, flight height and path surveys, fernbird playback surveys, and acoustic surveys[1] to detect nocturnal and migratory bird species. These surveys followed the prescribed methodology to provide baseline data on the potential effects of construction on bird ecology and behaviour. Data from these surveys were used to inform a bird collision model prepared by Christie and Kessels (2025)[2]. At the time of writing, the final survey was to be completed in August 2025.

The quarterly surveys completed will provide baseline data to address temporal and seasonal changes, allowing for pre- and post-construction analysis.

Acoustic recorders were initially deployed for two weeks at the Jedburgh Plateau in October/November 2023 to detect cryptic birds (mātātā/South Island fernbirds *Poodytes punctatus punctatus*; At Risk – Declining) and potential presence of kotoreke/marsh crake (*Zapornia pusilla affinis*; At Risk – Declining), and matuku-hūrepo/Australasian bittern (*Botaurus poiciloptilus*; Threatened – Nationally Critical). Subsequent deployment of acoustic recording devices from November 2024 to May 2025 has been undertaken to detect nocturnal (e.g. ruru/morepork *Ninox novaeseelandiae novaeseelandiae*; Not Threatened) and migrating birds that call in flight (noting that acoustic recorders will also be used in the August 2025 survey round).

4.2 Selection of survey sites

Survey sites that provide a representative assessment of the habitats present within the Project Site and optimise the collection of high-quality baseline data were selected. The data collected to date has been used to inform the potential effects of construction and operation of the wind turbines on bird behaviour and abundance during the various Project phases. Five primary representative habitat types have been identified (Figures 1a and 1b):

1. Indigenous broadleaved forest

This indigenous forest habitat type is situated in a large gully within Jedburgh Station outside of the Project footprint. Vegetation in the area is dominated by southern rātā-kāmahi forest. The survey sites encompass mature forest and indigenous scrub margins.

2. Mānuka forest and scrub

Extensive areas of forest and scrub with a near exclusive canopy of mānuka (*Leptospermum scoparium*) occur at middle elevations on Jedburgh Station. This vegetation type is also common on the upland parts of the property and is restricted to gullies at low elevation.

3. Wetland and shrubland mosaic

Low-stature indigenous shrubland and fen and bog wetlands are key features of the Jedburgh Plateau. Vegetation consists of a mosaic of indigenous shrubland species such as mānuka (*Leptospermum scoparium*), inaka (*Dracophyllum longifolium*), and *Veronica odora*, and fens and bogs that support a range of indigenous herbaceous species.

[1] Acoustic surveys were not undertaken in February 2024.

[2] Christie D. and Kessels G. 2025: Bird collision model for the proposed Southland Wind Farm. Prepared for Contact Energy Ltd.

4. Exotic conifer plantation forest

Exotic conifer plantation comprising radiata pine (*Pinus radiata*) and Douglas fir (*Pseudotsuga menziesii*) is present within Matariki Forest. At higher elevations, some indigenous scrub is located on the edges of the plantation and exposed ridges. Most of the upper elevations have a cover of younger plantation pines, with gaps between pines filled by exotic scrub species. The pine plantation and associated indigenous scrub and exotic scrub areas are included in the survey sites.

5. Pasture

This habitat is primarily grazed pasture with remnants of indigenous vegetation, primarily mānuka and gorse (*Ulex europeaus*) in narrow gullies. Survey sites traversed open pastures and gullies.

4.3 Five-minute bird counts

Pre-construction five-minute bird counts (Hartley and Greene 2012, Dawson and Bull 1975) were carried out along transects in April 2023, February 2024, October/November 2024, February 2025, and May 2025. Two additional transects were added to the February 2024 survey (onwards) in order to cover areas of mānuka forest and scrub at Jedburgh Station.

Each of the 12 transects comprises eight count stations spaced at least 200 metres apart. The location of transects and count stations were recorded using a hand-held GPS unit (Figures 1a and b).

At each station, the observer stood quietly and recorded all birds seen and heard within a radius of approximately 100 metres, over a five-minute period. Care was taken to minimise the possibility of double counting of the same individuals. Observations were undertaken during daylight hours and in varying weather conditions. Two observers counted each transect during a sampling round. Each observer completed a morning and afternoon count on each transect to reduce observer bias.

The final round of pre-construction five-minute bird counts will be completed in August 2025.

4.4 Kārearea/eastern falcon

Additional Kārearea/eastern falcon monitoring was undertaken at sites located throughout the Wind Farm Site and where good visibility exists (Figures 1a and 1b). These data were complemented by flight height survey data (described in Section 5.2), which will also inform the kārearea/eastern falcon monitoring.

Commencing in October 2024 through to May 2025, kārearea/eastern falcon surveys have been carried out on a quarterly basis at the six fixed-point stations established during the February 2024 survey. Surveys have ensured that all previously identified falcon observation points are included and that at least 10 minutes of observations are recorded at the observation points with binoculars. The observation stations have been selected based on previous sighting records and the presence of preferred habitat type (e.g. rocky outcrops, scarps, and ledges).

Data collected during flight height surveys and five-minute bird counts also recorded any kārearea/eastern falcon observations. Where possible, flight paths were recorded and mapped.

Observation points have been established and used to track kārearea/eastern falcon in flight, observing their direction and flight height, and to identify potential nesting locations e.g. rocky outcrops, scarps, and ledges.

Habitat features were recorded, including vegetation type, slope, aspect, elevation, terrain, distance to water, and distance to human infrastructure. Data on habitat features will be used to predict the probability of eastern falcon nesting in unoccupied areas in the future. Where possible, surveys were undertaken in fine weather with good visibility.

4.5 Acoustic surveys

In the October/November 2024, February 2025, and May 2025 surveys, 22 AR4 digital recorders were deployed in the 5MBC areas and in locations close to as many turbines as possible (Figures 1a and AMP-1b). This was to record the calls of nocturnal and any cryptic species that may be present, including mātātā/South Island fernbird, kotoreke/ marsh crake, matuku-hūrepo/Australasian bittern, ruru/ morepork, and migrating seabirds in flight. The deployment period was a minimum of two weeks.

The recorders were programmed to record nightly from 20:05-06:35, and set to the "high" recording protocol, which captures audio with a 32kHz sample rate and 16-bit depth. Analyses of the files were undertaken by Digilab Ltd on a purpose-built AI workstation that had been 'trained' to detect the following ten key species at the Southland Wind Farm Site:

- Kotoreke/marsh crake.
- Kuaka/bar-tailed godwit.
- Mātātā/South Island fernbird.
- Matuku-hūrepo/Australasian bittern.
- Ruru/morepork.
- Tara/white-fronted tern (*Sterna striata*).
- Taranui/Caspian tern (*Hydropogne caspia*).
- Tarapirohe/black-fronted tern (*Chlidonias albostriatus*).
- Tītī /sooty shearwater (*Ardenna grisea*).
- Tōrea/South Island pied oystercatcher (*Haematopus finschi*).

4.6 Mātātā/South Island fernbird

Supplemental to 5MBC surveys and incidental data on mātātā/South Island fernbird, acoustic monitoring was undertaken at predetermined stations within optimal fernbird habitat on the Jedburgh Plateau (15 stations) and Matariki Forest (six stations) (Figures 1a and 1b below). A recorded fernbird call was played and a response listened (for less than 30 seconds, with long pauses between playing calls, and a maximum period of 3-5 minutes) at each station.

No additional playback call monitoring will be undertaken for mātātā/South Island fernbird prior to the commissioning of the wind farm.

4.7 Flight Height Surveys

Overview

Flight height monitoring stations have been established throughout the Project Site, with data collection concurrent with five-minute bird counts. Locations of the surveys are at sites with maximum visible coverage for that habitat type.

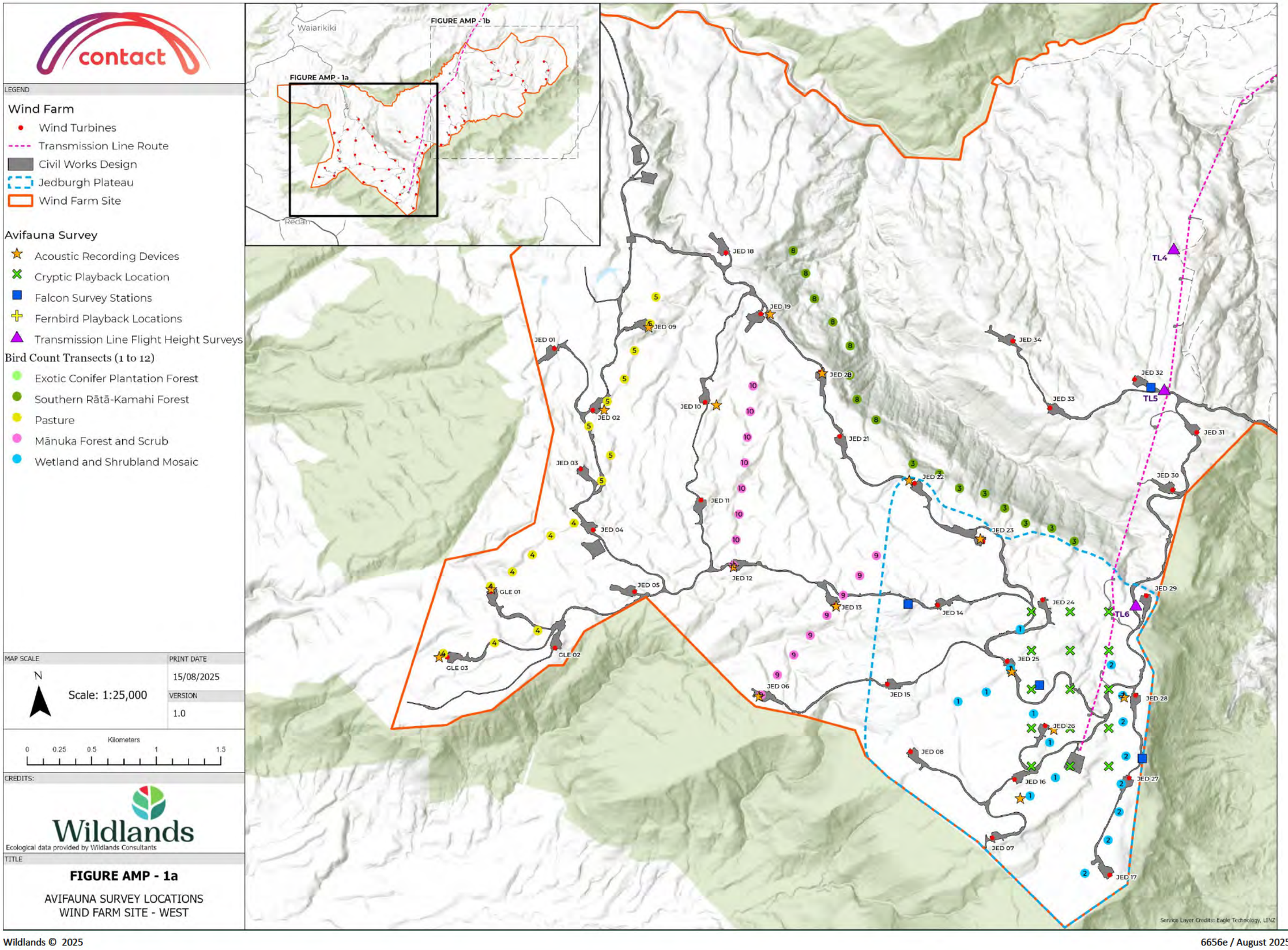
Birds that fly close to ground level and below the theoretical rotor-swept-area (RSA), such as the indigenous pīhoihoi/New Zealand pipit (*Anthus novaeseelandiae novaeseelandiae*) and mātātā/South Island fernbird are less likely to encounter a moving blade. Birds that frequently fly between 30-200 metres, such as the introduced Australian magpie (*Gymnorhina tibicen*, Introduced and Naturalised), and indigenous tūī (*Prosthemadera novaeseelandiae novaeseelandiae*, Not Threatened), kāhu/swamp harrier (*Circus approximans*, Not Threatened), and karoro/Southern black-backed gull (*Larus dominicanus dominicanus*, Not Threatened) are more likely to be at risk of blade collision.

Flight height zones are generally poorly understood for waders and migratory seabirds in New Zealand, but some species, such as the matuku-hūrepo/Australasian bittern, cover huge distances within New Zealand. Although considered highly unlikely, their flight routes could pass through the wind farm and the RSA of the turbines. It should also be recognised that migration patterns for some species through wind farm sites will be difficult to describe with current survey technology due to the cryptic behaviour of some bird species (i.e. flying at night or at high elevations) and the rare occurrence of migration events.

The flight height surveys provide baseline information on birds flying at various heights, providing a snapshot of the number of birds flying through the area. If any birds are killed or injured through turbine strike, it may be possible to estimate the impact on the local species.

Survey methodology

- The locations of the six observation stations have been identified and fixed with GPS coordinates during the surveys undertaken in 2024 and 2025.
- Counts have been undertaken in conjunction with the five-minute bird counts with regards to the logistics of site access.
- Where possible, at each flight path station, a fixed feature was measured for height (e.g., the height of a tree or power pole) to use as a reference and height calibration tool. The location and height of this feature was noted for future surveys.
- During the 30-minute observation periods, flight paths were drawn onto aerial photographs, and records of flight heights above the ground were compiled. The species, estimated number of individuals (for flock flights), habitat types flown over, and flight time were recorded for each observed flight.
- Three flight height ranges were used to categorise bird flight: 'below blade', which included any birds flying below the lower point of turbine blades, 'above blade' for birds flying over the maximum turbine rotor height, and 'at blade height' for birds flying within the lower and upper blade heights.
- Flight height and flight behaviour were recorded, e.g. straight flight, circling or changeable flight direction.
- Where possible, flight purpose was evaluated, e.g. hunting, foraging, commuting, or predator evasion.
- Weather was recorded to account for the effect that different conditions have on bird behaviour.


contact
LEGEND
Wind Farm
Wind Turbines
Transmission Line Route
Civil Works Design
Jedburgh Plateau
Wind Farm Site
Avifauna Survey
Acoustic Recording Devices
Cryptic Playback Location
Falcon Survey Stations
Fernbird Playback Locations
Transmission Line Flight Height Surveys
Bird Count Transects (1 to 12)
Exotic Conifer Plantation Forest
Southern Rātā-Kamahi Forest
Pasture
Mānuka Forest and Scrub
Wetland and Shrubland Mosaic
Waiarikiki
Redan
FIGURE AMP - 1b
FIGURE AMP - 1a
JED 18
JED 19
JED 09
JED 01
JED 34
JED 32
TL4
TL5
JED 33
JED 31
JED 28
JED 10
JED 02
JED 21
JED 03
JED 22
JED 30
JED 11
JED 23
JED 04
JED 12
JED 29
JED 05
GLE 01
JED 13
JED 14
JED 24
TL6
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GLE 03
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JED 16
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JED 07
JED 17
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Wildlands
Ecological data provided by Wildlands Consultants
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FIGURE AMP - 1a
AVIFAUNA SURVEY LOCATIONS
WIND FARM SITE - WEST

contact

LEGEND

Wind Farm

- Wind Turbines
- Transmission Line Route
- Civil Works Design
- Jedburgh Plateau
- Wind Farm Site

Avifauna Survey

- Acoustic Recording Devices
- Cryptic Playback Location
- Falcon Survey Stations
- Fernbird Playback Locations
- Transmission Line Flight Height Surveys

Bird Count Transects (1 to 12)

- Exotic Conifer Plantation Forest
- Southern Rātā-Kamahi Forest
- Pasture
- Mānuka Forest and Scrub
- Wetland and Shrubland Mosaic

MAP SCALE	PRINT DATE
N Scale: 1:25,000	15/08/2025
	VERSION 1.0

Kilometers

0 0.25 0.5 1 1.5

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TITLE

FIGURE AMP - 1b

AVIFAUNA SURVEY LOCATIONS
WIND FARM SITE - EAST

Service Layer Credits: Eagle Technology, LINZ

contact

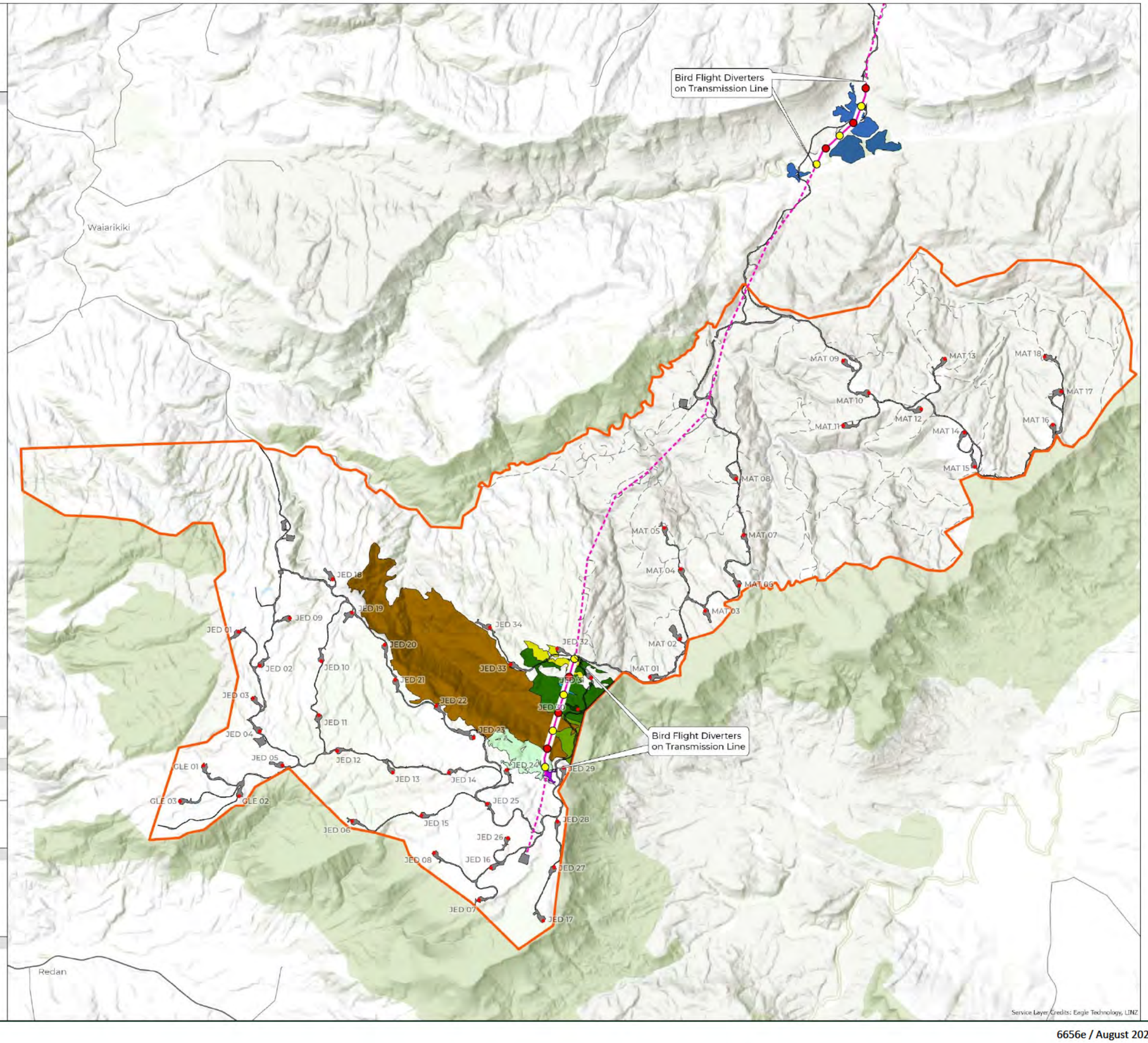
LEGEND

Wind Farm

- Wind Turbines
- Transmission Line Route
- Civil Works Design
- Wind Farm Site

Diverters and Vegetation Types

- Bird Flight Diverters (Dynamic Flappers)
- Bog wetland
- Copper tussock/rautahi marsh
- Fen wetland
- Mānuka forest and scrub
- Mānuka-haumakaroa-mountain holly forest
- Mānuka-inaka-mountain holly-(gorse) scrub and shrubland
- [Mānuka]/gorse-tauhinu scrub
- Southern rātā-kamahi forest



MAP SCALE	PRINT DATE
N Scale: 1:50,000	15/08/2025
	VERSION 1.0

Kilometers
0 0.5 1 2 3

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TITLE

FIGURE AMP - 2

LOCATION OF PROPOSED BIRD FLIGHT DIVERTERS ALONG THE TRANSMISSION LINE ROUTE

5.0 Protocols for Managing Vegetation Clearance Effects on Avifauna

5.1 Overview

Best practice measures to avoid or minimise potential adverse effects from wind farm activities identified during surveys are set out below. These measures will be discussed with TAMI so that the use of mātauranga and tikanga Māori can be incorporated as appropriate.

Indigenous terrestrial habitats and all wetland habitats are focal areas for managing effects on indigenous birds. No constraints on the clearance of pine forest or other exotic non-wetland vegetation are required in respect of care for avifauna habitat, as effects on avifauna within these habitats are considered low and/or out of scope for this project. Matariki Forest will be responsible for managing the clearance of pine forests under their own consents, including any associated potential effects on avifauna.

5.2 Bird nest checks during breeding season

Vegetation removal during the breeding season (September to March inclusive) could result in adverse effects on indigenous birds. Breeding birds could lose adults, eggs, or chicks that are present in areas where vegetation is cleared.

Therefore, the following protocols will be undertaken to avoid or minimise effects on indigenous birds within terrestrial and wetland habitats:

- Indigenous bird nest surveys will be undertaken during the bird breeding season in advance of vegetation/habitat clearance.
- They will occur a maximum of eight working days prior to vegetation removal commencing in accordance with Condition EC31.
- If no active nests are found, vegetation within the surveyed area may be cleared within two working days.
- Construction activities should not commence / cease if nesting birds are detected within specified setbacks, and not commence / resume until all chicks have fledged and the nests have been abandoned. In particular, setbacks between vegetation clearance and active nests in accordance with Condition EC32 will be imposed as follows:
  - A 50-metre setback from active nests of 'Threatened' and 'At Risk' indigenous bird species (noting that the 50-metre setback can be reduced on a case-by-case basis, if deemed appropriate by a suitably qualified ecologist);
  - A 25-metre setback from active nests of non-threatened indigenous bird species (noting that the 25-metre setback can be reduced on a case-by-case basis, if deemed appropriate by a suitably qualified ecologist); and
  - A 200-metre setback from active nests of kārearea/eastern falcon (noting that the 200-metre setback can be reduced on a case-by-case basis, if deemed appropriate by a suitably qualified ecologist).
- The exclusion setback zone is to be marked clearly with temporary cordoning for the attention of construction workers to ensure personnel do not disturb nesting indigenous birds.
- A Suitably Qualified and Experienced Ecologist is required to confirm when chicks have fledged and vegetation within the exclusion zone can be cleared.

6.0 Kārearea/Eastern Falcon Nest Discovery

If a kārearea/eastern falcon nest is identified at the Wind Farm Site during construction through active nest search surveys, or in the first two years of operation, the following protocols will be implemented (in accordance with Condition EC33):

- The location of the nest will be recorded using GPS.
- The site will be clearly demarcated on the ground to avoid inadvertent disturbance.
- Construction activities will be set back by at least 200 metres from the nest.
- While reducing the setback distance may increase the risk of impacting kārearea/eastern falcon nest success, this distance may be reduced by a Suitably Qualified and Experienced Ecologist during monitoring.
- Where a nest is located within 200 metres of construction activity, which cannot be deferred, monitoring of the nest will intensify as follows:
  - An observer will monitor the nest during all construction activity within 200 metres of the nest throughout the incubation phase;
  - Intensive nest minding will occur every second day thereafter for the first fortnight after hatching; and
  - Monitoring will include intensive observational notes on behaviour (noting that construction activity may adversely affect breeding behaviour).
- For all falcon nest checks **within 200 metres of construction activities**, the following variables will be recorded until construction in this area is complete:
  - Date and time;
  - GPS location and/or area of checking; and
  - Outcome of bird nest check (e.g., presence or absence of active nests, size of clutch where safely discernible).
- In the event that the 200-metre exclusion zone is triggered and the kārearea / eastern falcon start to dive bomb workers in the area, the number of dive bombs shall be monitored. If this results in five or more dive bombs per day, then the exclusion zone will be extended further from the nesting area. The revised exclusion distance shall be determined by a Suitably Qualified and Experienced Person. If the dive bombing continues, the Consent Holder shall continuously review this setback requirement until it ceases.

7.0 Post-Construction Monitoring

7.1 Continued monitoring

Post-construction avifauna monitoring will continue following the prescribed methodologies above (Section 4) and will be undertaken to provide data on the effects of construction on bird ecology and behaviour post-construction in accordance with Conditions EC35 and EC36. Monitoring will be undertaken seasonally (i.e. on a **quarterly** basis) as per the pre-construction surveys to allow for seasonal variation in bird abundance, and will continue for **three years** (36 months) after the commissioning of the wind turbines.

In brief, the monitoring will include the following (as set out in Sections 4.3 to 4.6):

i. Five-minute bird counts across the same 12 transects (as shown in Figures 1a and 1b);
ii. Fixed point surveys for kārearea/eastern falcon and kererū;
iii. Bioacoustics monitoring surveys to detect cryptic birds and nocturnal species within the Project Site;
iv. Fixed-point and bioacoustics monitoring surveys at wind turbine locations and along the transmission line route; and
v. Playback call monitoring for mātāta / South Island fernbird shall be completed within the Project Site annually between January and February.

In addition, flight height surveys will be undertaken for **12 months** following the commissioning of the wind farm following the methods in Section 4.7.

7.2 Collision mortality monitoring

Overview

Bird collision monitoring will begin following the commencement of the operation of the first wind turbine and be completed on a seasonal basis for a minimum of three years following the commissioning of the final wind turbine, and every five years thereafter (during each season) for the duration of the operation of the Southland Wind Farm (in accordance with Condition EC37). This monitoring is required to validate (and update) the original bird collision model prepared for the proposed wind farm. It will also be measured against the Compensation Trigger for the individual species listed in Condition EC37B.

The bird collision monitoring programme will include (but not be limited) to the following requirements:

- Identification of search areas across the Wind Farm Site, representing a range of habitat types and elevations;
- Calculation of the probability of bird carcass loss to scavengers, decomposition and other causes, taking into account temporal, environmental and other sources of variation; and
- Calculation of the probability of carcass detection by searchers, which may include searching assisted by suitably trained dogs, taking into account temporal, environmental, searcher identity and other sources of variation.

Sampling regime

Based on Strickland *et al.* (2011) it is recommended that 30% of the total number of turbines be searched within a Project site. Therefore, 17 turbines (of the total of 55) should be monitored for bird collisions. Each turbine should be visited seasonally by a Suitably Qualified and Experienced Ecologist. Collision mortality monitoring should be undertaken for a minimum of 36 months following the commissioning of the wind turbines.

Search technique

For each selected turbine a search area with a radius of two-times the length of the proposed turbine blades will be divided and marked into eight 45° wedges. Each wedge will be subdivided into three segments (15° wedges), with each major wedge and minor segment line given specific annotations (Figure 3). This methodology follows the Bull *et al.* (2013) study at Project West Wind, Wellington. The observer travels along each major wedge and minor segment line scanning either side for carcasses.

During searches in high vegetation areas, a zig-zag pattern should be used within the dense habitat between the affected segments in order to thoroughly cover the search area (Drachmann *et al*. 2021). This approach will ensure that the area closest to the theoretical base of the turbine, where most carcasses are likely to be found (Young *et al.* 2003, Choi *et al.* 2020) is searched most thoroughly. Each turbine search will be walked, with the observer searching 20 metres on both sides of the segment lines to ensure the full coverage of the proposed search area.

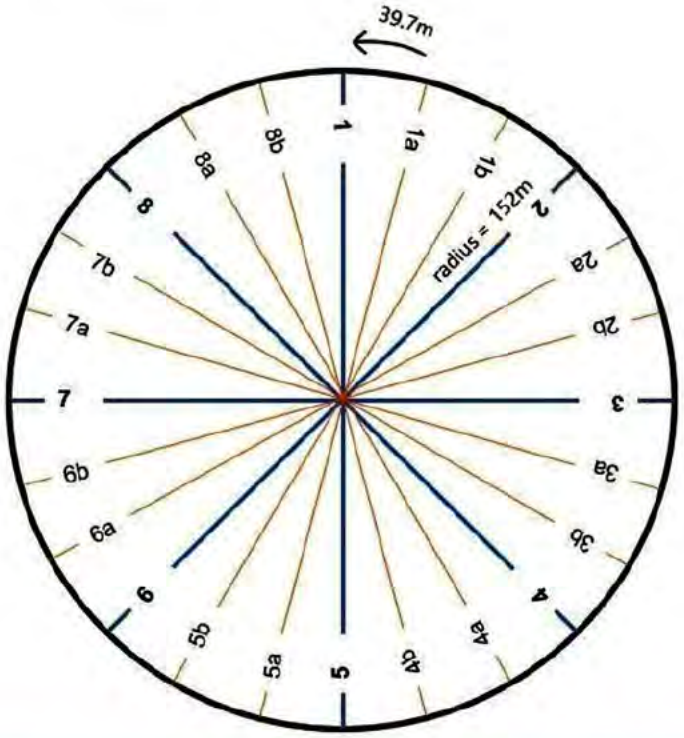

Figure 3 – Proposed search area for turbine collision monitoring. The search area will be centred around the selected turbine, and the radius represents two times the length of a turbine blade.

The position of any carcasses found will be recorded using a GPS unit to provide a 10-figure reference. Accompanying photographs should be taken. Following Johnson *et al.* (2002), the condition of carcasses will be recorded using the following categories:

- Intact – a completely intact carcass, is not badly de-composed and shows little to no sign of being predated or scavenged.
- Scavenged – an entire carcass showing signs of predation or scavenged or dismembered (portions) in one focal location (e.g., wings, skeletal remains, legs, pieces of skin).
- Feather patch – a patch of 10 or more feathers, or two or more primaries, indicating predation or scavenging.

Carcasses or parts found near turbines will be considered wind farm-related casualties unless another cause of death is obvious. Carcasses of kārearea/eastern falcon and other 'Threatened' or 'At Risk' indigenous species will be taken for post-mortem on the day of discovery or as soon as possible after. If the species cannot be determined *in situ*, carcasses of other indigenous species will be frozen or retained for potential post-mortem analyses or identification. Given the focus on indigenous species, only carcasses of these species will be kept for future necropsy.

All carcasses found within each turbine monitoring area should be collected, photographed as found, and GPS location recorded. A draft Turbine Record Sheet is provided for this purpose (Appendix 1). A Carcass Search Field Form (Appendix 2) is also included and should be completed for each carcass found. This form records (Johnson *et al*. 2002):

- Date and time located.
- Identification number.
- Species (if known).
- Age (if known).
- Sex (if known).
- Carcass condition (intact, scavenged, feather spot).
- Probable cause of death (if apparent).
- Turbine number.
- Distance to turbine base.
- Bearing to turbine tower.
- Major or minor segment line where carcass was detected.
- Weather conditions at time of collection (see next section).

As stated above, collision mortality monitoring should be carried out for a minimum of 36 months post-commissioning of the wind turbines.

Carcass detection and persistence trials

International research has shown that bird size is a significant factor in detection trials, with the height and type of vegetation also playing a significant role (Morrison 2002). Searcher efficiency can also differ between observers, therefore data is needed to understand differences in carcass detection, for both large and small size classes, and how these rates vary across different observers. Persistence rates are needed to account for the loss of carcasses to decay and scavenging. These data are used to estimate how many birds killed by the turbines in the weeks or months previous to a search are likely to remain and be counted in a subsequent survey.

It is proposed to undertake trials to gather data on the persistence of carcasses across weeks and months (and after exposure to decay and scavenging), and differential recovery rates across different observers and different-sized bird species. These trials will need to be undertaken in similar habitats near, but outside of, the wind farm footprint, to avoid attracting scavenging wildlife to the wind farm.

The search area will follow the same design as that proposed for the collision mortality monitoring Detection carcasses will be placed out on the previous day to commencement of the search period, on or near segment lines as determined by a random order.

7.3 Triggers for compensation

Overview

Bird collision monitoring shall be measured against the Compensation Trigger for the individual species listed in Condition EC37B (Table 4 below). The annual mortality period shall commence following the date of the commissioning of the first wind turbine at the Southland Wind Farm and thereafter on 1 July – 30 June annually.

A monitoring report will be prepared and be provided to the Department of Conservation (Invercargill Office) for review and comment within 20 working days of the anniversary of the commencement of bird collision monitoring (in accordance with Condition EC37D). The monitoring report will present, summarise and analyse the data collected in the preceding year and report on the operation of the Project against the objective of the AMP and the Compensation Trigger for individual species set out in Condition EC37B.

Response in event that triggers are exceeded

In the event that the bird collision monitoring identifies that the mortality of any individual bird species listed in Condition EC37B has equalled or exceeded the compensation trigger for that individual species, compensation will need to be implemented to address the effect. The compensation will aim to enhance a known habitat or breeding site of the affected bird species in New Zealand to address the residual effects of the operation of the Southland Wind Farm on avifauna. This may be in the form of additional predator control or habitat enhancement or the provision of funding to an existing or proposed predator control or habitat enhancement programme for the affected bird species (as set out in Condition 37E).

Table 3 – Compensation triggers for individual species

SPECIES	CONSERVATION STATUS	TAONGA SPECIES AS PER NGĀI TAHU CLAIMS SETTLEMENT ACT 1998	COMPENSATION TRIGGER (ANNUAL MORTALITY)
Nationally Critical or Nationally Endangered Species			
Australasian bittern/matuku- hūrepo	Critical	No	1
Black-fronted tern/tarapihore	Endangered	Yes	2
Any other Nationally Critical species			1
Any other Nationally Endangered species			2
Nationally Vulnerable Species			
Eastern falcon/kārearea	Vulnerable	Yes	2
Long-tailed cuckoo/koekoeā	Vulnerable	Yes	3
Wrybill/ngutu pare	Nationally Increasing	No	3
Any other nationally vulnerable species			3
At Risk and Other Species			
Godwit/kūaka	Declining	Yes	5
New Zealand pipit/pīhoihoi	Declining	Yes	5
Black-billed gull/tarāpuka	Declining	No	5
Red-billed gull/tarāpunga	Declining	No	5
South Island fernbird/ mātātā	Declining	Yes	5
Pied oystercatcher/tōrea	Declining	No	5
Sooty shearwater/tītī	Declining	Yes	5
South Island kākā	Recovering	Yes	5
Fairy prion/tītī wainui	Relict	Yes	8
Black shag/māpunga	Relict	Yes	5
Little shag/kawaupaka	Relict	Yes	5
Kererū	Not Threatened (but Conservation Dependent)	Yes	5
Pied stilt/poaka	Not Threatened	Yes	10
Any other At Risk species			8
Any other indigenous or taonga bird species not listed above			50

8.0 Bird Injury and Mortality Protocols

A protocol for dealing with bird carcasses and injured native birds including, but not limited to, kererū, kārearea/eastern falcon, matuku-hūrepo/Australasian bittern, mātātā/South Island fernbird, koekoeā/long-tailed cuckoo, and pīhoihoi/New Zealand pipit is required by Condition EC80.

The location of any discovered native bird or carcass must be recorded, the bird photographed at the location, and an incident mortality data sheet filled out (Appendix 2). If carcasses are located at the Wind Farm Site, either incidentally or during carcass searches, relevant data will be recorded in the mortality monitoring programme and included in an annual report alongside the results of the mortality monitoring.

Should any evidence be found of injury and/or mortality of any 'Threatened' or 'At Risk' species in accordance with the New Zealand Threat Classification System through interaction with wind farm infrastructure, DOC should be contacted immediately and then a 'Threatened or At Risk species' report will be prepared for Southland District Council as soon as practicable after the event (Condition EC80).

If an injured indigenous bird is found during construction or operation of the wind farm, the following procedures will be implemented:

- Injured indigenous birds will be taken immediately to a veterinarian approved by the Department of Conservation for assessment;
- Birds will be placed in a cool, dark, material-lined box/bag by or under the direction of an ornithologist to ensure the bird is handled appropriately;
- The local Department of Conservation office or DOC hotline (if after hours) will be contacted no later than two hours after the injured or dead bird is found. The DOC hotline is 0800 DOCHOTLINE (0800 362 468); and
- Contact information for approved contact in the event of indigenous bird injury or mortality shall be advised by DOC.

It is anticipated that mana whenua involvement will be through established protocols with DOC. However, a process for notifying TAMI will also be confirmed.

DOC and veterinary advice shall be sought in conjunction with the Project Ecologist when considering the rehabilitation requirements of any injured indigenous birds (for example, legislative requirements will need to be considered). Once the veterinarian has made an assessment, the Project Ecologist will, taking into account the advice from the veterinarian, arrange for the delivery of the bird to a rehabilitation centre. If the bird is euthanised by the veterinarian, it must be taken to the local DOC office as soon as practicable.

9.0 Incidental Discovery Protocol (Threatened and At Risk Species)

All personnel working on site are responsible for alerting the Environmental Manager and the site manager of the discovery of any 'Threatened' or 'At Risk' avifauna not otherwise identified in this management plan on the same working day as the discovery. Any 'Threatened' or 'At Risk' avifauna species not identified in this management plan will be reported to the Department of Conservation Local Area Manager and Te Ao Marama Inc. All such discoveries will be recorded in a database with an incident register and log of actions taken for each discovery.

All personnel working on site should be aware of the potential that birds that were not observed during a site survey or are not identified in the management plan may be present on site. While undertaking work, all personnel should be observant of any indigenous birds within the works area and must notify the Environmental Manager if any indigenous birds that are not identified in this Plan are detected. Works should cease in the immediate vicinity of the discovery until the species has been identified and appropriate action taken.

10.0 Compliance Monitoring and Reporting

10.1 Post-construction reporting

An annual report will be submitted to Southland District Council and the Department of Conservation by 30 September for a minimum of three years following the commencement of the operation of the first wind turbine at the Southland Wind Farm, and every five years thereafter for the life of the Project (as per EC36).

This report can be submitted as part of the broader package of annual reporting or individually and shall include:

- Confirmation that effects on avifauna were managed in accordance with this AMP and associated consent conditions;
- Monitoring methodology and locations; and
- Discovery of any active nests, chicks (dead or live), or dead adult birds.

10.2 Bird collision monitoring report

All results of the bird collision monitoring programme will be provided in writing annually (1 July to 30 June) by 30 September to Southland District Council and the Department of Conservation for a minimum of 36 months following commissioning of the wind turbines.

The monitoring report shall present, summarise and analyse the data collected in the preceding year and report on the operation of the Project against the objective of the AMP and the Compensation Trigger for individual species set out in Condition EC37B.

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Appendix 1

Turbine record sheet – Southland Wind Farm

	Date	Turbine	Observer	Start time	Finish Time	Carcass located	Turbine activity*
1							
2							
3							
4							

* Turbine activity: 0 = Stationary, 1 = Slowly turning / idling, 2 = Normal, 3 = Fast moving

Appendix 2

Carcass Search Field Form – Southland Wind Farm

SOUTHLAND WIND FARM - CARCASS SEARCH FIELD FORM					
Please fill out all details above the heavy line for each site searched, even if no carcasses are found. All details below the line are required if a carcass is found; one form per carcass					
Observer:	**Date:**	**Start time:**	**Finish time:**		
Turbine identifier:					
Vegetation	**Description** (incl. vegetation type):				
	Average height:	**Density:** Very dense / Dense / Moderate / Sparse / Very sparse			
Temperature	**Wind direction/speed:**	**Humidity:**			
Search purpose (e.g. scavenger trial, monitoring, incidental find):		**Search completed:** Yes / No			
Onsite works in last 5 days:					
Weather conditions in last 5 days:					
Comments:					
Carcass details	**Time:**	**Coordinates:**	**Substrate:**		
Distance from tower (m):		**Bearing from tower (Deg):**			
Species name:		**Age/sex?**			
Photo taken (attach to form)					
Carcass condition: Intact, Scavenged, Feather spot	**Describe:**				
Estimate the age of the carcass (tick category):	**<24 hours**	**1-3 days**	**>3 days**	**Other**	
Other notes (incl. presence of stock, or other factors affecting results):					
Further actions required: 1. Place carcass in sealable bag, write the turbine, date, time and radial wedge designation on bag with marker pen, double bag, then take to freezer at site office as soon as possible 2. One form should be completed for each carcass found, as well as searches that do not result in a carcass **3.** Please attach photograph to this form.					

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