Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

[redacted]

Prepared by:

SLR Consulting New Zealand

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Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	6 October 2025	Steve Rate Mike Wakelin	Hamish Dean Keren Bennett	Steve Rate

Basis of Report

This report has been prepared by SLR on the instructions of our Client, in accordance with the agreed scope of work. It is intended to support the Client's application under the Fast Track Approvals Act 2024 and may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While SLR has exercised due care in preparing this report, it does not accept liability for any use of the report beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Executive Summary

This Ecological Assessment for vegetation, wetlands, and terrestrial invertebrates has been prepared by SLR for Tararua Wind Power Limited to support the approvals for Mahinerangi Wind Farm Stage 2.

Terrestrial vegetation

The Wind Farm Site is characterised by a network of waterways/gullies separated by low ridges. The flatter ridgetops largely contain grazed exotic grassland and brassica crops. Modified remnants of snow tussock grassland remain at some ridgetop sites and on gully walls. Indigenous shrublands are present at a few sites on gully walls and floors. A small area of recently replanted plantation forest is present. Rock outcrops are uncommon.

The Ecological Monitoring and Management Plan required by Clutha District Council land use consent RM1409 condition 25D provides measures to prevent potential weed introduction and spread within the site.

A comparison was made of the extent of vegetation clearance between a realistic consented layout and the proposed Stage 2 layout. This showed that the Stage 2 layout will result in less potential clearance of snow tussock grassland, indigenous shrublands, and wetlands. The reduction is due to a change in Contingency Zone layout and a new configuration of Surplus Fill Disposal areas which avoid wetlands, as well as a reduction in the number of turbines and roads. In addition, the Thomas Block which contains high-quality snow tussock grassland will be completely avoided in Stage 2. Overall, the impact on mapped indigenous vegetation types and wetlands is lower for the proposed Stage 2 when compared with the realistic consented layout.

Indigenous vegetation clearance has been authorised by way of existing land use consent RM1409 with the “Scrappy Pines” QEII Covenant being provided as 59.2 ha compensation. Rehabilitation and revegetation of areas affected by construction activities is required to be undertaken in accordance with the Rehabilitation Management Plan required by condition 25C.

Wetlands

Natural wetland assessments were undertaken following the methods outlined in the Wetland delineation protocols (Ministry for the Environment (MfE) 2022). Natural wetlands are present in gully floors, on gully walls, and in flatter areas where drainage is poor.

Stage 2 has been designed to avoid wetlands wherever practicable to do so. However, there are two instances where works occur within a wetland, and a further six instances where works occur outside of a wetland but within 10 m of a wetland. These are principally associated with the roading access. For the transmission line corridor, there are a further three instances where works are proposed outside of, but within 10m of a wetland.

For the limited instances where avoidance of a wetland has not been practicable, compensation by way of wetland enhancement is proposed and management of wetlands (including those other wetlands within 100 m of works) will be addressed by the Wetland Monitoring and Management Plan.

In the two instances where the roading access results in the physical disturbance of the natural wetlands which cannot be practicably avoided, the loss of wetland extent is approximately 476 m^2 (0.05 ha). This loss will be compensated for by rehabilitating nearby wetlands, guided by the Wetland Compensation Plan.

Indirect adverse effects on wetlands will be avoided by not blocking waterways and runoff, minimising the length of new flow paths, directing all flows that would have originally flowed

into a gully into the same gully, locating and contouring fill disposal sites to conserve catchment areas, and including appropriate armouring of drains and areas downstream of culvert outlets to reduce the effects of any increased flow velocity. The Environmental Construction Management Plan (ECMP) and Erosion and Sediment Control Plan (ESCP), which will follow best practice methods for control of sediment, storage of fuels and oils, vehicle re-fuelling and maintenance, and management of hazardous materials.

In addition, some wetlands within 100 m of works sites will be monitored using the Wetland Monitoring and Management Plan to ensure no adverse effects occur.

Flora

The *Carex tenuiculmis* and *Epilobium chionanthum* Management Plan will manage potential effects on *Carex tenuiculmis* and *Epilobium chionanthum,* both At Risk species. These species were recorded in some wetlands which will be avoided.

Transmission Corridor

No works are proposed within wetlands in the Transmission Corridor. There are two instances (in respect of five wetlands) where access tracks associated with transmission line poles will be located within 10 m of wetland extent. Management of these wetlands (and other wetlands within 100 m of works) will be addressed by the Wetland Monitoring and Management Plan.

Based on the proposed Stage 2 layout, 614 m^2 of rough pasture with scattered snow tussocks will be cleared during construction of access tracks and erection of the transmission line pole structures.

Habitats within the Transmission Corridor will be subject to the same management plans as the Stage 2 area, preventing adverse effects on threatened plant species and wetlands.

Invertebrates

Due to existing agricultural modifications, impacts on terrestrial invertebrates from the variations to the land use consent and new activities are expected to be minimal. In addition, any small adverse effects on invertebrates will be mitigated through remediation of habitat at earthworks sites in accordance with 25C and within the Wetland Compensation Site, and the covenanted QEII area.

Management summary

Actual or Potential Effect	Proposed Management	Relevant Plan
Loss of wetlands	Wetland compensation: • Fencing • Legal protection • Monitoring of compensation works	Wetland and Aquatic Compensation Plan
Loss of snow tussock grassland	• Tussock rehabilitation	Rehabilitation Management Plan
Indirect effects on wetlands	• Monitoring	Wetland Monitoring and Management Plan
Loss of At Risk plant species	• Monitoring • If required, translocation and/or propagation	*Carex tenuiculmis* and *Epilobium chionanthum* Management Plan
Loss of terrestrial invertebrates	• Protection of habitat as part of wetland compensation and QEII area.	Wetland and Aquatic Compensation Plan

Conclusion

Following compensation for directly affected wetlands, and implementation of a range of ecological monitoring and management plans, the actual and potential adverse effects of Stage 2 of the Mahinerangi Wind Farm (including the transmission line and BESS) on vegetation, wetlands, and terrestrial invertebrates will be minimal.

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Acronyms and Abbreviations

BESS	Battery Energy Storage System
CDC	Clutha District Council
CZ	Contingency Zone
FAC	Facultative taxa. Equally likely to occur in wetlands and non-wetlands.
FACU	Facultative upland taxa. Usually occur in non-wetlands but occasionally found in wetlands.
FACW	Facultative wetland taxa. Usually occur in wetlands but occasionally found in non-wetland.
MfE	Ministry for the Environment
MWF	Mahinerangi Wind Farm
NES-F	National Environmental Standards for Freshwater 2020
NPS-FM	National Policy Statement for Freshwater Management
O & M Facility	Operations and Maintenance Facility
OBL	Obligate wetland taxa. Occur almost always under natural conditions in wetlands.
ORC	Otago Regional Council
RAP	Recommended Area for Protection
SFD	Surplus fill disposal
SNA	Significant natural area
TWP	Tararua Wind Power Limited
UPL	Obligate upland taxa. Almost always occurs in non-wetlands under natural conditions.
WFDA	Wind Farm Development Area

Definitions

Windfarm Site	1,723 ha area incorporating all the Zones and Areas listed below, including the Thomas Block, which is not part of Stage 2
Contingency Zone	Specific development location for each wind turbine
Exclusion Areas	Areas excluded from development by the Environment Court
Windfarm Buffer Area	A minimum 50 m buffer to high ecological value areas, as identified in the original ecological assessment. Referred to as “ecological buffer areas” in the conditions
Windfarm Development Area	The land available for works, shaped to respond to the preferred areas for development of the wind farm

1.0 Introduction

This Ecological Assessment has been prepared by SLR for TWP to support the approvals for Mahinerangi Wind Farm Stage 2. TWP is a wholly owned company of Mercury Wind Limited. TWP holds a land use consent for the construction, operation, and maintenance of the Mahinerangi Wind Farm. The resource consents were granted by the Environment Court in 2009 and authorise up to 100 wind turbines, with a maximum tip height of 145 m.

Stage 1 of the wind farm was completed in 2011 and involved 12 Vestas V90 turbines with a tip height of 125 m. Stage 2 is proposed to consist of 44 additional turbines which will have a maximum tip height of 165m. Stage 2 also includes a new 110kV transmission line, substation and a Battery Energy Storage System (BESS).

The Mahinerangi Wind Farm Stage 2 project is included as a listed project in Schedule 2 of the Fast-track Approvals Act 2024.

The Mahinerangi Wind Farm Site covers approximately 1,723 hectares. It is located on the eastern foothills of Lammermoor Range, situated approximately 5 km north of Lake Mahinerangi and approximately 50 km west of Dunedin. Part of the western boundary of the wind farm is bounded by Black Rock Scientific Reserve while Te Papanui Conservation Park lies further west.

Figure A below shows the location of Stage 2. The main differences between the consented layout (Figure A) and the proposed layout (Figure B) are summarised in Table 1 below. Although the resource consents do not specify what turbines must be constructed, 2 MW and 3MW turbine options were considered as options at the time. Those types of turbines are no longer available, and a realistic and non-fanciful turbine has been selected which could be constructed under the land use consent for the purpose of s127 of the Resource Management Act 1991.

Table 1: Main differences between the consented and proposed layout.

Attribute	Consented layout	Realistic 2025 equivalent of consented layout	Proposed layout
Turbine locations	100	88	54
Turbines (built)	100	47 (in addition to 12 already built)	44 (in addition to 12 already built)
Tip height	Maximum 145	Maximum 145	Maximum 165
Transmission line, substation and BESS			New application
Thomas Block	Included	Included	Excluded

From a terrestrial ecology perspective, Stage 2 will include the following key features (Riley 2025):

- Internal roading network that will provide vehicular access to the turbine locations during and following construction, with various connections from Eldorado Track. Tracks will be an unsealed granular pavement with a minimum width of 5.5 m and additional widening at bends to accommodate turbine component delivery vehicles.
- The movement of some turbines from their consented locations, and new CZs– some of which are proposed within the consented Wind Farm Buffer Areas.

- Works in or within 10 m of a natural inland wetland where avoidance is not practicable and where the is a functional need for the works.
- Turbine platform/hardstand areas are required for storage of components and placement and erection of the crane for installation. The main (hardstand) portion is retained as a gravel pad for future turbine maintenance activities.
- Electrical reticulation, with underground cables between the turbines and the substation.
- A substation (c.0.39 ha).
- A BESS (c.0.42ha), to store surplus power.
- An overhead 110kV transmission line between the substation and existing overhead power lines located to the south of the site, with 25 pole/tower structures up to 45 m high. Consent is sought to locate the lines/poles within a 100m wide corridor, measured 50 m either side of the indicative route, subject to any environmental constraints. Access tracks will be formed to provide maintenance access to each structure location.
- Operations and Maintenance (O&M) facility (indicative sizing of approximately 2,200 m^2, including 700 m^2 of buildings).
- Some new SFD locations that differ from the consented locations due to movement of some Turbines.

To inform the application and the detailed design development of the MWF Stage 2, SLR was engaged to:

- Identify terrestrial vegetation and habitat types.
- Assess natural wetlands under the National Environmental Standards for Freshwater 2020 (NES-F).
- Assess terrestrial invertebrates.
- Assess the actual and potential adverse effects of the Stage 2 construction on the identified ecological values.
- Provide recommendations on necessary avoidance, minimisation, mitigation, offsetting/compensation measures and any monitoring proposals.

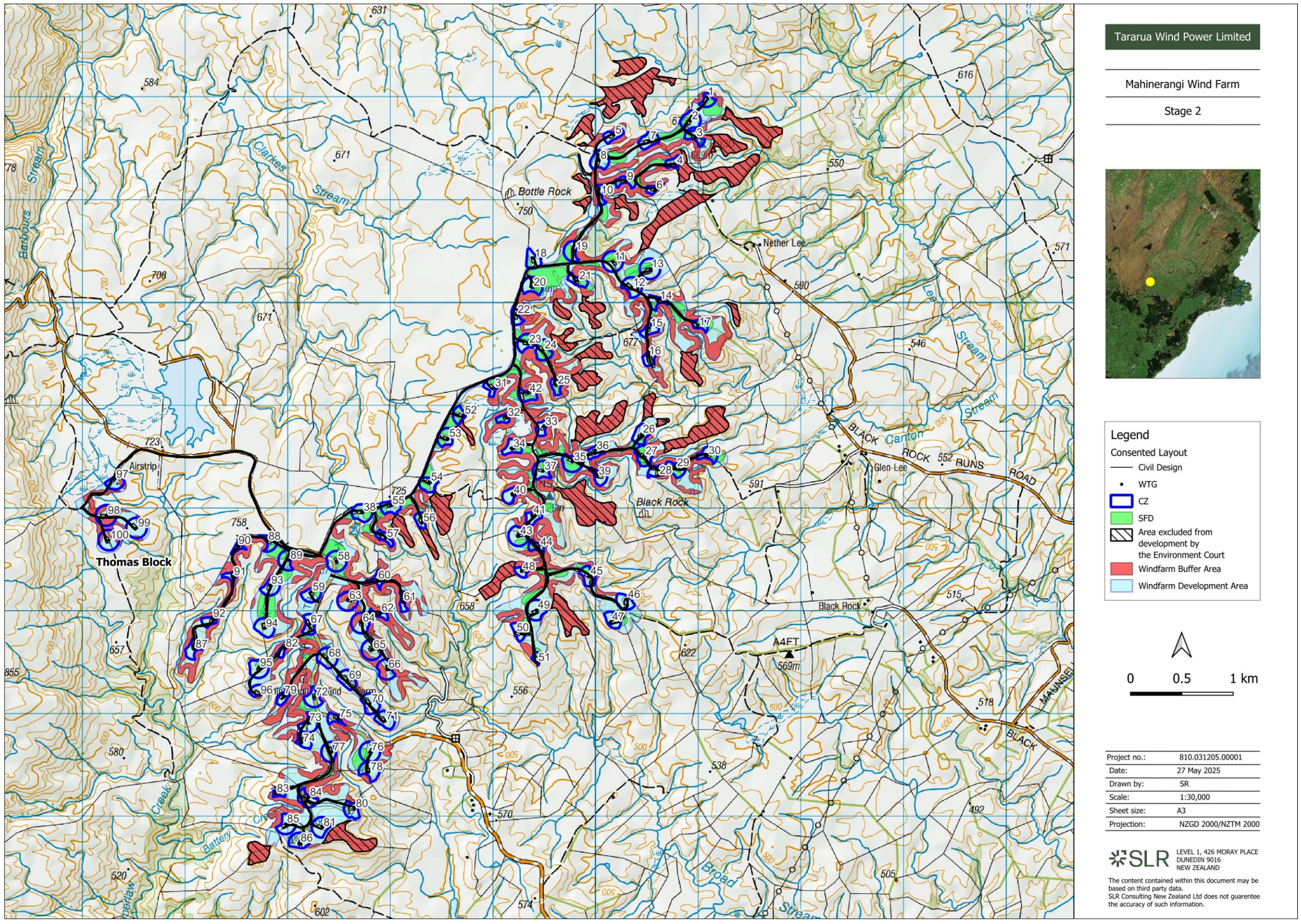


Figure A: Consented layout for the Mahinerangi Windfarm.

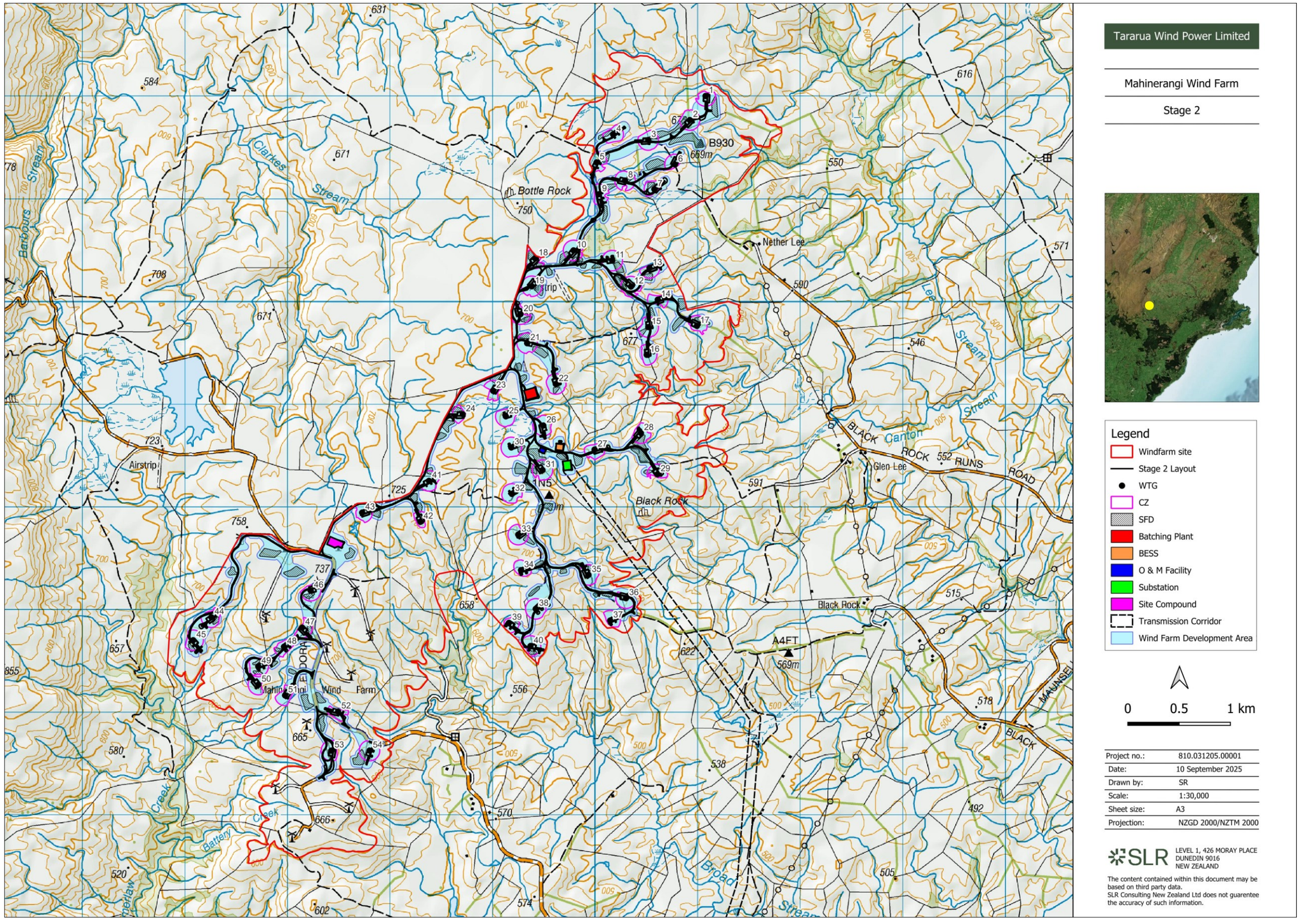


Figure B: Proposed layout for Stage 2 of the Mahinerangi Wind Farm.

2.0 Methods

2.1 Terrestrial Vegetation and Natural Inland Wetlands

Fieldwork

SLR undertook site visits to Stage 2 of the MWF over six days in March and April 2024, two days in January 2025, and two days in April-May 2025 (>80 hours), with the purpose of identifying any ecological constraints that would help inform wind farm layout. Specifically, this included identifying:

- Areas with high ecological values, including waterways and wetlands; and
- Any areas to avoid, with appropriate buffer zones, if required.

Terrestrial vegetation and habitats were described and all observed flora recorded.

Natural wetlands were identified within 100 m of the proposed construction works and consented CZs for the turbines. Potential wetland sites were walked to on foot and wetland delineation assessments undertaken following the methods outlined in MfE (2022b).

Mapping

Mapping of vegetation and habitats was undertaken during field surveys onto hard copy aerial imagery and later mapped in a GIS. Hard copy maps were supplemented by photography taken during surveys and aerial imagery, with ground-truthing of the latter undertaken on subsequent trips. The mapping was also compared with the mapping undertaken for Stage 1 (which covered the entire Windfarm Site), with attention paid to areas that appeared to differ in extent or assessments of quality. The locations of all observed nationally and regionally threatened plant species and pest plants were recorded using a handheld GPS and/or recorded in a notebook.

Mapping of terrestrial vegetation was undertaken within the following:

- The Stage 2 Wind Farm Development Area (WFDA).
- The 100 m-wide Transmission Corridor and 25 m either side of Transmission Corridor access tracks.

Mapping of wetlands was undertaken within the following areas:

- All areas within which Stage 2 works are proposed.
- 100 m from any works.
- 100 m from any CZ.
- 100 m either side of the Transmission Corridor and 25 m either side of Transmission Corridor access tracks.

Mapping of vegetation comprised all of the vegetation types identified:

- Indigenous shrubland - For terrestrial shrublands only. Wetland shrublands were mapped as wetlands.

- Snow tussock grassland - This type meets the definition of indigenous vegetation in the Clutha District Plan[1] (Clutha District Council 1998).
- Rough pasture - Exotic grassland with sparse snow tussocks and/or golden speargrass.
- Natural wetlands - The extent was mapped using the MfE (2022b) delineation protocols, the vegetation community (i.e. areas with similar vegetation to that present in the natural wetlands determined using wetland delineation plots were also mapped as wetlands), hydrological features, topography, and professional judgement. The vegetation community was the most important factor considered.
- Plantation forest - Including recently harvested and replanted forest.
- Shelter belts.
- Developed pasture, crops, and roads - These habitat types were combined in maps as their cover alternated in some areas over the survey period.

The locations of woody weeds were also mapped based on field observations and also, for gorse and/or broom, aerial imagery (i.e., yellow flowers in shrubland).

Natural Wetland Assessment

Assessment of the presence of natural wetlands was undertaken following the methods outlined in MfE (2022b):

- Establishing 2 × 2 m herb stratum plot (and 5 × 5 m shrubland plot where required) in potential wetland vegetation at sites potentially affected by proposed works. Generally, only one plot was established at any one site. Additional plots were added at some locations to determine the extent of wetland vegetation.
- Estimating the cover of each plant species within the plot.
- Entering the species data and their wetland indicator and pasture species status into a pre-prepared Excel assessment template, and:
    - undertaking a pasture exclusion test (>50% total pasture species cover) based on defined pasture species (MfE 2022a). If the pasture exclusion test was clearly met, no further assessment was made.
    - calculating the presence of hydrophytic vegetation by way of the Dominance Test and Prevalence Index (a pass in both tests is required).

Hydrological indicator and hydric soil tests are only required for wetland delineation assessments that are uncertain or in dispute (MfE 2021). In several instances, the hydrophytic vegetation test was inconclusive or was not met, but the hydrological indicator and/or hydric soil tests were met. In these instances, the site was deemed to be a wetland.

Natural wetland assessments were undertaken in the growing season. Stock were present at some sites, or had been present at sites prior to surveys, but this was unavoidable due to operational farming. Nevertheless, there was little difficulty identifying plant species based on morphological characteristics or estimating plant species cover at the time of survey.

[1] The Clutha District Plan defines indigenous vegetation as “plant communities dominated by species that are indigenous to New Zealand”. Dominated is taken to mean having a cover greater than 50%.

The ecological significance of the wetlands identified was assessed based on the criteria in APP2 – Significance criteria for indigenous biodiversity in the proposed Otago Regional Policy Statement 2021.

2.2 Terrestrial Invertebrates

A desktop assessment was undertaken to determine a list of invertebrates recorded from the vicinity of the MWF based on extensive survey work (over many years) completed within the tussock lands and across the adjacent pasture near the MWF:

- A study over several summers at Deep Stream / Black Rock Reserve, within 2-3 km of the MWF area: Barratt *et al.* (2005), Murray *et al.* (2003), Bell *et al.* (2005), Sarathchandra *et al.* (2005), Murray *et al.* (2006), Espie and Barratt (2006), Barratt *et al.* (2009), Barratt *et al.* (2012), and Barratt *et al.* (2019).
- A study on spiders at Te Papanui Conservation Park, within 10 km of the MWF area: Malumbres-Olarte (2010) and Malumbre-Olarte *et al.* (2013).
- A study on moths at Great Moss Swamp / Loganburn Reservoir, within 20 km of the MWF area: Barratt and Patrick (1987).
- A search was made of the iNaturalist website for research grade records within a 20 km radius of the MWF.
- An ecological assessment of the Wind Farm Site by Kingett Mitchell (2006) listed eight invertebrate species from Peat and Patrick (2002) and 51 from Barratt *et al*. (2005) and confirmed the presence of some groups.

These studies provide a broad list of invertebrates from less modified tussock grasslands and varied wetland, herbfield and scrub vegetation habitats. It has an uneven focus across all invertebrates but provides an indication of what would have been present at the Wind Farm Site before agricultural modifications. Records from nearby forested areas, such as Waipori, were not considered to be relevant, as forest habitats are not present at the MWF.

Field Visit

A survey of invertebrates at the site was undertaken on 29 January 2025 to confirm the potential for taxa found in previous surveys to be present in the Wind Farm Site. Hand collections were made within the CZs around turbine sites 11-17, 19, 21, 43-45 and 49. The results of the survey are set out in Section 14.0.

2.3 Assessment of Effects

Potential adverse effects of the proposed works on vegetation and wetlands were quantified by overlaying GIS layers of proposed works areas on mapped vegetation types.

For the land use variation application, the Stage 2 layout on a worst-case scenario was compared to the consented layout.

The worst-case scenario for Stage 2 selected the 44 turbines with the highest potential impacts on ecological values from the 54 potential turbine locations and associated CZs. The assessment also factored in the undertaking of works anywhere within a CZ. For the consented layout, 47 turbine locations of the 88 (remaining) potential turbine locations were selected.

For the 110kV transmission line, BESS, and regional consents (including works in and near wetlands), a new activity effects assessment was undertaken.

3.0 Ecological Context

The site is located on the border between the "wet south-east" environmental zone and the "dry grassland" vegetation zone of Waipori Ecological District in Lammerlaw Ecological Region, with approximately 800-1,000 mm of annual rainfall (Carter 1994). Prior to the arrival of Europeans, the dominant vegetation type in the ecological district would have been low- to mid-altitude short and tall tussock grassland (with narrow-leaved snow tussock *Chionochloa rigida*, copper tussock *Chionochloa rubra* subsp. *cuprea*, and hard tussock *Festuca novae-zelandiae*), which has now been mostly converted to pasture up to about 600 m asl (McEwen 1987).

The geology in the area is dominated by schist-block mountains and fault-controlled basins which have eroded to form the Otago peneplain surface (Bishop 1994, ORC 2013). The majority of the site lies within the headwaters of the Lee Stream catchment at about 675-700 m asl. West of the main access road along the paper road portion of Eldorado Track, gullies are part of the Deep Stream catchment. Gullies are generally shallow and broad in the upper reaches, becoming further incised downstream.

Most of the Wind Farm Site, in the process of conversion to farmland, has been burnt and grazed, and some parts cultivated, but prior to 1840 would have been similar to the adjacent Black Rock Scientific Reserve which lies outside the Wind Farm Site to the west of Turbine 12 (constructed during Stage 1) and immediately adjacent to the proposed access road to Stage 2 of the MWF (Figure C). The reserve consists of "gently rolling ridges covered in a narrow-leaved snow tussock (*Chionochloa rigida*) association, substantially intact or in various stages of degradation, and shallow gullies containing *Sphagnum* bog and minor grassland communities" (Bulloch 1973).

Te Papanui Conservation Park, which is dominated by snow tussock grassland and contains bogs and tarns, is located c.4 km to the west of the Wind Farm Site. Following completion of the Stage 1 of the wind farm, a 59.2 ha QEII Open Space Covenant was created in accordance with the consent conditions for the MWF over an area formerly referred to as the "Scrappy Pines Block"[2]. Condition 14 required the covenanting of the Scrappy Pines Block "no later than six months after the construction of the turbines and the rehabilitation of tracks". Not all of the consented turbines within the Scrappy Pines Block were constructed as part of Stage 1, however TWP is not proposing any further works within the Block as part of Stage 2. The QEII covenanted area predominantly contains snow tussock grassland and is located in the southern part of the wind farm (Figure C).

A Marginal Strip is also located alongside the Lammerlaw Creek to the southwest of the Wind Farm Site (Figure C). No works for Stage 2 are proposed within the marginal strip.

Recommended Area for Protection (RAP) 9 Black Rock from the Protected Natural Areas Programme (PNAP) report for Waipori Ecological District (Carter 1994) is located west of proposed turbine sites 39 and 40 (Figure C) outside of the Wind Farm Development Area (see Figure C). The RAP was described as containing representative silver beech (*Lophozonia menziesii*) forest that is much reduced in extent in the ecological district and shrubland of *Coprosma dumosa*, tauhinu (*Ozothamnus vauvilliersii*), *Veronica odora*, and bracken (*Pteridium esculentum*). No works for Stage 2 are proposed within the RAP.

[2] See Condition 14, Land use consent RM1409.

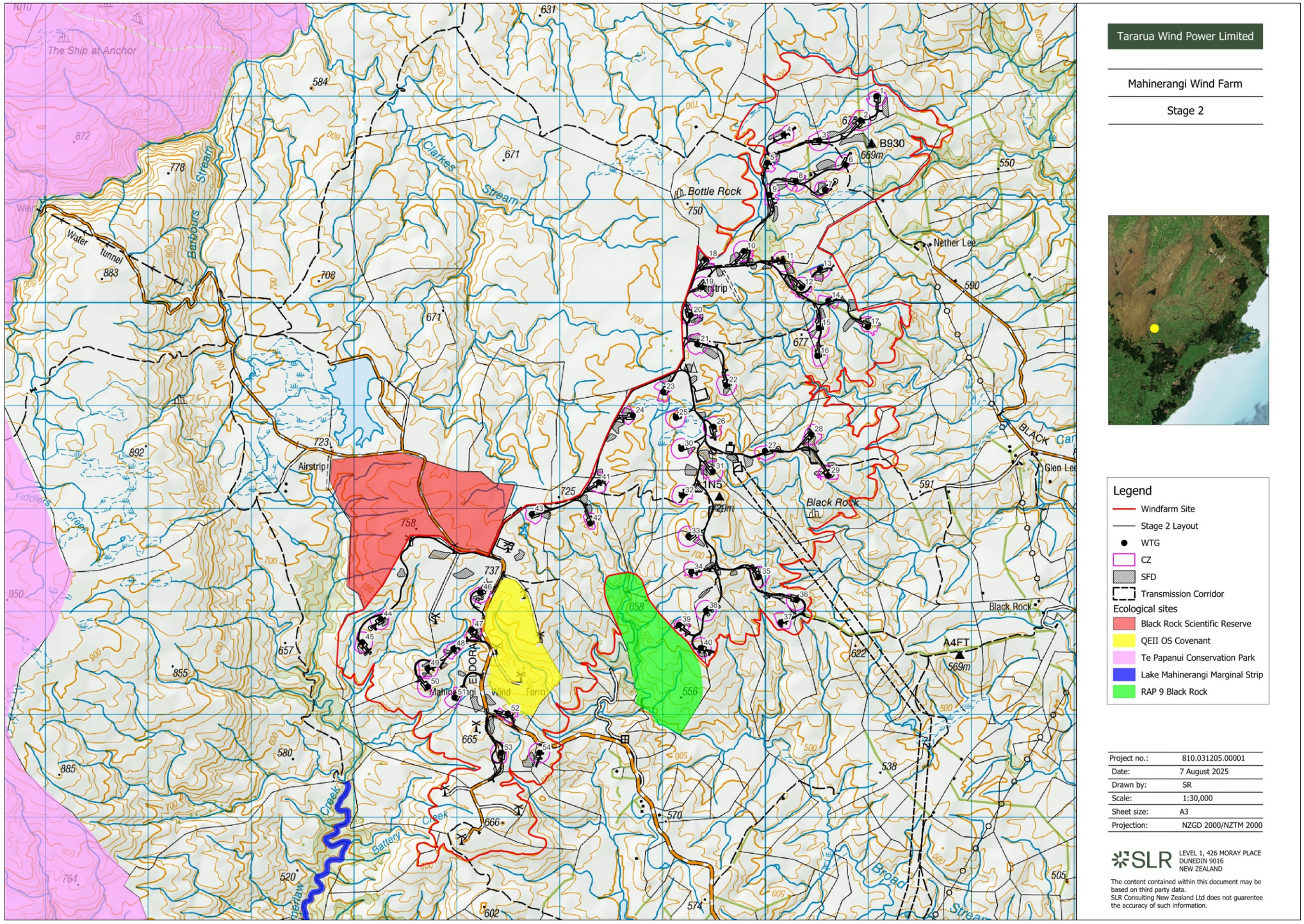


Figure C: Ecological sites near the Mahinerangi Wind Farm, Stage 2.

4.0 Vegetation and Habitats

4.1 Overview

The site is characterised by a network of waterways/gullies separated by low ridges. The flat ridgetops largely contain grazed exotic grassland and brassica crops. Modified remnants of snow tussock grassland remain at some ridgetop sites, and on gully walls which are more difficult to develop for farming activities. Wetlands are present in gully floors, on gully walls, and in flatter areas where drainage is poor. Indigenous shrublands are present at a few sites on gully walls and floors. A small area of recently replanted plantation forest is present. Rock outcrops are generally small and uncommon but contain a few plant species not found elsewhere within the site. Vegetation and habitat types present within the Wind Farm Site are mapped in Figures D-F.

4.2 Indigenous Shrublands

Several small indigenous shrublands are present in gullies (Photo 1). Dominant species are *Olearia bullata* and *Coprosma propinqua*, with scattered shrub pōhuehue (*Muehlenbeckia complexa*) and *Coprosma dumosa*. The groundcover in gully floor shrublands includes rautahi (*Carex coriacea*), sphagnum moss, rushes (*Juncus* spp.), the fern *Hypolepis millefolium*, and pasture grasses.

On a steep face in a gully to the east of turbine site 1, a shrubland dominated by inaka (*Dracophyllum longifolium*) and mountain flax (*Phormium cookianum*) merges with *Olearia bullata* shrubland near the creek and narrow-leaved snow tussock and golden speargrass (*Aciphylla aurea*) on hillslopes.

There is a small inaka shrubland located between two sections of shelterbelt just northeast of turbine site 17. Other species present include Yorkshire fog (*Holcus lanatus*), rautahi, little hard fern (*Austroblechnum penna-marina*), small kiokio (*Parablechnum procerum*), copper tussock, and catsear (*Hypochaeris radicata*).

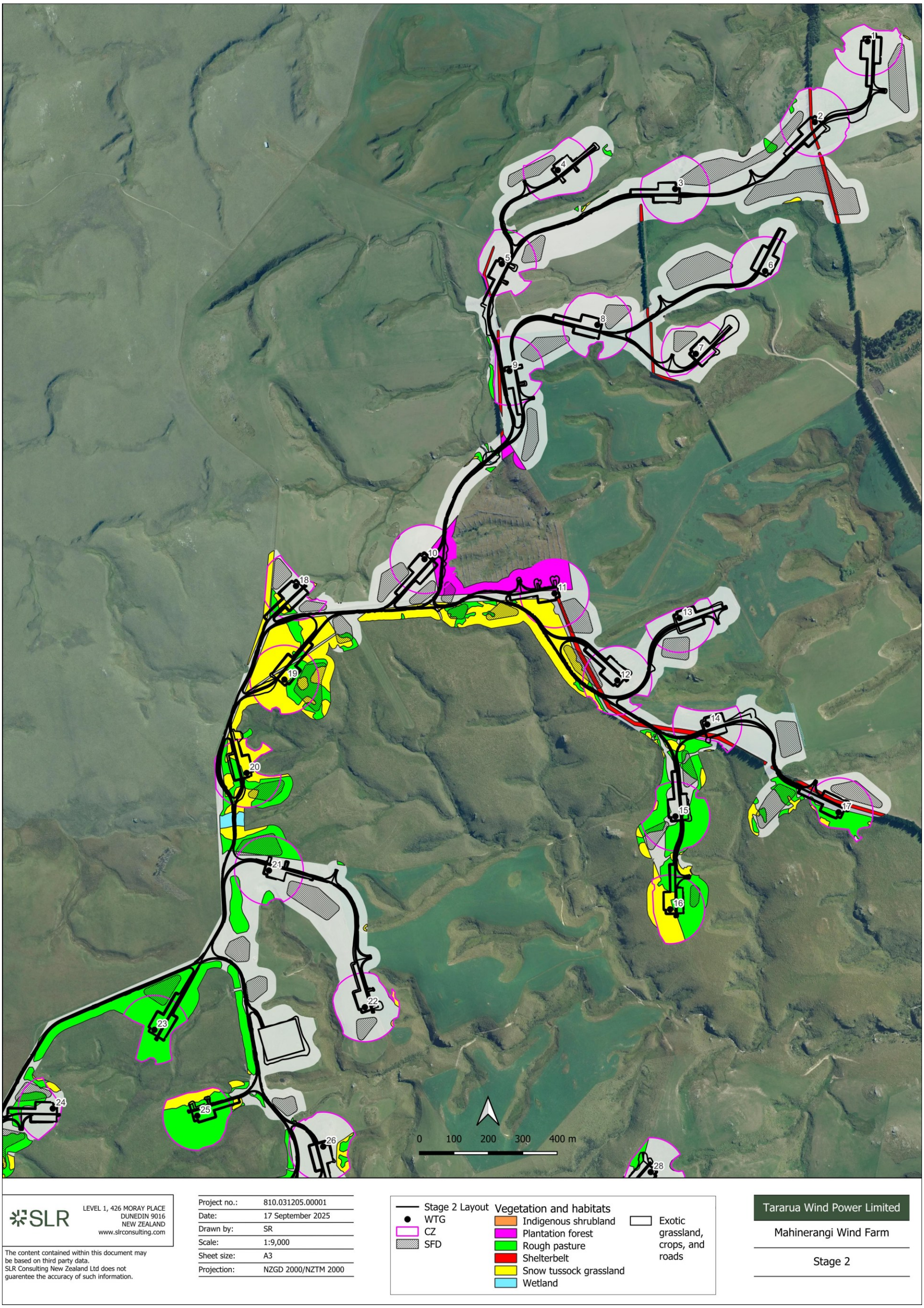


Figure D: (1/3) Vegetation and habitats. Exotic grassland and crops are not mapped. See section 8.0 for complete wetland mapping.

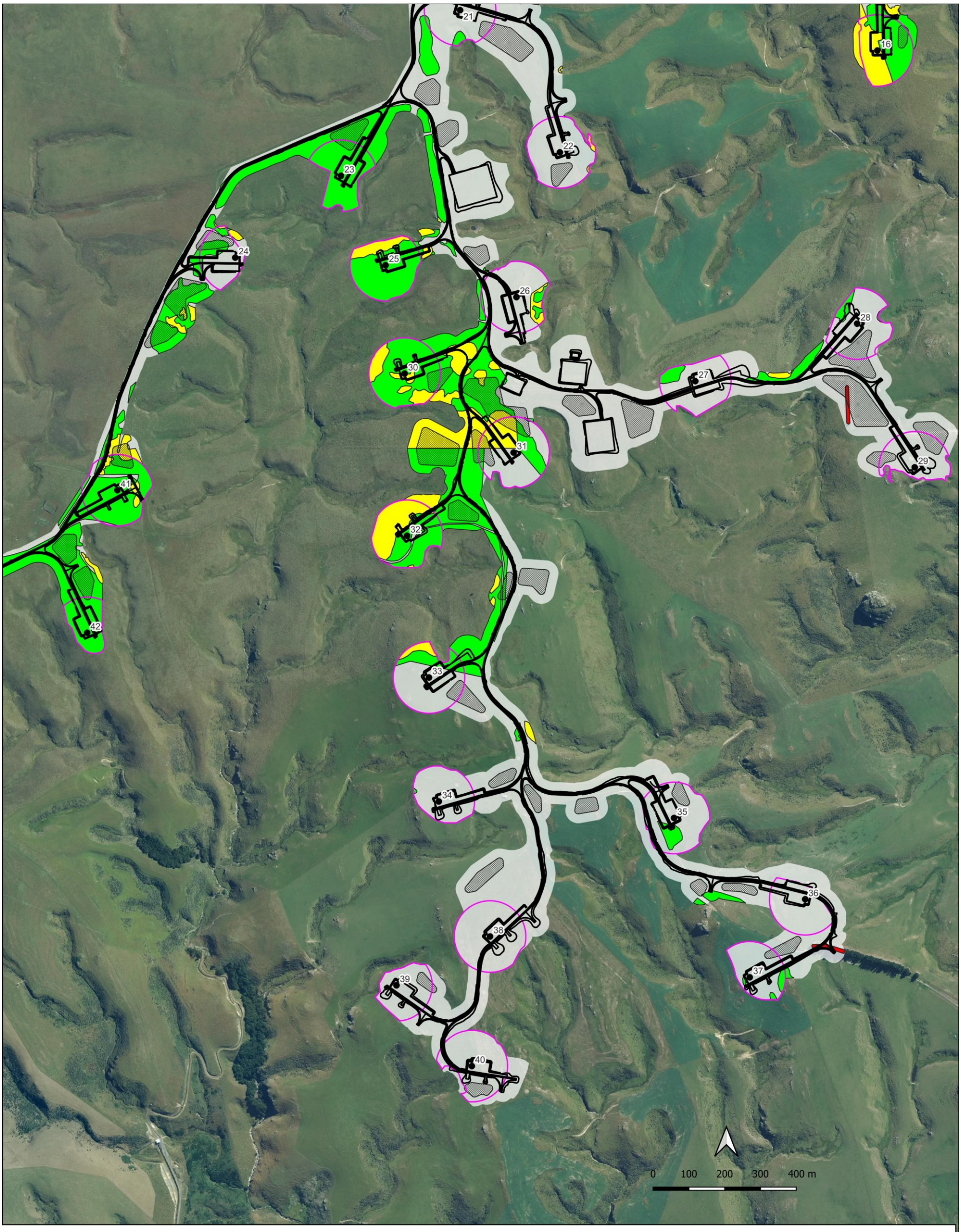


Figure E: (2/3) Vegetation and habitats. Exotic grassland and crops are not mapped. See section 8.0 for complete wetland mapping.

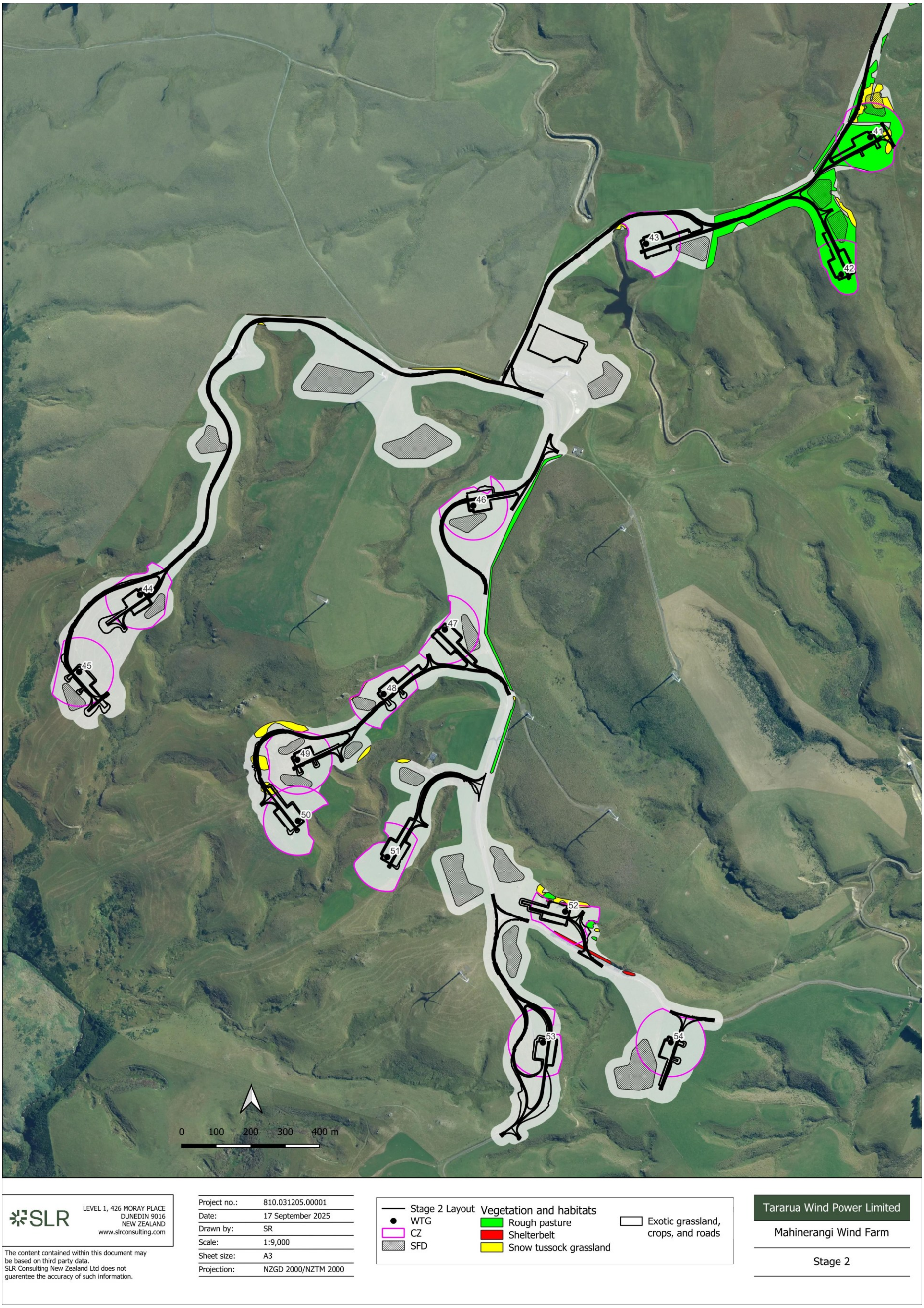


Figure F: (3/3) Vegetation and habitats. Exotic grassland and crops are not mapped. See section 8.0 for complete wetland mapping.

Photo 1: Shrubland of *Olearia bullata* and *Coprosma propinqua* in the gully containing Wetland Delineation Plot 31. Photo taken 22 March 2024.

4.3 Narrow-leaved Snow Tussock Grassland

Areas of narrow-leaved snow tussock grassland are predominantly present on gully sides where they have been better protected from fire and ploughing (Photos 2 and 3). The upper catchments of the Canton Stream and Broad Stream are less developed and generally retain a higher cover of narrow-leaved snow tussocks than other areas within the Wind Farm Site. Narrow-leaved snow tussock grassland is the dominant vegetation type within the Scrappy Pines QEII Covenant.

The dominant species is narrow-leaved snow tussock, which on average has a cover greater than 50%. Exotic grasses and herbs are common, including browntop (*Agrostis capillaris*), sweet vernal (*Anthoxanthum odoratum*), Yorkshire fog, white clover (*Trifolium repens*), mouse-ear hawkweed (*Pilosella officinarum*), and catsear. Other scattered to uncommon indigenous species present include golden speargrass, and less common *Coprosma cheesemanii*, pātōtara (*Styphelia nesophila*), *Acrothamnus colensoi*, prostrate snowberry (*Gaultheria macrostigma*), creeping everlasting daisy (*Helichrysum filicaule*), hard tussock (*Festuca novae-zelandiae*), *Anisotome aromatica*, mountain myrrh (*Chaerophyllum colensoi*), shrub pōhuehue, and mosses and lichens.

Photo 2: Dense narrow-leaved snow tussock and golden speargrass on a gully wall near proposed turbine site 29. Photo taken 22 March 2024.

Photo 3: Dense narrow-leaved snow tussock grassland in the upper Canton Stream catchment (looking east from near proposed turbine site 19). Photo taken 9 April 2024.

4.4 Wetlands

Most of the wetlands are on gully floors throughout the Wind Farm Site, although there are several small seepage wetlands on gully walls and hillslopes, and a few bogs on poorly drained flat areas (e.g., between turbine sites 25 and 26). Several of the gully floor wetlands are traversed by culverted farm tracks. Some of the larger gullies contain running water, all wetlands were damp or wet underfoot at the time of survey, and most wetlands have a peaty topsoil, as determined by soil test pits and a spongy consistency while walking across them (Photo 4). This is likely to have resulted from build-up of accumulated sphagnum moss (an obligate wetland species (OBL)) (Bulloch 1973).

Common species include sphagnum moss, other mosses, liverworts, star sedge (*Carex echinata*; OBL), rautahi (a facultative wetland species (FACW)), jointed rush (*Juncus articulatus*; FACW), blinks (*Montia fontana*; OBL), Edgar's rush (*Juncus edgariae*; FACW), soft rush (*Juncus effusus*; FACW), and exotic grasses including Yorkshire fog (a facultative species (FAC)), browntop (a facultative upland species (FACU)), and sweet vernal (FACU).

Areas with more permanent surface water often contain a band of sharp spike sedge (*Eleocharis acuta*; OBL), sweetgrass (*Glyceria declinata*; OBL), and a few small clumps of musk (*Erythranthe moschata*; OBL). Copper tussock (*Chionochloa rubra* subsp. *cuprea*; FAC) was seen at some sites. Prostrate snowberry (FACU), little hard fern (*Parablechnum penna-marina*; a facultative species (FAC)), *Nertera scapanioides* (OBL), and pratia (*Lobelia angulata*; FAC) are often associated with sphagnum moss.

In one sphagnum bog, there were a few shrubs of bog pine (*Halocarpus bidwillii*; FAC) and *Coprosma propinqua* (FAC) (Appendix B). In another sphagnum bog, there were a few shrubs of inaka (FACU) and mānuka (FAC), and scattered copper tussock (Appendix B). The shrub *Olearia bullata* (FAC) is present at a few sites. Photographs of a range of other wetland types are provided in Appendix B.

Photo 4: Wetland dominated by sphagnum, rautahi, and prostrate snowberry (wetland Plot 124). Exotic grasses and rushes are also present. Insert shows peaty soil at Plot 68B. Photos taken 14 March 2024.

4.5 Plantation Forest

An area between proposed turbine sites 10 and 11 comprises recently felled radiata pine (*Pinus radiata*) forest (felled sometime between 2019 and 2021, as viewed on Google Earth imagery) (Photo 5). This area has been replanted in Douglas fir (*Pseudotsuga menziesii*) which are still less than 1 m tall, although numerous small radiata pine seedlings have regenerated from seed in the soil. The site is dominated by windrows of decomposing waste wood and browntop-dominated grassland on open ridgetops, and a few patches of bracken (*Pteridium esculentum*) on gully walls. A few mature radiata pine trees are present in wetlands on gully floors. Scattered broom (*Cytisus scoparius*) are also present.

Photo 5: Recently replanted plantation forest near proposed turbine sites 10 and 11. Photo taken 24 April 2024.

4.6 Shelterbelts

Shelterbelts contain various mixes of radiata pine, another pine species (*Pinus* sp.), Douglas fir, eucalyptus (*Eucalyptus* sp.), Lawson's cypress (*Chamaecyparis lawsoniana*), silver birch (*Betula pendula*), macrocarpa (*Cupressus macrocarpa*), and alder (*Alnus glutinosa*).

4.7 Rough pasture

Rough pasture is present on ridge tops and gully walls. It comprises exotic grassland with a few to scattered narrow-leaved snow tussocks and/or golden speargrass[3]. (Photos 6 and 9). Common species are browntop, sweet vernal, Yorkshire fog, timothy (*Phleum pratense*),

[3] These areas are not considered to be indigenous vegetation because they are not "plant communities dominated by species that are indigenous to New Zealand" (Section 5 Definitions and Planning Maps, Clutha District Plan 1998).

cocksfoot (*Dactylis glomeratus*), crested dogs tail (*Cynosurus cristatus*), and red clover (*Trifolium pratense*).

Photo 6: Rough pasture on a gully wall. Photo taken 30 April 2024.

4.8 Developed pasture, crops, and roads

Developed pasture is generally present on ridge tops. In the more developed sites, perennial ryegrass (*Lolium perenne*) and white clover are dominant (Photo 7). Open areas within less developed grasslands are dominated by mouse-ear hawkweed, and catsear, with scattered exotic grasses (particularly browntop and sweet vernal). Patches of dainty bristle grass (*Rytidosperma gracile*) are also present.

Crops (*Brassica* sp.) were observed on ridge tops in parts of the site (Photo 8). The location of these crops can change from year to year, with some areas re-sown in pasture grasses in spring.

Photo 7: Exotic grassland dominated by perennial ryegrass southwest of proposed turbine site 21. Photo taken 22 March 2024.

Photo 8: Brassica crop near proposed turbine site 21 in March 2024. This area was covered in recently sown pasture grass in March 2025.

5.0 Vegetation and habitats at specific sites

5.1.1 Contingency Zones

The CZs (132.8 ha) are predominantly located on the peneplain surface and have been trimmed to avoid gullies containing wetlands. They are covered in exotic vegetation (77.8% of the total area), with some snow tussock grassland (7.2% of the total area) and rough pasture (15.0% of the total area) (Figures D-F, Table 2). There are no wetlands within the CZs.

5.1.2 Surplus Fill Disposal (SFD) areas

The SFD areas (41.6 ha) are predominantly covered in exotic vegetation (80.5% of the total area), with some snow tussock grassland (4.4% of the total area) and rough pasture (15.1% of the total area) (Photo 9, Table 2). There are no wetlands within the SFDs.

Table 2: Area (ha) of each mapped vegetation and habitat type at specific sites. Note that only 44 CZs are included, as a worst-case scenario. The remaining 10 CZs are entirely covered in exotic vegetation. See sections 7.0 and 9.0 for further explanation of the effects assessment. See Appendices I and J for a breakdown of the vegetation in each CZ and SFD.

Vegetation and Habitat Type	CZ (44 locations)	SFD	BESS	O & M Facility	Substation	Batching plant	Site compound
Snow tussock grassland	9.80	2.10	0	0	0	0	0
Indigenous shrubland	0	0	0	0	0	0	0
Wetland	0	0	0	0	0	0	0
Rough pasture	20.22	6.25	0	0.02	0	0	0
Remaining exotic vegetation	78.47	33.22	0.42	0.20	0.66	1.07	1.03
Total	108.48	41.58	0.42	0.22	0.66	1.07	1.03

Photo 9: Example of rough pasture with location of SFD site 75 arrowed.

5.1.3 Battery Energy Storage System, O & M Facility, substation, batching plant, and site compound

The BESS site is located on gently sloping land on the northern side of the road connecting the O & M Facility and substation site. The vegetation comprises grazed exotic grassland (Photo 10).

The O & M Facility site is located on almost flat land to the south of turbine 26. The vegetation predominantly comprises exotic grassland (pasture), with a small area (208 m^2) of rough pasture (Photo 11).

The substation site is located on almost flat land at the northern end of the Transmission Corridor. The vegetation comprises grazed exotic grassland (Photo 12).

The batching plant is located on flat land between turbines 22 and 25. In March 2025, the vegetation comprised grazed exotic grassland, but in March 2024 this area contained a *Brassica* crop (Photo 13).

The site compound is located on flat land just north of turbine 12 (constructed during Stage 1). The vegetation comprises grazed exotic grassland (Photo 14).

Photo 10: BESS site. The vegetation comprises exotic grassland (pasture). 24 April 2025.

Photo 11: O & M Facility site. The vegetation comprises exotic grassland (pasture) and rough pasture. 24 April 2025.

Photo 12: Substation site. The vegetation comprises exotic grassland (pasture). 24 April 2025.

Photo 13: Batching plant site (arrowed). The vegetation comprised exotic grassland (pasture) in March 2025 and a *Brassica* crop on 21 March 2024.

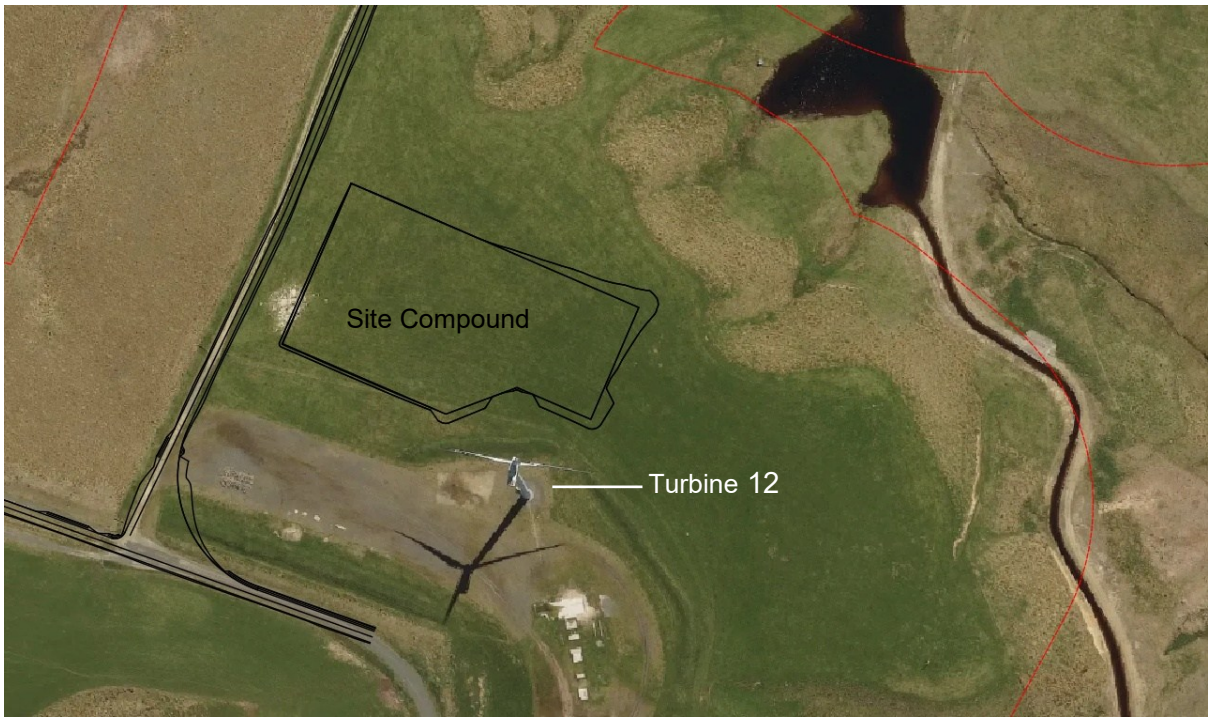


Photo 14: Site compound. The vegetation comprises grazed exotic grassland.

5.1.4 Transmission Corridor

Vegetation types present within the Transmission Corridor (Figure G) are:

- Indigenous shrubland – common species were *Olearia bullata*, *Coprosma propinqua*, *Coprosma dumosa, Melicytus alpinus*, and *Muehlenbeckia complexa*.
- Snow tussock grassland – narrow-leaved slow tussock, golden speargrass, with predominantly exotic grasses between the tussocks.
- Wetland – present in the bases of gullies. As determined by natural wetland delineation.
- Artificial ponds – formed in gullies using earth bunds, predominantly open water.
- Plantation forest – relatively recently planted.
- Rough pasture – sparse narrow-leaved slow tussocks amongst pasture.
- Developed pasture, crops, and roads – the dominant vegetation type. Grazed by stock. Farm tracks are also mapped ad this type.

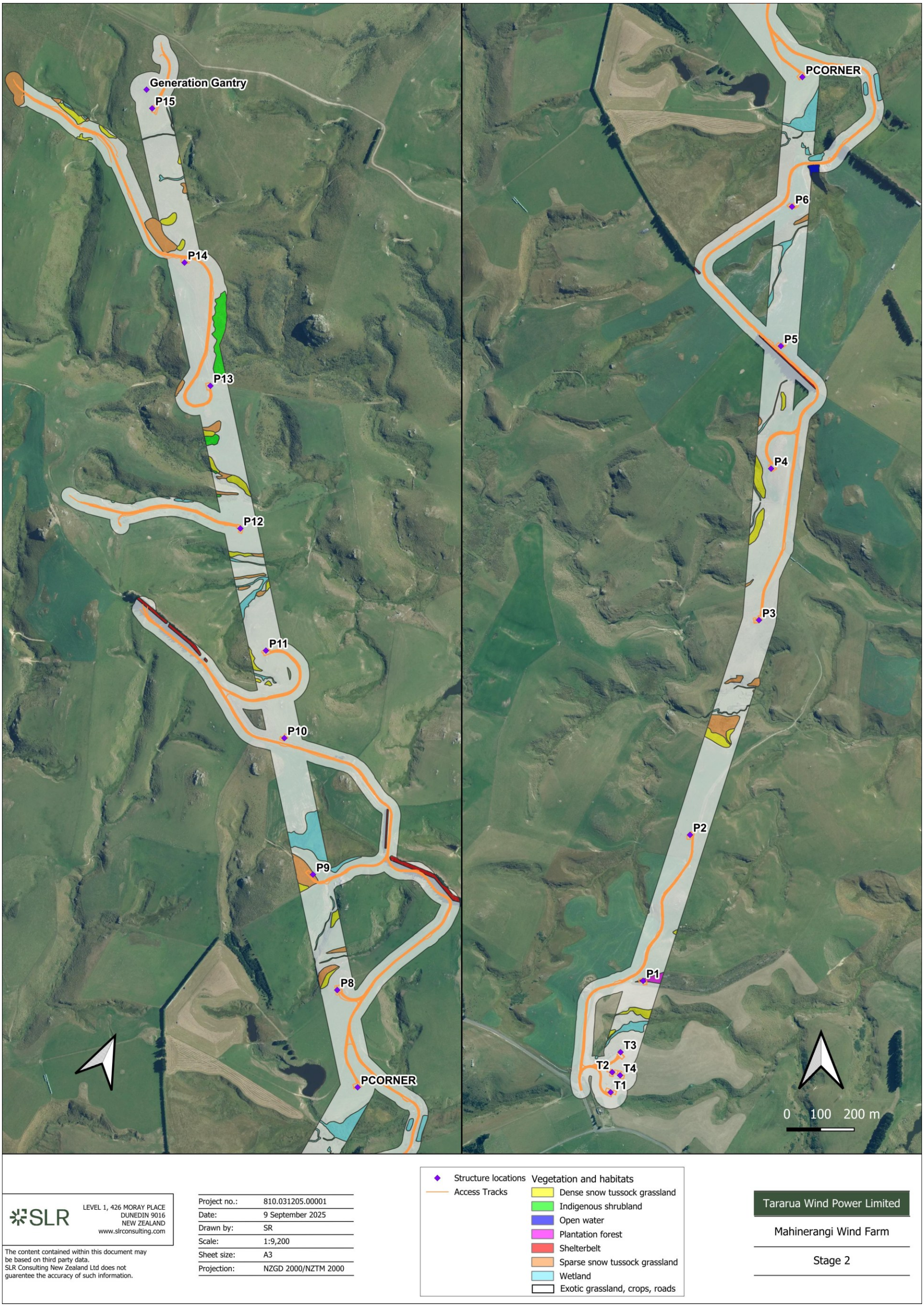


Figure G: Vegetation and habitats within the Transmission Corridor and alongside associated access tracks.

6.0 Flora

There were 153 vascular plant taxa (93 indigenous and 60 introduced) recorded at representative sites within the Wind Farm Site and Transmission Corridor (Appendix C). Several moss, liverwort, and lichen species were also observed, including sphagnum moss, *Polytrichum juniperinum*, and *Racomitrium lanuginosum*. Four species recorded within the Wind Farm Site and Transmission Corridor have a national threat classification of At Risk in de Lange *et al*. (2023) (Table 3):

- Marsh willowherb (*Epilobium chionanthum*; classified as At Risk-Declining) was recorded in wetland delineation plots 13 (Photo 15) and 25. This species may be more widespread at the site as *Epilobium* species with similar vegetative features were observed outside the flowering period.
- Desert broom (*Carmichaelia petriei*; At Risk – Declining). One plant was recorded in a gully 200 m to the southeast of turbine site 22. This area will be avoided by works.
- *Olearia lineata* (At Risk – Declining). One tree was recorded in the gully to the northeast of turbine 35 and 106 m west of the Transmission Corridor (Figure H). This area will be avoided by works.
- *Carex tenuiculmis* (At Risk – Declining) was recorded along the Transmission Corridor in wetlands T30, T33, and T34 between poles P5 and PCorner (Photo 16, Figure I). Kingett Mitchell (2011) tentatively recorded this species within the Wind Farm Site (site(s) not provided), but it was not recorded within the Wind Farm Site during the 2024-2025 surveys.

Three other nationally threatened plant species have populations in nearby areas but have not been sighted in the Wind Farm Site:

- The small sedge *Carex lachenalii* subsp. *parkeri* (At Risk – Naturally Uncommon) may also be present in wetlands, as it has been recorded in the adjacent Black Rock Scientific Reserve (Bulloch 1973). Not recorded in the 2024 or 2025 vegetation surveys.
- *Carex purpurata* (At Risk – Naturally Uncommon) is known from rocky outcrops and escarpments in the area (Kingett Mitchell 2006, sites not identified). Not recorded in the 2024 or 2025 vegetation surveys. Likely habitats are to be avoided by works.
- Sprawling inaka (*Dracophyllum frondosum*; At Risk – Naturally Uncommon) was recorded in 2025 in a gully to the east of turbine site 1 (c.20 m outside the Wind Farm Site). Rock outcrop habitats are to be avoided by works.

Five other species recorded at the site are classified as Regionally Naturally Uncommon but are Not Threatened at a national scale (Table 3), with most of these species found in wetlands. These species are not located near any proposed works sites, with several only observed outside the Wind Farm Site in more intact wetlands to the west.

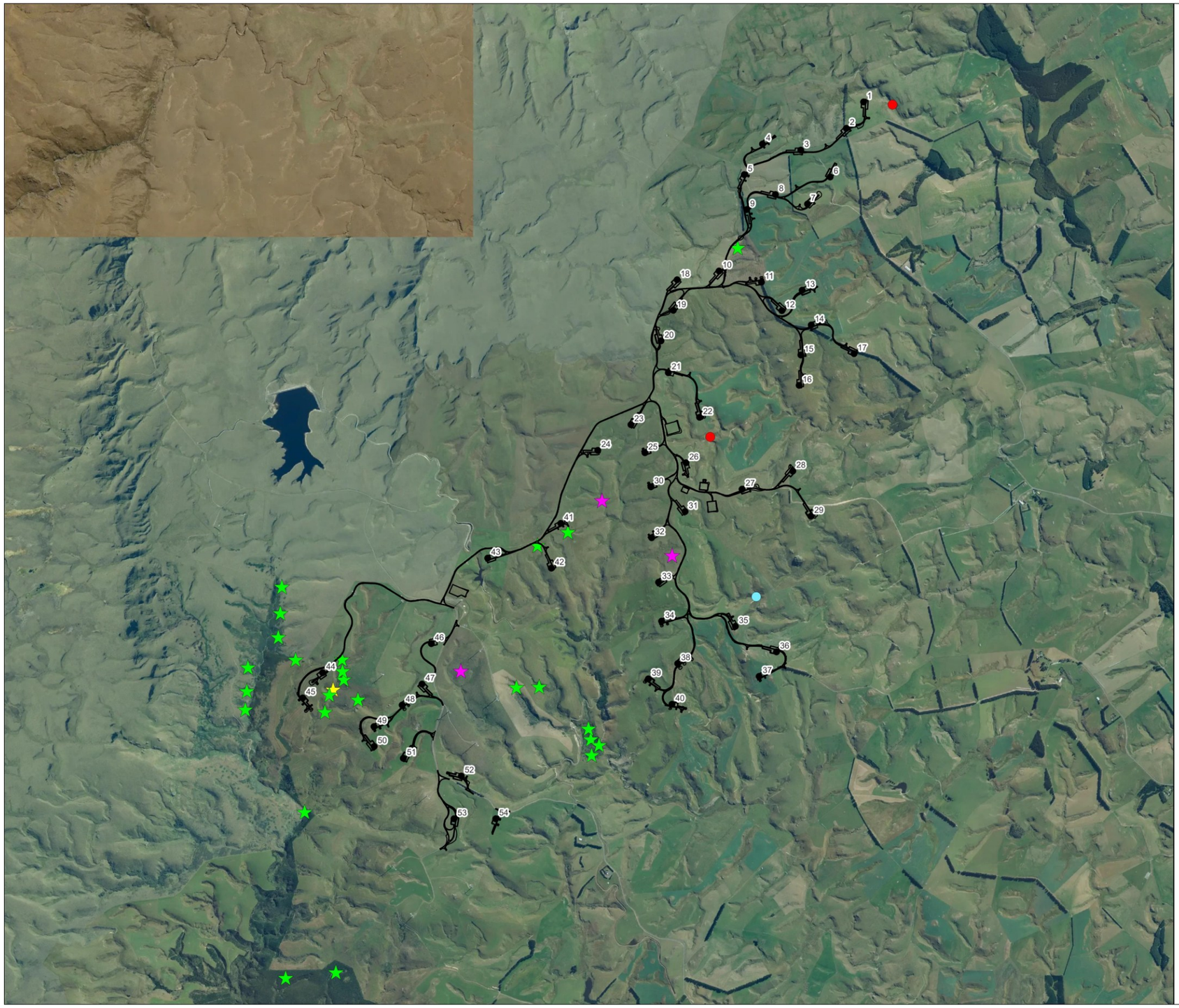


Figure H: Locations of At Risk indigenous plant species and woody weeds within and adjacent to the Wind Farm Site.

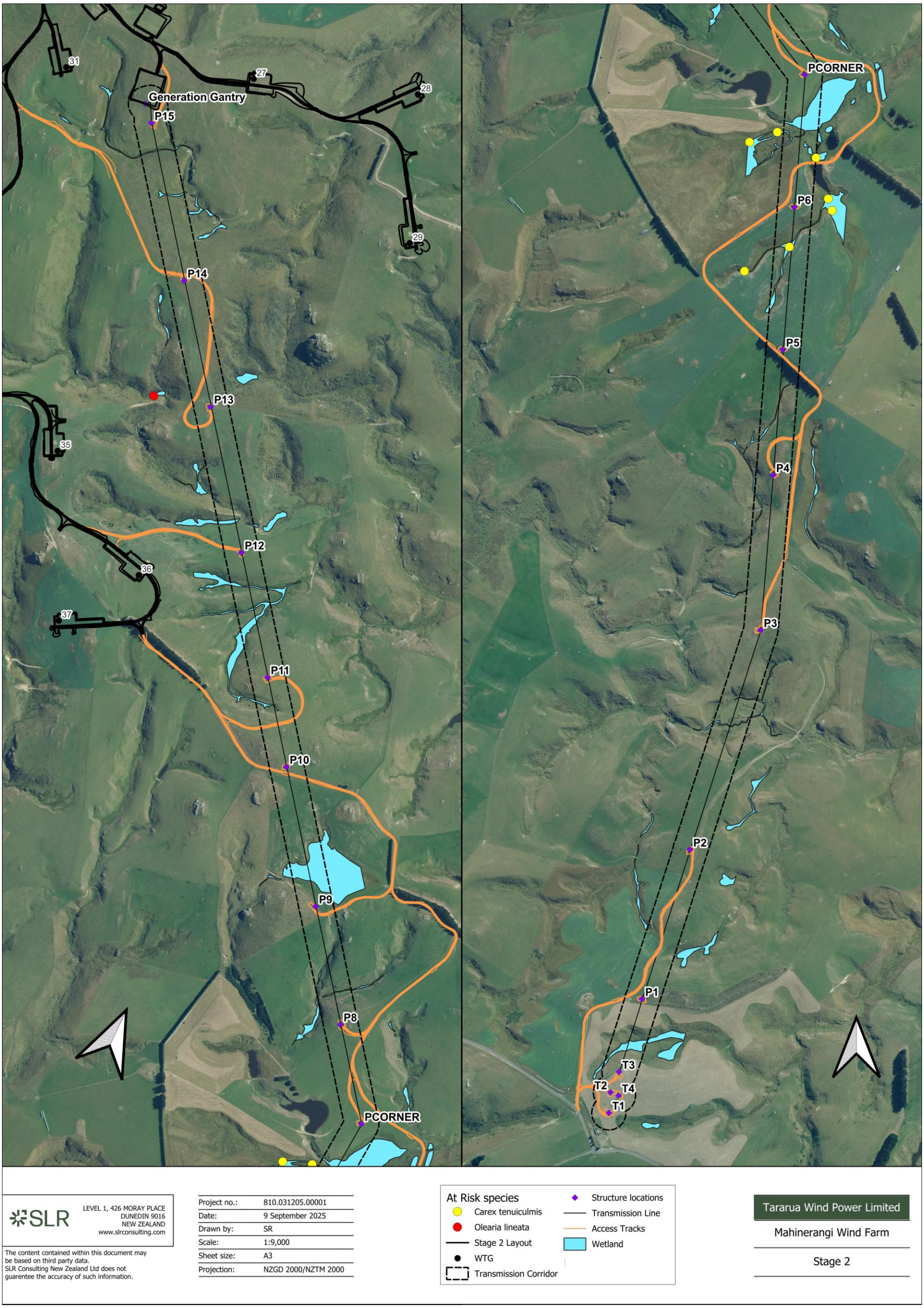


Figure I: At Risk plant species within and near the Transmission Corridor and access tracks.

Table 3: National and Regional threat classifications of plant species recorded within (bold text) and near the Wind Farm Site and Transmission Corridor.

Species	Common name	National threat classification[1]	Regional threat classification[2]
Aciphylla scott-thomsonii	Speargrass	Not Threatened	Regionally Naturally Uncommon
Azorella cockaynei		Not Threatened	Regionally Naturally Uncommon
Carex lachenalii subsp. *parkeri*		At Risk – Naturally Uncommon	Regionally Naturally Uncommon
Carex purpurata	Hooked sedge	At Risk – Naturally Uncommon	Regionally Naturally Uncommon
Carex tenuiculmis[3]		At Risk – Declining	Regionally Endangered
Carmichaelia petriei	Desert broom	At Risk – Declining	Regionally Declining
Dracophyllum frondosum	Sprawling inaka	At Risk – Naturally Uncommon	Regionally Vulnerable
Epilobium chionanthum	Marsh willowherb	At Risk – Declining	Regionally Vulnerable
Euchiton traversii		Not Threatened	Regionally Naturally Uncommon
Nertera balfouriana		Not Threatened	Regionally Naturally Uncommon
Olearia bullata		Not Threatened	Regionally Naturally Uncommon
Olearia lineata		At Risk – Declining	Regionally Declining

[1] de Lange *et al*. (2023); [2]Jarvie *et al*. (2024); [3] Only recorded in the Transmission Corridor.

Other plant species of interest (all with national threat classifications of Not Threatened) include about 10 plants of bog pine (*Halocarpus bidwillii*) in a wetland between turbine sites 42 and 43 (see photograph in Appendix B), a few shrubs of mānuka (*Leptospermum scoparium*) on a gully wall about 95 m east of turbine site 20 and in wetland delineation Plot 11 near turbine site 10, and copper tussock[4] (*Chionochloa rubra* subsp. *cuprea*) at a few wetland sites.

[4] At least some plants are apparently not the narrow-leaved snow tussock × copper tussock hybrids recorded in Black Rock Scientific Reserve (Bulloch 1973), as fracturing sheaths are not present (as per Connor 1991).

Photo 15: (Montage) Marsh willowherb from wetland delineation plot 13 (left, 29 January 2025) and *Olearia lineata* northeast of turbine 35 (right, 24 April 2025).

Photo 16: *Carex tenuiculmis* (sedge with reddish foliage) in a wetland between P5 and P6 in the Transmission Corridor.

Five pest plant species listed in the Otago Pest Management Plan 2019-2029 (ORC 2019) were recorded within the Wind Farm Site (Figure H, Table 4, Photo 17).

Table 4: Plant species listed in the Otago Pest Management Plan 2019-2029 that were recorded within the Wind Farm Site.

Species	Common name	Otago RPMP listing	Notes
Cytisus scoparius	Broom	Sustained control	One patch at a wind mast north of turbine site 42. Scattered in area of plantation forestry between turbine sites 10 and 11. Scattered plants and patches near Stage 1.
Pinus radiata[1]	Radiata pine	Progressive containment	Rare, single wildings northeast of turbine site 41 and between turbine sites 32 and 33. Also in shelterbelts. Regenerating from seed in plantation forest. Wilding control undertaken in QEII covenant.
Pseudotsuga menziesii[1]	Douglas fir	Progressive containment	Recently planted near turbine site 19. No wildings seen.
Salix sp.	Willow	Organism of Interest	One tree in the gully east of turbine site 44.
Ulex europaeus	Gorse	Sustained control	One small patch near turbine site 41, several small patches in southern part of Stage 2 (near Stage 1).
[1] Listed under Wilding conifer.			

Photo 17: (Montage) Gorse southeast of proposed turbine site 41 (left) and broom north of proposed turbine site 42 by a wind mast (right). Photos taken 22 March 2024.

7.0 Assessment of Actual and Potential Effects on Indigenous Vegetation

7.1 Weed Introduction and Spread

Weeds will be managed according to the Ecological Monitoring and Management Plan[5], which outlines requirements regarding vehicle use, vehicle hygiene, sourcing of weed-free construction materials, prompt revegetation of bare earth following earthworks, and weed monitoring and control. Therefore, the adverse effects of weeds on existing values are likely to be very low.

7.2 Indigenous Vegetation Clearance

Indigenous vegetation clearance will occur as a result of earthworks for roads, SFDs, hardstands, turbine platforms, cable reticulation, BESS, substation, batching plant, laydown areas, and temporary platforms. Although much of that indigenous vegetation clearance is authorised by way of the land use consent, there are additional clearances associated with the changes proposed by the Stage 2 layout and the new activities, and some areas (for example the Thomas Block) where consented indigenous vegetation will be avoided.

The Rehabilitation Management Plan (SLR 2025a) details the rehabilitation of snow tussock grassland affected by construction as required by consent condition 25C. Rehabilitation of snow tussock grassland will be undertaken in the Wetland Compensation Site (see Section 11.0 and SLR 2025b). Following this rehabilitation, the adverse effects of construction of Stage 2 on indigenous vegetation will be very low.

The estimated areas of each terrestrial vegetation and habitat type affected by Stage 2 are provided in Table 5 in Section 7.4 of this report. Effects on wetlands are assessed in Section 9.0 of this report.

7.3 Loss or disturbance of threatened plant species

The *Carex tenuiculmis* and *Epilobium chionanthum* Management Plan has been developed (SLR 2025c) due to the previous tentative identification of *Carex tenuiculmis* within the Wind Farm Site and the presence of populations within the Transmission Corridor, although the latter will be avoided. In addition, *Epilobium chionanthum* (At Risk), which was recorded in some wetlands which will be avoided. The *Carex tenuiculmis and Epilobium chionanthum* Management Plan requires pre-works surveys at the wetlands directly affected by works and, if required, post-works surveys and/or transplanting and propagation which will result in no net loss of these species.

7.4 Land use variation: Comparison of Worst-Case Potential Effects Between the Consented and Proposed Layouts

7.4.1 Contingency Zones (CZ)

The effect of the change in layout between the consented layout and the proposed Stage 2 layout has been assessed with regard to CZs. As noted earlier, for Stage 2, some of the 54 potential turbine locations have moved from their consented locations including into areas previously identified as Windfarm Buffer Areas. In addition, the consented CZs are too

[5] e.g., RM1409 Land Use Consent, Condition 25D (Ecological Monitoring and Management Plan) and Condition 29 (Control of Invasive Woody Weeds).

constrained for the Stage 2 turbines, and some CZs have been enlarged up to the 100 m radius (although some Stage 2 CZs remained trimmed to avoid features such as wetlands, gullies and high value vegetation).

Also as noted earlier, the land use consent authorises up to 100 turbines, of which 12 have already been constructed meaning that there remains 88 consented CZs together with associated SFDs and roading. To provide a realistic consented layout, given 2 MW turbines are no longer readily available, a comparison was made between a realistic consented layout of 47 turbines within a possible 88 locations/CZs[6], with the Stage 2 layout of 44 turbines in 54 possible locations/CZs[7].

Extending some of the Stage 2 CZs into the Windfarm Buffer Areas (which are avoided by the consented layout) results in an estimated additional clearance of 3.65 ha of snow tussock grassland and 6.80 ha of (non-indigenous) rough pasture with scattered tussocks in these areas. However, due to the design changes described above, overall clearance of snow tussock grassland and wetlands are lower in Stage 2 than in the realistic consented layout (Table 5). Stage 2 also avoids the entire Thomas Block which contains high value tussock and reduces the number of turbines to be constructed.

Appendix I contains a breakdown of the mapped vegetation in each CZ. The extents of all CZs are suitable for turbines as they do not contain wetlands, are dominated by exotic vegetation (93% cover over all the CZs, with 26 CZs entirely covered in exotic vegetation and habitats), and are located on the peneplain surface.

7.4.2 Surplus Fill Disposal (SFD)

All SFD areas were included in the comparison between the consented layout and the Stage 2 layout. Compared to the consented layout, the Stage 2 layout has less clearance of snow tussock grassland, wetlands, and rough pasture with scattered tussocks within the SFD areas. This is due to Stage 2 SFDs avoiding wetlands and an overall reduction in earthworks requirements, largely attributable to fewer turbines and roads.

7.4.3 Internal roads

All internal roads outside CZs were included in the comparison between the consented layout and the Stage 2 layout. Re-routing of internal roads has resulted in less clearance of indigenous shrublands and wetlands (Table 5). There has also been a small increase in clearance of snow tussock grassland between road layouts, although overall clearance of snow tussock grassland is much lower for the Stage 2 layout.

[6] For the Consented layout, the representative selection (supplied by Mercury) comprised WTG/CZs 1, 2, 7, 8, 11, 12, 18, 20, 23, 28, 36, 38, 40, 43, 46, 52, 54, 56, 76, 5, 6, 10, 15, 16, 17, 19, 22, 25, 26, 31, 34, 37, 45, 48, 49, 59, 60, 61, 62, 77, 78, 82, 87, 92, 96, 97, and 100.

[7] For the Stage 2 ‘worst case’ layout, WTG/CZs 35-40 and 43-46 were omitted from the comparison. The CZs for these turbines are entirely covered in exotic vegetation (predominantly grazed exotic grassland).

Table 5: Comparison between potential effects on vegetation and wetlands between the consented layout and Stage 2 layout. Negative areas (m^2) represent an improvement (less clearance) between consented and Stage 2 layouts.

Scenario/ Site	Total area	Snow tussock grassland	Indigenous shrubland	Rough pasture	Wetland[1]	Remaining exotic vegetation
Consented layout CZ (47 of 88 CZ)	890,525	100,721	0	127,710	869	661,225
Stage 2 CZ (worst 44 of 54 CZ)	1,084,833	98,417	0	211,159	0	775,257
Difference	+194,308	-2,304	0	+83,449	-869	+114,032
Consented layout SFD	659,705	58,259	0	85,917	2,392	513,200
Stage 2 SFD	415,779	21,133	0	69,308	0	325,338
Difference	-243,926	-37,126	0	-16,609	-2,392	-187,862
BESS	4,197	0	0	0	0	4,197
SW Basin	228	0	0	0	0	228
O & M Facility	2,191	0	0	208	0	1,983
Site Compound	10,349	0	0	0	0	10,349
Batching Plant	10,661	0	0	0	0	10,661
Substation	6,594	0	0	0	0	6,594
Consented internal roads[2]	454,386	64,262	108	37,583	1,522	350,911
Stage 2 internal roads[3]	260,786	18,967	29	31,786	476	209,528
Difference	-193,600	-45,295	-79	-5,797	-1,046	-141,383
Transmission Corridor - Access Tracks and pads at pole sites[4]	66,703	2	0	1,222	0	64,660

[1] Wetlands included for completeness – see Sections 8.0 and 9.0 for the full wetland assessment.

[2] All roads. Calculated from the 2009 Civil design shapefile, from which 2009 CZs were removed.

[3] All roads. Calculated from the Earthworks Boundary shapefile (incorporating the outer extent of all earthworks except for SFDs), from which hardstands and CZs were removed. Also includes small parts of turbine laydown areas that extend beyond the CZs.

[4] Calculations based on 4.5 m wide tracks.

8.0 Natural Wetland Assessment

8.1 Regionally Significant Wetlands

No Regionally Significant Wetlands are present within the Wind Farm Site.

8.2 Natural Wetland Delineation

There were 123 wetland delineation plots, and 12 rapid pasture tests, assessed in the Wind Farm Site and 29 plots were assessed in the Transmission Corridor (Figures J-M; Table 6).

Nineteen wetland obligate species (OBL: which almost always occur under natural conditions in wetlands) and sixteen facultative wetland species (FACW: which usually occur

in wetlands but are occasionally found in non-wetlands) were identified in wetlands (Appendix C).

Several of the assessed sites were not natural inland wetlands as they met the pasture exclusion test (i.e., had >50% cover of pasture species (as per MfE 2022a)), failed both parts of the hydrophytic vegetation test or failed the dominance test of the hydrophytic vegetation test and hydrological indicators were not observed (Table 6). These sites were generally in the drier heads of gullies.

Most of the assessed sites passed both parts of the hydrophytic vegetation test (Table 6). However, some sites which failed the hydrophytic vegetation test and/or passed the pasture test were assessed as being natural wetlands due to the presence of peaty soils, hydrological indicators, and wetland obligate species (Table 6).

A conservative approach was taken to mapping wetlands. If a wetland plot indicated the presence of a natural wetland, downstream reaches were assumed to also contain wetlands unless they became incised and terrestrial vegetation extended to the margins of the waterway. In most cases, the heads of gullies were also considered to contain wetlands, with sites only excluded if wetland delineation plots or rapid pasture tests did not indicate the presence of a wetland. In several cases the presence of sphagnum moss (OBL) was visible on aerial imagery; all sites where sphagnum was observed were mapped as wetlands.

Natural wetland delineation worksheets are provided separately.

Table 6: Summary of wetland delineation assessments.

Dominance test	Prevalence test	Hydrophytic vegetation	Pasture	Hydric soils	Hydrological indicators	Natural wetland	Plot name
Wind Farm Site							
Not assessed	Not assessed	n/a	Yes (rapid test)	Not assessed	Not assessed	No	A1, A2, A3, 13A, 20A, 47, 61, 127A, 281, 286, H head, E2
Pass	Fail	Uncertain	Yes	Not assessed	No	No	2, 68B, 68C
Fail	Fail	No	Yes	Not assessed	No	No	D, 29, 68
Fail	Fail	No	No	Not assessed	No	No	203
Fail	Fail	No	Yes	Not assessed	Yes	No	B, B2, E2B, 71
Fail	Pass	Uncertain	No	Yes	Yes	Yes	3, 128
Fail	Fail	No	Yes	Yes	Yes	Yes	L, 10, 47b
Pass	Pass	Yes	Yes	Not assessed	Yes	Yes	129
Pass	Pass	Yes	No	Yes, or not assessed	Yes, or not assessed	Yes	Remaining plots
Transmission Corridor							
Pass	Pass	Yes	No	Yes, or not assessed	Yes, or not assessed	Yes	T289-T321
-	-	-	Yes	Not assessed	Not assessed	No	T322

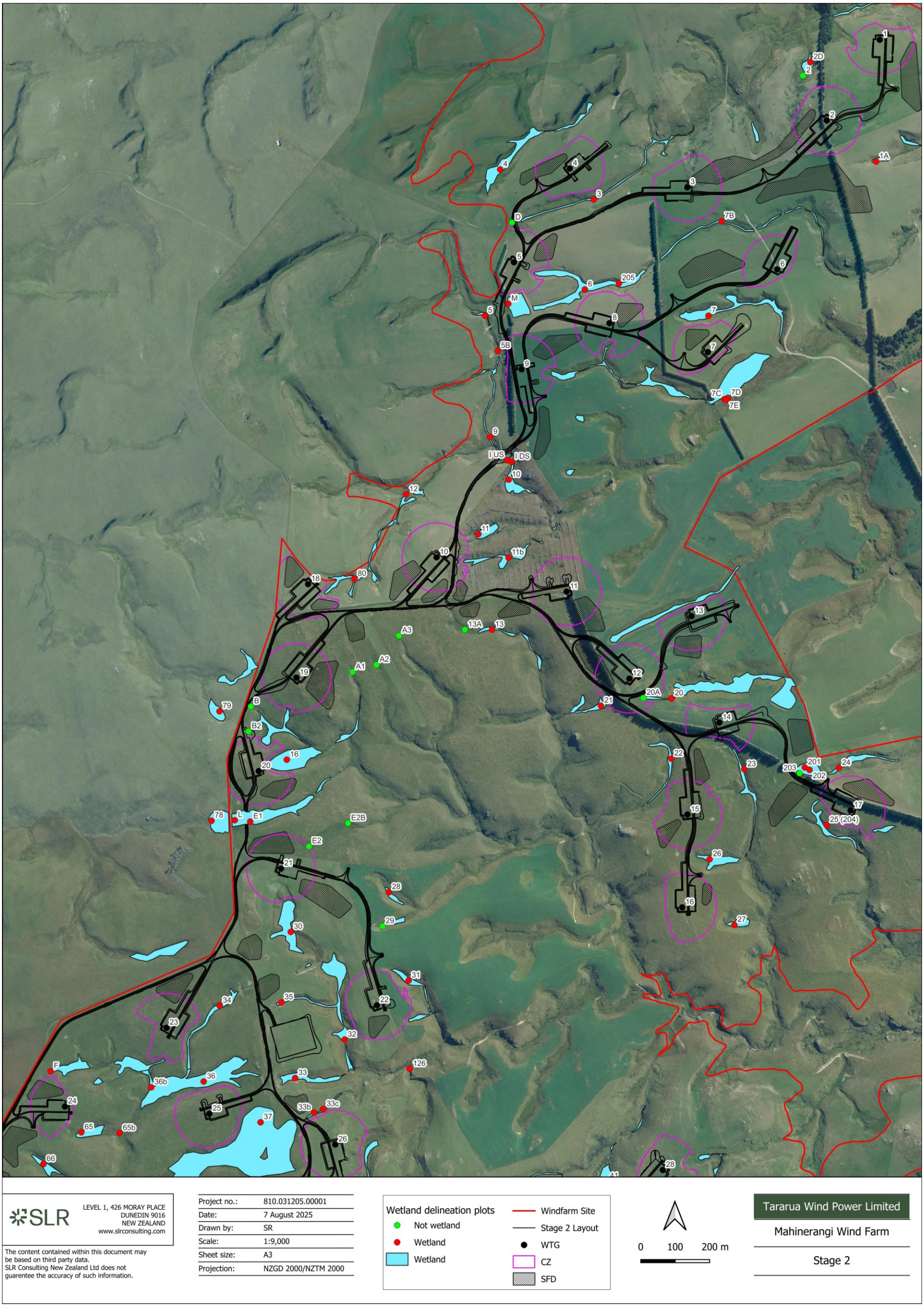


Figure J: (1/3) Wetland delineation plots within the Wind Farm Site.

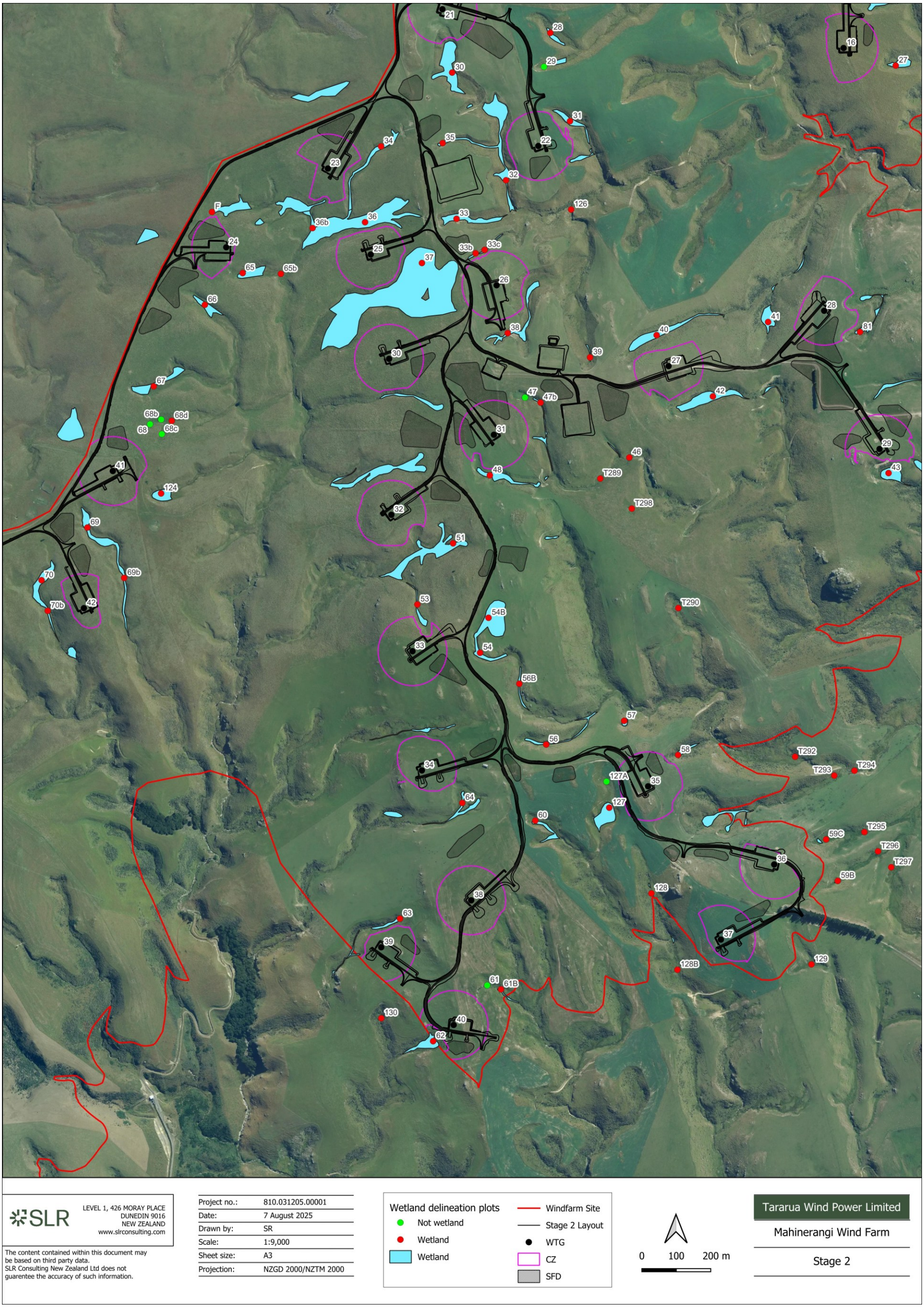


Figure K: (2/3) Wetland delineation plots within the Wind Farm Site.

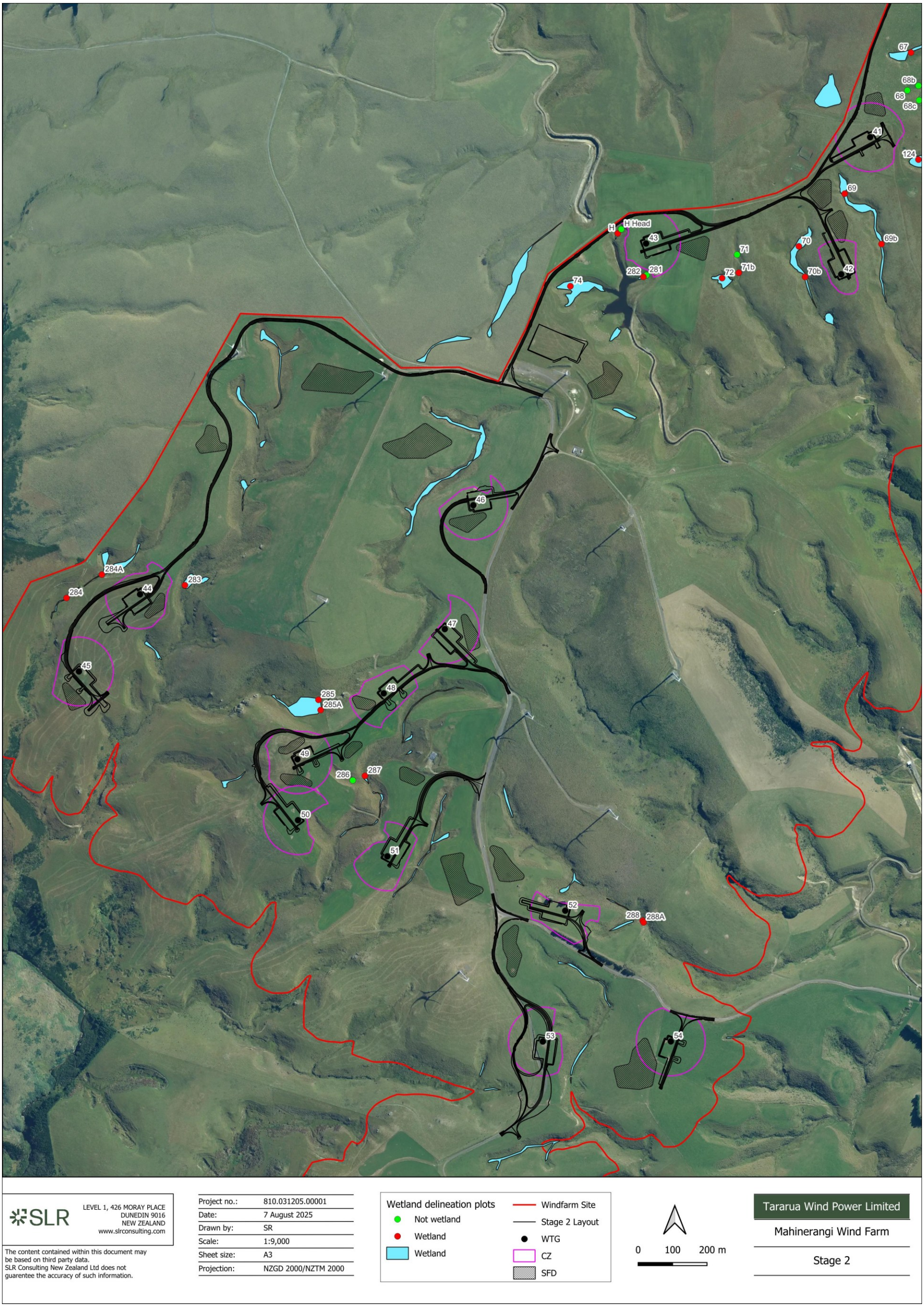


Figure L: (3/3) Wetland delineation plots within the Wind Farm Site.

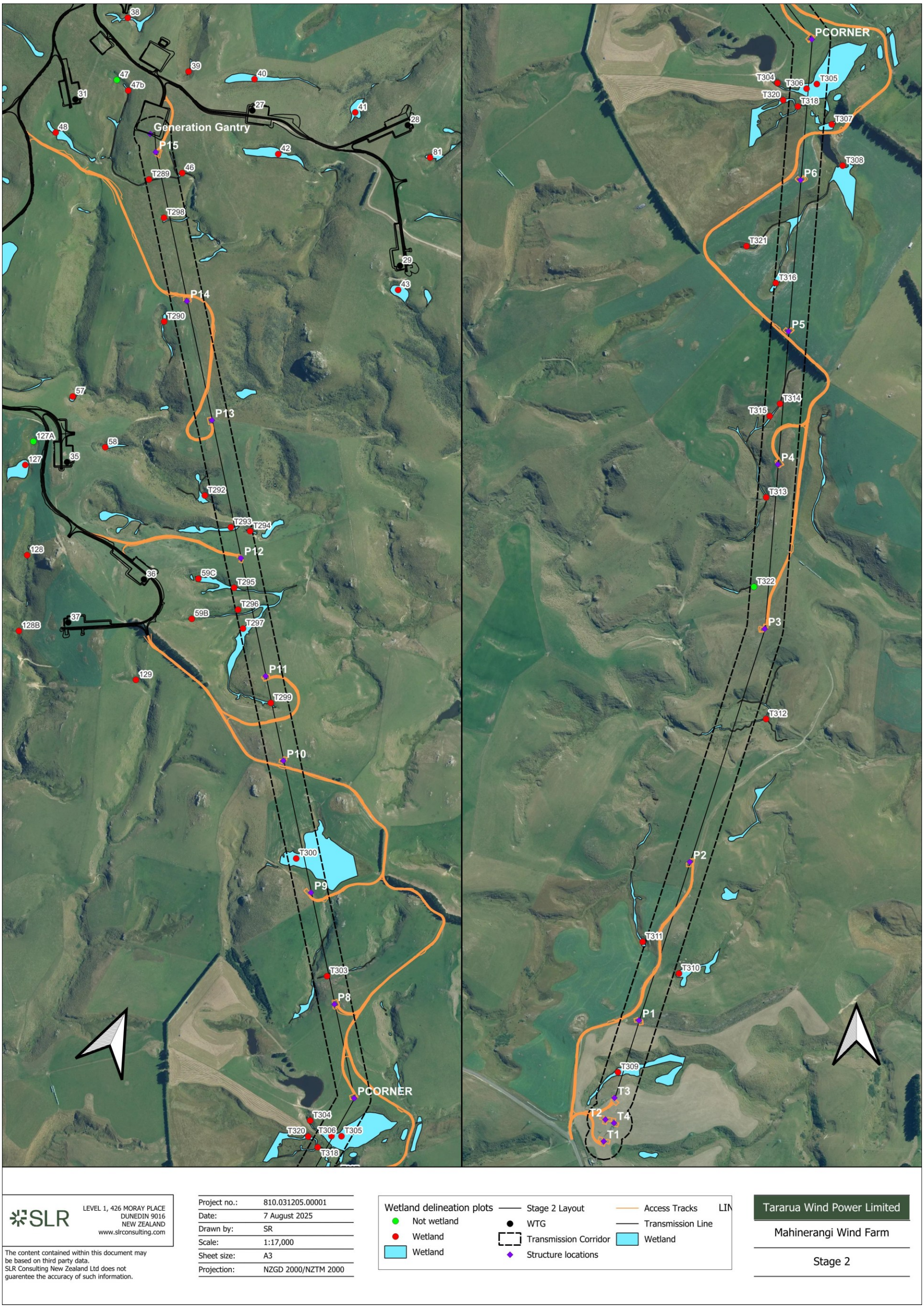


Figure M: Wetland delineation plots in the Transmission Corridor.

9.0 Assessment of Actual and Potential Effects on Wetlands

There is an estimated 34.15 ha of natural wetlands in and within 100 m of proposed works sites and CZ for Stage 2 of the Wind Farm Site, and 9.40 ha in and within 100 m of the Transmission Corridor (Figures J-M). Most of these wetlands are located within the bases of gullies and therefore are not subject to any direct effects. A large peat bog is present on flattish land west of turbine 26.

9.1 General Effects

Physical Disturbance

The physical disturbance of wetlands within the site as a result of wind farm construction, such as the internal road network, trenching for cable reticulation, and constructing turbine platforms and SFDs, has the potential to adversely affect natural wetlands.

The potential for permanent loss of wetland extent can result from the disturbance of wetlands to establish the internal road network and turbine platforms by placing engineering fill within an existing wetland and forming the permanent road or platform over the wetland. The cable reticulation network necessary for connecting the turbine generators with each other and the wind farm substation requires trenching to install the cables below ground level.

Physical disturbance also has the potential to adversely affect wetland values as a result of the loss of wetland vegetation which may impact the ability of the wetland to perform valuable functions, including improvement of water quality, attenuation of peak flows, and provision of wildlife habitat.

The Stage 2 wind farm layout has been optimised to avoid physical disturbance to wetlands by, where practicable, locating roads and other works on ridge tops away from gullies, and by amending the layout where practicable. Minimisation of direct disturbance, where practicable, has also driven design. However, there are limited instances where avoidance has not been practicable. The wetlands affected are discussed in further detail below.

Changes to Wetland Hydrology

Works have the potential to result in changes to the hydrological function of wetlands as a result of earthworks within and near wetlands, changes in the natural flows, such as directing flows along new flow paths, or changing the frequency, volume, or velocity of flows (e.g., through temporary erosion and sediment control measures).

These potential adverse effects can be avoided by ensuring that the proposed construction works:

- Do not block waterways and runoff.
- Minimise the length of new flow paths.
- Direct all flows that would have originally flowed into a gully into the same gully.
- Locate and contour fill disposal sites to conserve catchment areas; and
- Include appropriate armouring of drains and areas downstream of culvert outlets to help reduce the effects of any increased flow velocity.

Flow volume and frequency are expected to be the same post works, as the catchments remain the same size, and flow paths will mimic existing runoff patterns (Environmental

Construction Management Plan, ECMP). In addition, the wetlands identified at the Wind Farm Site are predominantly fed by surface flow (rain, snow melt); therefore, the potential blockage of subsurface flows (e.g., by turbine platform foundations) is not considered to be a potential adverse effect on wetlands at this site.

Effects of Sedimentation and Contaminated Run-Off on Wetland Habitats

Sediment and erosion control measures adopted to protect wetlands from sedimentation and pollutants are outlined by Riley (2025), including.

- interception of sediment laden runoff from earthworks areas, including the use of sediment traps and silt fences.
- diversion of clean water runoff away from earthwork areas.
- protection of downstream environments from sedimentation and water quality degradation.
- monitoring sediment control measures.
- capturing potentially contaminated run-off from the BESS platform in a detention basin and then remove from the site (Riley 2025).

The ECMP and Erosion and Sediment Control Plans (ESCP) follow best practice methods for control of sediment, storage of fuels and oils, vehicle re-fuelling and maintenance, and management of hazardous materials (Riley 2025).

9.2 Directly Affected Wetlands

Two new road sites have been identified where physical disturbance of the natural wetlands cannot be practicably avoided (Table 7, see Appendices F and G for maps and descriptions of these sites). These natural wetlands are not able to be avoided as the road network has already been configured to minimise possible adverse effects on wetlands.

The area of each potentially affected wetland was measured in GIS based on the extent of earthworks shown in the indicative design plans. In total, approximately 476 m^2 (0.05 ha) of natural wetlands will be directly affected by roading works (Table 7). At these sites, parts of the wetlands present will be completely cleared.

Direct adverse effects on wetlands will be compensated by way of rehabilitation of existing natural wetlands within the Wind Farm Site (see Section 11).

An additional six works sites (three in the Wind Farm Site, three in the Transmission Corridor) are located within 10 m of nine wetlands (Table 8, maps in Appendix H). Management of these wetlands and other wetlands within 100 m of works will be addressed by the Wetland Monitoring and Management Plan (SLR 2025) (see Section 12.0).

There are no wetlands within (i.e. directly affected by) or within 10 m of the Battery Energy Storage System (BESS), Batching Plant, O & M Facility, Substation, Site Compound, SFD areas, or CZs.

No natural wetlands are present at Transmission Corridor pole sites or within 10 m of pole sites (Figure M). Existing vehicle tracks along the Transmission Corridor are located within 10 m of wetlands, but no works will be undertaken at these sites as the pole sites can be accessed by the required vehicles and machinery using existing gully crossings, and there will be no effects on wetlands.

Table 7: Sites with direct effects on wetlands.

Site	Wetland number	Wetland area directly affected (m^2)
Road south of Turbine 9	20	154
Road south of Turbine 20	43	322
Total		**476**

Table 8: Additional works sites within 10 m of wetlands.

Location (Turbine)	Wetland number
Wind Farm Site	
Turbine site 5	15
Turbine site 20	37
Roads to and near turbine 26	68 and 69
Transmission Corridor	
Access track on bund downstream of pond, 150 m northeast of P6	T30
Access track 70 m northeast of P9	T16
Access track 220 m east of PCorner	T26, T27, T28

9.3 Indirectly Affected Wetlands

An estimated 32.91 ha of natural wetlands are found within 100 m of works sites[8] for the Mahinerangi Wind Farm Stage 2.

As described in Section 9.1 above, the potential indirect effects on wetlands within 100 m of the proposed construction works include changes to wetland hydrology and sedimentation. The implementation of high-quality erosion and sediment controls, in accordance with an approved Erosion and Sediment Control Plan, will ensure that sedimentation effects on these wetlands are avoided. Erosion and sediment controls will include the application of silt fences, armoured flow paths, minimisation of the works area, and control of run-off. Any disturbed areas are to be re-grassed as soon as possible after works are complete to help prevent soil movement.

The potential for hydrological effects on wetlands within 100 m of the proposed construction was assessed by assessing the location of planned drainage culverts in relation to roads, turbine platforms, wetland location, and local topography. The effects of these culverts are also considered to be low, on the basis that the design of the roading network and turbine platforms is such that any rainwater and runoff throughout the site will be directed back into downslope wetlands within the same catchment area. It is therefore considered that the hydrology of all wetlands will be maintained. Although there is some potential for temporary diversion of potential flows reaching wetlands at the two wetland sites directly affected by works, the likelihood of any adverse effects on these wetlands as a result of these temporary

[8] No wetlands are present in the CZs or SFD areas.

measures is low, considering the temporary nature of these works. Due to their peaty nature, the wetlands are also likely to retain substantial moisture over the works period.

Furthermore, TWP propose to undertake wetland monitoring as outlined in Section 12 of this assessment and in accordance with the Wetland Monitoring and Management Plan (SLR 2025d). This monitoring will ensure that any unanticipated effects on the hydrological function of wetlands in proximity to the wind farm construction works will be identified and the appropriate remedial actions undertaken.

10.0 Effects Management Hierarchy

The NPS-FM requires all adverse effects on wetlands and indigenous biodiversity to be addressed using the effects management hierarchy which:

> *in relation to natural inland wetlands and rivers, means an approach to managing the adverse effects of an activity on the extent or values of a wetland or river (including cumulative effects and loss of potential value[9]) that requires that:*
>
> *(a) adverse effects are avoided where practicable; then*
>
> *(b) where adverse effects cannot be avoided, they are minimised where practicable; then*
>
> *(c) where adverse effects cannot be minimised, they are remedied where practicable; then*
>
> *(d) where more than minor residual adverse effects cannot be avoided, minimised, or remedied, aquatic offsetting is provided where possible; then*
>
> *(e) where biodiversity offsetting of more than minor residual adverse effects is not possible, aquatic compensation is provided; then*
>
> *(f) if aquatic compensation is not appropriate, the activity itself is avoided.*

The Stage 2 design avoids direct impacts on all natural wetland except at two locations where the access roading cannot practicably avoid the wetlands. In addition, there are nine instances where earthworks are proposed within 10 m of the natural wetland.

While avoidance of the two wetlands is not practicable, overall the road network has been configured to avoid or minimise adverse effects on wetlands.

Measures to minimise adverse effects on natural wetlands include:

- Refining the construction design based on the identified ecological values in order to limit adverse effects. This has included relocation of CZ and SFD boundaries and roading.
- Limiting physical disturbance works to only the extent necessary to enable construction of the required infrastructure.

[9] The potential values of affected wetlands are expected to be low given their current low-moderate condition, a continuation of current threats to the wetlands, and their expected severe degradation and/or loss over time due to those threats.

Conversely, the potential values of the compensation wetland are higher than its exiting values due to the protection and management that will be provided.

Cumulative effects on wetlands are low given the avoidance of wetlands in Stage 1, the small area of wetlands affected in Stage 2, and the restriction of works to specified areas away from wetlands.

- Undertaking works in accordance with the Erosion and Sediment Control Plan to reduce any potential deposition of sediment in downstream wetlands.
- Maintaining surface water flows to the same wetlands that would have received those waters prior to works by way of roadside drains and culverts and retention of natural contours where possible.

Two stream/wetland areas will be remediated and enhanced near the sites where the two wetlands cannot be avoided. At these sites the existing farm tracks and culverts will be removed, and the stream channel re-established to natural contours. Exposed soils will be re-vegetated once works are complete. Compensation is also proposed for loss of wetland habitat at these locations (see Section 11.0).

Biodiversity offsetting is not proposed for wetlands, as it is not practicable to create like-for-like wetlands to replace those lost due to the difficulty in creating peat bogs and a lack of available gully sites within the Wind Farm Site (all available sites already have wetlands).

11.0 Wetland Compensation

The Wetland and Aquatic Compensation Plan (SLR 2025b) describes the rehabilitation of existing disturbed wetland habitat near the proposed areas of wetland loss as compensation for the effects associated with traversing the wetlands at the two identified locations.

Loss of part of Wetland 20

An estimated 154 m^2 of wetland will be lost at this site to construct a road crossing and install a culvert. However, there is an existing, farm track which crosses the stream immediately downstream of the works site. The crossing has a culvert. This farm track and culvert will be removed and the stream habitat remediated. The exotic wetland plant species currently present in the wetland will naturally colonise the site post works. Nevertheless, compensation for wetland loss is still required.

Loss of part of Wetland 43

An estimated 322 m^2 of wetland will be lost at this site due to road construction.

Compensation

The Wetland Compensation Site is located adjacent to the Transmission Corridor (Figure N). It contains degraded wetland and gully habitat at risk of further degradation/loss[10], is of sufficient size (5.7 ha site with 1.4 ha of wetland). The 1.4 ha of wetlands are more than adequate as compensation for wetland loss, as over 29 times the area of wetland lost will be protected and the surrounding buffer area enhanced. Over time, with stock removed, the Compensation Wetland will have strengthened vegetative values and improved ecosystem services which will significantly increase its ecological and functional (filtration and water quality treatment) values.

Compensation works for wetlands will be in accordance with the Wetland and Aquatic Compensation Plan and include:

- Fencing of the gully system to exclude stock. The fence should be placed at the top of the gully wall so that any indigenous snow tussock grassland and indigenous shrubs on gully walls are also protected.

[10] Very few privately-owned waterways or gully wetlands in the local area are fenced from stock.

- Direct transfer of narrow-leaved snow tussocks from areas where they will be cleared to gully walls, to buffer the wetland from surrounding land uses and improve indigenous cover.
- Planting of eco-sourced indigenous species will be undertaken in the, including on gully walls.
- Monitoring of rehabilitation works and ongoing woody weed control to ensure the gains in ecological value persist.

The benefits from fencing will be:

- Growth of exotic grassland (including in the inter-tussock sward) on gully walls which will form a dense thatch to intercept overland water flow, trap sediments, and remove nutrients, buffering the wetland and aquatic habitats from surrounding land uses.
- Recovery of soils from compaction, tracking, and other disturbance caused by stock.
- Removal of a direct source of nutrient inputs to wetland and waterway from stock.
- Removal of grazing pressure on wetland and gully wall vegetation, allowing recovery of snow tussock grassland and indigenous wetland vegetation.
- Protection of an existing population of *Carex tenuiculmis*, a sedge which has a national threat classification of At Risk (de Lange et al. 2023).

The benefits from woody weed control are:

- Preventing displacement of existing and planted snow tussock grassland by exotic shrubland.
- Maintenance of and improvements in indigenous biodiversity.

The benefits of snow tussock transfer are:

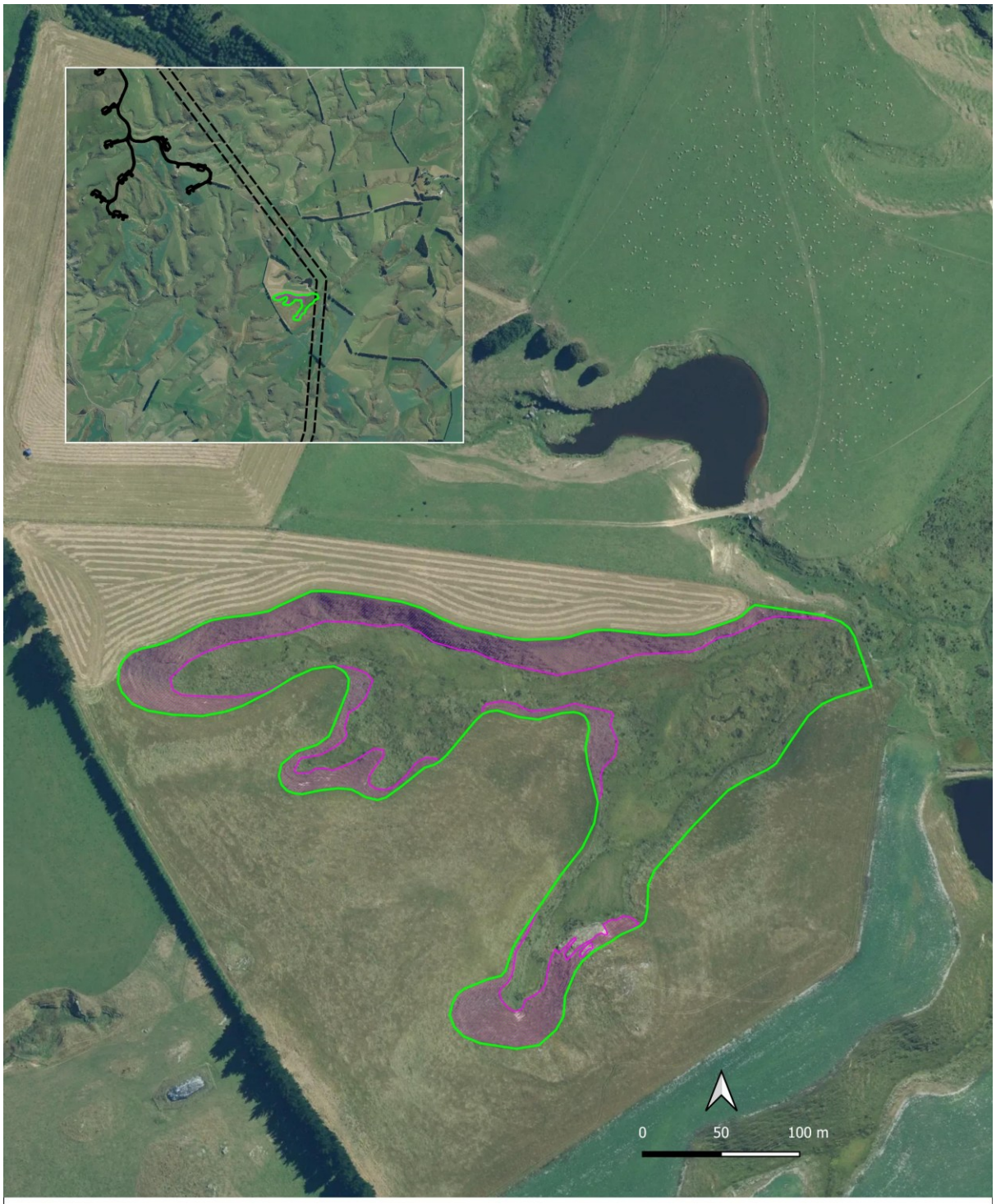
- Increasing vegetation cover, which will buffer the wetland and aquatic habitats from surrounding land uses.
- Increasing indigenous cover and biodiversity.
- Increasing the extent of protected habitat for indigenous terrestrial invertebrates.
- Providing additional habitat for lizards.

The benefits of indigenous plantings are:

- Increasing indigenous biodiversity.
- Returning species likely to have been present prior to conversion to farmland.
- Increasing numbers/populations of At Risk plant species.
- Provision of food plants for lizards (should they colonise the site in the future), avifauna and invertebrates.

These benefits will ultimately ensure that there will be a net gain in wetland values within the project site.

For monitoring and reporting requirements and closure criteria, refer to the Wetland Management Plan and the Wetland and Aquatic Compensation Plan.



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Legend
- Wetland Compensation Site
- Snow tussock transfer site
- Stage 2 Layout
- Transmission Corridor

Tararua Wind Power Limited
Mahinerangi Wind Farm
Stage 2

Figure N: Wetland Compensation Site.

12.0 Monitoring and Management of Wetlands within 100 m of Works

The Wetland Monitoring and Management Plan (SLR 2025d) describes the actions required to ensure that natural wetlands located within 100 m of works are not adversely affected by construction activities. A summary of these actions is provided below.

Prior to construction, photopoints will be established in all wetlands downstream of proposed construction-related activities. During construction, notes will be undertaken of any sedimentation, plant death, erosion, and any other factors which may influence wetland extent and condition. An assessment will be made regarding any changes in quality or reductions in size of the wetland, whether these changes can be attributed to the proposed activities, and if any remedial actions, such as improvements in sediment controls, are required.

The photographs and written assessment will be provided to Otago Regional Council on a three-monthly basis to confirm compliance with the proposed wetland monitoring and management condition for the duration of construction works.

13.0 Ecological Significance Assessment

Notwithstanding that the NES-F does not require natural inland wetlands to meet any ecological significance criteria, an assessment of ecological significance is undertaken below (Table 9) based on the criteria in APP2 – Significance criteria for indigenous biodiversity in the proposed Otago Regional Policy Statement 2021. An area is significant if it meets one or more of the criteria.

Wetlands within 100 m of proposed works for the MWF Stage 2 are assessed as being significant as they meet criteria Rarity d(i), Rarity d(ii), Distinctiveness f(iii), and Ecological Context g(iv), due to the presence of At Risk flora and fauna, freshwater wetlands being reduced from their original extent at a national scale, the probable presence of an unusual assemblage of cold-climate adapted insect fauna, and because they are likely to be protecting downstream water quality and fish habitat. While significant, these wetlands are degraded by grazing, pugging, the presence of exotic plant species, and likely nutrient enrichment.

Table 9: Ecological significance assessment for gullies (containing wetlands, streams, shrublands, and snow tussock grasslands) and adjacent snow tussock grassland in the MWF Stage 2 project area based on APP2 significance criteria in the proposed Otago Regional Policy Statement 2021.

Criterion	Description	Significant?	Notes
Representative-ness	(a) An area that is an example of an indigenous vegetation type or habitat that is typical or characteristic of the original natural diversity of the relevant ecological district or coastal marine biogeographic region. This may include degraded examples of their type or represent all that remains of indigenous vegetation and habitats of indigenous fauna in some areas.	No	All examples are heavily modified and larger and better examples are present nearby in protected areas.
	(b) An indigenous marine ecosystem (including both intertidal and sub-tidal habitats, and including both faunal and floral assemblages) that makes up part of at least 10% of the natural extent of each of Otago's original marine ecosystem types and reflecting the environmental gradients of the region.	N/a	Not a marine ecosystem.
	(c) An indigenous marine ecosystem, or habitat of indigenous marine fauna (including both intertidal and sub-tidal habitats, and including both faunal and floral components), that is characteristic or typical of the natural marine ecosystem diversity of Otago.	N/a	Not a marine ecosystem.
Rarity (d) An area that supports:	(i) An indigenous species that is threatened, at risk, or uncommon, nationally or within an ecological district or coastal marine biogeographic region, or	**Yes** (some sites)	At Risk plant species: *Carmichaelia petriei* on edge of waterway at one site and *Epilobium chionanthum* in Wind Farm Site wetlands, and *Carex tenuiculmis* in Transmission Corridor wetlands. *Olearia lineata* also recorded. Threatened and At Risk aquatic invertebrates (incl. kōura) and fish (Eldon's galaxias, kōaro) in waterways. At Risk lizards (tussock skink) in grasslands.
	(ii) Indigenous vegetation or habitat of indigenous fauna that has been reduced to less than 20% of its former extent nationally, regionally or within a relevant land environment, ecological district, coastal marine biogeographic region or freshwater environment including wetlands, or	**Yes**	Freshwater wetlands now cover less than 10% of their former extent at a national scale (Cromarty and Scott 1985). Indigenous shrublands have a low cover in Waipori ED (LCDB v5.0) but may not be reduced in extent. None of the Wind Farm Site is located on Category 1 (<10% indigenous cover left) or Category 2 (10-20% indigenous cover left) land environments (Cieraad *et al*. 2015).
	(iii) Indigenous vegetation and habitats within originally rare ecosystems, or	No	No originally rare ecosystems identified (as per Williams *et al*. 2007).

Criterion	Description	Significant?	Notes
	(iv) The site contains indigenous vegetation or an indigenous species that is endemic to Otago or that are at distributional limits within Otago.[11]	**Yes**	No such vegetation or plant species identified. Eldon's galaxias is only found in eastern areas of Otago.
Diversity	(e) An area that supports a high diversity of indigenous ecosystem types, indigenous taxa or has changes in species composition reflecting the existence of diverse natural features or gradients.	No	Few indigenous ecosystem types with low species diversity.
Distinctiveness (f) An area that supports or provides habitat for:	(i) Indigenous species at their distributional limit within Otago or nationally, or	**Yes**	No such plant species identified. Eldon's galaxias is only found in eastern areas of Otago.
	(ii) Indigenous species that are endemic to the Otago region, or	**Yes**	No such plant species identified. Eldon's galaxias is endemic to Otago.
	(iii) Indigenous vegetation or an association of indigenous species that is distinctive, of restricted occurrence, or has developed as a result of an unusual environmental factor or combinations of factors.	**Yes**	Identification of a range of threatened aquatic invertebrate species supports the conclusion that an unusual assemblage of cold-climate adapted insects is present, as described for upland peat bogs in Waipori Ecological District by Patrick *et al*. (1993).
Ecological context (g) The relationship of the area with its surroundings (both within Otago and between Otago and the adjoining regions), including:	i) An area that has important connectivity value allowing dispersal of indigenous flora and fauna between different areas, or	No	Areas of indigenous vegetation are generally small and isolated. Streams allow movement of some fish species.
	(ii) An area that has an important buffering function that helps to protect the values of an adjacent area or feature, or	**Yes**	Streams and wetlands buffer downstream waterways from surrounding land uses
	(iii) An area that is important for indigenous fauna during some part of their life cycle, either regularly or on an irregular basis, e.g. for feeding, resting, nesting, breeding, spawning or refuges from predation, or	**Yes** (some sites)	Important area for Eldon's galaxias which is restricted to eastern areas of Otago.
	(iv) A wetland which plays an important hydrological, biological or ecological role in the natural functioning of a river or coastal ecosystem.	**Yes**	Wetlands likely help protect downstream water quality and fish habitat.

[11] Note that endemism and distributional limits are assessed in both Rarity and Distinctiveness criteria.

14.0 Assessment of Actual and Potential Effects on Terrestrial Invertebrates

Desktop review

The list of invertebrates recorded from the vicinity of the proposed MWF, compiled from reports from surveys within the snow tussock grasslands and across the adjacent pasture near the MWF area, includes 924 invertebrate taxa within 20 km of the Wind Farm Site. This includes moths and butterflies (270), beetles (218), flies (123), spiders (108), Hemiptera (57), wasps/ants (41), nematodes (46), thrips (13), and wētā/grasshoppers (11). Other groups in small numbers or less identified were flatworms, earthworms, slugs, snails, amphipods, slaters, centipedes, millipedes, diplopods, symphyla, pauropods, protura, diplura, collembola, harvestmen, pseudoscorpions, mites, cockroaches, earwigs, barklice, stick insects, caddisfly, damselflies and dragonflies.

From the compiled list there are 13 species of invertebrate found within 20 km of the MWF that are listed as threatened in the New Zealand Threat Classification System (NZTCS). A further 14 taxa are recorded on the list, but only to genus, which is not sufficient to determine whether they are threatened species (some species in these genera are threatened). In addition to those listed, there are records of another 27 threatened invertebrate taxa potentially in the vicinity of the wind farm (i.e., in tussock grasslands within 50 km), from a database of New Zealand's threatened species locations (Appendix D).

Due to most of these records coming from relatively intact tall tussock grassland, and the Stage 2 site mostly comprising modified agricultural land which does not provide suitable habitat for the majority of these species, only a proportion of the listed invertebrates are likely to be found at the Wind Farm Site.

Field Survey

Sixty different terrestrial invertebrate taxa were identified during the January 2025 site visit (Appendix E). None of these species were identified as threatened.

Assessment of Effects

Different aspects of the wind farm construction and operation could impact invertebrate species differently. Impacts can also differ between life stages of the same species, e.g., the adult tussock moth (*Argyrophenga antipodum*) might fly out of the construction zone that its tussock-feeding larvae will not survive. Conversely, operational turbines might disrupt flights of the adult but not impact larvae at ground level. The seasonality of invertebrate species will also influence potential effects. Most 'aquatic' insects (dragonflies, damselflies, mayflies, stoneflies, caddisflies, dobsonflies, scorpionflies, flies, lepidoptera, hemiptera, coleoptera and lacewings) have flying adults that could be impacted by turbines and are therefore considered along with terrestrial invertebrates.

The major potential impact of wind farms on terrestrial invertebrates (Elzay *et al.* 2017, Weschler and Tronstad 2024) is through habitat loss and fragmentation. Earthworks will result in loss of invertebrate habitat when undertaken in areas of tussock grassland. Existing agricultural modifications are likely to have already changed invertebrate diversity and abundance at the Wind Farm Site (e.g., Espie and Barratt 2006), and further agricultural operations are likely to continue. In addition, rehabilitation of snow tussock grassland affected by construction will be undertaken as required by consent condition 25C. As such, overall impacts on invertebrates are expected to be minimal. Furthermore, any small adverse effects on invertebrates will be mitigated through remediation of habitat and compensation for lizards, indigenous vegetation, and wetlands.

No invertebrates listed in Schedule 7 of the Wildlife Act were found and therefore they are highly unlikely to be present within the Stage 2 area. As such, it is not necessary to obtain a Wildlife Act Authority for invertebrates.

15.0 Conclusions

Terrestrial vegetation

Potential indigenous vegetation clearance is reduced in the Stage 2 layout compared to a realistic consented layout, due to a change in CZ layout and a new configuration of SFDs which avoid wetlands, as well as a reduction in the number of turbines and roads. In addition, the Thomas Block which contains high-quality snow tussock grassland will be completely avoided in Stage 2. Indigenous vegetation clearance has been authorised by way of existing land use consent. Rehabilitation of earthworks will be undertaken in accordance with consent conditions.

Natural Wetlands

There are limited instances where is not practicable to avoid works within or within 10 m of a wetland. There are three sites in the Wind Farm site and three in the transmission Corridor where the roading or associated earthworks will be located within 10 m of nine wetlands. Indirect adverse effects on wetlands will be avoided by maintaining existing hydrology, control of potential erosion, sediment, and contaminants, and monitoring. Management of all wetlands will be addressed by the Wetland Monitoring and Management Plan.

Two roading sites have been identified where physical disturbance of the natural wetlands cannot be practicably avoided. Approximately 476 m^2 (0.05 ha) of parts of these natural wetlands will be cleared. This loss will be compensated for by rehabilitating nearby wetlands guided by the Wetland and Aquatic Compensation Plan.

Flora

The *Carex tenuiculmis* and *Epilobium chionanthum* Management Plan will manage potential effects on At Risk plant species. Woody weeds will be managed according to the Woody Weed Management Plan (SLR 2025e).

Invertebrates

Due to existing agricultural modifications, impacts on terrestrial invertebrates from the variations to the land use consent and new activities are expected to be minimal.

Overall Conclusion

Following compensation for directly affected wetlands, and implementation of a range of ecological monitoring and management plans, the actual and potential adverse effects of Stage 2 of the Mahinerangi Wind Farm (including the transmission line and BESS) on vegetation, wetlands, and terrestrial invertebrates will be minimal.

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17.0 Closure

Sincerely,

SLR Consulting New Zealand

[redacted]

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Appendix A Authors' qualifications and experience

Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

SLR Project No.: 810.031205.00001

6 October 2025

Name & Role	Qualifications	Experience
Steve Rate Senior Ecologist	PhD., Ecology, University of Otago (2005) Graduate Diploma, University of Otago (1999) BSc. (Honours), Biochemistry, University of Canterbury (1987)	Steve has undertaken terrestrial ecology surveys, including wetland surveys, throughout New Zealand since 2007, including for a range of wind farm projects. Steve has worked at the proposed Mahinerangi wind farm site, completing wetland and vegetation surveys in 2024, and is therefore familiar with the local environment, challenges associated with the area and the methods required to assess the ecological communities. Steve's extensive experience includes completing terrestrial assessments and monitoring for a range of energy providers throughout Otago and Southland, where he ensures robust scientific methods are used and pragmatic recommendations are provided to clients. Steve has recently undertaken natural wetland assessments in Canterbury, Otago, and Southland.
Mike Wakelin Ecologist	Diploma of Applied Science, Victoria University of Wellington (1999) NZ Certificate in Science, Central Institute of Technology (1990)	Mike has over 30 years of experience working with New Zealand wildlife, specifically focusing on terrestrial invertebrate ecology and taxonomy. Mike's valuable expertise has contributed to projects across New Zealand, including in Otago and Southland where he has completed a range of projects over several years investigating Data Deficient terrestrial invertebrates. Mike's recent experience includes an extensive baseline assessment of terrestrial invertebrate populations, surveyed using a wide range of techniques, where over 36,000 specimens from 461 different taxa were caught and identified.
Hamish Dean Principal Ecologist	MSc (Hons) Biological Science (Ecology), University of Waikato BSc Ecology and Zoology, Victoria University of Wellington	Hamish has over 21 years of experience working in ecological consultancy and natural resource management. Hamish specialises in terrestrial ecology and wetlands and has worked in a wide range of habitats across New Zealand on projects involving significance assessments, impact assessments and ecological restoration. Hamish has significant experience providing the ecological technical input required for proposed wind and solar farms, including site assessments of vegetation, wetlands, fauna and aquatic values and subsequent reporting and impact assessment. This includes seven solar farm sites for Harmony Energy, of which one solar farm is now in construction and a further three have been consented.

Name & Role	Qualifications	Experience
Keren Bennett Technical Director	PGDipl. Wildlife Management, University of Otago (1993) BSc (Zoology), Auckland University (1992)	Keren has more than twenty-five years' consulting experience. Her professional experience has involved providing ecological and freshwater management advice to a wide range of stakeholders across New Zealand, including local government, urban developers, iwi, community groups, the transport sector, mining and quarrying sector, and the water, wastewater and renewable energy industries. She has designed, managed and implemented river, stream and wetland surveys, riparian vegetation assessments, fisheries studies, eDNA monitoring, ecological constraints and risk analyses, ecological effects assessments and reporting for a wide variety of audiences. Keren regularly assists local government with peer review and ecological advice associated with land development. She has prepared and presented expert ecological evidence in relation to a range of projects at Council and Environment Court hearings.

Appendix B Photographs of wetlands

Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

SLR Project No.: 810.031205.00001

6 October 2025

Wetland with sharp spike sedge (orange colour) and jointed rush (wetland Plot 70b). Photo taken 14 March 2024.

Wetland dominated by soft rush (wetland Plot 66). Photo taken 14 March 2024.

Sweetgrass (darker green) in stream channel (downstream of wetland Plot 30). Photo taken 22 March 2024.

Wetland with bog pine and sphagnum moss adjacent to wetland Plot 72. Photo taken 22 March 2024.

Sphagnum moss, rautahi, copper tussock, inaka, and mānuka in a wetland near wetland Plot 11 (surrounded by plantation forest). Photo take 24 April 2024.

Degraded peaty wetland on shallow slope near wetland Plot 54B containing sphagnum moss, copper tussock, and a few cushions of comb sedge.

Wetland near wetland Plot 7D with copper tussock and *Juncus edgariae*.

Wetland near wetland Plot 80 dominated by *Carex echinata* and *Juncus articulatus*.

Appendix C Plant species recorded during field surveys

Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

SLR Project No.: 810.031205.00001

6 October 2025

Table C-1: Plant species recorded during 2024 and 2025 field surveys to MWF Stage 2. Relative abundance is estimated over the entire site. A = abundant, F = frequent, O = occasional, R = Rare. #Observed only in the Transmission Corridor. *Observed just beyond the Wind Farm Site.

Native species	Common name	Plant type	Wetland indicator status	Relative abundance
Acaena anserinifolia	Bidibid	Herb	FACU	R
Aciphylla aurea	Golden speargrass	Herb	UPL	O
Aciphylla scott-thomsonii	Giant speargrass	Herb	n/a	R
Acrothamnus colensoi		Shrub	n/a	R
Agrostis muscosa	Pincushion grass	Grass	n/a	R
Anaphalioides bellidioides	Hells bells	Herb	FACU	O
Androstoma empetrifolium		Shrub	FACW	R
Anisotome aromatica	Common aniseed	Herb	FACU	R
Aporostylis bifolia	Odd-leaved orchid	Orchid	FACW	O
Asplenium appendiculatum	Ground spleenwort	Fern	n/a	R
Astelia nervosa	Mountain astelia	Monocot herb	FACU	R
Austroblechnum penna-marina	Little hard fern	Fern	FAC	O
Austroderia richardii	Toetoe	Grass	FAC	R
Austrolycopodium fastigiatum	Alpine clubmoss	Fern	FAC	R
Azorella cockaynei		Herb	FACW	R
Brachyglottis bellidioides var. *bellidioides*	Hell's bells	Herb	n/a	R
Carex coriacea	Rautahi	Sedge	FACW	O
Carex echinata	Star sedge	Sedge	OBL	O
Carex punicea	Red hook sedge	Sedge	FAC	R
Carex secta	Pūkio; Pūrei	Sedge	OBL	R
Carex tenuiculmis#		Sedge	OBL	O
Carex wakatipu		Sedge	n/a	O
Carmichaelia petriei	Desert broom	Shrub	FAC	R
Celmisia gracilenta	Mountain daisy	Herb	FAC	R
Chaerophyllum colensoi		Herb	n/a	R
Chionochloa rigida	Narrow-leaved snow tussock	Grass	FAC	O
Chionochloa rubra subsp. *cuprea*	Copper tussock	Grass	FAC	R
Cladonia species	Lichen	Lichen	n/a	R
Coprosma cheesemanii		Shrub	FACU	R
Coprosma dumosa		Shrub	FAC	R
Coprosma propinqua	Mingimingi	Tree	FAC	O
Coriaria sarmentosa	Tutu	Herb	n/a	R
Dracophyllum longifolium	Inaka; Inanga	Tree	FACU	R

Native species	Common name	Plant type	Wetland indicator status	Relative abundance
Eleocharis acuta	Sharp spike sedge	Sedge	OBL	O
Epilobium chionanthum	Marsh willowherb	Herb	OBL	R
Epilobium sp.		Herb	n/a	R
Euchiton traversii		Herb	FAC	R
Festuca novae-zelandiae	Hard tussock	Grass	UPL	R
Forstera tenella		Herb	FAC	R
Galium perpusillum	Dwarf bedstraw	Herb	FACU	R
Gaultheria crassa		Shrub	n/a	R
Gaultheria macrostigma	Prostrate snowberry	Shrub	FACU	O
Gentianella grisebachii		Herb	n/a	R
Geranium microphyllum	Small-leaved cranesbill	Herb	FACU	R
Glossostigma elatinoides		Herb	OBL	R
Gonocarpus micranthus	Piripiri	Herb	FAC	O
Gunnera monoica		Herb	FAC	R
Gunnera prorepens		Herb	FACW	R
Halocarpus bidwillii	Bog pine	Shrub	FAC	R
Helichrysum filicaule	Slender everlasting daisy	Herb	FACU	O
Herpolirion novae-zelandiae	Grass lily	Dicot herb	FAC	O
Histiopteris incisa	Mātātā; water fern	Fern	FAC	R
Hydrocotyle novae-zeelandiae		Herb	FAC	R
Hymenophyllum species		Fern	n/a	R
Hypnum cupressiforme	Moss	Moss	n/a	R
Hypolepis millefolium	Thousand-leaved fern	Fern	n/a	R
Isolepis habra		Sedge	FACW	R
Juncus antarcticus	Dwarf rush	Rush	OBL	R
Juncus edgariae	Edgar's rush; Wīwī	Rush	FACW	R
Lagenophora cuneata		Herb	n/a	R
Lemna minor	Common duckweed	Herb	OBL	R
Leptospermum scoparium	Mānuka	Tree	FAC	R
Lobelia angulata		Herb	FAC	R
Lycopodium scariosum	Creeping clubmoss	Fern	n/a	R
Melicytus alpinus	Porcupine shrub	Shrub	n/a	R
Montia fontana	Blinks	Herb	OBL	O
Muehlenbeckia complexa	Scrub pōhuehue	Liane	FACU	R
Nertera balfouriana		Herb	FACW	R
Nertera depressa	Nertera	Herb	FACU	R
Nertera scapanioides		Herb	OBL	R

Native species	Common name	Plant type	Wetland indicator status	Relative abundance
Olearia arborescens	Common tree daisy	Shrub	n/a	R
Olearia bullata		Shrub	FAC	O
*Olearia nummulariifolia**		Shrub	UPL	R
Oreobolus pectinatus	Combsedge	Sedge	OBL	R
Ozothamnus leptophyllus	Tauhinu	Shrub	FAC	R
Parablechnum minus	Swamp kiokio	Fern	FACW	R
Parablechnum montanum	Mountain kiokio	Fern	FACU	R
Parablechnum procerum	Small kiokio	Fern	FACU	R
Pentachondra pumila		Shrub	FAC	O
Phormium cookianum	Mountain flax	Monocot herb	FACU	R
Poa colensoi	Blue tussock	Grass	n/a	R
Polystichum vestitum	Prickly shield fern	Fern	n/a	R
Polytrichum juniperinum	Moss	Moss	n/a	R
Potamogeton cheesemanii	Red pondweed	Herb	OBL	R
Pseudocephalleria sp.	Lichen	Lichen	n/a	R
Pteridium esculentum	Bracken	Fern	FACU	R
Pulchrocladia retipora	Lichen	Lichen	n/a	R
Racomitrium lanuginosum	Moss	Moss	n/a	R
Ranunculus amphitrichus	Waoriki	Herb	OBL	R
Ranunculus cheesemanii		Herb	OBL	R
Raoulia subsericea	Turf mat daisy	Herb	n/a	R
Rubus cissoides	Bush lawyer	Liane	n/a	R
Rytidosperma gracile		Grass	FACU	O
Sphagnum cristatum	Sphagnum moss	Moss	OBL	O
Stereocaulon ramulosum	Lichen	Lichen	n/a	R
Styphelia nesophila	Pātōtara	Shrub	n/a	O
Thelymitra longifolia	White sun orchid	Orchid	n/a	R
Veronica odora		Shrub	n/a	R
Viola cunninghamii	Mountain violet	Herb	FAC	R
Viola filicaulis	Forest violet	Herb	FAC	R
Wahlenbergia albomarginata	Harebell	Herb	FACU	O
Introduced species	**Common name**	**Plant type**	**Wetland indicator status**	**Relative abundance**
Achillea millefolium	Yarrow	Herb	FACU	O
Agrostis capillaris	Browntop	Grass	FACU	A
Alnus glutinosa	Alder	Tree	FACW	R
Alopecurus geniculatus	Kneed foxtail	Grass	FACW	R

Native species	Common name	Plant type	Wetland indicator status	Relative abundance
Anthoxanthum odoratum	Sweet vernal	Grass	FACU	A
Bellis perennis	Daisy	Herb	n/a	R
Betula pendula	Silver birch	Tree	FAC	R
Bromus hordeaceus	Soft brome	Grass	UPL	R
Callitriche stagnalis	Starwort	Herb	OBL	R
Capsella bursa-pastoris	Shepherd's purse	Herb	FACU	R
Carex leporina	Oval sedge	Sedge	FACW	R
Cerastium fontanum	Mouse-ear chickweed	Herb	FACU	R
Chamaecyparis lawsoniana	Lawson's cypress	Tree	n/a	R
Cirsium arvense	Californian thistle	Herb	FACU	O
Cirsium vulgare	Scotch thistle	Herb	FACU	R
Crepis capillaris	Hawksbeard	Herb	FACU	O
Cupressus macrocarpa	Macrocarpa	Tree	n/a	R
Cynosurus cristatus	Crested dogstail	Grass	UPL	O
Cytisus scoparius	Scotch broom	Shrub	UPL	R
Dactylis glomerata	Cocksfoot	Grass	FACU	R
Digitalis purpurea	Foxglove	Herb	UPL	R
Epilobium ciliatum	Tall willowherb	Herb	FAC	O
Erythranthe guttata	Monkey musk	Herb	OBL	R
Erythranthe moschata	Musk	Herb	OBL	O
Eucalyptus species	Eucalyptus species	Tree	n/a	R
Euphrasia nemorosa	European eyebright	Herb	n/a	O
Glyceria declinata	Sweet grass	Grass	OBL	R
Hieracium lepidulum	Tussock hawkweed	Herb	UPL	R
Holcus lanatus	Yorkshire fog	Grass	FAC	A
Hypochaeris radicata	Catsear	Herb	FACU	O
Juncus articulatus	Jointed rush	Rush	FACW	O
Juncus bufonius	Toad rush	Rush	FACW	R
Juncus effusus	Soft rush	Rush	FACW	O
Lolium perenne	Perennial ryegrass	Grass	FACU	A
Lotus pedunculatus	Lotus	Herb	FAC	R
Malva species	Mallow	Herb	n/a	R
Myosotis laxa	Water forget-me-not	Herb	OBL	R
Phleum pratense	Timothy	Grass	FACU	O
Pilosella officinarum	Mouse-ear hawkweed	Herb	FACU	A
Pinus radiata	Radiata pine	Tree	n/a	R
Pinus species		Tree	n/a	R

Native species	Common name	Plant type	Wetland indicator status	Relative abundance
Prunella vulgaris	Self-heal	Herb	FACU	R
Pseudotsuga menziesii	Douglas fir	Tree	n/a	R
Ranunculus flammula	Spearwort	Herb	FACW	R
Ranunculus repens	Creeping buttercup	Herb	FAC	R
Rumex acetosella	Sheep's sorrel	Herb	FACU	R
Rumex obtusifolius	Broad-leaved dock	Herb	FAC	R
Sagina procumbens	Procumbent pearlwort	Herb	FACU	R
Salix sp.	Willow	Tree	FACW	R
Senecio vulgaris	Common groundsel	Herb	n/a	O
Spergula arvensis	Spurrey	Herb	n/a	O
Stellaria alsine	Bog stitchwort	Herb	FACW	R
Stellaria media	Chickweed	Herb	FACU	R
Taraxacum officinale	Dandelion	Herb	FACU	R
Trifolium dubium	Suckling clover	Herb	UPL	O
Trifolium pratense	Red clover	Herb	FACU	O
Trifolium repens	White clover	Herb	FACU	O
Ulex europaeus	Gorse	Shrub	FACU	R
Urtica urens	Nettle	Herb	n/a	R
Veronica arvensis	Field speedwell	Herb	n/a	R

Appendix D Threatened, At Risk, and Data Deficient invertebrate species recorded near MWF Stage 2

Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

SLR Project No.: 810.031205.00001

6 October 2025

Table D-1 lists species recorded within 20 km of the Mahinerangi Wind Farm. The grasshopper *Sigaus campestris* and moth *Epichorista tenebrosa* are found in tussock grasslands, *Zeadelium* spp. are flightless darkling beetles possibly under rocks and on tors, the spider *Cantuaria apica* live in tunnels in mossy ground. The Agelenid and Linyphiid spiders live on the ground amongst leaf litter. Caterpillars of the moths *Notoreas perornata* feed on pimelea, *Paranotoreas fulva* feed on *Atriplex buchananii* and *Plantago coronopus*, *Pyrgotis pyramidias* feed on *Leucopogon fasciculatus*. Cholopidae grass fly larvae feed on grass stems.

Table D-1. Threatened, At Risk, and Data Deficient species recorded within 20 km of MWF.

Order	Family	Species	Threat classification
Araneae	Idiopidae	*Cantuaria apica*	Data Deficient
Araneae	Linyphiidae	*Metafroneta minima*	Data Deficient
Araneae	Agelenidae	*Mahura rufula*	Data Deficient
Araneae	Agelenidae	*Orepukia orophila*	Data Deficient
Orthoptera	Acrididae	*Sigaus campestris*	At Risk declining
Coleoptera	Tenebrionidae	*Zeadelium hudsoni*	At Risk Naturally Uncommon
Coleoptera	Tenebrionidae	*Zeadelium senile*	At Risk Naturally Uncommon
Diptera	Chloropidae	*Diplotoxa harrisoni*	At Risk Naturally Uncommon
Diptera	Chloropidae	*Tricimba deansi*	At Risk Naturally Uncommon
Lepidoptera	Geometridae	*Notoreas perornata*	Threatened Nationally Vulnerable
Lepidoptera	Geometridae	*Paranotoreas fulva*	At Risk relict
Lepidoptera	Tortricidae	*Epichorista tenebrosa*	At Risk relict
Lepidoptera	Tortricidae	*Pyrgotis pyramidias*	At Risk Naturally Uncommon

For a further 14 taxa, identification is not sufficient to be certain they are a threatened species, but it is likely (Table D-2). For example, only one species of Huttoniidae is described (*Huttonia palpimanoides*, which is At Risk Naturally Uncommon), but there are others undescribed.

These are generally species of open grasslands; Hahniidae, Anapidae and Mysmenidae spiders, Agromyzidae leaf miner flies. A stiletto fly was observed at site 21 on 29/1/25 resting on an *Aciphylla* flower. Encyrtidae are parasitic wasps of Hemiptera such as the Cicadellidae leaf hoppers found in sedgy grasslands. The Huttoniidae spiders are perhaps more scrub species, living in fern crowns.

Table D-2. At Risk and Data Deficient species recorded within 20 km of MWF.

Order	Family	Species	Threat classification
Araneae	Amphinectidae	*Aorangia* sp.	At Risk Naturally Uncommon
Araneae	Hahniidae	*Alistra* sp.	At Risk Naturally Uncommon
Araneae	Huttoniidae	Huttoniidae sp.	At Risk Naturally Uncommon
Araneae	Anapidae	*Zealanapis* sp.	Data Deficient
Araneae	Hahniidae	*Kapanga* sp.	Data Deficient
Araneae	Mysmenidae	Mysmenidae sp.1	Data Deficient
Araneae	Mysmenidae	Mysmenidae sp.2	Data Deficient
Araneae	Mysmenidae	*Trogloneta* sp.	Data Deficient
Hemiptera	Cicadellidae	*Arahura* sp. nr. *gourlayi*	Data Deficient
Hemiptera	Cicadellidae	*Limottetix* sp. nr. *harrisi*	Data Deficient
Diptera	Agromyzidae	*Liriomyza* sp. nr. *homeri*	Data Deficient
Diptera	Heleomyzidae	*Allophylopsis* sp.	At Risk Naturally Uncommon / Data Deficient
Diptera	Therevidae	*Anabarynchus* sp.	At Risk Naturally Uncommon / Data Deficient
Hymenoptera	Encyrtidae	? *Adelencyrtoides* sp.	Data Deficient

In addition to those listed, there are records of another 30 Threatened, At Risk, and Data Deficient invertebrate taxa potentially in the vicinity (tussock lands within 50 km), from a database of New Zealand's threatened species locations (Table D-3).

Table D-3. Threatened, At Risk, and Data Deficient species recorded within 50 km of MWF.

Order	Family	Species	Threat classification	Locality
Araneae	Migidae	*Migas linburnensis*	Data Deficient	Linburn salty complex
Araneae	Linyphiidae	*Laestrygones* sp.	Data Deficient	Te Papanui reserve
Araneae	Hahniidae	*Alistra centralis*	At Risk Naturally Uncommon	Sutton
Araneae	Malkaridae	*Whakamoke hunehune*	Data Deficient	Lee Stream Bridge
Araneae	Orsolobidae	*Subantarctia centralis*	Data Deficient	Rocklands
Araneae	Toxopidae	*Gasparia montana*	Data Deficient	N Summit Rock
Araneae	Desidae	*Makora mimica*	Data Deficient	Middlemarch
Araneae	Cycloctenidae	*Orepukia pallida*	Data Deficient	Patearoa
Araneae	Desidae	*Rorea otagoensis*	Data Deficient	Summit Taieri ridge
Orthoptera	Anostostomatidae	*Hemiandrus* 'rocklands'	Data Deficient	Rocklands

Order	Family	Species	Threat classification	Locality
Coleoptera	Carabidae	*Megadromus fultoni*	At Risk Naturally Uncommon	Taieri
Coleoptera	Elmidae	*Hydora nitida*	Data Deficient	Taier
Coleoptera	Elmidae	*Hydora obsoleta*	Data Deficient	Taieri
Hemiptera	Aphididae	*Aphis* sp 1.	Data Deficient	Rock and Pillar
Hemiptera	Aphididae	*Euschizaphis* sp. 1	At Risk Naturally Uncommon	Rock and Pillar
Hemiptera	Miridae	*Chinamiris zygotus*	At Risk Naturally Uncommon	Rock and Pillar
Hemiptera	Pentatomidae	*Hypsithocus hudsonae*	At Risk Naturally Uncommon	Rock and Pillar
Hemiptera	Artheneidae	*Nothochromus maroricus*	Data Deficient	Rock and Pillar
Hemiptera	Miridae	*Romna bicolor*	Data Deficient	Rock and Pillar
Diptera	Chloropidae	*Tricimba dugdalei*	At Risk Naturally Uncommon	Rock and Pillar
Hymenoptera	Diapriidae	*Pantolytomyia polita*	Data Deficient	Rock and Pillar
Hymenoptera	Braconidae	*Shireplitis frodoi*	Data Deficient	Great Moss Swamp
Trichoptera	Oeconesidae	*Oeconesus angustus*	Nationally Critical	Near Lee Stream School
Trichoptera	Philorherithridae	*Philorheithrus harunae*	At Risk Naturally Uncommon	Deep creek
Trichoptera	Conoesucidae	*Pycnocentria patricki*	At Risk Naturally Uncommon	Lammermoor range
Lepidoptera	Crambidae	*Orocrambus sophists*	Nationally Vulnerable	Maniototo range
Lepidoptera	Geometridae	*Hierodoris polita*	At Risk Naturally Uncommon	Rock and Pillar
Trichoptera	Hydrobiosidae	*Neurochorema pilosum*	Data Deficient	Stoney Creek
Plecoptera	Gripopterygidae	*Zelandobius auratus*	Data Deficient	Sutton Stream
Plecoptera	Gripopterygidae	*Taraperla johnsi*	Nationally Critical	Maungatua

Appendix E Terrestrial invertebrates recorded in the MWF Stage 2 site, January 2025

Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

SLR Project No.: 810.031205.00001

6 October 2025

Order	Family	Species	Threat Classification[1]
Annelida (segmented worms)		sp.	-
Araneae (spiders)	Araneidae	*Argiope protensa*	Not Threatened
	Araneidae	*Colaranea viriditas*	Not Threatened
	Pisauridae	*Dolomedes minor*	Not Threatened
Coleoptera (beetles)	Carabidae	*Neocicindela latecincta*	NL
	Coccinellidae	*Coccinella undecimpunctata*	NL (Introduced and Naturalised)
	Scarabaeidae	*Costelytra zelandica*	NL
	Zopheridae	*Pristoderus* sp. cf. *discedens*	
Dermaptera (earwigs)	Dermaptera	sp.	-
Diptera (flies)	Stratiomyidae	*Odontomyia chloris*	NL
	Syrphidae	*Melangyna* (= *Austrosyrphus*) *novaezelandiae*	NL
	Tachinidae	*Protohystericia* sp.	NL
	Therevidae	*Anabarynchus* sp.	NL
	Tipulidae	several spp.	-
Hymenoptera (incl. bees, wasps, ants)	Apidae	*Bombus terrestris*	Introduced and Naturalised
	Colletidae	*Leioproctus fulvescens*	NL
	Ichneumonidae	sp.	-
Lepidoptera (moths and butterflies)	Lycaenidae	*Lycaena salustius*	NL
	Lycaenidae	*Zizina oxleyi*	Not Threatened
	Nymphalidae	*Argyrophenga antipodum*	NL
	Nymphalidae	*Vanessa itea*	NL
	Pieridae	*Pieris rapae*	NL (Introduced and Naturalised)
Mollusca		sp.	-
Myriapoda (incl. millipedes and centipedes)	Diplopoda	sp.	-
Odonata (dragonflies and damselflies)	Coenagrionidae	*Xanthocnemis zealandica*	Not Threatened
	Lestidae	*Austrolestes colensonis*	Not Threatened
Opiliones (harvestmen)	Phalangiidae	*Phalangium opilio*	NL
Orthoptera (incl. grasshoppers and wētā)	Acrididae	*Phaulacridium marginale*	Not Threatened
	Acrididae	*Sigaus dugdali*	Not Threatened
	Gryllidae	sp.	-
Platyhelminthes (flatworms)		sp.	-

[1] as listed at https://nztcs.org.nz/
NL = Not listed.

Appendix F Directly affected wetland 20

Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

SLR Project No.: 810.031205.00001

6 October 2025

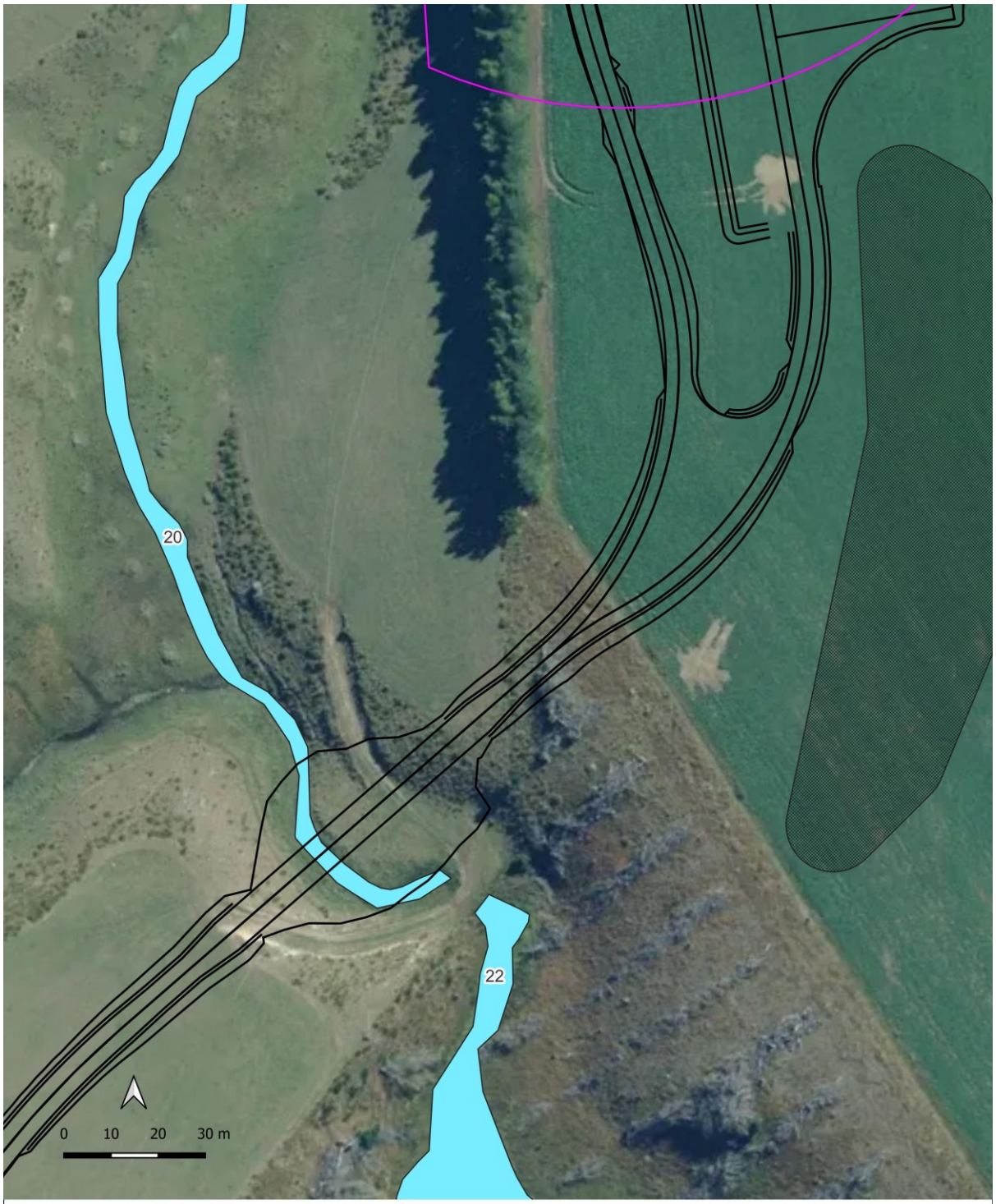
Wetland 20, south of Turbine 9

This wetland is at the site of a proposed road crossing and culvert upgrade. To the northwest and upstream of the existing culvert (wetland delineation plot I US), the wetland is located in and alongside a small waterway surrounded by grazed pasture. At the time of assessment, the waterway had been previously channelised with piles of sediment located along the stream edge. Wetland vegetation was dominated by the exotic jointed rush (*Juncus articulatus*, FACW, 80% cover), but four obligate wetland (OBL) species were also present (*Montia fontana*, *Erythranthe moschata*, *Glyceria declinata*, *Ranunculus amphitrichus*). Grazed pasture encroaches on the wetland on all sides.

To the southeast of the existing culvert (wetland delineation plot I DS), the wetland is located within the same waterway as the wetland described above. The gully passes through an area of recently planted Douglas fir (*Pseudotsuga menziesii*) and rank, ungrazed grassland. The waterway forms a channel in places, with flowing water. Wetland vegetation in and alongside the waterway is dominated by sweet grass (*Glyceria declinata*, 60% cover), an obligate wetland species.

Site of wetland delineation plot I US in wetland 20, just upstream of the existing farm track crossing and culvert (photo taken 23 April 2024). The wetland vegetation was dominated by jointed rush.

Wetland Plot I_DS in wetland 22 south of Turbine 9, dominated by sweetgrass, with Yorkshire fog, rautahi, and rushes, is located on the northern margins of plantation forest and downstream of a proposed culvert (photo taken 23 April 2024).



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Legend
- CZ
- Windfarm site
- Stage 2 Layout
- Wetland
- SFD

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Mahinerangi Wind Farm
Stage 2

Appendix G Directly affected wetland 43

Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

SLR Project No.: 810.031205.00001

6 October 2025

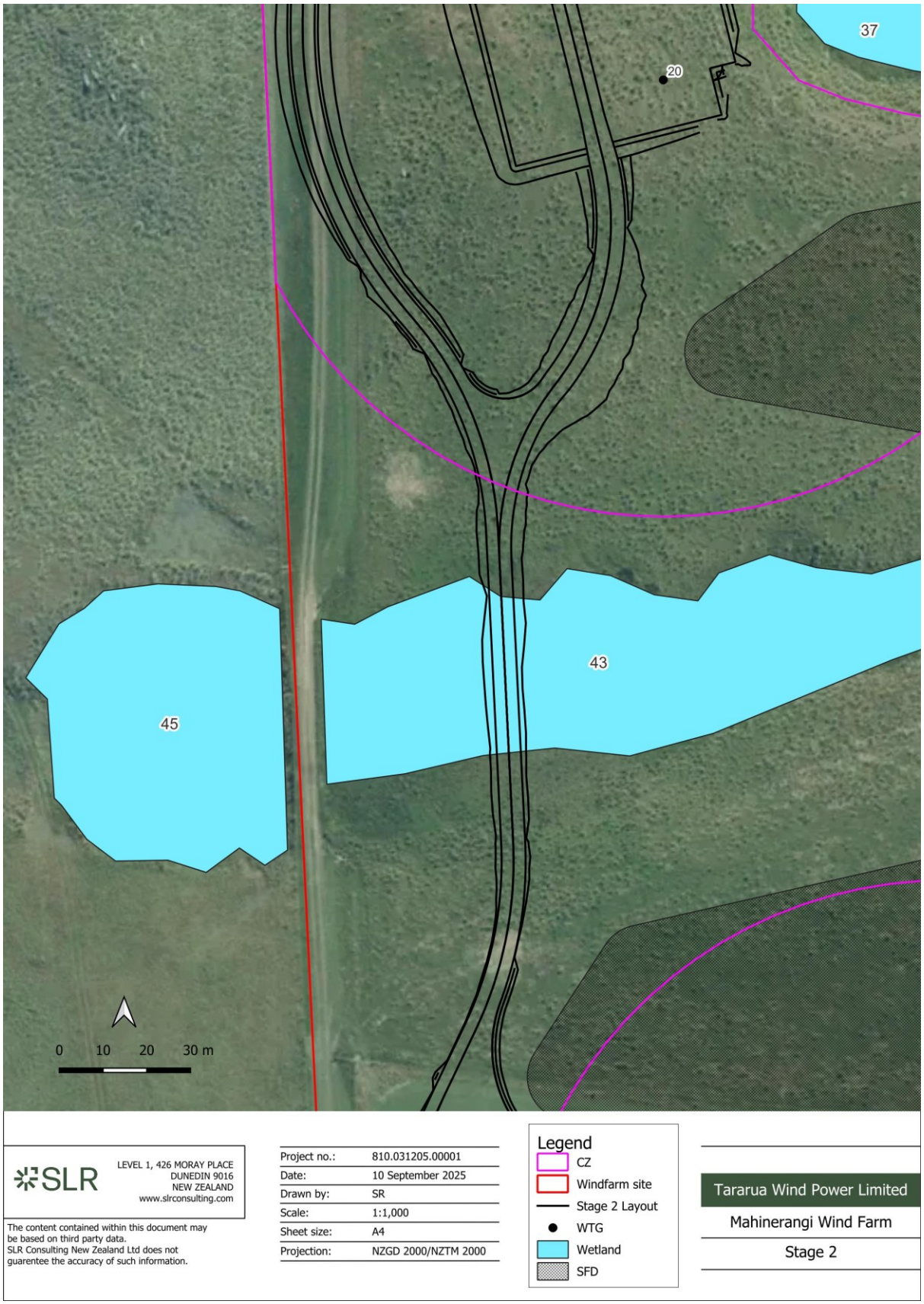
Wetland 43, south of Turbine 20

Immediately to the east of the existing road (wetland delineation plot L), the vegetation has a high cover of exotic pasture species, but the presence of an indigenous sedge (*Carex echinata*, OBL), several facultative wetland (FACW) species, and peaty wetland soils indicates the presence of a wetland. Further to the east (wetland delineation plot E1), the cover of tall rushes (FACW), is high and the presence of sphagnum moss (OBL), and associated FAC and FACW species indicates the wetland extends further downstream.

Wetland 43 (arrowed)

Wetland delineation plot L in wetland 43, close to the existing farm track.

Wetland delineation plot E1 in wetland 43, approximately 55 m from the existing farm track. The vegetation is dominated by tall rushes.


37
20
43
45
0 10 20 30 m
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Legend
CZ
Windfarm site
Stage 2 Layout
WTG
Wetland
SFD
Tararua Wind Power Limited
Mahinerangi Wind Farm
Stage 2

Appendix H Wetlands within 10 m of works sites

Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

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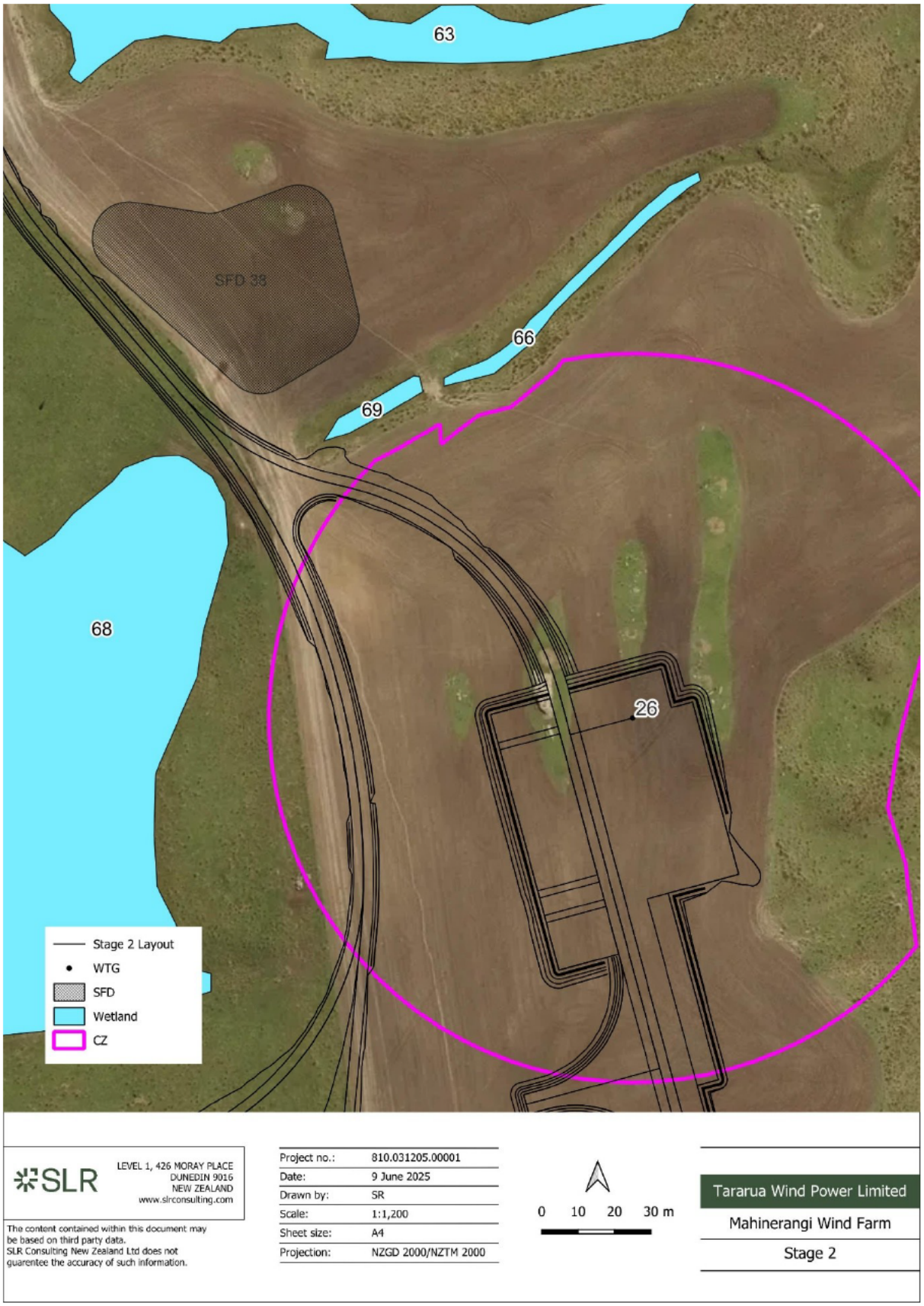
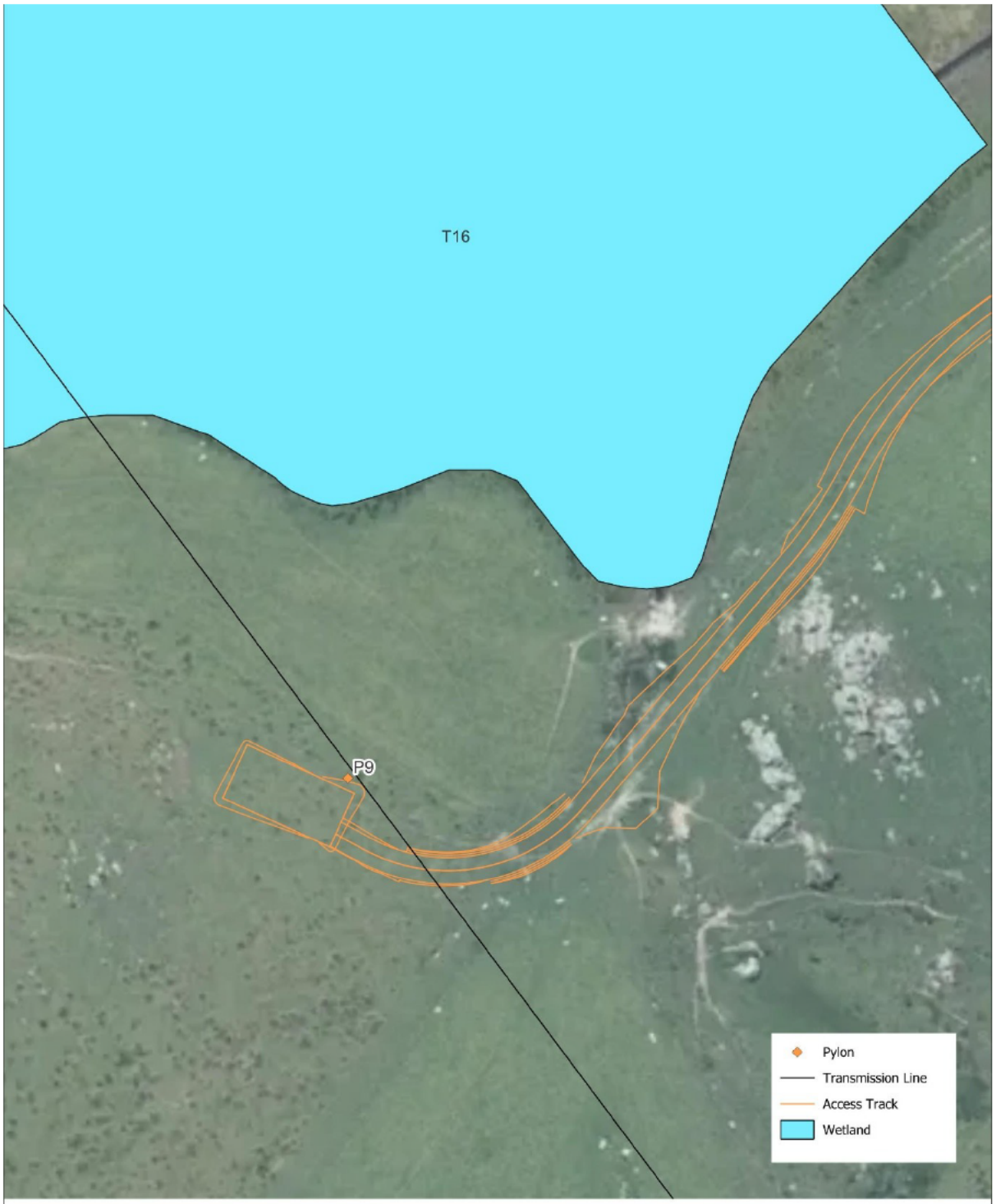
6 October 2025

Road at WTG5 (wetland 15)

Turbine site 20 (wetland 37)



WTG26 (wetlands 68 and 69)



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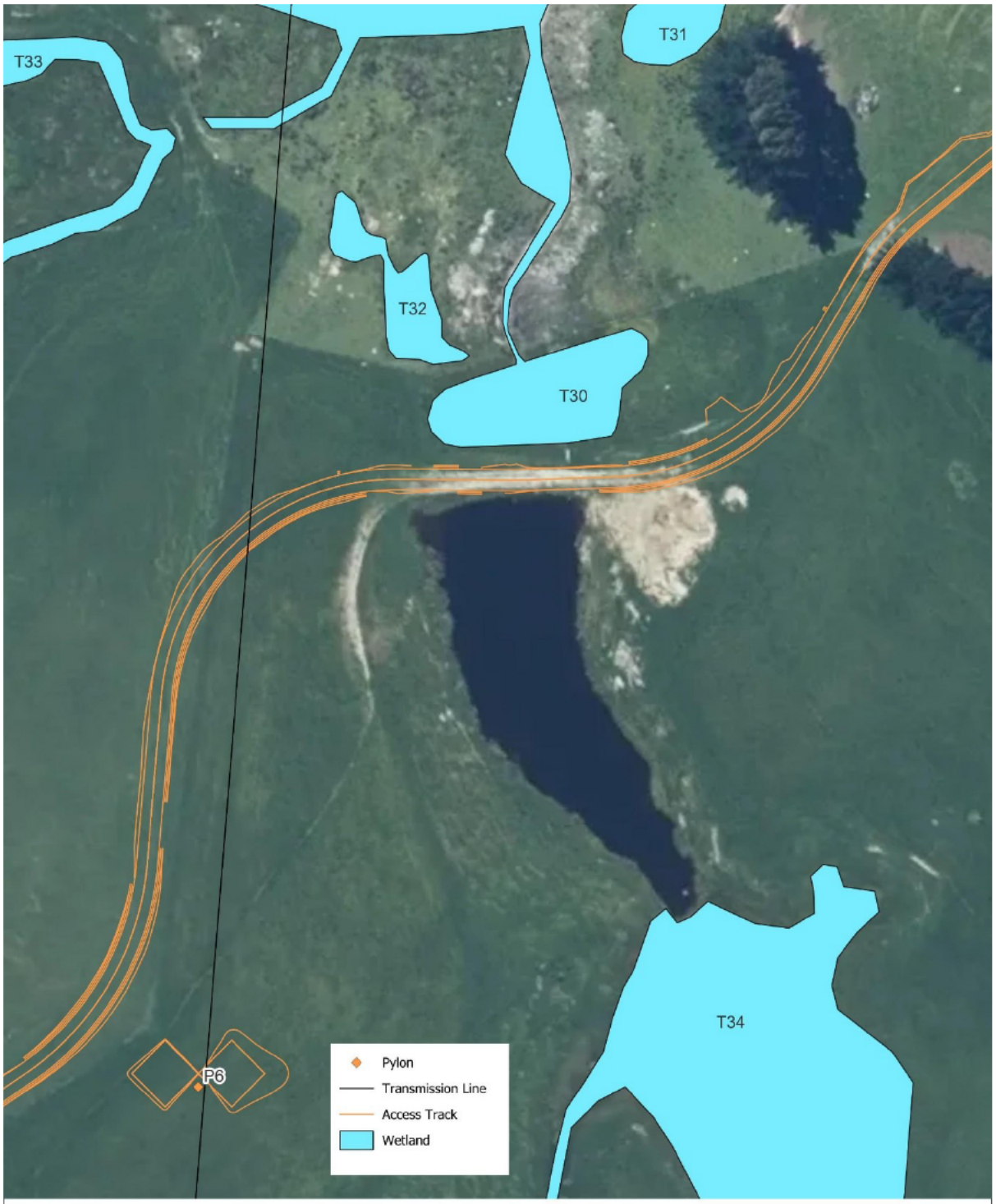
0 10 20 m

Tararua Wind Power Limited
Mahinerangi Wind Farm
Stage 2

Transmission Corridor Wetland T16



Transmission Corridor Wetland T30

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Sheet size:	A4
Projection:	NZGD 2000/NZTM 2000

0 10 20 30 m

Tararua Wind Power Limited
Mahinerangi Wind Farm
Stage 2

Transmission Corridor Wetlands T26-28

Appendix I Vegetation in Stage 2 Contingency Zones (CZ)

Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

SLR Project No.: 810.031205.00001

6 October 2025

CZ	Total Area (m^2)	Snow Tussock Grassland (m^2)	Indigenous Shrubland (m^2)	Wetland (m^2)	Rough Pasture (m^2)	Remaining Exotic Vegetation (m^2)
1	20,689					20,689
2	30,200				360	29,840
3	29,025					29,025
4	24,400					24,400
5	23,656					23,656
6	17,663					17,663
7	18,920	4				18,916
8	28,706					28,706
9	22,595					22,595
10	30,173	36				30,137
11	31,371	6,783				24,588
12	29,859	1,556			819	27,484
13	20,395					20,395
14	18,057				273	17,784
15	28,580	247			19,078	9,255
16	23,948	10,485			13,462	1
17	22,296	1,142			7,560	13,594
18	19,681	3,564			1,597	14,504
19	31,021	21,201			8,339	1,481
20	25,253	12,932			9,883	2,438
21	30,846				8,537	22,309
22	28,489	612				27,877
23	21,573				21,573	0
24	15,266	177			3,561	11,528
25	27,156	4,355			22,790	11
26	29,330	1,966			1,730	25,634
27	23,621				2,275	21,346
28	24,953				1,994	22,959
29	19,998					19,998
30	30,728	7,334			23,388	6
31	30,467	7,488			5,989	16,990
32	28,579	13,434			13,999	1,146
33	29,423	2,084			5,493	21,846
34	21,133				102	21,031

CZ	Total Area (m^2)	Snow Tussock Grassland (m^2)	Indigenous Shrubland (m^2)	Wetland (m^2)	Rough Pasture (m^2)	Remaining Exotic Vegetation (m^2)
35	28,604				2,951	25,653
36	19,912					19,912
37	19,357					19,357
38	31,075					31,075
39	18,108					18,108
40	26,370					26,370
41	29,714	2,725			24,853	2,136
42	13,225				13,222	3
43	24,032					24,032
44	24,752					24,752
45	27,229					27,229
46	23,671					23,671
47	20,099					20,099
48	20,038	292				19,746
49	27,308				282	27,026
50	23,202					23,202
51	21,161					21,161
52	16,510					16,510
53	24,233					24,233
54	29,875					29,875
49/50	1,434					1,434

Appendix J Vegetation in the Stage 2 Surplus Fill Disposal (SFD) areas

Vegetation, Wetland, and Terrestrial Invertebrate Assessment

Mahinerangi Wind Farm Stage 2

Tararua Wind Power Limited

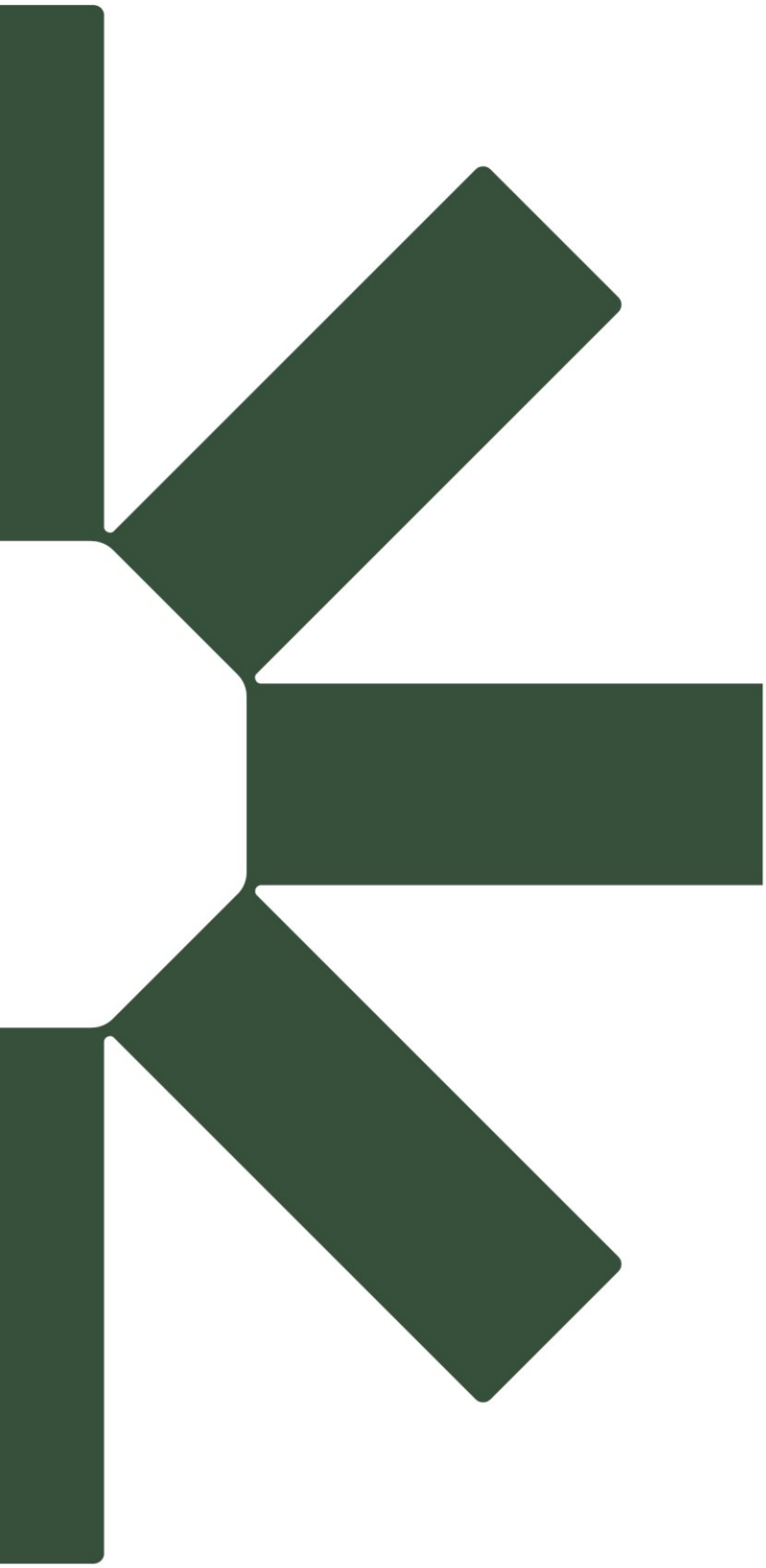
SLR Project No.: 810.031205.00001

6 October 2025

SFD	Total Area (m^2)	Snow Tussock Grassland (m^2)	Indigenous Shrubland (m^2)	Wetland (m^2)	Rough Pasture (m^2)	Remaining Exotic Vegetation (m^2)
1	8,589					8,589
2	15,023					15,023
3	4,581					4,581
4	20,735					20,735
5	3,509					3,509
6	11,654					11,654
7	3,588					3,588
8	2,750					2,750
9	5,759					5,759
10	4,705					4,705
11	3,099					3,099
12	5,220					5,220
13	1,679	12				1,667
14	2,595					2,595
15	1,906					1,906
16	1,859	192			1,667	
17	2,857	2,698			159	
18	6,418					6,418
19	3,340	1,166				2,174
20	4,628					4,628
21	5,455	2,232			11	3,212
22	8,363	2,866			5,497	
23	5,976					5,976
24	3,083				1,730	1,353
25	4,077	575			3,501	1
26	5,778					5,778
27	6,968	190			2,520	4,258
28	3,067				929	2,138
29	6,368				5,967	401
30	1,480				1,480	
31	8,752					8,752
32	3,964					3,964
33	3,306					3,306

SFD	Total Area (m^2)	Snow Tussock Grassland (m^2)	Indigenous Shrubland (m^2)	Wetland (m^2)	Rough Pasture (m^2)	Remaining Exotic Vegetation (m^2)
34	4,761				4,761	
35	2,568					2,568
36	3,730				1,637	2,093
37	2,726					2,726
38	6,712	369			5,158	1,185
39	3,987	85			3,339	563
40	8,223					8,223
41	3,059	63			2,996	
42	12,008					12,008
43	13,566	2,780			8,189	2,597
44	3,719					3,719
45	6,493					6,493
46	5,619					5,619
47	4,190	1,934			1,151	1,105
48	9,551	4,251			5,261	39
49	3,257	1,678			1,416	163
50	2,450					2,450
51	3,666				3,666	
52	4,156				4,125	31
53	4,342					4,342
54	3,472				3,472	0
55	1,746				676	1,070
56	4,182					4,182
57	4,444					4,444
58	12,073					12,073
59	6,014					6,014
60	2,269					2,269
61	2,009					2,009
62	2,019					2,019
63	2,450					2,450
64	4,429					4,429
65	11,945					11,945
66	1,466					1,466
67	2,147					2,147

SFD	Total Area (m^2)	Snow Tussock Grassland (m^2)	Indigenous Shrubland (m^2)	Wetland (m^2)	Rough Pasture (m^2)	Remaining Exotic Vegetation (m^2)
68	4,058					4,058
69	3,524					3,524
70	2,910					2,910
71	1,645					1,645
72	2,182					2,182
73	3,384					3,384
74	1,915	42				1,873
75	2,903					2,903
76	2,289					2,289
77	1,809					1,809
78	1,555					1,555
79	2,581					2,581
80	2,457					2,457
81	5,613					5,613
82	9,292					9,292
83	5,436					5,436
84	11,647					11,647



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