Sensitivity: General

Western Bays – Fast Track Referral

Ecological Assessment

Prepared for Meridian Energy Ltd
Prepared by Beca Limited

29 May 2026



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Revision History

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1	Victoria Brosnahan	Draft revision following comments from Meridian	28/01/2025
2	Raymond Chang	Updated in response to legal comments	27/02/2026
3	Victoria Brosnahan	Final for issue	19/03/2026
4	Victoria Brosnahan	Minor updates to project description	29/05/2026

Document Acceptance

Action	Name	Signed	Date
Prepared by	Victoria Brosnahan		29/05/2026
Reviewed by	Raymond Chang		29/05/2026
Approved by	Raymond Chang		29/05/2026
on behalf of	Beca Limited		

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1 Introduction

Meridian Energy Limited (Meridian) is proposing the Western Bays Solar Development (the Project) on the western side of Lake Taupō. This Fast Track Referral summary memorandum has been prepared by Beca Limited (Beca) for Meridian to support a referral application for the Fast Track Approvals Act 2024 (FTAA) process. It describes the anticipated and known adverse ecological effects of the project. Effects on long-tailed bats (*Chalinolobus tuberculatus*) are addressed separately in the summary report by Tītoki Landcare.

1.1 Project Description

Meridian Energy Limited (Meridian) is seeking approvals to construct, operate and maintain the Project on the western side of Lake Taupō. The Solar Farm will generate approximately 420 MW (enough to power approximately 113,000 homes annually).

The Project will consist of the following key components and their associated supporting infrastructure and facilities:

1) Solar Farm – this will consist of solar photovoltaic panels, inverters and related electrical infrastructure (such as an internal electricity network of 33 kV underground cables) across an area of approximately 620ha. There will also be an onsite 33/220 kV substation and associated operational facilities and buildings.
2) Transmission Line Corridor - a 220 kV double circuit transmission line approximately 9.7km in length supported by towers of up to 60m in height, and with a potential maximum vegetation clearance width of tall trees 60m either side of the final alignment of the transmission lines. The transmission line will connect the solar farm substation to the Grid Injection Point.
3) Grid Injection Point (GIP) – a 220 kV switchyard. The GIP will connect the Solar Farm, via the Transmission Line and GIP infrastructure, to the National Grid (specifically, Transpower New Zealand Limited's (Transpower) Bunnythorpe-Whakamaru (BPE-WKM) A and B 220 kV lines)

Earthworks, as well as various ancillary discharges and activities, are proposed to facilitate the construction of the Project, creating access points as well as on-site access tracks. Other temporary works will be required during the construction, including but not limited to construction laydown areas, concrete batching, geotechnical investigations, site offices, security fencing, and earthwork grading. While operational, works at the Project Site are expected to include general operation and maintenance as well as the potential for grazing of sheep between the panels.

2 Executive Summary

A high-level assessment of the potential effects of the Project has been undertaken with respect to the ecological values of the Project Site. Historically, the Project Site would have consisted of forested habitat, which is mapped on Waikato Maps as MF10: tōtara, mataī, kahikatea forest, MF8-1: kāmahi, broadleaved, podocarp forest, and smaller areas of MF5: black beech forest and WL: swamp forest. However, the Project Site has faced significant land-use changes and is likely to have been used for pastoral land uses since the 1960s. Some mapped SNAs remain on the edges of the Project Site.

Existing ecological features across the Project Site include:

- Being situated between high value habitat for native avifauna (Lake Taupō, Lake Kuratau, Pureora Forest and various SNAs), which means birds may occasionally traverse the Project Site when travelling between these habitats (see Figure 1 for the Solar Farm Site in reference to nearby SNAs)
- Low value vegetation, which provides habitat for Not Threatened native avifauna
- Incidental observations of Threatened and At-Risk avifauna at the Solar Farm Site
- Three wetlands of Negligible ecological value
- The Orongopioi Stream, which ultimately discharges into Lake Taupō
- Potential lizard habitat present, however, surveys did not find evidence of a lizard population

The potential benefit of the Project for ecology is the cessation of dairy farming at the Project Site, which will reduce nutrient leaching into the catchment.

Potential adverse effects of the Project have been avoided in the first instance through design mitigations, including avoidance of wetland habitats and higher value terrestrial vegetation, and the creation of an ESCP and stormwater management system. Remaining potential adverse effects include:

- Injury / mortality of native fauna during construction works and following the establishment of solar panels and transmission lines
- Loss of nesting, foraging, and roosting habitat for native avifauna
- Disturbance and displacement of native avifauna
- A slight decrease in surface water inputs to the wetland and watercourse at the GIP Site
- Riparian vegetation clearance
- Impacts to water quality due to sedimentation and erosion impacts

Management recommendations to reduce the potential adverse effects to ecology will be detailed in the Ecological Impact Assessment (EcIA), but may include:

- Monitoring and / or impact management for avifauna collision risk with solar panels and transmission lines
- Avifauna management during the construction period, including construction timing, surveying, and monitoring
- The creation of an Incidental Discovery Protocol (IDP) in case of native lizard discovery
- Infill planting in locations where mature trees have been removed

Potential adverse ecological effects are expected to be able to be managed primarily through avoidance and minimisation. Remediation, offset, and compensation is not expected to be required for this Project. With the recommended design and management measures implemented, the adverse effects of the Project on ecological values will be **Low** and not significant (based on the ecological assessment methodology applied in this memorandum).

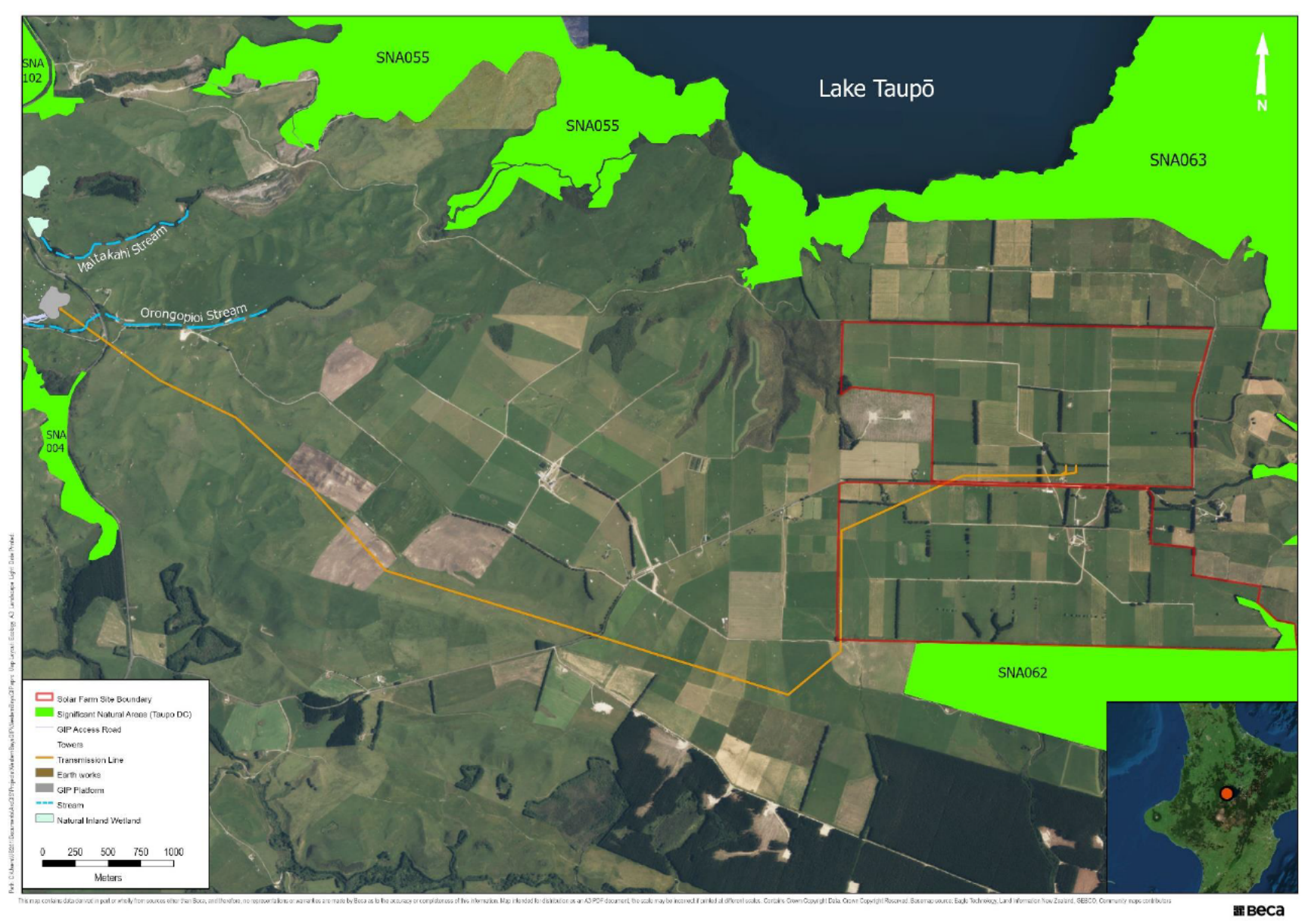


Figure 1. Extent of Western Bays Site and nearby Significant Natural Areas (SNAs), including the Transmission Line Corridor, the Solar Farm Site, and the GIP Site.

3 Methodology

Ecological assessments were undertaken between 2024 and 2025 for the Solar Farm Site, Transmission Line Corridor, and GIP Site. See Table 1 for a summary of desktop and site investigations undertaken and dates of the investigations.

Table 1: Methodology undertaken during desktop review and site visits.

Component	Assessment	Project Site Location
Desktop	A desktop-based review of ecological information from the following sources: • Waikato Regional Council and Taupō District Council geospatial layers and information on the ecological values of the Project Site/surrounds. • New Zealand Freshwater Fish Database (Sotffels, 2022) • New Zealand eBird Database (eBird, 2025). • iNaturalist Database (iNaturalist, 2025). • Department of Conservation fauna records. • Land Information New Zealand (LINZ) aerial imagery and geospatial layers. • Land Cover Database Version 5. • LiDAR and aerial imagery from a drone survey completed on 7 June 2024. • Freshwater Ecosystems of New Zealand (FENZ) historic wetland typology and current wetland typology geospatial layers (Leathwick et al., 2010) • Eco-Index – Pre-human Native Ecosystem Locations in New Zealand. • Other publicly accessible reports or information.	Solar Farm Site GIP Site Transmission Line Corridor
Vegetation	Vegetation surveys and habitat appraisal	Solar Farm Site GIP Site Transmission Line Corridor
Avifauna	Five-minute bird counts and flight path observations	Solar Farm Site Transmission Line Corridor GIP Site
	Line transect counts	Solar Farm Site
	Bio-acoustic surveys	Solar Sarm Site
	Incidental observations	Solar Farm Site Transmission Line Corridor GIP Site
Herpetofauna	Onduline Artificial Cover Objects (ACOs) surveys	Solar Farm Site
	Manual habitat searches totalling 21 person hours.	Solar Farm Site
	Manual habitat searches totalling one person hour.	GIP Site
Bats	Information on bats is discussed in a separate memo created by Tītoki Landcare.	
Wetlands	Wetland classification and delineation surveys	Solar Farm Site GIP Site Transmission Line Corridor

Component	Assessment	Project Site Location
Watercourses	A watercourse classification based on the definitions from the Waikato Regional Plan (WRP)	Solar Farm Site GIP Site Transmission Line Corridor

4 Ecological Features

4.1 Site Ecological Context

The Project Site includes the Solar Farm Site, Transmission Line Corridor, and GIP Site. The Project is situated within the Taupō Ecological District (ED) (McEwen, 1987). The Taupō ED comprises Lake Taupō, the largest lake within New Zealand, surrounded by the Kaimanawa and Hauhungaroa ranges. Characteristics of the natural environment (topography, vegetation, soils) have been influenced by several volcanic eruptions, the last occurring c. 186 AD (Waikato Regional Council, n.d.).

Prior to human settlement, vegetation within the Taupō ED would have been predominately dense podocarp forest, with localised areas of red, silver, black and mountain beech forest (McEwen, 1987). The ED has since been subject to significant modification for agriculture, forestry and urban land use, however indigenous forest fragments remain on the steep slopes surrounding the lake (Waikato Regional Council., n.d.).

Soils within the ED are generally well-drained and comprise coarse volcanic ash soils and rhyolitic ash (from the eruption) over older brown, silty and sandy ashes (McEwen, 1987). Thick deposits of pumice occur on the eastern side of the lake.

Historically, the Solar Farm Site is expected to have been covered in tōtara, mataī, kahikatea forest (MF10). The Transmission Line Corridor land was also likely dominated by MF10, with areas of swamp forest (WL), kāmahi, broadleaved, podocarp forest (MF8-1) and black beech forest (MF5). The GIP Site historically would have been dominated by tōtara, mataī, kahikatea forest (MF10) and kāmahi, broadleaved, podocarp forest (MF8-1).

The Solar Farm Site is mostly cleared from terrestrial vegetation and is occupied by an operational dairy farm and has been used as pastoral land since the 1960s. It is bordered by a large SNA[1] (SNA062 – Te Kokomiko Point, Poukura Pa Bush, Warf) to the south. Other SNAs are also located near the site, including SNA233 approximately 450m to the east, and SNA063 approximately 380m to the north. SNA062 contains a mix of vegetation types including kānuka/kamahi-rewarewa-(podocarp) forest, kowhai treeland, whauwhaupaku-rewarewa-kamahi forest, kamahi/rewarewa forest, kamahi/rewarewa-treefern-mahoe forest, manuka shrubland, pasture grassland, and wilding pines poplar-broadleaved forest (Lewis, 2017). Within the SNA, endemic avifauna such as New Zealand falcon (kārearea, *Falco novaeseelandiae*), long-tailed cuckoo (koekoeā, *Eudynamys taitensis*), bellbird (korimako; *Anthornis melanura*), whitehead (pōpokotea; *Mohoua albicilla*) and tomtit (miromiro; *Petroica macrocephala*) have been recorded.

The Transmission Line Corridor traverses pastoral land including dairy and sheep farms and the Orongopioi Stream.

The GIP Site is currently occupied by an operational sheep farm and is currently used as pastoral land. It is located approximately 100m from SNA004 to the south and 900m from SNA102 to the north-west.

4.1.1 Lake Taupō

Lake Taupō is the largest lake in New Zealand (61,300 ha), it has historically been described as having high water quality, and is of local, regional, and national significance (Waikato Regional Council, 2024). The Lake was formed following large volcanic eruptions and is surrounded by well-draining pumice soils (Waikato Regional Council, n.d). These eruptions have influenced the vegetation and formation of the land throughout the Taupō Ecological District.

[1] Mapped by Taupō District Council

Since the 19th Century, much of the land surrounding Lake Taupō has been modified for agriculture. The development and intensification of this land have reduced the water quality within the Lake (Waikato Regional Council, 2024).

Lake Taupō is home to many native plant species and a number of native and introduced fish, including kōaro (*Galaxias brevipinnis*), common bully (*Gobiomorphus cotidianus*), common smelt (*Retropinna retropinna*), rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*). The Lake and associated wetland systems contain habitat for many Threatened and At-Risk aquatic birds species, including the Australasian bittern (matuku-hūrepo, *Botaurus poiciloptilus*), fernbird (mātātā, *Poodytes punctatus*), and the New Zealand dabchick (weweia, *Poliocephalus rufopectus*), while forest remnants contain species such as North Island robin (toutouwai, *Petroica longipes*), bellbird, and tomtit. Long-tailed bats (pekapeka-tou-roa, *Chalinolobus tuberculatus*) are also present in native and exotic forests surrounding the Lake.

Lake Taupō has Very High ecological value due to its ecological significance and the habitat provided for endemic species. The lake is located between 1-3km from the Solar Farm Site. Orongopioi Stream and overland flow paths within the Site will flow into Lake Taupō.

4.2 Solar Farm Site

4.2.1 Terrestrial Vegetation

The Solar Farm Site is predominantly made up of high-producing exotic grassland reflecting its current use as a dairy farm. Terrestrial vegetation is of Low ecological value and comprises hedgerows, shelterbelts, and specimen trees. Two areas of mixed native-exotic vegetation are located at the southern end of the Solar Farm Site and are contiguous with the native-dominated SNA that extends along the southern boundary.

4.2.2 Wetlands

One, small (133.6m^2) confirmed ‘natural inland wetland’ that meets the definition under the NES-FW (Wetland 1) is present at the site. This wetland has Negligible ecological value.

The wetland is not expected to be naturally occurring (i.e. it is ‘induced’) as it has formed behind the farm access road, which is restricting drainage, but nevertheless is considered a natural inland wetland under the NPS-FM (2020). It is characterised by a high percentage of exotic facultative wetland (FACW) vegetation.

4.2.3 Indigenous fauna

4.2.3.1 Avifauna

A range of avifauna species, ranging from common native to Threatened and At-Risk species were present at the Solar Farm Site during surveys.

Not Threatened native species present included tui (tūī, *Prosthemadera novaeseelandiae*), grey warbler (riroriro, *Gerygone igata*), fantail (pīwakawaka, *Rhipidura fuliginosa*), and silvereye (tauhou, *Zosterops lateralis*), which were present in woody vegetation at the Site. Welcome swallow (warou, *Hirundo neoxena*), spur-winged plover (*Vanellus miles*), black-backed gull (karoro, *Larus dominicanus*) and paradise shelduck (pūtangitangi, *Tadorna variegata*) were observed foraging and roosting in open pastureland habitat. Morepork (ruru, *Ninox novaeseelandiae*) are likely to forage in open habitat at the Site and nest within woody vegetation. These Not Threatened species have Low ecological value.

At Risk – Declining species present included New Zealand (NZ) pipit (pīhoihoi, *Anthus novaeseelandiae*), which were observed foraging along the farm race at ground level. A flock of 190 At Risk - Declining, red-billed gulls (tarāpunga, *Larus novaehollandiae scopulinus*) were also observed roosting in a recently tilled paddock, however, they have not been observed in any following site visits. These species have High ecological value.

A Threatened – Nationally Increasing NZ falcon was also observed flying over the Site.

A number of other species that are classified as Threatened and At Risk (TAR) are associated with Lake Taupō, and/or other nearby aquatic habitat. These species may infrequently interact with the site or fly over it when traversing between areas of suitable habitat.

4.2.3.2 Herpetofauna

Some suitable lizard habitat is present at the Solar Farm Site; however manual searches did not find evidence that native lizard species are present. This is not unexpected as the Solar Farm Site has been subject to extensive historic modification, and it is evident that lizard populations have been unable to persist in abundance after land disturbance and conversion for farming. Therefore, herpetofauna values at the Site have Negligible ecological value.

4.3 Transmission Line Corridor

4.3.1 Terrestrial Vegetation

The Transmission Line Corridor is predominantly made up of grazed pasture. Terrestrial vegetation within the Transmission Line Corridor has Low ecological value and includes a small section of riparian vegetation and three patches of terrestrial vegetation, made up of:

- An area of mixed native-exotic vegetation in the riparian margins of Orongopioi Stream.
- An area of native vegetation near entrance to the GIP Site.
- An area of exotic vegetation along the side of State Highway 32.
- An area of mixed native-exotic vegetation along the side of Karangahape Road.

4.3.2 Wetlands

One wetland (787.78m^2) defined as ‘natural inland wetland’ that meets the definition under the NES-FW was observed near the Transmission Line Corridor access track. The wetland is located near a spring fed section of Orongopioi Stream, and surface water was present during the site visit. This wetland has Negligible ecological value.

4.3.3 Orongopioi Stream

The Transmission Line Corridor crosses Orongopioi Stream, a Low value watercourse that ultimately discharges to Lake Taupō. See Section 4.4.3 for further detail on Orongopioi Stream.

Where Orongopioi Stream intersects with the Transmission Line, there is an approximately 30m wide riparian buffer consisting of a canopy of poplar (*Populus* sp.) and elder (*Sambucus* sp.) trees and an understory of mixed native and exotic shrubs.

4.3.4 Indigenous fauna

4.3.4.1 *Avifauna*

The Transmission Line Corridor traverses a varied topography dominated by pasture apart from the Orongopioi Stream/riparian corridor, and patches of roadside vegetation. These features provide confirmed habitat for Not Threatened native and introduced avifauna typical of open country habitat, and passerine species such as whitehead (pōpokotea, *Mohoua albicilla*), fantail, and tūī. These Not Threatened native species have Low ecological value.

The Transmission Line Corridor spans 9.5km and is situated between several areas of high-value habitat for native avifauna (i.e. Lake Taupō, Lake Kuratau, Pureora Forest and various SNAs).

4.4 Grid Injection Point

4.4.1 Terrestrial Vegetation

Terrestrial vegetation at the GIP site consists of pastureland habitat with volcanic rocks scattered across the site and is of Negligible ecological value.

4.4.2 Wetlands

One, small (177.15m^2) confirmed 'natural inland wetland' that meets the definition under the NES-FW was observed within 50m of the GIP access track. The wetland is dominated by a high percentage of exotic obligate (OBL) and facultative wetland (FACW) vegetation and has a Negligible ecological value.

4.4.3 Orongopioi Stream

The GIP site footprint is located 80m from Orongopioi Stream, and the access road crosses approximately 50m to the northwest of where the spring feeding the stream emerges. Orongopioi Stream ultimately discharges into Lake Taupō. The stream is of Low ecological value. The section of the stream that flows to the south of the GIP was flowing at the time of the site visit and is assessed as either ephemeral/intermittent or perennial. Most of the stream reach was 1-2m wide but this expanded to 5m wide where water was dispersed through a small patch of *Glyceria*. Habitat consisted predominantly of run with some small riffles and water depth ranged from 5cm to 10cm. Downstream fish passage barriers were present and eDNA confirmed that no freshwater fish are present within the stream reach on the GIP site. The stream is fenced to exclude stock and riparian vegetation consists of mature exotic trees with a mixed native exotic understory that provides moderate-good shading.

4.4.4 Indigenous fauna

4.4.4.1 *Avifauna*

The GIP Site is dominated by pastureland habitat, however woody vegetation outside of the GIP footprint provides habitat for Not Threatened native species such as grey warbler, whitehead, tūī, silvereye, fantail, and bellbird, and these species may traverse the GIP Site when moving between patches of native vegetation. Other native species recorded flying overhead the GIP site area include black-backed gull, swamp harrier (kāhu, *Circus approximans*), and paradise shelduck.

4.4.4.2 *Herpetofauna*

The GIP site supports marginal herpetofauna habitat in the form of volcanic rock and woody debris. However, manual searches and a desktop review did not indicate that a population of lizards are present at the Site (defined as one Threatened or three At-Risk or Not Threatened native individuals).

5 Potential Ecological Effects

5.1 Avifauna

Injury/mortality: The project may result in injury / mortality of native avifauna, potentially including Threatened and At-Risk species during construction particularly during the breeding season. If clearance includes breeding habitat, such as woody vegetation for passerines or grassland habitat for NZ pipits, there is a risk of injury / mortality of eggs, chicks, and adults. It is expected that impact management measures related to construction timing, survey and monitoring will be included in the EcIA as part of the substantive application. Although no NZ specific monitoring data are yet available, other solar farm applications have identified a risk of potential collision and electrocution associated with the operation of solar farms and transmission lines. There is some scientific debate on causal mechanisms and probability of occurrence. The EcIA will provide an assessment of the potential impacts of avian collision and electrocution based on site-specific avian data, international literature and solar farm design and specifications. Monitoring and / or impact management measures related to collision and electrocution impacts may be recommended.

Nesting, foraging and roosting habitat loss: Avian habitat at the site comprises largely of open pastoral areas and small areas of trees and shrubs which are used by a wide range of species observed at the site. The clearance of woody vegetation and reduction of open pasture by solar panels will reduce foraging and nesting habitat for these species but is not expected to have a substantive impact on any of the species present. The extent of impact on each species will be considered further in the substantive application along with recommendations for impact management through site layout and design.

Disturbance and displacement: Construction and operational noise and lighting could result in indirect habitat loss or temporary displacement of native avifauna. Typically, these impacts are readily managed but warrant addressing as part of the ecological impact assessment.

5.2 Herpetofauna

Injury/mortality: Native lizards were not observed on Site and therefore are not expected to be impacted by the works. An IDP for lizards may be recommended in case of lizard discovery during works.

5.3 Wetlands

The proposed works are not anticipated to result in significant changes to any of the wetlands present on Site either directly or indirectly. Project design has gone through various iterations to avoid direct impacts on wetlands and other potential adverse effects such as changes in hydrological function have been minimised, notwithstanding the Negligible ecological value of the three wetlands.

The proposal will implement cutoff drains alongside the GIP access road as well as level spreaders to distribute the flow of surface water more evenly before it reaches Orongopioi Stream and the wetlands. Basins will be established to treat and attenuate surface water flow discharge from the GIP platform. Surface water flows into the wetland may change slightly, but this is unlikely to have a significant impact with appropriate design consideration. Potential degradation via sediment run off will be mitigated through adoption of best practice erosion and sediment control and further residual effects are not anticipated.

5.4 Watercourses

Riparian vegetation clearance: A small section of mixed native-exotic vegetation along Orongopioi Stream will be cleared for the Transmission Line Corridor. Removal will be restricted to large trees. Native species that are present in the understory are small stature and will likely remain. Recommendations to infill plant gaps left by tree removal may be included in the EcIA. Further residual effects are not expected.

Water quality, sedimentation, and erosion impacts: The proposed works and presence of solar panels may result in the deposition of sediments into downstream waterbodies and increase the risk of erosion. An ESCP and stormwater management system will be implemented to reduce the risk of adverse impacts on water quality. Further residual effects are not expected.

Impacts to hydrology: The proposed works are not anticipated to result in significant changes to the hydrology of Orongopioi Stream. Groundwater management is in place (detailed in Section 4.3) and will likely only have negligible changes on the input of surface water into the stream (Beca, 2026).

5.5 Benefits

Although not quantified directly, it is expected that benefits resulting from the change in land use from dairy farming to a solar farm include potential improvements in water quality of the catchment following a reduction in nutrient leaching (particularly of nitrogen and phosphorous) into Lake Taupō and the downgradient catchment.

5.6 Conclusion

The potential adverse effects of the Project on ecological values are expected to be able to be managed primarily through avoidance and minimisation. Remediation, offset, and compensation is not expected to be required for this Project. The overall adverse effects of the Project on ecological values will be **Low** and not significant with the recommended design and management measures implemented.

Limitations

This report has been prepared by Beca Ltd solely for Meridian Energy Limited (MEL) (the client). This report is prepared solely for the purpose of a fast-track referral memo for the Western Bays Solar Development. The report has been prepared to support a fast-track application and may be used by the Client and others in subsequent processes to consider the application to which the assessment pertains. The contents of this report may not be used by the Client for any purpose other than in accordance with the stated Scope.

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This report should be read in full, having regard to all stated assumptions, limitations and disclaimers.

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Appendix A – Supporting Maps

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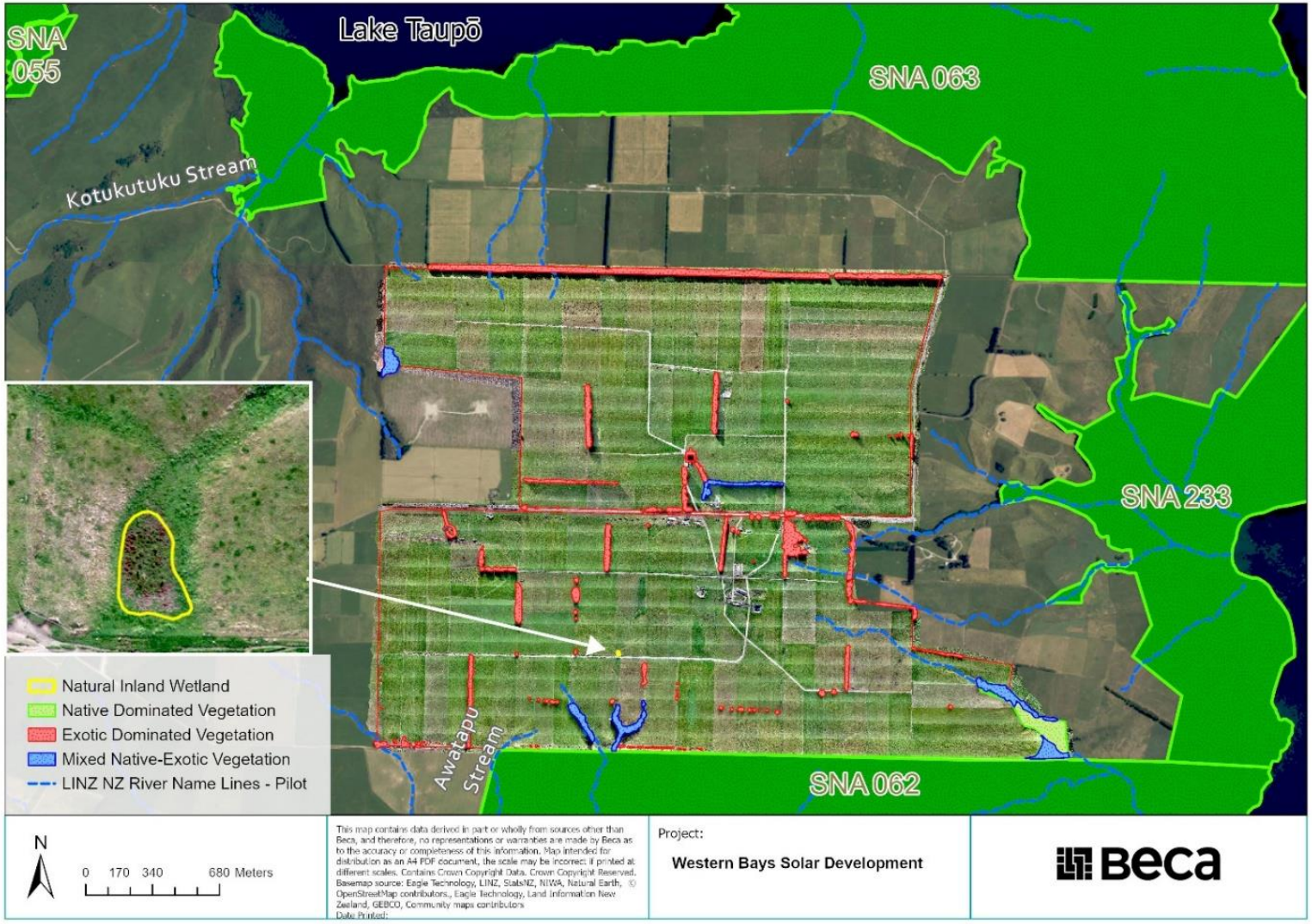


Figure 2: Solar Farm Site and ecological features, including surrounding SNA, wetlands, and non-pastoral vegetation. LINZ river lines intersecting with the site were ground-truthed and only consist of overland flow paths.



Figure 3: Approximate maximum vegetation clearance areas (60m either side of lines). It is anticipated that vegetation clearance will be significantly less as only select tall trees that may be close to wires will need to be cleared.



Figure 4: Indicative design of GIP Site including access tracks in relation to Orongopioi Stream and the wetland.