Mahinerangi Wind Farm Stage 2

Water Quality Monitoring Plan

Tararua Wind Power Limited

Prepared by:

SLR Consulting New Zealand Limited

SLR Project No.: 810.031205.00001

8 October 2025

Revision: V1.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
V1.0	8 October 2025	Keren Bennett	Ben Ludgate	Ben Ludgate

Basis of Report

This report has been prepared by SLR Consulting New Zealand Limited (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.

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Acronyms and Abbreviations

ECMP	Earthworks and Construction Management Plan
EPA	Environmental Protection Authority
MWF	Mahinerangi Wind Farm
ORC	Otago Regional Council
TWP	Tararua Wind Power Limited

1.0 Introduction

Tararua Wind Power Limited (TWP) is progressing Stage 2 of the Mahinerangi Wind Farm (MWF), which is to be known as “Puke Kapo Hau” (“the Project”, “Puke Kapo Hau” or “MWF Stage 2”).

The MWF is located on the eastern foothills of the Lammermoor Range, situated approximately 5 km north of Lake Mahinerangi and approximately 50 km west of Dunedin.

The road/track network has been aligned on ridgelines and positioned to avoid gullies and steeper terrain, and to maintain a 10 m setback from mapped wetlands, where practicable. The culverts required to convey stormwater and surface water associated with overland flow path are therefore located away from watercourses. Construction of the roads/tracks and installation of the culverts will be in accordance with the Environmental Construction Management Plan (ECMP). Maintenance of existing flow paths, and use of energy dissipation at culvert outlets, will avoid or minimise the potential for any adverse effects of these culverts on the ecological values of the catchment watercourses.

The installation of a new culvert in a headwater tributary of Lee Stream located in the northwest of the wind farm site at coordinate 45°44'5.00"S, 169°54'53.71"E (Figure A) is one of two places of the MWF Stage 2 that cannot avoid a watercourse, with direct disturbance of the bed and banks required[1]. Construction works and installation of the culvert will be in accordance with the sediment controls outlined in the ECMP, intended to minimise any adverse effects of sediments on the ecological values of the watercourse. Nonetheless, monitoring of suspended sediment concentrations (in the water column) surrounding the culvert location is proposed.

Culvert construction works are proposed to be undertaken during a low flow period between January and March and to last approximately 7 days. Works during September to November (inclusive) may only occur with prior approval from the consent authority if it can be demonstrated the works will avoid the disturbance of Eldon’s galaxias (*Galaxias eldoni*) spawning habitat.

1.1 Objective

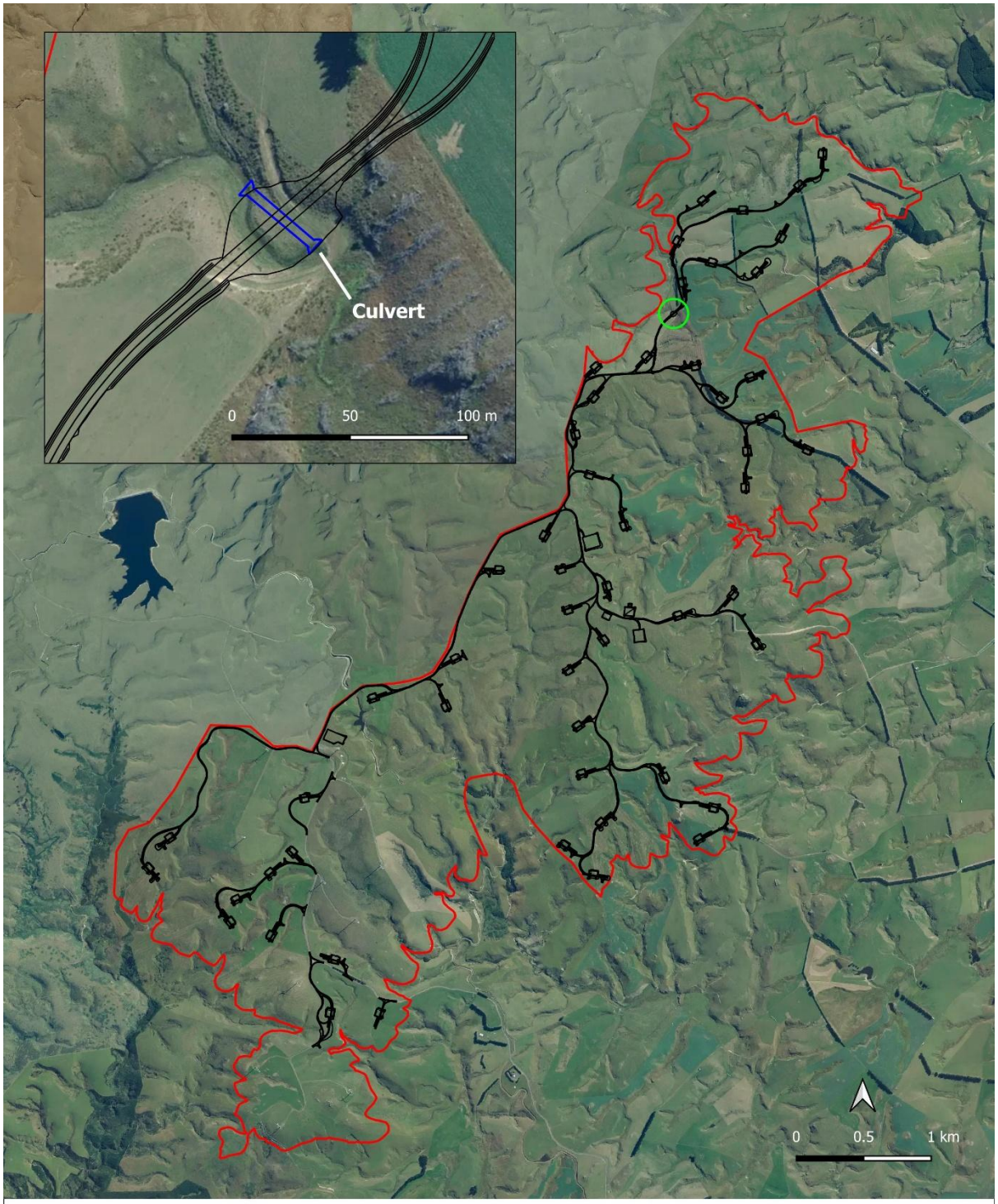
The objective of this Water Quality Monitoring Plan (‘the Plan’) is to outline requirements of a water quality monitoring programme to demonstrate the effectiveness of site-specific erosion, stormwater and sediment control measures during culvert installation on the Lee Stream tributary.

Monitoring will be undertaken in the stream upstream and downstream of the culvert immediately prior to instream works commencing (to establish ‘baseline’ conditions), during the culvert installation works, and following completion of the installation works.

The monitoring will ensure sediment and construction controls are effective. Should monitoring results indicate increased instream sediment that can be attributed to the instream works, an immediate review and amendments to the sediment control mechanisms will be initiated (in conjunction with appropriate site staff and management).

[1] The second place is the track at wetland 43 which will be managed by the Rehabilitation Management Plan.

Figure A: Approximate location of Lee Stream tributary culvert.



SLR
LEVEL 1, 426 MORAY PLACE
DUNEDIN 9016
NEW ZEALAND
www.slrconsulting.com

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Project no.:	810.031205.00001
Date:	14 July 2025
Drawn by:	SR
Scale:	1:35,000
Sheet size:	A4
Projection:	NZGD 2000/NZTM 2000

Legend
- Culvert site
- Stage 2 Layout
- Windfarm Site

Tararua Wind Power Limited
Mahinerangi Wind Farm
Stage 2

2.0 Site Features

The new culvert will be a permanent structure and will replace an existing, smaller culvert located under a farm track approximately 20 m downstream of the new culvert. The Lee Stream tributary in the vicinity of the proposed new culvert is unfenced and sits in open pasture (Photo 1) upstream of a former forestry plantation area (now harvested) and wetland. The channel is dominated by instream vegetation (primarily grasses), with bed substrates of soft sediments and fine gravels. Instream habitats comprise runs with low water velocities.

Observations made onsite in 2025 indicate that during dry periods the stream can be reduced to minimal amounts of flowing water through vegetation (SLR, 2025). The stream channel surrounding the existing culvert and in areas upstream have been historically excavated (evident from discrete clumps of soil distributed along the stream banks), presumably to facilitate flow through the existing undersized culvert. The stream habitat is typical of modified first and second order streams flowing through farmland in the Lee Stream and neighbouring catchments.

Photo 1: Lee Stream tributary, immediately upstream of the existing culvert and at the site of the new culvert. Taken May 2025.

3.0 Monitoring Plan and Programme

The focus of monitoring is to understand the effectiveness of erosion and sediment control measures associated with the culvert construction activities, to determine potential changes in sediment discharge to the receiving area in relation to the activities. Monitoring is intended

to allow differentiation of construction activities from other land use (i.e., farm) related activities which could affect sediment levels.

Sampling will be undertaken at locations upstream and downstream of the culvert where sufficient flowing water is present (noting this may not be possible at all locations at all times).

Sampling will involve assessments on site of visual clarity (black disk) and turbidity (using a field meter) and the collection of water quality samples (in laboratory-provided containers) to be analysed for suspended solids. Laboratory analysis of samples for suspended solids will be used to confirm on site assessments of clarity and turbidity, and help determine if sediment and construction controls are effective or if there has been any increased instream sediment that can be attributed to the instream works which would trigger a review of sediment control mechanisms.

Photographs of each sampling site, to indicate water and weather conditions at the time of sampling, will be taken on each occasion, from a similar position to allow comparisons over time. Rainfall in the 24 hours prior to the sampling event will be recorded, based on data from the closest monitored rainfall gauge.

A monitoring data sheet has been developed and is included as Appendix A. The water quality monitoring sheet will be completed for each sampling site on each sampling occasion.

3.1 Baseline monitoring

Baseline monitoring will be undertaken on one occasion immediately prior to construction works commencing (i.e., within seven days prior to construction works commencing). The sampling will be timed to be as close as possible to commencement of activities, before any sediment control methods are installed, and when conditions are stable.

When timing for the construction works have been determined, and if a rainfall event of at least 10 mm to 15 mm in a 24 hour period occurs within the seven days immediately prior to construction works commencing, a second ‘rainfall baseline’ monitoring occasion will be undertaken. The intent of this monitoring, if a rainfall event occurs, is to obtain a baseline for the stream during typical rainfall events that are large enough to generate increased stream flows and/or runoff from surrounding land. If there is no rainfall event in the seven days immediately prior to construction works commencing, no ‘rainfall baseline’ monitoring will be required.

3.2 Construction Monitoring

Sampling during works activities will be undertaken at a time when activities have progressed to the extent that sediment control measures would be required (i.e., sampling is to demonstrate whether control measures were working effectively).

Sampling will be undertaken once during the construction period, under the weather/rainfall conditions that occur on the day selected for sampling (i.e., sampling will occur if weather conditions are dry or wet).

Immediate review of the on site results (i.e., visual clarity and turbidity) and comparison with baseline sampling results and the upstream control site will be required to determine if water quality conditions have changed during the commencement of or progress with works activities (i.e., did instream conditions decline compared to pre-works (baseline) conditions?). This review of results can assist with determining the requirement for any short-term improvements to erosion and/or sediment control measures that may be required on site.

Review of laboratory results for suspended solids will also be undertaken to confirm on site assessments of clarity and turbidity. Additional factors such as weather will need to be incorporated into the review. The photographs of each sampling site, taken on each occasion to indicate water and weather conditions at the time of sampling, will assist with this review.

If amendments to erosion and sediment control measures are required due to changes in water quality parameters from baseline conditions (i.e., a 30% change in visual clarity and/or turbidity in comparison to the control site), these will be immediately discussed with appropriate site staff and management.

3.3 Post Construction Monitoring

Once works have been completed, sampling will be undertaken following removal of all equipment and control measures from the watercourse, and stabilisation of areas of bare earth.

Sampling will be undertaken on one occasion following the completion of works.

Requirements for additional sampling may be triggered should elevated sediment levels, that can be attributed to construction works, be identified. Elevated sediment levels will also trigger a review of site stabilisation measures.

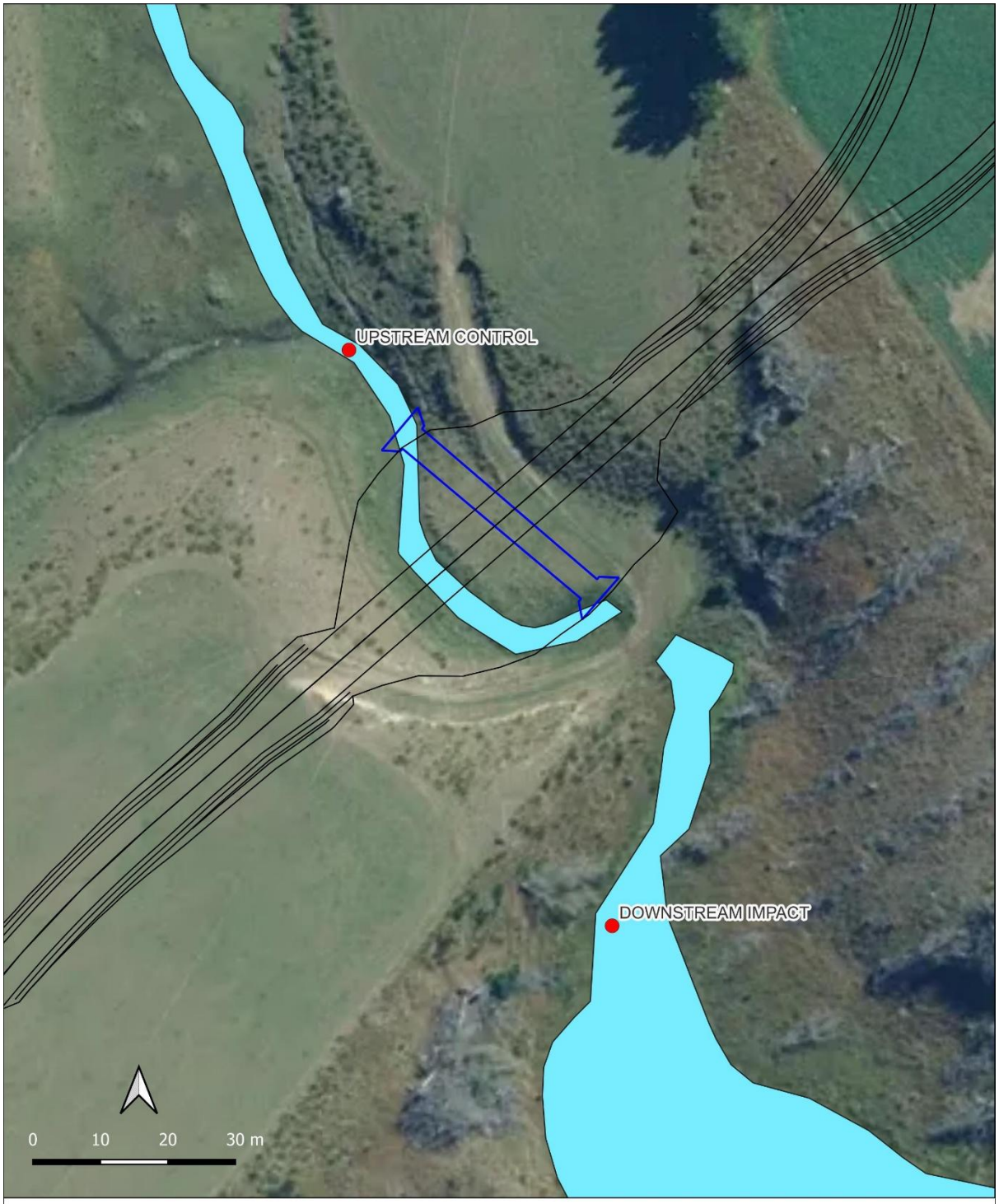
3.4 Monitoring Sites

Approximate monitoring locations are illustrated in Figure B. Sampling will be undertaken at two locations:

A. Upstream Control. Upstream of the culvert works site, but downstream of the confluence of the true left and true right branches of the site tributary.

B. Downstream Impact. Downstream of the culvert works area. An appropriate location will be confirmed on-site and will be affected by the stream length available between the downstream edge of the works footprint and the wetland located a short distance downstream. As a result, this site will be located either immediately above the wetland, or a short distance within the wetland.

Figure B: Approximate location of water quality monitoring sites.



4.0 Review and Reporting

During the construction monitoring, reviews will be undertaken which will comprise review of sampling results following each sampling occasion and, if required, notification of requirement for improvements to sediment control measures to site management. This notification will be in person with appropriate site staff and management and in email form (followed by phone communication, if required) to ensure immediate awareness for actions to be determined and initiated on site. If review of sampling results does not indicate any change in water quality, results will be filed for use in final reporting and no notification will be provided to site management.

Final reporting will follow the completion of the culvert installation on the Lee Stream tributary and associated sampling and will include a summary of results from the sampling, photographs of the sites at the time of sampling, a summary of relevant weather conditions, and information regarding reviews during construction and any required improvements in sediment control measures. The final report will be prepared and provided to ORC at the completion of the culvert installation and stream quality monitoring programme. The report will, at a minimum, detail the following:

- Methodologies used to monitor water quality.
- A summary of outcomes of the monitoring.
- Any amendments to the sediment control mechanisms that were initiated as a result of monitoring data.

5.0 Closure

Sincerely,

SLR Consulting New Zealand Limited

[redacted]

Keren Bennett
Technical Director – Freshwater Ecology

[redacted]

Ben Ludgate
Principal Ecologist

6.0 References

SLR. 2025. Ecological Assessment – Aquatic Ecology, Mahinerangi Wind Farm Stage 2. Prepared by SLR Consulting New Zealand for Tararua Wind Power Limited. Version 1.0, June 2025.

Appendix A Water Quality Monitoring Sheet

Mahinerangi Wind Farm Stage 2

Water Quality Monitoring Plan

Tararua Wind Power Limited

SLR Project No.: 810.031205.00001

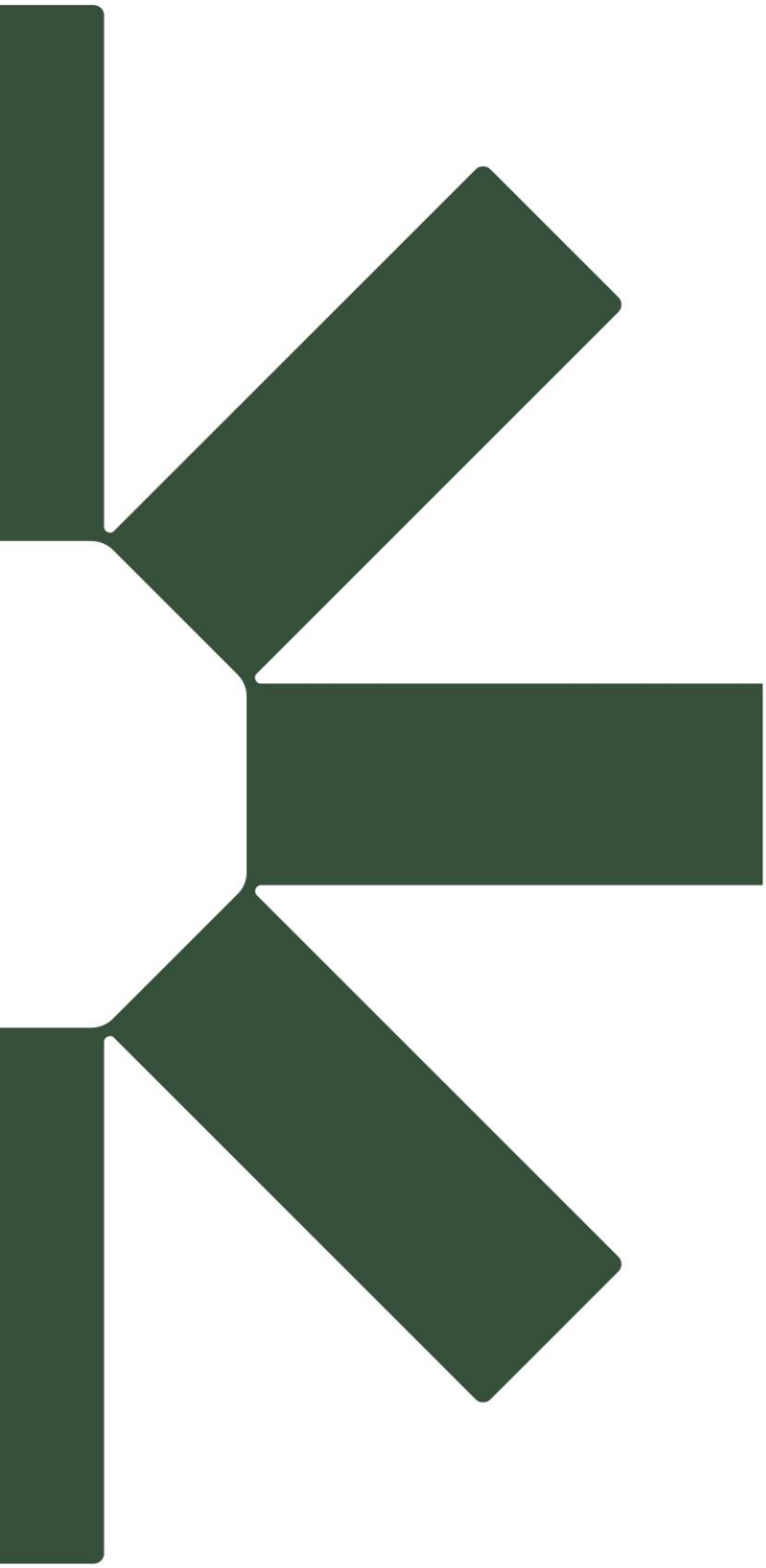
8 October 2025

Table A-1: Mahinerangi Wind Farm Lee Stream tributary water quality monitoring sheet.

Site name	
NZTM: Easting, Northing	
Date	
Start time	
Personnel	
Flowing water present?	Y / N
Water velocity (m/s) [2]	
Width of wetted channel (m)	
Water depth (m)	
Weather conditions	
Rainfall in previous 24 hrs (mm)	
Photos taken?	Y / N
Turbidity (NTU)	
Water clarity (m)	
Visible scums, foams, discolouration?	Y / N Notes:
Lab water sample collected?	Y / N Time:
Lab water results (from Hills):	*Complete below when lab results received*
Suspended solids (g/m^3)	

Additional notes:

[2] Can be estimated by measuring the distance a floating particle travels in a fixed time period (commonly 10 seconds). Velocity is calculated as: distance travelled (m)/time taken (s)



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