



**CONSTRUCTION ENVIRONMENTAL
MANAGEMENT PLAN**

for the

Waitaha Hydro Scheme

Date: 7 August 2025

DOCUMENT CONTROL RECORD

PROJECT: Waitaha Hydro Project

CLIENT: Westpower Limited

Revision	Date	Originator	Reviewer	Approver	Description
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Table of contents

1	INTRODUCTION.....	1
2	PURPOSE & OBJECTIVES OF THE CEMP	1
3	ROLES AND RESPONSIBILITIES	3
4	KEY SITE INFORMATION.....	4
5	PROJECT DESCRIPTION OVERVIEW	10
6	CONSTRUCTION WORK PROGRAMMES AND STAGING	12
7	CONSTRUCTION ENVIRONMENTAL EFFECTS IDENTIFICATION AND MANAGEMENT	13
8	PROJECT CONSTRUCTION METHODS	19
9	INSPECTIONS, REPORTING AND RECORDING	22
10	EMERGENCY RESPONSE	23
11	COMPLETION OF CONSTRUCTION	24
12	APPENDIX A – CIVIL ENGINEERING DRAWINGS	25
13	APPENDIX B – DRAFT EROSION AND SEDIMENT CONTROL PLAN (ESCP) – ACCESS ROADING CONSTRUCTION	25
14	APPENDIX C – DRAFT EROSION AND SEDIMENT CONTROL PLAN (ESCP) – HEADWORKS, TUNNELS AND POWER STATION CONSTRUCTION SITES AND SPOIL DISPOSAL AREA	25
15	APPENDIX D – CONSTRUCTION TRAFFIC MANAGEMENT PLAN (CTMP).....	25
16	APPENDIX E – DUST MANAGEMENT PLAN (DMP).....	25
17	APPENDIX F – CONSTRUCTION NOISE MANAGEMENT PLAN (CNMP).....	25
18	APPENDIX G - FLIGHT MANAGEMENT PLAN (FMP).....	25
19	APPENDIX H - VEGETATION MANAGEMENT PLAN (VMP)	25
20	APPENDIX I - AVIFAUNA MANAGEMENT PLAN (AMP).....	25
21	APPENDIX J - BAT MANAGEMENT PLAN (BMP)	25
22	APPENDIX K – LIZARD MANAGEMENT PLAN (LizMP).....	25
23	APPENDIX L - FRESHWATER ECOLOGY MANAGEMENT PLAN (FEMP).....	25
24	APPENDIX M - LANDSCAPE MANAGEMENT PLAN (LMP).....	25

Figures

Figure 1: Site Location	1
Figure 2: Plan showing Waitaha River and key surrounding features	5
Figure 3: Other notable features	6
Figure 4: Nearest Residents	8
Figure 5: Swingbridge near the head of Morgan Gorge	9
Figure 6: Scheme layout and key components.....	10

Tables

Table 1: Project roles and contact details	4
Table 2: Sites and construction activities	11
Table 3: Construction stages.....	12
Table 4: Objectives and scopes of Management Plans	14
Table 5: Environmental Effects Register	16

1 INTRODUCTION

Westpower Limited is constructing a run-of-the-river hydro-electric power scheme (the “**Scheme**” or the “**Project**”) on the Waitaha River located approximately 60 km southwest of Hokitika on the West Coast of the South Island, New Zealand (**Figure 1: Site Location**).

This Construction and Environmental Management Plan (“CEMP”) has been prepared to assist with the management of all construction activities associated with the Project, and in particular, to achieve compliance with all construction related conditions set out in the Project’s suite of Fast-track Approvals Act 2024 approvals (the “**Approvals**”).

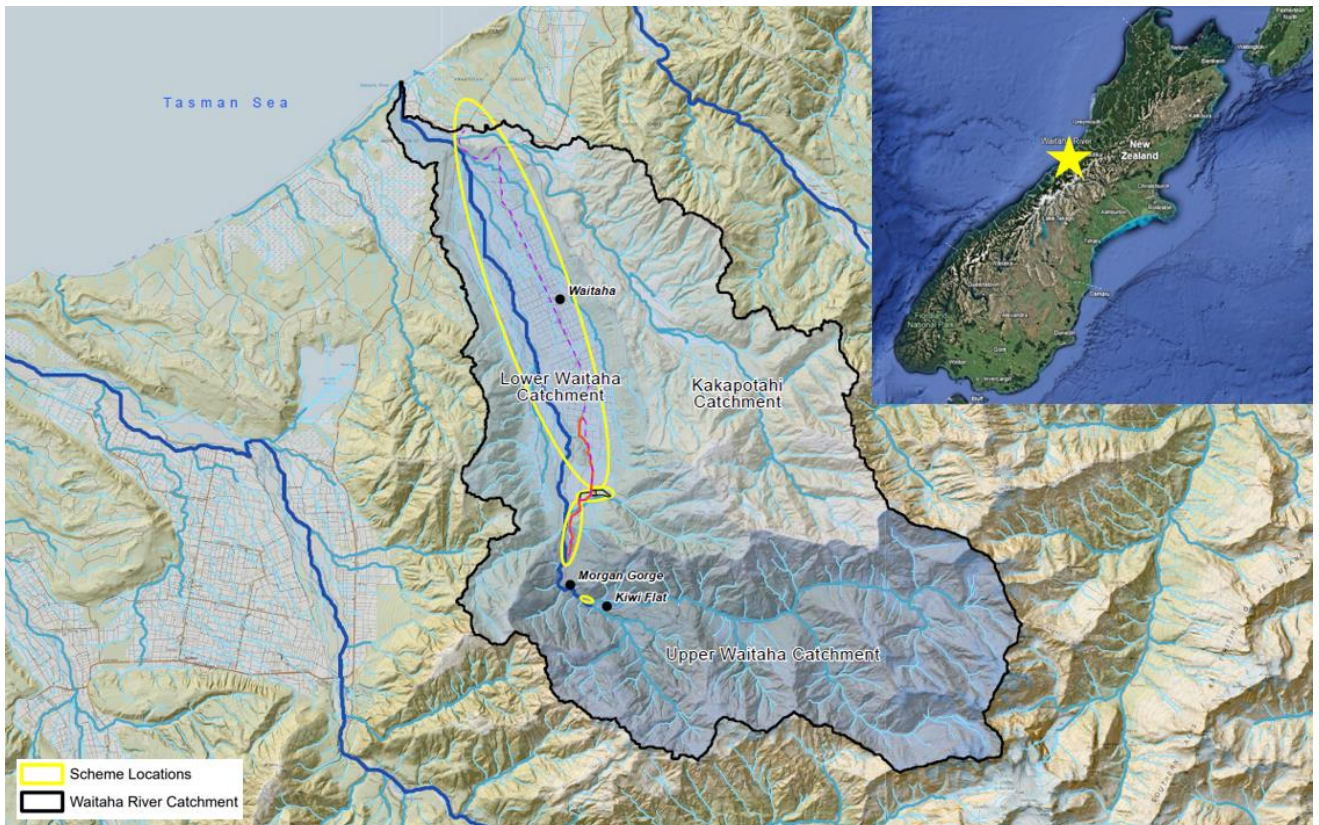


Figure 1: Site Location

This is a ‘living’ document and will be updated as the project progresses. This document covers the overarching construction philosophies and processes associated with key project construction phases and components. Other construction related management plans required by the Approvals will be appended to this CEMP (some of which are available as published or in draft as part of Westpower’s Fast-track Approvals application).

2 PURPOSE & OBJECTIVES OF THE CEMP

2.1 Purpose

The purpose of this CEMP is to set out the management procedures and construction methods to be undertaken by all contractors to, as far as practicable, avoid, remedy or mitigate any adverse environmental effects associated with all construction work activities associated with the Project to comply with the construction related conditions of consent.

2.2 Objectives

This CEMP has the following objectives:

- To ensure that all requirements of the CEMP and statutory requirements of the Approvals are complied with for the duration of the construction works.
- To ensure all practicable steps are taken to care for and protect the environment.
- To carry out the works while taking all necessary steps and processes to ensure the health and safety of all staff, contractors, sub-contractors and the public.
- To avoid, minimise or mitigate construction related adverse effects on neighbouring properties, the local community and sensitive receiving environments resulting throughout the duration of the works.

2.3 Scope

For the avoidance of doubt, the scope of this CEMP covers the following construction activities:

- Pre-construction geotechnical and geophysical investigations;
- Enabling works including access establishment and implementation of erosion and sediment controls;
- Clearance of vegetation;
- Earthworks;
- In-river works;
- Importation of construction materials and equipment and associated traffic;
- Civil infrastructure construction; and
- Restoration and construction site rehabilitation.

2.4 Implementation of the CEMP

This CEMP will be included with the tender documents. Following award of the contract to the successful contractor (**Contractor**), this CEMP will be submitted for review and finalised for certification by the Westland District Council, West Coast Regional Council and the Department of Conservation.

The Contractor must ensure the CEMP is a comprehensive single document that demonstrates all Approvals requirements can be satisfied and complied with.

The Contractor must identify and set out specific procedures and measures that will implement the provisions of this CEMP. The Contractor must also nominate staff who will be responsible for implementing and ensuring compliance with the provisions of the certified CEMP.

The Contractor must, in consultation with Westpower, take the necessary steps to adopt a pro-active approach to the management of the site by:

- Considering the potential for adverse effects resulting from the various construction activities during their planning stages;
- Planning all activities to ensure compliance is achieved with all relevant conditions contained within the Approvals.

The Contractor must ensure all staff and sub-contractors are familiar with the provisions and requirements of this CEMP and that these staff members know who is responsible for the implementation and monitoring of the CEMP's processes and methods set out.

The Contractor must ensure that a copy of the certified CEMP (including all certified Appendices) is kept onsite for reference by all staff and external regulatory staff.

2.5 Health & Safety

The Contractor must be in total control of the site and take all responsibility for all staff, sub- contractors, authorised visitors, and the public to ensure their Health & Safety. The Contractor must prepare a site-specific Health and Safety Plan and submit this to Westpower for review and approval before commencing any phase of the construction works.

One particular risk associated with the construction of the Scheme is flooding because of heavy rain. The Scheme includes weather monitoring stations and flow gauges to provide early warning of the risk of flooding. The Contractor's Health and Safety Plan will specifically address the risk to personnel and equipment posed by floods.

2.6 Updating the CEMP "Live Document"

This CEMP is considered a 'live' document and as such will be updated as and when required. Given the long duration of the construction works and the staging of construction work activities, updates to this CEMP will likely be necessary as the construction works progress. Amendments may also be necessary in the event of any changes in environmental management practices, works activities and/or contractors.

As detailed in the later sections, the procedures agreed in this CEMP will also be audited by Westpower throughout the Project to ensure ongoing Contractor compliance.

3 ROLES AND RESPONSIBILITIES

3.1 Approvals Holder

The Approvals Holder (Westpower Limited), will be accountable for ensuring that the site works are undertaken in accordance with this CEMP and all relevant conditions set out in the Approvals. The Approvals Holder will also appoint the Project Engineer and the Contractor(s).

3.2 Project Engineer

Appointed by the Approvals Holder, the Project Engineer or their representative will carry out regular inspections to ensure the construction activities are undertaken in accordance with the certified CEMP (and any other appended certified Management Plans) and any relevant conditions within the Approvals. This may include engaging other specialists as required by the respective Management Plans.

3.3 Contractor

Appointed by the Approvals Holder, the Contractor(s) will be responsible for implementing site management controls during the works, daily inspections, record keeping and reporting to the Project Engineer. The Contractor must, in conjunction with the Approvals Holder, prepare a Health and Safety Plan for the Project.

The Contractor(s) must also update the CEMP as the project progresses, and as required, to reflect their proposed construction methodologies and sequences. Any updated CEMP must be provided to the Project Engineer for approval prior to implementing any changes on the site.

The Contractor(s) must ensure that all construction activities are carried out in accordance with the contract and specifications, CEMP and Approvals requirements. The Contractor(s) must also ensure appropriate training is provided to all staff and sub-contractors.

To facilitate compliance with the CEMP and Approvals, the Contractor(s) will appoint a Site Construction Manager(s) (SCM) prior to the commencement of works on the site.

3.4 Site Construction Managers

The SCM(s) will be responsible for implementing specific measures in place to ensure the site in its entirety is secure to deter unauthorised persons accessing the site. The SCM(s) will also be responsible for providing and maintaining provisions for internal traffic and helicopter management in accordance with provisions set out in the Approvals and the approved Health & Safety Plan. To assist with the day-to-day implementation of the CEMP, the Contractor and SCM(s) can appoint site supervisory roles who will be responsible for Environmental Management and Health & Safety matters onsite and must report directly to the SCM(s).

The SCM(s) must also maintain daily records as set out in Section 9 of this CEMP. That will include (but not necessarily be limited to) Incidents, Complaints and any inspections and tests required by the CEMP.

3.5 Project Liaison

The Approvals Holder will appoint a designated Project Liaison to act as the point of communication between the Contractor(s) and the local community and regulatory staff from the Department of Conservation, Westland District Council and West Coast Regional Council. The Project Liaison may be a Westpower employee.

The Project Liaison will communicate and meet, as required, with regulatory staff to ensure they remain abreast of construction project activities (both occurring and upcoming) and to discuss compliance matters with Approvals conditions.

Prior to the commencement of each construction “Stage” onsite, the Project Liaison must convene a pre-construction meeting with the SCM(s), the Project Engineer, relevant regulatory staff and other stakeholders or other parties in accordance with relevant Approvals conditions. A minimum of one weeks’ notice by the Approvals Holder will be provided to all parties to ensure their attendance at the pre-construction meeting.

3.6 Project Ecologist

A general Project Ecologist will be available to advise the SCM(s) at all times. The Project Ecologist works with the project team to develop, implement, monitor and review work practices to assist compliance with approval conditions.

The Project Ecologist will undertake regular inspections, audits and monitoring to record and demonstrate compliance with the Approvals.

The Project Ecologist will work with appropriately qualified specialist ecologists where necessary, for example when Management Plans and Wildlife Permits require the involvement of a herpetologist, bat, and whoio specialist.

3.7 Construction Project Key Contacts

Project roles and respective names and contact details are set out in Table 1: Project roles and contact details

Table 1: Project roles and contact details

[TO BE INSERTED PRIOR TO CONSTRUCTION COMMENCING]

Role	Company	Name	Mobile	e-mail
Approvals Holder	Westpower			
Project Engineer				
Contractor(s)				
Site Construction Manager(s)				
Project Liaison				
Project Ecologist				

4 KEY SITE INFORMATION

4.1 Site Location and Setting

Construction site areas are in and beside the Waitaha River which is located 60 km southwest of Hokitika. The river catchment extends from the Main Divide of the Southern Alps to the Tasman Sea on the West Coast.

Figure 3 identifies various notable features surrounding the site while a general description of key site information is provided further below. Project components are also shown in **Figure 2**. These generally comprise the Scheme Headworks (Area 1), Power Station Site and access road from the McLean farm boundary at Macgregor Creek and the Power Station Site (Area 2), Spoil Disposal Areas and Construction Staging Area 3 (Area 3), and access road and transmission line on McLean farm and between the farm and Waitaha Substation (Area 4).

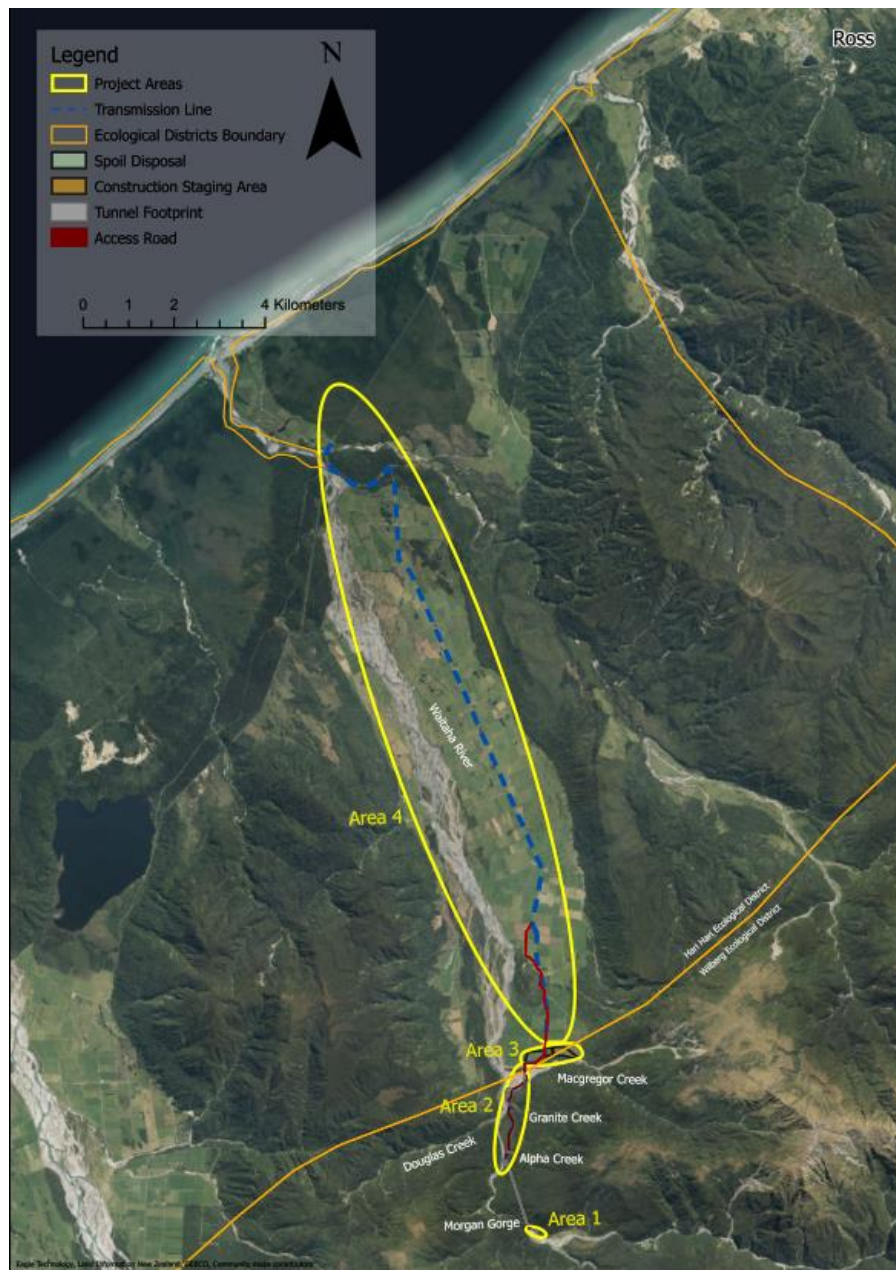


Figure 2: Plan showing Waitaha River and key surrounding features

4.2 Other Notable Site Features

Other notable features in the general area and shown in **Figure 3** include:

- A public walking track along the true right side of the Waitaha River (see peach dashed line; section shown is up to Morgan Gorge);
- A publicly accessible swing bridge located near the downstream extent of Kiwi Flat and the top of Morgan Gorge (directly adjacent to the yellow star);
- A site where geothermally heated water discharges to the surface (denoted by the orange coloured cross); and
- The Kiwi Flat Hut (denoted by the green triangle).



infrastructure will continue along local road reserve land at which point it passes into SH6 land administered by Waka Kotahi.

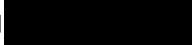
4.4 Waitaha River Catchment

The Waitaha River catchment is relatively small in comparison to other river catchments on the West Coast, being 316 km². The mainstem of the Waitaha River is dominated by a plane-bed/cascade morphology, with a mixture of sand-gravel–cobble substrate in slower flowing areas of the river, and massive boulders and shifting gravel in faster flowing areas. The river is predominantly a single-thread channel above Kiwi Flat, but as the valley flattens and widens at Kiwi Flat the river takes on a slightly braided nature, with low terraces representing the previous location of the river channel. At the downstream end of Kiwi Flat the river flows through Morgan Gorge as a confined channel, with a substrate dominated by bedrock, massive boulders, and shifting gravels. Below the Morgan Gorge, the Waitaha River flows in less steeply graded channel sections (the Douglas Creek and then the Downstream Reaches). A number of tributary streams also flow into the Waitaha River across the length of the Site. These include the Anson and Glamour streams (both entering from the true left within the Morgan Gorge), and the Alpha, Douglas and Macgregor Creeks entering further downstream.

Vegetation within the site areas and surrounding the Waitaha Catchment is indigenous native forest occupying the majority of the lower and mid slopes of both the Lower and Upper Waitaha Catchments.

The lower part of the Waitaha Catchment (generally located beyond the northern boundary of the Conservation Area – see dashed green line in **Figure 2: Plan showing Waitaha River and key surrounding features**) is a mix of uses and land types including large areas of well-developed farmland, particularly on the true right bank of the Waitaha River downstream of Macgregor Creek.

4.5 Neighbours

The nearest dwellings to the proposed Scheme are located at  (**Figure 4**). These are approximately two and three kilometres away from the proposed powerhouse location. Beyond this, a number of other dwellings are situated further north down the Waitaha Valley from the Scheme.

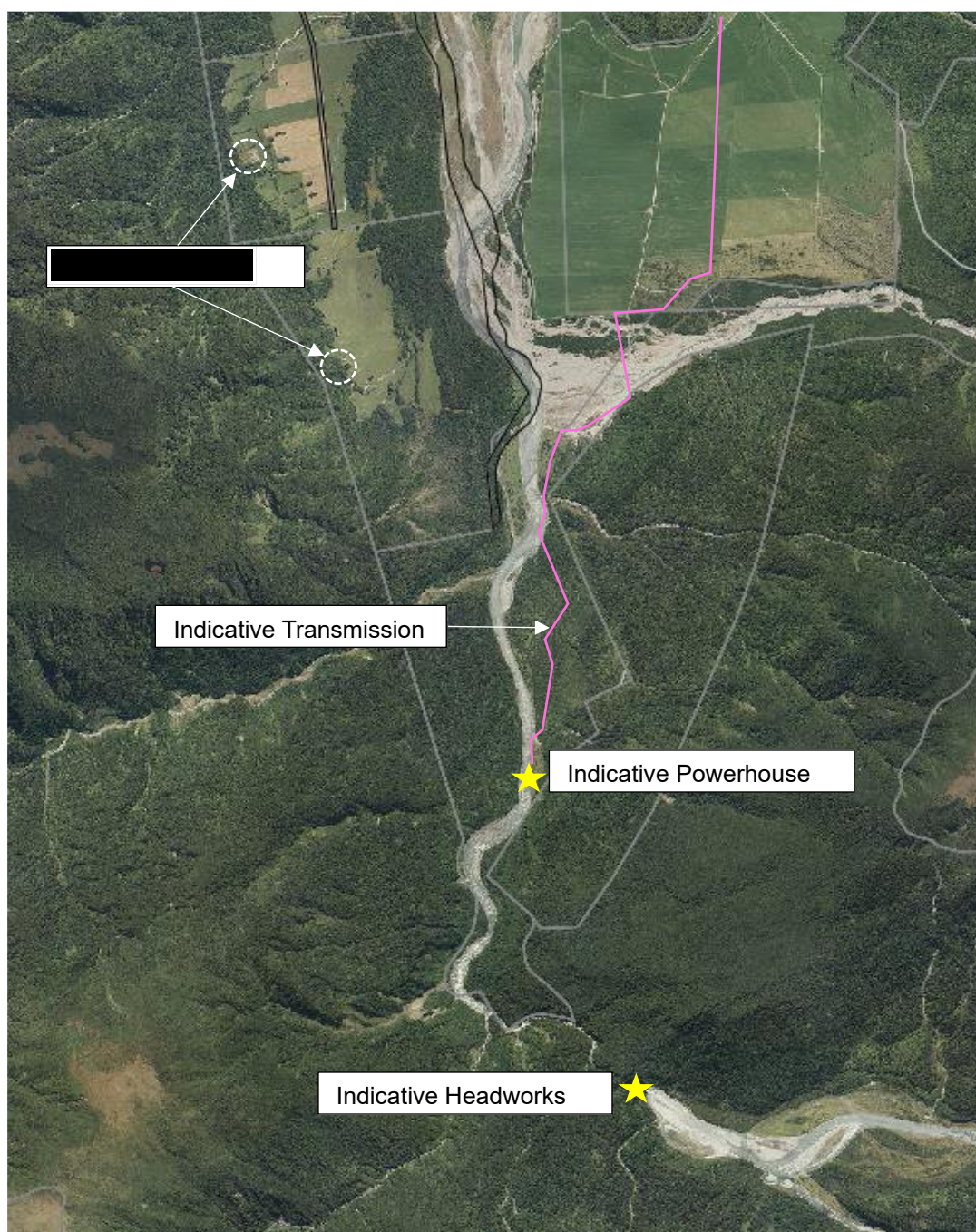


Figure 4: Nearest Residents

4.6 Land Access

Land within and near the site is accessed by trampers, hunters, kayakers and canyoneers and used to gain access higher up the Waitaha Valley which contains several huts.

Public roads closest to the Scheme area are Anderson Road at the entrance to the farm, and Waitaha Road and Allen Road which run roughly parallel and to east and west of the Waitaha River respectively. Anderson Road and Allen Road are no-exit roads.

Access to the Waitaha Valley requires driving from SH6, along the Waitaha Road and no-exit Anderson Road through to a small parking area used by visitors to access the DOC walking track to Kiwi Flat. This track runs alongside the river's true right bank to public conservation estate on the upstream side of Macgregor Creek and requires obtaining permission to be obtained from the local landowner (McLean Family).

The walking track then continues alongside the true right bank of the Waitaha River to Morgan Gorge and then on true left bank at Kiwi Flat (see peach dashed line in **Figure 2: Plan showing Waitaha River and key**

surrounding features, section of the track captured on the map is up to Morgan Gorge). The crossing across Waitaha River is provided by a swing bridge (see **Figure 5**). At Kiwi Flat the track enters the broader mountainous interior of the Upper Waitaha catchment where several huts are located.



Figure 5: Swingbridge near the head of Morgan Gorge

From Kiwi Flat there are several tracks leading further up the valley which are part of a greater network of back country tracks.

There is no formed track leading to the geothermal hot spring on the true left bank of the Morgan Gorge.

Foot access onto conservation land from Allen Road requires crossing private land and permission from the landowner. Access can also be gained via helicopter which is intermittently used to transport kayakers to the Upper Waitaha/Kiwi Flat and ferry hunters and trampers in and/or out of the area.

5 PROJECT DESCRIPTION OVERVIEW

The layout of the Scheme is shown in **Figure 6: Scheme layout and key components**.

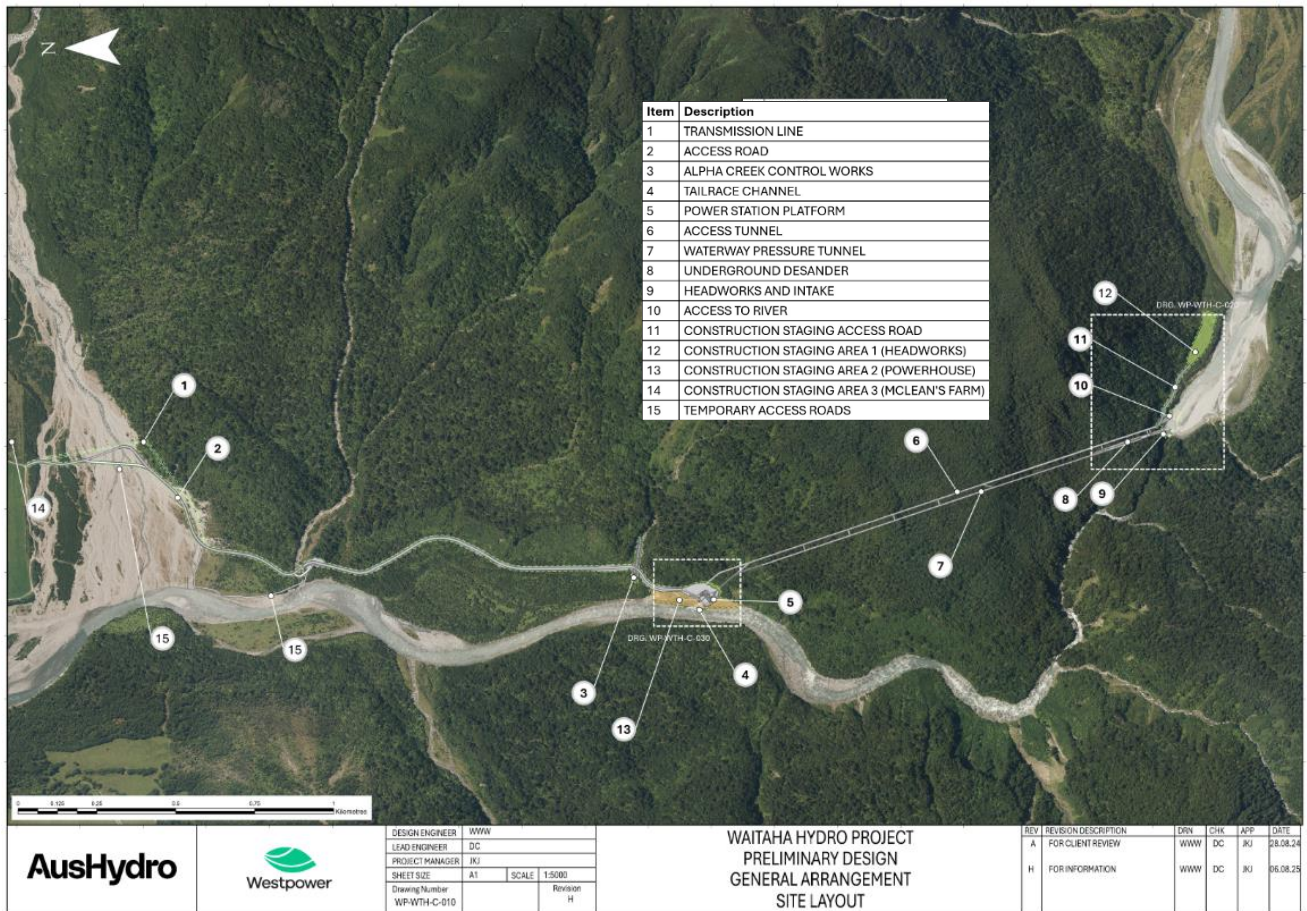


Figure 6: Scheme layout and key components

The Project is a run-of-river Scheme with no in or off-stream storage. The proposed headworks¹ include a low-profile weir and intake structure situated at the top of Morgan Gorge that will divert up to 23 m³/s (cumecs) of water into a tunnel. The weir has been designed to avoid any upstream inundation of Kiwi Flat – an important habitat for whio (blue duck). The water tunnel has been designed to convey the diverted water down to a powerhouse located below Morgan Gorge. The powerhouse will include turbine and generation equipment with a peak output of 23 MW of power. Once the diverted water has passed through the powerhouse, it is returned to the Waitaha River via a tailrace near the confluence of Alpha Creek.

The Scheme will be operated so that no less than 3.5 cumecs of flow is retained in the Waitaha River between the upstream headworks and the powerhouse tailrace (the “abstraction reach”). This reach of the Waitaha River will be approximately 2.5 km long, including Morgan Gorge at its upstream end.

Construction and future maintenance access to the headworks above Morgan Gorge will be via an access tunnel running parallel to the diversion tunnel. The project also includes an access road and a 66kV transmission line to the Power Station Site.

¹ Structures designed to divert river water into the Scheme.

5.1 Sites used for Construction and Associated Construction Activities

Table 2: Sites and construction activities

Construction Site Name	Overview	Relevant Construction Activities
Construction Staging Area 1 (Headworks)	Located near the top of Morgan Gorge, supports construction of the diversion weir, intake structure, and access tunnel portal.	<ul style="list-style-type: none"> • Site establishment • Sediment and erosion control structures • Temporary access road and culverts • Helicopter landing zones • Water supply infrastructure • Vegetation clearance • Streamworks • Construction of diversion weir • Construction of intake structure • Access tunnel portal construction • Water tunnel portal construction • Blasting activities associated with the above construction • Permanent access to river edge • Installation of river and weather monitoring equipment
Construction Staging Area 2 (Power Station Site)	Situated adjacent to the Waitaha River, facilitates construction of the Power Station and tailrace.	<ul style="list-style-type: none"> • Power Station and switchyard construction • Tailrace and tailbay construction • Tunnel portals and slope protection • Temporary staging road and flood protection • Tunnel spoil management • Water treatment systems • Installation of public safety signage • Foundation excavation • Tailrace outlet structure • Blasting activities associated with the above construction • Construction of retaining walls and flood bunds
Construction Staging Area 3 (McLean Farm)	Located on private farmland, used for contractor facilities and initial access road construction.	<ul style="list-style-type: none"> • Contractor offices and workshops • Concrete batching plant (operation and decommissioning) • Gravel screening • Spoil disposal • Initial access road construction • Helicopter operations • Laydown areas • Storage of construction materials • Water supply and wastewater systems • Vegetation clearance and rehabilitation
Access Roads and Transmission Corridors	Includes permanent and temporary access routes and transmission line installation.	<ul style="list-style-type: none"> • Permanent access road from Anderson Road to Power Station Site • Temporary access track to Granite Creek • Stream crossing structures • Transmission line installation • Installation of box culverts and bridges • Road metalling and drainage • Vegetation clearance along corridor • Installation of poles and conductors
Tunnel Construction Zones	Includes excavation sites for water and access tunnels and desander cavern.	<ul style="list-style-type: none"> • Excavation of pressurised water tunnel • Excavation of access tunnel • Blasting activities associated with the above construction • Construction of desander cavern • Spoil transport to disposal areas • Water supply and discharge management • Shotcrete application and wastewater treatment • Groundwater diversion and monitoring
Riverbed Gravel Extraction Area	Located in the dry bed of the Waitaha River near McLean	<ul style="list-style-type: none"> • Gravel extraction for road construction • Screening on old airstrip

	Farm.	<ul style="list-style-type: none"> • Nesting bird surveys • Sediment control • Compliance with extraction limits • Restoration of extraction area
Spoil Disposal Areas	Adjacent to Construction Staging Area 3, used for disposal of tunnel spoil and vegetation.	<ul style="list-style-type: none"> • Spoil and vegetation disposal • Rehabilitation to pasture • Flood protection bunding • Stabilisation and erosion control • Monitoring and compaction supervision

6 CONSTRUCTION WORK PROGRAMMES AND STAGING

6.1 Construction Programme Overview

The construction of the Waitaha Hydro Scheme is planned over a **3 to 4-year period**, with activities sequenced into **four key stages**:

Table 3: Construction stages

Stage	Description	Estimated Duration
Stage 1	Construction of access road and transmission line from Waitaha Road to the Power Station Site, including Staging Areas 2 and 3 and the bridge across Granite Creek.	Months 1–10
Stage 2	Excavation of tunnels and subsurface structures, early works at the intake, development of Construction Staging Area 1, and access tracks to the intake.	Months 7–27
Stage 3	Completion of water tunnel and desander, construction of intake channel and weir, Power Station, switchyard, tailrace, and transmission line from Waitaha Substation to Macgregor Creek.	Months 28–33
Stage 4	Equipment installation and commissioning at the Power Station, switchyard, and intake.	Months 32–37

6.2 Sequencing Highlights

- Pre-construction activities include geotechnical drilling, geophysical surveying, vegetation and road alignment surveys, and intake design refinements.
- Tunnel construction begins from the Power Station Site and proceeds upward toward the Headworks, with alternating excavation between the access and water tunnels.
- Headworks construction is timed to coincide with tunnel breakout and includes intake channel blasting, weir construction, and installation of sluice and environmental flow gates.
- Transmission line installation is split across stages, with early sections built for temporary 11 kV supply and later upgraded to 66 kV for operational use.
- Spoil management involves continuous transport of tunnel and excavation spoil to designated disposal areas on McLean Farm, with rehabilitation into pasture.
- Gravel extraction for road construction is sourced from the Waitaha River and spoil areas, screened on-site and reused or backfilled.
- Helicopter operations support remote access and material transport, especially during Headworks and transmission line construction.

6.3 Construction Intensity and Logistics

- Tunnel excavation is a 24/7 operation, with initial blasting confined to daylight hours until the operation is underground.
- Vehicle movements peak during overlapping tunnel, Power Station, and transmission line works, with up to 64 light vehicle and 12 heavy vehicle movements per day on public roads.
- Lighting and noise are managed to minimise ecological impacts, with artificial light sources limited to 2700K and noise protocols in place as stipulated by the CNMP.
- Water management includes sediment retention ponds, pH treatment systems, and controlled discharge to the river.

7 CONSTRUCTION ENVIRONMENTAL EFFECTS IDENTIFICATION AND MANAGEMENT

7.1 Potential Adverse Environmental Effects

The project will involve various activities that could result in the following adverse environmental effects:

- Discharge of sediment from disturbed land areas, spoil disposal site, tunnel discharges and in-stream works;
- Discharge of high-pH water from tunnel excavations and in-stream concrete works;
- Potential destruction or disturbance of terrestrial fauna: birds (including whio), bats, lizards and invertebrates, and their habitat associated with vegetation clearance activities;
- Potential disturbance and loss of aquatic habitat;
- Potential disturbance and loss of fish;
- Construction traffic and associated nuisance effects and road safety impacts on neighbours and local road users;
- Construction safety risks relating to flooding;
- Construction traffic and impacts on local road surfaces;
- Disruption and introduction of public safety hazards for trampers, hunters, kayakers, canyoners and other recreational users of the area;
- Direct effects on McLean farmland and livestock;
- Excessive noise and associated adverse impacts on birds, bats and livestock and the local community;
- Discharge of dust and associated nuisance effects on neighbours;
- Contamination of surface water, soil and groundwater from concrete batching plant and fuel and oil spills; and
- Pollution from litter and waste materials.

7.2 Register for Environmental Effects

An Environmental Effects Register for the potential construction related effects has been prepared (refer Table 5: Environmental Effects Register below). This register provides high level information on the projects' potential adverse effects and sets out general methods to be implemented to avoid, minimise, mitigate or compensate for these impacts during construction. It also guides users of the CEMP to where they can find more information on those methods in the various project Management Plans.

The objectives and scopes of the Management Plans are as follows:

Table 4: Objectives and scopes of Management Plans

Management Plan	Objective(s)	Scope
CEMP (Construction Environmental Management Plan)	To set out how construction activities will, as far as practicable, avoid, remedy or mitigate any associated adverse environmental effects and how these activities will comply with relevant regulatory requirements for the project. The CEMP includes roles and responsibilities, construction methodologies, site layouts, health and safety, vegetation clearance, erosion and sediment control, incident management, spill response, and integration of other management plans.	<ul style="list-style-type: none"> • Overall project management including role and responsibilities, a summary description of the existing sites, and construction activities; • Construction staging • Health & safety • Incident and complaint procedures • Methods for gravel extraction and screening, access road and transmission line construction, streamworks, spoil disposal, concrete batching, and water take • Integration of other management plans • Methods for amendment and update
ESCP (Erosion and Sediment Control Plan)	To minimise sediment losses and sediment discharges to surface water during all earthworks and construction activities, using best practice stormwater and sediment control processes and procedures.	<ul style="list-style-type: none"> • Access road construction • Vegetation clearance • Tunnel excavation and treatment of high pH tunnel water • Spoil disposal • Gravel extraction • Concrete batching, Stream crossings and in-river works • Construction staging areas • General earthworks
VMP (Vegetation Management Plan)	To address vegetation removal protocols, revegetation and rehabilitation procedures and plans, and associated planting, weed monitoring and reporting for the construction phase. To ensure that indigenous vegetation loss is minimised, and that rehabilitation and weed control are effective.	<ul style="list-style-type: none"> • Vegetation clearance methods • Avoidance of ecologically significant areas • Rehabilitation of temporary construction areas • Weed monitoring and control • Monitoring and reporting
AMP (Avifauna Management Plan)	To set out pre-clearance requirements and methods to avoid, remedy and minimise effects and risks to birds (including whio) from noise, disturbance, and habitat loss during construction. To ensure best practice for bird protection and compliance with Wildlife Act approvals.	<ul style="list-style-type: none"> • Management of effects on birds including whio • Nesting protocols • Compensation measures • Monitoring and reporting
BMP (Bat Management Plan)	To avoid, remedy and minimise effects and risks on native bats, including adherence to DOC's Bat Management Protocols, minimising harm during vegetation clearance, and managing construction activities to reduce disturbance to bats.	<ul style="list-style-type: none"> • Habitat protection Pre-, during, and post-clearance protocols • Compensation measures • Monitoring and reporting
LizMP (Lizard Management Plan)	To minimise the risk of injury or death to native lizards during construction, through pre-clearance salvage, habitat	<ul style="list-style-type: none"> • Survey, trapping, and relocation protocols • Habitat clearance and transfer

	management, and rehabilitation, and to ensure compliance with Wildlife Act approvals.	<ul style="list-style-type: none"> • Release site description • Reporting
FEMP (Freshwater Ecology Management Plan)	To minimise adverse effects on aquatic ecology during construction and operation, including maintaining fish passage, managing streamworks, and monitoring and adaptive management for periphyton, sediment, and fish populations.	<ul style="list-style-type: none"> • Fish salvage and relocation • Monitoring of kōaro and other species • Periphyton and sediment monitoring • Weir and tailrace design criteria • Reporting
LMP (Landscape Management Plan)	To minimise and manage adverse effects on landscape, natural character, and visual amenity values, through careful design, placement, and rehabilitation of structures and disturbed areas.	<ul style="list-style-type: none"> • Rehabilitation of disturbed areas • Design and placement of structures • Contingency options for slips and erosion
CNMP (Construction Noise Management Plan)	To ensure construction noise is managed to comply with relevant standards and to minimise adverse effects on residents, recreation users, livestock, and wildlife. Includes noise mitigation measures, communication, and complaint procedures.	<ul style="list-style-type: none"> • Noise limits and criteria • Mitigation measures • Blasting and helicopter protocols • Complaint procedures
CTMP (Construction Traffic Management Plan)	To manage construction traffic to minimise safety risks, nuisance, and road damage, including traffic management measures, communication, and coordination with local authorities.	<ul style="list-style-type: none"> • Traffic routes and signage • Road maintenance and upgrades • Communication with residents • Corridor Access Requests
DMP (Dust Management Plan)	To minimise dust emissions from construction activities, including batching plant and gravel handling, to protect air quality and amenity.	<ul style="list-style-type: none"> • Dust suppression methods • Identification of sensitive receivers • Water supply for dust control • Complaint response protocols
FMP (Flight Management Plan)	To manage helicopter and drone use to minimise effects on wildlife and the environment, and to ensure safe and efficient flight operations.	<ul style="list-style-type: none"> • Helipad locations • Flight paths and protocols • Noise mitigation • Wildlife protection • Logging and reporting

Table 5: Environmental Effects Register

Construction Effect	Mitigation to Reduce Effect	Management Plan(s) Managing Effect
Water quality effects (sediment, cementitious discharges, high pH water, spills, didymo risk)	Erosion & Sediment Control Plan (ESCP); Construction Environmental Management Plan (CEMP); chemical treatment for pH; setbacks for fuel/concrete; didymo protocols; monitoring	CEMP, ESCP
Effects from gravel extraction (riverbed and land-based)	Extraction only from dry riverbed; setbacks from water; nesting bird checks; rehabilitation of land-based pits	CEMP, ESCP
Effects on river sediment transport and morphology	Limit extraction volumes; adhere to standard extraction methods; monitoring; rehabilitation of extraction areas	CEMP, ESCP
Effects on vegetation (clearance, edge effects, weed incursion)	Minimise clearance; avoid large trees; rehabilitation; weed monitoring/control	Vegetation Management Plan (VMP), CEMP
Effects on bats (habitat loss, noise, lighting, road strike)	Avoid large trees; limit night works; lighting limited to 2700K; speed limits; implement DOC bat protocols	Bat Management Plan (BMP), CEMP
Effects on avifauna (habitat loss, noise, disturbance, nest loss)	Avoid clearance in breeding season; nest checks; speed limits; lighting limited to 2700K; manage food/waste	Avifauna Management Plan (AMP), CEMP
Effects on Powelliphanta land snails	No snails found; surveys confirm absence; no specific mitigation required	CEMP (if required)
Effects on lizards (habitat loss, injury/death during clearance)	Pre-clearance salvage; retain cut vegetation; rehabilitation; manual searches	Lizard Management Plan (LizMP), VMP

Construction Effect	Mitigation to Reduce Effect	Management Plan(s) Managing Effect
Effects on terrestrial invertebrates (habitat loss, lighting)	Rehabilitation; weed control; minimise night lighting; manage food/waste	VMP, CEMP
Effects from construction phase surface water takes	Limit take to 20 L/s; monitor take; ensure negligible effect on flows	CEMP
Effects on aquatic ecology (habitat disturbance, fish passage, mortality)	Maintain fish passage; fish salvage/relocation; intake screens; follow fish passage guidelines	Freshwater Ecology Management Plan (FEMP), CEMP, ESCP
Traffic effects (increased traffic, safety, nuisance)	Passing bays; traffic management plan; communication system; speed limits; signage	Construction Traffic Management Plan (CTMP), CEMP
Noise effects (construction noise, blasting, helicopters)	Limit hours; inform residents; buffer distances; noise management plan; close tracks during blasting	Construction Noise Management Plan (CNMP), CEMP
Landscape, natural character & visual effects (temporary, localised)	Minimise footprint; retain vegetation; limit lighting; careful placement of structures; rehabilitation	Landscape Management Plan (LMP), CEMP
Recreation effects (track disruption, noise, access)	Alternative track alignment; signage; maintain access; information provision	CEMP, Recreation Report (implementation via CEMP)
Geotechnical hazards (land instability, slips)	Geotechnical investigations; design to standards; conservative safety factors	CEMP

Construction Effect	Mitigation to Reduce Effect	Management Plan(s) Managing Effect
Natural hazard effects (flood, earthquake during construction)	Early warning systems; robust design; flood protection for worksites	CEMP
Public safety effects (construction hazards to public)	Signage; barriers; restrict access to hazardous areas; communication with locals	CEMP, Public River Safety Report (implementation via CEMP)

8 PROJECT CONSTRUCTION METHODS

This section of the CEMP summarises, in general terms, the methods that will be adopted to avoid, minimise or mitigate adverse environmental effects during the various construction activities for the Project.

8.1 Construction hours of work

Construction activities will generally occur between 7AM and 7PM Monday to Sunday inclusive. Night-time works may be required for tunnelling and underground construction activities and other critical activities, subject to noise management protocols. Construction of tunnel portals and the Headworks will not occur between the hours of 7PM and 7AM whenever practicable.

8.2 Erosion and sediment controls

Erosion and sediment control measures will be implemented onsite prior to stripping topsoil and / or removal of vegetation in accordance with a Sediment and Erosion Control Plan (ESCP) designed for each construction area.

The ESCP for the site's access road construction will be in accordance with the ESCP provided in Appendix B of this CEMP. The ESCP for the site's main construction areas will be in accordance with the ESCP provided in Appendix C of this CEMP.

The ESCP provides guidance for sediment retention ponds, clean water diversions, perimeter bunds, and staged stabilisation. Monitoring will occur before and after rainfall events, and sediment will be removed from SRPs when it reaches 20% of design volume.

8.3 Gravel extraction and screening activities

Gravel will be extracted from the bed of the Waitaha River and the McLean farm. The gravel will be screened on the McLean farm but not washed. All screened gravel will be weed free when it is brought to site, and compliance with the Didymo prevention protocols is mandatory.

Effects from gravel extraction and screening will be managed by the ESCP, the CNMP and the FEMP.

8.4 Vegetation and tree clearance activities

General Methodology

Vegetation clearance will be minimised and timed to avoid sensitive breeding seasons. Large trees ($\geq 30\text{cm}$ dbh) will be retained where practicable. Clearance will follow protocols in the VMP, AMP, BMP, and LizMP. All food and waste will be promptly removed to avoid attracting pests.

Bat Management

Bat management will follow DOC's Bat Protocols and the BMP. Measures include pre-clearance acoustic monitoring, tree inspections, lighting limited to 2700K, speed limits, and seasonal restrictions on night works. Pest control will be undertaken to support bat populations.

Avifauna (including Whio) Management

Bird management will follow the AMP and include nest checks, seasonal clearance restrictions, and mitigation of noise and lighting impacts. A whio population maintenance initiative will be implemented, and predator control will be active throughout construction.

8.5 Site vehicle access establishment

Access roads will be constructed in stages to minimise disturbance. Gravel will be sourced locally to reduce traffic. Passing bays will be installed on Waitaha Road. All access routes will be stabilised and maintained to minimise sediment discharge.

Roads will be metalled and constructed with appropriate drainage and erosion controls. Culverts and bridges will be installed following fish passage guidelines. Temporary access tracks will be removed and rehabilitated post-construction.

8.6 Construction of stream crossings

General Methodology

All in-stream works will be managed in accordance with the ESCP and the FEMP. Stream crossings will include culverts, fords, and bridges. Construction will occur during low-flow periods and follow fish salvage protocols. Structures will be designed to maintain fish passage and minimise bed disturbance.

Culverts and bridges will be installed using coffer dams and flow diversions where necessary. Riprap and training structures will stabilise creek beds. All works will comply with NES-F and RLWP requirements.

Aquatic Ecology Management

Aquatic ecology will be protected through fish salvage, sediment control, and adherence to the FEMP. Monitoring will occur before, during, and after in-stream works. Didymo protocols will be followed.

8.7 Establishment of construction and associated laydown areas

Three Construction Staging Areas will be established at the Headworks, Power Station Site, and McLean Farm and are shown on **Figure 6**. These areas will include offices, workshops, batching plants, refuelling sites and storage. Erosion controls and stormwater management will be implemented as per the ESCP.

Areas will be fenced, stabilised, and monitored. Wastewater and refuse will be managed via closed-loop systems and removed off-site. Rehabilitation will occur post-construction using stockpiled topsoil and vegetation where appropriate, in accordance with the LMP.

Construction Staging Area 3 is adjacent to the spoil disposal areas on the McLean farm. These areas will be cleared, levelled and stabilized before being returned to pasture. Small scale stockpiles may be placed at Kiwi Flat and the Power Station site and only used when direct transport is not feasible.

Spoil disposal and recontouring will be governed by the ESCP – there will be no more than 1 ha unstabilised at one time and the spoil height will not exceed 1 m.

Water take

Up to 600 litres per minute (L/min) of water may be required for tunnelling operations.

Water will be sourced either from the Waitaha River or from tunnel seepage, depending on availability and suitability. For geotechnical drilling, a pump site will draw up to 50 L/min from the nearest water source to support drilling rigs.

Where water is taken from the river, fish screens will be used to prevent fish and debris from being drawn into the pipe.

8.8 Construction traffic management

To minimise or mitigate potential adverse effects associated with construction traffic, the protocols and methods set out in the Construction Traffic Management Plan (attached as Appendix D) will be implemented. Measures include speed limits, signage, communication systems, and coordination with local authorities. Construction traffic will be minimised through on-site concrete batching and gravel sourcing.

8.9 Hazardous substances and fuel management

General Methodology

Hazardous substances will be stored at the three Construction Staging Areas indicated in **Figure 6**, in bunded areas with spill kits and monitoring. All practices will comply with HSNO and Worksafe NZ requirements, and hazardous substances will be managed according to ElectroNet/Westpower standard (*EWPP-HSE-GEN-023 - Hazardous Substance Management*) that deals with the full life-cycle of any hazardous substances.

Refuelling will occur away from waterways. Transformer oil and diesel will be stored in double-skinned tanks with oil detection systems. Spill response procedures will be documented in the CEMP and SMP. Staff will be trained in spill response. All hazardous substances will be tracked and audited.

Spill Response

[To Insert]

8.10 Construction noise management

Noise will be managed via the CNMP. Measures include limiting hours of work, notifying residents, using buffer distances, and inspecting machinery. Helicopter flights will follow the Fly Neighbourly programme.

Noise monitoring will be conducted, and non-compliance will trigger mitigation and reporting. Complaints will be logged and addressed within 24 hours. Blasting will be scheduled to avoid sensitive times.

8.11 Dust Management

To minimise or mitigate potential adverse effects associated with dust, the protocols and methods set out in the Dust Management Plan (attached as Appendix E) will be implemented. Complaints will be recorded and responded to promptly. Dust suppression equipment will be maintained and operated effectively.

8.12 Concrete batching plant management

Concrete batching will occur at Construction Staging Area 3. Wash water will be contained and treated. Dust and noise will be minimised. All discharges will comply with RLWP and RAQP requirements

Batching operations will use closed-loop systems. Contaminated water will be treated or removed off-site. Silos and equipment will be maintained to prevent emissions. Spill response plans will be in place.

At the conclusion of construction the concrete batching plant will be decommissioned and the site will be rehabilitated. Remaining sludge will be dried and disposed of in the Disposal Areas. The sediment retention ponds and balance of the Construction Staging Area 3 will be returned to pasture along with the spoil disposal area on McLean farm.

8.13 Helicopter flight management

Helicopter use will follow the FMP. Flight paths, helipad locations, and protocols will be established to minimise noise and wildlife disturbance. Flights will be limited during sensitive ecological periods

Pilots will be briefed on ecological sensitivities of the area. Flight logs will be maintained. Noise monitoring will be conducted, and mitigation measures implemented as needed. DOC protocols will be followed

8.14 Tunnel construction and diverted groundwater management

Tunnelling will use drill-and-blast or milling methods. Groundwater will be collected, tested, and treated before discharge. Shotcrete wastewater will be managed to meet clarity and pH standards

Water will be monitored for pH and clarity. If outside acceptable ranges, it will be treated or removed off-site. Clean and dirty water will be separated. Monitoring and reporting will be documented in the CEMP.

8.15 Head works construction and associated in-river works

General Methodology

Headworks construction will follow staged coffer dam installation. In-stream works will be timed to avoid high flows and ecologically sensitive times such as when nesting where practicable. Fish passage and sediment management will be prioritised as per the FEMP.

Works will be sequenced to minimise disturbance. Sediment control and fish salvage will be implemented. Structures will be designed to maintain ecological function and public safety.

Aquatic Ecology Management

Aquatic ecology will be managed via the FEMP. Monitoring will occur before, during, and after works. Adaptive management will be used to respond to observed impacts.

8.16 Power station site construction and associated in-river works

Construction will include excavation, foundation works, and tailrace installation. In-stream works will follow sediment and fish management protocols. Public safety signage and barriers will be installed

Works will be staged and monitored. Tailrace construction will follow ESCP and FEMP guidelines. All discharges will be treated or contained. Access will be restricted during high-risk activities.

8.17 Transmission line construction

Transmission lines will be installed using concrete poles and overhead conductors. Vegetation clearance will be minimised. No poles will be placed in water bodies. Access will follow approved routes. Conductors are strung using helicopters to pull the wires between the poles.

Construction will follow safety and environmental protocols. Vegetation will be cleared in accordance with the VMP. Erosion controls will be implemented as per the ESCP. Monitoring and reporting will be documented.

8.18 Project solid and sewage waste management

Sewage waste treatment

Waste will be managed via closed-loop systems. Sewage will be stored in tanks and removed off-site via tankers (no wastewater treatment or disposal will occur on site). Wastewater tanks will be monitored and emptied regularly.

Solid waste

Solid waste management will be by means of large refuse bins, secure to manage pests and birds, that will be regularly taken away for disposal in an approved manner.

8.19 Construction site rehabilitation activities.

Construction site rehabilitation activities will be undertaken in accordance with the relevant protocols, methods and monitoring set out in the Landscape and Vegetation Management Plans (attached as Appendix G and F1 respectively).

9 INSPECTIONS, REPORTING AND RECORDING

The Contractor (assisted by the Project Ecologist where relevant) will undertake regular inspections and audits of the construction activities and will report and maintain records of the outcome of these. In addition, records, and responses to incidents to public inquiries or complaints will be maintained.

9.1 Inspections

Various inspections will be required to ensure compliance with this CEMP. In this respect, the Contractor will arrange for their Site Construction Managers to undertake daily site inspections covering the following:

- Site security;
- Access road conditions;
- Erosion and sediment controls;
- Plant and equipment condition;
- Waste management and litter;
- Noise and dust levels;
- Hazardous substance storage facilities and use of substances; and
- General identification of any other environmental risks or potential emerging risks.

To assist in undertaking these inspections a check sheet will be used. The inspections will record all non-compliances or improvements.

9.2 Reporting

The Contractor's Site Construction Managers will be responsible for preparing a monthly report for the Approvals Holder which will include all daily inspection records.

9.3 Incident Register

An incident register will be maintained to record any incidents onsite that have potential for adverse environmental effects. Such incidents may include:

- Failure to follow the correct protocols as set out in this CEMP and other appended management plans;
- Failure of any erosion and sediment control or other stormwater or diverted groundwater treatment measures.
- Any spillage of fuel, lubricants, wastewater, or hazardous substances; and
- Any other incident which either directly or indirectly causes, or is likely to cause, adverse environmental effects.

9.4 Complaints Register

The Contractor must maintain a register to record all complaints they receive relating to construction works. The register must record the following:

- the date, time and duration of the event;
- the name (if known) and location of the complainant when the event was detected;
- measures taken to verify the event;
- the weather conditions and wind direction (if relevant);
- the possible causes of the event;
- any corrective action taken by the Contractor in response to the complaint; and
- comments regarding corrective action provided back to the complainant.

The Contractor must advise the Approvals Holder as soon as possible following receipt of a complaint (and no later than 24 hours).

9.5 Updates to the CEMP

Further to section 2.6, given the duration of the construction works and the staging of construction work activities, updates to this CEMP will likely be necessary. Triggers for changes to the CEMP include the inspections, monitoring and reporting described in sections 9.1-9.4 above.

Minor changes to the CEMP can occur at any time, and those changes will be communicated to relevant parties. A full review of the CEMP will occur at least annually, when the CEMP will be compared against the Fast-track Project Approvals.

Following the annual review, the updated CEMP will follow the approval process in the Project Conditions and shared with all relevant parties.

A register will be kept of all updates to the CEMP over the life of the Project.

10 EMERGENCY RESPONSE

In conjunction with the Approvals Holder, the Contractor must develop appropriate emergency response plans to cover the following potential events:

- Health and Safety Incident;
- Fire;
- Earthquake;
- Extreme Flood; and

- Spill of fuel, oil or other hazardous substance to water (or to ground with the potential to enter water)

In addition, in the event of a bush fire, the Contractor must abide by the protocols and methods set out in the Fire Plan (provided in Appendix H)

11 COMPLETION OF CONSTRUCTION

Upon completion of construction, all areas not required for ongoing maintenance or operation of the Scheme will be rehabilitated according to the LMP. Rehabilitation will aim to restore indigenous vegetation cover or pasture, depending on the location and land use context.

Westpower standard as-built documentation and operating plans will be developed and finalised, along with any other drawings, guidelines or management plans required under the Approvals.

- 12 APPENDIX A – CIVIL ENGINEERING DRAWINGS**
- 13 APPENDIX B – DRAFT EROSION AND SEDIMENT CONTROL PLAN (ESCP) – ACCESS ROADING CONSTRUCTION**
- 14 APPENDIX C – DRAFT EROSION AND SEDIMENT CONTROL PLAN (ESCP) – HEADWORKS, TUNNELS AND POWER STATION CONSTRUCTION SITES AND SPOIL DISPOSAL AREA**
- 15 APPENDIX D – CONSTRUCTION TRAFFIC MANAGEMENT PLAN (CTMP)**
- 16 APPENDIX E – DUST MANAGEMENT PLAN (DMP)**
- 17 APPENDIX F – CONSTRUCTION NOISE MANAGEMENT PLAN (CNMP)**
- 18 APPENDIX G - FLIGHT MANAGEMENT PLAN (FMP)**
- 19 APPENDIX H - VEGETATION MANAGEMENT PLAN (VMP)**
- 20 APPENDIX I - AVIFAUNA MANAGEMENT PLAN (AMP)**
- 21 APPENDIX J - BAT MANAGEMENT PLAN (BMP)**
- 22 APPENDIX K – LIZARD MANAGEMENT PLAN (LizMP)**
- 23 APPENDIX L - FRESHWATER ECOLOGY MANAGEMENT PLAN (FEMP)**
- 24 APPENDIX M - LANDSCAPE MANAGEMENT PLAN (LMP)**