Boffa Miskell

Waitaha Hydro Scheme

Landscape Effects Assessment
Prepared for Westpower Limited

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Executive Summary

Introduction

Westpower Ltd (**Westpower**) proposes a run-of-the-river hydro-electric power scheme (**Scheme**) for the Waitaha River, approximately 60km south of Hokitika[1] on the West Coast of the South Island, New Zealand.

The Scheme would be run-of-river with no instream storage. The proposed Headworks include a low weir and intake structure situated at the top of Morgan Gorge that will divert water into a pressurised desander and tunnel. The pressurised tunnel will convey the diverted water down to a Power Station below Morgan Gorge. Having passed through the turbines, the diverted water will be returned via tailrace discharging to the Waitaha mainstem in the vicinity of the confluence of Alpha Creek. The Scheme is to divert up to a proposed maximum of 23 m3/s (cumecs) whilst maintaining a minimum residual flow of 3.5 cumecs immediately downstream of the intake. The hydro design includes a 10 cumec bypass valve to maintain water flow following Power Station outages. The abstraction reach concerns approximately 2.5 km of the Waitaha River, including Morgan Gorge. Construction access to the Headworks above Morgan Gorge would initially be via helicopter and / or on foot and then via the access tunnel (once it is completed), while an access road and transmission line corridor (average 15m in width) would be required from the Waitaha Valley Road to the Power Station to enable a connection to the existing network. As part of this work, the existing transmission corridor extending from the State Highway to the southern part of Waitaha Road, would also be upgraded[2]. A short access road will provide temporary access between the access tunnel portal and Construction Staging Area 1 (Headworks) during the construction phase.

Further detail on the project design and project background information as it relates to landscape and natural character is set out in Section 1 of **Appendix A**. This information, as well as a description of the Project Site is set out in the **Project Overview Report** and the **Project Description**.

Boffa Miskell Limited has been commissioned by Westpower to assess the potential effects of the Scheme on landscape and natural character. More detailed information pertaining to this Report is included in the **Landscape Effects Assessment** attached as **Appendix A**. Boffa Miskell Limited has also provided input on Westpower's **Landscape Management Plan** which accompanies the application.

This report considers and assesses the values and the significance of the Project Site in relation to landscape and natural character, the potential effects of the Scheme on landscape and natural character and how (if necessary) these effects are proposed to be avoided, mitigated or remedied. The full report is attached in **Appendix A.**

Existing Environment

This is comprehensively outlined within Section 2 of **Appendix A**. The Scheme is situated within the West Coast Region *(Te Kaunihera Whakakotahi o Te Tai Poutini)* characterised by dynamic tectonic activity, high rainfall and associated high energy fluvial processes, which has resulted in a diverse landscape of large mountains, numerous lakes, large rivers and coastal plains.

[1] Measured using local roads and tracks to the Power Station.

[2] Despite the upgrading of the transmission line within the lower Waitaha Valley being a permitted activity under the current Westland District Plan, an effects assessment has been carried out, for completeness.

The Scheme is located within the Waitaha Catchment, which is relatively small in comparison to other river catchments on the West Coast, being 223 km², whereas the Wanganui and Hokitika are 521 km² and 1,066 km² respectively. However, the drop in elevation from 2,640 m in the Upper Waitaha Catchment to sea-level is significantly steeper along the Waitaha River's 40 km length. Broadly, the Waitaha Catchment can be divided into three main sub-catchments or landscapes, based on the tributaries of the Waitaha River. These are the Upper Waitaha Catchment, the Lower Waitaha Catchment and the Kakapotahi Catchment. Refer to **Diagram 1** below.

The majority of the Scheme (Headworks and Power Station Site) is located within the Upper Waitaha Catchment, with the transmission line and access road extending into the more modified Lower Waitaha Catchment. The mountainous environment of the Upper Waitaha River Valley is a highly natural landscape supporting a range of features, including the Waitaha River. Due to the steep catchment, the Waitaha River maintains numerous hydrological characteristics, from the narrow, steep channels in its alpine upper reaches, to the whirling tortuous rapids travelling through the three gorges of Windhover, Waitaha and Morgan, to broad open braids within its lower valley. The river mouth contains a single channel with a small gravel barrier located immediately offshore. The strong westerly to northerly currents means that the morphology of this part of the river is constantly changing.

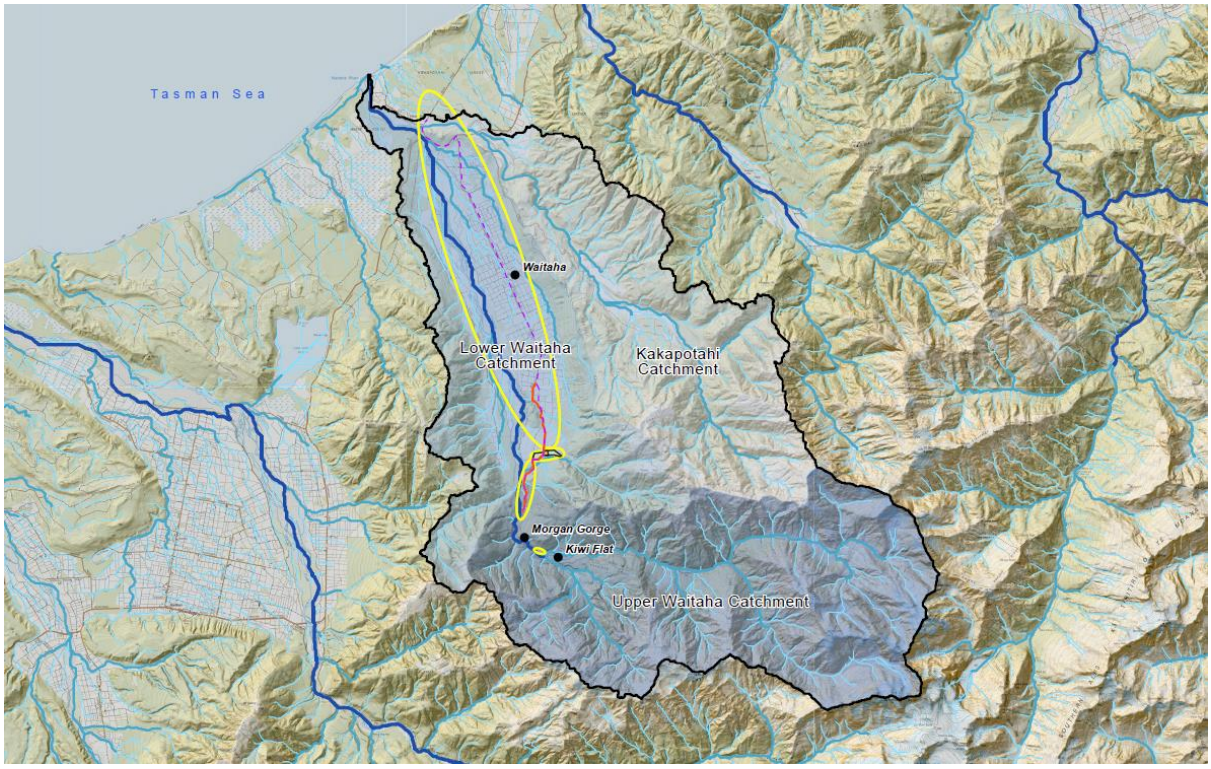


Diagram 1: The Waitaha Catchment and the Scheme overlaid.

Morgan Gorge is the lower of the three gorges and acts as a constriction to river flows. Within Morgan Gorge are the Waitaha Hot Springs.

The permanent operational footprint of the Scheme encompasses a small part of DOC land (5 hectares[3]) of the Upper Waitaha Valley catchment, with the Scheme as a whole retaining less than 12 hectares footprint (which encompasses the Headworks, Power Station, access tracks and transmission corridor between the northern farm boundary with Anderson Road and the Headworks).

The intake of the proposed Scheme is located at the lower end of the Kiwi Flat Reach, immediately east of where the river constricts into Morgan Gorge. Other than for highly experienced (and extreme)

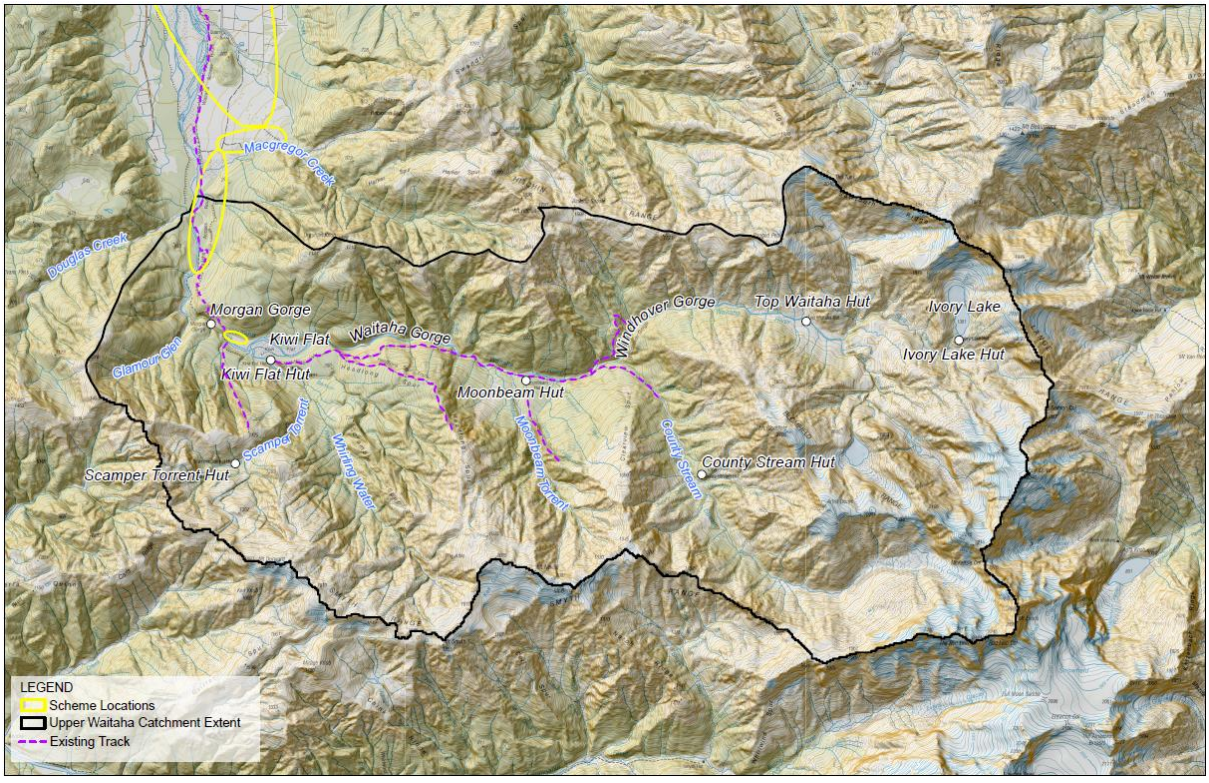
[3] Refer to Appendix A: Project Description, in the Project Overview Report, Westpower.

kayakers[4], access into Morgan Gorge itself is restricted by its rugged topography and inaccessible, incised river channel. The section of river between Morgan Gorge, at the confluence of Glamour Glen, and the confluence of Douglas Creek is described as the Douglas Creek Reach.

The Power Station and tailrace structures are proposed to be located on the true right of the river within this reach. The section of river downstream of the Douglas Creek confluence is referred to as the Downstream Reach. The abstraction reach describes the section of river between the intake structures at the top of Morgan Gorge to where the water re-enters the river at the tailrace.

The Lower Waitaha Catchment (with its extent outlined on **Figure 6: Catchment Areas** and above in **Diagram 1**) has very different landscape characteristics from the Upper Waitaha Catchment. Framed by the forested peaks of Urquhart Knob, Mt. Allen, and the Rangitoto and Bonar Ranges, the open, flat and agriculturally managed pastoral land is the focus for numerous rural activities, including quarrying. The small settlement of Waitaha is located mid-way in the Lower Valley and accessed via Waitaha Road. The river takes on a braided character below Douglas Creek and flows north-west towards its mouth.

A walking track extends along the true right of the river, from the modified Lower Waitaha Valley towards Department of Conservation (**DOC**) land and Morgan Gorge and Kiwi Flat, where the track enters the broader mountainous interior of the Upper Waitaha catchment. The DOC component of the track is therefore physically maintained by DOC. Views from the track towards the Headworks Site are broadly restricted to the swingbridge and that lower part of the track on the true left of the river as it descends onto lower Kiwi Flat. For the Power Station Site, there are elevated glimpses through the vegetation on the cliff to the east. Lower elevated views of the Power Station are also obtained from the track as it extends northwards towards the Macgregor Creek. The abstraction reach can be seen from the swingbridge and from elevated parts of the track above the Power Station Site and close to the riverbank at the Power Station Site, but otherwise views are broadly contained to the track only. There will be occasional views towards the abstraction reach for users who decide to use the original track on the true left-hand side of the river, especially if accessing the hot springs.



[4] Refer to Recreation Report by Rob Greenaway.

Diagram 2: The Upper Waitaha Catchment, noted features and the Scheme overlaid.

Investigations

The findings of this assessment are based on site visits, an iterative working relationship with Westpower, including the broader project team, to further develop and integrate the Scheme into the existing environment, as well as reviewing the relevant expert reports as they relate to natural character. Further detail of the landscape and natural character investigations is provided in Section 1 of **Appendix A.**

Values and significance assessment

The Upper Waitaha Catchment contains a very high to near pristine level of natural character and is also identified as an Outstanding Natural Landscape in the proposed Te Tai o Poutini Plan (**TTPP**). The Waitaha Hot Springs are listed as a geopreservation Site, of regional importance[5]. Whilst these springs are listed as a site of regional significance, there is no specific recognition or protection provided within the Westland District Plan or the TTPP to this site, or any other listed site, and as such, retain limited status.

The Scheme is predominantly located within the Waitaha Forest Stewardship Land which is administered by DOC, and almost exclusively contained within the northerly extent of the Upper Waitaha Catchment. The remaining part of the Scheme is contained within private ownership, and within the Lower Waitaha Valley. Both of these areas are located within the Westland District.

Further detail of the significance of the values relating to natural character, landscape and visual amenity is provided in Section 3 of **Appendix A** and **Table 1** below provides a summary of the significance of the values assessed in accordance with the relevant planning provisions. These documents are the West Coast Regional Policy Statement (**RPS**), the Westland District Plan (**WDP**), the proposed and notified TTPP and the West Coast Conservation Management Strategy 2010-2020 (**CMS**). The provisions of each of the above planning documents relevant for assessing significance of natural character, landscape and visual amenity values are set out in Section 4 of **Appendix A**.

Table 1 Significance of natural character, landscape and visual amenity values

Criteria	Current significance of values in the Waitaha Valley
Natural Character (RPS, WDP, TTPP and CMS)	Power Station access road/transmission line corridor Lower Waitaha Valley: Moderate to Low. Power Station access road/transmission line corridor Upper Waitaha Valley: Very High. Power Station Site: Very High. Weir and Headworks Site: Very High. Abstraction Reach: Very High.
Landscape (RPS, WDP, TTPP and CMS)	Power Station access road/transmission line corridor Lower Waitaha Valley: No landscape overlay. Power Station access road/transmission line corridor Upper Waitaha Valley: Outstanding Natural Landscape. Power Station Site: Outstanding Natural Landscape. Weir and Headworks Site: Outstanding Natural Landscape.

[5] Waitaha River Hot Spring. Significance: (C= Regional importance & 2= Vulnerable to significant modification by humans). The Inventory states: The springs are one of several hot springs coming up near Alpine Fault. They are described within the Geopreservation Inventory as: Warm springs coming up fractures through schists. Strong smell of sulphur. Local schist is highly fractured parallel to Alpine Fault, 2km downstream. *Hayward BW & Kenny, JA: Inventory and Maps of Important Geological Sites and Landforms in the West Coast, First Edition 1999*. Note: The extent of this feature is not mapped within the Inventory. The Geopreservation Inventory is a list of representative geological features and landforms of New Zealand identified by the Geoscience Society of New Zealand for the purpose of protecting significant sites as well as providing information on the listed features and landforms. The inventory is continually upgraded and reassessed as new information comes to hand.

Visual amenity (RPS, WDP, TTPP and CMS)	Power Station access road/transmission line corridor Lower Waitaha Valley: Rural landscape characteristics. Power Station access road/transmission line corridor Upper Waitaha Valley: High visual amenity in a remote setting. Power Station Site. High visual amenity in a remote setting. Weir and Headworks Site: High visual amenity in a remote setting.

Landscape and Natural Character Effects Assessment

The full assessment of Natural Character, Landscape (and visual) effects is covered within Section 4 of the Landscape Assessment at **Appendix A**.

Overall Approach to assessing effects and the design process

A landscape effect is a consequence of changes in a landscape's physical attributes on that landscape's values. Change is not an effect: landscapes change constantly. It is the implications of change on landscape values that is relevant.

Effects are considered against the existing and potential landscape values, and the outcomes sought in the statutory provisions. Such provisions often anticipate change and on achieving certain landscape values. Whether effects on landscape values are appropriate will therefore depend both on the nature and magnitude of effect on the existing landscape values and what the provisions anticipate.

In terms of natural character and landscape (and visual) effects, the design process for the Scheme has been extremely iterative and has been further refined since the 2016 and 2022 scheme designs. The design measures have avoided potentially greater levels of effects. Key measures incorporated into the design and assessment include:

- A very small operational footprint of 5.0 hectares[6] achieved by:
    - adopting a 'run-of-river' design to avoid damming the river (and hence avoids introducing a significant structure, forming a lake and creating large cuts for access roads for equipment).
    - utilising underground tunnels which conceal much of its infrastructure avoiding effects and reducing effects to the areas at the Headworks, abstraction reach and Power Station; and
    - excluding vehicular access into Kiwi Flat.
- Adopting a low weir design minimising area of backwater effect above the weir and allowing sediment and river material to pass over and/or under and continue down the gorge.
- Minimising the visual presence at the Headworks further by locating the intake (i.e. entrance of the pressurised water tunnel) under the water.
- Minimising the footprint of the Power Station and tailrace. This has been achieved by partly burying the Power Station and utilising space efficient infrastructure.

[6] This includes a permanent footprint of: 0.3 hectares at the Headworks Site; 0.7 hectares at the Power Station site, and up to 4.0 hectares for the transmission line/ access road, between Macgregor Creek and the Power Station site. Source: Westpower Project Description. A further 6.5 hectares is required for the transmission and access road through the farm to the north of Macgregor Creek.

- Aligning the power transmission line along the Power Station access road for most of the route from the Power Station to Macgregor Creek to reduce vegetation clearance; and
- Utilising methods to encourage weathering and using existing rock boulders to integrate the structures into the landscape.

Broad scale Effects

At a broad, Upper Waitaha Catchment scale, the Scheme will affect the very high levels of **natural character** at two discrete nodes, at the entrance to Morgan Gorge and the area around the Power Station Site. The abstraction reach extends for a 2.5 km stretch of the broader Waitaha River connecting the two nodes. The Scheme will introduce a level of modification to the Upper Waitaha Catchment and will alter the natural hydrology of the Waitaha River for a 2.5 km stretch. Despite this area being overwhelmingly natural, there are human-incursions already evident, such as the track, the swingbridge and numerous huts, including Kiwi Flat Hut located approximately 1km from the Project Site and the presence of pests. As such the Scheme is not rated at the highest (pristine) end of the spectrum. There is also a geothermal water take, located near Moonbeam Hut on the Waitaha River and a further water take, for geothermal purposes on the Waitaha River close to Macgregor Creek as well as a gravel/stone extraction permits, close to Macgregor Creek. Further, the Scheme is located closer to the more modified paddocks of the Lower Waitaha catchment, rather than the more remote upper reaches of the Waitaha catchment.

Based on this, at an Upper Waitaha Catchment scale, it is considered that the Scheme will have **moderate to low** adverse natural character effects. It is considered that, at a broad scale, the Upper Waitaha Catchment would retain its very high levels of natural character under section 6(a) of the RMA, despite some of the values being affected to a low degree.

From a broad scale landscape perspective, and despite the amount of measures to mitigate the effects of the Scheme, the Scheme will modify the landscape and introduce structures that currently are not present in the area. There will be a physical ‘presence’ of the Scheme at the Headworks and at the downstream Power Station Site which will affect the remote-like characteristics of the area and will affect, to a small degree, the intrinsic values of Morgan Gorge. The natural flow of the river within the abstraction reach will also be modified and be more apparent during periods of low flow. Despite this, however, it is considered that irrespective of the Upper Waitaha Catchment being an ONL and Morgan Gorge being a feature within the ONL, the Scheme will not create broad significant adverse effects due to the design measures summarised above as well as for the following reasons:

- The Scheme will occupy a very small footprint (5 hectares) within the Upper Waitaha Catchment’s 12,761 hectares with the structures being largely subservient and set within a relatively large and grand natural setting.
- despite the Scheme being located within an ONL (with Morgan Gorge being considered a feature within this outstanding landscape), much of the West Coast is an ONL, and therefore not uncommon in this region or within mountainous upper river catchments. Morgan Gorge is one of many equally ‘unique’ gorges on the West Coast.
- although the Scheme will, to a small extent, interrupt the remote-like characteristics and values of the area, the Upper Waitaha Catchment cannot be regarded as ‘truly’ remote or holding pristine wilderness qualities due to for example, the existing modifications, presence of pests, some water takes, the recreational use of the tracks and the presence of huts and the swingbridge.
- the effects of the Scheme on Morgan Gorge will not affect the overall biophysical, associational and sensory values of the gorge to a significant degree and, therefore, will not reduce its 'outstandingness' as a feature. The weir will appear close to the entrance of the gorge, is of a low profile which will retain the present geomorphology with the natural eroding of the broader gorge by fluvial processes continuing.

- the Scheme will not affect accessibility or the physical geomorphology of the Waitaha River Hot Springs.
- the changes to the flow regime of the river will only have minor adverse effects on its landscape values.
- the Scheme is not being proposed in a national park, wilderness area or World Heritage Area, such as Fiordland and South Westland. The area is classified as Stewardship Land by DOC where limited or no active pest control is undertaken.

The broad landscape effects of the Scheme on the values associated with the ONL are **moderate-low**.

In terms of broad scale **visual** effects, the intake and weir structure will be mainly visible from the swingbridge at the entrance to Morgan Gorge. Glimpses of the intake structures will be visible from the walking track on the true left of the river, close to Kiwi Flat. Glimpses of the Power Station and related ancillary structures will be possible from both the walking track as it descends/ ascends on the true right of the river and from closer views further along the track on the true right side of the river as it winds its way up 50-100 m behind the Power Station. The visual amenity of people using the river itself, such as kayakers will also be partly affected by the weir, intake and Power Station structures, although that will depend to varying degrees upon their disposition and individual expectations as to how much it affects their remote-like experience. The appearance of the Power Station structures will be designed to be integrated into the natural riverine landscape, and the colours of the Power Station will be dark and recessive. Proposed planting will also visually soften these structures in views from the river. The low profile of the intake structure will affect the remote values of Morgan Gorge and introduce a small node of industrial activity into an otherwise highly natural area.

Due to the setting of the activities, they will not be seen against the skyline from any views (and therefore prevent potential for amplifying their visual presence) and will, for the majority of the time, be located within areas of heavy shade, assisting to further visually reduce their prominence. The Power Station and intake structures will occur in discrete locations within a small footprint and will not visually dominate their setting.

Based on this, at an Upper Waitaha Catchment scale, the proposal will have **low adverse** visual effects due to the defined footprint of the Scheme.

Regarding the upgrading of the transmission line within the Lower Waitaha Catchment, this is **neutral** concerning broad scale landscape, visual and natural character effects. The proposed upgrading of transmission poles will essentially replace existing poles and overhead wires, within an already modified landscape.

Residual Effects on natural character (In River Effects)

The long-term effects of the flow regime changes will include lower flows for longer periods of time, when compared to the natural river state. Natural freshes will continue to occur, although smaller freshes will be reduced to a greater degree. There will also be a greater visible presence of rocks within and adjacent to the river channel during low flows but the presence of such rocks is part of the geomorphic nature of Morgan Gorge and of its landscape values. The frequency of minor floods will reduce by 10%, however, the frequency of larger floods will remain unchanged[7]. These frequent freshes / floods will, to varying degrees reduce the scale of the effects of the residual flow.

The long-term effects on the natural character of the river in relation to changes in the riverbed, include both the reduced flows in the active channel, exposed banks and beaches and the greater visibility of the presence of rocks within and adjacent to the river channel during low flows, but such rocks are part of the geomorphic process and a characteristic of the naturalness of Morgan Gorge.

[7] In-Stream Habitat Flow Assessment for the Waitaha River: Morgan Gorge to Douglas Creek, Cawthron Institute, September 2013, piii.

Flood flows will not be affected by the Scheme. Sudden releases of water from the by-pass valve at the Power Station will occasionally occur, however will be focussed within the active channel, with any increase in water somewhat characteristic of the large floods and freshes. Ongoing maintenance work in the river will involve an excavator clearing boulders and river gravel to ensure that river flows towards the intake and sluice gate. Similar ongoing maintenance work will be required at the Macgregor Creek crossing to remove flood debris.

Concerning biotic aspects of instream habitats, flora and fauna, the river and the biotic community will continue to be dominated/primarily influenced by the high disturbance regime of the system, so will only be affected by the Scheme to a low degree. Fish passage for kōaro (the only fish found up stream of Morgan Gorge) will be maintained. The construction of the weir at the top of Morgan Gorge will prevent trout access to Kiwi Flat while maintaining kōaro access.

Based on this, the **effects of the abiotic and biotic attributes of natural character** on the natural elements, patterns and processes **of the proposed reduced flow through the abstraction reach will be low**.

Concerning perceptual aspects of in-river effects on natural character, the visual connection to the river from land-based public viewpoints is limited to varying degrees by the restricted surrounding access points obtainable close to the riverbed. These locations are very short sections of the walking track and from the swingbridge (which is part of the track). Characteristics such as river channel shape, the balance of gravel banks and braids, and water colour and movement that underpin the visual experience of the river are not expected to be noticeably affected under the Scheme. Kayakers paddling Morgan Gorge (within the abstraction reach), will be the most directly affected since they are the principal group of people who would see the differences in water levels within the river from sections within the abstraction reach.

There would be limited visual change in the appearance of the river downstream of the Power Station, particularly around the modified Waitaha Valley down to its mouth.

Based on this, while the section of the river with reduced flows (abstraction reach) will still have a natural appearance, the Scheme will change the perceptions of the Waitaha River as a natural wilderness river for those people who pass the banks of the river in front of the Power Station (either in a kayak or those that walk along the rocky river edge) or cross the swingbridge that are familiar with the river's natural flows. These people will understand that the river flow is modified. The **perceptual aspects of natural character** on the natural elements, patterns and processes on the reduced flow regime, for those persons **moderate**.

During a circuit trip or an equipment malfunction when the turbine stops running, a by-pass valve will start releasing water to maintain water discharge (10 cumecs) from the Power Station. While the by-pass valve is open the generating equipment will also go into overspeed and continue to pass 40% of flow. This will likely occur about six times per year, for one hour on average, due to weather events causing a fault on the transmission network, or because of an internal plant/machinery malfunction. Subsequently, there will be a plume of water released in the tailrace direction approximately 100 m long, 40 m tall and 36 m wide. A siren will also sound, warning of this occurring. This will amplify perceptual aspects of natural character effects to a **high** adverse degree, during this temporary and locally focussed procedural event.

Based on this, it is considered that coupled with the reduction in flow, and infrastructure associated with the Headworks and Power Station Site, the overall adverse effects to natural character on this stretch of the Waitaha River are **moderate-low**.

Local Effects: Headworks Site

Concerning local **natural character** effects, the weir and intake structure will change the natural river flows through the Morgan Gorge. Whilst the majority of the infrastructure at the intake will be underground, the top of the weir, headworks access portal, short access road to the riverside and

short access road to the Construction Staging Area 1, will be visible. The intake structure will often not be visible and the intake portal will be submerged. As a result, the natural character of this part of the Upper Waitaha Catchment will be modified from its natural state by the introduction of these structures and change in the river's local morphology.

Due to the dynamic nature of this river and the influence the river has had on sculpting the landscape, the physical effect of the weir and intake structures on the natural character will be localised. Periods of freshes and floods will continue to occur at reasonably regular intervals, meaning that water will quickly accumulate for short periods at the entrance to the Gorge, often submerging the entire intake structure. Sedimentation and river transportation of sediments will continue to occur through the gorge. Natural aggradation of sediment would occur relatively quickly behind the weir and a new equilibrium reached. However, after that time the weir would have little, if any effect on water flows or sediment transport. The processes that formed Kiwi Flat will continue to occur. Ongoing maintenance work in the river will involve an excavator clearing boulders and river gravel to ensure that river flows towards the intake and sluice gate.

Kōaro will also be able to travel through the abstraction reach. The **Sediment Report**[8] outlines that the Scheme will not alter the natural processes and fluvial features or physical characteristics of the river, particularly through the abstraction reach. This is because the large boulders within Morgan Gorge and the 'rock garden' downstream of the gorge and immediately upstream of the Power Station Site have low mobility (i.e. do not move much even during high floods) therefore finer material that is generally supplied at rates less than the river's capacity to transport such material overpasses these obstacles. River bedload is understood to remain stable through the abstraction reach.

The natural character of this part of the Upper Waitaha Catchment will be modified from its natural state by the introduction of these structures and roads and change the river's local morphology.

Based on this, and the findings in the previous sections of this report, the natural elements, patterns and processes of the proposed flow reduction through the abstraction reach will be locally affected to a **moderate to low** degree. With the additional physical elements present (intake and weir structures), this natural character effect is amplified to **moderate-high** at the localised Headworks Site. The river will continue to sculpt and erode the landscape, however the presence of the weir, intake structure, headworks access portal and associated short access roads will erode the local natural character values of the entrance to Morgan Gorge.

For **landscape,** as with natural character, the majority of the infrastructure associated with the Headworks Site will be subterranean. Permanent 'above ground' landscape effects will arise from the intake structure, the weir, the headwork access tunnel and short access road.

The principal factor to affect the landscape characteristics of Morgan Gorge will be the introduction of the weir and the reduced water flow. The infrastructural components of the Scheme will be at the entrance of the gorge and will not directly affect its main bulk; however, they will affect the natural aesthetic coherence of the entrance to Morgan Gorge. Other characteristics such as the gorge's internal vertical, river sculpted walls and the presence of the Waitaha River Hot Springs will remain unchanged. **The effects of the Scheme on Morgan Gorge** will not affect the overall biophysical, associational and sensory values of the gorge to a significant degree and, therefore, **will not reduce its 'outstandingness' as a feature within the Upper Waitaha Catchment Landscape**.

The proposed structures have been designed carefully, to respond to the highly natural landscape. The weir will appear low across the river during normal and low flows and be almost submerged during high flows. The intake structure will, at times, not be visible with the intake portal submerged. The Headworks access portal and associated access road will be most visible, however these will be integrated into the rock as much as possible, where lichen, moss and ferns will be encouraged to grow to further reduce the visual presence of the Scheme.

[8] Sediment report, Section 3.1.

Based on the permanent infrastructure associated with the intake, and how it affects the local landscape values, there will be **moderate-high** landscape effects at the Headworks Site. There will be a sense of reduced naturalness, reduced wildness and reduced sense of remoteness due to the presence of the Scheme, however this has been designed to reflect those landscape values as much as possible and prevent potential higher adverse effects.

For **visual amenity** aspects at the Headworks Site, the low profile of the weir, the rapid up-river deposition of gravel infill to its top level and relatively small scale of the intake structure and frequent submersion, will restrict to certain degrees its visibility from the walking track. The vast scale of the Upper Waitaha Catchment also severely restricts opportunities to clearly see the Headworks Site. The principal view towards the weir and intake structure will be from the river itself, close to Morgan Gorge, from the swingbridge and from one or two locations along the walking track, within the lower parts of Kiwi Flat.

The Scheme would introduce semi-industrial type features into a landscape virtually devoid of modification. From a close-up vantage point next to the river on the true left bank, (at approximately 60m and the point where the track starts to climb to the swingbridge), such as from **IN-1** (see Graphic supplement) the headworks access portal and access roads would be the most visible, along with the intake structures and weir as they are seen by walkers and kayakers within the river. This current design is considered a visual improvement from the previous design, where the intake portal was visually present in the rock above the intake. This is now submerged. The remaining parts of the Scheme will be largely subterranean and therefore not visible. The design will also provide for safe portage around the structure for kayakers and a launch spot further downstream. Based on this, the visual effect from this viewpoint would be **moderate**.

From the swingbridge, the Scheme would introduce semi-industrial type features into a landscape virtually devoid of modification. It would be seen (aerially) as part of the entrance to Morgan Gorge. Although sometimes submerged during high flows, based on this, the visual effects from this viewpoint would be **moderate-high**. This is depicted on **IN-2** (see Appendix 27B Graphic Supplement).

From distances beyond the immediate vicinity of Morgan Gorge, such as close to Kiwi Hut (at approximately 1km), the Scheme would not be noticeable, and would be very difficult to see, as for most of the year, the intake structure and weir would be seen against a dark, rocky background in shade. From these distances (i.e. approximately 800 m to 1km), the intake structure and associated temporary backed-up water (at 5.8 cumecs) will not be discernible. Views from Kiwi Hut towards the intake would be curtailed by intervening topography and vegetation. Based on this, the visual effects from these more distance viewpoints would be **low**.

In terms of **construction effects**, there would be some local disturbance, however, this would be temporary over 3-4 years. Construction of the weir and intake will involve the use of helicopters. The degree to which these are used will depend on the final plans for the tunnel and degree of access for machinery.

Some investigative geotechnical drilling will be one of the first activities to occur at the Headworks, involving up to six vertical locations and one horizontal drilling location in total. Each borehole will be between approximately 20m and 250m in length, and some limited vegetation clearance may be required around each borehole drill site. The establishment of the Construction Staging Area 1 site will follow and will support the geotechnical drilling with a range of temporary structures and activity areas, including a helipad (for the Power Station), and emergency hut, amenity buildings, laboratory geotechnical testing and fuel tanks. Further, a pump site, taking up to 50 litres of river water per minute will be required adjacent to the Headworks site for the drilling rig.

Construction Staging Area 1 will be located on a low alluvial flat upstream of the tunnel portal entrance at the lower Kiwi Flat area, which will also require the formation of an approximately 140 m of road. The area required for this staging area will be 0.7 hectares at a maximum. This area will act as a storage location for machinery and any temporary stockpiling and will be difficult to see due to the vegetative screening. A heli-pad will also be located within this area. Following construction, all

temporary areas, including the small access road to Construction Staging Area 1 will be removed. Existing vegetation between this staging area and the river will be retained, as much as practicable to provide screening. Natural regeneration after site treatment such as scarification of compacted surfaces and spreading/distribution of any accumulated organic soil material will be relied on for rehabilitation as outlined within the Landscape Management Plan, following construction (and in consultation with DOC).

Spoil from the tunnel excavations will be initially stockpiled within the Power Station Site then transported onto adjacent privately owned land where it will be used to develop and improve existing farmland. River flows through the construction period will be closely monitored, both upstream at the intake and downstream of the construction areas.

The construction effects of the weir, intake and associated intake access road and headworks access tunnel at the Headworks Site will occur within an area previously unmodified. The introduction of heavy machinery and earthworks will erode the remote and natural values of the area. The construction activity will, however, be confined to a limited footprint (approximately 0.7 hectares) within a small area of the Valley, would be partly screened by existing vegetation and will be temporary.

Any lighting will be primarily associated with the tunnelling phase at the portal, which will occur throughout a 24/7 period. Where practicable, lighting will be colour rated to 3000k and designed to limit upward light/light scatter

Construction effects will affect landscape values, notably those remote, wildness and naturalness values. These values will be affected by the presence of machinery, helicopter noise, blasting and stockpiling. Natural character effects will be adversely affected, through the temporary in-river works and construction of the tunnels and weir/ intake structures. Visually, this will appear as a local node of industrial-type activity.

During operation, there will also be the need for maintenance work to occasionally clear gravel and boulders within the river at the intake/ sluice gates. This will involve an excavator within the riverbed removing debris that has washed down from the catchment, and not involve full channel reprofiling. Materials extracted from the intake/ sluice gate areas will remain in the riverbed, moved over to the true left, where they may remain or be re-entrained by large flows and passed over the weir.

Any other planned maintenance at the intake will be undertaken during the summer months (January – March) in low flows and outside of the who breeding season of August – December.

Based on this, the landscape, natural character and visual effects on the construction of the Headworks Site will be **high** however, restricted to a small area on a temporary basis.

Local Effects: Power Station Site

From a **local natural character** perspective, all components of the Scheme in this section of the river are contained within the river margins or banks of the Waitaha River, with the Power Station occupying a raised river gravel bank, partially covered with indigenous shrub hardwoods, tree ferns, monocots, ferns and introduced grasses and broadleaved herbaceous species.

The Power Station will be located on a concrete raised foundation, however much of the infrastructure associated with the Power Station will be located below ground. New built forms will be present on the concrete foundation. As such, the natural character of the raised river gravel bank will be altered, where natural elements, patterns and processes will be locally eroded.

Extending from the Power Station will be the tailbay for approximately 16 m and be approximately 15 m wide, with a depth of 8 m. The establishment of the tailrace will require the removal of a portion of the rocky Waitaha riverbank and riverbed. Alluvial plant species will also be disrupted. The tailrace water will enter the Waitaha River at a rate determined by what the take is, up to the proposed maximum of 23 cumecs. Natural character effects at the outfall will relate to the re-entry of the

diverted water back into the river. The tailrace will be angled along a natural depression within the alluvial gravel bank to avoid significant earthworks. A low weir located at the downstream end of the tailrace provides the elevation change for a drop into the river to prevent predatory fish from entering the tailrace. Boulders from the river will be placed in this area, to provide further protection and to better naturalise this part of the tailrace as it enters the Waitaha River. Comprehensive rehabilitation is proposed on the gravel bank.

Work is also required to stabilise the rocky cliff behind the Power Station. This will take the form of a wingwall, as well as rock stabilisation. Opportunities to encourage lichen, mosses, ferns and other local vegetation will be designed into the fabric of the structure, to blend this in with the green cliff wall behind. Refer to the Landscape Management Plan.

A concrete based ford or culvert will be required where the road crosses Alpha Creek . It is envisaged that some vegetation removal will be required during the construction of riverbank bunds to protect the access road. Some stop bank protection will also be required to the Power Station side.

The Power Station will introduce new, constructed elements into a currently undeveloped part of the Waitaha River. This will represent a modification of the natural elements, patterns and processes at this localised area. The Power Station (and tailrace) will artificially modify the riverbank. Landscape restoration techniques will be employed to ensure that river boulders are naturally distributed and assist in providing a natural 'edge' to the structures via visually softening. New native planting will also assist to integrate the Power Station Sites into its location. As a result, it is considered that **the permanent natural character effects at this localised PowerStation Site are assessed as being moderate-high**.

From a **local landscape** perspective, there will be visual and physical changes to the gravel bank adjacent to the Waitaha River and to the riverbed of the Waitaha River. The Power Station (and switchyard) will require a footprint of approximately 0.70 hectares with a further 4.0 hectares for the main Power Station access road and transmission line[9]. A raised platform on which the Power Station will sit, will be rock-armoured, using river rocks in a natural way.

The built component of the Power Station Site (i.e. the Power Station building and switchyard infrastructure) will be the most visual components of the area, along with the raised concrete foundations, portal and wingwall and tailrace. The switchyard will comprise an area of 25 m by 15 m and be fenced, with 1 transformer (of up to 66 kV), and transmission line infrastructure for connection to local distribution at the State Highway. The maximum height of the poles in the switchyard will be no more than 15 m.

The location of the Power Station is located within the ONL; however, it is not located within the most remote and most natural parts of the ONL. The Power Station is located close to the border of the Lower Waitaha Catchment where there are modified paddocks, on a raised river gravel bank, partially covered with indigenous shrub hardwoods, tree ferns, monocots, ferns and introduced grasses and broadleaved herbaceous species. Natural bush extends around the eastern extent of the Power Station Site, and on the opposite side of the river. The mountainous landscape at this part appears less enclosed, and more open than that further south, retaining a relationship with the openness of the modified Valley further north.

The Scheme will modify this natural area, by introducing built forms and structures uncharacteristic to this setting. The presence of the Scheme in this location will extend rurally based activities into the more natural setting of conservation land. Whilst landscape values, such as wildness, remoteness and naturalness will be affected, these will be localised to the gravel bank. Efforts to visually integrate the Scheme into the landscape, such as careful siting, dark building colours, low building profile and vegetated walls, assist to reduce potentially larger landscape effects. The river will continue to form an important and focal part of the landscape, along with the vegetated river margins and smaller watercourses draining the hillsides. The proposed Power Station will form a small incursion into the natural landscape, with its effects being reasonably well contained. Occasionally, plumes of water up

[9] Which extends to Macgregor Creek (Source: Westpower Project Description).

to 40m in height released from the by-pass valve will be noticeable from close to the Power Station, however these are local to the Power Station Site, rare and temporary.

Although there will be some vegetation loss, mostly associated with the alignment of the main access road, and will adversely affect some landscape values, including wildness, remoteness and naturalness values, adverse **landscape effects** at a local scale are **moderate**.

From a **visual amenity** perspective, there are a number of locations where the Power Station could be viewed from, but mainly these will be from the existing track (from an elevated position immediately behind the Power Station Site and as the existing track emerges from the steep descent to the river), or from the river and its immediate margins. Visually, this part of the river corridor is reasonably contained, therefore there are no long-distance views obtained. The visual simulations produced as part of this assessment (refer to the Graphic Supplement) demonstrate that in most situations, the Power Station structures (including tailrace, switchyard and stop bank / rock prevention) will be well integrated into the riverine landscape, through careful placement of structures, growth of new planting and recessive colours used on buildings. A newly aligned part of the track, which is partly illustrated on **Figure 10** and more comprehensively on **Figure 8A** of the Graphic Supplement extends from Alpha Creek slightly away from the river and within existing bush, connecting with the existing track to the north, at the river, therefore preventing opportunities for close up views of the Power Station to be obtained. Overall, visual effects from different locations on the existing track range from **moderate** at near-distance views, to **moderate-low**. Closer to the river, such as in a kayak, views will appear at a lower elevation, and range in visual effect from **moderate-high** on the true left bank of the river, to **moderate**. The moderate-high effect is simply due to the proximity of the viewer to the Scheme, however this is reduced for users on the alternative walking track, where views would be more limited.

In terms of construction effects at the Power Station, these are assessed as being **high**, however these will be associated to a relatively small and discrete footprint and be temporary. Effects will arise due to the presence of construction-related machinery, excavation, temporary stockpiling, vegetation removal and effects within the riverbed.

As at the Headworks, some investigative geotechnical drilling will be one of the first activities to occur at the Power Station Site, involving up to six vertical locations and one horizontal drilling location in total. Each borehole will be between approximately 20m and 250m in length, and some limited vegetation clearance may be required around each borehole drill site. The establishment of the Construction Staging Area 2 site will follow and will support the geotechnical drilling with a range of temporary structures and activity areas, including a helipad site (for the Headworks), and emergency hut, amenity buildings, laboratory geotechnical testing and fuel tanks. Further, a pump site, taking up to 50 litres of river water per minute will be required adjacent to the Power Station site for the drilling rig.

Construction Staging Area 2 will be located on an alluvial flat between Alpha Creek and the portal. The area required for this staging area will be approximately 0.8 hectares. This area will act as a staging area for construction of the tunnels, Power Station, substation, lines for conveying electricity (construction and operation), and the access road. More specifically the area will be used for storage of materials and equipment, refuelling, small scale stockpiling of spoil, water treatment systems (including sediment protection ponds), temporary staff facility buildings. A heli-pad will also be located within this area. Following construction, all temporary areas, will be removed. Existing vegetation between this staging area and the rack will be retained, as much as practicable to provide screening. Active rehabilitation in the form of seeding or replanting on the upper terrace surfaces outside of the riparian margin is outlined within the Landscape Management Plan, following construction (and in consultation with DOC).

Occasionally, plumes of water up to 40m in height released from the by-pass valve will be noticeable from close to the Power Station, potentially amplifying visual effects of the Scheme to a wider area, however these plumes of water would be rare and temporary, lasting for one hour on average.

Any lighting associated with construction of the Power Station Site will be limited and associated more with vehicle truck movements on Waitaha Road. Lighting around the construction site will be localised, primarily at the portal. Most night lighting will occur during the tunnelling phase of operation. Where practicable, lighting will be colour rated to 3000k and designed to limit upward light/light scatter.

Concerning effects of the main Power Station access road (as it extends from the Power Station Site to the modified lower Waitaha Valley) and the transmission corridor, it is acknowledged that there will be a level of vegetation removal to facilitate this access corridor, which would be 17.5 m in width, reducing to 15m after construction ceases. Culverts and fords will be constructed over smaller watercourses between Macgregor Creek and the Power Station, and a bridge constructed over Granite Creek. A box culvert will be used over Alpha Creek. There will be approximately 23 waterway crossings in total between Macgregor Creek and the Power Station, which will take the form of concrete fords or culverts. The crossing of Macgregor Creek will be formed using insitu river gravels worked to form a smooth surface or use of Hynds Driftdeck[10] or similar. An alternative walking track immediately to the north of the Power Station site, extending from Alpha Creek northwards towards the stable tributary will lead walkers away from the river's edge for approximately 600m.

Based on the vegetation clearance, the establishment of the access road and visual presence of power poles and the powerline from the Power Station site to Macgregor Creek, there will be locally **moderate to high** landscape and natural character effects during construction, **reducing to low** as the vegetation matures to visually soften the route.

Up to 23,000m³ of gravel from the Waitaha River and spoil disposal areas will be required for the construction of the access road. Gravel will be locally sourced from within an area of the Waitaha River already consented to a third party for separate 'stone' removal activities. Areas where gravel extraction will occur will include:

- Beach areas at the Waitaha River north and south of the doughboy – by horizontally scraping off the dry gravel above the water level and away from the edge of the wetted area (approximately 23,000 m^3) and
- Spoil disposal areas on McLeans farm (up to 100,000m^3).

All extracted gravel areas within the Waitaha River will be naturally contoured to resemble a natural component of the river[11]. Due to the existing consent, adverse natural character effects relating to the sourcing of the gravel will be locally **low**.

Local effects – Spoil Disposal Area

Concerning the spoil disposal areas (approximately 17 hectares in total), there would be approximately 102,500 m³ of spoil to dispose of resulting from the underground works. Excess spoil will be utilised within the development earthworks areas where possible, or temporarily stockpiled before being transferred off conservation land and onto a paddock within the plains of the Lower Waitaha Catchment. The spoil would then be profiled, graded and compacted and grassed for grazing purposes. Any watercourses would be avoided. The total un-rehabilitated area of spoil will not be greater than 1 Ha at any one time and would not exceed 1m in height. Based on this, it is considered that the landscape and visual effects of the spoil disposal area would be **low**.

In terms of Construction Staging Area 3, this area will be approximately 3.2 ha. The site will be cleared, levelled and stabilised for use. Activities on the site will include main site administration,

[10] This is a form of river crossing, using concrete slabs which follows the profile of the watercourse, and provides a running surface for the traffic. The surface is raised typically by 600mm to provide generous openings to allow the passage of water at low flows. The drift deck comprises a series of inverted "u" shaped precast concrete elements, bearing on a concrete slab. The units extend the full width of a single carriageway, and butt together longitudinally across the stream bed, providing the running surface for the traffic (source: R4.2-Hynds-Driftdeck-System.pdf)

[11] And will be aligned with an existing gravel extraction resource consent (RC-2019-0037)

project management and staff facilities and buildings, storage areas for vehicles, machinery, infrastructure, machinery repair and workshop, a concrete batching plant, gravel screening; and a helipad. Gravel screening may also occur in an area of approximately 0.2 ha at the unused airstrip on the farm. Following construction, the land will be rehabilitated to pasture, in accordance with the requirements of and as part of, the farming operation. Based on this, it is considered that for the construction operations, the landscape and visual effects of the spoil disposal area would be **moderate**.

Local Effects: Access and transmission line north of Macgregor Creek

Immediately north of Macgregor Creek, the access road that connects onto Waitaha Road will extend through private farmland, and where practicable, will follow existing tracks or be aligned between differing paddocks. This road will be approximately 10m in width, with an operational corridor of 15m, and combined with the power lines extending from the Power Station which will connect with those on Waitaha Road. This is a modified working farm, and the presence of an additional metalled road will not affect the rural characteristics of the working farm. Visually this would be difficult to see from Waitaha Road. It is proposed for up to 0.2 hectares of vegetation close to the doughboy to be removed as a result of the upgrade to the access road. As such, the landscape and visual effects are assessed as being **low** during the construction phase returning to **neutral** in the long term.

Concerning the upgrading of the transmission corridor through the Lower Waitaha Valley, this would essentially be replacing existing power poles and lines, with a slightly larger pole. The number of overhead wires would remain the same. There would be limited disturbance caused through this replacement as it extends from the upper part of the Lower Waitaha Valley towards an area close to the State Highway. The transmission line would extend through predominantly a modified landscape, within the road reserve, and enter a small area of vegetation close to the State Highway. It is anticipated that no vegetation will be required to be removed to facilitate the upgrade in this area, where required. As such, the landscape and visual effects are assessed as being **low** during the construction phase returning to **neutral** in the long term.

Adverse Effects Management Recommended

Further detail of the proposed management for the Scheme's adverse effects is provided in the assessment contained within Section 4 of **Appendix A** and is summarised in **Table 2** below. Many of the recommendations and techniques are also outlined further within the Landscape Management Plan. Essentially, the adverse effects created by the Scheme are difficult to mitigate, however, a key emphasis of the design of the project has been to avoid significant effects on natural character, landscape and amenity values (as set out above) and then minimise where practicable effects on those values for instance:

- Reducing the number and size of portals and positioning of the intake tunnel portal below the water level to avoid visibility.
- Aligning the Headworks access portal and intake structure with the striations of the surrounding rock.
- Avoiding significant cuts and battered slopes for the access tracks at the Headworks including avoiding their proximity to riverbank features; and keeping works in the bed of the river to the minimum required to construct and maintain the road.
- Accelerating the weathering of the intake and access portal by the use of rough-hewn concrete where plants and mosses are able to grow.
- Careful placement following construction of rocks and boulders to assist in integrating the intake structure and portal into the natural landscape to respect the natural characteristics of the area.

- Undertaking additional engineering within the portal to avoid the need for structures such as a canopy portal cover to prevent rock fall.
- That the built forms at the Power Station use dark recessive colours and material, to assist with blending them into the natural landscape.
- Minimising the removal of indigenous vegetation and to retain as much of the more mature areas of planting on the raised gravel bank.
- A comprehensive planting plan is developed at the Power Station Site.
- Ensuring that active and passive rehabilitation measures are effective, notably for the construction sites.

Irrespective though, there are some residual effects that locally affect the natural and wild characteristics that are, practically impossible to mitigate, due to human interventions in a highly natural landscape.

Table 2 - environmental effects on natural character, landscape and visual amenity associated with each phase of the Scheme (construction and operational), the suggested approaches to manage these effects, and effects after management measures have been applied.

Table 2 - Environmental effects on landscape (visual) and natural character associated with each phase of the Scheme (construction and operational), the suggested approaches to manage these effects, and effects after management measures have been applied.

Scheme phase	Environmental effects (positive and adverse effects)	Assessment of effects	Recommended effects management	Residual effects post mitigation
Construction effects	Natural Character (Headworks Site and Power Station and access road to Macgregor Creek) Adverse	High *(Significant),* but temporary and localised	In accordance with the Project Description the project includes: - A contained footprint and careful placement of infrastructure above ground. - Careful sedimentation control during all Streamworks. - Retention of as much existing vegetation as possible, especially around construction areas. - Limiting transportation movements as much as practicable. - Limited lighting. - Limit stockpiling of debris.	Moderate-High *(More than Minor)*
	Landscape (Headworks Site and Power Station and access road to Macgregor Creek) Adverse	High *(Significant),* but temporary and localised		Intake: Moderate-High *(More than Minor)* Power Station: Moderate *(More than Minor)*
	Visual amenity (Headworks Site and Power Station and access road to Macgregor Creek) Adverse	High *(Significant),* but temporary and localised		Low *(Minor)*
	Local Effects – Spoil Disposal Area (for landscape, natural character and visual amenity)	Moderate *(More than Minor)*	In accordance with the Project Description the project includes: - Confined location away from main viewing road.	Low *(Minor)*
	Local Effects – Access and transmission line north of Macgregor Creek (for	Low *(Minor)*	In accordance with the Project Description the project includes: - Limited vegetation removal	Neutral

Scheme phase	Environmental effects (positive and adverse effects)	Assessment of effects	Recommended effects management	Residual effects post mitigation
	landscape, natural character and visual amenity)		- Visually will appear like an existing farm track.	
	Transmission Corridor upgrade through Waitaha Valley (on landscape and visual amenity)	Low *(Minor)*	In accordance with the Project Description the project includes: - Limited vegetation removal.	Neutral
Operational effects	Reduced River flow (natural character through abstraction reach) Abiotic and Biotic Adverse Effects Perceptual Adverse Effects	Abiotic & Biotic Effects: Low *(Minor)* Perceptual Effects: Moderate *(More than Minor)*	In accordance with the Project Description the project includes: - A contained footprint and careful placement of infrastructure above ground. - Low level weir design. - Controlled low flows. - Controls to allow native fauna to still utilise river. Additional mitigation measures to include: - Careful placement of river boulders/ rocks at head works and power station to assist integrate structures into natural landscape.	Abiotic & Biotic Effects: Low *(Minor)* Perceptual Effects: Moderate *(More than Minor)*
	Broadscale Natural Character (Headworks & Power Station)	Moderate Low *(Minor)*	In accordance with the Project Description the project includes:	Moderate Low *(Minor)*
	Broadscale Landscape	Moderate Low *(Minor)*		Moderate Low *(Minor)*

Scheme phase	Environmental effects (positive and adverse effects)	Assessment of effects	Recommended effects management	Residual effects post mitigation
	(Headworks & Power Station)		- A contained footprint and careful placement of infrastructure above ground. - Controlled low flows through the abstraction reach, to ensure a 'flow' is always apparent. - Low level weir design and access for native fauna and safe portage for kayakers. - Retention of as much existing vegetation as possible. - Limit stockpiling of debris. - Dark colours for buildings. - Controlled low flows. - No lighting during operation except during unplanned shutdown requiring night-time staff call out / repairs. Additional mitigation measures to include: - Supplementary planting around the Power Station site. - Careful placement of river boulders/ rocks at headworks and power station to assist	
	Broadscale Visual (Headworks & Power Station)	Low *(Minor)*		Low *(Minor)*

Scheme phase	Environmental effects (positive and adverse effects)	Assessment of effects	Recommended effects management	Residual effects post mitigation
			integrate structures into natural landscape. - Further landscape mitigation techniques are outlined within the Landscape Management Plan.	
	Local Natural Character (Headworks)	Moderate-High *(More than Minor)*	In accordance with the Project Description the project includes: - A contained footprint and careful placement of infrastructure above ground. - Low level weir design and access for native fauna and safe portage for kayakers. - Controlled low flows. Additional mitigation measures to include: - Careful placement of river boulders/ rocks at head works and power station to assist integrate structures into natural landscape. - Further landscape mitigation techniques are outlined within the Landscape Management Plan.	Moderate-High *(More than Minor)*
	Local Landscape (Headworks)	Moderate-High *(More than Minor)*		Moderate-High *(More than Minor)*
	Local Visual (Headworks)	Moderate-High (near) *(More than Minor)* Neutral (distant)		Moderate-High (near) *(More than Minor)* Neutral (distant)

Scheme phase	Environmental effects (positive and adverse effects)	Assessment of effects	Recommended effects management	Residual effects post mitigation
	Local Natural Character (Power Station and transmission line/ access road from Power Station to north of Macgregor Creek)	Moderate-High *(More than Minor)*	In accordance with the Project Description the project includes: - A contained footprint and careful placement of infrastructure above ground. - Retention of as much existing vegetation as possible. - New planting around Power Station. - Where practicable, encourage a green wall/ use of existing rocks for rock stabilisation. - Limit stockpiling of debris. - Dark colours for buildings. Additional mitigation measures to include: - Supplementary planting around the Power Station site. - Careful placement of river boulders/ rocks to assist integrate structures into natural landscape. - Further landscape mitigation techniques are outlined within the Landscape Management Plan.	Moderate-High *(More than Minor)*
	Local Landscape (Power Station and transmission line/ access road from Power Station to north of Macgregor Creek)	Moderate *(More than Minor)*		Moderate *(More than Minor)*
	Local Visual (Power Station and transmission line/ access road from Power Station to north of Macgregor Creek)	Moderate-High (near) – *More than Minor*, Low (distant) - *Minor*		Moderate-High (near) – *More than Minor*, Low (distant) - *Minor*

Scheme phase	Environmental effects (positive and adverse effects)	Assessment of effects	Recommended effects management	Residual effects post mitigation
	Local Effects – Spoil Disposal Area (for landscape, natural character and visual amenity)	Low – *(Minor)*	In accordance with the Project Description the project includes: - The spoil would be profiled, graded and compacted and grassed for grazing purposes. Any watercourses would be avoided. - Defined areas of gravel extraction and careful regrading of riverbed to natural forms when extraction complete	Low
	Local Effects – Access and transmission line between Macgregor Creek and Waitaha Road (for landscape, natural character and visual amenity)	Neutral	In accordance with the Project Description the project includes: - Transmission corridor and access track aligned (where possible) together. - Limited vegetation removal.	Neutral
	Transmission Corridor upgrade between Mclean Farm and Waitaha substation (on landscape and visual amenity)	Neutral	In accordance with the Project Description the project includes: - Replacement poles to be located along this road corridor. - Very limited to no vegetation removal.	Neutral

Summary of the Assessment

The Waitaha Scheme involves the construction of a low-profile weir immediately upstream of Morgan Gorge, a tunnel through the schist rock north of the gorge, an intake structure (which is partly submerged with the portal fully submerged) and a small Power Station and switchyard immediately downstream of the gorge. The Scheme will also require a 15 m (average) wide access road and transmission corridor extending from the farmed Waitaha Valley to the Power Station. The flow in the river would be reduced between the intake at the top of Morgan Gorge and where the water re-enters the river via the tailrace, below the Power Station. This section of river abstraction reach is approximately 2.5 km long. It is proposed that the residual flow at the intake be 3.5 cumecs. A Landscape Management Plan supports appropriate conditions to ensure that construction methods and materials where feasible will minimise effects on the environment and enable recolonisation of vegetation.

Concerning RMA matters, the project triggers Section 6(a) natural character and Section 6 (b) ONL, which are matters of national importance. Section 7 (c) and (f) are also relevant considerations under the RMA. This assessment concludes that there are adverse effects to the Natural Character, Landscape and Visual Amenity values, at a variety of scales. The adverse effects vary from low and moderate-low at a broad scale to moderate- high (and high for construction) at a more localised scale. The adverse effects would therefore be *'more than minor'* in the RMA context at the local scale and to some values (notably remote) at the broader scale.

The Power Station and Headworks Sites are classified as an ONL within the proposed TTPP, and therefore subject to a range of objectives and policies within the proposed TTPP and the RPS and WDP. Those specific landscape values are identified and amplified further in a local context. In terms of natural character, the whole Upper Waitaha Catchment contains very high, near pristine levels of natural character, due to the general lack of human-induced modification. However, the Scheme area is not rated at the highest end of the spectrum, due to a number of modifications, including pests, evidence of tracks, huts and a swingbridge and its popularity for hunting and kayaking. There is a geothermal water take, located near Moonbeam Hut on the Waitaha River and a further water take, for geothermal purposes on the Waitaha River close to Macgregor Creek as well as a gravel/stone extraction permits, close to Macgregor Creek.

In terms of effects, the Scheme will result in varied adverse effects to the landscape values, the visual appearance and natural character condition of the surrounding environment. Specifically, this will result in:

- **Low to moderate** adverse effects on landscape values and the natural character at the broader scale, and **low** adverse effects on visual matters. This is principally due to the small and defined footprint of the Scheme. Remoteness values would be affected, however, as noted, the Scheme is not occurring within a National Park, one of New Zealand's highest rated conservation areas nor on a river with a Water Conservation Order. There are areas of modification, such as an existing bridge, tracks and huts, as well as some water take, and gravel extraction permits. The area is not actively managed by DOC, so pests are present. Helicopters visit the Upper Waitaha Catchment, dropping off hunters and kayakers to a range of destinations within the Upper Waitaha Catchment. The Scheme is also in close proximity to the boundary with the Lower Waitaha Catchment, and away from the truly wild and more remote areas further upstream beyond Waitaha Gorge.
- With respect to local effects to the natural character through Morgan Gorge (the abstraction reach) associated with reduced flow, there will be **low** adverse effects to the abiotic and biotic natural character aspects of the Waitaha River, and **moderate** adverse effects relating to the perceptual attributes of natural character.
- At the local scale,

- The Headworks Site, would have **moderate- high** adverse landscape effects and **moderate -high** adverse natural character effects. At the Power Station Site, there would be **moderate** landscape effects and **moderate-high** adverse natural character effects.
- There would be **moderate-high** adverse visual effects at near-distance (within approximately 800m to 1km) vantage points at the Headworks Site, and at greater distances, this reduces to a **neutral** (or no effect). At the Power Station Site, there would be **moderate-high** adverse visual effects at near-distance locations, reducing to **moderate-low** at more distance locations.
- During construction, there would be **high adverse levels** of effects to the landscape values, the natural character condition and visual amenity.
- Concerning the Power Station access road and transmission route extending from the Power Station into the Lower Waitaha Valley (and connecting with the existing powerlines) including the access road on private land (and traversing Macgregor Creek), there will be **moderate to high** landscape effects during construction, **reducing to low** as the vegetation matures to visually soften the route.
- Concerning the spoil disposal area, the landscape effects of the spoil disposal area would be **moderate** during construction, reducing to **low**.
- Concerning the new access road and transmission corridor through the working farm from Macgregor Creek to Waitaha Road, the construction effects are **low**, reducing to **neutral.**
- Concerning the upgrading of the transmission corridor through the Lower Waitaha Valley, the landscape and visual effects are assessed as being **low** during construction, reducing to **neutral**.

Under the various RMA planning documents, the landscape in which the Scheme is located within is an ONL. Due to the range of adverse effects, overall, the adverse effects would be *'more than minor'* in the RMA context at the local scale and to some values (notably remote) at the broader scale. An analysis of the objectives and policies of the relevant plans (West Coast Regional and Westland District) is contained below.

Despite the effects being considered *'more than minor'* overall, the Scheme satisfies the matters set out within Section 6(a), 6(b), 7(c) and 7(f) and is not inappropriate use and development in the context of sections 6(a) and 6 (b).

The RPS looks to protect the natural character of the region's rivers from inappropriate development, while providing for appropriate subdivision, use and development to enable people and communities to maintain or enhance their economic, social and cultural wellbeing. Section 7B of the RPS, in a similar vein, looks to protect the values, which together contribute to a natural feature or landscape being outstanding, from inappropriate subdivision, use and development.

For natural character, the natural elements, patterns and process will still continue following implementation of the Scheme. Long-term effects of the flow regime changes will include lower flows for longer periods of time, when compared to the natural river state. Natural high flow freshes will continue to occur, although smaller freshes will be reduced to a greater degree. For landscape, despite the Scheme being in an ONL, it is considered the overall values will be retained.

Despite the Scheme adversely affecting some localised landscape values, none of the identified values will be lost, rather there will be a reduction to some values. This will not remove the ONL status from this landscape. The extent of the effects is localised, and the project will be carefully designed to avoid permanent significant effects.

With respect to the TTPP landscape objectives and policies, the Scheme will not create significant adverse effects on the ONL. It is recognised that given that the Scheme, as a new renewable run-of-

the-river hydro scheme needs to occur on a river, the emphasis is on avoiding significant adverse effects. The long-term landscape effects at the intake are at most moderate-high, and those at the Power Station are moderate. This level of effect is not significant. Whilst there will be a higher level of effect during the construction phase, these will be temporary and remedied through careful removal of machinery and construction infrastructure, temporary stockpiling and new planting. Despite localised areas experiencing high levels of adverse effects, these are for a finite duration.

For natural character under the TTPP, these effects are not significant. The river will still maintain a natural appearance and will still appear to have natural freshes and floods. Higher level effects are localised and associated with the built parts of the project as they intersect with the river and the natural environment. Despite high effects occurring through the construction phase at the Headworks and Power Station Sites, these effects are temporary and localised. New planting around the Power Station Site will assist to improve levels of natural character on the raised gravel area.

The WDP includes specific provisions with respect to landscape in general in Part 3.10 (Objectives) and Part 4.8 (Policies). The Scheme is consistent with the broad-based landscape objectives outlined in the WDP. Due to the small footprint of the Scheme within the mountainous landscapes of the Westland District, the Scheme does not impinge on the integrity of the broader district landscape values, that areas of new planting are proposed, and that the infrastructure proposed will be small, low profile and integrated with the natural environment.

The iterative design process and mitigation measures proposed enable the Scheme to sit well within its landscape and to respond to its setting and to acknowledge the outstanding landscape, natural character and visual amenity values the Upper Waitaha Catchment holds by avoiding potentially significant effects. Overall, the Scheme is appropriate with respect to natural character, landscape and visual amenity despite the fact that at more local levels the natural character, landscape and visual amenity effects are assessed as being moderate to high (or more than minor under the RMA). At a broader scale the effects are, at worst, moderate- low (or minor under the RMA). Conditions are recommended, including implementation of the Landscape Management Plan, to avoid effects being to a degree or scale which are inappropriate to the landscape, features and setting within which the Scheme is located.

Appendix A: Landscape Effects Assessment

1.0 Introduction

Boffa Miskell Limited (**BML**) was recommissioned by Westpower Limited in 2024 to update the *Natural Character, Landscape and Visual Amenity Effects Assessment*, prepared in March 2014 to support Westpower's application for concessions under the Conservation Act 1997. This updated assessment reflects Westpower's commitment to submit their run-of-the-river hydroelectric generation scheme on the Waitaha River, approximately 60 km[12] south of Hokitika, through the new Fast-track Approvals Act 2024. BML has had input into a separate **Landscape Management Plan** accompanies the application.

The Scheme will involve the construction of an intake and a low-profile weir immediately upstream of Morgan Gorge at the Headworks Site, a 1.5 km pressurised tunnel through the schist rock north of the Gorge and a small Power Station and a switchyard immediately downstream of the Gorge. The Scheme will also require a 15 m wide (average) access road and transmission corridor extending from the Power Station to Macgregor Creek to enable a connection to the existing network at the southern end of the farmed Waitaha Valley. As part of this, the existing transmission corridor which runs to the State Highway would also be upgraded. The flow in the river would be reduced between the intake at the Headworks Site and where the water re-enters the river via the tailrace, below the Power Station (the abstraction reach). The abstraction reach is approximately 2.5 km long. It is proposed that the minimum residual flow below the intake be 3.5 cumecs, which will slightly increase over the abstraction reach due to contributions from side streams (first by Anson Stream, 350 m downstream of the intake, then by Glamour Glen, 660 m downstream of Anson Stream). The residual flow below Glamour Glen would be at least 4.2 cumecs for 50% of the time. Upgrades to the powerlines and tracks within the lower modified Waitaha Valley would also be required. The extent of works is illustrated within **Figure 1**: Scheme Location.

1.1 Background

BML have been involved within this project since 2008, when Frank Boffa, landscape architect at BML (at the time) provided a Scheme Options Selection Assessment Paper to the Westpower board (dated 2012). Following this, a comprehensive landscape assessment was prepared throughout 2013 and finalised in 2014. This was lodged with the Department of Conservation (**DOC**) in 2014 for a concessions approval under the Conservation Act 1987 and a hearing was held in 2016.

1.1.1 Preferred original 2012 Option

Preliminary work was undertaken to assess the location, portal arrangement and tunnel options comprising of two design scenarios.

The preferred option, which is the option that is broadly assessed for this application (noting there have been several changes (including significant ones) since 2012), is to create a run-of-

[12] Distance estimated using local roads.

the-river hydro scheme, which will involve the construction of a low-profile weir and intake structure immediately upstream of Morgan Gorge at the Headworks Site, a 1.5 km pressurised water tunnel through the schist rock north of the Gorge would convey water to a small Power Station and a switchyard downstream of the Gorge. The flow in the abstraction reach of the river would, as a consequence, be reduced from the intake to the Power Station. It is proposed that the residual flow below the intake be no less than 3.5 cumecs, which will increase over the abstraction reach due to contributions from side streams. For operational maintenance purposes, access between the Power Station Site and the Headworks would be via a separate access tunnel and there would also be a short access road between the upper access tunnel portal and the intake structure. The Scheme will also require a 15 m wide (average) access road and transmission corridor extending from the Power Station Site to Macgregor Creek to enable a connection to the existing network.

The principal reason for selecting the preferred water intake option at Morgan Gorge is that it had significantly fewer adverse environmental effects than the alternative option, which proposed to locate the intake at the bottom of the Waitaha Gorge. The Waitaha Gorge option also had a much longer access road within the Kiwi Flat area and required part of the river to be dammed.

In 2019, the concessions application was unsuccessful.

1.1.2 Design Review and Updates

In 2022, a review of the design of the Headworks was undertaken with an aim to reflect the advancements in design of the intake and access tunnel portals since the concession application was lodged. Updated visual simulations were produced to illustrate the smaller access portal entry proposed (3m by 3m). The portal entry proposed as part of the original application was 5m by 7.5m which was reduced due to smaller digger requirements.

The 2022 refined design continued to respect the natural characteristics of the area, aligning the portal entrances with the striations of the surrounding rock. Weathering of the intake and access portals was also detailed, illustrating how the use of rough-hewn concrete, where plants and mosses, are able to take hold, and successfully grow. Careful placement following implementation of the Scheme of rocks and boulders also assists to integrate the portals into the natural landscape. Ancillary structures, such as a canopy portal cover, to prevent rock fall, was not required, due to engineering within the portal that can be activated, when required. These 2022 design changes to the Headworks Site demonstrated a meaningful improvement to the intake design reducing the visibility of the portal entries and represents a lighter touch.

In early 2024, Westpower and their consultants met to explore the current proposal in a workshop in Christchurch. Further refinements to the Headworks and Power Station Site were discussed and represent the Scheme as it assessed for this application. The refined version of the design is assessed as part of this assessment, and this has resulted in some further modifications to the project. Key areas of change that affect landscape, visual and natural character matters include:

- Only one ‘visible’ portal required at the Headworks (a headworks access portal, now 5 m by 5 m) and no high-level intake required. The intake portal has been designed to be under the water level, therefore not visible. This has reduced further the visibility of the intake structure.
- A more compact design for the Power Station Site, meaning that the overall footprint is smaller than previously assessed.

The preferred option is referred to in this report as the 'Scheme'.

1.2 Methodology

This Landscape Effects Assessment (**LEA**) follows the concepts and principles outlined in Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines[13]. A full methodology is outlined in **Appendix 1** of this report. In summary, the effects ratings are based upon a seven-point scale which ranges from very low to very high.

Te Tangi a te Manu recognises the term 'landscape effects' as all-encompassing, and that visual effects and natural character effects are a subset of landscape effects. This assessment provides separate chapters to discuss natural character, landscape and visual effects, but is referred to throughout as LEA in accordance with the Guidelines.

It is noted that Te Rūnanga o Ngāi Tahu are the iwi and Te Rūnanga o Ngāti Waewae and Te Rūnanga o Makaawhio (together Poutini Ngāi Tahu) are the rūnanga who exercise tino rangatiratanga within, and are the kaitiaki of, the natural and physical resources within the West Coast including the Waitaha River.

Poutini Ngāi Tahu are project partners, have a financial interest in the Scheme and support the Scheme. Poutini Ngāi Tahu have chosen not to prepare a cultural impact assessment but have contributed to the preparation of the assessment on environmental effects and have provided a letter of support for the Scheme. On this basis it is understood that all potential cultural issues relating to landscape, visual and natural character effects of the Scheme have been adequately addressed.

Te Tangi a te Manu recognises that landscape assessment in Aotearoa New Zealand requires a bi-cultural approach, seeking alignment between Te Ao Māori and Te Ao Pākehā streams of landscape assessment.

1.2.1 Assessment Process

This LEA considers all aspects of the Scheme throughout construction and operation, including the effects of introducing the proposed structures that form part of the Scheme into the landscape and effects of water abstraction on the natural river flows in Morgan Gorge. The natural character, landscape and visual assessment methodology is outlined within **Appendix 1** of this report and summarised as follows:

- Familiarisation of the project proposal and background documents.
- Desktop review of the Existing Environment and Landscape Values. This included the review of the following documents:
  - Te Tai o Poutini: Natural Features and Landscapes: Outstanding Natural Landscape values.
  - Relevant Waitaha Hydro technical reports (see below) to gain an understanding of the ecology and natural science values of the area for the natural character assessment.
- Site visit to understand the Project Site, its context, and nature of existing views.

[13] Te Tangi a te Manu Aotearoa New Zealand Landscape Assessment Guidelines, July 2022

- Review of relevant statutory provisions.
- Assessment of landscape (including visual) and natural character effects.
- Recommended mitigation measures to avoid, remedy, and mitigate potential adverse effects.

To accompany this written assessment is a separately bound Graphic Supplement. The **Graphic Supplement** illustrates the Figures, plans and photographs of the Site and surrounding landscape and also contains seven **Visual Simulations.** The Visual Simulations illustrate both the Headworks Site and Power Station Site of the Scheme based on photographs taken adjacent to the Site. They are illustrative of what the Scheme may look like.

1.3 Data Sources

To assist in completing this work, a variety of baseline reports have been referred to, which have assisted to better understand various components of the existing environment. These include:

- The **Recreation Report**, (2025) prepared by Rob Greenaway and Associates.
- The In-Stream Habitat Flow Assessment **IFIM Report**, prepared by (2013) Cawthorn Institute.
- The **Freshwater Ecology Report,** (2025) prepared by EOS Ecology.
- The **Terrestrial Fauna Report** (concerning Bats and Birds and *Powelliphanta* land snails) (2025) prepared by Rhys Buckingham.
- The **Whio Report** (2025) prepared by Sustainability Solutions Ltd.
- The **Terrestrial Invertebrates Report** (2025) prepared by Richard Toft, Entecol Ltd.
- The **Hydrology Report**, (2025) prepared by Martin Doyle, Consulting Hydrologist.
- The **Sediment Report** (2025) prepared by Murray Hicks.
- The **Vegetation Report** (2025) prepared by TACCRA Ltd.

This assessment has been based on a Scheme design as outlined at the date of this report. This design was carried out by AusHydro with input provided by Westpower. This assessment was also based on project description information provided by Westpower, including the Access Road Maps.

1.4 Site visits and Photographic Record

Numerous Site visits have been undertaken as part of this project. Most recently, a visit to the Site and the broader area was undertaken by James Bentley, landscape architect and Corey Murray, visualisation specialist on 8 and 9 July 2024. James and Corey were accompanied by Silvie Saskova, Westpower representative and Jan Derks, terrestrial ecologist.

The team were flown into Kiwi Flat on the morning of 8 July 2024, after briefly stopping on the true left bank of the Waitaha River opposite the Power Station Site. After exploring Kiwi Flat and the entrance to Morgan Gorge, James and Corey commenced walking the track which extends over the Waitaha River at Morgan Gorge and towards the Power Station Site and the modified

Waitaha Lower Valley. The second day was explored in a vehicle, noting the Lower Waitaha Valley area and potential location for the new power poles and overhead electricity lines. These site investigations were confined to public roads where an appreciation of the broader landscape context could be gained, primarily of views from SH6. The weather for this Site visit was dry, overcast and with good visibility.

A Site visit also occurred in May 2022 to Kiwi Flat and the entrance to Morgan Gorge. This was attended by James Bentley and Corey Murray and numerous technical specialists associated with the Scheme. The main purpose of this visit, which was undertaken by helicopter, was to re photograph the portal area.

In 2013, two sets of Site visits also occurred, and these were the original Site visits undertaken for the initial application. One occurred in February 2013 and the other in August 2013. The February 2013 visit was undertaken by James, and accompanied by Rob Greenaway (Recreation Consultant), Dean Arthur (Abseil Specialist), Murray Hicks (Principal Scientist, Sediment Processes, NIWA) and Martin Doyle (Hydrologist). All attendees were flown into Kiwi Flat by helicopter. Rob, Dean and James proceeded to walk downstream along the true left of the Waitaha River, through Morgan Gorge to a point by Douglas Stream where a helicopter picked them up. As part of the walking trip, James and Rob assisted by Dean, abseiled into the Gorge to view the Waitaha River Hot Springs.

The subsequent August 2013 visit was attended by James and Corey to take photographs for the original visual simulations.

1.5 External Peer Review

Gavin Lister, a director and landscape architect of Isthmus, peer-reviewed a previous version of this report in 2014. Whilst this updated version has not been externally peer reviewed, the comments provided by Isthmus, in 2014, have been incorporated into this assessment. Gavin Lister was also central to discussions in 2022 when Westpower reviewed the design of the Headworks Site.

Whilst there were some subtle differences in opinion as to how landscape assessment is undertaken and values attributed, the authors of these reports are largely in agreement that the Scheme is appropriate. Much of this may now be addressed through advancements in landscape assessment processes, as outlined in Te Tangi a te Manu: Aoteraroa New Zealand Landscape Assessment Guidelines 2022, especially concerning incorporation of tangata whenua values.

2.0 Existing Environment

2.1 The West Coast Region

The West Coast Region *(Te Kaunihera Whakakotahi o Te Tai Poutini)* extends over a distance of 600 km from Kahurangi Point in the north to Awarua Point in the south[14]. It is bounded in the

[14] West Coast Policy Statement, Introductory statement to Chapter 2: The West Coast

east by the Southern Alps and in the west by the Tasman Sea and has a land area of 23,000 km², or 8.5% of New Zealand's land area[15].

The Region is characterised by dynamic tectonic activity, high rainfall and associated high energy fluvial processes, which has resulted in a diverse landscape of large mountains, numerous lakes, large rivers and coastal plains. **Figure 2: Land Cover of the West Coast Region** demonstrates that nearly two-thirds of the Region is mountainous and over three quarters consists of indigenous forest cover.

The West Coast Region is synonymous with dramatic and rugged landscapes with much of this contained within Conservation Estate. Iconic landmarks including *Aoraki*/ Mount Cook, the Pancake Rocks at Punakaiki and the southern glaciers are world renowned and dominate tourist literature of the Region. All of these 'icons' are managed within Conservation Areas. The extent of these Conservation Areas are illustrated on **Figure 3: Conservation Areas of the West Coast Region** which includes all land managed by DOC and illustrates that approximately 16% of the West Coast Region is of National Park status.

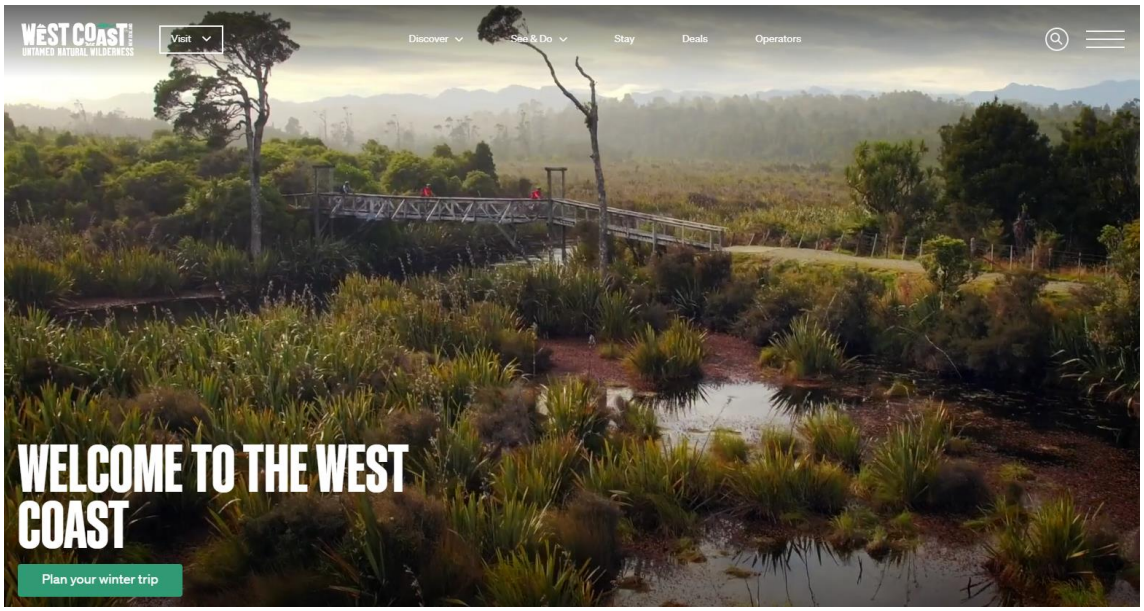


Image 1: The welcome page of www.westcoast.co.nz *celebrating the region's natural and cultural assets.*

The West Coast Region's economy has historically been focussed on the Region's natural resources, notably mining for coal and gold as well as for timber and dairying. Tourism is now an important and growing industry, and the selling point is the Conservation Estate and landscapes managed within them.

2.2 Westland District Landscape Context

The Scheme is located approximately 1 km east of the Alpine Fault, within the Waitaha Valley and within the northern half of the Westland District. This valley occupies a broad catchment extending inland to the Southern Alps. The Waitaha River is one of many West Coast rivers that drains the landscape to the west. The land east of the Alpine Fault is characterised by dynamic tectonic activity and associated high energy fluvial processes. The Scheme is located between Kiwi Flat and Macgregor Creek (refer to **Figure 1: Scheme Location Plan** within the Graphic

[15] Ibid

Supplement) between the steep and forest-clad mountains to the east and the settled alluvial flats and often turbulent coastal waters and beaches to the west. The rugged and relatively inaccessible geography of the West Coast is a distinctive feature and attraction to local, national and international visitors.

This part of the West Coast, including the Waitaha Valley, typifies the imprint of past and present alluvial and glacial activity. The headwaters of the major rivers in this area, including the Waitaha, Wanganui, Poerua and Whataroa originate in the steep and precipitous Southern Alps draining the landscape westwards from one of the highest rainfall areas in the country. All of these river catchments contain numerous physical characteristics that are in some way unique to each area, however, collectively share common elements, such as indigenous vegetation cover, hot springs, gorges, waterfalls and wild rivers. A number of the more noted features have been recorded by the Geopreservation Society. **Figure 4: River Gorges and Hot Springs of the West Coast Region** within the Graphic Supplement illustrates the range of Gorges and Hot Springs identified within the Geopreservation Society's Inventory of Maps and Important Geological Sites and Landforms in the West Coast[16]. There are further gorges within proximity to, and including, the Waitaha River that are not included within the Geopreservation Society's Inventory, such as the Waitaha, Morgan, Kakapotahi, Whataroa and Hokitika[17].

Large coastal floodplains extend out from the numerous foothills and gorges and are the principal locations for transportation, fertile grazing (refer to **Image 2** below), lowland forest, saltwater lagoons and small settlements. State Highway 6 (SH6) is the principal access road through this land.

[16] *Hayward BW & Kenny, JA: Inventory and Maps of Important Geological Sites and Landforms in the West Coast, First Edition 1999*. Note: The extents of these features are not mapped within the Inventory. The Geopreservation Inventory is a list of representative geological features and landforms of New Zealand identified by the Geoscience Society of New Zealand for the purpose of protecting significant sites as well as providing information on the listed features and landforms . The inventory is continually upgraded and reassessed as new information comes to hand.

[17] Within the summary on page 4 of the Inventory, the following is noted: 'This inventory, which has been compiled using the combined knowledge of most of the earth science community, is only a first attempt and cannot be regarded as complete, or the last word. Some important sites have undoubtedly been overlooked and the assessed importance and vulnerability of sites could change as more information is gathered and the state of preservation of sites alters.'

Image 2: Typical lowland grazed country

These floodplains, including the Waitaha, have filled in the glacial troughs created through the last glacial period. In some areas glacial melt water trapped behind walls of moraine has created a series of lakes, including Lake Ianthe/ Matahi (refer to **Image 3**).

Image 3: The forest-lined, freshwater Lake Ianthe/ Matahi

Beyond the coastal flats are the rugged and drift-wood strewn beaches that are a distinctive characteristic of the West Coast (refer to **Image 4**).

Image 4: The sand and driftwood characterise the beaches along much of the West Coast

The underlying rock forms part of the Aspiring lithologic association of the Torlesse composite terrane [formally the Haast Schist Group] comprising predominantly hard metamorphic schist bedrock and glacial/ alluvial outwash gravels. Greywacke forms part of the higher elevated areas of land, which is the boundary between the Pacific plate to the east and the Australian plate to the west and part of the Torlesse Supergroup. Central to this is the active Alpine Fault, which divides the Waitaha catchment into the upper and lower sections.

Vegetation within the immediate Scheme area and surrounding the Waitaha Catchment is illustrated on **Figure 5: Land Cover Plan** within the Graphic Supplement. As outlined within the **Vegetation Report**, Indigenous native forests occupy the majority of the lower and mid slopes of both the Lower and Upper Waitaha Catchments. Species typically comprise primary podocarp forests on the more stable lower elevations with the presence of rata/ kamahi forests on the upper steeper slopes, especially within the Upper Waitaha Catchment. At higher elevations, vegetation tends to comprise more scrub and alpine vegetation, including indigenous broadleaved hardwood species, tussocks and sub-alpine shrubs. On the lower, managed alluvial plains, high producing exotic pasture is evident. The vegetation associated with the Waitaha Valley is typical of other river catchments up and down the West Coast.

The West Coast is synonymous with the ‘wilder’ side of New Zealand. The combination of the topography, geology and tectonic, glacial and fluvial processes have sculpted a dynamic mountainous landscape which extends along the spine of the South Island and known nationally and internationally for its drama and scenic beauty. The Waitaha Catchment forms a small part of this overall mountainous landscape.

2.3 The Waitaha Catchment

The Waitaha Catchment is relatively small in comparison to other river catchments on the West Coast, being 223 km² whereas the Wanganui and Hokitika are 521 km² and 1,066 km² respectively. However, the drop in elevation from 2,640 m in the Upper Waitaha Catchment to sea-level is significantly steeper along the Waitaha River’s 40 km length.

The Waitaha catchment is defined by the Smyth Range to the south, the Bloomfield Range to the west and the Lange Range to the north-west. Numerous peaks above 2,100 m are within the catchment, many covered in permanent snow and ice. Small glaciers are located within these upper tributaries, including Ivory Glacier and its associated cirque; Ivory Lake (refer to **Image 5**). At Morgan Gorge the Waitaha River changes its course from an east-west direction to a south- north alignment in its lower reaches.

Image 5: Ivory Glacier and Ivory Lake located at the headwaters of the Waitaha River. Note Ivory Lake Hut perched in the foreground.

The topography within the Waitaha Catchment is steep and often precipitous where areas of exposed rock, gravel and cliffs characterise the landscape over 1,300 m. At lower altitudes, the land is covered by a sequence of predominantly indigenous vegetation, ranging from alpine grasses and scrub at the highest elevation to hardwood and podocarp/ hardwood forests at lower altitudes. Areas of exotic grasses and other small shrubs are evident along parts of the Waitaha River above Morgan Gorge. Below Morgan Gorge, the valley landscape becomes more open, containing landscape modifications such as roads, agriculture and settlements.

The largest tributary to the Waitaha River is the Kakapotahi River (or Little Waitaha River) which drains from the northern faces of the Hitchin Range parallel to the main stem of the Waitaha River (refer to **Figure 6: Catchment Areas** within the Graphic Supplement). This tributary flows through reasonably steep terrain, and enters Happy Valley, an area of flat, open land within the Kakapotahi lower catchment before the tributary is then constricted again before it connects with the Waitaha River downstream close to SH6. Other steep tributaries within the Upper Waitaha Catchment include County Stream, Moonbeam Torrent and Whirling Water and in the Lower Waitaha Catchment there are Douglas and Macgregor Creeks. There are a small number of backcountry huts and walking tracks that traverse this area. The **Recreation Report** describes these huts in more detail.

Broadly, the Waitaha Catchment has been divided into three main sub-catchments or landscapes, based on the tributaries of the Waitaha River. These are the Upper Waitaha Catchment, the Lower Waitaha Catchment and the Kakapotahi Catchment. **Figure 6: Catchment Areas** within the Graphic Supplement illustrates these areas and indicates, under the River Environment Classification system[18], the order of the different rivers within these catchments.

[18] The River Environment Classification system is a guide to river classification. It groups rivers into classes at a variety of details and classes, therefore rivers of the same class have similar physical, biological and economic values. Specifically, the REC organises information about the physical characteristics of New Zealand's rivers (for example,

2.3.1 The Upper Waitaha Catchment

As outlined above, the Upper Waitaha Catchment is defined and contained by steep and precipitous mountain peaks and ridges, extending to just beyond Morgan Gorge, where the topography becomes less steep and the river valley becomes more open.

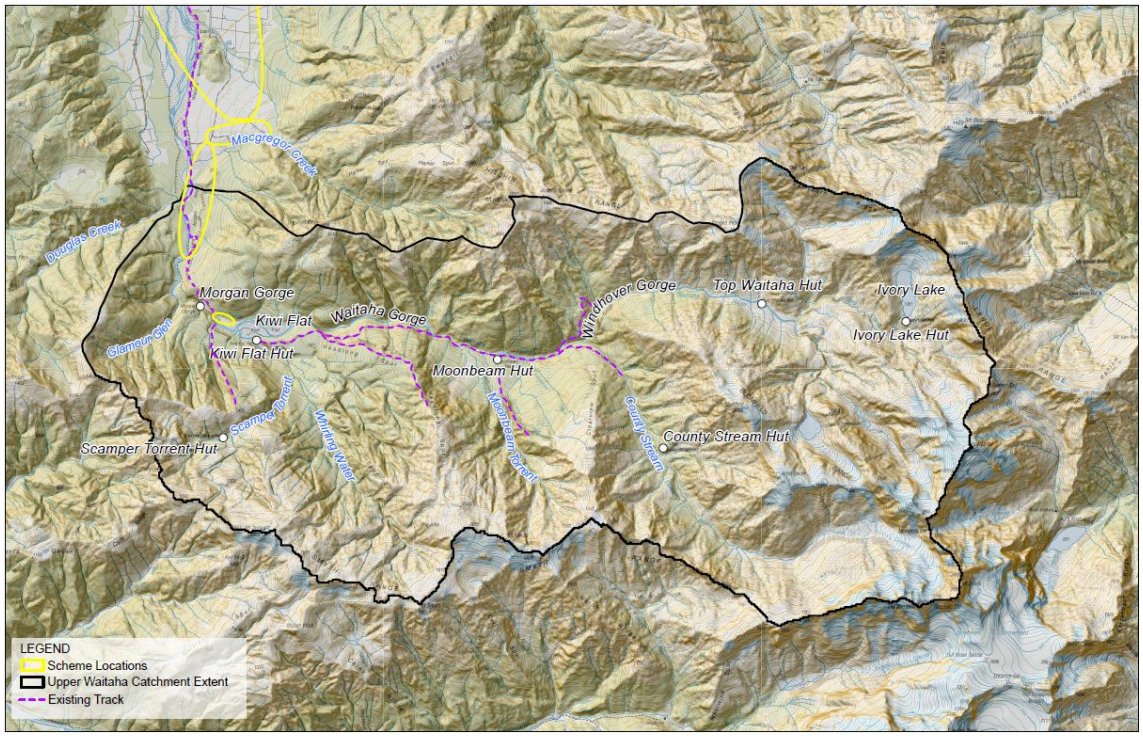


Image 5A: The Upper Waitaha Catchment and the Scheme overlaid.

The Upper Waitaha Catchment is dynamic and maintains a visually coherent remote character, where natural elements, patterns and processes have sculpted the area to retain several identifiable features, such as glaciers, cirques, tarns and gorges that are not uncommon in West Coast upper river catchments. The entire Upper Waitaha Catchment is managed by DOC as the Waitaha Forest Stewardship Land and is illustrated in **Image 5A** above.

The relatively hard basement rock and rapid tectonic uplift creates steep catchments, where loose scree, rocks, boulders and slips are common. Much of this loose material is transported by the numerous tributaries, such as Stag Creek in **Image 6**, that feed into the Waitaha River further downstream.

their climate, the source of flow for the river water, the geology of the catchment and catchment land cover, e.g. forest, pasture, urban) and maps this information by river segment for New Zealand's river network – over 425 thousand kilometres of river [www.maf.govt.nz]. Within the Waitaha catchment, only the lower Waitaha River from Morgan Gorge to its mouth reaches the highest order. Due to the terrain, many of the low order rivers occur within the upper catchments.

Image 6: The small single stream of Stag Creek feeds into the Waitaha River

Other than Morgan Gorge, there are two other gorges further upstream in the Upper Waitaha Catchment: the Waitaha and Windhover Gorges (shown in **Images 7 and 8** below). Both of these gorges have steep vegetated sides and rocky riverbeds.

Image 7: The approach to Windhover Gorge (to the left of this photograph). This photograph also illustrates the confluence of County Stream (right) with the Waitaha (left)

Image 8: The Waitaha Gorge

Within the Upper Waitaha Catchment is Kiwi Flat (**Image 9**), an alluvial basin immediately upstream of the constriction in the river created by Morgan Gorge. Kiwi Flat has been the collection point for the aggradation of alluvial and glacial sediment and has formed a small open area of approximately 2 km long and 500 m wide at its widest point. During periods of high rain fall, Kiwi Flat floods due to the constriction at Morgan Gorge.

Image 9: Kiwi Flat: The focal area of the Upper Waitaha Catchment where the Waitaha River and Whirling Water converge before entering Morgan Gorge

Kiwi Flat is also the point where the Waitaha River first starts to braid before it enters the constricted passage of Morgan Gorge.

Morgan Gorge is the lowest elevated gorge and acts as a division between the upper and lower catchments. Its characteristics are similar to the other two gorges with steep, precipitous rocky sides, and its upper parts clothed in indigenous vegetation. **Image 10** illustrates the enclosed nature of the eastern extent of Morgan Gorge. Morgan Gorge is further described within Section 2.4.

Downstream of Morgan Gorge, the Upper Waitaha Catchment begins to slowly open, where the enclosing mountain spurs appear lower and less steep, and the river widens. Glimpses of the Lower Waitaha Catchment are evident, north of the Power Station Site. Numerous accumulations of river gravel areas are also apparent. Despite this area immediately north of Morgan Gorge retaining a slightly different character than the remainder of the Upper Waitaha Catchment, it is considered very much part of the Upper Waitaha Catchment. The division between the Upper and Lower Waitaha Catchments is just south of Macgregor Creek.

Image 10: The eastern extent of Morgan Gorge

2.3.2 The Lower Waitaha Catchment

The Lower Waitaha Catchment (with its extent outlined on **Figure 6: Catchment Areas**) has very different landscape characteristics from the Upper Waitaha Catchment. Framed by the forested peaks of Urquhart Knob, Mt. Allen, and the Rangitoto and Bonar Ranges, the open, flat and agriculturally managed pastoral land is the focus for numerous rural activities, including quarrying. The small settlement of Waitaha is located mid-way in the Lower Valley and accessed via Waitaha Road. The river takes on a braided character below Douglas Creek and flows north-west towards its mouth.

The Lower Waitaha Catchment is illustrated with reference to **Site Photographs 13** through to **Site Photograph 17** within the Graphic Supplement.

Image 11: Waitaha Road looking north towards the forested mountains of the Upper Waitaha Catchment

At its confluence with the Kakapotahi River, the Waitaha River becomes slightly constricted as it flows through slightly harder rock before entering the sea. Lowland coastal forest dominates this coastal environment, where numerous lagoons and wetlands have formed.

Image 12: The mouth of the Waitaha River

2.3.3 Kakapotahi (or Little Waitaha River) catchment

This catchment is almost separate from the main Waitaha River and lower catchment, as the Kakapotahi River enters the Waitaha River approximately 3 km upstream of its mouth. It provides similar upper catchment characteristics to the Upper Waitaha Catchment, with its upper reaches defined by the Hitchin Range (1,943 m asl) and Dickie Ridge (1,920 m asl) and its mid to lower catchment defined by the Purcell Range (728 m asl) to the true left and the much higher Rangitoto Range (1,127 m asl) to the river's true right.

Similar in character to Kiwi Flat, the Kakapotahi River enters an area of flat land known as Happy Valley. This fertile area is partially grazed. The river takes on a semi-braided nature before flowing north-westwards into a single channel through the harder schist foothill rock of the Rangitoto Range. Numerous small, often ephemeral streams flow into the Kakapotahi at this point, through indigenous forest. The river converges with the Waitaha River immediately north of the SH6 bridge.

2.3.4 The Hydrological Character of the Waitaha River

As mentioned above, the Waitaha River itself maintains numerous hydrological characteristics, from the narrow, steep channels in its alpine upper reaches, to the whirling tortuous rapids travelling through the three gorges of Windhover, Waitaha and Morgan, to broad open braids within its Lower Valley. The river mouth contains a single channel with a small gravel barrier located immediately offshore. The strong westerly to northerly currents means that the morphology of this part of the river is constantly changing.

Due to the mountainous terrain, ice cover and high rainfall, the Waitaha River can be broadly divided into a number of reaches based on its varied characteristics. These reaches are illustrated on the following images:

Images 13A, 13B and 13C: The various different characteristics of the Waitaha River; namely (far left) the small streams in the upper reaches; the more turbulent and rocky waters below Morgan Gorge (centre) and the open braids of the lower catchment (far right)

Around 8.6% of the Waitaha Catchment (as measured at the flow recorder) is under permanent ice. This coupled with the high intensity of rainfall highly influences the nature of the flow conditions of the river.

The river flows high in spring and early summer and is discoloured with snowmelt, but flows recede as the temperature cools over autumn into winter, when flows drop to very low levels and run clear during dry periods.

At the top of Morgan Gorge, the median or 'normal flow' reaches a peak of 31.8 cumecs in December as rising temperatures melt the seasonal snowpack (along with some ice), and the river is continuously discoloured, either showing the milky colour of snowmelt, or the darker colour of flood flows. By March the median flow has dropped to 20.8 cumecs, as much of the available snow is gone, but the river still retains a milky appearance. Flows continue to drop with reduced temperatures and reach a low point in July, when the median flow is 10.3 cumecs. At that time, with no snow or ice melt occurring, the river runs clear if no recent rain has fallen[19].

Low flows are a notable feature and can also be described seasonally. In December the lowest flows on average reach 17.8 cumecs, in March they are 16.0 cumecs, while in July they are 8.2 cumecs. At low flows more rocks become visible within and adjacent to the river channel. A series of photographs illustrate different natural flow regimes of the Waitaha River by Morgan Gorge and close to the Power Station Site. These are illustrated in **Figures 9A and 9B** within the Graphic Supplement. Further images of flows are illustrated in **Images 13D and 13E** below.

Floods occur every 8.6 days on average and it is typically around 2 days from onset before levels drop back to the point where the grey/brown flood discoloration reverts to the usual milky colour, although this depends on the nature of the heavy rainfall.

Images 13D & 13E: The different flow regimes of the Waitaha River. The image to the left illustrates a winter flow of 6.1 cumecs at the top of Kiwi Flat (2009), and the image to the right illustrates a medium summer flow of 20.7 cumecs in the Waitaha Gorge (January 2007). Photographs courtesy of Martin Doyle.

The constricted channel of Morgan Gorge through which the Waitaha River flows, causes water to pond in and around Kiwi Flat during periods of high flows. During large floods (i.e. 1,000 cumecs) this can extend up to the Whirling Waters confluence[20]. During periods of flows below

[19] Hydrological Assessment (2025) – Appendix C.

[20] Sediment Investigations relating to a Proposed HEP Scheme on the Waitaha River, NIWA, June 2013, p17.

100-120 cumecs the water exits through the Gorge without ponding or creating a backlog[21]. The lower velocities resulting from this ponding during high flows causes sediment aggradation and can account for the sand and silt riverbanks in this area.

The **Sediment Report[22]** describes the size of the bed-material as highly variable, notably around the Kiwi Flat area. The report highlights that the river's bed material at Kiwi Flat ranges from silt through sand, gravel, cobbles, and boulders. Silt and sand typically deposit from suspension on channel margins and pools on flood recessions.

Downstream, beyond Morgan Gorge, the riverbed is largely formed of large boulders, with a highly turbulent flow. Occasional areas of sand and silt build up were evident, although sparsely located. Further downstream, around the Macgregor Creek area, the river begins to braid and the sandy silt sediments accumulate.

2.4 Morgan Gorge and Scheme Location

The Scheme location occupies a small part of the Upper Waitaha Catchment, from the entrance of Morgan Gorge, downstream to the raised gravel area beyond Morgan Gorge, and the site of the proposed Power Station. These locations are illustrated on **Figure 11: Photograph Location Plan**. The permanent footprint of the whole Scheme encompasses a small part (approximately 5 hectares[23]) of the Upper Waitaha Valley. Part of the Power Station access road and transmission line corridor does however enter the Lower Waitaha Catchment.

The proposed intake of the Scheme is located within the Lower Kiwi Flat Reach, immediately east of where the river constricts into Morgan Gorge. Other than for highly experienced (and extreme) kayakers[24], access into Morgan Gorge itself is restricted by its rugged topography and inaccessible, incised river channel. The section of river between Morgan Gorge, at the confluence of Glamour Glen, and the confluence of Douglas Creek is described as the Douglas Creek Reach. The Power Station and tailrace structures are proposed to be located on the true right of the river within this reach. The section of river downstream of the Douglas Creek confluence is referred to as the Downstream Reach. The abstraction reach describes the section of river between the intake structures at the top of Morgan Gorge to where the water re-enters the river at the tailrace. Refer to **Figure 7: Morgan Gorge Area** for locations of these sections of river.

A walking track extends along the true right of the river, from the modified Lower Waitaha Valley towards Morgan Gorge, Kiwi Flat and entering the broader mountainous interior of the Upper Waitaha Catchment. This track is maintained by DOC. There was once a walking track that extended along the true left of the river however, this track is no longer in use, due to continued slips and landowner restrictions within the lower part of the Valley[25]. As a result, the true right track was walked in 2024 by the author of this report from Kiwi Flat to the Power Station Site and out to the private land beyond Macgregor Creek. The true alignment of the track is illustrated on **Figure 8A** within the Graphic Supplement and is somewhat different from that shown on the NZ Topographic Maps.

[21] Personal communication with Martin Doyle; 5 November 2013

[22] Sediment Report, section 2.1

[23] Refer to Project Description.

[24] Refer to Recreation Report by Rob Greenaway.

[25] This track was walked as part of the 2013 Site visit to the area.

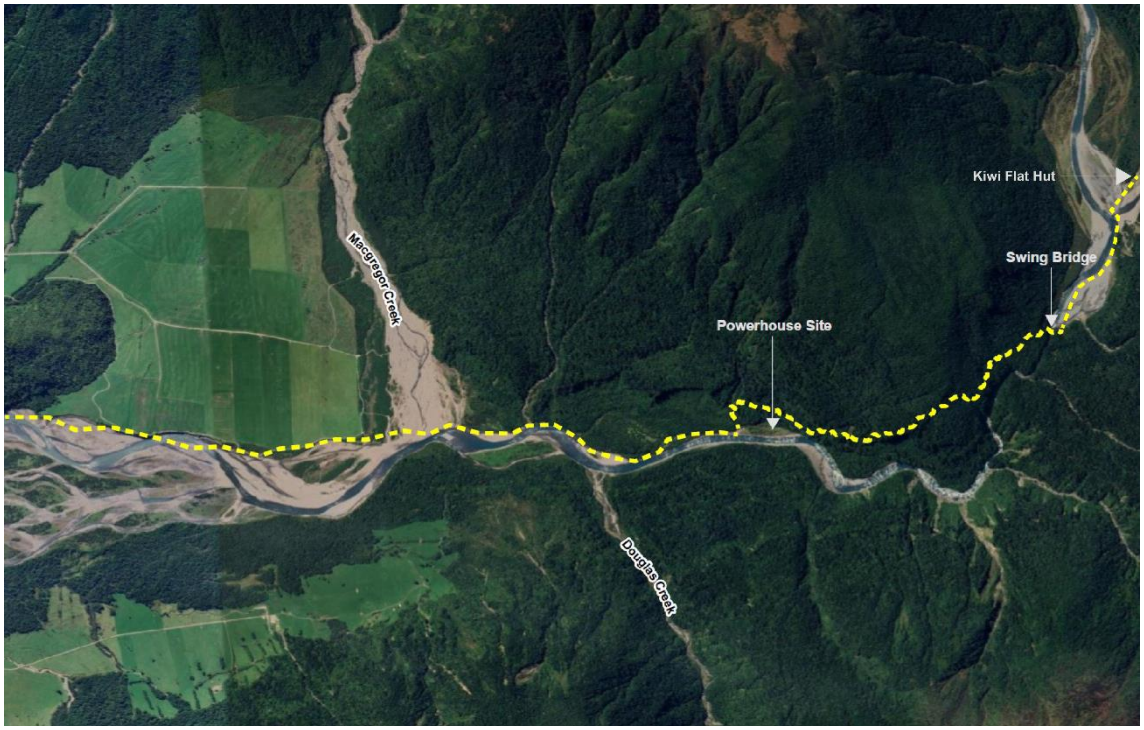


Image 14: Location of the true right walking track in the vicinity of the proposal.

From within Lower Kiwi Flat, close to Morgan Gorge, the track extends up the true left of the river, to an elevated position above the Gorge itself. A swingbridge extends across the Gorge, enabling views to be obtained into part of the gorge and onto Kiwi Flat.

Image 15: A view looking directly below the swingbridge at the turbulent water and smooth-sided jagged rock chasm.

Morgan Gorge is steeply sided and cut into basement rocks. The upper slopes above the rocky gorge are clad with dense indigenous vegetation, while the rock is exposed in the frequently submerged lower parts. Large rocky boulders and almost vertical, river sculpted walls are a result of the turbulent, energy rich waters. The Gorge is particularly narrow, which means that the swingbridge vantage point is one of the only locations it is possible to view this part of the Gorge.

The track extends from the swingbridge on the true right of the river, ascending gently at first, then in some locations quite steeply. The track is marked, although is strewn with boulders, fallen trees and in places, is extremely boggy. It is possible to hear the river within the Gorge throughout the majority of the track, however it is difficult to obtain views into the Gorge, unless a diversion from the track is taken due to the dense indigenous vegetation blocking views.

Image 16: Impression of the track close to the swingbridge.

As the track reaches its uppermost point, there are opportunities to gain elevated views of the river (and the proposed Power Station Site). Refer to **Site Photograph 6** within the Graphic Supplement. Beyond this, the track continues along the ridge and then gently descends. There is a point where a ladder is required due to the sheer drop in elevation at a particular point on the track.

Image 17: Due to the steepness of the terrain, a ladder is used to navigate this.

Beyond this, the track descends further in elevation, over rocks, further fallen trees and over exposed tree roots. Towards the lower elevations, and close to the Power Station Site, the track follows Alpha Creek, where careful navigation is required through the rock-strewn channel.

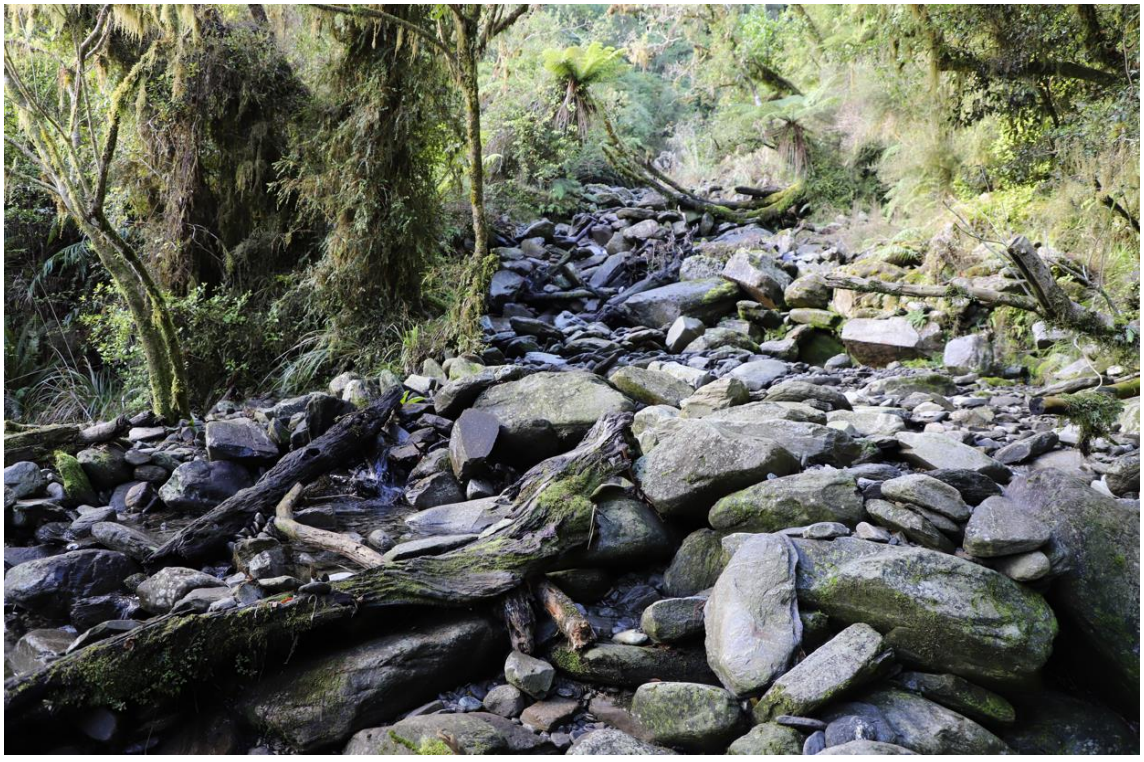


Image 18: The final descend to the Power Station Site and the river follows the Alpha Creek rocky watercourse.

The track opens at the southernmost part of the Power Station Site and its onwards direction north is clearly marked by small orange arrows. Here, the track follows tightly the edge of the riverbank, occasionally, in places, utilising the rocky terrain of the edge of what would be the riverbed at higher flows. There are occasional small flat grassy patches, where views back up the Valley to the Power Station Site are obtained. As the track continues northwards, the Valley becomes less steep and the modified and flatter terrain becomes visible in the distance.

Beyond Macgregor Creek, the track enters the Lower Waitaha Catchment, through open and relatively flat private pastoral land. A small hill, known locally as the 'doughboy'[26] is located within the farmland and covered in indigenous vegetation. From here, agreement with private landowners is necessary for access.

The **Recreation Report** discusses further the Waitaha Catchment's setting attributes and experiences, noting its 'classic' West Coast backcountry and 'remote and challenging' recreational experiences[27].

Image 19: The track continues along the rocky margins of the Waitaha River towards the farmland further north.

As part of a separate trip, which followed the true left of the river in 2013 (which is accessible by invite only of the landowner in the Lower Waitaha Catchment and not currently maintained), a visit to the Waitaha Hot Springs took place. The Waitaha River Hot Springs are located within the project area close to the bottom of Morgan Gorge (refer to **Images 20 and 21**). The Waitaha River Hot Springs are one of 12 West Coast hot springs that have been identified as a

[26] Being a glacial deposit.

[27] Greenaway, R; Recreation and Tourism Assessment of Effects (2025), p63-64

Geopreservation Site of regional importance in the NZ Geopreservation[28] and are referenced on **Figure 7**.

It is unclear how these springs could be accessed via the true right track,[29] however, access could be obtained from using the true left track from the swingbridge. During the 2013 trip, these hot springs were accessed via a steep section of rock, generally by abseiling with the aid of a fixed rope. The Waitaha River Hot Springs are located on a rocky ledge, immediately above the whirling rapids and torrents of the Waitaha River. There are numerous pools, each with their own small spring, which are located within the indented rocks along an approximately 100 m stretch of the Gorge. Over time, the Waitaha River Hot Springs have been altered, where rocks and boulders have shifted the location and size of the pools due to highly active river flows. In the past, people have been known to recline in one of the pools; however, its shape presently requires a more imaginative relaxing position.

During periods of high flow, the springs are submerged. The hot springs area is fed by sulphurous groundwater that has been heated in the active Alpine Fault zone and is returned to the surface through local fractures in the schist rock[30]. The hot springs are further described within the **Recreation Report**[31].

[28] Waitaha River Hot Spring. Significance: (C= Regional importance & 2= Vulnerable to significant modification by humans). The Inventory states: The springs are one of several hot springs coming up near Alpine Fault. They are described within the Geopreservation Inventory as: Warm springs coming up fractures through schists. Strong smell of sulphur. Local schist is highly fractured parallel to Alpine Fault, 2km downstream. *Hayward BW & Kenny, JA: Inventory and Maps of Important Geological Sites and Landforms in the West Coast, First Edition 1999*. Note: The extent of this feature is not mapped within the Inventory. As above, the Geopreservation Inventory is a list of representative geological features and landforms of New Zealand identified by the Geoscience Society of New Zealand for the purpose of protecting significant sites as well as providing information on the listed features and landforms. The inventory is continually upgraded and reassessed as new information comes to hand.

[29] Some people appear to have accessed the hot pools: https://nzhotpools.co.nz/hot-pools/waitaha-river-hot-springs/

[30] Personal communication with Mark Yetton, geologist to Westpower for the Waitaha Hydro Scheme (2013).

[31] Greenaway, R; Recreation and Tourism Assessment of Effects (2025), p59-61

Images 20 & 21: Hot water percolates through the gaps in the schist rock and collects in pools close to the main river. During periods of high flow, these pools would be submerged.

3.0 Natural Character condition & Landscape Values

Natural Character and Landscape are key topics to be considered under the RMA for this proposal.

3.1 Natural Character

The environments with the greatest natural character are those with comparatively low levels of human modification and are therefore composed of natural elements appearing in natural patterns and underpinned by natural processes.

The RMA under section 6(a) requires, as a matter of national importance the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, lakes and rivers and their margins from inappropriate subdivision, use and development.

Natural character has been interpreted as:

- The naturalness or degree of modification of an area
- An area's distinct combination of natural characteristics and qualities[32].

The Scheme is within the Waitaha River catchment, and therefore falls within the Section 6(a) considerations of '*rivers and their margins'*.[33] For this assessment, this includes the river channel, the riverbed, its immediate beaches, rocky incised cliffs and its close vegetated areas. It includes Morgan Gorge, the Waitaha River Hot Springs and its immediate vegetated slopes. It also includes the numerous small watercourses and tributaries that confluence with the Waitaha River within the vicinity of the Scheme and include Macgregor Creek, Alpha Creek and Granite Creek.

The Kakapotahi River is essentially a separate catchment and enters the Waitaha River very close to its mouth and 16 km below the Scheme and has therefore not been assessed as part of this natural character assessment.

Given natural character is assessed over a continuum from highly natural (pristine) to totally modified (urban), half of the continuum (i.e. above moderate) can be considered predominantly "natural", while the half below moderate can be considered primarily modified. Consequently, and in natural character terms, where the level of natural character is highest, it is generally more sensitive to change.

[32] Te Tangi a te Manu, paragraph 9.02

[33] The RMA does not define the extent of **'rivers and their margins'** although the extent of the term "margin" was discussed in *High Country Rosehip Orchards Ltd v Mackenzie District Council* [2011] NZEnvC 387. Case law concerning the extent of the coastal environment provides a guide to principles that might apply, including the principle that each situation requires particular consideration in its context (See e.g. *Northland Regional Planning Authority v Whangarei County Council* (463/76); *Pigeon Bay Aquaculture Ltd v Canterbury Regional Council iC179/03.*)

The table below illustrates in diagrammatic form, the natural character continuum relative to the 7-point assessment scale used to assess the levels of natural character / modification. The threshold between what can be considered a predominantly “natural environment” and a predominantly “urban environment” is also shown.

Very High	High	Moderate - High	Moderate	Moderate - Low	Low	Very Low

The natural character assessment for the Scheme utilises the methodology outlined below, with input provided by the associated technical reports to ascertain the level of naturalness.

3.1.1 Existing Natural Character

3.1.1.1 Upper Waitaha Catchment

The Upper Waitaha Catchment displays high levels of abiotic, biotic and experiential natural character.

For perceptual natural character, the Upper Waitaha Catchment contains unmodified landforms where elements, patterns and processes are particularly legible. The river environment of the Waitaha and its tributaries contains very little human structures, with the exception of several small huts[34], a swingbridge at Morgan Gorge and few tracks. Where these few structures are evident they are insignificant given the scale of their setting and are not uncommon in mainland New Zealand backcountry areas. The landscape is sculpted and moulded by the past and continued erosion of glaciers and the Waitaha River and its tributaries. The vegetation is almost entirely indigenous, with only small areas of exotic grasses around the alluvial flats and occasional areas of slips. The river is high flowing with natural pools, riffles and rapids and gains in steepness further towards the top of the catchment.

The river flows high in spring and early summer and is discoloured with snowmelt, but flows recede as the temperature cools over autumn into winter, when flows drop to very low levels and run clear during dry periods. Floods occur every 8.6 days on average and it is typically around two days from onset before levels drop back to the point where the grey/brown flood discoloration reverts to the usual milky colour, although this depends on the nature of the heavy rainfall. The constricted channel of Morgan Gorge through which the Waitaha River flows, causes water to pond in and around Kiwi Flat during periods of high flows causing sediment aggradation up to Whirling Water and can account for the sandy and silt riverbanks in this area.

[34] Namely Kiwi Hut, Moonbeam Hut, County Stream Hut, Top Waitaha Hut, Ivory Lake Hut and Scamper Torrent Hut.

Concerning ecological natural character, the **Vegetation Report**[35] describes the flora of the Upper Waitaha Catchment as comprising indigenous vegetation of various types and cover densities, occurring across the entire area, ranging from mature podocarp and hardwood forests to a mix of herbs, ferns and shrubs at lower levels. At these lower levels, particularly within the active riverbed and tributary streambed areas, exotic species occur, notably grasses and broadleaved herbaceous species. The Vegetation Report states that the browsing effect on indigenous vegetation by possums, deer and cattle below Morgan Gorge appears very low. Due to the conservation status of the land, and the criteria under the WDP, the vegetation would be regarded as significant indigenous vegetation, based on the intactness and the size/ area of the vegetation. However, the Vegetation Report continues by stating that nothing surveyed suggests that the vegetation communities are rare or particularly unique to or within Westland.

The **IFIM Report**[36] describes numerous habitats within the Waitaha River that support a range of species, including periphyton, invertebrates, fish and blue duck. Due to the frequent severity of flow regimes within the Waitaha River, habitat retention values vary. For example, due to the steep, turbulent and confined nature of Morgan Gorge, very little suitable habitats can be maintained, thereby supporting few species.

At a broader analysis, the **Freshwater Ecology Report**[37] states that periphyton communities were identified in the Waitaha Catchment. Periphyton communities were similar throughout the mainstem river and most tributary waterways, although three stable tributary sites (including two in the Waitaha catchment) supported distinct communities. The Freshwater Ecology Report states that all taxa recorded are common and widespread in South Island rivers and the communities are typical for the catchment type in terms of their diversity and species composition[38]. Aquatic bryophytes (mosses, liverworts and hornworts) were found in a small stable spring-fed tributary in the Douglas Creek reach. This stream represents a biodiversity "hotspot" for bryophytes in the Waitaha Catchment, and these plants provide valuable habitat and food resources for the aquatic invertebrate community.

The **Freshwater Ecology Report** states a total of 104 different invertebrate taxa were found in the study area, with the fauna of the wider Waitaha Catchment composed of a diverse assemblage of insect taxa, dominated by mayflies, chironomid midges, caddisflies, and stoneflies[39]. Invertebrate density and diversity (i.e., the number of taxa found) were significantly higher in stable tributary sites than the mainstem river or other tributaries. These stable tributaries are locally important for maintaining biodiversity values and ecosystem functioning. In contrast, invertebrate density in the mainstem of the Waitaha River was low. The fauna of the Waitaha catchment appears typical to that of other neutral pH, fast-flowing West Coast rivers flowing through unmodified catchments in high rainfall areas, where water quality is high, and nutrient levels and algal biomass are low.

In terms of fish, the **Freshwater Ecology Report** states that the Waitaha River catchment supports quite a diverse assemblage of fish species; however, diversity and abundance of fish were particularly low in the mainstem river, especially upstream of the Douglas Creek confluence. This is likely related to the unstable nature of the river, high glacial flour content, and low food resources[40]. Koaro were the numerically dominant species recorded, and of particular interest is the fact that they are the only species recorded upstream of Morgan Gorge.

[35] Assessment of Environmental Effects: Vegetation (2025) TACCRA Ltd.

[36] IFIM Report, Executive Summary, pages 1-2.

[37] Freshwater Ecology Report, paragraph 12.1.

[38] Freshwater Ecology Report, paragraph 12.1.

[39] Freshwater Ecology Report, paragraph 5.1(a), 14.1.

[40] Freshwater Ecology Report, paragraph 5.1(d).

Longfin and shortfin eel, torrentfish, brown trout, common and redfin bully, and lamprey were all recorded downstream of Morgan Gorge, with species diversity greater in the downstream section than in the Douglas Creek reach (i.e. the abstraction reach), and greater in the tributaries than in the mainstem.

The **Terrestrial Invertebrate Report**[41] found in the Waitaha Valley are largely typical of the region and have high natural integrity with relatively few adventive species. The riparian margins of the river contain communities of terrestrial invertebrates that are adapted to these highly dynamic habitats and that no terrestrial invertebrate species of known conservation threat were identified in the area.

The **Terrestrial Fauna Report**[42] describes that long-tailed bats (Nationally Critical) were found throughout the survey area with greatest activity recorded at Kiwi Flat, and moderate activity along the river below Macgregor Creek. A total of 40 species of birds were recorded, including a number of threatened species: kea ('Nationally Endangered'[43]), South Island kākā ('Nationally Vulnerable'), yellow-crowned kākāriki ('At Risk Declining'), migratory long-tailed cuckoo ('Nationally Vulnerable') and falcon (At Risk: Recovering). Other birds, including the long-tailed cuckoo and weka were also observed, but thinly distributed. The survey area contains areas of significant habitat for indigenous fauna based on assessment of guidelines/criteria for significance set out in the RPS (Chapter 7, pages 25-30; WDP: Policy 4.9 (b); TTPP: ECO-P8 (e)), and accordingly have high natural heritage values[44] based on assessment criteria in the CMS (Policy 3.3.2.3(1)). The presence and representativeness of Threatened and At Risk species largely define significance in this location.

The **Whio Report** (Blue duck report), states that Waitaha River and its tributaries present a highly dynamic habitat for whio[45], which is a nationally vulnerable species. In 2024, at least 12 adults were found between Kiwi Flat and the Douglas Creek confluence[46].

Based on this, it is considered that the **Upper Waitaha River and its margins** hold **very high, near pristine levels of natural character,** despite the small amounts of modification present. It is considered that this level of natural character would be the same or similar for other upper catchments within the broader West Coast Region.

3.1.1.2 Lower Waitaha Catchment

The Lower Waitaha Catchment is more settled and modified than the Upper Waitaha Catchment, since areas of pasture and other land use activities have interrupted natural elements, patterns and processes on the riverbanks and terraces. There are, however, areas in the catchment, such as the Kakapotahi (or Little Waitaha) River where indigenous vegetation cover is present, notably on the flanks of the Purcell and Rangitoto Ranges. The braided pattern of the main stem of the Waitaha River in this lower catchment displays high natural patterns, although this often contains some exotic species which have colonised the exposed alluvial parts of the braided riverbed and its banks. A number of structures, in particular the SH bridge with its associated flood control works, present obvious modifications to the river environment in this reach. There is a geothermal water take within the Waitaha River close to Macgregor Creek as well as a gravel/ stone extraction permit, also close to Macgregor Creek. There are also a

[41] Terrestrial Invertebrate Report, chapter 5, conclusions

[42] Terrestrial Fauna Report, Appendix D.

[43] Robertson et al 2021

[44] Terrestrial Fauna Report, Section 2.1

[45] Whio Report, paragraph 2.16

[46] Whio Report, paragraph D34.

number of land use consents for works in and around the Waitaha River e.g. flood protection and gravel extraction.

Image 22: The SH6 bridge over the Waitaha River

The river mouth displays high levels of naturalness, due to dominating coastal processes and lack of human modification.

Based on the above there are a number of smaller sub-units within the Lower Waitaha Catchment that hold higher levels of natural character than the remaining parts. These are the river mouth and the flanks of the Purcell and Rangitoto Ranges. However, on balance, it is considered that the **Lower Waitaha River and its margins** retains **moderate to low levels** of natural character, due to its modification.

3.2 Landscape

As outlined, within the proposed TTPP, the entire project area is mapped as an ONL. Following a review of the mapped extent of the proposed ONL, the author of this report agrees with the extent of its delineation. Whilst the landscape values are listed within the proposed plan, they relate to the broader mapped landscapes that they are associated with. Whilst they are important to acknowledge, there are also other landscape values, that are more specific to the landscape (the Upper and Lower Waitaha catchment landscape) in which the Scheme is set. These two different scales are outlined below.

3.2.1 Landscape values within the TTPP

The following landscape values are contained within the proposed TTPP. They concern the entire mapped extent outlined in **Figure 7** within the Graphic Supplement. They are considered high level and do not contain a comprehensive set of landscape values of the landscapes in

which the Scheme is located. Further landscape values, that build on these, are expressed below.

ONL18: Mt Elie De Beaumont – Mt Whitcome

'Extensive landscape consisting of dramatic mountain ranges that extend westward from the main divide, high altitude peaks, glaciers, permanent snowfields, and incised valley systems.

- *Interplay of mature indigenous forest and vegetative sequence from lowland beech forest through to alpine scrub communities reinforcing topography and pronounced relief – particularly where horizontal vegetation patterns including seral beech forest and scrub mark glacial retreat.*
- *Exposed peaks and ridgetops revealing underlying geology are highly expressive of the landscapes formative and ongoing natural processes. Dramatic etched bluffs are highly expressive of formative glacial processes.*
- *Combination of etched ridgelines, rocky outcrops, expansive permanent ice flows, glacial lakes, vegetation sequences giving way to raw and exposed peaks and ridges are highly natural.*
- *The Garden of Eden Ice Plateau, Garden of Allah, Mt Elie De Beaumont, Whitcome, Mannering, Moffat, and Newton Peak are key / representative landmarks within this landscape'.*

ONL22: Bonar, Rangitoto & Bald Hill Ranges

'Assemblage of heavily dissected ranges, foothills, and valley systems with broad rounded peaks whose

underlying geology set them apart visually from the high altitude ranges to the east.

- *Interplay of mature indigenous forest and vegetative sequence from lowland beech forest through to alpine scrub communities reinforcing topography and pronounced relief. Exposed peaks and ridgetops revealing underlying geology are highly expressive of the landscapes formative and ongoing natural processes.*
- *Assemblage of ridges, peaks, and mountaintops of similar orientation, altitudes, vegetative cover and appearance. Contiguous mountain range and foothills. Mature beech forest giving way to alpine vegetation at higher attitudes.*

The Hokitika Gorge is a well known landmark within this landscape'

3.2.2 Landscapes of the Waitaha River Catchment

The proposed Scheme occupies a short section (2.5 km, including abstraction reach) of the overall length of the 40 km long Waitaha River. The Upper Waitaha Catchment occupies a small component (12,761 ha) of the mountainous Southern Alps within the West Coast Region (which at a broad scale is approximately 1,560,000 ha[47]). The rugged West Coast mountains, foothills and coastal plains form the wider landscape context for the landscape contained within the Waitaha Catchment, as outlined earlier. Many of the landscape characteristics occurring within the Catchment are found in other adjacent river valleys and mountain ranges of the Central West Coast.

[47] Approximately measured land above 300m for entire West Coast Region

For the purposes of this Scheme, the hydrological catchment[48] of the Waitaha has been mapped on **Figure 6: Catchment Areas**. The various components of the Catchment, i.e. the river, the gorges, indigenous vegetation and the mountain basins are distinctive features within the Waitaha landscape, however they do appear in different numbers, lengths and guises throughout all upper reaches in the West Coast Region (**refer to Figure 2 and Figure 4**).

Based on this, the Waitaha Catchment can broadly be divided into three smaller sub-catchments, each holding a coherent character and unity in terms of natural processes. These are the Upper Waitaha Catchment upstream of the confluence of Macgregor Creek, the Lower Waitaha Catchment downstream (at the confluence of and including Macgregor Creek) and the Kakapotahi Catchment (refer to **Figure 6**). Under this delineation, the Scheme falls within the Upper Waitaha Catchment with some aspects such as new road access between the public Waitaha Road and Macgregor Creek falling within the Lower Waitaha Catchment. Although a question of scale, it can be assessed that the landscape(s) under consideration for the Scheme are both the Upper and Lower Waitaha catchments, with an acknowledgement that the broader Southern Alps/ ONL landscape areas are also a landscape as are the coastal lowlands.

The following outlines the landscape values associated with the Upper and Lower Waitaha catchments.

3.2.2.1 Physical landscape values

The entire Waitaha Catchment contains a range of landforms which are clearly expressive of their formative processes and geology. From the alpine ridges and peaks that define the catchment to the eroded basement rocks exposed in the gorges, the catchment holds many attributes that are typical of many river catchments within the district and broader region, including the Wanganui. On a regional or even national scale, the Upper Waitaha Catchment forms part of the Southern Alps, a clearly identifiable mountain range that expresses a range of the highest outstanding biophysical values in the country that contain 'iconic' landscape features such as *Aorak*i /Mt. Cook, and the large glaciers of Fox and Franz Josef.

The network of tributaries that drain the Upper Waitaha Catchment, converge with the Waitaha River and Whirling Water and continue to cut through the mountain barrier via Morgan Gorge. Further downstream, beyond Macgregor Creek, the alluvial outwash plains are open, allowing the natural processes of the river to braid before entering the sea.

The glacial and fluvial carved valleys of the Upper Waitaha Catchment provide a vivid and identifiable link to past and present glacial activity, where features including Ivory Glacier and its Lake[49] express clearly the area's formative processes. Alluvial deposition marks the more open feature of Kiwi Flat, before the water enters Morgan Gorge, a dramatic chasm of sculpted rock, tortuous rapids and whirling waters, even at low flows. This spectacular gorge feature, where ridges of almost vertical rock extend precipitously from the water, demonstrates the continued cutting of the water through the basement rocks. Other features include the Waitaha River Hot Springs created by ejecting, near-boiling sulphurous water on schist ledges above the river and recognised as a site of regional importance by the NZ Geopreservation Inventory[50].

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[48] Environment Court decisions have emphasised that *'In our view a much more useful and scientifically based unit of land is the hydrological catchment, and that should be the starting point for most analyses'* (High Country Rosehip Orchards Limited v Mackenzie District Council Decision [2011] NZEnvC 387, paragraph 83).

[49] Ivory glacierised surfaces and Ivory Lake. Map: J34; Classification: B3. Significance: Good example of glacierised rock surfaces and meltwater lake at toe of a glacier. *Hayward BW & Kenny, JA: Inventory and Maps of Important Geological Sites and Landforms in the West Coast, First Edition 1999*.

[50] C= Regional importance & 2= Vulnerable to significant modification by humans. Whilst these springs are listed as a site of regional significance, there is no specific recognition or protection provided within the WDC or the TTPP to this

The Upper Waitaha Catchment area receives high rainfall and accounts for the clean-sided rocks that contain the river, which are visible during periods of low flow. Typical for West Coast rivers[51] are dramatic high flows that can occur during prolonged rainfall, dislodging boulders and creating slips, cascades and waterfalls. The area is dynamic, further reinforced by numerous active faults, including the major Alpine Fault, which is located along Douglas Creek.

The vegetation pattern within the Upper Waitaha Catchment illustrates clearly altitudinal sequences of species adapted to grow in harsh conditions. From tussock grasses and alpine vegetation at higher altitudes to a mosaic of dense indigenous hardwood and podocarp/ hardwood forest at mid and lower elevations, the Upper Waitaha Catchment overwhelmingly holds very high levels of indigenous naturalness. There are areas containing exotic species around Kiwi Flat and occasionally in areas where localised slips have occurred. At a broader district and regional scale, the vegetation pattern is typical.

In terms of terrestrial fauna and birds and bats, the Upper Waitaha Catchment holds significant habitat for indigenous fauna[52], notably for long-tailed bats, long-tailed cuckoo, blue duck and other at-risk species. However, the presence of predators greatly contributes to their limited numbers.

For freshwater fauna, there are no significant concentrations of fish; however, both the Upper and Lower Catchments do support a diverse assemblage of fish species (below Douglas Creek) typically found in West Coast rivers. Only kōaro are located above Morgan Gorge.

Physical values downstream, within the Lower Waitaha Catchment are highest where modification is least. The upper slopes of the Rangitoto Range to the north and the Bonar Range to the south are clothed in indigenous vegetation. The network of river braids of the Waitaha is also a natural feature of this lower catchment and is broadly unmodified. However, on the valley floor, this lower catchment displays much higher levels of introduced and managed vegetation, which reduces its biophysical naturalness. Modified areas containing roads, bridges, areas of settlement and introduced pasture and other exotic weeds reduce the natural character value of this landscape. Human modifications have commonly proliferated where there is more sheltered accessible country along the entire West Coast landscape.

3.2.2.2 Perceptual Landscape Values

The Upper Waitaha Catchment retains a sense of remoteness due to the lack of human modifications. These remote-like characteristics are emphasised by the expressive nature and raw form of the inland mountain ranges and are apparent as soon as one walks upstream of Macgregor Creek. The area displays very high, almost pristine levels of naturalness, with strong aesthetic values. Due to the difficult access arrangements (i.e. walking through Morgan Gorge / flying in) and the steep and dramatic Upper Waitaha Catchment, the landscape is very memorable. However, when considering the Upper Waitaha Catchment at a broader scale it is considered that the catchment would be just as memorable as other comparable upper reaches.

Views from the true-right track into Morgan Gorge are virtually non-existent, unless a diversion is undertaken along one of the many slips. However, the audibility of the river remains throughout the journey into Kiwi Flat. Once out of Morgan Gorge by the swingbridge and Kiwi Flat, long views are obtained towards the forested steep slopes of Whirling Water and Scamper

site, or any other listed site, and as such, retain limited status. As above, the Geopreservation Inventory is a list of representative geological features and landforms of New Zealand identified by the Geoscience Society of New Zealand for the purpose of protecting significant sites as well as providing information on the listed features and landforms. The inventory is continually upgraded and reassessed as new information comes to hand.

[51] Other West Coast rivers with similar characteristics to the Waitaha River include the Mikonui, Kakapotahi, Wanganui, Poerua and Whataroa (personal communication with Martin Doyle).

[52] Terrestrial Fauna Report, Section 2.1.

Torrent. Views are also obtained into the precipitous canyon of Morgan Gorge from the swingbridge and from short departures from parts of the true left track. Dramatic and extremely memorable views within Morgan Gorge can be also obtained at the Waitaha River Hot Springs.

The Lower Waitaha Catchment is a pleasant settled pastoral valley, where enclosing vegetated hills frame views towards the mountains or the open coast. Views of the river are difficult due to the alignment of the road in the centre of the valley, however, as one proceeds further westwards, glimpses are obtained. The visual amenity values of the modified plains are very typical of other West Coast settled valleys. As a consequence, the Lower Waitaha Catchment does not hold as high perceptual/ experiential values, due to its modified form.

3.2.2.3 Associative Landscape Values

The principal associative values of the Upper and Lower Waitaha Catchments relate to low levels of recreational activities, namely tramping, white-water kayaking, canyoning and hunting, predominantly in the Upper Waitaha Catchment. It is understood that no other human land use activities have occurred in the Upper Waitaha Catchment, including settlement or mining[53]. This is typical of other upper reaches within the District and Region. The **Recreation Report** states that the Waitaha River is identified as one of 14 class V white water rivers on the West Coast which require helicopter access, and one of 24 class V rivers in the region (of all access types) **[54]**.

Other than flying in via helicopter, the primary, and more challenging way through into the Upper Waitaha catchment is via the track that wends its way above Morgan Gorge. Access is possible from the upper reaches of adjacent catchments, including the Wanganui, Hokitika and Mikonui. The passage from the settled plains to the remote back country emphasises the role of the Gorge as an ‘entrance feature’ into the upper reaches. Although the walk into Kiwi Flat is reasonably short (approximately 3-4 hours), it nonetheless highlights the remote characteristics of this part of the catchment.

There is a small number of back country huts located within the Upper Waitaha Catchment. These include Kiwi Flat Hut, close to the confluence of Whirling Water; Moonbeam Hut, just beyond Waitaha Gorge and Moonbeam Torrent; County Stream Hut, approximately halfway up County Stream, Top Waitaha Hut close to the confluence of the Waitaha River, Watson Creek, Stag Creek and Reid Creek and Scamper Torrent Hut located close to the Scamper Torrent watercourse. One further hut, located precariously on the edge of Ivory Lake at the head of the valley is named Ivory Lake Hut.

The Recreation Report states that despite these low use levels, the Waitaha Catchment is an important recreation setting due to its accessible but 'remote' natural setting, and the characteristics of its white-water resource**[55]**.

Ngai Tahu and iwi values have been considered by Te Rūnanga o Ngāi Tahu (iwi) and Te Rūnanga o Ngāti Waewae and Te Rūnanga o Makaawhio (rūnanga)[56].

The settled valley of the Lower Waitaha Catchment retains many farms and buildings. Once holding a small village with a school, the Waitaha community has, like many West Coast small villages, gradually got smaller, with the school closing and people leaving to seek employment elsewhere. Access is provided via SH6 and the Waitaha Road. Access is also obtained via

[53] Except for the gold mining concession in Kiwi Flat (largely unexercised).

[54] Greenaway, R; Recreation and Tourism Assessment of Effects (2025), paragraph 2.11

[55] Greenaway, R; Recreation and Tourism Assessment of Effects (2025), paragraph 2.19

[56] Refer to Te Rūnanga o Ngāti Waewae and Te Rūnanga o Makaawhio letter dated 13 May 2025.

Allen Road on the south side of the Waitaha River and Valley. There is an existing schist extraction operation in Macgregor Creek.

4.0 Effects Assessment

4.1 Overall approach to assessing effects

A landscape effect is a consequence of changes in a landscape's physical attributes on that landscape's values. Change is not an effect: landscapes change constantly. It is the implications of change on landscape values that is relevant. While an effect arises from changes to physical attributes, the consequences on landscape values relate to all a landscape's physical, associative, and perceptual dimensions. Landscape effects can be both adverse and positive.

Effects are considered against the existing and potential landscape values, and the outcomes sought in the statutory provisions. Such provisions often anticipate change and on achieving certain landscape values. Whether effects on landscape values are appropriate will therefore depend both on the nature and magnitude of effect on the existing landscape values and what the provisions anticipate.

The landscape (visual) and natural character effects have been determined using a seven-point scale ranging from very low to very high as set out in **Appendix 1** of the assessment methodology.

The assessment of effects takes account of the latest 2025 design iterations of the Scheme, that have materially changed since 2014.These changes include:

- Utilising two tunnels. One will be an access tunnel (approximately 5 m x 5 m) and one a pressurised water tunnel (approximately 5 m x 5 m). The entrance of the pressurised water tunnel will be concealed under the water at the intake and will be underground at the Power Station Site. The only visible tunnel entrance at the Headworks Site will be the access tunnel. Therefore, the original portal proposed above the Headworks Site has been discarded, removing one of the more visible aspects at the Headworks Site.
- Sediment will be transported by a pipe from the desander to the tailrace through the access tunnel. As such, there will be no sediment channel at the intake.
- At the Power Station Site, the overall design of the current scheme in this location is slightly more compact than the original proposal. Whilst the footprint of disturbance is approximately the same at 0.70 hectares,[57]and the footprint of the Power Station is similar, its height is much reduced, where it was previously 10m, and now its height is between 4.5 – 6.0 m. Further, the footprint of the switchyard was previously approximately 20 m x 20 m including a 12 m high (maximum) tower and now this is 20 m x 15 m (with up to a 15 m high tower).

A particular focus of the assessment will be on the construction stages. This period is expected to take approximately 3-4 years at a minimum and will occur over four key stages:

[57] Power Station. Refer to the Project Description (Westpower 2025).

1. The construction of the access road and transmission line from Waitaha Road to the Power Station Site, including the bridge over Granite Creek (1-10 months construction).
2. Construction of the tunnels and subsurface structures, and early works at the Headworks. Implementation of Construction Staging Area 1 and the access track from the access portal to Construction Staging Area 1. Construction of the short access track from the access portal at the intake to the river. (7-27 months construction).
3. Remaining water tunnel and desander excavations completed. Construction of the intake channel and weir. Construction of the Power Station, switchyard and tailrace. Construction of the remaining section of the transmission line from Westpower's Waitaha Substation near SH6 to Macgregor Creek. Rebuild of Waitaha substation. (28-33 months construction); and
4. Equipment installation and commissioning in the Power Station, switchyard and intake. (32-37 months).

There will be some overlap between stages 2, 3 and 4, with stages 3 and 4 occurring concurrently.

Key effects of the Scheme, based on the above, relate to the following:

- Broad scale landscape, visual and natural character effects.
- Actual and potential effects of the reduced river flow on natural character.
- Actual and potential effects of structures introduced to the Headworks Site (including weir).
- Actual and potential effects of structures introduced to the Power Station Site, the switchyard, access road and transmission line.
- Assessment against relevant statutory provisions.

The tunnel spoil will be deposited on private land outside of the Conservation Estate.

4.2 Broad scale natural character and landscape effects

4.2.1 Broad scale Natural Character effects

The Waitaha Catchment retains a range of natural character, from the very high almost pristine levels in the virtually unmodified Upper Waitaha Catchment, to the extensively modified plains of the Lower Waitaha Catchment. Forming part of the mountainous Southern Alps, the catchment as a whole is broadly homogenous, although it retains a relatively high level of ecological and perceptual diversity at a more local level. The areas of highest natural character tend to be located in areas that have the least modification, which includes the steeper terrain, or the more exposed locations, including ridges, spurs and steep gullies. More modified areas, such as the settled Lower Waitaha Catchment area retain a lower level of natural character. It is this more sheltered accessible country, where human modifications have proliferated and are common along the entire West Coast Landscape.

At a broad scale, the Scheme comprises a permanent total footprint of 5 hectares[58] and directly affects approximately 2.5 km of the Waitaha River's 40 km river length. The modelling indicates the residual flow of the river will be 3.5 cumecs below the intake. This is discussed further in Section 4.3 of this report.

The related infrastructure associated with the Headworks and Power Station will be of a limited and compact footprint, be low profile and visually, relatively unobtrusive in terms of its setting. The broader natural elements, patterns and processes of the Waitaha River Catchment will continue to occur.

Although the majority of the Scheme is located within the Upper Waitaha Catchment which currently shows very high levels of natural character, the area cannot be considered 'pristine' due to the presence of existing small modifications to the area. Furthermore, it is noted that there is a geothermal water take[59], located near Moonbeam Hut on the Waitaha River and a further water take, for geothermal purposes on the Waitaha River close to Macgregor Creek[60]. There is also a consent for gravel extraction within the Waitaha River, also close to Macgregor Creek[61].

At a broad scale, the Scheme will locally affect the very high levels of natural character at two discrete nodes, near the weir and intake at the entrance to Morgan Gorge and the area around the Power Station. The abstraction reach extends for a 2.5 km stretch of the broader Waitaha River connecting the two nodes. The Scheme will introduce a level of modification to the Upper Waitaha Catchment and will alter the natural hydrology of the Waitaha River for a 2.5 km stretch. Despite this area being overwhelmingly natural, there are human-incursions already evident, such as the track, the swingbridge and numerous huts, including Kiwi Flat Hut. The location of the Scheme is closer to the more modified paddocks of the Lower Waitaha Catchment, rather than the more remote Upper reaches of the Waitaha Catchment.

Based on this, at an Upper Waitaha Catchment scale, it is considered that the Scheme will have **moderate to low** adverse natural character effects. It is considered that, at a broad scale, the Upper Waitaha Catchment would retain its very high levels of natural character under section 6(a) of the RMA, despite some of the values being affected to a low degree.

4.2.2 Broad scale Landscape effects

Listed as an ONL within the proposed TTPP, and holding high landscape values, this broad-scale landscape assessment considers how the Scheme has been designed to avoid *significant landscape effects*. The Scheme elements have also been designed to suit the environment without being disproportionate in scale to its surrounding. Specifically, these design measures include:

- A very small footprint of 5 hectares achieved by:
    - adopting a 'run-of-river' design to avoid damming the river (and hence introducing a significant structure, forming a lake and creating large cuts for access roads for equipment).

[58] Project Description (Areas of potential disturbance: Operation: Headworks (0.3 hectares); Power Station (0.7 hectares) and Access Road/ Transmission line between Macgregor Creek and the Power Station site (4.0 hectares).

[59] West Coast Consents (Consent 8047)

[60] West Coast Consents (Consent 8047)

[61] West Coast Consents (RC-2019-0037-01 Stone removal, Waitaha River and Maccregor Creek)

    - utilising underground tunnels which conceal much of its infrastructure avoiding effects and reducing effects to the areas at the Headworks Site, abstraction reach and Power Station; and
    - excluding vehicular access into Kiwi Flat.
- Adopting a low weir design minimising area of backwater effect above the weir and allowing sediment and river material to pass over and under and continue down the gorge.
- Minimising the visual presence at the Headworks further by locating the entrance of the pressurised water tunnel under the water.
- Minimising the footprint of the Power Station and tailrace. This has been achieved by partly burying the Power Station and utilising space efficient infrastructure.
- Aligning the power transmission line along the access road for most of the route from the Power Station to Macgregor Creek to reduce vegetation clearance; and
- Utilising methods to encourage weathering and using existing rock boulders to integrate the structures into the landscape.

Despite the amount of measures to mitigate the Scheme, it is acknowledged that the Scheme will modify the landscape and introduce structures that currently are not present in the area. There will be a physical 'presence' of the Scheme at the Headworks and at the downstream Power Station Site which will affect the remote-like characteristics of the area and will affect, to a small degree the intrinsic values of Morgan Gorge. The natural flow of the river within the abstraction reach will also be modified and be more apparent during periods of low flow. Despite this, however, it is considered that, irrespective of the Upper Waitaha Catchment being an ONL and Morgan Gorge being a particular feature within this ONL, the Scheme will not create long term significant adverse effects for the reasons set out below.

Firstly, the Scheme will occupy a very small footprint (5 hectares) within the Upper Waitaha Catchment's 12,761 hectares. The structures will largely be subservient, set within a relatively large and grand natural setting, which is typical of much of the West Coast landscape. It is due to this scale of the landscape within which the Scheme is set, in combination with its small footprint, that ensure the effects on the physical, associational and perceptual values that make this landscape special will not be sufficiently eroded. A landscape can absorb a degree of modification and still be an outstanding natural landscape and/or feature. Furthermore, while Morgan Gorge is smaller in scale than the Upper Waitaha Catchment, the Scheme will not affect the gorges' overall physical, associational and perceptual values to a significant degree and therefore not reduce its 'outstandingness' as a feature within the ONL. Essentially, the weir will appear close to the entrance of the gorge, along with the intake structure. The river will maintain its course through the gorge despite reduced flows. The associated cliffs and natural eroding of broader Morgan Gorge by fluvial processes will continue.

Secondly, although the proposed Scheme will, to a small extent, interrupt the remote-like characteristics and values of the area, the Upper Waitaha Catchment cannot be regarded as 'truly' remote or holding pristine wilderness qualities due to the existing modifications and recreational use of the tracks, huts and swingbridge. It is also noted that there is a geothermal water take, located near Moonbeam Hut on the Waitaha River and a further water take, for geothermal purposes on the Waitaha River close to Macgregor Creek as well as a gravel/stone extraction permits, close to Macgregor Creek. Any interruption as a result of the Scheme will occur at a very localised level and in the context of the more modified Waitaha Valley close by, rather than being located further within the Upper Waitaha Catchment.

The Scheme is not being proposed in a national park, wilderness area or World Heritage Area, such as Fiordland and South Westland. The area is classified as Stewardship Land by DOC where limited or no active pest control is undertaken. Furthermore, in the broader context of the West Coast Region, where approximately 84%[62] of the land is managed by DOC, there are numerous other river catchments holding similar features such as gorges, hot springs and glaciers and therefore the catchment is not considered unique. The river is also not subject to a Water Conservation Order.

Thirdly, the Scheme will not affect accessibility or the physical geomorphology of the Waitaha River Hot Springs.

Finally, it is considered that the changes to the flow regime of the river will only have low adverse effects on its landscape values. The appearance of the river is predominantly shaped by high flows and floods which constantly reshape the highly active riverbed. These channel forming floods will continue to occur throughout the year. The sediment transportation will be largely unaffected by the weir structure, and the riverbed of the Lower Waitaha will continue to be supplied from both the upper reaches and tributaries. The currently occurring river processes, in particular flood flows with high sediment transportation capacity, will continue to sculpt the gorge reach. This means that the physical processes that form and maintain the Waitaha River and its bed and banks, whilst modified to some degree, will continue to occur.

The Options Selection exercise as part of the initial phases of the project assisted in refining the location and design of the Scheme to avoid potentially more significant effects, (as discussed in the **Project Overview Report**).

The broad landscape **effects of the Scheme** on the values associated with the ONL are **moderate-low.**

4.2.3 Broad scale Visual effects

In terms of broad scale visual effects, the intake and weir structure will be mainly visible from the swingbridge at the entrance to Morgan Gorge and from parts of the track as it extends into Kiwi Flat from the swingbridge. Glimpses of the Power Station and related ancillary structures will be possible from a short section of the track above the Power Station Site (from an elevated position) as well as from parts of the walking track as it extends along the true right of the river. People using the river itself, such as kayakers will also be affected by the structures, although that will depend to varying degrees upon their disposition and individual expectations as to how much it affects their remote-like experience. Construction of these two main structures associated with the Scheme will be confined to these two reasonably discrete areas, with further temporary earthworks occurring along the access corridor north of the Power Station. These two nodes will be noticeable at close distance when viewed from sections of the walking track close to each of the nodes, as well as from the river itself. This will affect to varying degrees the remote, natural setting. Due to the setting of the activities, they will not be seen against the skyline from any views (and therefore prevent potential for amplifying their visual presence) and will, for the majority of the time, be located within areas of heavy shade, assisting with visually recessive traits. The Power Station and Headworks will occur in discrete locations within a small footprint and will not visually dominate their setting. The low profile of the intake structure will affect the remote values of Morgan Gorge and introduce a small node of industrial activity into an otherwise highly natural area.

[62] 2.1 Administrative overview of The West Coast *Tai Poutini* Conservancy, para 2.1.1. West Coast Conservation Management Strategy 2010-2020

Hydro schemes, notably run-of-river types are common in New Zealand, with six[63] in the West Coast Region. The Amethyst project located within the adjacent Wanganui catchment to the south typifies how a small, well-designed Scheme can integrate into a relatively remote setting. So, although there will be a change of view for users within the Waitaha Valley, these will be concentrated to small, defined areas.

Based on this, at an Upper Waitaha Catchment scale, it is considered that the proposal will have **low adverse** visual effects due to the defined footprint of the Scheme.

4.3 Potential Effects of the Residual Flow (In River Effects)

4.3.1 Effects to the Abiotic and Biotic Natural Character attributes

The assessment of natural character effects relating to flow reductions is complex as subtle changes to the natural elements, patterns and processes in the affected Waitaha River have to be fully considered. These changes relate to various aspects of physical and ecological processes. The conclusions drawn therefore, partially rely on findings from other experts, such as those outlined in the freshwater and terrestrial ecology reports, the **Hydrology Report** and the **Sediment Report**.

The area of main flow difference will be from the Headworks at the entrance of Morgan Gorge to the confluence with Glamour Glen, which will contribute to the residual flow occurring in the main stem. This is also the most difficult part of the river to view from its steep banks, due to its incised sides and boulder-strewn riverbed. Access here is very difficult, and as the **Recreation Report** indicates, only experienced kayakers have ventured down this stretch of the Waitaha River. From Glamour Glen to the outfall, the residual flow will be somewhat increased after rain by a further 0.7 cumecs for 50% of the time.

The natural flow of the Waitaha, as described by the **Hydrology Report** is highly variable. The natural flow is above 4.8 cumecs for 100% of the time[64], 11.8 cumecs for 80% of the time and above 23.3 cumecs for 40% of the time. The flow regime is seasonal and depends on weather conditions. The median natural flow is 31.8 cumecs during the summer months reducing to 20.8 during the autumn. The median flow in winter is 10.3 cumecs.

The proposed residual (minimum) flow at the intake at Morgan Gorge is 3.5 cumecs which will increase over the length of the abstraction reach due to contributions from side streams. The proposed ‘take’ is 23 cumecs.

Hydrological modelling estimates that the minimum residual flow will on average extend for several days at a time before being broken by a fresh. For example, there are on average 14 times a year when the minimum residual flow state lasts less than a day, four occurrences a year when it lasts less than three days and about one occurrence a year when it lasts ten days[65]. During natural low-flow conditions, the lowest flows on average reach 17.8 cumecs in December, whilst in March they are 16.0 cumecs and in July they are 8.2 cumecs. At residual

[63] Amethyst, Kaniere Forks and Makay Schemes, Lake Rochfort, Arnold, Haast and Duffers are all considered run of river schemes. Wahapo is fed from a lake so not run of river.

[64] Natural low flows conditions average 17.8 cumecs in December, whilst in March they are 16.0 cumecs and in July they are 8.2 cumecs. Refer to The Hydrology of the Waitaha Catchment, Martin Doyle Consulting Hydrologist (2025), Appendix C.

[65] Hydrology Report, paragraph 5.7.

low flows, there will be an increase in the amount of rocks visible within and adjacent to the river channel than what would naturally occur.

For a take of 23 cumecs, the minimum residual flow will occur for 66% of the time (or for 241 days of the year). Clearly the higher takes increase the longevity of the residual flow through the abstraction reach[66].

Furthermore, the Hydrology Report notes[67] three points which influence the assessment of effects on natural character:

1. The 241 days per annum of residual flow will not occur as consecutive days, but normally as small intervals of time before a fresh or flood occurs
2. The residual flow of 3.5 cumecs is supplemented 300 m downstream of the intake by Anson Creek, and again by Glamour Glen. These two streams boost the residual flow below the Scheme intake considerably after rain, and for 50% of the time they add at least 0.7 cumecs, hence the residual flow below Glamour Glen is at least 4.2 cumecs for 50% of the time.
3. The river flow is very seasonal, and over late spring and summer the effect of the Scheme is much reduced, but conversely, in winter it is increased.

The long-term effects of the flow regime changes will include lower flows for longer periods of time, when compared to the natural river state. Natural freshes will continue to occur, although smaller freshes will be reduced to a greater degree. There will also be a greater visible presence of rocks within and adjacent to the river channel during low flows. The frequency of minor floods will reduce by 10%, however, the frequency of larger floods will remain unchanged[68]. These frequent freshes/ floods will, to varying degrees reduce the scale of the effects of the residual flow. Sudden releases of water from the by-pass valve at the Power Station will occasionally occur (approx. 6 times a year), however will be focussed within the active channel, with any increase in water somewhat characteristic of the large floods and freshes. Ongoing maintenance work in the river will involve an excavator clearing boulders and river gravel to ensure that river flows towards the intake and sluice gate. Similar maintenance activities will be required to clear flood debris from other instream structures such as the Macgregor Creek crossing.

The long-term effects on the natural character of the river in relation to changes in the riverbed, include both the active channel and exposed banks and beaches. The abstraction reach displays a range of morphological characteristics, from the steep sided gorge of Morgan Gorge immediately downstream of the weir, and the more open, rock and boulder laden single channel at the outfall. These morphological characteristics are an important aspect of the river's natural character. Flood flows and freshes are also important characteristics of the river, especially so for 'flushing' out the riverbed of sediments and some vegetation. Larger floods assist in rearranging the riverbed and river edges and banks. These larger freshes and floods will not be affected by the Scheme. While the duration and magnitude of the fresh flows through the abstraction reach will be slightly reduced, the **Sediment Report** finds that with the Scheme operating the Waitaha River's geomorphic character:

[66] The higher take (23 cumecs) will increase both the total number of days in a state of residual flow over a long period, and all periods of residual flow (consecutive days) will be longer. However, on many occasions the length of each residual period will only be slightly longer (say 12 – 24 hours), but on some occasions the period may be considerable longer (10 days or more). Martin Doyle (personal communication) 23 October 2013.

[67] Hydrology report (2025), paragraph 5.6.

[68] In-Stream Habitat Flow Assessment For The Waitaha River: Morgan Gorge to Douglas Creek, Cawthron Institute, September 2013, piii.

'will continue to be dominated by the action of frequent natural floods and very high and variable sediment loads delivered from upstream. In particular, the bulk of the Waitaha River's sediment load will continue to be carried by un-diverted flood flows.[69]

In terms of the changes to the ecology of the river and how this would affect its natural character, the **Freshwater Ecology Report** states that while the IFIM Report[70] modelling predicts an increase in filamentous algae growth, this is unlikely to occur in reality due to the regular flushing flows and low nutrient status of the river[71]. Similarly, while the IFIM modelling reports a decrease in diatom growth in the abstraction reach, algal density is already particularly low, reflecting the low nutrient status of the river and the impact of glacial flour and regular freshes on periphyton growth. The IFIM modelling predicts little change to habitat for native fish in the abstraction reach but does predict a reduction in suitable habitat for trout (which are blocked naturally by Morgan Gorge). Ultimately the morphology of the river and the biotic community will continue to be dominated/primarily influenced by the high disturbance regime of the system, which will not be greatly affected by the Scheme. Fish passage for kōaro (the only fish found up stream of Morgan Gorge) will be maintained. The construction of the weir at the top of Morgan Gorge will prevent trout access to Kiwi Flat while maintaining koaro access.

The **Terrestrial Fauna Report** concludes that notwithstanding the overall level of significance and ecological values, all bat and bird species recorded have a wide distribution range, and similar habitats are found widely throughout the West Coast. Consequently, effects on the values of significance for terrestrial fauna within the Waitaha Valley would be **less than minor** [72].

The **Whio Report** states that the Scheme has been designed to avoid, remedy and otherwise to minimise effects on whio (and other environmental values). There are mitigations recommended that will manage the construction and operation impacts on the significant whio population to achieve a residual less than minor effect and intended design measures (such as enabling whio ducklings access up the weir) and compensation measures that may achieve have positive effects[73].

Based on this, it is considered that the **effects of the abiotic and biotic attributes of natural character** on the natural elements, patterns and processes **of the proposed reduced flow through the abstraction reach will be low**.

The effects of the Headworks and discharge structures on the natural character are discussed in more detail within the following paragraphs.

4.3.2 Effects relating to the perceived visual change of flow on Natural Character

While the Waitaha River is an important landscape feature within the Waitaha Catchment, the visual connection to the river from public viewpoints is limited to varying degrees by the restricted surrounding access points obtainable close to the riverbed. Characteristics such as river channel shape, the balance of gravel banks and braids, and water colour and movement that underpin the visual experience of the river are not expected to be noticeably affected under

[69] Sediment Report, Section 3.8

[70] In-Stream Habitat Flow Assessment For The Waitaha River: Morgan Gorge to Douglas Creek, Cawthron Institute, September 2013

[71] Freshwater Ecology Report, paragraph 5.3(a), 3.10(b).

[72] Terrestrial Fauna Report, Section 2.2.3 and 2.1.1.

[73] Whio Report, Table 2: Environmental Effects on whio, pg 21 and Section 5 Key Findings and Conclusion, pg 32-36.

the Scheme. People using the river, such as kayakers, will be the most directly affected since they are the principal group of people who would see the river from sections within the abstraction reach.

Given the unpredictable nature of river flow, which mainly depends on precipitation in the Waitaha Catchment and snow accumulation, the perception of a flow encountered on an individual day will vary. Smaller freshes will be less frequent and the likelihood of encountering a low flow will significantly increase under the Scheme. River perception research has shown that differences in flow, in particular in the higher ranges, are very difficult to detect. Perception of rivers at low flows, in particular for instantaneous flows in relation to landscape aesthetics, are partially influenced by the residual flows. It is important to note that the residual flow is unlikely to be continuous for more than a week, due to the Waitaha Catchment's high rainfall. Seasonal changes in precipitation also influence the flow of the river.

Any difference in flows would be more apparent to those who use and/or are more familiar with the river and its current flow regime and abstractions. Kayakers who regularly access the riverbed and are familiar with the river's appearance at a variety of flows will detect flow changes more readily. When viewed at close distances, the subtle difference in flow such as velocity and depth, can be noticed more easily than from distant viewpoints. Knowledgeable and frequent observers of the river will be aware of some differences in the river's flow, particularly over the longer periods of low flows (i.e. winter) compared to the natural flow patterns, however they may not necessarily consider any visual changes adverse. People passing the Power Station and Headworks Site will understand that the river has modified river flows and sometimes this difference in flow will be more apparent. Changes to the 'soundscape', i.e. the noise of the water through the gorge, would result in a slightly reduced audibility.

The Waitaha River Hot Springs, which are accessible during natural flows (i.e. typically under 20 cumecs) will remain accessible for longer periods during the residual flow period, with the Scheme not affecting its hot water supply.

There would be limited visual change in the appearance of the river downstream of the Power Station, apart from a potentially greater amount of flow observable, due to the additional water being discharged into the river from the penstock. This would not be uncommon from other watercourses discharging into the river.

Based on this, while the section of the river with reduced flows (abstraction reach) will still have a natural appearance, the Scheme will change the perceptions of the Waitaha River as a natural wilderness river for those people who pass the Power Station or cross the swingbridge that are familiar with the River's natural flows. These people will understand that the river flow is modified. Based on this, the **perceptual aspects of natural character** on the natural elements, patterns and processes on the reduced flow regime, is **moderate**.

During a circuit trip or an equipment malfunction when the turbine stops running, a by-pass valve will start releasing water to maintain water discharge (10 cumecs) from the Power Station. While the by-pass valve is opening the machines will go into overspeed and continue to pass 40% of flow. This will likely occur about six times per year, for one hour on average, due to weather events causing a fault on the transmission network, or as a result of an internal plant/machinery malfunction. As a result of this, there will be a plume of water released in the tailrace direction approximately 100 m long, 40 m tall and 36 m wide. A siren will also sound, warning of this occurring. This will amplify perceptual aspects of natural character effects to a **high** adverse degree, during this infrequent, temporary and locally focussed procedural event.

4.3.3 Overall effects on In-Stream natural character

Based on this, it is considered that coupled with the reduction in flow, and infrastructure associated with the Headworks and Power Station Site, the overall adverse effects to natural character on this stretch of the Waitaha River are **moderate-low**.

4.4 Potential Effects of Headworks Structures

This section of the report considers the operational (permanent) effects of each component of the Headworks on natural character, landscape and visual matters.

The principal visual effects upstream of Morgan Gorge will relate to the weir and intake structure. Ancillary structures such as the headworks access portal entrance and access road will also be apparent to varying degrees from certain locations, such as the swingbridge and track.

Operational (Permanent) Components

- Intake structure (and submerged portal)
- Weir
- Headworks access portal and access road to riverside

4.4.1 Operational (Permanent) Effects of Headworks structures on Natural Character

In terms of natural character, the weir and intake structure will change the natural river flows through the Morgan Gorge. The height of the weir is proposed at 238 m above sea level (masl), with a small, lowered crest (or chute), being at 237.35 masl). This equates to the structure being less than 4 m in height above the riverbed, but up to 7 m in the sluice/diversion channel, secured by rock anchors at either end. The water will flow over the crest of the weir. The **Sediment Report**[74] states that there would be an initial backwater effect. Natural aggradation of sediment would occur relatively quickly behind the weir and a new equilibrium reached. However, after that time the weir would have little, if any effect on water flows or sediment transport.

The intake structure will be predominantly subterranean and located within the rocky bank of the true right of the entrance of Morgan Gorge, immediately adjacent to the weir. The concrete intake portal will be submerged and not visible. The invert level will be approximately 227 m, and portal sofit at approximately 237 m. The water level will operate at 238 m. This key design change means that this aspect of the Scheme is now submerged and not visible, further reducing the Scheme's visible presence.

At a higher elevation than the intake structure, is the headworks access portal, which will be approximately 5 m in width by 5 m high. This will be located above the normal operating water level of 238m and located with an invert level of 245m. This will be the only visible portal and will be designed to sympathetically sit within the existing rock. Existing moss, lichen and ferns will be encouraged to further integrate this structure into the landscape.

[74] Sediment Report, Section 3.4

Linking the Headworks access portal to the river, will be a short access road (approximately 60 m in length), of approximately 12 m in width and unsealed. The access road will require tree removal and some earthworks (i.e. cuts and batters no greater than 2 m) to gain alignment over the steep terrain and will be no steeper than 1 in 6. The road will be capable of transporting a maintenance vehicle to the intake structure, which will be stored inside the upper portal. The actual alignment will be agreed on site following a detailed survey and will avoid, where practicable, large trees and rocks.

The natural character of this part of the Upper Waitaha Catchment will be modified from its natural state by the introduction of these structures and roads and change the river's local morphology.

Due to the dynamic nature of this river and the influence the river has had on sculpting the landscape, the physical effect of the structures within this part of the Scheme on the natural character will be localised. Periods of freshes and floods will continue to occur at reasonably regular intervals, meaning that water will quickly accumulate for short periods at the entrance to the gorge, often submerging the entire intake structure. Sedimentation and river transportation of sediments will continue to occur through the gorge. Ongoing maintenance work in the river will involve an excavator clearing boulders and river gravel to ensure that river flows towards the intake and sluice gate.

Koaro will also be able to travel through the abstraction reach. The **Sediment Report**[75] outlines that the Scheme will not alter the natural processes and fluvial features or physical characteristics of the river, particularly through the abstraction reach. This is due to the fact that the large boulders within Morgan gorge and the 'rock garden' downstream of the gorge and immediately upstream of the Power Station Site have low mobility (i.e. do not move much even during high floods) therefore finer material that is generally supplied at rates less than the river's capacity to transport such material overpasses these obstacles. River bedload is understood to remain stable through the abstraction reach.

Based on this, and the findings in the previous sections of this report, the natural elements, patterns and processes of the proposed flow reduction through the abstraction reach will be locally affected to a **moderate to low** degree. With the additional physical elements present of the intake and weir structure, this effect is amplified to **moderate-high** natural character effects at this localised Headworks Site. The Waitaha River will continue to sculpt and erode the landscape, however the presence of the weir, intake structure and associated access road at the Headworks will erode the local natural character values of the entrance to Morgan Gorge.

4.4.2 Operational (Permanent) Effects of Headworks structures on Landscape

The majority of the work associated with this area will be subterranean. Permanent 'above ground' landscape effects will arise from the intake structure, the weir, the headwork access tunnel and short access road. Due to the location of the intake structure and intake portal at the entrance to Morgan Gorge on the rocky true right bank of the river, there will be limited vegetation removal within the margin of the waterway and limited disturbance of the river edge rocks. The operational footprint of the Scheme area will be small in comparison to the broader landscape setting.

The Headworks will be located at the entrance to Morgan Gorge, which will to varying degrees adversely affect and reduce the remote and natural values of this part of the Upper Waitaha

[75] Sediment Report, Section 3.1

Catchment. The physical, associative and perceptual values of Morgan Gorge itself, will, however not change in a significant way. The principal factor to affect the characteristics of the Gorge will be the introduction of the weir and the reduced water flow. The infrastructural components of the Scheme will be at the entrance of the gorge and will not directly affect its main bulk, however, will affect the natural aesthetic coherence of the entrance to Morgan Gorge. Other characteristics such as the Morgan Gorge's internal vertical, river sculpted walls and the presence of the Waitaha River Hot Springs will remain unchanged. A **Landscape Management Plan** outlines techniques to further integrate and mitigate the headworks at this location.

The proposed insertions will be designed carefully, to respond the highly natural landscape. The weir will appear low across the river during normal and low flows and be almost submerged during high flows. The headworks access portal and associated access road will appear as the most visible, however will be integrated into the rock as much as possible, where lichen, moss and ferns will be encouraged to grow to further reduce the visual presence of the Scheme.

Whilst there will be a localised disturbance to the highly natural landscape, this would be associated with the part that most people would visit, either walking (via the swingbridge and track), or helicoptering-in to land at Kiwi Flat. The more remote parts of the Upper Catchment would remain untouched.

Based on the permanent infrastructure associated with the intake, and how it affects the local landscape values, it is considered that there will be **moderate-high** landscape effects. There will be a sense of reduced naturalness, reduced wildness and reduced sense of remoteness due to the presence of the Scheme, however this has been designed to reflect those landscape values as much as possible and prevent potential higher adverse effects.

4.4.3 Operational (Permanent) Effects of Headworks structures on Visual matters

The low profile of the weir, the rapid up-river deposition of gravel infill to its top level and relatively small scale of the intake structure, will restrict to certain degrees its visibility from within the Upper Waitaha Catchment. The principal view towards the weir and intake structure will be from the river itself, from the swingbridge and from various locations along the river channel's edge accessed from the track on the true left (which will of course vary depending on the type of flow).

The **Recreation Report** states that the vast majority of kayakers will portage Morgan Gorge from the bottom of Kiwi Flat and that the rugged existing environment can contribute to the kayaking experience.

To assist interpretation of the visual effects of the Headworks, a number of **Visual Simulations** have been undertaken (**IN1-2**). They illustrate a range of near and distant viewpoints that people may view the Headworks from. Technical advice including scale/ reading distances is included within the separate document.

Visual Simulation IN1 is taken from a location on the true left riverbank at a flow of approximately 5.8 cumecs[76]. It is looking directly at the intake and swingbridge area at a distance of some 60 m and within what could be considered proximate to the track alignment. During periods of lower flows (i.e. below 15 cumecs), it is possible to get quite close to the riverbed.

[76] Martin Doyle communication (19 September 2024).

The Visual Simulation illustrates that from this viewpoint, the actual viewpoint location would be partially submerged at a flow of 5.8 cumecs. The water level would extend slightly upstream of the proposed weir and intake structure and appear to cover more rock. The intake structure itself would be evident, as would the exposed upper parts of the weir. The intake structure would, however, be moulded to fit within the existing rock features. Any exposed concrete would be weathered to varying degrees although exposed cut rock faces would remain evident. Above the intake structure would be a headworks access tunnel, which would appear as a natural hole in the rock. The battered slopes of the intake road would also be partly visible from this viewpoint, albeit that parts of the access road would be 'behind' large boulders and rocks. After approximately 10 years, moss and small plants will have established, assisting in softening this cut. Where possible, small pockets/ ledges will be created to allow for organic material to collect which would assist plant growth.

Due to the aspect of the view, the intake will be seen against a dark background, which, for most of the year, will appear in shade increasing the level to which it is visually recessive. During periods of high flows, the weir and intake structure would be submerged. Incorporated into the design will also be a safe portage for kayakers to gain access around the structure to launch further downstream.

The Scheme would introduce semi-industrial type features into a landscape virtually devoid of modification. From this close up vantage point, the headworks access portal and access road would be the most visible, along with the intake structures and weir as they are seen within the river. This current design is considered a visual improvement from the previous design, where the intake portal was visually present in the rock above the intake. This is now submerged. The remaining parts of the Scheme will be largely subterranean and therefore not visible. Based on this, the visual effect from this viewpoint would be **moderate**.

Visual Simulation IN2 is taken from an elevated location within the centre of the swingbridge, above the entrance to Morgan Gorge, looking upstream towards the intake and weir structure at the Headworks. The river is at a flow of approximately 5.8 cumecs.

The weir would act as a barrier for any slightly backed up water. The residual flow of 3.5 cumecs would be flowing over at weir, with the remaining 6.5 cumecs being directed into the intake structure. More exposed rocks would be evident within the gorge, due to the reduction in water entering the Morgan Gorge. The 'soundscape' of roaring water would also lessen at the residual flow.

As with Visual Simulation IN1, from this elevated viewpoint, the Scheme would introduce semi-industrial type features into a landscape virtually devoid of modification. It would be seen (aerially) as part of the entrance to Morgan Gorge. Mention has been made of potentially moving the swingbridge away from the entrance of Morgan Gorge within the **Recreation Report**[77], however, from a visual perspective it is considered that this would not mitigate elevated views to a substantial degree and could, potentially, due to the terrain if relocated, create further visual effects relating to benching and placement of the bridge. Based on this, the visual effects from this viewpoint would be **moderate-high**.

From distances beyond the immediate vicinity of Morgan Gorge, such as close to Kiwi Hut in the upper Kiwi Flat area, the Scheme would not be noticeable, and would be very difficult to see, as for most of the year, the intake structure and weir would be seen against a dark, rocky background in shade. From these distances (i.e. approximately 800 m), the intake structure and associated temporary backed-up water (at 5.8 cumecs) will not be discernible. Based on this, the magnitude of change from this viewpoint would be **low**.

[77] Recreation Report (2025), paragraph 3.33.

From more elevated locations, such as from a location on the Headlong Spur track further up the Catchment, it is not possible to discern the intake or weir structures at this elevated location. The overall panorama of the Waitaha River around Kiwi Flat provides a notable reference point, as does the mountainous topography around Morgan Gorge. The grandeur of the landscape at this scale dominates the viewers impression and any local modification, including Kiwi Flat Hut would be very difficult to discern. Based on this, it is considered that the visual effects from these distances would be neutral.

4.4.3.1 Visual Amenity Effects for the Headworks Summary

This part of the Scheme is located within a reasonably discrete part of the Valley, with its form nestled within rocks. The concrete finish of the intake and weir will also, to varying degrees, blend in with the surrounding rocks and boulders, due to its colour, texture, limited presence above the water and overhanging encroaching vegetation. Over time, approximately 5-10 years, moss and lichen will grow on the upper parts of the structure, further reducing its visual prominence. Frequent freshes and floods will ensure that the lower parts of the structure will be clear of moss and lichen. It is anticipated that the proposed structure will not draw the viewers' eye to it or dominate the landscape setting due to its discrete location.

Based on this the permanent visual effects at this localised Headworks Site are assessed as being at worst **moderate-high** at near-distance views (i.e. Viewpoints IN1 and IN2) reducing to **low** and **neutral** at more distant views.

4.4.4 Construction Effects associated with the Headworks

Construction Components:

- Earthworks associated with construction of intake structure.
- Regular helicopter activity.
- Temporary diversion of river for weir construction.
- Blasting and excavation of tunnel portal.
- Temporary Construction Staging Area 1 usage for storage of equipment, materials etc
- Temporary access road from access portal to Construction Staging Area 1.
- Vegetation clearance for access roads from tunnel portal entrance to Headworks and to Construction Staging Area 1.

The **Project Overview** report and **Project Description** outlines the likely construction sequence of the intake and weir structures. The first area of work will involve the establishment of a temporary worksite (referred to as Construction Staging Area 1). The two tunnels will be excavated from below Morgan Gorge to Kiwi Flat.

Some investigative geotechnical drilling will be one of the first activities to occur at the headworks, involving up to six vertical locations and one horizontal drilling location. Each borehole will be between approximately 20m and 250m in length, and some limited vegetation clearance may be required around each borehole drill site. The establishment of the Construction Staging Area 1 site will follow and will support the geotechnical drilling with a range of temporary structures and activity areas, including a helipad (for the Power Station), and emergency hut, amenity buildings, laboratory geotechnical testing and fuel tanks. Further, a pump site, taking up to 50 litres of river water per minute will be required adjacent to the Headworks site for the drilling rig.

Construction of the weir and intake will initially involve the use of helicopters. The degree to which these are used will depend on the final plans for the tunnel and degree of access for machinery. Helicopters could be used for delivery of materials, equipment, personnel etc.

Construction Staging Area 1 will house the contractors' facilities which will be located on an alluvial flat upstream of the tunnel portal entrance, which will also require the formation of approximately 140 m of road. The final width of the access road to Construction Staging Area 1 is approximately 9 m. The area required for this staging area will be 0.7 hectares at a maximum within an area of vegetation classified within the **Vegetation Report**[78] as a dense, closed-canopy hardwood shrub cover, typically 3-5 m in height, comprising a range of indigenous species. This area will act as a storage location for machinery and any temporary stockpiling and will be difficult to see due to the vegetative screening. A heli-pad will also be located within this area. Following construction, all temporary areas, including the small access road to the contractors' facilities will be removed. Rehabilitation will be in the form of natural regeneration after site treatment such as scarification of compacted surfaces and spreading/distribution of any accumulated organic soil material as outlined within the Landscape Management Plan following constriction (and in consultation with DOC) OBJ

Excavation of the tunnels will start from the Power Station Site. Large machinery will also be present within a confined compound at the Headworks site. Once the tunnels are completed then the headworks access road can be built which will enable works to continue on the Headworks structures with less reliance on helicopters. The diversion intake channel will be built first as this will enable diversion of the river so that construction of the weir can commence. Subterranean excavation works and settling basins may occur concurrently to external works at the intake structure.

Spoil from the tunnel excavations will be initially stockpiled within the Power Station area then transported onto adjacent privately owned land where it will be used to develop and improve existing farmland.

River flows through the construction period will be closely monitored, both upstream at the intake and downstream of the construction areas. Appropriate sediment control measures will be put in place to avoid any discolouration of the river during construction. Any spoil will be deposited in a nominated area away from the riverbank, above flood levels and disposed of regularly.

The effects associated with constructing the Headworks, including the weir, intake and associated intake access road and main tunnel, will occur within an area previously unmodified. The introduction of heavy machinery and earthworks will erode the remote and natural values of the area. There will also be helicopters used as part of the construction of the weir and intake. It is anticipated that there could be an average of eight movements per day between the Headworks and the Waitaha Valley during the initial work stages of the intake construction and would only be used during daylight hours. During certain activities, such as concrete pouring, there may be intense helicopter activity for a number of days, although these will not all be consecutive days. This would involve helicopter movements between the Power Station Site and the Headworks.

Any lighting will be primarily associated with the tunnelling phase at the portal, which will occur throughout a 24/7 period. Where practicable, lighting will be colour rated to 3000k and designed to limit upward light/light scatter.

The construction activity will, however, be confined to a limited footprint (approximately 1.3 hectares) within a small area of the Valley, would be partly screened by existing vegetation and

[78] Vegetation report (2025) Table 2.

will be temporary. As outlined within the **Vegetation Report**, any earthworks could, where practicable, be seeded or replanted using indigenous species typical of the area. Due to the West Coast conditions, regeneration will occur quickly, however appropriate preparation works will need to occur to the land after removal of equipment to provide the best conditions.

Construction effects will affect landscape values, notably those remote, wildness and naturalness values. These values will be affected by the presence of machinery, helicopter noise, blasting and stockpiling. Natural Character effects will be adversely affected, through the temporary in-river works and construction of the tunnels and weir/ intake structures. Visually, this will appear as a local node of industrial-type activity.

Based on this, the landscape, natural character and visual effects on the construction of the Headworks will be **high** however, restricted to a small area on a temporary basis.

4.5 Potential Effects of the Power Station and switchyard

Downstream of Morgan Gorge, at the point where the abstracted water is returned to the river, the principal natural character, landscape and visual effects will rest with the following associated components:

Operational (Permanent) Components

- A Power Station (partly buried), 35 m x 15 m, and some 4.5- 6.0 m high (above the rock embankment elevation). Roofline will be double mono-pitch, and angled 90 degrees to the river, coloured in dark, recessive colours.
- A 66kV switchyard (25 m x 15 m) fenced with maximum height of poles being 15m, and 15.5m high transmission poles, a service area, and a car park (within the Power Station Site).
- A buried penstock from the lower portal to the Power Station with bifurcation (i.e. splits into two).
- A tailbay, of concrete construction 16 m long by 15 m wide to a depth of approximately 8 m. The tailrace outflow level is set to EL 126.50 m, which is higher than the river level at average flow of EL 125.00 m. Natural boulders will be used to visually soften its appearance.
- An access tunnel portal, with post and wire mesh (or similar) to prevent falling rocks (some 60 - 70 metres in length).
- Concrete wingwalls designed to retain the rock fill and require water proofing and drainage measures. Drainage provided to ensure water drains back into the river during low flows. Water will also be collected and either drained or pumped from the power station to the tailrace. The rockfall prevention walls to be visually mitigated by vegetation.
- A stop bank and associated flood protection works, including at Alpha Creek.
- Naturalised replanting.
- Circuit trip or equipment malfunction: plume of water released in the tailrace area from the bypass which would likely be 100 m long, 40 m tall and up to 36 m in width. This will likely occur about six times per year, for one hour on average, due to weather events causing a fault on the transmission network, or as a result of an internal plant/machinery malfunction.

4.5.1 Operational (Permanent) Effects of structures within the Power Station Site on Natural Character

All components of the Scheme in this section of the river are contained within the river margins or banks of the Waitaha. The Power Station is located on a raised river gravel bank, partially covered with indigenous shrub hardwoods, tree ferns, monocots, ferns and introduced grasses and broadleaved herbaceous species. Due to the introduced colonising vegetation on this small stretch of the riverbank, the degree of natural character of this localised area of the Waitaha is not considered as high as other parts further upstream, where indigenous vegetation predominates.

The Power Station will be located on a concrete raised foundation, however much of the infrastructure associated with the Power Station will be located below ground. New built forms will be present on the concrete foundation. As such, the natural character of the raised river gravel bank will be altered, where natural elements, patterns and processes will be locally eroded.

Extending from the Power Station will be the tailbay for approximately 16 m and be approximately 15 m wide, with a depth of 8m, which will continue into a tailrace**.** The establishment of the tailrace will require the removal of a portion of the rocky Waitaha riverbank and riverbed. Alluvial plant species will also be disrupted. The tailrace water will enter the Waitaha at a rate determined by what the take is, up to the proposed maximum of 23 cumecs. Natural character effects at the outfall will relate to the re-entry of the diverted water back into the river. The **Sediment Report**[79] states that the water outflow would be slightly less turbid (by virtue of the desander) than what it would be under normal conditions. Despite this, re-combined flows below the Power Station should only have reduced clarity during any flushing flow releases along the abstraction reach. This would be a short-term effect that produced sediment concentrations within the range experienced during natural runoff events.

The tailrace will be angled along a natural depression within the alluvial gravel bank to avoid significant earthworks. A low weir located at the downstream end of the tailrace provides the elevation change for a drop into the river to prevent predatory fish from entering the tailrace. Boulders from the river will be placed in this area, to provide further protection and to better naturalise this part of the tailrace as it enters the Waitaha River. Natural character effects will also arise from stop bank protection that will align the river margin from the outfall to close to where the exit tunnel portal is located.

Whilst there will be an area of physical disturbance to the Power Station Site, there will also be potential disturbance in the area of land to the north of the immediate Power Station Site, where some existing stands of large shrubs and tall grasses exist amongst the raised gravel area. It is anticipated that much of this area will be utilised for the construction of the Power Station, and then rehabilitated utilising native species. However, it maybe that this area is not disturbed. Either way, it is proposed that native species be planted around the Power Station Site, once constructed, to improve the local naturalness of the area.

In addressing the rockfall prevention wall (or wingwall) close to the steep cliff to the east of the Power Station Site, it is proposed to visually mitigate this by creating opportunities for a ‘green wall’ or vegetated wall to become established. Measures to encourage lichen, mosses, ferns and other local vegetation will be designed into the fabric of the structure and may include geobags or crevices/ hollows/ shelves. It is also proposed to green the secured rock

[79] Sediment report, Section 3.4.

stabilisation area behind the wingwall, which will, overtime, blend this in with the green cliff wall. Refer to the Landscape Management Plan.

Some waterway training work will be required to Alpha Creek at the access road crossing, to reduce the risk of washout. A box culvert with side river training bunds topped with rip rap for channel control, and rock groynes, will be required which will require some vegetation removal.

The natural elements, patterns and processes of the Waitaha River will continue, albeit at a reduced flow to the point where the water used for electricity generation re-enters the river.

During operation, there may be a circuit trip or an equipment malfunction when the turbine stops running, a by-pass valve will start releasing water to maintain water discharge (10 cumecs) from the Power Station. While the by-pass valve is opening the machines will go into overspeed and continue to pass 40% of flow. This will likely occur about four times per year, for one hour on average. As a result of this, there will be a plume of water released in the tailrace direction approximately 100 m long, 40 m tall and 36 m wide. A siren will also sound, warning of this occurring. This will amplify adverse effects of natural character effects to **high** during this infrequent, temporary and locally focussed procedural event.

The Power Station will introduce new, constructed elements into a currently undeveloped part of the Waitaha River. This will represent a modification of the natural elements, patterns and processes at this localised area. The Power Station (and tailrace) and modifications to 140m of Alpha Creek will artificially modify the riverbank. Landscape restoration techniques will be employed to ensure that river boulders are naturally distributed and assist in providing a natural 'edge' to the structures via visually softening. New native planting will also assist to integrate the Power Station area into its location. As a result, it is considered that **the permanent natural character effects at this localised Power Station Site are assessed as being moderate-high**.

4.5.2 Operational (Permanent) Effects of structures within the Power Station Site on Landscape

The **Vegetation Report** outlines that the Power Station Site occupies a relatively recent alluvial flat that has a flood channel around its eastern margin. Vegetation cover is typically grass, shrub and tree ferns, reaching heights between 0.5 and 0.8 m[80]. A few regenerating forest trees are evident; however, these are in very early stages of growth and are small. From a vegetation impact perspective, the Power Station Site will occupy a footprint of approximately 0.70 hectares with a further 4.00 hectares for the access road and transmission line. The footprint of the Power Station building will be approximately 35 m x 15 m, with a maximum height of between 4.5- 6.0 m above the rock embankment. The footprint of the switchyard will be approximately 25 m x 15 m and will contain many electric features that are typical of a switchyard, including a 15 m high (maximum) tower. The switchyard will look similar to the Amethyst switchyard however it is proposed to alter the appearance of the Power Station to use a darker material to better integrate the structure into the landscape.

[80] Vegetation Report, page 53.

Image 23: Example of the Amethyst Power Station and switching station

As outlined earlier, stop bank protection will be required to protect the Power Station, switchyard, tailrace and penstock. It is proposed that an armoured-rock stop bank, faced using river rocks in a natural way will be located adjacent to the footprint of the proposed structures.

The built component of the Power Station Site (i.e. the Power Station building and switchyard infrastructure) will be the most visual components of the area, along with the raised concrete foundations, portal and wingwall and tailrace. It is proposed that the Power Station will sit on raised concrete foundations and will be clad in dark recessive colours with a mono-pitch roof. Much of the internal parts of the Power Station will be below ground (some 5-6m to house two horizontal shaft Francis turbines).

The switchyard will comprise an area of 25 m by 15 m and be fenced, with 1 transformer (of up to 66 kV), and transmission line infrastructure for connection to local distribution at the State Highway. The maximum height of the poles in the switchyard will be 15 m. A transformer will be located within a bunded area to manage potential oil spills.

The rockfall prevention wall (or wingwalls) will be up to 6m in height and located adjacent to the exposed tunnel portal entry. To visually soften its appearance, it is proposed to mitigate this by creating opportunities for a ‘green wall’ or vegetated wall to become established. Measures to encourage lichen, mosses, ferns and other local vegetation will be designed into the fabric of the structure and may include geobags or crevases/ hollows/ shelves able to withstand the climate. This will assist to visually soften the appearance of this when seen against the vegetated cliff to the immediate east. In addition, a rock protection system (to prevent falling rocks), which may consist of a post and wire mesh structure (or similar) and is likely to be up to 60 m or 70 m in length will need to be established around the access portal.

Spoil disposal from the tunnel excavations (approximately 102,500 m³), along with other spoil from other aspects of the project (including the Power Station site) will be placed on nominated farmland outside of the Conservation Area.

The location of the Power Station is located within the ONL; however, it is not located within the most remote and most natural parts of the ONL. The Power Station is also located close to the modified paddocks, on a raised river gravel bank, partially covered with indigenous shrub hardwoods, tree ferns, monocots, ferns and introduced grasses and broadleaved herbaceous species. Natural bush extends around the eastern extent of the Power Station Site, and on the

opposite side of the river. The mountainous landscape at this part appears less enclosed, and more open than that further south, retaining a relationship with the openness of the modified valley further north.

The Scheme will modify this natural area, by introducing built forms and structures uncharacteristic to this setting. The presence of the Scheme in this location will extend rurally based activities into the more natural setting of conservation land. Whilst landscape values, such as wildness, remoteness and naturalness will be affected, these will be localised to the gravel bank. Efforts to visually integrate the proposal into the landscape, such as careful siting, dark building colours, low building profile and vegetated walls, assist to reduce potentially larger landscape effects. The river will continue to form an important and focal part of the landscape, along with the vegetated river margins and smaller watercourses draining the hillsides. The proposed Power Station will form a small incursion into the natural landscape, with its effects being reasonably well contained. Occasionally, plumes of water up to 30m in height will be noticeable from the close to the Power Station, however these are local to the Power Station Site and temporary.

Although there will be some vegetation loss, mostly associated with the alignment of the access road, and will adversely affect some landscape values, including wildness, remoteness and naturalness values, adverse **landscape effects** at a local scale are **moderate**.

4.5.3 Operational (Permanent) Effects of structures within the Power Station Site on Visual matters

The introduction of these new constructed features, nestled on the banks of the Waitaha River will be viewed from a number of locations, including from the existing walking track and from the river itself.

Due to the location of the Power Station adjacent to steep terrain, the visual catchment is reasonably defined.

To assist with interpretation of the visual effects of the Power Station Site, a number of **Visual Simulations** have been prepared **(PH1-5)**. They illustrate a range of near and medium-distant viewpoints that people may view the structures area from. They illustrate the Scheme at 10 years post development.

PH1 represents a simulation from a location on the raised gravel bank on the track, some 160 m distance to the north of the Power Station. This is the view that a tramper would experience as they are about ascend up Alpha Creek towards Morgan Gorge and Kiwi Flat, or as they are about to walk out of the Upper Waitaha Catchment, if they use the existing track. A newly aligned part of the track, which is partly illustrated on **Figure 10** and more comprehensively on **Figure 8A** of the Graphic Supplement extends from Alpha Creek slightly away from the river and within existing bush, connecting with the existing track to the north, at the river, therefore preventing opportunities for close up views of the Power Station to be obtained.

The Visual Simulation demonstrates that there will be a change in view from this location of the existing track. The upper portions of the Power Station and associated poles and tower associated with the switchyard will be visible above the planting. The Visual Simulation has illustrated a scenario where all existing vegetation on the gravelly-raised bank will be removed as a result of implementing the Power Station, switchyard and tailrace works. There is a possibility that some existing vegetation could be retained, which, would further assist to screen the built forms from this section of the existing track.

As illustrated, with either scenario (i.e. complete removal of vegetation, or some vegetation removal), there would be extensive rehabilitation planting proposed in this location, which would assist in visually anchoring and partially screening the Power Station and ancillary structures into the landscape. There would be added growth of vegetation associated with the slope protection works behind the access tunnel portal. This would visually soften the vegetated 'wall' behind the Power Station and rock prevention system and appear similar with a profile of a natural slip.

From this viewpoint, the Power Station structures would be noticeable, however would appear within a context where the vegetated backdrop and river corridor will remain the dominating factors. Based on this, the magnitude of visual effects is considered **moderate**, however this is reduced for users on the alternative walking track, where views would be more limited.

PH2 illustrates a view from close to the water, on the rocks, at a lower elevation than the existing track, looking south, some 165m north of the Power Station. This location represents one of the last (or first) opportunities to interact with the river before the track ascends up part of Alpha Creek southwards towards Morgan Gorge, or as one has descended from the higher inland part of the track, tracking northwards towards exiting the Upper Waitaha Catchment (should users be on the existing track). This location could also represent a kayaker on the water.

From this vantage point, the Power Station and upper parts of the switching station are evident, as is part of the trailrace. As with PH1, the Power Station and switchyard appear as small components in the landscape, despite the 165m distance of the viewpoint to the Power Station. Boulders and rocks will be redistributed around the retaining raised platform in which the Power Station will sit, and coupled with proposed new rehabilitation planting, this will visually soften the appearance of the built forms. Natural dark colours associated with the Power Station will assist to blend the building into the natural environment. The broader setting of the vegetated cliffs and rock-strewn river corridor will continue to predominate. Based on this, the magnitude of visual effects is considered **moderate**, however this is reduced for users on the alternative walking track, where views would be more limited.

PH3 from a location on the true left of the Waitaha River, some 60m from the Power Station, looking in an easterly direction. This vantage point, similar to PH2, is taken from a lower position than the Power Station, and closer to the water of the river. This view could also represent a kayaker looking eastwards (or to the right).

The Visual Simulation demonstrates that the Power Station and associated switchyard will be clearly discernible from the true left side of the Waitaha River. Although not simulated, views towards the tailrace will also be observed, where boulders and rocks would be carefully located to channel water back into the river. Rocks and boulders would also be located close to the retaining wall, to assist integrate this structure into the riverine environment.

Any rock protection works on the slope to the rear of the Power Station will appear to be vegetated over in the five years this simulation is meant to represent. The rock protection wall will also be appropriately 'greened', either by encouragement of ferns and mosses growing on the wall or by way of grow bags.

The view from this vantage point will change from one of a slightly elevated alluvial bank covered in early successional vegetation species to one of an area supporting a Power Station, areas of hard standing, retaining wall and a tailrace. The more prominent vegetated cliff immediately behind the Power Station will remain providing a backdrop to the view, where the building and associated structures will not penetrate the skyline. Rehabilitation planting will assist to varying degrees to assimilate the structures into the landscape and where possible, retained vegetation on the gravel bank will be retained. Despite this, building and switchyard's

visual presence will still be evident, however to a much lesser degree than if the planting was not in place. Based on this, the magnitude of visual effects from this location will be **moderate-high**.

PH4 taken from a southerly location, looking northwards towards the Power Station. It will be possible to access that part of the gravel bank by walking along the access road to the east of the Power Station.

The view is orientated south towards the more open plain of the Lower Waitaha Valley, where the mountainous landscape appears more distant from views. The view illustrates that the proposed Power Station would be clearly evident, as would the 'top' of the switchyard located to the south of the Power Station. River boulders and rocks would be evident extending to the raised retaining wall, and this would be accompanied with a palette of indigenous planting, which would assist to further visually soften the built forms.

The Visual Simulation illustrates that the tunnel portal would not be visible from this location, nor would the rock protection works or associated rock protection wall. The tailrace would appear as an area of boulders extending into the river. The relatively low-profile and dark colouration of the Power Station means that the building appears well-integrated into the landscape. As with Photo Simulation PH1, based on the elevated and reasonably close location of this viewpoint the adverse visual effects are considered **moderate**.

PH5 is taken from a location on the existing true right track, some 320m to the north of the Power Station looking in a southerly direction. As mentioned earlier, views from the alternative walking track would be more limited as this alternative track would be located away from the river for a section to immediate north of the Power Station, within existing vegetation, which assists to curtail views.

This vantage point illustrates one of the more northerly views one might experience of the Power Station from the existing track due to the grassy clearing. From this viewpoint, the vegetated cliff located immediately behind the Power Station is clearly evident, as is the presence of the river. The alluvial gravel flat is not as evident, due to riverbank vegetation partially obscuring views.

The Visual Simulation demonstrates that from this distance, the Power Station and switching station appear as small elements within the landscape, and that the riverine landscape continues to dominate the view. Partial views of the Power Station from this location will be evident, due in part to the angle of the view and due to both intervening existing mature vegetation flanking the Waitaha River, which partially obscures the Power Station and the proposed vegetation located immediately adjacent to the Power Station. The water exiting the tailrace will also form an important part of the view, with the lower portions of the tailrace being formed by natural boulders and rocks.

Occasionally, plumes of water up to 40m in height will be noticeable from close to the Power Station, potentially amplifying visual effects of the Scheme to a wider area, however these plumes of water would be infrequent, temporary, lasting for one hour on average.

The proposed Power Station access road and electricity transmission corridor will extend in a direction away from the walking track in this location. Therefore, based on this, the magnitude of visual effects is considered **moderate- low** with regards to the Power Station, switchyard and tailrace, however this is reduced for users on the alternative walking track, where views would be more limited to non-existent due to intervening existing vegetation block views.

4.5.4 Construction Effects associated with the Power Station Site

Construction Components include:

- Vegetation clearance for Power Station, Switchyard, access road and Alpha Creek.
- Establishment of Construction Staging Area 2.
- Drill and Blast for tunnel.
- Construction works to construct Power Station/ switchyard.
- Construction of tailrace.
- Flood protection (including Alpha Creek).
- Presence and storage of heavy machinery/ equipment.
- Stockpiling and lay down areas.
- Earthworks associated with tunnel.

The excavation for the Power Station and switchyard will be located on a raised river gravel bank, partially covered with indigenous shrub hardwoods, tree ferns, monocots, ferns and introduced grasses and broadleaved herbaceous species. There will be a localised change of landscape character, from semi-remote and semi-natural, to semi- industrial. This change will be unavoidable due to the earthworks and heavy machinery required.

As at the Headworks area, some investigative geotechnical drilling will be one of the first activities to occur, involving up to six vertical locations and one horizontal drilling location. Each borehole will be between approximately 20m and 250m in length, and some limited vegetation clearance may be required around each borehole drill site. The establishment of the Construction Staging Area 2 site will follow and will support the geotechnical drilling with a range of temporary structures and activity areas, including a helipad site (for the Headworks), and emergency hut, amenity buildings, laboratory geotechnical testing and fuel tanks. Further, a pump site, taking up to 50 litres of river water per minute will be required adjacent to the Power Station site for the drilling rig.

Construction Staging Area 2 will be located on an alluvial flat between Alpha Creek and the portal. The area required for this staging area will be approximately 0.8 hectares. This area will act as a staging area for construction of the tunnels, Power Station, substation, lines for conveying electricity (construction and operation), and the access road. More specifically the area will be used for storage of materials and equipment, refuelling, small scale stockpiling of spoil, water treatment systems (including sediment protection ponds), temporary staff facility buildings. A heli-pad will also be located within this area. Following construction, all temporary areas, will be removed. Existing vegetation between this staging area and the rack will be retained, as much as practicable to provide screening. Active rehabilitation in the form of seeding or replanting on the upper terrace surfaces outside of the riparian margin is outlined within the **Landscape Management Plan**, following construction (and in consultation with DOC).

The principal views towards this area will be from the walking track on the true right bank of the river which extends immediately past the Power Station Site for about 700 m, as well as from a short section of the river itself and from the banks of the river, directly opposite. Although the visual presence of heavy machinery/ equipment and earthworks and vegetation clearance will be apparent, this will be localised. Temporary fencing and screening will assist in containing the construction effects, however there will be the visual presence of vehicles utilising the access

road. Traffic movements will be dependent on the stages of construction. For example, during the busiest period when tunnel excavations, Power Station and transmission line construction is overlapping, there is the potential for up to 28 truck movements per day (14 trucks) but their movements will be confined to between the construction site and adjacent farmland. Due to the relatively open nature of the site for the Power Station, views towards the construction area will be open for a section of approximately 500 m.

Direct landscape effects would result from the removal of vegetation. As detailed within the **Vegetation Report**[81], and especially within Table 2 of that report, there will be approximately 0.698 hectares of vegetation potentially affected at the Power Station area cleared (including the Power Station, switchyard, tailrace, access ramps, turning bay, slope protection works, and river protection). The report also states that there will be a 17.5 m (average) wide corridor for the access road and transmission line within which vegetation clearance will occur. A potential disturbance area of up to 0.7450 hectares may also be impacted during construction.

Essentially the majority of the vegetation on the alluvial flat will be cleared as part of the construction footprint. Vegetation will also be lost to accommodate the work required around Alpha Creek. The **Vegetation Report** states that although the majority of the vegetation to be removed will be indigenous species, it is considered that this vegetation type is not unique and can be appropriately rehabilitated.

There would also be some vegetation removal associated with the slope protection works immediately behind the access tunnel portal and slope protection wall. This protection would essentially be some recontouring of material, which will have netting overlain on it and revegetated utilising indigenous species. Noting how quickly plants establish in this area, it is envisaged that there would be sufficient coverage of plant growth over this area within five years.

There will be permanent river training bunds on the Alpha Creek side of the Power Station area and temporary bunds along the Waitaha River to reduce risk of washout of the access road to protect Construction Staging Area 2.A box culvert will be implemented at Alpha Creek, with side bunds topped with rip rap for channel control above and below the culvert. The width of the combined road and lines corridor during construction will be approximately 17.5 m in this area. It is anticipated that up to 50% of the disturbed area around Alpha Creek will regenerate.

Further direct landscape effects would result from tunnel blasting/ drilling of the tunnel portal and associated earthworks. Spoil associated with the tunnel excavation will be transported off the conservation area to farmland within the modified part of the Lower Waitaha Valley further downstream, however there will be temporary small-scale stockpiling of earth and rock spoil, approx. 100 m^3, Suitable spoil, including excavated tunnel material, may be re-purposed as construction material and aggregate for site development purposes.

Tailrace effects will be centred around the excavation of the tailrace channel, and the construction of the wingwalls. Settling ponds will initially be established before the outflow into the river is formed. The tailrace outflow level will be set to EL 127.50 m, which will be higher than the river level at average flow of EL 125.00 m. A low weir located at the downstream end of the tailrace provides the elevation change for a drop into the river to prevent predatory fish from entering the tailrace. Natural boulder and rock will be carefully placed here to provide additional protection and be consistent with the natural characteristics of the rocky Waitaha River.

Any lighting associated with construction of the Power Station Site will be limited and associated more with vehicle truck movements on Waitaha Road. Lighting around the construction site will

[81] Vegetation Report, Table 2 (2025), TACCRA

be localised, primarily at the portal. Most night lighting will occur during the tunnelling phase of operation. Where practicable, lighting will be colour rated to 3000k and designed to limit upward light/light scatter.

The degree of adverse effects created concerning natural character, landscape and visual considerations associated with the construction of the Power Station and switchyard will be **high**, however these will be associated to a relatively small and discrete footprint and be temporary.

4.6 Potential Effects of the Power Station access road, transmission route and spoil disposal area

Beyond the Power Station, this component assesses the natural character, landscape and visual effects associated with the 66kV transmission line as it extends from the Power Station into the Lower Waitaha Valley and connects with the existing powerlines, the Waitaha substation, the access road connecting the Lower Waitaha Valley with the Power Station and the spoil disposal area, resulting from the spoil from the tunnels, as well as Construction Staging Area 3.

There will be some vegetation loss associated with the construction of the access road and powerline corridor, which will be 17.5m in width from Macgregor Creek to the Power Station Site. Power poles and supply lines installed from the end of the existing network on the true right of Waitaha River to the Power Station / tunnel entrance site will be used and will measure approximately 15.5m in height and up to 21m over rivers (such as at Macgregor Creek). Due to the width of Macgregor Creek, there may be power poles within the margins of the Creek, but not within the bed of the Creek. It is envisaged that over time, and due to the climate of the west coast, that vegetation will colonise the margins of the corridor, further softening its impact.

Up to 23,000m³ of gravel from the Waitaha River and spoil disposal areas will be required for the construction of the access road. Gravel will be locally sourced from within an area of the Waitaha River already consented to a third party for separate ‘stone’ removal activities. Areas where gravel extraction will occur will include:

- Beach areas at the Waitaha River north and south of the doughboy – by horizontally scraping off the dry gravel above the water level and away from the edge of the wetted area (approximately 23,000 m^3) and
- Spoil disposal areas on McLeans farm (up to 100,000m^3).

All extracted gravel areas within the Waitaha River will be naturally contoured to resemble a natural component of the river[82]. Due to the existing consent, the adverse natural character effects relating to the sourcing of the gravel will be locally **low**.

Post construction, the metalled access road (approximately 1.6km in length) from the Power Station to Macgregor Creek will be 15m in width (which will also contain the power lines). The road will be benched and contain sediment control measures. Where the access road crosses Granite Creek, this will include a permanent bridge, of which will contain piles. A temporary bridge is also proposed to transport machinery to the Power Station Site and to enable construction of the permanent bridge. A box culvert with side bunds will be used over Alpha Creek. There will be approximately 30 waterway crossings in total between Macgregor Creek and the Power Station, which will take the form of concrete fords or culverts. The crossing of

[82] And will be aligned with an existing gravel extraction resource consent (RC-2019-0037)

Macgregor Creek will be formed using insitu river gravels worked to form a smooth surface or use of Hynds Driftdeck[83] or similar. An alternative walking track immediately to the north of the Power Station site, extending from Alpha Creek northwards towards the stable tributary will lead walkers away from the river's edge for approximately 600m.

Image 24: Examples of 66kV poles (source: google streetview)

Based on the vegetation clearance, the establishment of the access road and visual presence of power poles and the powerline, it is considered that there will be locally **moderate to high** landscape effects during construction, **reducing to low** as the vegetation matures to visually soften the route.

Immediately north of Macgregor Creek, the access road that connects onto Waitaha Road will extend through private farmland, and where practicable, will follow existing tracks or be aligned between differing paddocks. This road will be approximately 10m in width, with an operational corridor of 15m where combined with the power lines extending from the Power Station which will connect with those on Waitaha Road. It is proposed for up to 0.2 hectares of vegetation close to the doughboy to be removed as a result of the upgrade to the access road. This is a modified working farm, and the presence of an additional metalled road will not affect the rural

[83] This is a form of river crossing, using concrete slabs which follows the profile of the watercourse, and provides a running surface for the traffic. The surface is raised typically by 600mm to provide generous openings to allow the passage of water at low flows. The drift deck comprises a series of inverted "u" shaped precast concrete elements, bearing on a concrete slab. The units extend the full width of a single carriageway, and butt together longitudinally across the stream bed, providing the running surface for the traffic (source: R4.2-Hynds-Driftdeck-System.pdf)

characteristics of the working farm. Visually this would be difficult to see from Waitaha Road. As such, the landscape and visual effects are assessed as being **low** during the construction phase returning to **neutral** in the long term.

Concerning the spoil disposal area, there would be approximately 162,800m³ of spoil to dispose of resulting from all project works. Excess spoil will be utilised within the development earthworks areas where possible, or temporarily stockpiled before being transferred off conservation land and onto a paddock within the plains of the Lower Waitaha Catchment. The spoil would then be profiled, graded and compacted and grassed for grazing purposes. Any watercourses would be avoided. The total un-rehabilitated area of spoil will not be greater than 1 Ha at any one time and would not exceed 1m in height.

It is anticipated that all spoil material will be to cleanfill standards and not result in leachate or changes in pH levels in the surrounding environment. This will be confirmed by laboratory testing prior to deposition.

Based on this is considered that the landscape effects of the spoil disposal area would be **low**.

With respect to Construction Staging Area 3, this area is also on private farmland on the true right of Macgregor Creek, outside the margin of the creek and is approximately 3.2 ha in area. The site will be area will be used for activities including the main site administration, project management and staff facilities and buildings, storage areas for vehicles, machinery, infrastructure, the concrete batching plant, gravel screening and a helipad. Gravel screening may also occur in an area of approximately 0.2 ha at the unused airstrip on the farm. Following construction, the land will be rehabilitated to pasture, in accordance with the requirements of and as part of, the farming operation. Based on this, it is considered that for the construction operations, the landscape and visual effects of the spoil disposal area would be **moderate.**

Concerning the upgrading of the transmission corridor through the Lower Waitaha Valley, this would essentially be replacing existing power poles and lines, with a slightly larger pole (see Image 24). The number of overhead wires would remain the same. There would be limited disturbance caused through this replacement as it extends from the upper part of the Lower Waitaha Valley towards an area close to the State Highway. The transmission line would extend through predominantly a modified landscape, within the road reserve, and enter a small area of vegetation close to the State Highway. It is anticipated that no vegetation will be required to be removed to facilitate the upgrade in this area, just occasional trimming, where required. As such, the landscape and visual effects are assessed as being **low** during the construction phase returning to **neutral** in the long term.

4.7 Assessment against Statutory Matters

4.7.1 Conservation Act

As outlined in **Section 3.1** of this report, the Scheme falls mainly within Stewardship Area which must be managed so that its natural and historic resources are protected. The remaining part of the Scheme (i.e. the part of the access road and transmission areas connecting the modified plain of the Lower Waitaha Valley to the edge of the Conservation area) is within private ownership.

Through the above assessment it is considered that the Scheme meets the emphasis of the Conservation Act regarding natural character, landscape and visual amenity matters. This has been discussed and outlined within **Chapter 5** of this report.

4.7.2 Resource Management Act

Under the RMA, the matters of national importance relevant to this report rest within section 6(a) and section 6(b). Section 7(c) and 7(f) matters are also considered.

A comprehensive assessment of the natural character condition and relevant landscape values has been undertaken in the previous section of this report. As a result, the natural character of the Waitaha River is assessed as very high, and the landscape in which the Scheme is located within is an ONL.

This assessment concludes that there are adverse effects to the Natural Character, Landscape and Visual Amenity values, at a variety of scales. The adverse effects vary from low and moderate-low at a broad scale to moderate- high (and high for construction) at a more localised scale. The adverse effects would therefore be *'more than minor'* in the RMA context at the local scale and to some values (notably remote) at the broader scale. An analysis of the objectives and policies of the relevant plans (West Coast Regional and Westland District) are contained in the planning report.

Despite the effects being considered 'more than minor' it is considered that under the overall assessment, as outlined within the previous paragraphs above, the Scheme meets the matters set out within Section 6(a), 6(b),7(c) and 7(f) and is not inappropriate development.

4.7.3 The West Coast Regional Policy Statement

Section 7A concerns Natural Character and Section 7B concerns Natural features and landscapes. Section 7C looks to protect the natural character of the region's wetlands, and lakes and rivers and their margins, from inappropriate subdivision, use and development and to provide for appropriate subdivision, use and development to enable people and communities to maintain or enhance their economic, social and cultural wellbeing.

Meanwhile Section 7B, in a similar vein, looks to protect the values, which together contribute to a natural feature or landscape being outstanding, from inappropriate subdivision, use and development. This Section also gives direction that whilst considering the proposal's appropriateness, consider a range of factors which may affect those values, as well as the overall resilience of the landscape to change. As outlined within the assessment, the Scheme will create adverse natural character effects, however these adverse effects range from moderate-high to moderate-low at the local scale (for the Headworks and Power Station Site) and moderate to low for the abstraction reach. These effects are not considered significant. For landscape, the long-term adverse effects at the intake are at mostly moderate-high, and those at the Power Station are moderate. These effects are not considered to equate to significant.

Temporary construction effects are high for both landscape and natural character, however these are localised and temporary for a period of activity lasting between 3-4 years.

For natural character, the natural elements, patterns and process will still continue. Long-term effects of the flow regime changes will include lower flows for longer periods of time, when compared to the natural river state. Natural freshes will continue to occur, although smaller freshes will be reduced to a greater degree. From a habitat perspective, modelling predicts little change to habitat for native fish in the abstraction reach but does predict a reduction in suitable habitat for trout (which are blocked naturally by Morgan Gorge). The morphology of the river and the biotic community will continue to be dominated/primarily influenced by the high disturbance regime of the system, which will not be greatly affected by the Scheme. Visually, there will be physical structures present at the Headworks and Power Station Site, resulting in

an overall moderate-low level of adverse effects on natural character. New planting will also be proposed around the Power Station Site.

For landscape, despite the Scheme being in an ONL, it is considered the values will be broadly retained. At a more local level, there will be adverse effects, notably to the remote and natural values. The proposed buildings and structures will be designed carefully, to respond to the highly natural landscape. Careful consideration has been applied to the scale, appearance and footprint of the project, which have collectively reduced potentially greater effects from occurring.

Despite the proposed Scheme adversely affecting some localised landscape values, it is considered that the proposal will not cause the loss of any identified values, rather it is a reduction to some values. This will not remove the ONL status from this landscape. The extent of the effects is localised, and the project carefully designed to avoid potentially higher effects.

Overall, it is considered that the Scheme meets the objectives and policies in the RPS and that the proposed Scheme is not inappropriate in the area.

4.7.4 Proposed Te Tai o Poutini Plan

Specific provisions are set out protecting the values of ONLs and ONFs on the West Coast. These are contained within objective NFL-01. Objective NFL-02 specifically provides for new activities within ONLs that do not adversely affect the values that contribute to a natural feature or landscape being outstanding, especially focussing on

> *NFL-P1 g) Upgrading and/or new infrastructure and renewable electricity generation facilities where there is a functional need for it to be located in these areas;*

Policy NFL-P2 states that, where possible, avoid significant adverse effects on the values that contribute towards ONLs, and where this is unavoidable, ensure that these effects are remedied, mitigated or offset.

As demonstrated through the assessment, there will be adverse effects created by the Scheme to the values that underpin the ONL. It is recognised that given that the Scheme, as a new renewable run-of-the-river hydro scheme needs to occur on a river, the emphasis is on avoiding significant adverse effects. The long-term landscape effects at the intake are at most moderate-high, and those at the Power Station are moderate. This level of effect is not significant. Whilst there will be a higher level of effects during the construction phase, these significant effects will be temporary and remedied through careful removal of machinery and construction infrastructure, temporary stockpiling and new planting. Despite localised areas experiencing high levels of adverse effects, these are for a finite duration.

NFL-P4 requires that any new buildings or structures within ONLs minimise adverse effects by a range of ways, including reducing the overall scale of the footprint required, using naturally occurring materials and colours that blend in with the area, and limiting overall prominence of buildings.

The proposal successfully meets this policy, by the careful placement of the Power Station and switching station. They are both located on a raised gravel part of the river, which is currently dominated by a range of shrub and grass species, some of which are not native or endemic to the area. Whilst the Power Station building will sit low in the landscape, on top of the raised gravel area, it will be dark in colour, making it appear recessive within the landscape. It will have a low profile and dark colouration, which coupled with proposed planting, will reduce the prominence of the building in the local landscape.

NPL-P5 is linked closely with NPL-P4, and tests the proposal as a whole, in terms of its wider effects, notably around its scale, and ability to be absorbed within the landscape. As demonstrated through the Visual Simulations, the built components of the proposal occupy a very small footprint, within a much larger landscape. Careful site planning and design has resulted in a proposed footprint that maximises efficiencies of the scheme, whilst minimising its overall project footprint. Both the Headworks and Power Station Site are located within parts of the Upper Waitaha catchment landscape where they can be more easily absorbed. The surrounding mountains and scale of the river remain the dominant elements. Due to this setting, the project will not be seen against the skyline, therefore reducing visual effects.

Concerning natural character objectives and policies, there is sufficient guidance supplied within NC-O1 and NC-O2 to preserve the levels of natural character and to recognise those cultural aspects as they relate to Poutini Ngāi Tahu. As with the landscape objectives and policies, there is specific reference around minimising adverse effects, especially through the establishment of new renewable energy schemes.

As discussed within the body of this report, the Scheme will create adverse natural character effects, however these adverse effects range from moderate-high to moderate-low at the local scale (for the intake and Power Station) and moderate to low for the abstraction reach. These effects are not considered significant. The river will still maintain a natural appearance and will still appear to have natural freshes and floods. Higher level effects are localised and associated with the built parts of the project as they intersect with the river and the natural environment. Despite high effects occurring through the construction phase at the Headworks and Power Station Site, these effects are temporary and localised. New planting around the Power Station Site will assist to improve levels of natural character on the raised gravel area. Based on this, it is considered that the proposal meets the direction of natural character objectives and policies of the TTPP.

4.7.5 The Westland District Plan

The WDP includes specific provisions with respect to landscape in general in Part 3.10 (Objectives) and Part 4.8 (Policies). These are outlined in detail in the Planning Report. There is also no specific referencing or mapping to outstanding natural features or landscapes in the Plan.

It is considered that the Scheme is consistent with the broad-based landscape objectives outlined in the WDP. Due to the small footprint of the Scheme within the mountainous landscapes of the Westland District, it is considered that the development does not impinge on the integrity of the broader district landscape values, as outlined within 3.10.1. It is also considered that the Scheme is aligned with Objective 3.10.2, where the existing scenic and open diverse character of the Westland District is maintained and continued to be dominated by the natural dynamic processes. As outlined, the river will continue to flow through the abstraction reach and will continue to erode the Morgan Gorge (by natural fluvial processes) and deposit material.

It is also considered that the Scheme is consistent with Objective 3.10.3, where land uses, buildings and development have regard to the natural landscapes in which they are located or seek to be located. Due to the small footprint and level of localised change to two relatively discrete locations on the Waitaha River and set within a large West Coast valley landscape, the Scheme meets this Objective.

Policy 4.8 (Landscape) (A) relates to the continuity of the mountains to the sea with acknowledgement that significant landscape elements are protected. Based on the assessment

within Chapter 5 of this report, it is considered that the Scheme will not affect the continuity of the mountains to the sea and that effects on Morgan Gorge (as a feature) are low. Natural elements, patterns and processes will continue to occur, and the feature will retain its legibility within its large landscape setting.

(B) relates to the clearance of indigenous vegetation. Where this occurs, appropriate remediation planting or restoration techniques encouraged, utilising species of local provenance. The extent of these areas, including the Construction Staging Areas will be limited to discrete areas.

(C) relates to the protection of significant landscape areas within the district. As an ONL, it is considered that the Scheme is consistent with the protection of the necessary values of the Upper Waitaha Catchment under (C). The landscape values associated with Morgan Gorge would however be affected, but not to a significant degree, insofar that it would not remove the 'outstandingness' of the natural feature. Under the criteria within this policy, it is considered that the landscape meets the 'intactness/ naturalness' attribute, in that it is highly natural, open and spacious and largely unmodified by human activity. The 'area' also holds important scientific and cultural value, due to the Hot Springs geopreservation site and it value as a whole to iwi. The 'area' is also distinctive, but not unique and highly representative of its location.

(E) the removal of significant indigenous vegetation on water margins has been managed through the Scheme design to minimise potential effects on landscape, character and amenity values.

Overall, the Scheme meets the objective and policies in the WDP. Whilst there are some adverse effects of the Scheme, overall, the values and status of the Upper Waitaha Catchment as an outstanding natural landscape and Morgan Gorge as a natural feature, have been protected.

4.8 Summary of Actual and Potential Effects

A summary of the relevant Natural Character, Landscape and Visual Amenity Effects can be outlined clearly within **Table 1** below:

Table 1: Summary of Effects[84]

	Natural Character Effects	**Landscape Effects**	**Visual Effects**
Reduced River flow (through abstraction reach)	Abiotic & Biotic Natural Character Effects: Low Perceptual aspects of Natural Character: Moderate		
Intake (Construction/ Temporary)	High	High	High
Intake (Permanent) – <u>Broad</u> scale	Moderate - Low	Moderate - Low	Low

[84] Refer to Table 2 in the Executive Summary part of this overall report for a more comprehensive breakdown of effects.

	Natural Character Effects	Landscape Effects	Visual Effects
Intake (Permanent) – Local scale	Moderate- High	Moderate- High	Moderate-High (near) Neutral (distant)
Power Station* (Construction/ Temporary)	High	High	High
Power Station* (Permanent) –Broad scale	Moderate to Low	Moderate- Low	Low
Power Station* (Permanent) –Local scale	Moderate-High	Moderate	Moderate-High (near) Low (distant)

5.0 Recommended Measures to avoid, remedy or mitigate adverse effects

An integral part of this assessment has been to carefully consider natural character, landscape (and visual) effects, and to consider measures which will assist in integrating the development into its surrounding landscape. Many of these measures have been incorporated in the planning stages of the Scheme, where the project design has aimed at minimising where possible effects to natural character, landscape and visual amenity values. Many of the recommendations and techniques are also outlined further within the **Landscape Management Plan**. Key elements of the design include:

- A decision not to build a vehicular access road into Kiwi Flat.
- Using underground tunnels for transporting water from the intake to the Power Station and locating the penstock within the tunnel.
- Low level weir design.
- Selecting an option of tunnel and intake at Morgan Gorge, where overall effects were considered by experts to be significantly less than other options considered.

In order to achieve an acceptable outcome, a number of Landscape Objectives have been developed. These will form part of a Landscape Management Plan which will be developed and prepared in consultation with a Landscape Architect. The overall objective will be:

- To use construction methods and materials where feasible that will minimise effects on the environment, including reducing visual prominence and enable recolonisation of vegetation.

Specific Objectives for the Power Station Site include:

- To ensure that the footprint of the Power Station is clearly defined and that works do not extend outside of these parameters.
- That the design of the Power Station and adjacent penstock and portals avoids imposing structures with as much as practical kept underground.
- That the rockfall prevention wall and flood walls are appropriately mitigated to be recessed into the existing environment.
- That the built forms use dark recessive colours and material, to assist with blending them into the natural landscape.
- To minimise the removal of indigenous vegetation and to retain as much of the more mature areas of planting on the raised gravel bank.
- To ensure that a Landscape Planting Plan is developed.

Specific Objectives for the Headworks include:

- Avoiding significant cuts and battered slopes for access roads including avoiding their proximity to riverbank features; and keeping works in the bed of the river to the minimum required to construct and maintain the road.
- Ensuring that the intake structures intersect with the existing topographic features and that appropriate cliff stabilisation measures are sensitively implemented.
- Ensuring that active and passive rehabilitation measures are effective, notably for the construction sites.

Further specific measures relating to the Headworks, Power Station Site and the Construction Staging Areas are outlined below.

5.1 Headworks

The structures at the Headworks have been designed to minimise their visual and physical presence in the landscape at the entrance to Morgan Gorge. It is envisaged that the channel section of the weir will have a depressed crest at RL 237.35m. This will pass the residual flow, assumed to be 3.5 cumecs with the upstream water level at RL 238. Much of the details of the design will occur in the final design stages. The intake structure especially has been designed to sit within the riverine ‘sculpted rock’ of the Upper Catchment landscape. The intake and weir structures have been designed iteratively to achieve a low-profile design.

Consideration will be given where practical to implement measures that continue to reduce the visual impact of the intake structures and help blend this area in with its local setting. For example, there may be opportunities to further refine the design of the intake structures, (refer to **Visual Simulation IN1**) by, for example, rounding of corners, faceting and texturing of surfaces or aligning exposed faces to match the profile of rock on each side.

The intake portal will get completely submerged with big floods and on each event will get coated with rock flour and silt from the river, and decorated with driftwood, as does the cliff and banks on either side. Moss and lichen will grow; within a short time, it is likely to show quite a weathered surface.

In addition, the final design of the weir will incorporate features to protect the koaro population within Kiwi Flat and enable their passage in and out while providing a barrier to trout. The design of the Headworks has also be designed to incorporate features to provide a safe portage for kayakers' entry into Morgan Gorge. Such design aspects will be made in consultation with the relevant experts including a landscape architect. The final design of the intake must retain engineering integrity and economic feasibility.

It is also proposed to minimise disturbance around the intake interface with the river rock. There is likely to be some stabilization required above the intake structure. While shotcreting is commonly used as a stabilisation treatment (and has been used for the portal area at the Amethyst Scheme), alternative treatments may be used within this sensitive location.

Any vegetation clearance associated with the intake structure will be associated with the access road and Construction Staging Area 1 and will be contained to defined areas. Natural contours will be used in the alignment of the road to avoid excessive cuts and areas of fill. Rehabilitation of vegetation of these areas will be undertaken with natural (or passive) recolonisation can be expected to occur relatively quickly after construction particularly following treatment such as scarification, which will assist in softening the works to some degree, notably any cut faces.

The Headworks may therefore look different (i.e. greater integration with terrain) from the **Visual Simulations** once the various features to address those issues above are incorporated.

5.2 Power Station Site and transmission corridor to Macgregor Creek

The Power Station, switchyard, tailrace, transmission and access road (to Macgregor Creek) would occupy a footprint 4.7 hectares downstream of Morgan Gorge (up to the farm boundary including Macgregor Creek). The structures have been designed to minimise their footprint.

The visual effects of the Power Station would be mitigated by utilising a dark colour palette for the walls and roof (i.e. ironsands). This will assist to blend the building into the landscape. Additional screening in terms of vegetation would also assist in reducing the visual prominence of the structure as well as the switchyard, as illustrated in **Visual Simulations PH1-5**. It is considered that the disturbance area for construction is limited to a defined, small footprint, to ensure as much of the existing vegetation on the raised gravel bank is retained, notably the more mature group of vegetation located to the immediate north of the Power Station.

Rehabilitation would comprise of species indigenous to the area, which could include *Coprosma spp, Oleraia spp, Griselinea littoralis*, tree ferns and some southern rata. Ensuring that the plantings blend in with the surroundings is paramount for the integration of these structures as well as enhancing the biodiversity of the area.

Table 2 below illustrates the suggested species to be used and **Figure 9**: **Planting Plan** illustrates the areas:

Table 2: List of Species for rehabilitation purposes for the Power Station Site

Previous Latin Name	Current Botanical Name	Common Name
Trees	Trees	
Griselinia littoralis	*Griselinia littoralis*	Kapuka or Broadleaf

Previous Latin Name	Current Botanical Name	Common Name
Metrosideros umbellata	*Metrosideros umbellata*	*Rata or Southern rata*
Weinmannia racemosa	*Weinmannia racemosa*	*Kamahi*
Shrubs	Shrubs	
Ascarina lucida	*Ascarina lucida*	Hutu
Carpodetus serratus	*Carpodetus serratus*	Putaputaweta or Marbleleaf
Coprosma lucida	*Coprosma lucida*	Karamu or Shining karamu
Coprosma propinqua	*Coprosma propinqua*	Mingimingi
Coprosma rugosa	*Coprosma rugosa*	n.a
Hebe salicifolia	*Hebe salicifolia*	Koromiko
Hedycarya arborea	*Hedycarya arborea*	Porokaiwhiri or Pigeonwood
Melicytis ramiflorus	*Melicytis ramiflorus*	Mahoe or Whitey wood
Myrsine divaricata	*Myrsine divaricata*	Weeping mapou
Olearia arborescens	*Olearia arborescens*	Tree daisy
Olearia avicenniifolia	*Olearia avicenniifolia*	Mountain akeake
Olearia ilicifolia	*Olearia ilicifolia*	Hakeke or Mountain holly
Pennantia corymbosa	*Pennantia corymbosa*	Kaikomako
Pseudopanax crassifolius	*Pseudopanax crassifolius*	Horoeka or Lancewood
Pseudowintera colorata	*Pseudowintera colorata*	Horopito or Pepperwood
Tree Fern	Tree Fern	
Cyathea smithii		Katote or Soft tree fern
Dicksonia squarrosa		Wheki or Rough tree fern
Monocots		
Cortaderia richardii	*Austroderia richardii*	Toetoe
Phormium cookianum	*Phormium cookianum* subsp. *cookianum*	Whaariki or Mountain flax
Astelia fragrans	*Astelia fragrans*	Kahaha or Bush flax
Ferns	Ferns	
Polystichum vestitum	*Polystichum vestitum*	Punui or Prickly shield fern
Blechnum sp. “black spot”	*Parablechnum novae-zealandiae*	Kiokio or Palm-leaf fern – sometimes termed *B. capense*
Blechnum discolor		Piupiu or Crown fern

Any visual cuts on facing slopes will be revegetated using indigenous species. The rockfall prevention wall will be appropriately mitigated, using either a geobag for an instant vegetated appearance, or the surface of the wall will be scoured or designed to encourage lichens, ferns and other vegetation to grow on its surface, therefore mitigating its visual presence.

All working areas (including the access/ transmission corridor from Macgregor Creek to the Power House) will be rehabilitated and backfilled with topsoil and seeded with indigenous species, where appropriate. Natural rehabilitation will otherwise be relied upon.

The alignment of the access track and transmission line will avoid, where appropriate, any large individual or stands of mature trees located between Macgregor Creek and the Power Station Site. A 15m (average) 'corridor zone' is proposed within which clearance will occur to allow for the access road construction and installation of transmission poles and lines. The final alignment of the road within the wider area will be dependent on final survey work. Maintenance of the roadside vegetation will be required to avoid encroachment of gorse and other invasive exotic species.

5.3 Construction Staging Areas

The Construction Staging Areas will be rehabilitated and backfilled with topsoil and seeded with indigenous species, where appropriate. Natural rehabilitation will however primarily be relied upon in most areas. Screening by existing retained vegetation will assist to mitigate views. Refer to the **Landscape Management Plan**.

5.4 Transmission and access corridor through the farmland and Permanent Spoil disposal areas

The access and transmission corridor extending north from Macgregor Creek will traverse a working farm, and where practicable, will follow existing tracks or be aligned between differing paddocks. This road will be approximately 10m in width, with an operational corridor of 15m where combined with the power lines extending from the Power Station which will connect with those on Waitaha Road. This is a modified working farm, and the presence of an additional metalled road will not affect the rural characteristics of the working farm. Very limited vegetation will be removed as a result of this. The access road will be at grade with limited earthworks required. The road will be metalled resembling a farm track, and the paddocks fenced using post and wire.

For the spoil disposal areas, careful grading and profiling of spoil from the scheme construction will be placed on nominated farmland (McLeans Farm) outside of the Conservation Area. This spoil will be deposited within the plains of the Lower Waitaha Catchment. The spoil would then be compacted and grassed for grazing purposes. Approximate areas (two in total) equate to approximately 93.2 hectares and a further 8 hectares (with a total of 17 hectares of soil disposal). Any watercourses would be avoided.

6.0 Conclusion

The Waitaha Hydro Scheme is a run-of -river hydro Scheme, located east of the Alpine Fault on the Waitaha River. Most of the Scheme is located within the Upper Catchment of the Waitaha Valley, within Stewardship Land managed by DOC.

The Scheme will involve the construction of a low-profile weir immediately upstream of Morgan Gorge, a tunnel through the schist rock north of the gorge and a penstock, small Power Station and switchyard immediately downstream of the gorge. The Scheme will also require a 15 m (average) wide access road and transmission line corridor extending from the farmed private land in the Lower Waitaha Valley to the Power Station. The flow in the river would be reduced between the intake at the top of Morgan Gorge and where the water re-enters the river via the tailrace, below the Power Station. This abstraction reach is approximately 2.5 km long. It is proposed that the residual flow at the intake be 3.5 cumecs. A Landscape Management Plan will ensure that appropriate conditions are developed to ensure that construction methods and materials where feasible will minimise effects on the environment and enable recolonisation of vegetation.

The Power Station Site and Headworks are located in areas classified as an ONL within the proposed TTPP, and therefore subject to a range of objectives and policies within the proposed TTPP and the operative RPS and WDP. Those specific landscape values are identified and amplified further to a local context. In terms of natural character, the whole Upper Waitaha Catchment contains very high, near pristine levels of natural character, due to the general lack of human-induced modification. However, the Scheme area is not rated at the highest end of the spectrum, due to a number of modifications, including pests, evidence of tracks, huts and a swingbridge and its popularity for hunting and kayaking. There is also a geothermal water take, located near Moonbeam Hut on the Waitaha River and a further water take, for geothermal purposes on the Waitaha River close to Macgregor Creek as well as a gravel/stone extraction permits, close to Macgregor Creek.

In terms of effects, the proposed Scheme will result in varied adverse effects to the landscape values, the visual appearance and natural character condition of the surrounding environment. Specifically, this will result in:

- **Low to moderate** adverse effects on landscape values and the natural character at the broader scale, and **low** adverse effects considering visual matters. This is principally due to the small and defined footprint of the Scheme. Remoteness values would be affected, however, as noted, the Scheme is not occurring within a National Park, one of New Zealand's highest rated conservation areas nor on a river with a Water Conservation Order. There are areas of modification, such as an existing bridge, tracks and huts, as well as some water take / gravel permits. The area is not actively managed by DOC, so pests are present. Helicopters frequent the Upper Waitaha Catchment, dropping off hunters and kayakers to a range of destinations within the Upper Waitaha Catchment. The Scheme is also in close proximity to the boundary with the Lower Waitaha Catchment, and away from the truly wild and more remote areas further upstream beyond Waitaha Gorge.
- Concerning effects to the natural character of reduce flow through Morgan Gorge (the abstraction reach), it is considered that there will be **low** adverse effects to the abiotic and biotic natural character aspects of the Waitaha River, and **moderate** adverse effects relating to the perceptual attributes of natural character.

- For more local permanent effects, focussed on the Headworks and Power Station Site, it is considered that for the Headworks, there would be **moderate-high** adverse landscape effects and **moderate-high** adverse natural character effects. At the Power Station Site, it is assessed that there would be **moderate** landscape effects and **moderate-high** adverse natural character effects.
- For visual amenity, there would be **moderate-high** adverse visual effects at near-distance (within approximately 800 m to 1km) vantage points at the Headworks, and at greater distances, this reduces to a **neutral** (or no effect). At the Power Station Site, it is assessed that there would be **moderate-high** adverse visual effects at near-distance locations, reducing to **moderate-low** at more distance locations.
- During construction, it is assessed that there would be **high adverse levels** of effects to the landscape values, the natural character condition and visual amenity at the local level.
- Concerning the Power Station access road and transmission route extending from the Power Station into the Lower Waitaha Valley (and connects with the existing powerlines) and access road on private land (and traversing Macgregor Creek), it is considered that there will be locally **moderate to high** landscape effects during construction, **reducing to low** as the vegetation matures to visually soften the route.
- Concerning the spoil disposal area, it is considered that the landscape effects of the spoil disposal area would be **moderate** during construction, reducing to **low**.
- Concerning the new access road and transmission corridor through the working farm from Macgregor Creek to Waitaha Road, the construction effects are **low**, reducing to **neutral.**
- Concerning the upgrading of the transmission corridor through the Lower Waitaha Valley, the landscape and visual effects are assessed as being **low** during construction, reducing to **neutral**.

When assessed against the statutory provisions, it is considered that the Scheme meets the emphasis of the Conservation Act regarding natural character, landscape and visual amenity matters.

Under the RMA the landscape in which the scheme is located within an ONL. Due to the range of adverse effects, it is considered that overall, the adverse effects would be *'more than minor'* in the RMA context at the local scale and to some values (notably remote) at the broader scale.

An analysis of the objectives and policies of the relevant plans (West Coast Regional and Westland District) are contained above and summarised below.

Despite the effects being considered *'more than minor'* it is considered that under the overall assessment, the Scheme meets the matters set out within Section 6(a), 6(b),7(c) and 7(f) and is not inappropriate development in the context of sections 6(a) and 6 (b).

The RPS looks to protect the natural character of the region's rivers from inappropriate development, while providing for appropriate subdivision, use and development to enable people and communities to maintain or enhance their economic, social and cultural wellbeing. Section 7B of the RPS, in a similar vein, looks to protect the values, which together contribute to a natural feature or landscape being outstanding, from inappropriate subdivision, use and development.

For natural character, the natural elements, patterns and process will still continue following implementation of the Scheme. Long-term effects of the flow regime changes will include lower

flows for longer periods of time, when compared to the natural river state. Natural freshes will continue to occur, although smaller freshes will be reduced to a greater degree. For landscape, despite the Scheme being in an ONL, it is considered the values will be retained.

Despite the proposed Scheme adversely affecting some localised landscape values, none of the identified values will be lost, rather there will be a reduction to some values. This will not remove the ONL status from this landscape. The extent of the effects is localised, and the project carefully designed to avoid permanent significant effects.

With respect to the TTPP landscape objectives and policies, it is considered that the Scheme will not create significant adverse effects on the ONL. It is recognised that given that the Scheme, as a new renewable run-of-the-river hydro scheme needs to occur on a river, the emphasis is on avoiding significant adverse effects. The long-term landscape effects at the intake are at most moderate-high, and those at the Power Station are moderate. This level of effect is not considered to be significant. Whilst there will be a higher level of effects during the construction phase, these will be temporary and remedied through careful removal of machinery and construction infrastructure, temporary stockpiling and new planting. Despite localised areas experiencing high levels of adverse effects, these are for a finite duration.

For natural character under the TTPP, these effects are not considered significant. The river will still maintain a natural appearance and will still appear to have natural freshes and floods. Higher level effects are localised and associated with the built parts of the project as they intersect with the river and the natural environment. Despite high effects occurring through the construction phase at the Headworks and Power Station Site, these effects are temporary and localised. New planting around the Power Station Site will assist to improve levels of natural character on the raised gravel area.

The WDP includes specific provisions with respect to landscape in general in Part 3.10 (Objectives) and Part 4.8 (Policies). It is considered that the Scheme is consistent with the broad-based landscape objectives outlined in the WDP. Due to the small footprint of the Scheme within the mountainous landscapes of the Westland District, it is considered that the development does not impinge on the integrity of the broader district landscape values, that areas of new planting are proposed and that the infrastructure proposed will be small, low profile and integrated with the natural environment.

The mitigation measures proposed and the iterative design process, have enabled the Scheme to sit well within its landscape and to respond to its setting and to acknowledge the outstanding landscape, natural character and visual amenity values the Upper Waitaha Catchment holds by avoiding potentially major effects. Overall, it is considered that the Scheme is appropriate with respect to natural character, landscape and visual amenity despite the fact that at more local levels the natural character, landscape and visual amenity effects are assessed as being moderate to high (or more than minor under the RMA). At a broader scale the effects are, at worst, moderate- low (or minor under the RMA). Conditions are recommended, including development of a Landscape Management Plan, to avoid effects being to a degree or scale which are inappropriate to the landscape, features and setting within which the Scheme is located.

Appendix 1: Assessment Approach

Method Statement

22 November 2023

This assessment method statement is consistent with the methodology (high-level system of concepts, principles, and approaches) of 'Te Tangi a te Manu: Aotearoa New Zealand Landscape Assessment Guidelines', Tuia Pito Ora New Zealand Institute of Landscape Architects, July 2022. The assessment provides separate chapters to discuss landscape, visual and natural character effects where relevant, but is referred to throughout as a Landscape Effects Assessment in accordance with these Guidelines. Specifically, the assessment of effects has examined the following:

- *The existing landscape;*
- *The nature of effect;*
- *The level of effect; and*
- *The significance of effect.*

The Existing Landscape

The first step of assessment entails examining the existing landscape in which potential effects may occur. This aspect of the assessment describes and interprets the specific landscape character and values which may be impacted by the proposal alongside its natural character where relevant as set out further below. The existing landscape is assessed at a scale(s) commensurate with the potential nature of effects. It includes an understanding of the visual catchment and viewing audience relating to the proposal including key representative public views. This aspect of the assessment entails both desk-top review (including drawing upon area-based landscape assessments where available) and field work/site surveys to examine and describe the specific factors and interplay of relevant attributes or dimensions, as follows:

Physical –relevant natural and human features and processes;

Perceptual –direct human sensory experience and its broader interpretation; and

Associative – intangible meanings and associations that influence how places are perceived.

Engagement with tāngata whenua

As part of the analysis of the existing landscape, the assessment should seek to identify relevant mana whenua (where possible) and describe the nature and extent of engagement, together with any relevant sources informing an understanding of the existing landscape from a Te Ao Māori perspective.

Statutory and Non-Statutory Provisions

The relevant provisions facilitating change also influence the consequent nature and level of effects. Relevant provisions encompass objectives and policies drawn from a broader analysis of the statutory context and which may anticipate change and certain outcomes for identified landscape values.

The Nature of Effect

The nature of effect assesses the outcome of the proposal within the landscape. The nature of effect is considered in terms of whether effects are positive (beneficial) or negative (adverse) in the context within which they occur. Neutral effects may also occur where landscape or visual change is benign.

It should be emphasised that a change in a landscape (or view of a landscape) does not, of itself, necessarily constitute an adverse landscape effect. Landscapes are dynamic and are constantly changing in both subtle and more dramatic transformational ways; these changes are both natural and human induced. What is important when assessing and managing landscape change is that adverse effects are avoided or sufficiently mitigated to ameliorate adverse effects. The aim is to maintain or enhance the environment through appropriate design outcomes, recognising that both the nature and level of effects may change over time.

The Level of Effect

Where the nature of effect is assessed as **'adverse'**, the assessment quantifies the level (degree or magnitude) of adverse effect. The level of effect has not been quantified where the nature of effect is neutral or beneficial. Assessing the level of effect entails professional judgement based on expertise and experience provided with explanations and reasons. The identified level of adverse natural character, landscape and visual effects adopts a universal seven-point scale from **very low** to **very high** consistent with Te Tangi a te Manu Guidelines and reproduced below.

Landscape Effects

A landscape effect relates to the change on a landscape's character and its inherent values and in the context of what change can be anticipated in that landscape in relation to relevant zoning and policy. The level of effect is influenced by the size or spatial scale, geographical extent, duration and reversibility of landscape change on the characteristics and values within the specific context in which they occur.

Visual Effects

Visual effects are a subset of landscape effects. They are consequence of changes to landscape values as experienced in views. To assess where visual effects of the proposal may occur requires an identification of the area from where the proposal may be visible from, and the specific viewing audience(s) affected. Visual effects are assessed with respect to landscape character and values. This can be influenced by several factors such as distance, orientation of the view, duration, extent of view occupied, screening and backdrop, as well as the potential change that could be anticipated in the view as a result of zone / policy provisions of relevant statutory plans.

Natural Character Effects

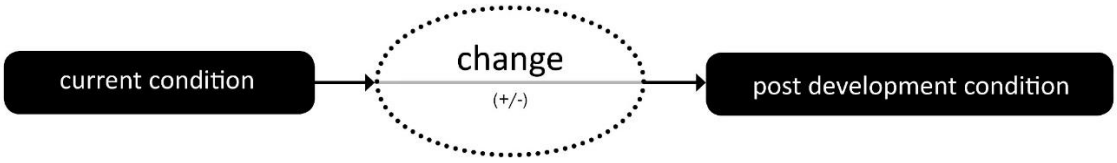
Natural Character, under the RMA, specifically relates to *'the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development'*. Therefore, the assessment of natural character effects only involves examining the proposed changes to natural elements, patterns and process which may occur in relevant landscape / seascape contexts.

As with assessing landscape effects, the first step when assessing natural character effects involves identifying the relevant physical and experiential characteristics and qualities which

occur and may be affected by a proposal at a commensurate scale. This can be supported through the input of technical disciplines such as geomorphology, hydrology, marine, freshwater, and terrestrial ecology as well as input from tāngata whenua. An understanding of natural character considers the level of naturalness and essentially reflects the current condition of the environment assessed in relation to the seven-point scale. A higher level of natural character means the waterbody and/or margin is less modified and vice versa.

A natural character effect is a change to the current condition of parts of the environment where natural character occurs. Change can be negative or positive. The resultant natural character effect is influenced by the existing level of naturalness within which change is proposed; a greater level of effect will generally occur when the proposal reduces the naturalness of a less modified environment. In short, the process of assessing natural character effects can be summarised as follows:

- Identify the characteristics and qualities which contribute to natural character within a relevant context and defined spatial scale(s), including the existing level of naturalness;
- Describe the changes to identified characteristics and qualities and the consequent level of natural character anticipated (post proposal); and
- Determine the overall level of effect based on the consequence of change.



The Significance of Effects

This assessment has adopted the following scale applied to relevant RMA circumstances[85] (refer to diagram below), acknowledging low and very low adverse effects generally equate to 'less than minor' and high / very high effects generally equate to significant[86].

[85] Seven-point level of effect scale. Source: Te tangi a te Manu, Pg. 15

[86] The term 'significant adverse effects' applies to specific RMA situations, including the consideration of alternatives for Notices of Requirement and AEEs, as well as assessing natural character effects under the NZ Coastal Policy Statement.

Appendix B: Relevant Statutory Provisions

The Scheme is predominantly located within the Waitaha Forest Stewardship Land which is administered by DOC and partly within private ownership, both of which are located within the Westland District. The following statutory documents provide the framework within which the significance of the existing environment and degree of natural character, landscape and visual amenity effects of the Scheme must be considered:

- The Conservation Act
- CMS
- The RMA
- The RPS
- The TTPP
- The WDP

The Conservation Act

The Scheme largely falls within the Waitaha Forest, which is held as Stewardship Area (the most generic category of land in the Conservation Estate) subject to section 25 of the Conservation Act. Section 25 of the Conservation Act provides that "*Every stewardship area shall so be managed that its natural and historic resources are protected*".

'Natural resources' are defined in the Conservation Act to include a range of elements, including "*c) landscape and landform".*

The Conservation Act defines *'conservation' as:*

> *'the preservation and protection of natural and historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations'.*

The emphasis of the Conservation Act is to ensure the preservation and protection of the natural and historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations.

However, the provisions of the Conservation Act require the Minister to also consider a number of matters set out in part 3B of that Act, including the effects of the proposed activity, and the possible safeguards and mitigation measures proposed. The Minister must also consider the values of the natural and historic resources the Stewardship Area land status seeks to protect and consider whether granting the application, with or without conditions, would protect those resources. The landscape values of the Stewardship Area within which the Scheme is located are discussed in **Section 3** of this report. The effects on those values are set out in **Section 4**.

West Coast Te Tai Poutini Conservation Management Strategy

The CMS identifies natural landscapes and their protection from the adverse effects of human use and management as being a key consideration. Relevant policies are listed in 3.3.4.3. The

overriding Objective being *'To protect geodiversity and landscapes from adverse effects of human use or management'.*

The Resource Management Act

As relevant to this assessment, the RMA outlines the following matters which must be considered as part of this proposal.

Section 6 – Matters of National Significance

> *(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use and development:*
>
> *(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use and development:*

Section 7 – Other Matters

> *(c) the maintenance and enhancement of amenity values:*
>
> *(f) the maintenance and enhancement of the quality of the environment:*

Sections 6(a) and 6(b) are outlined in further detail within sections 4.1 and 4.2 below.

The West Coast Regional Policy Statement

The RPS was made operative on 24 July 2020.

Section 7A concerns Natural Character and Section 7B concerns Natural features and landscapes.

The preservation of natural character (under RMA Section 6(a)) is a matter of national importance. The regional plan acknowledges this by its two key objectives:

1. *Protect the natural character of the region's wetlands, and lakes and rivers and their margins, from inappropriate subdivision, use and development.*
2. *Provide for appropriate subdivision, use and development to enable people and communities to maintain or enhance their economic, social and cultural wellbeing.*

Further guidance is outlined within the policies that underpin these objectives. Specifically, these include:

> *2. Protect the elements, patterns, processes and qualities that together contribute to the natural character of wetlands, and lakes and rivers and their margins from inappropriate subdivision, use and development.*
>
> *3. When determining if an activity is appropriate, the following matters must be considered:*
>
> *a) The degree and significance of actual or potential adverse effects on the elements, patterns, processes and qualities that contribute to natural character;*
>
> *b) The value, importance or significance of the natural character at the local, or regional level;*

c) The degree of naturalness;

d) The potential for cumulative effects to diminish natural character, and the efficacy of measures proposed to avoid, remedy or mitigate such effects; and

e) The vulnerability of the natural character to change, and its capacity to accommodate change, without compromising its values.

4. Allow activities which have no more than minor adverse effects on natural character.

Section 7B considers Natural features and landscapes. A key objective is around protecting the region's outstanding natural features and outstanding natural landscapes from inappropriate subdivision, use and development. This is considered against the objective considering providing for appropriate subdivision, use and development on, in or adjacent to outstanding natural features and outstanding natural landscapes to enable people and communities to maintain or enhance their economic, social and cultural wellbeing.

Specific policies include:

2. *Protect the values which together contribute to a natural feature or landscape being outstanding, from inappropriate subdivision, use and development.*
3. *When determining if an activity is appropriate, the following matters must be considered:*

   a) Whether the activity will cause the loss of those values that contribute to making the natural feature or landscape outstanding;

   b) The extent to which the outstanding natural feature or landscape will be modified or damaged including the duration, frequency, magnitude or scale of any effect;

   c) The irreversibility of any adverse effects on the values that contribute to making the natural feature or landscape outstanding;

   d) The resilience of the outstanding natural feature or landscape to change;

   e) Whether the activity will lead to cumulative adverse effects on the outstanding natural feature or landscape;

4. *Allow activities in outstanding natural features and outstanding natural landscapes which have no more than minor adverse effects.*

Proposed Te Tai Poutini Plan (TTPP)

This proposed plan, which is currently progressing through hearings, will replace the outdated Westland District Plan. The extent of the mapped area is illustrated on **Figure 7: ONL within the TTPP** and contained within the Graphic Supplement. As a result, the Scheme is contained partly within two ONLs (ONL 18 and ONL22). The schedules that underpin the values of the ONLs are contained within Schedule Five of Part 4 (Appendices). They are outlined fully within **Section 3.2** of this report.

Pertinent Landscape Objectives and Policies include:

NFL-O1 To protect the values of outstanding natural landscape and outstanding natural features on the West Coast/Te Tai o Poutini, while providing for subdivision, use and development where the values that make the landscape or feature outstanding can be maintained or enhanced.

NFL-P1 Provide for activities within outstanding natural landscapes described in Schedule Five and outstanding natural features described in Schedule Six where they do not adversely affect the values that contribute to a natural feature or landscape being outstanding and are for:

a) Existing land uses and lawfully established activities including existing network utilities, energy activities, agricultural, horticultural and pastoral activities;

b) Conservation activities;

c) Recreational activities;

d) Natural hazard mitigation activities;

e) Operation, maintenance and upgrade of renewable electricity generation facilities;

f) Operation, maintenance and upgrading of network infrastructure;

g) Upgrading and/or new infrastructure and renewable electricity generation facilities where there is a functional need for it to be located in these areas;

h) Poutini Ngāi Tahu uses; or

i) The alteration, maintenance or removal of existing buildings or structures.

NFL-P2 Where possible, avoid significant adverse effects on the values that contribute to outstanding natural landscapes described in Schedule Five and outstanding natural features described in Schedule Six. Where significant adverse effects cannot be avoided, ensure that the adverse effects are remedied, mitigated or offset.

NFL-P3 Recognise that there are settlements, farms and infrastructure located within outstanding natural landscapes or outstanding natural features and provide for new activities and existing uses in these areas where the values that contribute to the outstanding natural landscape or feature are not adversely affected.

NFL-P4 Require that new buildings, structures within outstanding natural features or landscapes minimise any adverse visual effects by:

a) Ensuring the scale, design and materials of the building and/or structure are appropriate in the location;

b) Using naturally occurring building platforms, materials and colour that blends into the landscape; and

c) Limiting the prominence or visibility of buildings and structures including by integrating it into the outstanding natural feature or landscape

NFL-P5 Minimise adverse effects on outstanding natural landscapes and outstanding natural features by considering the following matters when assessing proposals for land use or subdivision:

a) The scale of modification to the landscape;

b) Whether the proposal is located within a part of the outstanding natural feature or outstanding natural landscape that has capacity to absorb change;

c) Whether the proposal can be visually integrated into the landscape and whether it would break the skyline or ridgelines;

d) The temporary or permanent nature of any adverse effects;

e) *The functional, technical, operational or locational need of any activity to be sited in the particular location;*

f) *Any historical, spiritual or cultural association held by Poutini Ngāi Tahu;*

g) *Any positive effects the development has on the identified characteristics and qualities;*

h) *Any positive effects at a national, regional and local level;*

i) *Any relevant public safety considerations; and*

j) *The measures proposed to mitigate the effects on the values and characteristics, including:*

   i) *The location, design and scale of any buildings or structures, or earthworks;*

   ii) *The intensity of any activity; and*

   iii) *The finish of any buildings or structures, including materials, reflectivity and colour; and landscaping and fencing.*

Pertinent Natural Character Objectives and Policies include:

NC-01 To preserve the natural character of lakes, rivers and wetlands and their margins while providing for appropriate subdivision, use and development where adverse effects can be avoided or mitigated.

NC-02 To recognise and provide for the relationship of Poutini Ngāi Tahu and their traditions, values and interests associated with the natural character of lakes, rivers and wetlands and their margins.

NC-03 To provide for activities which have a functional need to locate in the margins of lakes, rivers and wetlands in such a way that the impacts on natural character are minimised.

NC-P1 Minimise the adverse effects of activities on the natural character of the riparian margins of lakes, rivers and wetlands by ensuring that subdivision and land use maintains the elements, patterns and processes that contribute to their natural character.

NC-P2 Provide for indigenous vegetation removal and earthworks within riparian margins of lakes, rivers and wetlands where significant adverse effects on natural character are minimised as far as practicable and:

a) *It is for the purpose of natural hazard mitigation; or*

b) *It is for the maintenance, repair, upgrade and extension of network utilities and infrastructure including the national grid; or*

c) *It is for the establishment, operation, maintenance or upgrading of renewable electricity generation structures or infrastructure where this has a functional or operational need to be located in a riparian margin; or*

d) *It is for Poutini Ngāi Tahu cultural purposes; or*

e) *It is for the repair and maintenance of legally established structures; or*

f) *The activity has a functional or operational need to be located adjoining a waterbody.*

NC-P3 Provide for buildings and structures within riparian margins of lakes, rivers and wetlands where these:

a) Have a functional need for their location; and

b) They are of a form and scale that will not adversely effect the natural character of the riparian area.

NC-P4 Encourage the restoration and enhancement of the natural character of the riparian margins of lakes, rivers and wetlands.

The Westland District Plan

The WDP includes specific provisions with respect to landscape in general in Part 3.10 (Objectives) and Part 4.8 (Policies). It specifically mentions that its landscapes comprise a distinctive mix of features, including mountains and peaks, glaciers, lakes and river, indigenous vegetation, the coastline and unique flora and fauna. While there is no specific mapping of any outstanding natural landscape in the district[87], reference is made to examples (that could be) outstanding natural landscapes in the district: land above 300 m, i.e. podocarp forest and mountains, Lake Ianthe/Matahi, Lake Mapourika, Lake Wahapo, Lake Moeraki, Lake Paringa, Saltwater Lagoon, Okarito Lagoon, Coastline.

3.10.1 “To ensure development does not impinge on the integrity of landscapes in Westland.”

3.10.2 “To maintain and protect the existing scenic and open and diverse character of the Westland District, dominated by natural dynamic processes.”

3.10.3 “To ensure that land uses, buildings and development have regard to the natural landscapes in which they are located or seek to be located.”

The relevant policies with respect to the above are outlined in Part 4.8 of the WDP. Particular mention is made of the continuity of the mountains to the sea, the contribution of indigenous vegetation to the landscape character and the protection of all significant landscape areas. Significant landscapes under the WDP shall meet the following criteria: intactness (naturalness) and scientific or other cultural value and distinctiveness or representativeness, its protected status, its buffering from other human based modifying influences as well as its visual sensitivity and coherence. Reference to outstanding natural features and natural character (regarding significant vegetation) are also outlined under 4.9 Natural Habitats and Ecosystems (Policies B, C and D).

[87] This has been rectified under the pTTPP process and the Headworks Site, abstraction reach and Power Station site are all considered to be within an ONL.

Appendix C: Experience of Technical Author

Technical author: James Bentley, Landscape Architect

James is an Associate Partner and Landscape Architect at Boffa Miskell Limited, a national firm of consulting planners, ecologists, biosecurity, urban designers and landscape architects.

James is a registered member (NZ, 2010) of the New Zealand Institute of Landscape Architects (NZILA) as well as an elected chartered member (London, 2002) of the British Landscape Institute (CMLI). James holds a post-graduate diploma (2000) in Landscape Architecture as well as a Bachelor of Arts with Honours Degree in Landscape Architecture (1998) from the Cheltenham and Gloucester College of Higher Education (now the University of Gloucestershire) in the United Kingdom.

James has gained considerable experience in all aspects of landscape planning through his 20+ years involvement in a wide variety of often complex projects throughout Aotearoa and within the UK. He has been involved at the forefront of developing guidance related to methods of better understanding aspects of landscape and natural character assessment, which has positively contributed to the development of the profession.'

Much of James' work has focused on broad scale landscape and natural character assessments for second generation resource management plans, where he has identified Outstanding Natural Landscapes and Natural Character areas throughout the country. He has continued this through providing advice regarding appropriate management mechanisms to manage the values that underpin these sensitive areas. James' practical experience includes writing landscape, natural character and visual amenity assessments as well as preparing written evidence for Council and Environment Court hearings. James also has experience in consulting with the general public on landscape issues.

James has project managed numerous proposal-driven environmental planning projects, including utilities, large-scale infrastructure, mining, aquaculture, energy, urban development and subdivision projects, re-zoning and retirement complexes throughout the country. As a consequence of this, he is a trusted and reliable expert witness at both the council and environment court levels

James has recently provided landscape evidence on behalf of Manawa Energy concerning their submission to the Natural Features and Landscape chapter of the Proposed Te Tai o Poutini Plan and has assisted the Department of Conservation concerning the proposed Mokihinui Hydro scheme. With these projects, coupled with others, including preparing the landscape assessment for the redevelopment of Dolomite Point, James is very familiar with the West Coast Region's landscapes.

James confirms that in his capacity as author of this report, he has read and abides by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

Together. Shaping Better Places.

Boffa Miskell is a leading New Zealand environmental consultancy with nine offices throughout Aotearoa. We work with a wide range of local, international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, Te Hīhiri (cultural advisory), engagement, transport advisory, climate change, graphics, and mapping. Over the past five decades we have built a reputation for creativity, professionalism, innovation, and excellence by understanding each project's interconnections with the wider environmental, social, cultural, and economic context.

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Appendix D: Waitaha Hydro Graphic Supplement

Boffa Miskell

WAITAHA HYDRO

GRAPHIC SUPPLEMENT

9 JULY 2025

CONTENTS

Part A

Part B

PART A: PLANS AND SITE PHOTOGRAPHS

Tasman Sea

Ross Township

Hokitika Gorge

Rangitoto Range

Mikonui River

Hokitika River

Waitaha

Waitaha River

Purcell Range

Bonar Range

Mt Allen

Urquhart Knob

Hitchin Range

Douglas Creek

Morgan Gorge

Kiwi Flat

Waitaha Gorge

Mt Ashmore

Whirling Water

Smyth Range

Harihari

Wanganui River

6

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0 3,760 m

1:150,000 @ A3

Data Sources: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors., Eagle Technology, Land Information New Zealand

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Scheme Locations
- Waitaha River Catchment
- Access Route
- Proposed Transmission Line
- Spoil Disposal
- Staging Area

WAITAHA HYDRO

Scheme Location Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 1

LEGEND

- Upper Waitaha Catchment Extent
- Territorial Authorities

Artificial Surfaces
- Built-up Area (settlement)
- Surface Mines and Dumps
- Transport Infrastructure
- Urban Parkland/Open Space

Bare or Lightly Vegetated Surfaces
- Sand and Gravel
- Landslide
- Alpine Grass/Herbfield
- Gravel and Rock
- Permanent Snow and Ice

Cropland
- Short-rotation Cropland
- Orchard Vineyard and Other Perennial Crops

Forest
- Forest - Harvested
- Deciduous Hardwoods
- Indigenous Forest
- Exotic Forest

Grassland, Sedge and Saltmarsh
- High Producing Exotic Grassland
- Low Producing Grassland
- Tall Tussock Grassland
- Depleted Grassland
- Herbaceous Freshwater Vegetation
- Herbaceous Saline Vegetation
- Flaxland

Other
- Not land

Scrub and Shrubland
- Fernland
- Gorse and/or Broom
- Manuka and/or Kanuka
- Broadleaved Indigenous Hardwoods
- Sub Alpine Shrubland
- Mixed Exotic Shrubland
- Matagouri or Grey Scrub

Water Bodies
- Lake or Pond
- River
- Estuarine Open Water

BULLER DISTRICT

GREY DISTRICT

Tasman Sea

WESTLAND DISTRICT

Insert extent

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0 36,000 m

1:1,500,000 @ A3

Data Sources: Eagle Technology, Land Information New Zealand, Manaaki Whenua Landcare Research, LCDB v5.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAITAHA HYDRO

Land Cover of the West Coast Region Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 2

LEGEND

- Upper Waitaha Catchment Extent
- Territorial Authorities
- DOC (exclude National Park)
- National Park

Tasman Sea

BULLER DISTRICT

GREY DISTRICT

WESTLAND DISTRICT

Insert extent

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0 36,000 m

1:1,500,000 @ A3

Data Sources: Eagle Technology, Land Information New Zealand, Department of Conservation.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAITAHA HYDRO

Conservation Areas of the West Coast Region Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

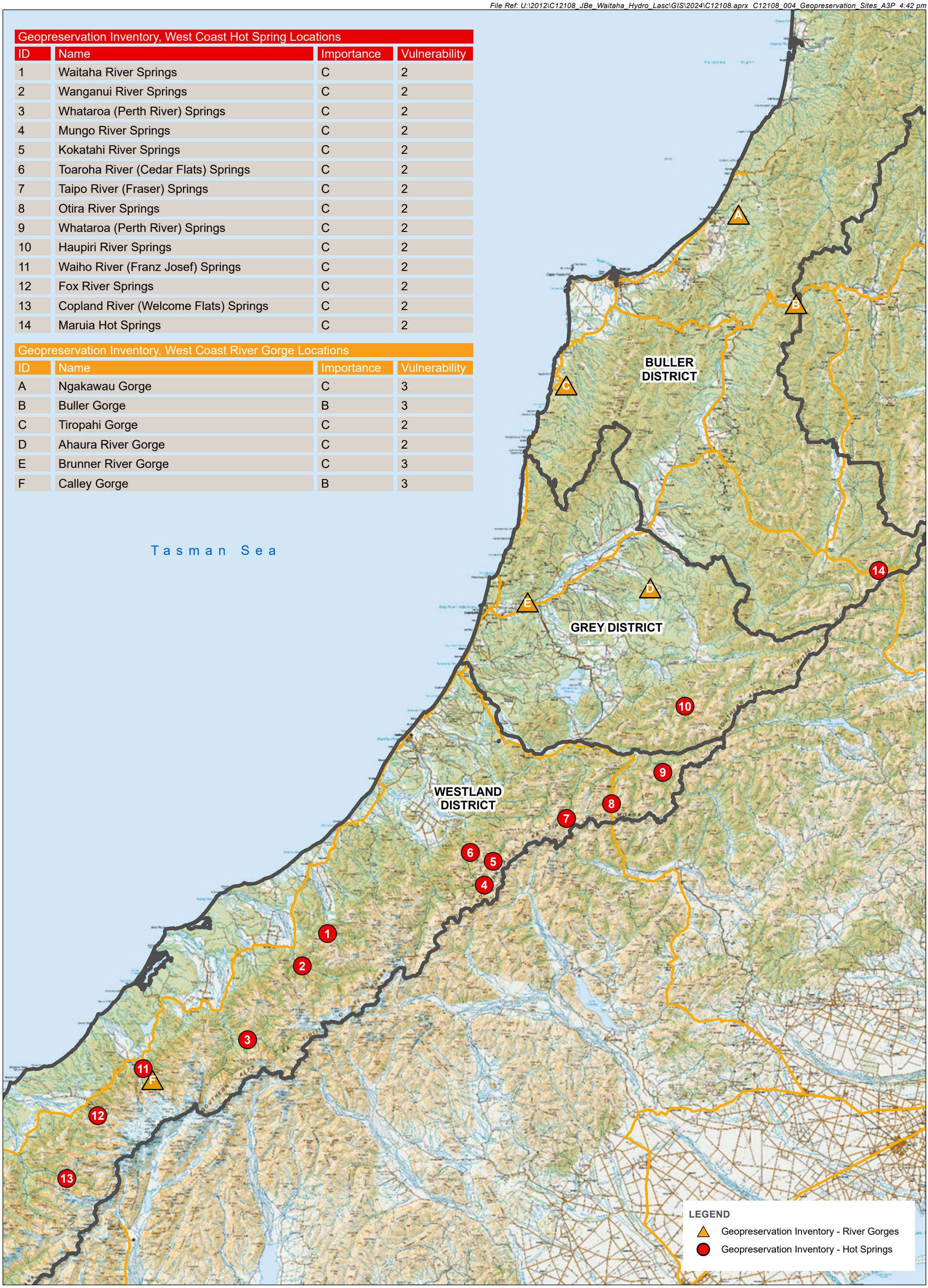
Figure 3

Geopreservation Inventory, West Coast Hot Spring Locations

ID	Name	Importance	Vulnerability
1	Waitaha River Springs	C	2
2	Wanganui River Springs	C	2
3	Whataroa (Perth River) Springs	C	2
4	Mungo River Springs	C	2
5	Kokatahi River Springs	C	2
6	Toaroha River (Cedar Flats) Springs	C	2
7	Taipo River (Fraser) Springs	C	2
8	Otira River Springs	C	2
9	Whataroa (Perth River) Springs	C	2
10	Haupiri River Springs	C	2
11	Waiho River (Franz Josef) Springs	C	2
12	Fox River Springs	C	2
13	Copland River (Welcome Flats) Springs	C	2
14	Maruia Hot Springs	C	2

Geopreservation Inventory, West Coast River Gorge Locations

ID	Name	Importance	Vulnerability
A	Ngakawau Gorge	C	3
B	Buller Gorge	B	3
C	Tiropahi Gorge	C	2
D	Ahaura River Gorge	C	2
E	Brunner River Gorge	C	3
F	Calley Gorge	B	3



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0 16,000 m

1:800,000 @ A3

Data Sources: Eagle Technology, Land Information New Zealand, Nature Maps (https://naturemaps.nz/geoserver)

Projection: NZGD 2000 New Zealand Transverse Mercator

WAITAHA HYDRO

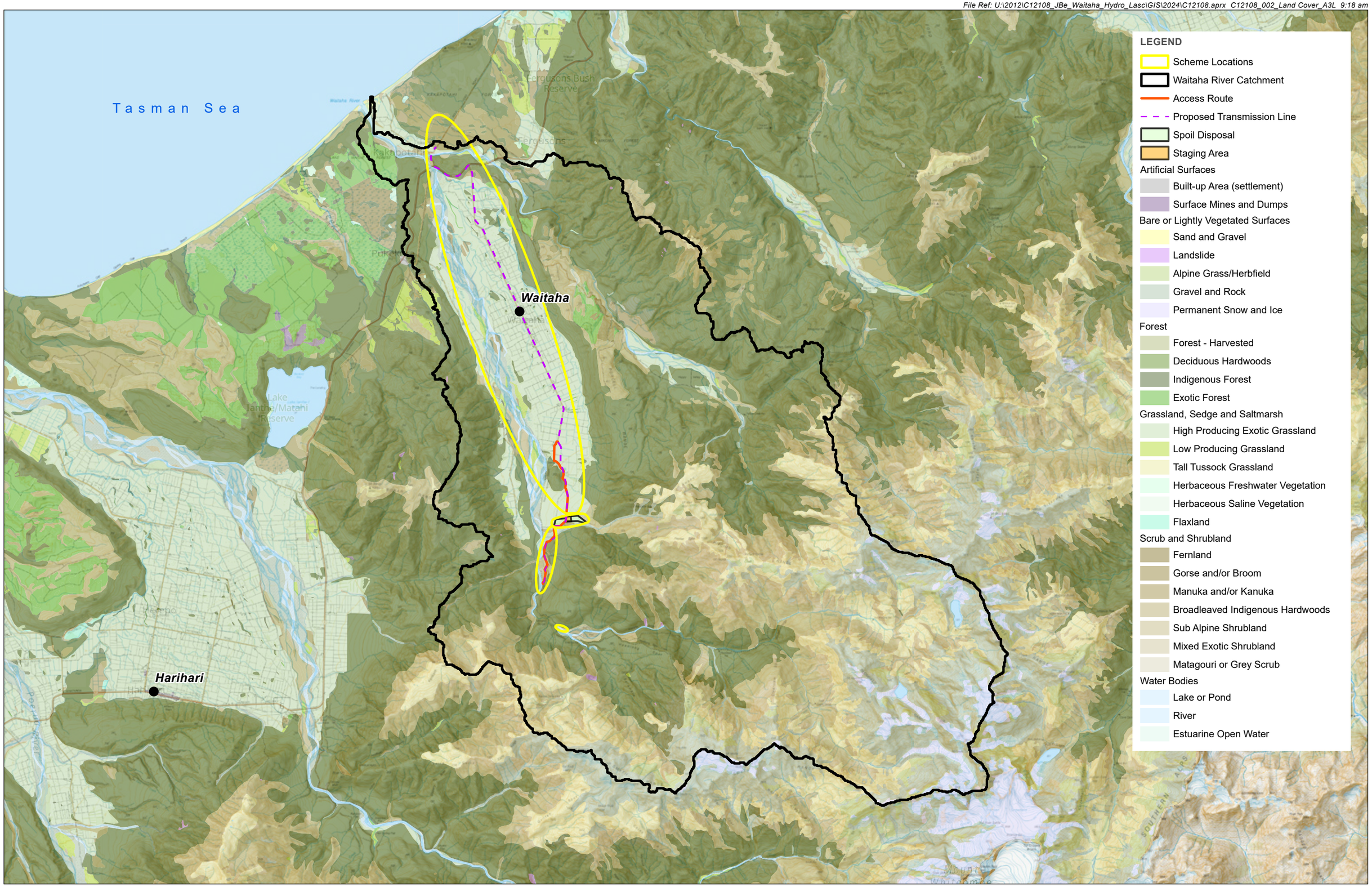
River Gorges and Hot Springs of the West Coast Region Plan

Date: Juy 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 4



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0 3,160 m

1:125,000 @ A3

Data Sources: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors., Eagle Technology, Land Information New Zealand, Manaaki Whenua Landcare Research, LCDB v5.

Projection: NZGD 2000 New Zealand Transverse Mercator

WAITAHA HYDRO

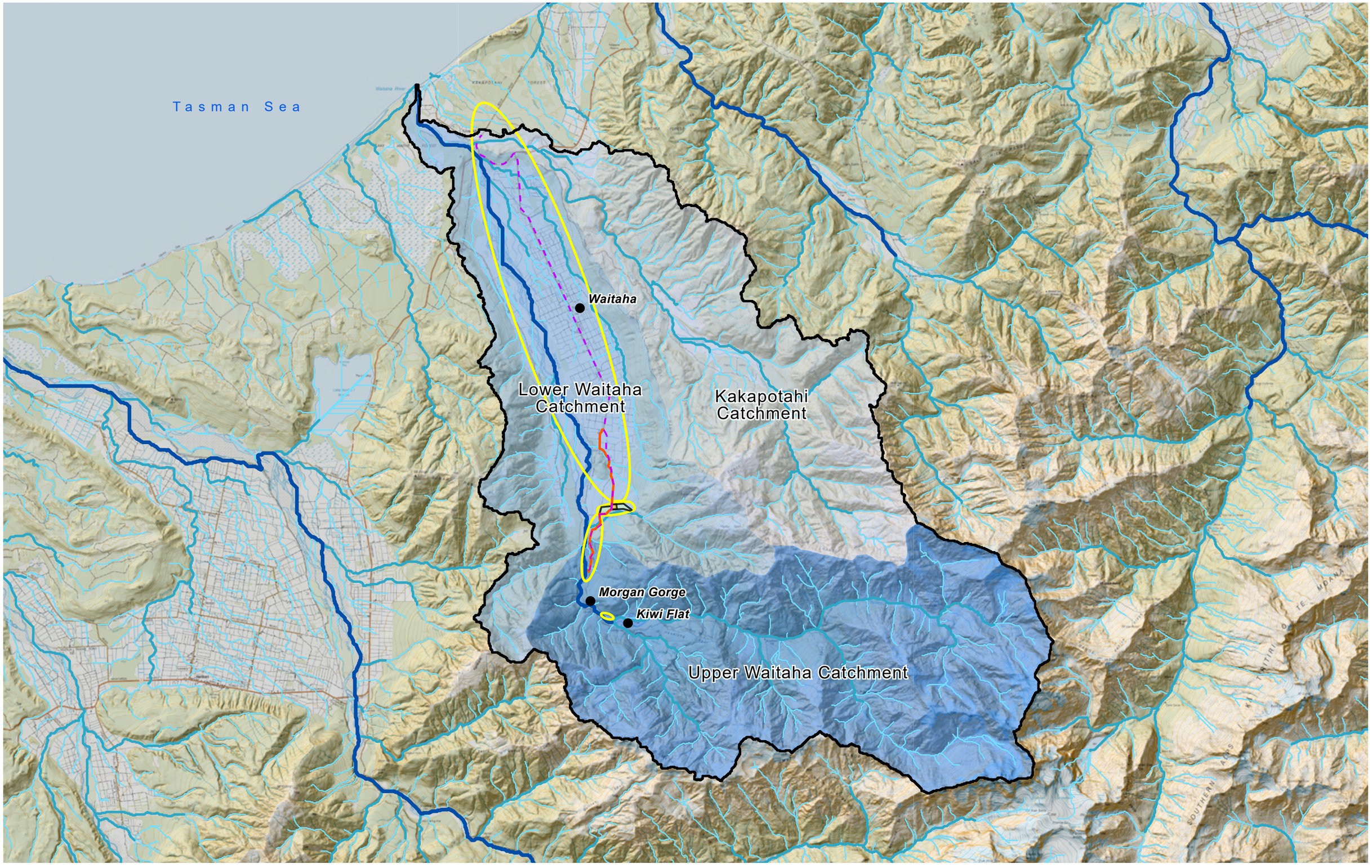
Land Cover Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 5



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0 200 m

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Data Sources: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors. Topo50 Map, Ministry for the Environment.

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Scheme Locations
- Waitaha River Catchment
- Access Route
- Proposed Transmission Line
- Spoil Disposal
- Staging Area

River Classification Order

- Low Order
- Middle Order
- High Order

- Kakapotahi Catchment
- Lower Waitaha Catchment
- Upper Waitaha Catchment

WAITAHA HYDRO

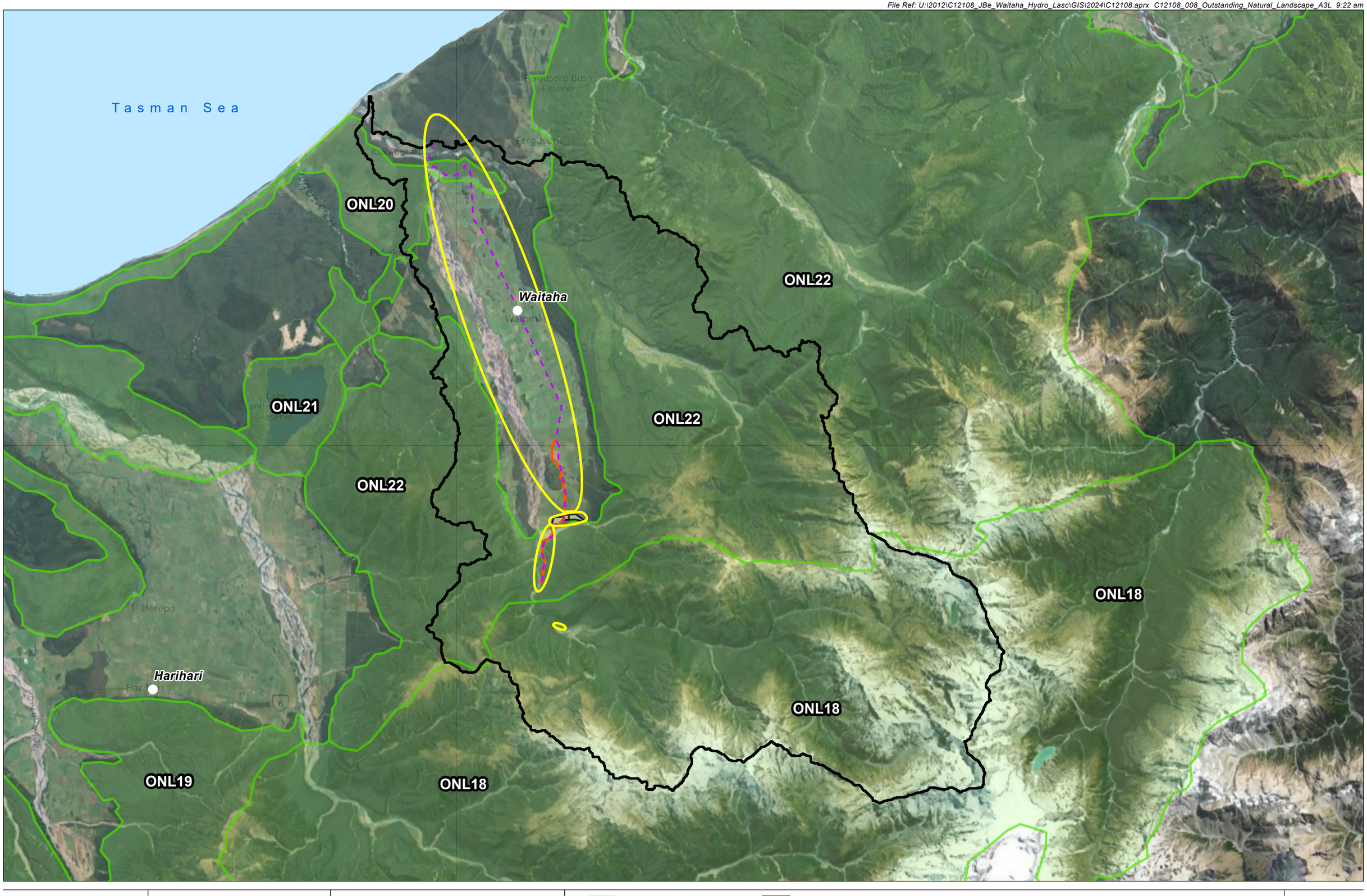
Catchment Areas Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 6



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Data Sources: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors., Eagle Technology, Land Information New Zealand, Google, West Coast Regional Council.

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Scheme Locations
- Waitaha River Catchment
- Access Route
- Proposed Transmission Line
- Spoil Disposal
- Staging Area
- Outstanding Natural Landscape

ONL18: Mt Elie De Beaumont - Mt Whitcome
ONL22: Bonar, Rangitoto & Bald Hill Ranges

WAITAHA HYDRO

Outstanding Natural Landscape (TTPP) Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 7

Area 4

Area 3

Macgregor Creek

LOWER WAITAHA CATCHMENT

Downstream Reach

Douglas Creek

Douglas Creek Reach

Area 2

Alpha Creek

Indicative Location of Powerhouse & Tunnel Portal Exit

Glamour Glen

Morgan Gorge Reach

Anson Stream

Area 1

Indicative Location of Intake Weir

Kiwi Flat Reach

UPPER WAITAHA CATCHMENT

LEGEND

- Scheme Locations
- Scheme Components
- Geopreservation Site (Hot Springs)
- Kiwi Flat Hut
- Abstract Reach
- Extent of Conservation Area
- Spoil Disposal
- Staging Area
- Access Route
- Alternative Walking Track
- Existing Walking Track
- Proposed Transmission Line
- Main Tunnel
- Name of Reach

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Data Sources: Google, Westpower, LINZ Data Service

Projection: NZGD 2000 New Zealand Transverse Mercator

WAITAHA HYDRO

Waitaha Project Area Envelope: Intake & Powerhouse Locations Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 8A

ONL20
ONL22
ONL21
ONL18
Area 4
Area 3
Area 2
Area 1
Waitaha River
Purcell Range
Bonar Range
Urquhart Knob
Morgan Gorge
Waitaha Gorge
Mt Ashmore
6

LEGEND
- Scheme Locations
- Outstanding Natural Landscape
- State Highway
- Access Route
- Proposed Transmission Line
- Spoil Disposal
- Staging Area

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0 1,500 m
1:60,000 @ A3

Data Sources: Google, Westpower, LINZ Data Service

Projection: NZGD 2000 New Zealand Transverse Mercator

WAITAHA HYDRO

Waitaha Project Area Envelope: Electricity Power Corridor & Roading Locations Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 8B

Location Plan: Flow Photographs One - Five
2325790 E 5783740 N (NZMG)

Flow Photograph One
Flow at date of photograph: 12.5 cumecs
Date of photograph: 21 February 2013, 15:18:02

Flow Photograph Two
Flow at date of photograph: 21 cumecs
Date of photograph: 5 February 2013, 15:32:01

Flow Photograph Three
Flow at date of photograph: 80 cumecs
Date of photograph: 2 June 2013, 09:00:00

Flow Photograph Four
Flow at date of photograph: 150 cumecs
Date of photograph: 2 February 2013, 13:01:35

Flow Photograph Five
Flow at date of photograph: 320 cumecs
Date of photograph: 2 February 2013, 14:01:47

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WAITAHA HYDRO

Waitaha River Flow Photographs, Looking Downstream

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 9A

Location Plan: Flow Photographs Six- Ten
2325250 E 5785080 N (NZMG)

Flow Photograph Six
Flow at date of photograph: 13.5 cumecs
Date of photograph: 5 April 2013, 11:33:03

Flow Photograph Seven
Flow at date of photograph: 17 cumecs
Date of photograph: 4 April 2013, 13:42:53

Flow Photograph Eight
Flow at date of photograph: 40 cumecs
Date of photograph: 03 April 2013, 15:34:05

Flow Photograph Nine
Flow at date of photograph: 100 cumecs
Date of photograph: 31 March 2013, 12:32:10

Flow Photograph Ten
Flow at date of photograph: 185 cumecs
Date of photograph: 31 March 2013, 15:03:42

Botanical Name	Common Name
Tree Fern	
Cyathea smithii	Katote or Soft tree fern
Dicksonia squarrosa	Wheki or Rough tree fern
Monocots	
Austroderia richardii	Toetoe
Phormium cookianum subsp *cookianum*	Whaririki or Mountain flax
Astelia fragrans	Kahaha or Bush flax
Ferns	
Polystichum vestitum	Punui or Prickly shield fern
Parablechnum novae-zealandiae	Kiokio or Palm-leaf fern – sometimes termed B. capense
Blechnum discolor	Piupiu or Crown fern

Botanical Name	Common Name
Trees	
Griselinia littoralis	Kapuka or Broadleaf
Metrosideros umbellata	*Rata or Southern rata*
Weinmannia racemosa	*Kamahi*
Shrubs	
Ascarina lucida	Hutu
Carpodetus serratus	Putaputaweta or Marbleleaf
Coprosma lucida	Karamu or Shining karamu
Coprosma propinqua	Mingimingi
Coprosma rugosa	n.a
Hebe salicifolia	Koromiko
Hedycarya arborea	Porokaiwhiri or Pigeonwood
Melicytis ramiflorus	Mahoe or Whitey wood
Myrsine divaricata	Weeping mapou
Olearia arborescens	Tree daisy
Olearia avicenniifolia	Mountain akeake
Olearia ilicifolia	Hakeke or Mountain holly
Pennantia corymbosa	Kaikomako
Pseudopanax crassifolius	Horoeka or Lancewood
Pseudowintera colorata	Horopito or Pepperwood

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0 26 m

1:1,000 @ A3

Data Sources: Google, Westpower

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Landscape Treatment: Cut Faces
- Landscape Treatment: Landscape Planting
- Disturbance Boundary
- Proposed Transmission Line
- Slope Protection Works
- Staging Area 2
- Alternative Walking Track
- Existing Walking Track

WAITAHA HYDRO

Powerhouse Site, Planting Rehabilitation Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 10

Insert Extent A

Insert Extent B

Area 1

Area 2

Area 3

Area 4

Kiwi Flat Reach

Urquhart Knob

Purcell Range

Bonar Range

Mt Ashmore

Allen Rd

Waitaha Rd

Waitaha River

Pukekura

Waitaha

Tahre River

Waitaha River

0 1,500 m

1:60,000 @ A3

Data Sources: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors., Eagle Technology, Land Information New Zealand, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Scheme Locations
- Site Photographs 1 - 17
- State Highway
- Access Route
- Proposed Transmission Line
- Alternative Walking Track
- Existing Walking Track
- Spoil Disposal
- Staging Area

WAITAHA HYDRO

Photograph Location Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 11

Site Photograph 1: Photograph taken from a location on Waitaha walking track at the easterly end of Morgan Gorge, looking in a northwesterly direction into Morgan Gorge.

Site Photograph 2: Photograph taken from a location on Waitaha walking track at the easterly end of Morgan Gorge, looking in northwesterly direction towards the proposed location for headworks and associated infrastructure activities.

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Viewpoint Details

Horizontal Field of View	: 90°
Vertical Field of View	: 30°
Projection	: Rectilinear
Image Reading Distance @ A3 is 20 cm	

Data Sources: Photographs taken on 8th-9th July 2024 between 10:00am and 5pm.

WAITAHA HYDRO

Kiwi Flat Reach (Intake): Site Photographs 1 - 2

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Site Photograph 3: Photograph taken from near the confluence of Whirling Water and Waitaha River, looking in a northwesterly direction.

Site Photograph 4: Photograph taken from a location on Waitaha walking track at the easterly end of Morgan Gorge, looking in a northeasterly direction towards the proposed location for headworks and associated infrastructure activities.

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Viewpoint Details

Horizontal Field of View	: 90°
Vertical Field of View	: 30°
Projection	: Rectilinear
Image Reading Distance @ A3 is	20 cm

Data Sources: Photographs taken on 8th-9th July 2024 between 10:00am and 5pm.

WAITAHA HYDRO

Kiwi Flat Reach (Intake): Site Photographs 3 - 4

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Site Photograph 5: Photograph taken from the swing bridge at Morgan Gorge, looking in a southeasterly direction over Kiwi Flat Reach.

Viewpoint Details

Horizontal Field of View	: 90°
Vertical Field of View	: 30°
Projection	: Rectilinear
Image Reading Distance @ A3 is 20 cm	

Data Sources: Photographs taken on 8th-9th July 2024 between 10:00am and 5pm.

WAITAHA HYDRO

Kiwi Flat Reach (Intake): Site Photograph 5

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Site Photograph 6: Photograph taken from an elevated location on the walking track, looking in a northwesterly direction over the proposed location for the powerhouse and Waitaha River.

Site Photograph 7: Photograph taken from a location south of walking track, close to the river, looking in a northerly direction.

Viewpoint Details

Horizontal Field of View	: 90°
Vertical Field of View	: 30°
Projection	: Rectilinear
Image Reading Distance @ A3 is	20 cm

Data Sources: Photographs taken on 8th-9th July 2024 between 10:00am and 5pm.

WAITAHA HYDRO

Douglas Creek Reach (Powerhouse): Site Photographs 6 - 7

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Site Photograph 8: Photograph taken on the true left bank of Waitaha River, looking in a northeasterly direction.

Site Photograph 9: Photograph taken from a location south of the Powerhouse Site, looking in a northwesterly direction.

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Viewpoint Details

Horizontal Field of View	: 90°
Vertical Field of View	: 30°
Projection	: Rectilinear
Image Reading Distance @ A3 is	20 cm

Data Sources: Photographs taken on 8th-9th July 2024 between 10:00am and 5pm.

WAITAHA HYDRO

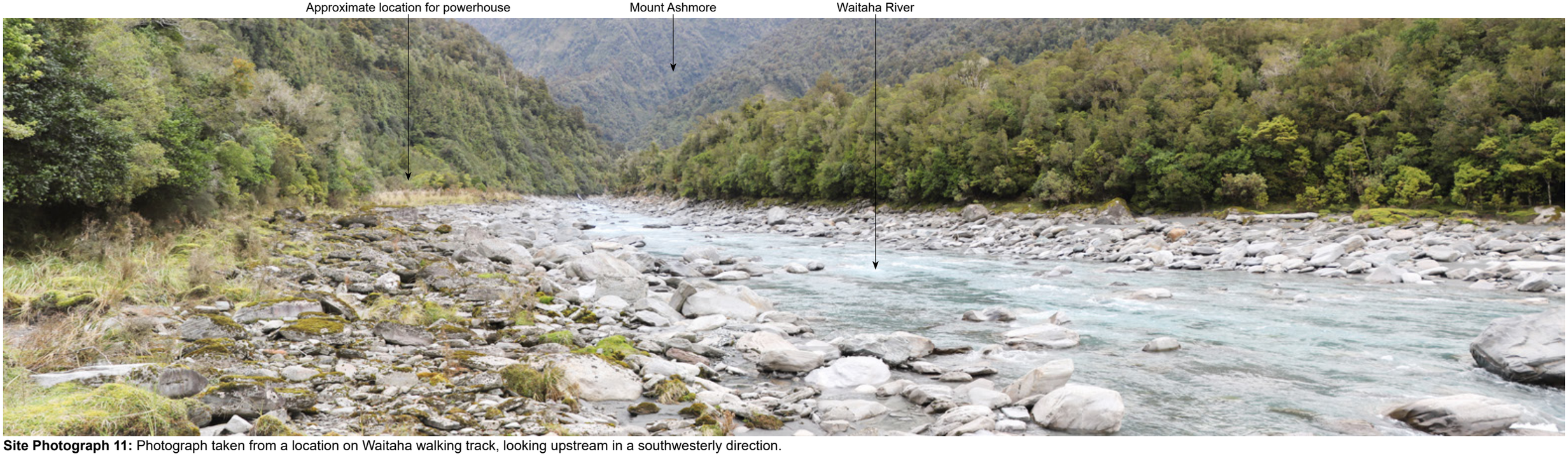
Douglas Creek Reach (Powerhouse): Site Photographs 8 - 9

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Site Photograph 10: Photograph taken from a location on Waitaha walking track, looking upstream in a southwesterly direction.



Site Photograph 11: Photograph taken from a location on Waitaha walking track, looking upstream in a southwesterly direction.

Viewpoint Details

Horizontal Field of View	: 90°
Vertical Field of View	: 30°
Projection	: Rectilinear
Image Reading Distance @ A3 is 20 cm	

Data Sources: Photographs taken on 8th-9th July 2024 between 10:00am and 5pm.

WAITAHA HYDRO

Douglas Creek Reach (Powerhouse): Site Photographs 10 - 11

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Site Photograph 12: Photograph taken further downstream from a location on Waitaha walking track near Douglas Creek confluence, looking upstream in a southerly direction.

Viewpoint Details

Horizontal Field of View	: 90°
Vertical Field of View	: 30°
Projection	: Rectilinear
Image Reading Distance @ A3 is 20 cm	

Data Sources: Photographs taken on 8th-9th July 2024 between 10:00am and 5pm.

WAITAHA HYDRO

Douglas Creek Reach (Powerhouse): Site Photograph 12

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Site Photograph 13: Photograph taken from a location on Waitaha Road, looking in a southwesterly direction into Waitaha Valley.

Site Photograph 14: Photograph taken from a location on Waitaha Road, looking in a southwesterly direction into Waitaha Valley.

Viewpoint Details

Horizontal Field of View	: 90°
Vertical Field of View	: 30°
Projection	: Rectilinear
Image Reading Distance @ A3 is	20 cm

Data Sources: Photographs taken on 8th-9th July 2024 between 10:00am and 5pm.

WAITAHA HYDRO

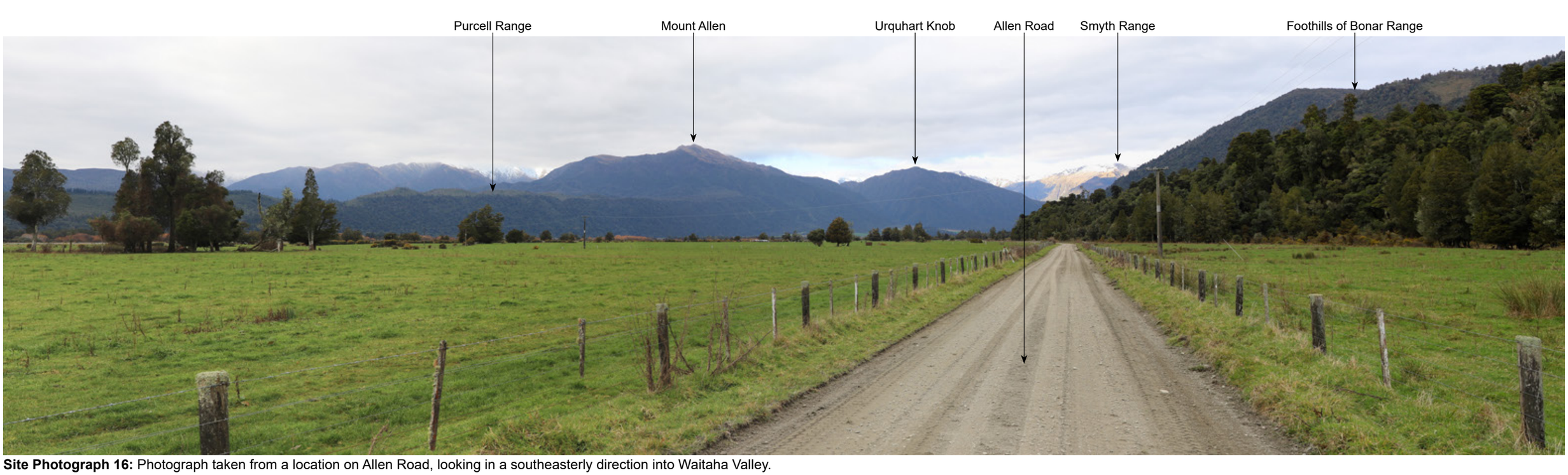
Lower Waitaha Valley (Transmission lines): Site Photographs 13 - 14

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Site Photograph 15: Photograph taken from a location further north on Waitaha Road, looking in a northwesterly direction.



Site Photograph 16: Photograph taken from a location on Allen Road, looking in a southeasterly direction into Waitaha Valley.

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Viewpoint Details

Horizontal Field of View	: 90°
Vertical Field of View	: 30°
Projection	: Rectilinear
Image Reading Distance @ A3 is 20 cm	

Data Sources: Photographs taken on 8th-9th July 2024 between 10:00am and 5pm.

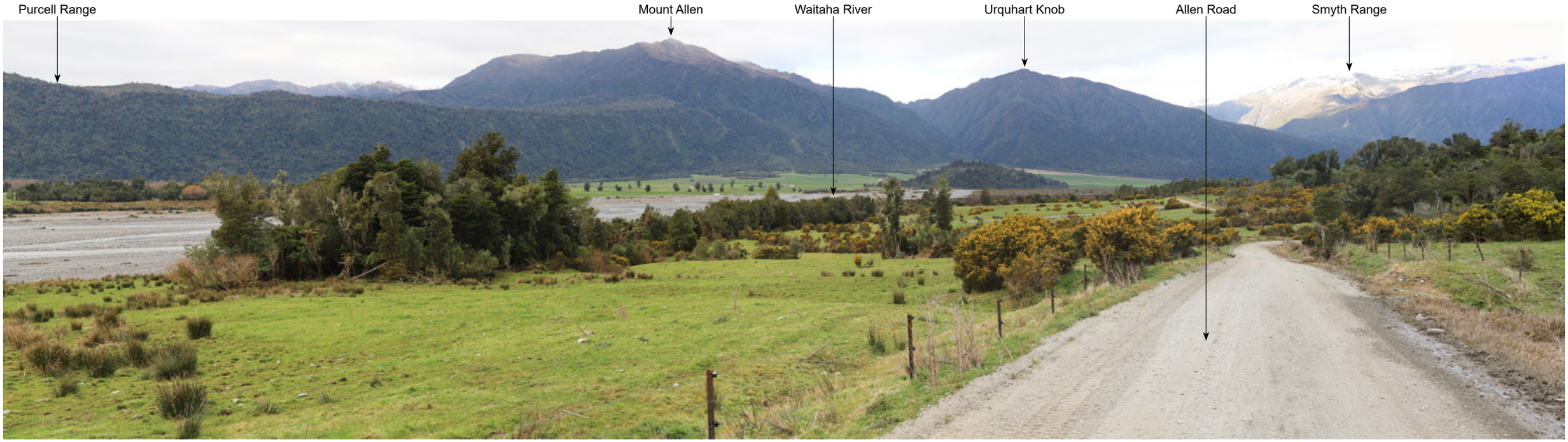
WAITAHA HYDRO

Lower Waitaha Valley (Transmission lines): Site Photographs 15 - 16

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]



Site Photograph 17: Photograph taken from a location on Allen Road, looking in a southeasterly direction into Waitaha Valley.

Viewpoint Details

Horizontal Field of View	: 90°
Vertical Field of View	: 30°
Projection	: Rectilinear
Image Reading Distance @ A3 is 20 cm	

Data Sources: Photographs taken on 8th-9th July 2024 between 10:00am and 5pm.

WAITAHA HYDRO

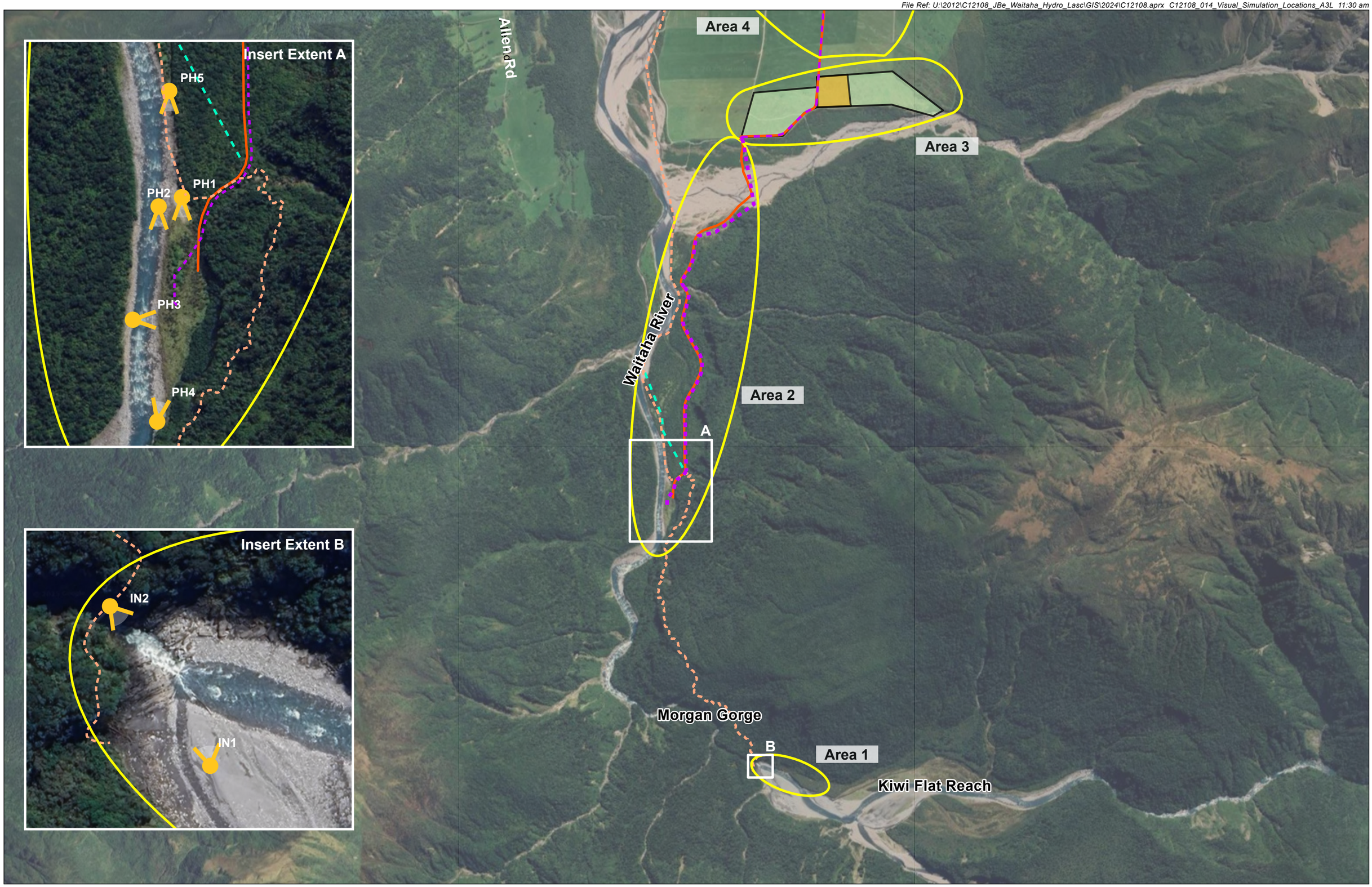
Lower Waitaha Valley (Transmission lines): Site Photograph 17

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

PART B: VISUAL SIMULATIONS



Boffa Miskell

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0 520 m

1:20,000 @ A3

Data Sources: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors., Eagle Technology, Land Information New Zealand, Google, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Scheme Locations
- Visual Simulation IN1-2 & PH1-5
- Access Route
- Alternative Walking Track
- Existing Walking Track
- Proposed Transmission Line
- Spoil Disposal
- Staging Area

WAITAHA HYDRO

Visual Simulation Location Plan

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

Figure 12

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Viewpoint Details

Easting	: 380 174 mE	Horizontal Field of View	: 65°
Northing	: 772 715 mN	Vertical Field of View	: 30°
Elevation/Eye Height	: 240.4m / 1.5m	Projection	: NA
Date of Photography	: 1:12pm 8 July 2024 NZST	Image Reading Distance @ A3 is 28 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Intake Simulation (VS1): IN1 Existing

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 380 174 mE	Horizontal Field of View	: 65°
Northing	: 772 715 mN	Vertical Field of View	: 30°
Elevation/Eye Height	: 240.4m / 1.5m	Projection	: NA
Date of Photography	: 1:12pm 8 July 2024 NZST	Image Reading Distance @ A3 is 28 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Intake Simulation (VS1): IN1 Proposed

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 380 133 mE	Horizontal Field of View	: 40°
Northing	: 772 786 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 254.6m / 1.5m	Projection	: NA
Date of Photography	: 1:35pm 8 July 2024 NZST	Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Intake Simulation (VS2): IN2 Existing

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 380 133 mE	Horizontal Field of View	: 40°
Northing	: 772 786 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 254.6m / 1.5m	Projection	: NA
Date of Photography	: 1:35pm 8 July 2024 NZST	Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Intake Simulation (VS2): IN2 Proposed

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] Checked: [redacted]

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Viewpoint Details

Easting	: 379 677 mE	Horizontal Field of View	: 40°
Northing	: 774 428 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 126.9m / 1.5m	Projection	: NA
Date of Photography	: 4:06pm 8 July 2024 NZST	Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Powerhouse Simulation (VS3): PH1 Existing

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 379 677 mE	Horizontal Field of View	: 40°
Northing	: 774 428 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 126.9m / 1.5m	Projection	: NA
Date of Photography	: 4:06pm 8 July 2024 NZST	Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Powerhouse Simulation (VS3): PH1 Proposed

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 379 643 mE	Horizontal Field of View	: 40°
Northing	: 774 415 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 124.2m / 1.5m	Projection	: NA
Date of Photography	: 4:56pm 8 July 2024 NZST	Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Powerhouse Simulation (VS4): PH2 Existing

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 379 643 mE	Horizontal Field of View	: 40°
Northing	: 774 415 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 124.2m / 1.5m	Projection	: NA
Date of Photography	: 4:56pm 8 July 2024 NZST	Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Powerhouse Simulation (VS4): PH2 Proposed

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 379 602 mE
Northing	: 774 252 mN
Elevation/Eye Height	: 127.1m / 1.5m
Date of Photography	: 12:14pm 8 July 2024 NZST

Horizontal Field of View	: 40°
Vertical Field of View	: 25°
Projection	: NA
Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Powerhouse Simulation (VS5): PH3 Existing

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 379 602 mE	Horizontal Field of View	: 40°
Northing	: 774 252 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 127.1m / 1.5m	Projection	: NA
Date of Photography	: 12:14pm 8 July 2024 NZST	Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Powerhouse Simulation (VS5): PH3 Proposed

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 379 634 mE	Horizontal Field of View	: 40°
Northing	: 774 104 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 133.8m / 1.5m	Projection	: NA
Date of Photography	: 4:41pm 8 July 2024 NZST	Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Powerhouse Simulation (VS6): PH4 Existing

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 379 634 mE	Horizontal Field of View	: 40°
Northing	: 774 104 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 133.8m / 1.5m	Projection	: NA
Date of Photography	: 4:41pm 8 July 2024 NZST	Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Powerhouse Simulation (VS6): PH4 Proposed

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 379 663 mE
Northing	: 774 582 mN
Elevation/Eye Height	: 125.3m / 1.5m
Date of Photography	: 5:18pm 8 July 2024 NZST

Horizontal Field of View	: 40°
Vertical Field of View	: 25°
Projection	: NA
Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Powerhouse Simulation (VS7): PH5 Existing

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

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Viewpoint Details

Easting	: 379 663 mE	Horizontal Field of View	: 40°
Northing	: 774 582 mN	Vertical Field of View	: 25°
Elevation/Eye Height	: 125.3m / 1.5m	Projection	: NA
Date of Photography	: 5:18pm 8 July 2024 NZST	Image Reading Distance @ A3 is 50 cm	

Data Sources: Engineering models supplied by Aus Hydro. LINZ

WAITAHA HYDRO

Powerhouse Simulation (VS7): PH5 Proposed

Date: July 2025 | Revision: 2

Plan prepared for Westpower Limited by Boffa Miskell Limited

Project Manager: [redacted] | Drawn: [redacted] | Checked: [redacted]

VISUALISATIONS - METHODOLOGY

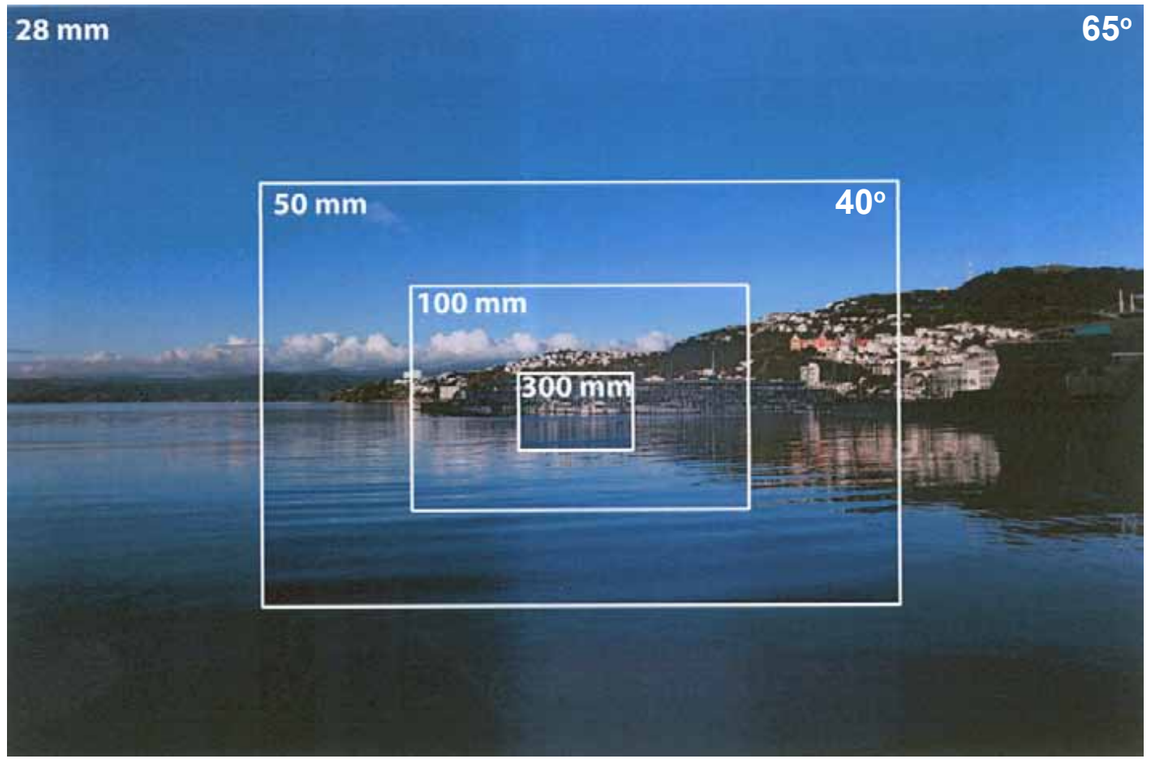
SITE VISIT & PHOTOGRAPHY

Site photographs were taken with a Canon digital SLR camera fitted with a 50mm focal length lens, mounted on a tripod and panoramic head. A series of photos were taken at predetermined viewpoints, situated on public land. The locations of each viewpoint were fixed using a hand held GPS Unit.

NZILA GUIDELINES & PANORAMA PREPARATION

The visualisations have been produced in accordance with the Tuia Pito Ora New Zealand Institute of Landscape Architects (NZILA) Best Practice Guidelines for Visual Simulations (BPG 10.2) and also adhere to Boffa Miskell's internal Visualisation Guidelines.

Camera lenses with different focal lengths capture images with differing fields of view. As can be seen below (derived from Fig 9 of the NZILA BPG), a photo taken with a 28mm lens provides a horizontal field of view of 65°. A 50mm lens will provide a cropped (40°) version of the same view. So panoramas can be created by taking multiple 28mm or 50mm photos (in "portrait" mode), and using digital stitching software to merge and crop to create a single panorama. The photographs used in these visualisations have a field of view of 40° (apart from IN1 which is 65°).

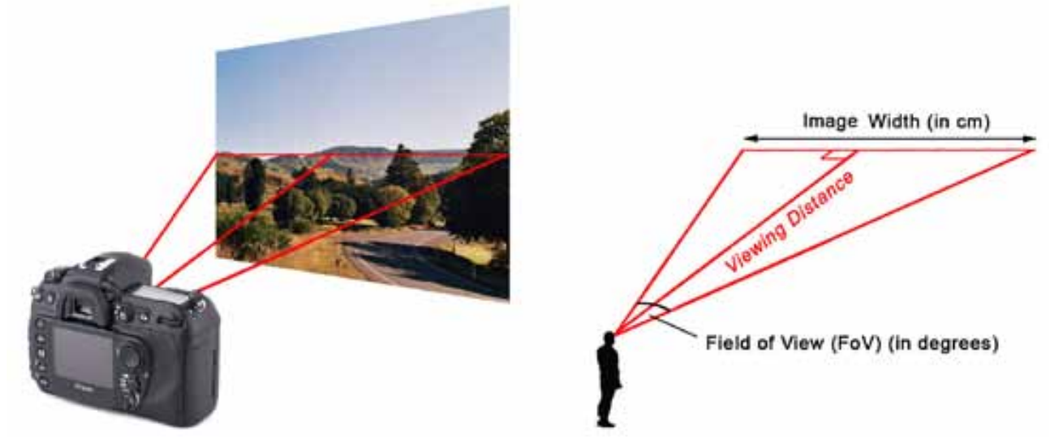


3D MODELLING

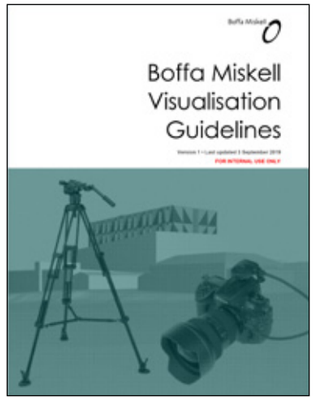
Virtual camera views were then created in 3D modelling software, and 3D terrain data and engineering models were imported. These views were then registered over the corresponding photographs, using identifiable features in the landscape and the characteristics of the camera to match the two together. The visualisations were then assembled using graphic design software.

IMAGE READING DISTANCES

These visualisations have a field of view of 40° and so should be viewed from a distance of 20 cm when printed at A3 (apart from IN1 which is 65° and should be viewed at 28 cm). This will ensure that each simulation is viewed as if standing on-site at the actual camera location, and is in accordance with Section 7.11 of the NZILA BPG. Users are encouraged to print these pages on A3 transparency, go to the viewpoint and hold at the specified reading distance in order to verify the methodology.

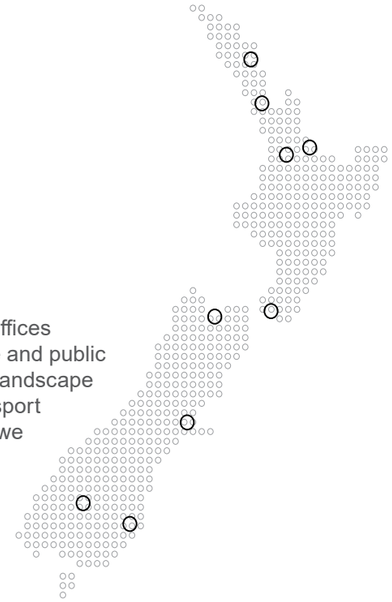


Geometry of Image Reading Distance



Together. Shaping Better Places.

Boffa Miskell is a leading New Zealand environmental consultancy with nine offices throughout Aotearoa. We work with a wide range of local, international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, Te Hīhiri (cultural advisory), engagement, transport advisory, climate change, graphics and mapping. Over the past five decades we have built a reputation for creativity, professionalism, innovation and excellence by understanding each project's interconnections with the wider environmental, social, cultural and economic context.



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