Proposed Waitaha Hydro Scheme

(Westpower Ltd)

PEER REVIEW

of:

APPLICANT'S ASSESSMENT OF NATURAL CHARACTER, LANDSCAPE AND VISUAL AMENITY EFFECTS

April 2015

Prepared for Department of Conservation:
By Jeremy Head
Jeremy Head Landscape Architect Ltd.

Introduction

Background

This report provides a peer review of (1) the visual and landscape assessment (prepared by James Bentley of Boffa Miskell Ltd, dated 24 March 2014) and (2), a later addendum also prepared by Mr Bentley dated 4 March 2015 responding to a Department of Conservation (DoC) request for further information (RFI) concerning parts of the proposal located above the gorge and (3), documents prepared by Westpower outlining track realignment options to avoid the powerhouse area (16 January 2015). These three documents form part of an application by Westpower Ltd seeking DoC concessions and resource consents to implement a run of the river hydro scheme on the Waitaha River located in Westland District.

The scheme would be located on and around the Morgan Gorge section of the Waitaha River. This is a steeply incised gorge with limited accessibility located approximately 6kms south of the end of the Waitaha Road.

The scheme involves a weir and intake structure at the upstream gorge entry point which would divert part of the riverflow into a penstock that would connect some 1.5kms downstream to a powerstation on the opposite side of the foothill range. From the powerhouse, water will be discharged back into the Waitaha River approximately 2.6kms from the intake site. Also part of the scheme will be a transmission line, earthworks and rehabilitation works, various tracks and level areas for temporary construction purposes and permanent vehicle access for maintenance purposes.

A site visit was conducted with Westpower representatives and DoC staff and other experts contracted by DoC. The site visit was via helicopter and on foot and included an overview of the Kiwi Flat area. Landings for ground assessment work were made near the intake site and power station site.

The nearby Westpower Amethyst hydro scheme was also inspected. Of relevance, the Amethyst scheme would be similar in scale to what is being proposed, although much of the infrastructure in this working example is located above ground (and therefore visible), whereas in the case of the proposal, much of the infrastructure would be concealed from view inside a tunnel.

This peer review covers the applicant's:

- landscape methodology;
- description of the existing landscape;
- description of the proposal;
- analysis of effects, assessed against the relevant statutory documents;
- measures taken to avoid, remedy or mitigate adverse effects;
- response in their revised application taking into account findings from the Landscape and Urban Design external review by Gavin Lister – Isthmus.

- Memorandum in response to the 23 October 2014 DoC RFI concerning the infrastructure above the Morgan Gorge aspect of the proposal.
- Information prepared in response to an RFI concerning the proposed alignment of the public track near the powerhouse site.

Methodology

The methodology outlined in the application is sound for the same reasons outlined in the Isthmus review and has been appropriately applied. Also of note is reference to alternative sites that were considered by the applicant. The assessment methodology is usefully and thoroughly explained in appendix 1.

Isthmus External Review

Mr Bentley acknowledges the findings in the Isthmus review at 1.5. Seven outstanding matters are responded to briefly in turn via a short summary of each point. In this peer review I largely comment on (1) matters not covered in the application, (2) where I disagree with comments in the Isthmus review, or (3) where matters raised in the Isthmus review are not responded to adequately in the final application document. In part, the Isthmus review was concerned that the remediation and mitigation measures proposed were aspirational rather than providing certainty of outcome and that conditions would be required to convert aspirations to outcomes.

Description of Existing Landscape

Mr Bentley describes the existing landscape including its geomorphology, biota and cultural patterns in thorough detail extending from a regional appraisal through to district and (Waitaha River) catchment scales. Other reports included in the application are referred to in further detail to help describe and underpin the descriptions of the resulting natural landscape character.

The Waitaha River catchment is then broken down into three main sub-catchments (upper, lower and Kakapotahi River)[1]. This catchment methodology is now widely accepted as a useful and relevant framework to help define and describe the environment in which development may occur. The environment court have stated that the hydrological catchment is a *"…useful and scientifically based starting point for most analyses"*.

Further detail is then provided on the hydrology and variable appearances of the Waitaha River depending on river flows. These descriptions are consistent with my own (more limited) observations of the area.

Morgan Gorge is then described. I have not walked the gorge tracks - either what remains of the track on the true left of the river or the new DoC track on the true right, other than the short climb up to and across the swing bridge. Nonetheless,

[1] See Figure 6 Catchment Areas (page 6, graphic appendices)

from my own observations of these discrete parts of the gorge from the swing bridge, I agree with Mr Bentley's description.

The report then covers off the various relevant statutory documents and describes the landscape implications of each, appending relevant policies[2]. Correctly identified is the fact that while outstanding landscapes are identified as requiring protection in the Regional and District Plans, these statutory documents have to date not mapped any outstanding natural areas / features.

Under the heading "Natural Character and Landscape Values", a natural character evaluation under Section 6(a) of the RMA is carried out for the Waitaha River and its margins. This assessment is thorough and relies on various relevant workshop findings and most recent environment court case law[3]. Following on from this is an assessment of the broader project area under Section 6(b) of the RMA to determine whether the landscape meets the test as an outstanding natural landscape (ONL) (or not). Relevant principles in how to assess this are identified and explained from various environment court cases, including current best practice as per the New Zealand Institute of Landscape Architect's "Best Practice Note". This is a thorough and accurate approach.

It is acknowledged that in the absence of an overall district-wide ONL study being undertaken, an independent study of the upper and lower Waitaha River catchments has been carried out using criteria from the District and Regional Council's policies. This assessment then organizes the findings under three main landscape headings (i) biophysical, (ii) perceptual/experiential and (iii) associative. This criteria represents current NZILA best practice.

The Isthmus report is in general agreement on the conclusions reached with regards to the descriptions of the existing landscape character, and outcomes of the Section 6(a) and 6(b) tests. I am also in agreement with these findings. Of note, despite small amounts of modification, the upper Waitaha River and its margins hold very high, near pristine levels of natural character.

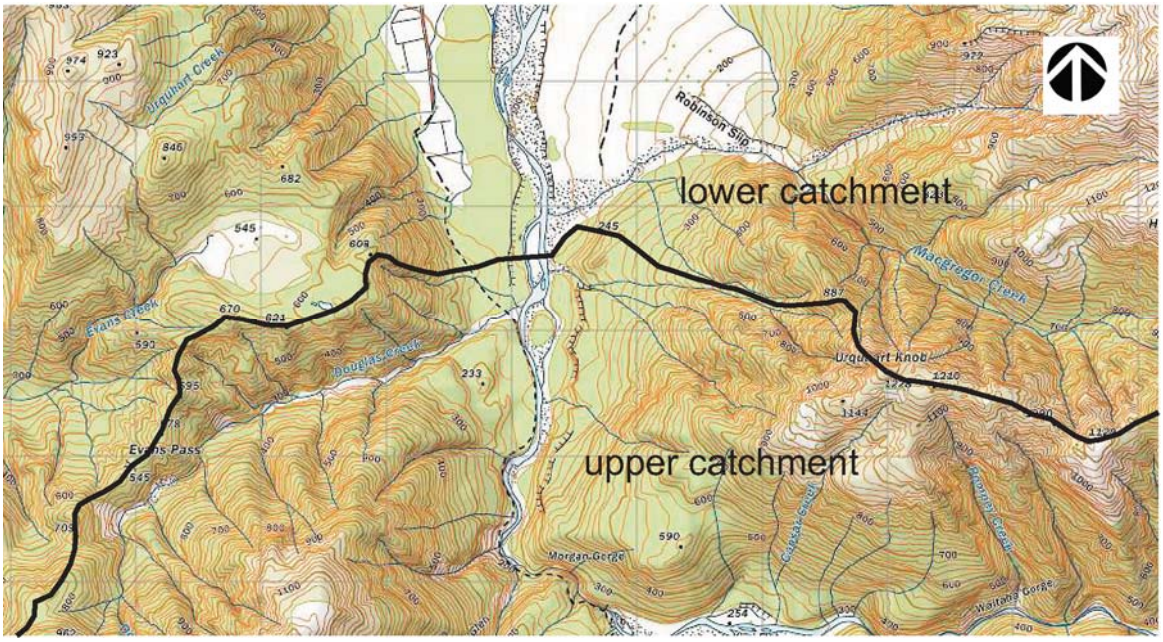
An issue raised in the Isthmus review argues that the line of demarcation between the upper and lower catchments could be mapped differently. Put simply, the upper catchment including the gorge is found by both Messrs. Lister and Bentley as likely to meet the requirements of an ONL, while the lower catchment is by contrast settled and farmed, and therefore less natural. The range pierced by the Morgan Gorge at a broad landscape scale provides the division between the two catchments and resulting different landscape character areas.

The Isthmus report suggests that the mapped line of change could be moved closer to the proposed powerstation site which infers that the more enclosed gorge

[2] Appendices 2- 4

[3] It is acknowledged that there may be more recent case law available since the applicant's assessment was written in March 2014.

topography might be a better change point. However Mr Bentley has re-examined his assessment of this line and has decided to retain it as is[4]. I agree with Mr Bentley's opinion and I favour his more conservative approach. The landscape



around the power station site is more open and easier to traverse and is less sublime than the chasm-like gorge - however it remains undeveloped, is located adjacent to a steep terrace scarp, and the general area remains clothed in indigenous cover and is out of view of the settled plains to the north.

Perhaps a third option for locating a catchment demarcation line would be to consider the Macgregor Creek sub-catchment as forming the boundary which would be topographically easy to define, and would still be close to Mr Bentley's Urquhart Knob spur division line (see diagram above).

Regardless of where the line of change is mapped, Mr Bentley has confirmed his opinion that the powerstation site would therefore be located in an area that has high landscape values (although perhaps not as high as the catchment above and including the gorge). By virtue of this, there is an obligation by the applicant to ensure that this structure is as compatible with its setting as possible while being practicable. I provide further comment on the mitigation measures around the powerstation site later in this report.

Description of Proposal

The proposal is summarised under 'Executive Summary' at the start of the report. Later throughout the report, various aspects are covered in more detail. This is thorough, there is a clear understanding of the 'mechanics' of what is being proposed, the timeframes of the various stages, what the temporary and permanent landscape effects would be generally and what bearing this would likely have on the natural environment.

[4] See Figure 7 Morgan Gorge Area (page 7, graphic appendices)

Analysis of Effects

The overall approach as to how the effects of the proposal are assessed is described at 5.1. Photosimulations are used to help demonstrate the effects of the proposal. A 'disclaimer' is included regarding the limitations inherent in photosimulations. This is reasonable, and I would also add that the photosimulation can/does not always include the full contextual setting where the activity is to be located, and is often focused on the primary area of change. Further to this, the photosimulations don't show the entirety of the changes at the intake or power station sites in a single frame, but rather hone in on specific areas. This has 'disjointed' the overall visual effects of the proposal somewhat and while it affords better detail of individual parts, it is less helpful in seeing how all the changes appear as one. As a 2D representation, photosimulations also tend to relegate everything within the image frame with the same focal 'priority' – compared to the reality, where ones scrutiny would focus more frequently on the elements in the setting that 'stood out' more.

The Isthmus review criticises that the structures appear as a 'clean insertion' into their setting, with no disturbance of the immediate surrounding area. In the March 2015 memorandum a revised image (IN1a) has been produced illustrating a revised proposal. Nonetheless, IN1a also shows the proposal as a 'clean insertion' into its setting. However, the revised scheme appears to involve much less site disturbance than it did in the initial application and it is possible that much of the adjacent terrain *could* now be retained. This would be a preferred outcome, in that if the bulk of the surrounding terrain, including the large loose rock slabs were retained in situ, it would help balance and mitigate the similar horizontally proportioned weir and diversion structures and ensure a better compatibility in this location.

The effects assessment is scale based. That is – effects on landscape character, and visual effects or visual amenity are assessed at the broad and local scales. It is my understanding that there are two fundamental requirements of assessing landscapes. The first is an assessment of the potential effects on landscape character. This relates to broad changes to the landscape which may not necessarily be visible, but could be perceived. The second are the assessment of potential effects on visual amenity. This relates to changes or additions to the landscape that concern scale, shape, bulk, line, texture, colour, activity and so forth. And these types of quantitative changes can be clearly indicated via photosimulations such as is the case here.

Turning to the broader catchment-based scale, the level of built intervention is relatively small, with much of it subterranean. Any effects on landscape 'character' will therefore be confined largely to altered flow rates of the river within the abstraction reach. And while the origin of the change (the weir and intake) may not even be visible from many parts of the catchment, it could be perceived that there has been some modification to the river and thus effects on the landscape character. These changes may be perceived more acutely by people who are familiar with the river's more subtle states, such as kayakers, rather than 'one-off' visitors for

example. And the effects on landscape character would be more heightened for those who eventually observe the built changes, and therefore understand why river flows may have altered.

The report adequately addresses these effects. Changes in river flows are quantified and scientifically presented. A conclusion is reached where there would be a 'moderate' effect on landscape character within the abstraction reach. Given the degree of natural fluctuation of river flows throughout the year and the relatively inaccessible nature of the gorge and abstraction reach – even to advanced kayakers, this is a fair conclusion. Other than this effect, there are no other significant landscape character effects, in my opinion.

The Isthmus review adds that the powerhouse will trigger peoples' awareness that the river flow has been modified. I'm not convinced that this would necessarily be the case, particularly where people were entering the area for the first time from the west. Other than the water being discharged back into the river via the spillway, the building would not necessarily appear 'connected' with changes in river flows. For most people, the building may simply appear as an incongruous large structure in an otherwise unbuilt landscape. However the Isthmus review maintains that people upstream of the gorge and crossing the swing bridge that observe the weir and intake structure would therefore appreciate that river flows may be altered. I agree with this point.

The Isthmus review disagrees with Mr Bentley's overall conclusion that the effects on landscape character at the broad scale would be low. He asserts that the effects would be greater than this and should be regarded as 'moderate'. I agree with Mr Lister. I agree that the gorge would likely meet the test of an outstanding natural feature within an outstanding natural landscape for the same reasons that Messrs. Bentley and Lister do. It is a dramatic, deeply incised feature that has clearly been shaped through regular high energy river flows. It forms the 'gateway' between the upper and lower catchments, and is currently perceived as an unaltered, very highly natural and wild place. For some, the presence of the proposal could be perceived as curtailing and 'taming' the wild riverine processes.

In my view, the driving force (the wild, turbulent river) behind the resulting highly memorable form of the gorge will be altered. There will be a modification to the source-to-sea progression of water within the catchment (even though relatively small) with the proposal in place. And for this reason, in my opinion, the effects on landscape character are greater than 'low'.

Headworks site

(Intake, weir, upper portal, access road, temporary contractors' yard and facilities)

The design of the headworks upstream of the gorge have been substantively altered and clarified since the initial proposal and subsequent March 2014 assessment of effects was prepared. These changes partly respond to a DoC RFI that concerned

landscape matters pertaining to: the location and appearance of the upper portal, location and extent of the intake access road, location and extent of vehicle maneuvering areas and the location and extent of any earthworks and vegetation removal. I also understand that the revised scheme is also the result of more detailed topographical survey by the applicant with the aim of further reducing environmental impacts and implementation costs, while still meeting operational requirements.

In summary, amendments to the proposal include; (1) reducing the area required for the contractors 'yard', (2) reducing the length and width of the access road, (3) eliminating the requirement for a vehicle turning area and (4) clustering the permanent built elements (weir, intake, upper portal) together. Some of these changes can be seen in the photosimulation IN1a. The overall development envelope has consequently been reduced. As a result, the current proposal also reduces the degree of vegetation clearance, earthworks and scope of rehabilitation works. Other changes now proposed are the addition of a temporary contractors' facilities shed, outdoors materials storage area located on a 100m^2 platform up to 7m above the ground near the intake structure[5].

The upper portal is the upstream end of an all-weather access tunnel linking the intake area with the powerhouse site. The upper portal is located near to and slightly above the intake structure. The report states that the upper portal would be up to 5m x 5m in diameter and is shown with a curved top although the photosimulation shows it nearer to 5m x 3m (wide). The report also states that final dimensions of the portal may reduce during construction, but that the maximum size would not exceed 5m x 5m.

Mr Bentley finds in his 2014 report that at a broad scale, the intake structure *"…will affect the remote values of Morgan Gorge and introduce a small node of industrial activity into an otherwise remote area."* I agree with this conclusion and it wouldn't alter following the 2015 scheme revisions. However, at the large landscape scale, the intervention of the headworks area remains small.

I now turn to Mr Bentley's response to the DoC RFI. Changes to the headworks area are described in detail and other than the addition of the contractors' platform and shed (which are not included in the photosimulation), the permanent changes are satisfactorily shown in the new photosimulation IN1a and Map 5. The intake structure and weir still appears largely 'inserted' into the rocky terrain to the true right of the entrance to Morgan Gorge and retains a low profile, sitting amongst the rocks. Of note, the more upright tunnel portal is now visible in the frame of Viewpoint 1 having been moved closer to the intake/weir structure. The access road (I would consider it more as an 'accessway') is now also partly visible, shortened, narrowed down from 5m to 3.5m and appearing as a 'ramp' directly accessing the upper portal. This new alignment avoids the previously proposed switchback

[5] Not shown in IN1a.

traversing the steep backslope, necessitating extensive cut and fill. The new access route (see 'B' on Map 5) alignment reduces earthworks and vegetation removal and unsightly scarring of the area. And of note, while shorter, the access route is now proposed to be located largely near river level and would likely appear as another (albeit constructed) small river terrace. Furthermore, as it is located largely near river level, where vegetation is scant, any vegetation removal would go largely unnoticed reducing the area of rehabilitation.

To summarise, the changes to the headworks area largely relate to clustering the various permanent elements together into a more contained footprint. This avoids a potentially sporadic appearance with introduced built structures located over a wider area around the gorge mouth.

Mr Bentley concludes that while the concentration of structures and resultant adverse effects of built structures near the gorge mouth has increased with the proximity of the upper portal and accessway, the benefits of this are much less ground and vegetation disturbance than what was originally proposed where the track and portal was more separated higher up the backslope. I agree with this approach and conclusion. He goes on to state that after five years, vegetation growth naturally establishing in formed niches in the disturbed parts of the construction site and on fill material around the structures will further reduce their visual effect. I agree with this assumption, having seen firsthand how quickly natural processes occur in the local climate.

Notwithstanding all of the above improvements to the scheme over what was previously proposed, Mr Bentley - fairly in my view, considers that the entrance to the gorge is a sensitive landscape feature and that the built changes to the area *"…maintain a high magnitude of adverse natural character effects".* This is based on the fact that the intake structure is an artificial element in a highly natural setting. I agree with this assessment and conclusion.

Other works in the vicinity of the intake site are described next. Items include a low-profile deck-type helipad located within a defined development envelope near area C (see Map 5) on the upper river terrace. Area C itself would also be used for the storage of equipment and machinery safely above flood levels. A temporary track would extend from area C down a dry tributary to the Waitaha River and from here continue downstream via a benched track to the upper portal and intake site. Following completion of construction, the contractors' facilities platform, and temporary access route would be removed and the disturbed areas rehabilitated. As I understand it, a new pedestrian track linking the true right side of the swing bridge to the upper portal would be retained for practical reasons. I am satisfied that the two additional permanent items (the pedestrian track and timber helipad) would have negligible landscape effects other than at close quarters and that with appropriate conditions put in place that the other areas (contractors' platform and track) would contribute only limited site disturbance and could be readily rehabilitated.

Mr Bentley states that mitigation measures remain unchanged from section 6.0 of his 2014 assessment. Mitigation currently includes a low profile design of the intake and weir structures, avoiding using shotcrete (which can appear artificially smooth until well weathered and vegetated) to stabilise slopes and working with, rather than, against the contours or 'grain' of the land, to better integrate pedestrian and vehicular tracks with the landscape. Section 6.1 also suggests that other mitigation measures may be employed during actual construction such as rounding off corners of the box-like structures, faceting and texturing of the surfaces and aligning faces with adjacent rock profiles. These measures would go some way towards improving the appearance of the permanent works around the intake area. It is evident in IN1a that the concrete structures *do* appear non-natural and box-like. The highly engineered forms, surfaces and edges all contribute to a monolithic appearance of a collection of structures in contrast to their natural rock surrounds. In particular, the upper portal appears to sit forward of the cliff face. This would be a good example of where aligning the formed concrete with adjacent rock faces would help mitigate the impact of the structure. It was suggested during the site visit with Westpower representatives that facing the visible parts of the intake, weir and portal structures with site rock would be an effective way to significantly improve the appearance of these structures. This would better achieve all of the techniques described above, in my opinion. Using local site rock to face the formed concrete structures will have an immediate benefit, and over time will provide an excellent textured surface for vegetation to establish, further helping these structures blend into their surrounds.

Power station site

The changes to this area following completion of the powerhouse and surrounds are described fairly. The existing site character is accurately described and accords with my own observations of the location. Natural character is high, although not as high as other parts of the upper catchment further upstream. This is largely attributed to the areas less enclosed topography coupled with less dense vegetation patterns comprising generally young colonising species. There is also more evidence of exotic colonising species around these more accessible river flats located on the edge of the settled plains.

A series of photosimulations[6] have been produced which indicate how the area will change following implementation of the proposal from viewpoints near and far. The 10m tall building which generates the greatest landscape effects would be similar in appearance to the current Amethyst power house[7] which I have observed at first hand. Time of day selected for the photosimulations shows the proposed powerhouse in 'worst light' - that is, catching the sun later in the day when reflectivity levels would be greatest, compared with an early morning scenario where the site would be cast in shade reducing visual effects considerably. This is good practice. Mr Bentley concludes that the visual effects of the powerhouse would be 'high'. I agree with this overall finding.

[6] PH1-6, pgs 31-51.
[7] See image 22, page 60.

At 6.2, mitigation is discussed. I agree with the techniques proposed generally, although if more detail was provided, it would provide a better certainty of outcome. I discuss this shortly. Rehabilitation planting proposed would over time cover the surface of the constructed bunds/stopbank structure located between the building and the river. This would help this new landform blend with the existing terrain which at first would appear as raw soil/gravels. From my discussions with Westpower representatives on site, the bund was suggested as being up to 1m above existing ground levels and would be 4m wide at its crest. This suggests a more compatible gentle rounded landform rather than an overtly steep sided landform which could look conspicuous in this more horizontal river terrace setting.

Existing local vegetation patterns scattered about this gently hummocky landscape are sporadic and species assemblages are not overly tall. It would help things blend in further if the bund top in elevation was formed to slightly undulate (rather than be set completely level) with rehabilitation planting laid out informally to better mimic natural patterns. These techniques would give this artificial landform a better compatibility with nearby natural patterns. Providing detail on bund form and planting design is not critical at this stage, however, it would benefit the decision makers if a bund form and planting/species setout methodology was noted in the application.

Colour is discussed as another factor in the mitigation package. A neutral colour is proposed. However in my opinion, any introduced colours should be neutral *and* recessive. The Amethyst building is cream with a blue-green roof and trim. Some hues of green can 'compete' with natural greens of nearby vegetation. Were the Amnethyst building colour suite used in this proposal (as is suggested in the photosimulations), the visual impacts would be unnecessarily high (colours would clash with contextual natural colours and be highly reflective). From discussions on site with Westpower representatives, I understand that the construction of the walls would be concrete. This does not preclude using darker colours[8]. I also understand from the Westpower representatives that the building does not have to follow any defined or corporate colour palette. I therefore recommend that the colour for the entirety of the building including doors and trim be '*Ironsand*'. This is a standard NZ Colorsteel colour, and is also available as a paint tint. There is no profit in picking out architectural features of a utilitarian structure such as this by using multiple colours. A single, uniform colour would allow the building to better recede into the landscape, and allow natural patterns (vegetated scarp backdrop at the rear of the building, additional rehabilitation vegetation and the river itself) to predominate, which is preferable.

Also discussed on site with DoC representatives was the alignment of the proposed walking track on the true right of the river[9]. The initial application did not specify a

[8] Dark colours on timber will absorb heat, causing the timber substrate to move and degrade more rapidly. Concrete by contrast is a far more inert and stable substrate and tolerant of darker colours.
[9] As I understand it, this route is currently used by walkers, but is not formally constructed.

track location. Following an RFI, the most recent proposal is to realign a section of the track up the edge of Alpha Creek, then traverse the contour above and inland of the Waitaha River (via routes 'A' or 'B'). The final route choice and alignment would be in collaboration with DoC. The recent proposal would serve to separate walkers from the section of Waitaha River where the powerhouse would be located. Whether routes A or B were selected, in my opinion the outcome of either would mitigate any potential adverse effects of the powerhouse area for walkers.

The Isthmus review also picked up on the 'general' nature of the remediation and mitigation measures, and was critical that these 'aspirations' were not enough to provide certainty of outcome. The Isthmus report was not as concerned with the effects generated at the powerhouse site as it was at the intake site, although did recommend that conditions be put in place to better secure outcomes. It would therefore be necessary for the application to include the following within their Special Conditions:

1. *The Concessionaire shall 'face' the visible parts of the intake, weir, portal and any walled retaining type structures with site rock to ensure these structures achieve a better compatibility with the surrounding environment.*

2. *The Concessionaire shall provide a cross section and longitudinal elevation of the form of the bund (for the flood protection bund at Alpha Creek) and a suitably detailed planting plan around the powerhouse/bund area as part of the proposed 'Construction Management Plan' for approval prior to construction.*

3. *The Concessionaire shall ensure the power house building including the doors and trim is coloured: 'Ironsand'.*

Other aspects associated with the powerhouse are described. These include the tailrace, 20m wide cleared access 'corridor' which includes the road and transmission line. However, the powerhouse building would form the primary visual change to the site where effects would be greatest. In my view the other elements (road, tailrace, transmission line) are relatively minor interventions in this landscape and tend to originate and expand northwards through an increasingly less natural landscape.

Summary

The Assessment is substantive and thorough. Assessment methodology follows that required in the RMA Fourth Schedule and represents best practice according to the NZILA and the Environment Court.

The Waitaha upper catchment was considered to meet the test of an outstanding natural landscape, and the Morgan Gorge would more than likely be considered worthy of inclusion as an outstanding natural feature. An alternative site for the

scheme was considered and with landscape architectural input, the proposed site was selected. In my view, this site is the better of the two sites considered for the same reasons outlined by Mr Bentley and discussed in the assessment.

Effects on landscape character and landscape amenity were considered in detail. A series of photosimulations were used to good effect. I note that some criticisms noted in the Isthmus review regarding 'scale' and 'field of view' have been better addressed in the later addendum. The findings in the assessment are fair, measured and credible. The findings largely accord with my own observations and opinions formed during and after visiting the area.

I agree with the overall conclusions reached, and provide some recommendations in the form of additional conditions with particular regards to further mitigating potential adverse effects at both the intake and powerhouse sites. With these few additional conditions included in the final application, a better certainty of outcome would be provided. In my opinion, these additional conditions are necessary as the scheme (particularly at the intake end) is located at the entrance to an outstanding natural feature, and for this reason would require its effects to be further mitigated to avoid this area becoming dominated by structures.

Jeremy Head
Registered Landscape Architect
April 15, 2015