Te Ahu a Turanga; Manawatū Tararua Highway
Notices of Requirement for Designations
Volume Three: Technical assessments

NZ TRANSPORT AGENCY
WAKA KOTAHI

New Zealand Government

4. LANDSCAPE, NATURAL CHARACTER & VISUAL

IN THE MATTER OF	The Resource Management Act 1991
AND	
IN THE MATTER OF	Notices of requirement for designations under section 168 of the Act, in relation to Te Ahu a Turanga; Manawatū Tararua Highway Project
BY	**NZ TRANSPORT AGENCY** Requiring Authority

TE AHU A TURANGA; MANAWATŪ TARARUA HIGHWAY PROJECT
TECHNICAL ASSESSMENT #4
LANDSCAPE, NATURAL CHARACTER AND VISUAL EFFECTS

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INTRODUCTION

1. My name is **Boyden Henry Evans**. I am a NZILA[1] Registered Landscape Architect and a Partner at Boffa Miskell Limited ("**Boffa Miskell**"), a New Zealand-owned environmental planning and design consultancy. I am the primary author of the assessment of landscape, natural character and visual effects (Technical Report #4) for the Te Ahu a Turanga; Manawatū Tararua Highway Project, Notices of Requirement.

2. Bronwyn Elizabeth Faulkner, a NZILA Registered Landscape Architect and Senior Principal in Boffa Miskell, assisted with the preparation of Technical Assessment #4.

3. The natural character component of the assessment of rivers, streams, wetlands and their margins involved, in addition to Bronwyn Faulkner and me, several other specialist contributors: Dr Adam Forbes (terrestrial ecology), Dr Olivier Ausseil (water quality) and Kieran Miller (freshwater ecology).

4. I have a Bachelor of Science in botany and pedology from Victoria University of Wellington and a post-graduate Diploma in Landscape Architecture from Lincoln University. I am a Fellow of the NZILA.

5. I have been a landscape consultant with Boffa Miskell since 1986 and have worked on a range of projects for corporate and private clients and for territorial authorities and government agencies in various parts of New Zealand. This work includes district and regional landscape assessments and resource studies, landscape and visual effects assessments for many types of development projects. These include infrastructure projects, such as new roads, wind farms, quarries, transmission lines, and rural lifestyle and residential subdivisions. I have also been involved in many site rehabilitation and revegetation projects and have prepared master plans and management plans for reserves and other areas.

6. Key projects in which I have been involved over the past 10 years include:

   (a) Mackays to Peka Peka Expressway;

   (b) Wellington International Airport Runway Extension;

   (c) Wellington City Landscape Evaluation Assessment;

   (d) Hutt City Landscape Evaluation Assessment;

[1] New Zealand Institute of Landscape Architects.

(e) Wairarapa Landscape Evaluation Assessment;

(f) Wellington and Hutt Coastal Natural Character Assessment;

(g) Porirua Coastal Natural Character Assessment;

(h) Hutt River Environmental Strategy;

(i) Otaika Quarry Overburden Disposal Area and Rehabilitation, Whangarei;

(j) Belmont Quarry Overburden Disposal Area and Rehabilitation Hutt City; and

(k) Kiwi Point Quarry s42A Report, Wellington City Council.

7. These projects have involved a combination of landscape and visual effects assessments, identification of outstanding natural features and landscapes, assessment of natural character and subsequently preparing and presenting expert witness evidence. In 2012, I prepared the landscape and visual effects assessment for the Mackays to Peka Peka Expressway project, presented evidence at the Board of Inquiry and then had an ongoing role over the following four years in the detailed landscape design and implementation phases of the project.

Code of conduct

8. I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2014. This assessment has been prepared in compliance with that Code, as if it were evidence being given in Environment Court proceedings. Unless I state otherwise, this assessment is within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Purpose and scope of assessment

9. Te Ahu a Turanga; Manawatū Tararua Highway Project ("**the Project**") is to provide a new resilient, safe and efficient connection between the eastern and western sides of the Ruahine and Tararua Ranges. The proposed approximately 11.5km route is located on the southern foothills of the Ruahine Range, immediately north of the Manawatū Gorge and south of Saddle Road. This new route will be SH3, replacing the existing State Highway route, which until it was permanently closed ran through the Manawatū Gorge ("**Gorge**").

10. The Assessment of Landscape, Natural Character and Visual Effects, Technical Assessment #4, forms part of the Assessment of Environmental Effects ("**AEE**") being submitted with Notices of Requirement ("**NoR**"). To undertake the assessment, the proposed designation corridor has been divided into six sectors and the assessment of landscape and natural character effects has been undertaken in relation to these sectors. The assessment of effects on visual amenity has been addressed in relation to the whole route as one. Technical Assessment #4 has been informed by the assessment appended to it, namely Appendix 4.A: Natural Character Assessment. Photographs and maps that support the description of the site, the Project, and this assessment, are referred to throughout the report and are included in the drawings and plans submitted in Volume 4 of the AEE.

11. The Environmental and Cultural Design Framework ("**ECDF**") prepared for this Project provides design guidance integral to the landscape outcome, of the proposed new road.

Assumptions and exclusions in this assessment

12. The assessment considers the upper/outer limit of (or realistic 'worst case') actual and potential effects on the environment of the Project, based on the location and the extent of the proposed designation considered and discussed by the Project team during the Project shaping process, potential options to design a road within that designation, and proposed measures to avoid, remedy, mitigate or offset adverse effects (where it is appropriate to do so).

13. In undertaking this assessment, it is acknowledged that, through the detailed design and resource consent processes, the road alignment within the designation corridor will be confirmed, which may affect the levels of landscape, natural character and visual effects as set out in this assessment. The Project Conditions arising from the NoR, together with the principles outlined in the ECDF, will provide the basis for the final road alignment and design, and that design will be the subject of the ‘outline plan’ process provided for in the Resource Management Act 1991 ("**RMA**").

14. Effects have been assessed against the existing environment, which is the current situation with the permanently closed section of SH3 through the Gorge.

EXECUTIVE SUMMARY

15. As with any major infrastructure development of this kind, the Project will have adverse effects on biophysical aspects, landscape character and on the natural character of rivers, streams and their margins. The Project will also give rise to adverse visual effects; for the most part these can readily be mitigated.

16. An integral part of the development of the Project has been the consideration of the designation corridor and potential alignment options by the consultant team to avoid or minimise adverse effects. As a result of this process, potential adverse landscape, natural character and visual effects have been reduced or minimised in several places.

17. The western end of the Project posed the greatest challenges in terms of landscape, natural character and visual effects. This involves a new bridge over the Manawatū River, within the Manawatū Gorge Outstanding Natural Landscape ("**ONL**"), and then the corridor traverses through an area of sensitive landscape comprising valued streams and indigenous vegetation, including two remnant forest areas protected by QEII open space covenants. The Project also traverses the ridgeline of the Ruahine Range, which is identified as an ONL.

18. The avoidance of important areas of indigenous vegetation, reduction of effects on waterways, attention to the detailed design of the alignment, and constraints on construction methods would all assist in reducing the level of adverse effects. These aspects, together with various mitigation measures, including the ecological offsetting as described by Dr Forbes (Technical Assessment #6) and in the ECDF, would all contribute to reducing adverse effects.[2]

19. A summary of biophysical, landscape character and natural character effects as identified is set out below.

Landscape effects

20. The landscape effects of the Project vary from low in some sectors to high in others. The areas where there are high adverse effects is where there are potential large-scale biophysical changes as a result of earthworks, together with removal of areas of high-value indigenous vegetation, which in several places is protected by Queen Elizabeth II Trust ("**QEII**") open space

[2] The Project Conditions describe the 'effects envelopes' and ecological offsetting measures.

covenants. The designation corridor also traverses two ONLs (Manawatū Gorge and the Ruahine Ridgeline). Conditions are proposed to limit the extent of clearance of the highest-value vegetation types; nonetheless, in several places where these high adverse biophysical changes occur, there will also be high adverse effects on landscape character.

21. Embankments formed to support the road and large cuts to existing landform will alter the existing topography and require vegetation removal and, in places, diversion of sections of existing streams. Using bridges instead of embankments or culverts and minimising the Project footprint are all measures that could be used to mitigate adverse effects. Revegetation of areas of indigenous vegetation affected by being fragmented by the Project and creating buffers of new planting to seal and protect the edges of native forest remnants are mitigation measures that should be integral to the Project's detailed design. In places, revegetation to connect isolated forest remnants affected by the Project and connecting these along gullies with the forest in the adjoining Manawatū Gorge Scenic Reserve is another positive offsetting/mitigation measure proposed. The proposed designation conditions address these measures.

22. The Project involves construction of a rural road through a working rural landscape, which has been altered previously by the construction of the Te Āpiti Wind Farm. Both the wind turbines and the construction of the network of access tracks between the turbines had an adverse effect on the original rural character and added new man-made elements; the Project will add a series of new elements, together with new activity. Saddle Road also crosses the Ruahine Ridgeline ONL.

23. While there will be adverse biophysical and natural character effects, these are focused at the western part of the Project. Where high levels of adverse biophysical and landscape character effects do occur, recommended mitigation measures, together with recommendations set out in the ECDF, if fully implemented through the detailed design and construction phases, would provide opportunities for adverse landscape effects to be remedied or mitigated effectively, and for cultural values to be expressed. The table below summarises the biophysical and landscape character effects of the Project in relation to each of the sectors identified.

Table 4.1: Summary of Landscape Effects

Sector	Biophysical Effects	Landscape Character Effects
1: Bridge to Bridge	Low	Moderate Low
2: New Manawatū River/Gorge Bridge	Moderate	High
3: Western Slope	Moderate High	High
4: Te Āpiti Wind Farm and Ridge	Moderate	Moderate High
5: Eastern Slope	Moderate High	High
6: Woodville Gateway	Moderate Low	Moderate

Natural character

Existing levels of natural character

24. Natural character is about condition. It is a term used to describe the naturalness (lack of modification) of coastal and river/stream environments. In the context of the Project, a lack of, or low level of modification, would equate to a high level of naturalness.

25. The assessment of existing levels of natural character of the rivers and streams was undertaken at two scales; a broad-scale assessment, and at a more detailed level focusing on specific areas where the Project crosses waterbodies. A region-wide natural character assessment of rivers, streams and wetlands has not yet been carried out by Horizons, nor by the territorial authorities, so the broad-scale assessment is intended to provide a contextual baseline.

26. Assessment of natural character is not the domain of any one specialist but instead involved inputs from several disciplines (i.e. freshwater and terrestrial ecology, stream morphology, water quality, landscape context and experiential aspects). For this reason, the natural character assessment of the waterways was carried out by a small team of specialists, who individually assessed particular attributes and then worked together to assign an existing level of natural character, and then determined a post development level of natural character.

27. There were no areas of outstanding natural character identified at either scale (refer **section 4.1, Appendix 4.A**).

28. One broad-scale reach, the Manawatū River through the Gorge, was identified as having a high level of natural character (with an assessed level of moderate-high at the proposed crossing point).

29. Three of the streams crossed by the Project have a high level of natural character as outlined in **Appendix 4.A**, at the following locations:

    (a) a stream in what is known as the 'western QEII area', which flows to an area of raupō wetland (chainage 4000-6000);

    (b) a stream in the 'eastern QEII area' (chainage 6100-6500); and

    (c) the location of a stream crossing associated with an existing construction access track from/to Saddle Road.

Effects on natural character

30. The assessments have considered the long-term (permanent) effects of the Project. It is assumed that best practice construction methodologies, including stormwater management, and erosion and sediment control measures will be implemented during construction to avoid or minimise short-term effects. However, it is acknowledged that there will be some short-term effects on natural character, such as temporary stream diversion, removal of vegetation along stream margins and experiential effects.

31. The change to the level of natural character was considered at a site level (crossing point locality) and at an overall stream catchment level for the streams, and at the local reach level for the Manawatū River. This was an important consideration in the assessment process because it acknowledges the interconnectedness of a stream or waterway. The Project crosses the Manawatū River and the streams with high natural character at right angles and thus the extent of disturbance at the crossing points is limited.

32. Based on the methodology, 10 attributes were considered to assess the existing level of natural character, and the Project's effects on natural character. Of these, the Project most impacted on the morphology of the active bed and margins, the aquatic taxa and ecosystem functioning of the active bed, the terrestrial ecology of the margins, and the experiential qualities. The flow regime, water quality, and absence/presence of exotic flora and fauna were not generally considered to be significantly affected over the long-term.

33. The greatest impact of the Project relates to the scale and location of the works footprint in the active bed and margins of the streams. At the local

scale, the filling of the stream gullies with earth embankments results in permanent loss of vegetation, loss or modification of significant lengths of active bed and margin in what are relatively small catchments. At the broader scale, the Project results in fragmentation of ecological communities, and disruption of ecosystem functioning along the streams.

34. Experientially, it is inevitable that the introduction of large-scale earthworks and road activity will dominate the natural environment and tranquil aspects of the small stream gullies, and within the Manawatū River corridor where the proposed new bridge will cross.

35. The areas of greatest sensitivity in terms of potential effects on natural character are those in locations were the existing natural character is highest. Three of the streams crossed by the Project have high natural character. The assessment of natural character by each sector below focusses on these three streams.

36. A reduction in natural character from High to Moderate (or less) is considered to constitute a significant reduction in the level of natural character[3]. Waterbodies with high natural character are more sensitive to change, which could adversely impact on the attributes and qualities than those that have a moderate or low level of natural character. A reduction from High to Moderate is considered to be significant as it requires reductions in several of the 10 assessment attributes for the overall level of natural character to be affected.

37. The assessment has determined that the existing high natural character of two streams (QEII West (chainage 4000-6000) and QEII East (chainage 6100-6400)) may be significantly reduced by the Project. In both situations, the footprint of the alignment and construction works could cause permanent loss to relatively large sections of the active bed and stream margins, in what are relatively small gullies and catchments.

38. Table 4.2 sets out a summary of effects on natural character. While natural character of these stream/river crossings would be diminished by the Project, the proposed mitigation, supported by the Project Conditions will go some way to reduce the level of effects on natural character. That is, refinement of the road alignment, and minimising construction works footprints to reduce the quantum of the streams affected, combined with the re-establishment of

[3] Horizons One Plan Objective 6-2(b)(ii) provides the following direction: *"Adverse effects, including cumulative adverse effects are: (ii) avoided where they would significantly diminish the attributes and qualities of areas that have high natural character, and…"*

vegetation in the catchments, would reduce the impact on natural character of the stream crossings.

39. In addition, design guidelines in the ECDF, once implemented during detailed design will also assist to reduce adverse effects of natural character on the streams.

40. The various alignment options and mitigation measures that were considered and assessed are described in detail in **Appendix 4.A** and summarised under each of the sectors.

Table 4.2: Summary of changes to natural character (at crossing locations)

Location	Current Condition	Post Construction Condition
Manawatū River Crossing	Moderate/High	Moderate
Chainage 4000-6000		
Lower stream/wetland	High	Moderate/High
QE II West	High	Moderate
QEII East (chainage 6100-6400)	High	Moderate
East End Stream (chainage 12700-13100)	Moderate	Moderate/Low
Stream Crossing construction access to Saddle Road	High	Moderate/High

41. Table 4.2 sets out the levels of natural character at a site-specific scale but when considered at an overall stream scale, the changes in the level of natural character is diminished. For the QE West stream, the natural character at an overall stream scale would change from High to Moderate/High. For the QEII East stream and the stream adjoining the construction access, the natural character would be unchanged (Table 4.3).

Table 4.3: Summary of changes to areas of high natural character (whole streams)

Location	Current Condition	Post Construction Condition
Chainage 4000-6000 **QE II West and lower stream/wetland**	High	Moderate/High
QEII East **(chainage 6100-6400)**	High	High
Stream construction access to Saddle Road	High	High

Visual effects

42. The focus of the assessment of visual effects is on the Project's visual effects on the receiving environment, given that it would be a new element and activity. The visual effects in terms of road users has also been a consideration, and the design principles and design outcomes covered in the ECDF describes these. These include creating memorable experiences for users through maintaining views for drivers descending the Ruahine Range, maintaining views of landscape features such as the Manawatū Gorge Scenic Reserve and the Te Āpiti Wind Farm, provision of lookout points and safe stopping places, integrating batter slopes with the adjacent landform, provision of ecological and amenity planting, and design of structures such as bridges to enhance the experience of road users and not compete or detract from the landscape. Views from the road will be considered as part of confirming a road alignment and preparing outline plans.

43. The potential viewing audiences of the Project are limited because of distance from both Ashhurst and Woodville, the two areas of concentrated residential settlement, and screening effects of both topography and vegetation. Overall, adverse visual effects can readily be mitigated from these two viewing audiences through the provisions set out in the ECDF and draft Project Conditions.

44. The only area where there will be a high level of visual effects are in the environs of the new bridge across the Manawatū River. The scale of the bridge and its contrast with the largely natural setting would dominate this area of the Manawatū River environment. However, the design of the bridge, treatment of the earthworks, and mitigation planting would help to integrate the bridge in its landscape setting.

45. A summary of the level of visual effects as identified from each representative viewpoint is set out below:

Table 4.4: Summary of Visual Effects

Viewpoint	Level of Effect
The Terrace Ashhurst	Low
SH3 Bridge	Moderate
New Manawatū Bridge from SH3	High
Te Āpiti Wind Farm Lookout	Moderate-low
Junction of SH3 and Hope Road	Moderate

PROJECT DESCRIPTION

46. A standard project description is provided in Volume 2 of the AEE, Part C Description of Project.

47. Sector-specific descriptions of the Project that relate to potential landscape, visual and natural character effects are included with the assessment of each sector below.

Environmental and Cultural Design Framework

48. The ECDF (**Volume 2 of the AEE, Part J Appendix Two**) is integral to shaping the Project. It sets out the environmental and cultural context, identifies design principles, and the outcomes sought which will then guide the detailed design of the Project.

49. The environmental design principles set out in the ECDF demonstrate how the Project will be integrated into the landscape to minimise impacts where possible. Consequently, the ECDF provides a principled framework for developing the Project design, including measures to avoid, mitigate and remedy potential effects, discussed in this assessment.

50. The ECDF sets out the expected landscape, environmental, and cultural design outcomes for the Project. It has been developed in consultation with iwi. Key stakeholders have also been consulted as part of its preparation. The ECDF incorporates the findings from this assessment and creates a point of reference for other specialist technical inputs to provide an integrated approach to the landscape.

EXISTING ENVIRONMENT

51. **Appendix 4.B** contains photographs to support the descriptions below and provide context to the assessment.

52. **Volume 4**, **Drawing C-01** shows the Project in its regional context. Located in the southern foothills of the Ruahine Ranges, the Project will provide a new road link between the Manawatū in the west and Tararua in the east. With the closure of SH3 through the Gorge, Saddle Road currently handles much of the east-west traffic. The Project straddles the districts of three territorial authorities: Palmerston North City Council, Manawatū District Council and Tararua District Council. All three territorial authorities are in the region of the Manawatū-Wanganui Regional Council ("**Horizons**").

53. The landscape north of the Gorge comprises steep hill country ranging from 200m asl[4] in the south to 400m asl to the north with deeply incised gullies (**Drawing C-04, Volume 4**). Further north, the landform rises steeply to Wharite Peak, a prominent landmark at 920 metres asl on which a television repeater tower is located. The vegetated southern slopes of Wharite Peak are part of the Ruahine Forest Park. Many of the gullies north of the Gorge have remnant or regenerating native vegetation and areas of exotic scrub.

54. The Manawatū Gorge Scenic Reserve (621 ha.) extends on both sides of the Gorge and provides a distinctive contrast to the surrounding farmland. It also provides a contextual southern 'boundary' to the Project. The Manawatū River flows through the Gorge from the east to west, bisecting the North Island's main axial ranges.

55. Tectonic forces have influenced landform both directly through active faulting and folding and indirectly as a result of effects on stream patterns and drainage. It is a relatively simple and clearly defined landscape of plains, terraces and steep broken hill country.

56. The Project is situated between Saddle Road to the north and the Manawatū Gorge Scenic Reserve to the south and runs through part of the 55-turbine Te Āpiti Wind Farm. South of the Gorge, the Tararua Wind farm is located on the Tokomaru Marine Terrace and adjoining hill slopes. Together, these two wind farms have changed the character of the previously farmed rural landscape.

[4] Above sea level.

57. To the west of the ranges, the Manawatū River flows through the relatively young Manawatū Plain landscape (c. 500,000 years). The old seabed of the Manawatū Plain has been affected by movements in the underlying rock, producing a series of domes with intervening low areas. The domes have controlled the course of the Manawatū River; once it emerges from the Gorge, the river does not take a direct course across the plain but meanders generally south-westwards. The Pohangina River, which flows between the Ruahine Range on the east and the Pohangina Dome on the west, joins the Manawatū River at Ashhurst. The Pohangina Valley occupies the area between the Ruahine Ranges and the Dome.

58. At the broad scale, the landscape is expansive, comprising several easily recognised landforms – mountain ranges, hills, plains and terraces. However, the landscape in the context of the corridor is more complex with short broken ridges, spurs, and deep gullies. The level of wind exposure is also high and hence the development of several wind farms along the Tararua/Ruahine ridgeline. Internationally, the performance of the wind turbines in these wind farms ranks among the best in the world.[5]

Landform

59. The Project is located on part of a landform referred to as the Manawatū Saddle, a structural sag in the otherwise continuous mountain axis formed by the Ruahine and Tararua Ranges. The designation corridor traverses a short section on the edge of the Manawatū Plain then crosses the Manawatū River near the confluence with the Pohangina River before rising quickly up the steep hill slopes to a flattish area along the ridge crest, and then descending through steep hill country on the eastern side and then on to the alluvial river plain west of Woodville.

60. Slopes vary in steepness over short distances along the corridor (**Drawing C-03, Volume 4**). Slips are reasonably common throughout the area and consequently, there are high sediment loads in many of the streams and waterways.

Vegetation

61. The Project area and surrounding hill country would have been covered in dense podocarp-broadleaf native forest (see Figure 6.2 in Technical Assessment 6: Terrestrial Ecology). Clearing of this forest on the hill country

[5] New Zealand Wind Energy Association, http://www.windenergy.org.nz/.

commenced around the turn of the twentieth century following almost wholesale clearance of the adjoining fertile plains. Forest clearance continued steadily as landowners converted forested land into pasture (**Drawing C-08, Volume 4**)

62. Extensive areas of native forest are located on both sides of the Gorge, much of which is protected by the Manawatū Gorge Scenic Reserve administered by the Department of Conservation. A popular network of walking tracks extends through the native forest on the southern side of Gorge and in a few places, there are views from open parts of the track to the Manawatū Gorge, Te Āpiti Wind Farm and the Tararua Wind Farm. Native forest covers the upper slopes of Wharite Peak to the north of the corridor.

63. Regionally, these areas of native vegetation are important ecologically and contribute to the vegetation framework and its habitat values. There are forest remnants that landowners have protected with QEII[6] open space covenants and the corridor runs through two of these covenanted areas (while avoiding several others in the vicinity). The Ruahine and Tararua Ranges are very exposed. A distinctive and important landscape along this section of the axial range has been created by the large area of continuous forest that has been protected in the Manawatū Gorge Scenic Reserve and supplemented by the areas of forest protected by QEII open space covenants.

64. Throughout, there are areas of young regenerating seral native vegetation, generally dominated by kānuka, on steep gully sides and in gully bottoms and that are relatively inaccessible to stock and form part of the mosaic of vegetation cover. While the Manawatū Gorge Scenic Reserve and Ruahine Forest Park are fenced to exclude domestic stock, as are the QEII open space covenants, much of the other areas of native forest is not fenced and is browsed and trampled by stock.

65. Most of the area within the corridor and on the surrounding area is in pasture with shelterbelts, small woodlots of exotic conifers, poplar planting for erosion control on steep hill faces, and amenity plantings around dwellings and farm buildings. While the extent of tall exotic vegetation across the site is not extensive, it contributes to the overall landscape character.

[6] Which are protected under the Queen Elizabeth the Second National Trust Act 1977.

Land use

66. The townships of Ashhurst on the western side of the Ruahine Range and Woodville on the eastern side are situated on the terraces and plains on either side of the ranges. The Ruahine Range not only separates the two townships but also form a prominent and distinctive skyline, which is highly visible from the surrounding low-lying countryside. The ridgeline is identified as an ONL.

67. A road was formed through the Gorge in 1872 and by 1900 very little native forest remained on the plains. Clearing of the hill country started later but even by 1900 major in-roads into the forest had been made.

68. The hill country has therefore been in pastoral use, with sheep and beef cattle, for the best part of a century and it is only relatively recently that new land uses have been introduced (e.g. exotic woodlots, wind farms). The development of the Te Āpiti and Tararua Wind Farms introduced a new sustainable land use and has provided landowners who have turbines on their land with another income stream. The development of the wind farms is an addition to the district's working rural landscapes and has allowed the primary farming use to continue largely unaffected and assisted by the network of turbine access tracks.

Landscape character areas

69. Landscape analysis that considered the wider landscape, in terms of differences in landform, land cover and land use, identified five landscape character areas through which the Project traverses (**Drawing C-09, Volume 4**). These landscape character areas are listed and described below[7]:

    (a) Manawatū River and Pohangina River terraces;

    (b) Western hill country;

    (c) Ruahine ridge crest;

    (d) Eastern hill country; and

    (e) Manawatū River valley.

[7] These landscape character areas are different to the six Project sectors that have been defined.

Manawatū River and Pohangina River terraces

70. The Pohangina and Manawatū Rivers run along the eastern edge of the expansive Manawatū Plain that extends westwards to the coastal dunes. The river terraces form an abruptly defined edge to the eastern hill country. Willows have been planted along the edges of both the Manawatū and Pohangina Rivers. The eastern terrace faces along the Pohangina River are well vegetated and dominated by native species. Native vegetation extends from the terrace face and on to the terrace itself in the vicinity of the corridor. There are also open areas of pasture on this terrace and stock have browsed and trampled the areas of unfenced native vegetation. In contrast, the Manawatū River terraces, south of the Gorge, are grazed with exotic woodlots, shelterbelts and groups of amenity trees.

71. Parahaki Island, a site of cultural significance, is an area of elevated gravel beaches with rough pasture and willows along the edges located at the mouth of the Gorge at the confluence of the Manawatū and Pohangina Rivers (**Drawing C-05, Volume 4**). Parahaki Island, together with the adjoining Manawatū Gorge Scenic Reserve (which extends on both sides of the Gorge) is recognised as a Regionally Outstanding Natural Feature in the Horizons One Plan (**Drawing C-06, Volume 4**)

72. Manawatū District Council is considering a future plan change[8] for an area north side of the Manawatū River adjoining the Manawatū Gorge Scenic Reserve as an Outstanding Natural Feature.

Western hill country

73. The western hill country rises steeply from the river terraces and is broken by deeply incised gullies and streams, many of which are well vegetated with stands of mature native forest in the gully bottoms and on the sides, together with areas of young regenerating native vegetation and exotic scrub. The hill country is extensively grazed.

74. Saddle Road is located to the north and well separated from the Project by a deep, well vegetated gully. Two areas of mature native forest extending over part of an adjoining gully system located within the corridor are protected by QEII open space covenants.

[8] Future PC65.

75. Turbines of the Te Āpiti Wind Farm are located on both sides of the Project and sited on the flatter spurs and connected by a network of well-formed access tracks.

Ruahine ridge crest

76. At the crest of the Ruahine Range, a wide rolling area of grazed farmland separates the western hill slopes from the generally steeper eastern hill slopes. The Te Āpiti Wind Farm extends over this area with the eastern-most turbine located on the edge of the adjoining steep hill slopes. Te Āpiti is one of several wind farms that have been built along the Tararua – Ruahine Ranges. The Tararua Wind Farm is located on a plateau immediately south of the Gorge.

77. The series of highest ridges and hilltops along the Ruahine (and Tararua) Ranges are recognised as a Regionally Outstanding Natural Feature; the Manawatū District Plan identifies the ridgeline of the Ruahine Range as an outstanding landscape and the Tararua District Plan identifies the *"skyline of the Ruahine Ranges"* in its schedule of natural features and landscapes.

78. The Te Āpiti Wind Farm substation and operational area is located on the ridge crest, as are groups of farm buildings and yards; Cook Road is also located on the crest and runs south off Saddle Road towards the Project. There are small stands of remnant native forest present, several of which are protected by QEII Trust open space covenants.

79. The rolling ridge crest also extends into the upper sections of the Manawatū Gorge Scenic Reserve, which then drops steeply into the river gorge below.

Eastern hill country

80. The eastern hill country is extensively grazed. It is generally steeper and more broken than on the western slopes and is characterised by short narrow spurs and deep gullies, many of which have streams and areas of native and exotic scrub. Scrub has been sprayed and recently cleared off many of the hill faces and there are small slips on several hill faces. Exotic pine woodlots are well established and widely-spaced poplar trees have been planted on erosion-prone slopes. The AgResearch farm straddles the Project in this character area.

81. The streams draining this area flow directly into the Gorge or on to the Manawatū River plain to the east and then into a series of smaller streams and drains, eventually ending up in the Manawatū River.

Manawatū River valley

82. The headwaters of the Manawatū River are in the Ruahine Range northwest of Norsewood. The Manawatū River is unique among New Zealand rivers in that it starts east of the axial ranges and has its outflow on the west. Unlike the river terraces along the Pohangina and Manawatū Rivers on the western side of the Ruahine Range, on the east, there is an abrupt transition between the river flats and the steep hill country. There are patches of remnant podocarp forest at the bottom of the toe slopes where it is wet and poorly drained and there are many small tributaries and farm drains, which eventually discharge into the Manawatū River.

83. Where the corridor joins the existing road network west of Woodville, the land is well subdivided and intensively farmed. There is also a cluster of rural lifestyle properties in this area.

84. Moving away from the edge of the hill country, the underlying river gravels ensure the area is well-drained, with shelterbelts along the edges of paddocks and along streams and waterways, together with groups of amenity trees around dwellings.

Natural character

85. The detailed methodology, including the attributes used for assessing natural character is provided in **Appendix 4.A**, and summarised in the methodology section below.

86. A high level of natural character means the waterbody is less modified and vice versa. The level of natural character has been assessed on a five-point scale[9] from very high to very low. Those areas assessed as having High or Very High natural character are then reassessed to determine whether they qualify as Outstanding (also refer paragraph 105).[10]

87. The assessment of the level of existing natural character of the rivers and streams has been undertaken at two scales; a broad-scale assessment, and at a more detailed level focusing on where the corridor designation crosses rivers and streams (refer **Drawings C-10 and C-11, Volume 4**). The existing level of natural character is summarised in the table below. No areas of ONC were identified.

[9] A five-point scale was used because the methodology adopted for the Project was developed and applied in natural character assessments of several South Island rivers. A decision was made to retain the five-point scale but to acknowledge that in-between ratings can be used.
[10] The Methodology section of this report provides more detail, as does Appendix 4.A Natural Character Assessment.

Table 4.5: Summary of Existing Natural Character

		Existing Level of Natural Character
Broad-scale Reaches	Manawatū Gorge	High
	Manawatū River below SH3 bridge	Moderate/Low
	Lower Pohangina River	Moderate/High
	Generic streams along the proposed designation corridor	Moderate
Detailed Sites	New Manawatū River crossing	Moderate/High
	West stream (QEII stream crossing to wetland north of Manawatū River)	High
	East QEII stream crossing	High
	Stream crossing-construction access	High
	Streams at eastern end of designation	Moderate

Associative values

88. Consideration of associative or shared and recognised values are an important part of understanding and assessing a landscape. To gain an understanding of the values that are shared and recognised by the wider community, I have relied on available published information and field work. Given that the Gorge is a well-recognised and distinctive landscape, there are communities on both sides of the ranges, and from further afield, that identify with or have special associations with the Gorge, Ruahine and Tararua Ranges, and environs.

89. To many travelers, driving the (now closed) section of SH3 through the Gorge represented a 'gateway' between the east and west. This sentiment is also felt by travelers currently driving over 'the Ruahines' via Saddle Road. For others, the Gorge provides a boundary and a sense of identity, separating east and west. The Gorge has long been a transport and communication route between east and west, first for Māori and later for Pākehā.

90. Information displayed at the Te Āpiti carpark sited near the proposed new Manawatū Bridge explains that the Gorge and environs hold a special significance for Rangitāne o Manawatū. Rangitāne refer to the Gorge as Te Āpiti (narrow gorge) and it was the preferred access route connecting

western Rangitāne with their eastern Rangitāne Tū Mai Rā kinsmen.[11] Above the river on the edge of the Ruahine range is a large reddish rock, Te Ahu a Turanga imua (the sacred place of Turanga). Turanga was an ancestor of Rangitāne and, according to Māori in the area, Te Ahu a Turanga remains above water even when the river experiences its highest floods.

91. As detailed in Technical Assessment 5, for Pākehā, the Gorge was the key link in early communication between the provinces of Wellington and Hawke's Bay. In 1867 a bridle track was cut through the Gorge and a road, only one coach wide, was completed five years later. From 1877 to 1881 Rangitāne leaders Huru te Hiaro and Nireaha Tāmaki ran a ferry service using two large waka connected by decking. In 1886, construction started on the railway on the northern side of the Gorge and the four and half miles of line, 27 bridges and three tunnels, was opened in 1891. The first Ashhurst bridge was opened in 1886 but 10 years later it was swept away in a flood; it was later replaced by a one-way bridge in 1909.

92. With the construction of the road and railway line, a settlement developed at the eastern end of the Gorge (around Ballance). When the railway through the Gorge was completed, the settlement gradually disappeared apart from a few houses, including that of the toll bridge keeper. (A toll gate was set up by the Government to recoup some of the road and railway line building costs.)

93. The protection of the 621 ha of native forest on both sides of the Gorge as a scenic reserve, managed by the Department of Conservation ("**DOC**"), created (until the recent closure) a dramatic landscape for drivers to experience through the Gorge. DOC has developed three Manawatū Gorge walks on the southern side of the Gorge; two shorter walks, and a 10.1km walk (one-way). At the western end of the Gorge, the new bridge that is part of the Project crosses over the Manawatū Gorge Track carpark. The recreational values of the Gorge have steadily risen with visitor numbers on the Manawatū Gorge Tracks, increasing by 350 percent since 2012.

94. The walks form part of a comprehensive 10-year plan for the area promulgated by the Te Āpiti Governance Group, which is led by DOC and Horizons and involves the NZ Transport Agency, Rangitāne, KiwiRail, Palmerston North City Council, Tararua District Council and Manawatū District Council. The aim of that project is for these organisations to work together to link all reserve areas, the river, road and rail line and some

[11] The Rangitāne Tū Mai Rā area of interest, as identified in the Rangitāne Tū Mai Rā (Wairarapa Tamaki nui-ā-Rua) Deed of Settlement, includes the Manawatū River and its tributaries.

adjoining private land to be managed as a single entity. A shelter and interpretation area at the eastern end of the carpark describes the aims of that project and an outline of the natural and cultural history of the area (the content of that signage is referred to above).

95. Meridian Energy's 1150 ha Te Āpiti Wind Farm is located on the Ruahine Range north of the Gorge and has become a landmark in the area, with access off Saddle Road to a public viewing area. The 55-turbine wind farm was built in 2004 and generates enough electricity to supply about 39,000 homes; it was the first wind farm to supply electricity into the national grid. Some of the turbines in the Te Āpiti Wind Farm, and the Tararua Wind Farm are visible from a very limited number of places on the walking tracks in the Manawatū Gorge Scenic Reserve.

96. Several landowners whose farms are located on the slopes of the Ruahine Ranges north of the Gorge, have recognised the landscape and biodiversity values of native forest remnants and the contribution these areas make at both a local and regional scale and have sought to protect and manage them. This has involved fencing native forest remnants to exclude stock, and pest plant and animal control programmes. One landowner whose property lies within the Project (and is leased to Meridian and accommodates part of the Te Āpiti wind farm) has protected several areas of native forest with QEII open space covenants. While such forest remnants are relatively small, it is their collective value that is important, providing habitat connections between covenanted areas and to the tract of tall native forest in the Manawatū Gorge Scenic Reserve.

METHODOLOGY

Introduction

97. The methodologies used in this assessment of landscape, natural character and visual effects are based on what I consider as current best practice. The methodologies have been refined by Boffa Miskell landscape architects[12] over several years as a result of involvement in a wide range of projects and tested in council hearings and the Environment Court. The landscape, natural character and visual effects assessment methodologies are included in **Appendices 4.A and 4.C**

[12]Boffa Miskell ecologists were also involved in developing the natural character methodology.

98. I have set out below a summary of the approach to this assessment, which considers the interrelated assessments of landscape, natural character and visual effects. The assessments of effects for landscape and natural character have been carried out for each of the six separate Project sectors with the visual effects assessment focusing on the Project overall.

Project sectors

The Project sectors are shown on **Drawing C-02, Volume 4** and in more detail on **Drawings A-00 to A-10, Volume 4.** The sectors are:

(a) Bridge to bridge (existing SH3 bridge to new bridge);

(b) New Manawatū River/Gorge bridge;

(c) Western slope;

(d) Te Āpiti Wind Farm and ridge;

(e) Eastern slope; and

(f) Woodville gateway.

Landscape effects assessment

99. Landscape is defined in the NZILA Practice Note[13] as follows:

> *"Landscape is the cumulative expression of natural and cultural features, patterns and processes in a geographical area, including human perceptions and associations."*

100. Assessing landscape effects involves consideration of both the magnitude of the change and the sensitivity of the landscape to change. Determining the overall level of landscape effects requires an understanding of the nature of the landscape resource (biophysical and landscape character) and the scale and nature of change resulting from a proposed development. The table below assists to explain the process.

[13] NZILA Best Practice Note, 2010

Table 4.6: Determining the level of landscape effects[14]

Contributing Factors		Higher	Lower
Nature of Landscape Resource	Susceptibility to change	Limited existing landscape detractors which make the landscape or feature highly vulnerable to the type of change which would result from a proposed development.	Many existing detractors which enable the feature or landscape to easily accommodate the proposed development without undue consequences.
	The value of the landscape	Includes important biophysical, sensory and/or associative attributes. The landscape requires protection as a matter of national importance (ONF/L).	Lacks any important biophysical, sensory or associative attributes. The landscape is of low or local importance.
Magnitude of Change	Size or scale	Total loss or addition of key features or elements. Major changes in the key characteristics of the landscape, including significant aesthetic or perceptual elements.	Most of key features or elements are retained. Key characteristics of the landscape remain intact with limited aesthetic or perceptual change apparent.
	Geographical extent	Wider landscape scale.	Site scale, immediate setting.
	Duration and reversibility	Permanent. Long term (over 10 years).	Reversible. Short term (0-5 years).

Landscape sensitivity

101. For the Project, matters that increase the sensitivity of a landscape to change include:

(a) statutory or legal recognition of special values or qualities such as Outstanding Natural Feature or Landscape status, reserves, QEII open space covenants, and other statutory overlays;

(b) community shared and recognised values, such as historic, scenic and recreational values of a place, high public use and high visibility locations;

(c) culturally significant sites or associations for those with mana whenua and the wider community; and

(d) high value biophysical features and streams, rare or threatened ecological communities.

14 Source: Boffa Miskell Landscape Assessment Methodology, Appendix 4.C.

102. The landscape effects assessment considers the potential effects in terms of biophysical effects and effects on landscape character, including potential impacts on associative/shared and recognised values.

Biophysical effects

103. This considers the extent and significance of modifications to landform, waterways, vegetation and habitat. The effects on landform considered the proposed alignment with reference to the LiDAR[15] model, together with an analysis of cross sections and long sections generated by the civil engineering team. Collaboration with the terrestrial and freshwater ecologists in the team provided ecological detail. The nature and scale of biophysical change was considered in relation to the sensitivity of the location to the potential changes.

Table 4.7: Biophysical effects

Level of effect	Indicative Examples
Very High	Total loss of key features/attributes
High	Fundamental alteration to most key features/attributes
Moderate High	Alteration to several key features/attributes-considerably changed
Moderate	Alteration to one key feature/attribute –partially changed
Moderate Low	Minor change to a key feature/attribute–similar to before
Low	Very slight change/change barely distinguishable
Very Low	No measurable change

Landscape character effects

104. Landscape character is derived from a combination of landform, land cover and land use that makes one area different from another. The effects on landscape character relate to changes in land use (new or different activities), changes to existing patterns and elements in the landscape, such as vegetation, waterbodies, landform, and settlement patterns.

105. The introduction of the Project into the Manawatū/Tararua landscape, including earthworks, structures, planting, and traffic, combine to potentially change the existing landscape character.

[15] LiDAR is an acronym of 'light detection and ranging'; it is an aerial survey method used to make high-resolution maps.

Table 4.8: Landscape character effects

Level of Effect	Indicative Examples
Very High	Complete change of landscape character
High	Fundamental alteration to key features / attributes, composition largely changed
Moderate High	Alteration to several key elements or features / attributes / patterns; major change to composition.
Moderate	Alteration to one key element or feature / attribute, composition / pattern partially changed
Moderate Low	Minor change to underlying composition / pattern, similar to before
Low	Very slight change to landscape character, change barely distinguishable
Very Low	No discernible change

Associative values

106. Parts of the Project area have various levels of significance in terms of associative or shared and recognised values for those with mana whenua and the wider community. Consideration of associative values has been taken into account as part of landscape sensitivity. It is beyond the scope of this assessment to assess how cultural values may potentially be affected. I have relied on the information provided by iwi to the NZ Transport Agency about cultural impacts, and Technical Assessment 6: Historic Heritage and Archaeology.

107. Having said that, the development of the ECDF is an iterative process that involves consultation and input from those with mana whenua and from community stakeholders. Through this process and the design guidance provided by the ECDF, the expression of community values will provide a framework for these aspects to be incorporated into the detailed design of the alignment.

Natural character effects assessment

108. Natural character in an RMA (section 6(a)) context relates only to waterbodies and their margins, rather than the landscape as a whole.

109. The detailed methodology, including the attributes used for assessing natural character is provided in **Appendix 4.A: Natural Character Assessment**, and summarised in the methodology section below.

110. Natural character is a term to describe the naturalness (lack of modification) of river environments. Natural character is the expression of natural

elements, patterns and processes and the extent that any physical modifications has incurred including the presence of built structures. It also includes the perceptual or experiential[16] component of naturalness.

111. The degree or level of natural character within an environment depends on:

(a) The extent to which natural elements, patterns and processes occur;

(b) The nature and extent of modifications to the ecosystems and riverscape;

(c) The highest degree of natural character (greatest naturalness) occurs where there is least modification; and

(d) The effect of different types of modification upon the natural character of an area varies with the context and may be perceived differently by different parts of the community.

112. Natural elements incorporate all key features of a river, such as the water, bed and banks, as well as attributes occurring within the river environment, such as geological formations, native vegetation and fauna. Natural patterns take the channel and the riparian edge into account, together with the patterns created by humans on adjacent land, such as shelterbelts, land use boundaries, etc. Natural processes include river/ lake dynamics, flows and currents, erosion, freshes and floods, and regeneration processes of riparian vegetation and ecological health.

113. For the purposes of the natural character assessment, the streams and rivers have been considered to comprise three components: context; margin; and active bed:

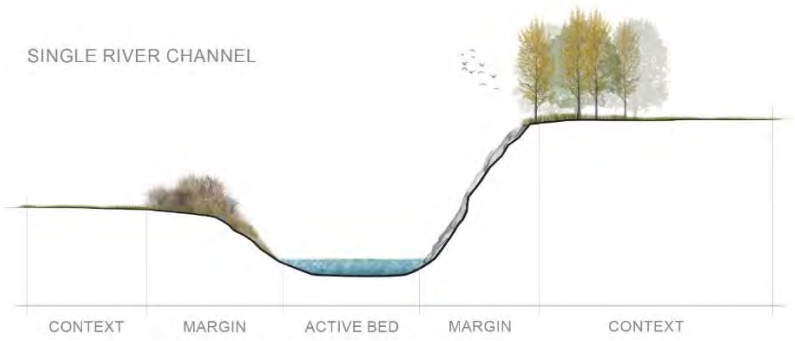
Context: refers to the wider catchment landscape adjacent to the stream/river, and considers the land use, landform and vegetation cover that contributes to the overall character of the river and its margins.

Margin: refers to the strip of land between the active bed and the wider landscape context. River processes, patterns and influences will be evident in the margin, such as occasional flooding, old banks and channel patterns, and river gorge wind flow.

Active Bed: for single stream incised rivers/streams, the active bed comprises the river/stream channel. For wider riverbeds and those with a

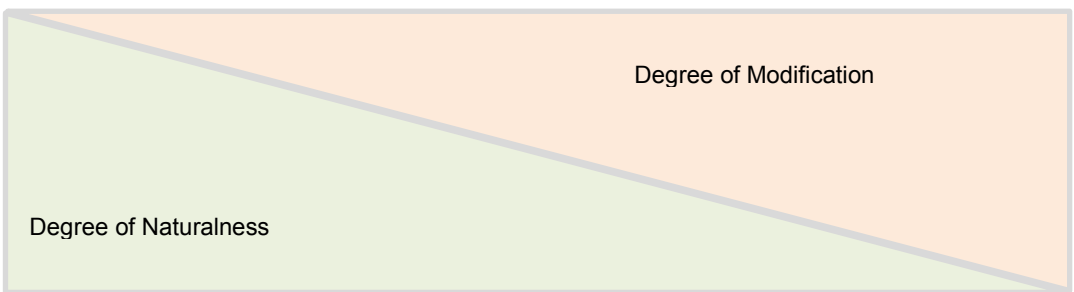
[16] The meaning of this term in respect of an 'all river corridor' is explained below.

braided character, the active river bed includes wetted areas/channels and may include dry margins, islands, banks abandoned channels, flood channels, and side channels and bars of a braid plain that form part of the river's natural migration across the riverbed. The diagrams below show the active bed, margin and context of a single river channel and braided river in accordance with the descriptions above.



114. The methodology adopted to assess the level of natural character involves a two-step process. In the first step, natural character is assessed in relation to a five-point scale with the ability for in-between ratings if required, as set out in the diagram below, (which also illustrates the relationship between the degree of naturalness and degree of modification). A high level of natural character means the waterbody is less modified and vice versa.

Very High	High	Moderate	Low	Very Low



115. The second step involves a re-assessment of those areas assessed as having High or Very High natural character to determine whether they qualify as Outstanding.

116. A river or stream reach with 'Outstanding' natural character ("**ONC**") should, 'Exhibit a combination of natural elements patterns and processes that are exceptional in their extent, intactness, integrity and lack of built structures and other modifications'.[17] An area of ONC should encompass the entire width of the river corridor, rather than applying to an individual component of a reach (context, margin, active bed), so that intact interrelated sequences of ecological systems and natural processes are included.

117. The approach to assessing natural character of the rivers and streams has been undertaken at two scales; a broad-scale assessment, and at a more detailed level focusing on river/stream crossings (refer **Drawing C-11, Volume 4**). Given that a regional natural character assessment has not been carried out by Horizons or the territorial authorities, the broad-scale assessment of the existing natural character was carried out to provide context and a baseline.

118. The broad-scale assessment covers a range of river environments with different attributes and qualities. The broad-scale assessment has provided a context for the identification of 'hot spots' at the river stream crossings, which are the focus of the detailed assessment.

119. For the detailed assessments, the existing level of natural character was first determined and the changes to natural character were assessed as a result of the potential effects of the Project. The assessment has considered the long-term operational outcomes of the Project as opposed to the construction effects, some of which will be temporary.

120. The broad-scale river reach assessment considers the Manawatū River from the Ballance Bridge to the confluence with the Pohangina River, and then south to Forest Hill Road, and from the confluence with the Pohangina River north to the Saddle Road Bridge. The assessment was considered in relation to three reaches and the collective generic stream crossings which form tributaries to the north of the Gorge, that is:

    (a) the Gorge;

    (b) Manawatū River below SH3 bridge;

[17] Boffa Miskell derived definition.

(c) Pohangina River from confluence to Saddle Road bridge; and

(d) generic stream crossings along the designation corridor.

121. The detailed assessment considers the existing natural character at five main river and stream crossings:

(a) the new Manawatū River bridge crossing (CH3600-4000);

(b) the crossing of a western stream (including QEII open space covenant and wetland at northern approach to new Manawatū River bridge) (CH4000-5900);

(c) the eastern QEII open space covenant stream crossing (CH 6100-6300);

(d) a stream crossing at eastern end of the Project (CH12800-13000); and

(e) a stream crossing at the western end for construction access to Saddle Road.

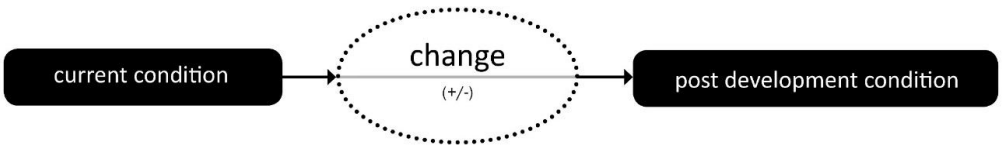
122. The process to assess the level of natural character involves an understanding of the many systems and attributes that contribute to a waterbody including abiotic, biotic and experiential factors. Consequently, this requires inputs from a range of disciplines – freshwater and terrestrial ecologists, water quality expertise, and landscape architects. A small team of specialists carried out the natural character assessment, first assessing the existing level of natural character and then the level of natural character post development (refer **Appendix 4.A**).

123. The assessment framework and attributes used are summarised below:

Table 4.9: Natural Character Components

Active Bed	
Attribute Group	**Natural Character Attributes**
Abiotic	Flow regime – how natural/modified are the flows. Active bed/body shape, including sedimentation, structures and human modifications Water quality
Biotic	Indigenous taxa assemblages Ecosystem functioning Exotic aquatic flora and fauna
Margin	
Abiotic	Structures and human modifications
Biotic	Terrestrial ecology
Context	
	Land use - degree of modification - broader scale landscape modification beyond the immediate river margin. Terrestrial ecology including vegetation, animals, habitats.
All River Corridor	
Experiential	Human perception of how natural a place appears, underpinned by the biotic and abiotic attributes (above). It includes the remote/untamed experience a place may provide and experiential attributes such as sounds, smells and transient values.

124. The assessment of effects on natural character is essentially understanding the degree of change from the existing level of natural character to the future level of natural character anticipated by the proposed development.



125. The natural character effects assessment involves the following steps:

    (a) assessing the existing level of natural character;

    (b) assessing the level of natural character anticipated; and

    (c) considering the significance of the change.

126. For this assessment, a reduction in natural character from High to Moderate or less is considered to *"significantly diminish the attributes and qualities of areas that have high natural character" (*Horizons One Plan Objective 6-2).[18]

127. Such a reduction is considered to be significant because it requires several of the 10 assessment attributes (above) to reduce for the overall level of natural character to be affected. Waterbodies with high natural character are more sensitive to change that could adversely impact on the attributes and qualities than those that have a moderate or low level of natural character. The interrelated nature of the attributes means that modification of a waterbody will typically result in a reduction to the rating of several attributes, rather than just one.

Visual effects assessment

Visual amenity values

128. The term 'amenity values' is defined in the RMA as, "*those natural or physical qualities and characteristics of an area that contribute to peoples' appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes*".[19] Amenity includes a combination of many factors, such as: visual amenity, ambient noise, air quality, and recreational and cultural attributes.

129. Visual amenity contributes to people's appreciation of the pleasantness and aesthetic coherence of a place and is a component of its overall amenity. This assessment considers the effects of the visual change that the Project would bring to the outlook and views of the viewing audience.

Magnitude of visual effects

130. Assessing visual effects involves consideration of both the scale and nature of the visual change and the nature and sensitivity of the viewing audience.

Nature of the viewing audience

131. The nature of the viewing audience is assessed in terms of the sensitivity of the viewing audience to change and the value attached to views. The value or importance attached to particular views may be determined with respect to its popularity or the numbers of people affected.

132. People more sensitive to change typically include:

[18] The team of specialist contributors who undertook the Natural Character Assessment determined the threshold of what constitutes "*significantly diminish."*
[19] RMA, s 2(1).

(a) nearby residents;

(b) people engaged in outdoor recreation whose attention or interest is likely to be focused on the landscape and on particular views;

(c) visitors to heritage areas or other important visitor attractions; and

(d) communities where views contribute to the landscape setting or local identity.

133. The table below assists to explain the variables.

Table 4.10: Determining the level of visual effects[20]

Contributing Factors		Higher	Lower
Nature of the Viewing Audience	**Susceptibility to change**	Views from dwellings and recreation areas where attention is typically focused on the landscape.	Views from places of employment and other places where the focus is typically incidental to its landscape context. Views from transport corridors.
	Value attached to views	Viewpoint is specifically recognised by the community, such as an important view shaft, identification on tourist maps or in art and literature. High visitor numbers.	Viewpoint is not typically recognised or valued by the community. Infrequent visitor numbers.
Magnitude of Change	**Size or scale**	Loss or addition of key features in the view. High degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture). Full view of the proposed development.	Most key features of view retained. Low degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture. Glimpse / no view of the proposed development.
	Geographical extent	Front on views. Near distance views; Change visible across a wide area.	Oblique views. Long distance views. Small portion of change visible.
	Duration and reversibility	Permanent. Long term (over 15 years).	Transient / temporary. Short term (0-5 years).

Visibility

134. Visibility is generally a key determinant in defining the extent of a study area as it may generate effects across all three assessment aspects – biophysical,

[20] Source: Boffa Miskell Methodology.

visual amenity, and landscape character. A tool often used for determining the extent of visibility is a zone of theoretical visibility ("**ZTV**") analysis. While ZTV analyses are very useful, they need to be interpreted with caution and considered as an indicative tool to identify features visible from any given point. It is important to understand the parameters and data used to generate a ZTV.[21]

135. Given the linear nature of the corridor and that it straddles both sides of the Ruahine Ranges, ZTV maps were produced from both the eastern and western locations. The ZTV maps are based on LiDAR contour data with the 3D model of the road corridor incorporated into the ZTV mapping.

136. To understand who will be affected by the Project, an analysis of the potential viewing population was carried out. The viewing audience falls into two broad groups:

    (a) Resident population: those residents located in Ashhurst and environs, rural and rural lifestyle residents on properties west of Woodville, and residents on Saddle Road.

    (b) Transient population: people using the roads, public spaces, and public facilities from where views of the proposed road may occur, albeit for short periods of time.

137. Computer-generated indicative visual simulations were produced from five viewpoints, all of which are publicly accessible locations.[22] Visual simulations are a well-recognised tool to better understand the extent and nature of visual effects. They do not, however, claim to reproduce what is perceived by the human eye. The preparation of the indicative visual simulations followed professional best practice as set out in the guidelines adopted by the NZILA.[23]

NATIONAL AND INTERNATIONAL BEST PRACTICE CRITERIA

138. This landscape and visual effects assessment methodology has been undertaken with reference to the *Quality Planning Landscape Guidance Note*[24] and its signposts to examples of best practice which include the *UK*

[21] Appendix 4.C provides detail of the ZTV methodology.
[22] The visual simulations are indicative because a road alignment has not been confirmed. As part of developing the outline plan of works (OPW) visual aspects will be further addressed. The OPW will allow for a more comprehensive confirmation of the mitigation of any potential effects once design has progressed and a construction methodology has been finalised
[23] NZILA Best Practice Guide: Visual Simulations BPG 10.2.
[24] http://www.qualityplanning.org.nz/index.php/planning-tools/land/landscape.

Guidelines for Landscape and Visual Impact Assessment[25] and the *New Zealand Institute of Landscape Architects Guidelines for Landscape Assessment.*[26]

STATUTORY CONSIDERATIONS, INCLUDING NATIONAL STANDARDS, REGIONAL AND DISTRICT PLANS, AND OTHER RELEVANT POLICIES

139. There are several statutory considerations relevant to landscape, visual, and natural character effects, as explained in the AEE report, and they have been considered in undertaking this assessment. They include matters included in Part 2 of the RMA, including section 6(a) and section 6(b), and associated objectives, policies, and rules in Horizons' One Plan and the relevant district plans. Some key provisions from these plans are described below.

One Plan

140. Horizons Objective 6-2 provides as follows:

> *"(b) Adverse effects, including cumulative adverse effects, on the natural character of the coastal environment, wetlands, rivers and lakes and their margins, are:*
>
> *(i) avoided in areas with outstanding natural character, and*
>
> *(ii) avoided where they would significantly diminish the attributes and qualities of areas that have high natural character, and*
>
> *(iii) avoided, remedied or mitigated in other areas.*
>
> *(c) Promote the rehabilitation or restoration of the natural character of the coastal environment, wetlands^, rivers^ and lakes^ and their margins."*

141. Schedule G of the Horizons One Plan identifies two Outstanding Natural Features and Landscapes of relevance to the Project, namely:

> *"l) The series of highest ridges and highest hilltops along the full extent of the Ruahine and Tararua Ranges, including within the Tararua and Ruahine Forest Parks;*
>
> *m) Manawatū Gorge, from Ballance Bridge to the confluence of the Pohangina and Manawatū Rivers, including the adjacent scenic reserve"*

[25] Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3).
[26] Best Practice Note Landscape Assessment and Sustainable Management 10.1, NZILA.

142. The AEE report sets out the other provisions of the One Plan relevant to ONFLs.

Manawatū District Council

143. Manawatū District Council is preparing a future plan change to give effect to the One Plan and directives within the Manawatū District Plan. The future plan change will be known as PC65 – Outstanding Natural Features and Landscapes ("**Future Plan Change**") and is due to be notified in November 2018. The draft of the Future Plan Change has identified an ONLF (ONLF 10 Manawatū Gorge) at the western end of the Gorge adjoining the Manawatū Gorge Scenic Reserve. The defined area of the draft ONLF encompasses and extends the regional ONL in that area.

144. Objective LU8 which relates to the rural character and amenity of the district in general:

"To maintain and where appropriate enhance the rural character and amenity of the District's rural areas, which includes:

…

ii) A landscape within which the natural environment (including farming and forestry landscapes) predominates over the built one.

…

iv) The natural quality of the District's indigenous forest areas, rivers, lakes, wetlands and coastal strip."

145. Objective LU9 of the Manawatū District Plan identifies outstanding landscapes that need to be considered in relation to the Project:

"To protect and where appropriate enhance the quality of the District's outstanding landscapes, namely:
a) Pohangina River and river valley (delineated on Maps 16/17d) The ridgeline of the Ruahine ranges."

Tararua District Council

146. Objective 2.6.2.1 of the Tararua District Plan relates to amenity values and environmental quality:

"To maintain and/or enhance amenity values and environmental quality in the District, for present and future generations.

2.6.2.2 Policy
(a) To manage the adverse effects of activities on amenity values by specifying minimum environmental standards for the development and maintenance of such activities.

147. Objective 2.6.4.1 relates to the Protection of Natural Features and Landscapes, significant trees and significant indigenous vegetation and significant habitats of indigenous fauna from inappropriate subdivision use or development. Policy 2.6.4.2 is to identify particular natural features and landscapes that contribute in a significant way to the amenity and environmental quality of the District and to classify them.

148. Schedule 3.3 identifies several Natural Features and Landscapes, including:

304 Skyline of the Ruahine Ranges – Cat.B (Map 6)

305 Manawatū Gorge, downstream of Ballance Bridge, including the adjacent Scenic Reserve – Cat.B (Map 6)

149. Related policy for identified natural features and landscapes is covered by Policy 2.6.4.1 c):

"To encourage the protection of significant trees, significant indigenous vegetation, significant habitats of indigenous fauna, and identified natural features and landscapes from inappropriate subdivision, development or use, and to promote public access where this will not adversely affect conservation or private property values."

150. Objective 2.6.6.1 is:

"*To protect the natural, scenic, ecological, cultural and amenity values of the District's lakes, rivers, and wetlands and maintain and/or enhance public access to and along their margins."*

Outstanding Natural Landscapes

151. There are several areas identified as ONLs in the vicinity of the corridor (**Drawing C-06, Volume 4**). The Project traverses two of these, the Ruahine Ridgeline ONL and the Manawatū Gorge ONLF. Neither of these ONLs have

been spatially defined and mapped in the relevant statutory plans. Instead, they are described in the respective district plans and the One Plan; for the purposes of this assessment they were interpreted and mapped by Boffa Miskell. I provided the draft map to each of the three respective Councils and to Horizons to review and verify. **Drawing C-06, Volume 4** illustrates the outcome of this process.

152. The Project cannot avoid crossing the Manawatū Gorge ONL or the Ruahine Ridgeline ONL. Where the Project crosses the Ruahine Ridgeline it will be in a section of cut based on the gradients to be attained. The new bridge over the Manawatū River will cross the Manawatū Gorge ONL. There will be landscape effects in relation to both ONLs but limited visual effects at the Ruahine Ridgeline crossing because the alignment will be visually contained by landform. The crossing of the Manawatū Gorge ONL will however, be visually prominent.

PROJECT SHAPING

153. The Detailed Business Case report ("**DBC**") completed in March 2018 describes the process of considering options. The options assessment process is summarised in Part E of the AEE. The Project being addressed in this assessment was selected following a multi criteria analysis ("**MCA**") process carried out in the latter part of 2017. I was a part of the team of specialists undertaking the MCA, and I provided landscape and visual inputs into the process. This process involved site visits and field work, a series of team workshops, analysis of the alignments prepared by the road designers and each specialist identifying and rating the adverse and beneficial aspects of each option.

154. Initially, a long list of 18 options was assessed and from this, a short list of four options was identified and assessed further. From the short list, one corridor alignment was selected for further development (Option 3). Option 3 is the focus of this assessment.

155. Since that time, the NoR investigations have involved a high level of collaboration amongst the Project team responsible for carrying out the technical assessments. There has also been considerable contact and involvement of the technical specialists with stakeholders (i.e. staff from the three territorial authorities, Horizons and their consultants, and with iwi). This included attendance by representatives from the different stakeholder groups and iwi at a series of meetings and workshops.

156. In this iterative process, the issues and concerns raised by the technical specialists and stakeholders have been considered and addressed with the aim of avoiding or, where that is not possible or practicable, minimising adverse effects. The Preliminary Design Philosophy report outlines the design development that was undertaken as part of the NoR process. The design changes resulting from this collaboration and agreements arrived at the workshops include several that have responded to potential adverse effects on landscape, natural character and visual aspects, including:

    (a) Amending designation boundaries to reduce effects on sensitive landscape areas and to provide better opportunities for incorporating landscape and ecological mitigation measures;

    (b) Reducing the extent of cut on the approach to the new Manawatū River bridge;

    (c) Development of the new bridge alignment over the Manawatū River to minimise adverse effects on a significant area of old growth indigenous forest on the north bank;

    (d) Development of a viaduct/long bridge option on the northern side of the Manawatū River to minimise the Project footprint;

    (e) Extending the new Manawatū River bridge on the southern side to avoid a bridge embankment encroaching on the Te Āpiti carpark;

    (f) Incorporating a bridge as to opposed to a culvert to cross one of the stems in the QEII West Stream crossing; and

    (g) Amending the corridor designation and the indicative alignment on the descent to Woodville to limit the number of potential stream crossings.

157. The Project has been adjusted to avoid or minimise effects but in some locations adverse landscape, natural character or visual effects cannot be avoided. In places there will be high adverse landscape, natural character or visual effects, and in others mitigation measures will reduce some high adverse effects but not in every place where they occur.

158. The final design for the Project will be developed when a contractor is procured to undertake the works. At the completion of detailed design and prior to construction starting, the NZ Transport Agency will submit an outline plan or plans of the works to the territorial authorities under section 176A of

the RMA, which will outline the detailed design elements of the Project (in respect of works within their respective jurisdictions).

159. The outline plan(s) must detail the following information, in accordance with section 176A(3) of the RMA:

    (a) the height, shape, and bulk of the public work, project, or work;

    (b) the location on the site of the public work, project, or work;

    (c) the likely finished contour of the site;

    (d) the vehicular access, circulation, and the provision for parking;

    (e) the landscape treatment proposed; and

    (f) any other matters to avoid, remedy, or mitigate any adverse effects on the environment.

160. The outline plan(s) will provide details of the potential effects and proposed mitigation measures, including in relation to visual and landscape matters (including design plans and mitigation).

161. The outline plan(s) will also include various management plans and other documents, including the Landscape Management Plan and updated ECDF.

162. The outline plan approach will allow for a more comprehensive confirmation of the mitigation of any potential effects once design has progressed and a construction methodology has been finalised. I understand that the NZ Transport Agency is proposing to engage further with specific communities prior to finalising the detail to be submitted in the outline plan(s) (including the Landscape Management Plan and updated ECDF). This engagement will enable further community consideration of landscaping and design details and information relating to communication during construction.

163. The outline plans may be submitted in stages, or to represent specific elements of the Project, and therefore there may be multiple plans. The detail within any outline plan will have to address the actual or potential effects of the works and how they will be mitigated. For example, the detailed design will necessitate a specific assessment of potential visual effects especially if new structures are introduced and specific mitigation recommended to address these effects.

164. On lodgment of the outline plan(s), the territorial authorities will review the details as provided and may request changes before construction is commenced.

ASSESSMENT OF LANDSCAPE AND NATURAL CHARACTER EFFECTS

165. The Project will have adverse effects on biophysical aspects, landscape character, and on the natural character of rivers, streams and their margins.

166. The effects assessment below explains, relative to each sector: the key landscape characteristics; the potential changes that will result from the Project; and each type of effect (biophysical, landscape character, and natural character). It summarises each level of effect in that sector (in table form) and explains recommended measures to avoid and minimise adverse effects, including mitigation and offsetting.

167. The assessment of natural character in each sector focusses on major streams and wetlands with high natural character, and the avoidance and minimisation of potential adverse effects that may result from the Project. All major streams affected by the Project are described and assessed in **Appendix 4.A**.

168. More generally, the Project also has the potential to have adverse effects on other areas of natural character, due to the nature and modification of the works required. In those areas, I consider that, subject to specific site responsive construction methods and measures to minimise effects implemented in conjunction with the ECDF principles (which will be detailed in resource consent applications for those works) together with consent conditions, potential adverse effects on natural character will be sufficiently avoided, remedied and mitigated.

Sector 1: Bridge to bridge (existing SH3 bridge to new bridge)

169. Refer also to the photographs in **Figure 1, Appendix 4.B**.

Key landscape characteristics of sector

170. This sector is characterised by established farmland and the existing SH3 route. The area is dominated by grazed pasture with shelterbelts and woodlots. SH3 is a prominent element through the area, bookended by the Manawatū River.

Potential changes resulting from the Project

171. Potential changes in this sector relate to new sections of SH57, the carpark access road, and a roundabout that will also be located on farmland (where a small number of mature exotic trees may need to be removed). The indicative road alignment largely follows the existing SH3 alignment but crosses farmland at the western end.

172. The roundabout will create a threshold for traffic on SH3 and from SH57. The design treatment of the roundabout provides an opportunity to integrate it into the surrounding landscape. This could involve tree planting to create a distinctive landscape setting and threshold as set out in the ECDF. Overhead LED lighting will be included at the roundabout.

Biophysical effects

173. Because of the flat topography, the earthworks through this sector will be relatively minor. The proposed southern bridge abutment uses the natural topography to gain elevation but fill embankments will also be required.

Landscape character effects

174. The Project will not substantially change the landscape character of the area, given SH3 and the existing road environment. While the new road with four lanes and a roundabout will have an increased footprint, the traffic volumes will be similar to that of the existing SH3. The addition of overhead lighting at the roundabout will affect what is currently a dark, rural environment. The existing SH57 and SH3 intersection is lit, it is anticipated that the lighting associated with the roundabout would be brighter and more intense.

Natural character effects

175. The works in this sector do not encounter any major streams or wetlands, and so a natural character assessment was not carried out.

Table 4.11: Effects Summary

Type of effect	Level of effect
Biophysical	Low
Landscape character	Moderate Low
Change in level of natural character	N/A

Measures to avoid, remedy or mitigate adverse effects

176. I recommend the following measures be undertaken during detailed design of the Project to avoid or reduce adverse effects:

    (a) the alignment avoids the need for large cuts into the slopes to the east; and

    (b) the south abutment of the bridge is located south of the existing SH3 to provide a more open area underneath the bridge on the river margin for visitor carparking.

177. I recommend that the environmental principles and design guidance detailed in the ECDF should provide the fundamental design guidance for detailed design of the road alignment to ensure potential landscape and visual effects are avoided and minimised, and that beneficial environmental and cultural opportunities can be realised.

Sector 2: New Manawatū River Bridge

178. Refer also to the photographs in **Figure 1, Appendix 4.B**.

Key landscape characteristics of sector

179. The key landscape characteristics of this sector are as follows:

    (a) The Manawatū River at the bottom of the steep sided Gorge opens out upstream of the confluence with Pohangina River.

    (b) The river crossing location is a culturally significant area; in particular, Parahaki Island is immediately downstream of the crossing point.

    (c) The Te Āpiti carpark and information shelter are a popular recreational destination providing access to the Manawatū Gorge Scenic Reserve and walking trails.

    (d) An ONL extends down to the confluence of the Manawatū and Pohangina Rivers, including Parahaki Island (Schedule G of the Horizons One Plan).

180. Manawatū District Council is proposing a future plan change, which would see the area on the northern side of the river between the Manawatū Gorge Scenic Reserve and the Pohangina River become an ONLF.

Potential changes resulting from the Project

181. Potential changes resulting from the Project in this sector relate to the addition of a large bridge structure across and within the river corridor, traffic activity, and vegetation clearance, as further explained below. The bridge deck would sit approximately 30m above the water. The north abutment would land on a spur just beyond the railway line, and the south abutment would be positioned immediately south of the existing SH3 and carpark. Bridge piers will be located in the river margins and possibly in the river channel.

182. The Project will also result in the addition of traffic activity and noise within the river corridor and vegetation clearance and landform modification at the proposed bridge abutments and pier locations.

Biophysical effects

183. The biophysical changes relate to the landform modification and vegetation clearance required to construct the bridge abutments and piers. The abutments are located beyond the immediate river margins. The spur where the north abutment is proposed supports regenerating secondary broadleaf and kānuka forest. Dr Forbes has recommended specific constraints on the clearance of different vegetation types in that area.[27] The proposed south abutment is on the existing SH3 embankment in farmed pasture. Collectively, these are Moderate effects.

184. The river margins where piers may be located are quite modified and the vegetation is a mix of native and exotic species.

185. In addition to the permanent biophysical effects referred to above, there will also be short term construction effects to enable the bridge to be built. This will involve providing temporary access and parking arrangements to the Manawatū Gorge carpark, and measures to enable construction of the bridge piers.

[27] The Project Conditions contain the 'effects envelopes' determining the constraints on vegetation clearance.

Landscape character effects

186. The introduction of the bridge spanning the river and associated traffic will significantly change the character of the river corridor. Its elevation and form, together with the introduction of traffic activity will change the spatial, remote and quiet quality of the river environment, particularly for river users such as fishers, kayakers and people using the Gorge carpark.

187. Effects on landscape character will be heightened during construction of the bridge given the presence and activity of machinery, construction workers, and storage of construction materials and plant, but these will be temporary effects.

Associative values

188. The bridge within the river corridor and adjacent to Parahaki Island, together with the recreational carpark, make this area sensitive to change due to the shared and recognised values held by the community and cultural values for those with mana whenua.

189. Engagement with tangata whenua and community stakeholders through the ECDF process has generated and promoted ideas in relation to the design treatment of the bridge and redevelopment of the carpark as a gateway to the Manawatū Gorge Scenic Reserve.

Natural character effects

190. The existing level of natural character of this sector has been determined as Moderate/High (refer to **Appendix 4.A**). The moderately degraded water quality of the river and the modification along the river margins have adversely affected natural character in the area. In addition, the carpark, SH3, railway embankment and box culvert under the railway line have all physically modified the river margins and the attributes and qualities of the area; the presence of willows and other exotic plant species have also contributed to this.

191. In terms of overall context, the rating is also Moderate/High. While indigenous vegetation dominates on the north bank and upstream to the Gorge, the south bank is relatively modified (farmland and shelter belts). The Gorge with its steep heavily vegetated slopes and swift flowing river have high experiential values, but the road and rail modifications detract from this largely intact natural environment.

192. The level of natural character will reduce from Moderate/High to Moderate, due largely to the detrimental effect on the experiential qualities of the remoteness and naturalness of the river corridor, especially for people using the river. A new and large-scale structure across the river corridor will reduce the level of naturalness of the corridor from beyond the immediate bridge site (e.g. Manawatū Gorge Scenic Reserve, and Ashhurst Domain).

193. The river margins will be modified under the bridge deck due to both physical modification and the long-term sheltering effect from light and rain, which will affect regeneration of vegetation. It may also result in structural protection of the river margins to protect them from the effects of flooding.

194. Avoiding bridge piers in the river bed and artificial rip rap for pier or bank protection would help to minimise adverse effects on natural character. However, piers would need to be considered in relation to the overall design of the bridge and its visual appearance, and also to wider landscape effects. While one carefully sited pier in the river bed would have a relatively limited adverse effect, more than one could increase the effects on natural character.

Table 4.12: Effects summary

Type of effect	Level of effect
Biophysical	Moderate
Landscape character	High
Change in level of natural character	From Moderate/High to Moderate

Design measures to avoid, remedy or mitigate adverse effects

195. I recommend the following measures be undertaken during detailed design of the Project to avoid or reduce adverse effects:

    (a) Any alignment within the designation corridor would have a similar level of biophysical and natural character effects. A more westerly alignment would require a longer bridge and perhaps additional piers in the river and also bring the alignment closer to Parahaki Island. A more easterly bridge alignment would have benefits in terms of reducing potential adverse landscape and natural character effects in the next sector.

    (b) Bridge design should seek to minimise the number and size of piers in the river corridor.

196. I recommend the following measures be undertaken during detailed design of the Project to minimise or offset adverse effects:

(a) Replace/restore indigenous vegetation and habitats disrupted by the construction process.

(b) The bridge design should seek to respect the distinctive landscape setting at mouth of the Gorge, and the fact that it crosses an ONL. This would involve attention to the bridge alignment and overall form, its detailed design and materials used in its construction. There is an opportunity for the bridge to be an 'elegant' structure that reflects its location at the confluence of two major rivers and avoids dominating the surrounding tall native vegetation on the north side. The ECDF provides the opportunity to explore and to appropriately express the cultural narrative and shared values of the Manawatū River and Parahaki Island.

(c) The environment under the bridge on the south side should aim to create a quality public space for visitors at the entrance to the Manawatū Gorge Scenic Reserve walking tracks.

197. The ECDF process has included engagement with those with mana whenua and community stakeholders to promote the development of themes and design expressions for the bridge as well as the new carpark area and gateway to the Manawatū Gorge Scenic Reserve.

Sector 3: Western Slope

198. Refer also to the photographs in **Figure 1, Appendix 4.B**.

Key landscape characteristics of sector

199. The key landscape characteristics in this sector are as follows:

(a) Deeply incised and densely vegetated stream originating just upslope of the corridor and discharging into the River at the proposed new bridge crossing. This area has a High level of natural character.

(b) Stream identified as high value (aquatic ecology). A seep wetland at the lower end of the stream gully supports a small stand of swamp maire, which are classified as Threatened species. This wetland is hydrologically separate from the stream.

(c) The Project extends over the same stream and gully system in two places. At the upper end, the Project traverses a QEII open space covenant and steep vegetated gully and ravines with high value old growth indigenous forest. At the lower section there is c.300-year old growth forest, a stand of swamp maire, three high value streams/tributaries, raupō seepage wetland, and kānuka forest on the hill faces adjoining the Manawatū Gorge Scenic Reserve.

(d) The Project is immediately adjacent to the Manawatū Gorge Scenic Reserve, and in the vicinity of Parahaki Island, identified as a culturally significant area. It also traverses an Outstanding Natural Landscape as identified in Schedule G of Horizons One Plan.[28]

(e) The lower part of the catchment forms part of the Manawatū River margin and is visible from the Manawatū Gorge Scenic Reserve carpark on the south bank.

Potential changes resulting from the Project

200. Potential changes that will result from the Project in this sector relate to installation of access tracks, spoil sites and stormwater management elements, cuts and fill, vegetation clearance, culverts and stream diversion, bridges over streams, embankments, and loss or fragmentation of indigenous ecological communities, as explained further below. Some of these effects will be temporary, such as provision of construction access tracks (which

[28] This area has also been identified by Manawatū District as a future ONL.

would be rehabilitated as part of mitigation measures), and stream diversion to enable construction.

201. The nature and scale of changes would depend on the Project alignment selected. Various options were considered for this sector that would have resulted in quite different outcomes. A westerly bridge alignment constructed on embankments after it crosses the Manawatū River, would have required extensive earthworks, stream diversion and removal of a valued area of old growth indigenous forest to accommodate the footprint. That option cannot proceed, because it would exceed the proposed 'effects envelope' (recommended by Dr Forbes).[29]

202. The current indicative alignment of the Project, comprising an easterly bridge alignment across the river, together with a second bridge to form a 'viaduct/long bridge' spanning the raupō wetland, would avoid the old growth indigenous forest and avoid stream diversion.

203. Two QEII open space covenants are crossed by the Project. One is located in this sector, referred to as **QEII west** at CH5600-6000 and another in Sector 4 – **QEII east** at CH6100-6400.

204. The alignment through the sector will result in landform changes. Landform modification will also occur at disposal sites, construction access tracks and for stormwater management features.

205. There will be vegetation clearance and landform modification in the steep gullies at the QEII west upper stream crossing. The road formation is likely to involve substantial cuts to the existing ground levels where the alignment crosses the two arms of the gully system in the headwaters of the stream. A culvert or 3-span bridge would cross the west arm, and a 60-80m long culvert is required to span the east arm. Both crossings require the removal of indigenous vegetation: old-growth forest and advanced secondary broadleaf forest in the west arm, and advanced secondary broadleaf forest in the east arm. Both the extent of vegetation clearance and the construction footprints would be relatively large in relation to the size of the QEII covenant occupying the designation corridor.

206. The extent of fill to form a road embankment in the westerly alignment option would have been in the order of 400m long, 100m wide, together with cuts

[29] The Project Conditions set out the 'effects envelopes', tabulating the limits of the different types of indigenous vegetation that can be removed or affected as part of the Project.

resulting in significant modification of the lower end of the stream gully (CH 4000-4400); again, that is no longer being progressed as a design option.

207. Loss and fragmentation of the indigenous ecological communities (i.e. very high and high value ecosystems) under any embankment, together with an allowance for construction and ground improvement footprints, would potentially have affected the raupō seep wetland, swamp maire stand, old growth forest and kānuka forest. Dr Forbes (in technical assessment report 6) therefore proposed constraints on the clearance of different types of vegetation, to ensure that effects can be appropriately addressed through offsets and mitigation measures.

208. The current indicative design, namely the easterly alignment of the 'viaduct / long bridge' option, would involve construction of a second approximately 130m long bridge spanning over much of the raupō wetland and stand of swamp maire and not encroach on the old growth indigenous forest. This option would have a smaller footprint, require less earthworks, avoid stream diversion and avoid removal of old growth forest.

209. Two stream tributaries join the main stream under the area anticipated to be covered by the embankment footprint and another stream flows from the Scenic Reserve near CH4000. Sections of stream will be affected by the Project and will require culverting or permanent diversion. Diverted streams are likely to be replaced by rock armoured channels to protect the road embankments. Culverts under the embankment would need to be at least 100m long. To facilitate construction an access track from the north bank of the Manawatū River to Saddle Road will largely require upgrade and widening of existing farm tracks, together with some new sections of track and also one stream crossing via a bridge or culvert.

Biophysical effects

210. From the proposed northern bridge abutment, the proposed designation corridor traverses the lower end of the stream catchment and ascends the pasture covered hill country before crossing the same stream again at its upper end (CH5600-5900). A wide extensive gully area in pasture located to the east of the alignment has been identified as a soil disposal area.

211. The biophysical effects in this sector are greatest at the upper stream crossing (CH5600 to 5900) and lower part of the gully (CH4100 to 4400). Between these two areas, the stream catchment will remain physically

unaltered, but given the width of the footprint to accommodate the four lanes of road, significant earthworks will be required.

212. At the lower end of the gully, the scale of the option requiring the large embankment footprint and associated construction/ground improvements, stream diversion, wetland loss, together with the loss or modification of high value ecological systems, would combine to significantly and permanently alter the biophysical nature of this part of the catchment. However, the indicative 'viaduct / long bridge' alignment, would result in much less landform modification.

213. The upper stream crossing where a bridge over the deep western gully and a culvert over the eastern gully are proposed lie within an area protected by a QEII open space covenant. The alignment is likely to be in a cut through this section, and this together with earthworks required for the bridge abutments and an 80m culvert, will significantly alter the landform at the head of this catchment. In addition, clearance of the dense indigenous vegetation in the gullies will be necessary under the alignment footprint and for construction access.

214. Upgrading the existing farm tracks to form the construction access from Saddle Road to the south abutment of the proposed new Manawatū Bridge (CH4000) will require vegetation clearance and earthworks. Most of these works are required south of the stream crossing where the topography becomes steeper and is more densely vegetated. The vegetation that would need to be cleared is primarily kānuka, but there are various groves of remnant forest trees (tōtara, maire, miro, tītoki) that should be retained where possible.

215. The existing farm access track is located in the Pohangina River ONL. While upgrading of the track for use as a construction access will result in widening and modification, it will not significantly impact on the landscape values of the ONL.

Landscape character effects

216. The lower end of this sector is very much a part of the Manawatū River margin where the Gorge ends, and the river begins to open out. This area has a relatively secluded and enclosed character, dominated by indigenous forest in the adjacent Manawatū Gorge Scenic Reserve and throughout the lower part of the gully. The construction of a four-lane road through this area ---will unavoidably significantly change the landscape character.

217. As the proposed designation corridor extends away from the river, the character is dominated by open grazed hill country, dissected by steep and densely vegetated gully systems. The Te Āpiti Wind Farm has already modified this hill country landscape with the introduction of turbines and access roads. A four-lane road, together with traffic movement and associated noise, will further change the landscape character of this rural landscape.

Natural character effects

218. The existing level of natural character for this stream catchment has been assessed as High (refer to **Appendix 4.A**). This is due to the attributes and qualities of the largely unmodified nature of the active bed and margins, high aquatic values and ecosystem functioning. While not fully intact, indigenous vegetation is generally continuous along the length of the stream. The QEII covenant is fenced to exclude grazing stock and other parts of the gully are extremely steep, which generally restricts stock access. The freshwater ecology assessment has identified this stream as having a high value.

219. In the lower catchment, the level of natural character would have been reduced from High to Moderate/Low if the Project had retained flexibility for a westerly alignment with embankments. This would have been due to the permanent loss of the raupō wetland, old growth forest and swamp maire, introduction of a 100m long culvert, and permanent diversion of 200m of the stream. Again, the western embankment option cannot be progressed, however.

220. If a viaduct/long bridge easterly alignment (as indicatively shown on the plans) were adopted by the Project, the level of natural character would be reduced from High to Moderate/High because it would have a smaller footprint and avoid the raupō wetland, stream diversion and the old growth indigenous forest.

221. At the upper crossing, the effect on natural character would also depend on the Project option. In the worst-case, level of natural character would reduce from High to Moderate. This is due to the physical modification by the road alignment being cut down into the stream gully, construction of a culvert, bridge abutments and piers. The culvert will permanently alter the active stream bed and impact on the aquatic ecosystem functioning. Dense indigenous vegetation along the stream margins will need to be removed under the alignment and construction footprints.

222. In addition to the natural character effects outlined above, the experiential qualities of a quiet, remote and largely natural stream gully will be significantly changed by the physical presence and activity of traffic from a road.

223. The localised effects on natural character at the two crossing points are outlined above. If considered at a catchment-scale, the modification to the approximately 1.5km long stream affects about 450m of its length. Between the two sites of modification, the stream and its margin will remain in their current state. Dealing at the whole stream scale with the viaduct/long bridge, together with the bridge across one of the arms of the QEII West covenant, the overall change to the level of natural character will reduce from High to Moderate/High.

224. The construction access road from Saddle Road (which is currently an access track) crosses a stream that has a High level of natural character. The crossing is anticipated to be a bridge or culvert. While the new structure will slightly reduce the level of natural character at the crossing site, overall, it will not adversely affect the level of natural character of the stream.

225. While natural character of the stream crossings would be diminished by the Project, the proposed mitigation measures below, supported by the Project Conditions, will go some way to reduce the level of effects on natural character. In addition, the outline plan(s) as described above will outline the detailed design elements of the Project. This will involve refinement of the road alignment, and minimising construction footprints to reduce the quantum of the streams affected; combined with the re-establishment of vegetation in the catchments, this would reduce the impact on natural character of the stream.

226. In addition, design guidelines in the ECDF, once implemented during detailed design, will also assist to reduce adverse effects of natural character on the streams.

Associative values

227. The lower area is part of an area between the Manawatū Gorge Scenic Reserve and the confluence of the Manawatū and Pohangina Rivers being considered by Manawatū District Council as a future ONL. The upper part of the designation crosses through a QEII open space covenant.

Table 4.13: Effects summary

Type of effect	Level of effect
Biophysical	Moderate High
Landscape character	High
Change in level of natural character- upper crossing	From High to Moderate
Change in level of natural character- lower catchment (viaduct/long bridge)	From High to Moderate/High
Change in level of natural character- whole stream catchment	From High to Moderate/High
Change to level of natural character - Stream Crossing construction access to Saddle Road	From High to Moderate/High
Change to level of natural character - construction access to Saddle Road- whole stream.	Unchanged

228. Table 4.13 sets out the changes in natural character for the lower and upper stream crossings at a site scale and also at a stream scale. When considered at an overall stream scale the changes in the level of natural character is diminished; the natural character would change from High to Moderate/High.

Design measures to avoid, remedy or mitigate adverse effects

229. I recommend the following measures be undertaken during detailed design of the Project to avoid or reduce adverse effects:

    (a) Alignment to avoid the most sensitive ecological areas, wetland and stream beds and reduce area lost or disturbed, by minimising the construction footprint.

    (b) Use bridges instead of embankments and culverts to potentially reduce the construction impacts and permanent footprints through sensitive areas, or otherwise situate any embankment so that vegetation clearance is avoided or minimised and within the specified 'effects envelopes' (and thus able to be offset effectively) specified by Dr Forbes.

    (c) Minimise requirements to temporarily or permanently divert streams.

230. I recommend the following measures be undertaken during detailed design of the Project to minimise or offset adverse effects:

(a) Replace/restore indigenous vegetation and habitats.

(b) Any measures to mitigate or offset the effects on natural character in this stream catchment must deliver benefit to the stream and its margins within this catchment as opposed to elsewhere in the Project. The Project works will impact of the natural elements, patterns and processes of this particular stream system and improving the natural character of a different catchment will not deliver benefits to this catchment.

(c) Removal of grazing stock from the area around the open space covenant to result in a relatively rapid regeneration given the excellent local indigenous seed source. There are limitations to the quantum of mitigation measures possible within this catchment to offset the landscape and natural character effects given the relatively short length of the catchment.

(d) Revegetation and protection of indigenous forest cover in the upper catchments, above the indicative alignment, that are currently in pasture would be effective mitigation and improve the ecological values and water quality of the stream headwaters.

Sector 4: Te Āpiti Wind Farm and Ridge

231. Refer also to the photographs in **Figure 2** in **Appendix 4.B**.

Key landscape characteristics of sector

232. The key landscape characteristics of this sector are as follows:

(a) The high ridge tops, the Te Āpiti Wind Farm, and the QEII covenanted area, as explained below.

(b) This 3.9 km section of the Project traverses the high ridge tops and the Te Āpiti Wind Farm. The wind turbines and access roads are dominant features throughout the sector and they have modified the character of the hill country farmland through the introduction of the wind turbines, which are often referred to as ‘industrial’ elements.

(c) Several steep vegetated gully systems dissect the rolling to steep hill country. The designation corridor crosses through one of the several QEII covenanted gullies in this sector at CH6100 to 6400. Vegetation in the covenant is secondary broadleaf forest and scrubland.

(d) The stream in the QEII gully is identified as high value for its fresh water ecology values.

(e) In Horizons One Plan, the *"highest ridges and highest hilltops of the Ruahine Ranges"* are recognised in Schedule G as a Regionally Outstanding Natural Feature and Landscape. The Manawatū District Plan identifies the ridgeline of the Ruahine Range as an ONL and the Tararua District Plan identifies the "*skyline of the Ruahine Ranges*" in its schedule of natural features and landscapes.

Potential changes resulting from the Project

233. Potential changes resulting from the Project in this sector relate to the installation of access tracks, culverts, earthworks, vegetation clearance, and spoil disposal sites. These are explained further below.

234. The hilly and often steep topography require substantial earthworks along the full length of the alignment forming either cut or on fill batters. Some of the cuts are up to 48m deep.

235. A new access road to service the Te Āpiti Wind Farm runs parallel to the road alignment for 2.0 km (between CH6100 and 8100). This will widen the overall Project footprint, and the impact of accommodating this access road will be proportionally greater across small gully systems. A new access road to a wind turbine at CH5900 will require large cuts and fill on the upper slopes of the stream gully.

236. The indicative alignment has an approximately 350m long footprint through the QEII east covenant, which comprises three arms of the stream headwaters, each of which has tributaries assessed as having high value. The road formation for the main alignment and adjacent wind farm access road will substantially modify the headwaters of the stream through a combination of cut and fill earthworks and three culverts.

237. In addition, the indicative alignment requires cuts into the gullies and three culverts will be required under the alignment. Approximately 450m of stream would be covered by the earthworks footprint.

238. With respect to vegetation clearance, removal of secondary broadleaf forest will be required in the western arm and lower value shrublands in the eastern gullies.

239. It is also expected that spoil disposal sites, which are not shown on the plans, will be required through this area.

Biophysical effects

240. The physical change to the landforms within the proposed designation corridor is substantial due to the hilly topography and the amount of fill in the small gullies. However, the scale of the wide hill crest area has capacity to accommodate this scale of physical change, but the gullies less so.

241. Apart from the vegetation in the QEII covenant, there is very little other high value vegetation that would need to be removed within the proposed designation corridor in this sector.

242. Given the combination earthworks and the vegetation affected in the QEII covenant the level of biophysical effects have been assessed as a Moderate.

243. Formation and shaping of spoil disposal sites adjacent to the road footprint during construction will require earthworks and disturbance, but these effects will be temporary.

Landscape character effects

244. The construction of a new road, associated earthworks and traffic activity will introduce a dominant new element to this area. During construction, effects on landscape character will be amplified given the extent of works and activity. The new road will change the landscape character from farmland/wind farm to a busy and noisy road environment. In terms of land use and farming, the Project will also create a barrier and separation between the north and south areas.

Natural character effects

245. Natural character effects were considered for the stream and its margins within the QEII covenant. The existing level of natural character of the entire stream (from its headwaters just above the alignment to the Manawatū River) was assessed as being High/Very High.

246. The localised effects to the corridor crossing on the natural character of the stream are relatively high. This is due to the large footprint in all three arms of the gully due to the cutting down of the landform, installation of culverts, construction disturbance and associated vegetation removal.

247. When considered at a whole stream level (1.8km long) the adverse effects are somewhat diluted because much of the stream is situated in the Manawatū Gorge Scenic Reserve and has a high level of natural character.

248. Because the adverse effects are high, mitigation measures could be adopted, in particular structures / bridges, which would reduce the footprint in streams,

or a road alignment further north within the designation corridor would reduce effects on natural character.

Table 4.14: Effects summary

Type of effect	Level of effect
Biophysical - Magnitude of effect	Moderate
Landscape Character - Magnitude of effect	Moderate High
Change in level of natural character - Stream Crossing	From High to Moderate
Change in level of natural character - Whole stream assessment	No change

249. Table 4.14 sets out the change in level of natural character at both a site-specific scale and at an overall stream scale. At the overall stream scale, the changes in the level of natural character is diminished, the natural character would not change.

Design measures to avoid, remedy or mitigate adverse effects

250. I recommend the following measures be undertaken during detailed design of the Project to avoid or reduce adverse effects:

(a) Locate the alignment to avoid the most sensitive ecological areas, and streams to reduce the footprint in the QEII covenant area and in other stream gullies. In this location, a northern-most alignment would be the best option.

(b) Use bridges instead of culverts, where possible, to reduce the construction and permanent footprints through sensitive areas.

(c) Revegetation and protection of the upper stream catchments in the QEII covenant which are located above the alignment and currently in pasture. Restoration of indigenous riparian vegetation cover of these upper areas would be effective mitigation and improve the ecological values and water quality of the stream headwaters and offset the stream bed and margins that will be permanently lost under culvert and embankment footprints.

251. Corridor-wide design guidance to mitigate adverse effects, and realise beneficial opportunities, will be provided through the ECDF.

Sector 5: Eastern Slope

252. Refer also the photographs in **Figure 2, Appendix 4.B**.

Key landscape characteristics of sector

253. The key landscape characteristics of this sector are related to the 3.0 km section of the corridor that descends from the high ridges to the toe of the hills where they meet the plains. This hill country is steeper and more broken than the western slope and is characterised by short narrow spurs and deep gullies, many of which have streams and areas of native and exotic scrub as well as exotic woodlots and shelter belts.

254. Several of the streams that drain in the area are generally of a lower value in terms of their freshwater quality.

Potential changes resulting from the Project

255. Potential changes resulting from the Project relate to substantial earthworks, stream diversion / culvert, bridge and vegetation clearance, as explained further below.

256. As for much of the proposed designation corridor, the broken topography requires substantial earthworks with the whole length of the alignment in cut or on fill as it traverses the multiple ridges and gullies.

257. The proposed designation corridor encounters a section of stream tributary at the toe of the hill country and this crossing will need to be culverted or the stream diverted. This tributary then flows into a stream which the corridor crosses with a bridge (both the tributary and the stream have been assessed together in terms of effects on natural character).

258. Three areas of secondary broadleaf forest will need to be cleared. Other vegetation that would also need to be removed is pine woodlots and mixed native/exotic scrub.

Biophysical effects

259. The most substantial biophysical effects relate to the physical change to the topography to enable road construction. This would involve filling sections of gully and cutting through ridges and soil disposal sites.

260. The removal of areas of secondary broadleaf native forest will cause additional biophysical effects resulting from fragmentation and opening up the edges of these stands to the effects of wind and weeds.

261. During construction, the extent of biophysical effects will in places be larger than the final footprint, but some of these will be temporary. Developing soil disposal sites and shaping them to their final form will require earthworks being carried out prior to these areas being hydroseeded and managed as pasture.

Landscape character effects

262. The eastern slope is rugged and wild with limited small-scale infrastructure, such as: farm access tracks, stock fences, stock water and dams. Landscape character will be affected by the introduction of the proposed designation corridor with steep cut faces slicing through this farmed landscape. In addition, soil disposal sites will alter the existing hilly topography. This will contrast with the fine scale and texture of the topography. It will physically and visually bisect the hill country and introduce traffic activity into the relatively quiet rural environment.

263. Various areas of native and exotic vegetation will be removed to facilitate construction but, in the context of the broader landscape, the effects on landscape character will be relatively limited.

264. During construction, the effects on landscape character will be heightened because of the level of disturbance, presence and activity of construction machinery, and overall construction activity. Many of the construction effects will, however, be temporary and will reduce upon completion of the Project, including implementation of the mitigation measures as set out in the Project Conditions and in the ECDF.

Natural character effects

265. The stream and tributary are not considered to be high-value streams for their freshwater qualities.

266. The streams are already reasonably modified through farming activities including: channelising and straightening, removal of riparian vegetation, and stock access.

267. The physical change to the streams and their margins will be the greatest change to natural character in this sector.

Table 4.15: Effects summary

Type of effect	Level of effect
Biophysical	Moderate High
Landscape character	High
Change in level of natural character- tributary and stream	Moderate to Moderate Low

Design measures to avoid, remedy or mitigate adverse effects

268. I recommend the following measures be undertaken during detailed design of the Project to avoid or reduce adverse effects:

    (a) Locate the alignment to avoid streams if possible.

    (b) Use bridges instead of culverts, where possible, to reduce the construction and permanent footprints over streams.

269. I recommend effective mitigation could be achieved through planting new buffers of indigenous vegetation along the edges of the areas of secondary broadleaf vegetation fragmented by the corridor. Planting for slope stability and landscape amenity planting in strategic locations would also assist to integrate the Project into the landscape. Corridor-wide design guidance to mitigate adverse effects and realise beneficial opportunities will be provided through the ECDF.

Sector 6: Woodville Gateway

270. Refer also the photographs in **Figure 2, Appendix 4.B**.

Key landscape characteristics of sector

271. The key landscape characteristic of this sector is that it is a distinctly rural area. Subsequently, the area is dominated by open grazed pasture farmland with shelterbelts. The hills of the eastern slope form a dominant backdrop to the flat plains.

272. In addition, SH3 is located nearby with several dwellings along the southern side of the sweeping curve west of Woodlands Road.

Potential changes resulting from the Project

273. Potential changes resulted from the Project in this sector relate to cuts, embankments, soil disposal sites and a new roundabout.

274. The new SH3 alignment cuts across the flat farmland and rises on embankments to gain elevation before ascending the hills of the eastern rise.

275. A new roundabout will be located near the SH3 and Woodlands Road intersection. The roundabout will service five exits and have a footprint of approximately 100m x 100m. Overhead LED lighting will be included in the roundabout and for 120-180m along both legs of SH3. Three poles associated with electricity transmission lines on Woodlands and Troup Road may need to be relocated to allow for the new roundabout.

Biophysical effects

276. There will be relatively low biophysical effects in this sector caused by the earthworks through it, which are relatively minor and can (with final shaping and hydroseeding) be integrated with the surrounding farmed landscape. This because of the flat topography; apart from the embankments, which will have a moderate effect at the northern end. Mature shelterbelt trees will need to be removed near the stream crossing.

Landscape character effects

277. The presence of a new road corridor across the open farmland between the eastern rise and the intersection with SH3 will change the rural character of the area. Although there are other roads throughout the area, the substantial linear structure, together with associated traffic activity will impact on the rural environment.

278. The Project will slightly change the landscape character of the area at the southern end of the sector (Woodlands Road). While the existing SH3 road environment already exists in this locality, the presence of a relatively busy roundabout will add a level of complexity to the traffic environment and increase its overall footprint.

279. The addition of overhead lighting at the roundabout will introduce light into an otherwise dark rural environment. The proximity of the roundabout to Woodville goes some way in reducing the incongruity that can occur when islands of light are isolated in dark rural landscapes. The roundabout at night will mark the boundary of Woodville with its rural hinterland.

280. The light may well be apparent from several nearby residences (100m to 300m away) but given the ability to direct and confine light emitted from LED fittings, together with potential screening by shelterbelts and other vegetation, this is unlikely to have an adverse effect.

Natural character effects

281. The works in this sector do not encounter any major streams or wetlands.

Table 4.16: Effects summary

Type of effect	Level of effect
Biophysical	Moderate Low
Landscape character	Moderate
Change in level of natural character	N/A

Design measures to avoid, remedy or mitigate adverse effects

282. I recommend that, to avoid or reduce adverse effects, the alignment is located to avoid the most sensitive ecological areas, and to minimise effects on streams.

283. I recommend that effective mitigation could be achieved through the shaping, hydroseeding and strategic planting of the road embankments to help integrate the elevated corridor with the flat plains and eastern slope. Ensuring that large parts of the embankments could be used for grazing would also assist with integration of the corridor into the landscape.

284. Again, the ECDF will guide mitigation measures and help realise beneficial opportunities such as gateway identification.

ASSESSMENT OF VISUAL EFFECTS

285. Given the focus of the NoR is on a designation corridor as opposed to a detailed road alignment, the assessment of visual effects, which often affect viewing audiences from well outside the corridor, was carried out as a separate exercise. An analysis of the different viewing audiences and their levels of visibility of the designation corridor and the potential visual effects was carried out supported by maps and indicative visual simulations.

ZTV and representative viewpoint locations

286. Given the nature of the visual catchments and separate viewing audiences on either side of the Ruahine Range, two separate ZTV maps were produced initially, one from the west and one from the east. After further analysis and field work, ZTV maps were also produced from two other observer locations;

the southern end of the SH3 bridge and from the southern side of the proposed new bridge across the Manawatū River.

287. On the western side of the Ruahine Range, two viewer observation points were selected; one at the top of the river terrace on the south-eastern of edge Ashhurst (corner of Mulgrave and Durham Street) and a second from The Terrace at the north-eastern edge of Ashhurst. To illustrate the extent of the viewshed from Ashhurst, a ZTV map was generated from the south-western observer point (**Drawing LVA-01, Volume 4**). Another western observer point was also selected (from the SH3 bridge) and another ZTV map generated (**Drawing LVA-02, Volume 4**). From these locations, the river terraces on the eastern side of the Pohangina River and lower hill faces are visible as are the upper slopes and the turbines of the Te Āpiti Wind Farm.

288. A ZTV was also produced from one other western location, the approach to the existing Manawatū Gorge Scenic Reserve carpark on southern side of the river near where the proposed new bridge will cross (**Drawing LVA-03, Volume 4**). Here, the visual catchment is confined by the existing topography which would obscure much of the proposed designation corridor as it rises on the hill slopes.

289. The size of the viewing audience on the eastern side of the Ruahine Range is limited. An observer location was selected 1.3km west of Woodville near to where the corridor joins the existing SH3 (**Drawing LVA-04, Volume 4**). From this location, fairly long stretches of the proposed designation corridor would potentially be visible because of the alignment and orientation.

290. Using the ZTV, field work was carried out to identify representative publicly accessible viewpoints for indicative visual simulations to be prepared (e.g. from local roads, parks and recreation areas, public and semi-public areas and facilities).

291. Given that the corridor traverses through a rural, sparsely settled area, the selection of representative viewpoints for visual simulations is relatively limited. Selection of representative viewpoints focused on locations from the following areas:

    (a) Saddle Road;

    (b) SH3;

    (c) SH57;

(d) Ashhurst and Woodville townships; and

(e) areas used by the public, such as the Ashhurst Domain and the Manawatū Gorge Scenic Reserve track network.

292. Five representative viewpoint locations were subsequently selected for indicative visual simulations (**Drawing LVA-05, Volume 4**); these are described below.

The Terrace, Ashhurst (Drawing LVA-06, Volume 4)

293. Situated on The Terrace on the north-eastern edge of Ashhurst there are panoramic views from residential dwellings across the Pohangina River flats to the western hill slopes of the Ruahine Range, the turbines of the Te Āpiti Wind Farm, the forest in the Manawatū Gorge Scenic Reserve and the Tararua Wind Farm in the distance. From here, landform and vegetation obscure the new bridge over the Manawatū River and much of the proposed designation corridor on the northern side of the Manawatū River. Only a short section of the proposed corridor on the mid slopes would be visible.

Effects summary

294. There would be a Low level of visual effects from the residential properties on the edge of Ashhurst, because of the limited scale of the visual changes and the 1.9km viewing distance.

SH3 Bridge (Drawing LVA-07, Volume 4).

295. Travelling east over the SH 3 bridge, there are transient panoramic views to the Ruahine Range with the forest of the Manawatū Gorge Scenic Reserve in the mid-ground and the turbines of the Te Āpiti Wind Farm silhouetted on the skyline. The vegetation growing on the terrace face of the Pohangina River and on the terrace itself, the willows along the edge of the Manawatū River and the native forest of the Manawatū Gorge Scenic Reserve provide the landscape setting for the new bridge over the Manawatū River. Landform, together with the stand of native vegetation on the terrace, would partially obscure the proposed designation corridor on the northern side of the river.

296. For road users, views of the new bridge and corridor would introduce additional modification into an area of landscape currently dominated by natural elements and seen below wind turbines along the skyline. The new bridge would be partially screened by exotic trees along the river margins. Beyond this, the proposed designation corridor would be visible through

indigenous vegetation as it rises onto the mid slopes of the western slope which extend along the northern side of the river.

Effects summary

297. Overall the level of visual effects would be Moderate.

SH 3 Approach to New Manawatū Bridge (Drawing LVA-08, Volume 4)

298. The existing stretch of road from the SH3 and SH57 intersection will be retained to provide access to the Manawatū Gorge Walkway carpark. The new road will be located on the river terrace to the east, and the southern abutment of the new bridge will be located on the edge of this terrace.

299. From here, the bridge will be prominent feature, crossing over the carpark against the backdrop of the dense forest of Manawatū Gorge Scenic Reserve beyond and wind turbines silhouetted on the skyline. While existing trees and other vegetation in the mid-ground would provide some screening of the bridge/road, the view would still be dominated by the bridge. The design of the bridge, treatment of the earthworks and mitigation planting would help to integrate the bridge in its landscape setting. However, the bridge, because of its scale and its contrast with the largely natural setting, would dominate this area of the Manawatū River environment.

Effects summary

300. Overall the level of visual effects would be High.

Te Āpiti Wind Farm Lookout on Saddle Road (Drawing LVA-09, Volume 4)

301. Views from the Te Āpiti Warm Farm Lookout enable visitors to observe wind turbines up close in this open, hummocky rural landscape. From here, wind turbines are seen dispersed throughout areas of pasture and pockets of exotic and indigenous vegetation. Further to the south, the Tararua Wind Farm is visible along the Tararua Ranges beyond the Gorge.

Effects summary

302. The proposed designation corridor will be visible in this context and introduce areas of cut and fill which modify the undulating landform in the mid-ground. This will extend the degree of modification apparent along this area of the Ruahine Range with a Moderate-Low level of effect.

Junction of SH3 and Hope Road (Drawing LVA-10, Volume 4)

303. Along the flat farm land west of Woodville, the view is characterised by rural land use which extends onto the backdrop of the Ruahine Range. Much of the surrounding land cover is pasture with dispersed shelter belts, farm fences, farm buildings, pine woodlots and indigenous vegetation becoming more prevalent along the toe slopes. The 'crumpled' form of the skyline along the Ruahine Range and the presence of wind turbines within the Te Āpiti Wind Farm are also characteristic features of this view.

Effects summary

304. In this context, the corridor will be seen traversing the toe slopes of the Ruahine Range and disrupt part of the broader natural landform with visible road embankments and cut slopes. This would generate a Moderate level of visual effect.

Table 4.17: Summary of Visual Effects

Viewpoint	Level of Effect
The Terrace Ashhurst	Low
SH3 Bridge	Moderate
New Manawatū Bridge from SH3	High
Te Āpiti Wind Farm Lookout	Moderate-low
Junction of SH3 and Hope Road	Moderate

MEASURES TO AVOID, REMEDY OR MITIGATE THE ACTUAL OR POTENTIAL ADVERSE VISUAL EFFECTS

305. Refer to section assessments for the proposed mitigation measures for landscape and natural character effects. This section deals with proposed mitigation measures in relation to visual effects. The next section provides a tabulated summary of all the recommended mitigation measures for the landscape, natural character and visual effects.

306. The level of visual effects in relation to much of the corridor have been assessed as moderate or lower. The only area where the visual effects are high is in relation to the proposed new bridge over the Manawatū River. Given that the bridge is a new, large-scale structure introduced into a landscape where natural elements prevail, visual effects cannot be avoided. I recommend measures that would mitigate visual effects below.

307. The alignment of the bridge, its design, materials and finishes will all assist in reducing visual effects. The relationship of the bridge to its landscape context and the way it meets the land (i.e. piers and abutments) are important factors in reducing the scale of visual effects. While the bridge can provide a threshold and act as 'gateway' for road travelers, the aim should be for it not to dominate its location and setting. The bridge design can still be distinctive and incorporate strong cultural references, but it should respect its landscape context.

308. The visual integration of the bridge into the landscape will also depend on the level of disturbance that occurs during its construction and the amount and success of the site rehabilitation that follows. The proposed Project Conditions set out the 'effects envelope' in relation to the constraints on the limits of vegetation removal, and the measures that need to be addressed in the Landscape Management Plan, Ecological Management Plan and the ECDF.

309. In terms of mitigating visual effects of the Project for residents in Ashhurst and Woodville, and from rural properties in the environs, the greatest influence will be: the extent of the Project footprint, details of the execution, and finishes of earthworks. The Project is situated in a working rural landscape and the scale and type of site rehabilitation should reflect and respect this. The Landscape Management Plan and the ECDF set out the matters that need to be addressed to achieve this.

310. Ensuring a smooth transition of the junction between cut and batter slopes and soil disposal areas and the adjoining landform will be important. Planting along the edges of areas of native vegetation to provide protection from wind and ensuring areas of rehabilitation planting follow 'natural' boundaries, will assist with visual integration. Densely planting with native or other species along both sides of the road would produce a totally inappropriate visual result and diminish the visual opportunities that the Project will offer (i.e. expansive views whether travelling east or west, views to the Manawatū Gorge Scenic Reserve and to the turbines of the Te Āpiti and Tararua Wind Farms). However, planting in strategic locations along the designation corridor to achieve landscape and ecological outcomes appropriate to the landscape setting and context will be required. The details of this will be set out in the outline plan(s), Landscape Management Plan, Ecological Management Plan and ECDF.

311. Given the steep and (in places) unstable topography, erosion planting using a proven range of tree species should be included as part of site rehabilitation would have long-term site stability and visual benefits. Areas where this type of planting should be undertaken would be addressed as part of the Landscape Management Plan. For many people, travelling through a landscape with slips and sheet erosion creates strong negative impressions so how a new road sits 'in' as opposed to 'on' the landscape is an important visual consideration.

312. The ECDF sets out a series of corridor design principles in relation to the location, design and appearance of the elements that will be form part of the Project. The ECDF has drawn in part on the findings from the technical assessments. It sets out design outcomes that should be incorporated into the brief for the detailed design and consenting phases of the Project.

SUMMARY OF RECOMMENDED MITIGATION FOR LANDSCAPE, VISUAL AND NATURAL CHARACTER EFFECTS

Table 4.18: Summary of mitigation measures

Sector	Location specific mitigation for development during detailed design
1 **Bridge to Bridge (existing SH3 bridge to new bridge)**	**Measures to avoid and reduce adverse effects:** a) The alignment avoids the need for large cuts into the slopes to the east; b) The south abutment of the bridge is located south of the existing SH3 to provide a more open area underneath the bridge on the river margin for visitor carparking.
2 **Manawatū River Bridge**	**Measures to avoid and reduce adverse effects:** c) Any alignment within the proposed designation corridor would have a similar level of biophysical and natural character effects. A more westerly alignment would require a longer bridge and perhaps additional piers in the river and also bring the alignment closer to Parahaki Island. A more easterly alignment of the bridge would enable the 'long bridge / viaduct' option to be achieved in sector 3 and the old growth indigenous forest to be avoided. d) Bridge design should seek to minimise the number and size of piers in the river corridor. **Measures to mitigate/offset effects:** e) Replace/restore indigenous vegetation and habitats disrupted by the construction process. f) The bridge design should seek to respect the distinctive landscape setting at mouth of the gorge. This would involve attention to the bridge alignment and overall form, its detailed design and materials used in its construction. There is an opportunity for the bridge to be an 'elegant' structure that reflects its location at the confluence to two major rivers and the dominance of the surrounding tall native vegetation on the

Sector	Location specific mitigation for development during detailed design
	north side. The ECDF provides the opportunity to explore and to appropriately express the cultural narrative and shared values of the Manawatū River and Parahaki Island. g) The environment under the bridge on the south side should aim to create a quality public space for visitors at the entrance to the Manawatū Gorge Scenic Reserve walking tracks
3 **Western Slope**	**Measures to avoid and reduce adverse effects:** h) Alignment to avoid the most sensitive ecological areas, wetland and stream beds and reduce area lost or disturbed, by minimising the construction footprint (in line with recommended effects envelopes). i) Use bridges instead of embankments and culverts or otherwise reduce the construction impacts and permanent footprints through streams / sensitive areas (within the constraints identified). j) Minimise requirement to temporarily or permanently divert streams. k) An eastern-most alignment that minimises the removal and effects on the old growth native forest and stream (in line with recommended effects envelopes). **Measures to mitigate/offset effects:** l) Replace/restore indigenous vegetation and habitats. m) Any measures to mitigate the effects on natural character in this stream catchment must deliver benefit to the stream and its margins within this catchment as opposed to elsewhere in the Project. The Project works will impact of the natural elements, patterns and processes of this stream system and improving the natural character of a different catchment will not deliver benefits to this catchment. n) There are limitations to the quantum of mitigation measures possible within this catchment to offset the landscape and natural character effects given the relatively short length of the catchment. The permanent footprint is relatively large in comparison to the size of the gully and therefore this reduces the length of stream that can be improved through mitigation. In addition, the gully is already reasonably well vegetated. Removal of grazing stock from the area around the open space covenant would, however, result in a relatively rapid regeneration given the excellent local indigenous seed source. o) Effective mitigation could be achieved through revegetation and protection of the upper catchments, above the alignment, currently in pasture. Restoration of indigenous forest cover of these upper areas would improve the ecological values and water quality of the stream headwaters.
4 **Te Āpiti Wind Farm and Ridge**	**Measures to avoid and reduce adverse effects:** p) Locate the alignment to avoid the most sensitive ecological areas, and streams to reduce the footprint in the QEII covenant area and in other stream gullies. In this location, a northern-most alignment would be the best option. q) Use bridges instead of culverts, where possible, to reduce the construction and permanent footprints through streams. **Measures to mitigate/offset effects:**

Sector	Location specific mitigation for development during detailed design
	r) I recommend that effective mitigation could be achieved through revegetation and protection of the upper stream catchments in the QEII covenant which are located above the alignment and currently in pasture. Restoration of indigenous forest cover of these upper areas would improve the ecological values and water quality of the stream headwaters and offset the stream bed and margins that will be permanently lost under culvert embankment footprints.
5 Eastern Slope	**Measures to avoid and reduce adverse effects:** s) Locate the alignment to avoid the most sensitive ecological areas, and streams, and minimise the length of stream impacted by the alignment. t) Use bridges instead of culverts to reduce the construction and permanent footprints through streams. **Measures to mitigate/offset effects:** u) I recommend effective mitigation could be achieved through planting new buffers of indigenous vegetation along the edges of the areas of secondary broadleaf vegetation fragmented by the corridor.
6 Woodville Gateway	**Measures to avoid and reduce adverse effects:** v) The alignment is located to avoid the most sensitive ecological areas, and to minimise effects on streams. **Measures to mitigate/offset effects:** w) I recommend that effective mitigation could be achieved through the shaping and strategic planting of the road embankments to help integrate the elevated corridor with the flat plains and eastern slope. Ensuring that large parts of the embankments could be used for grazing would also assist with integration of the corridor into the landscape.
Corridor wide design to mitigate adverse effects and realise beneficial opportunities through ECDF	
I recommend that the environmental principles and design guidance detailed in the ECDF should provide the fundamental design guidance for detailed design of the road alignment to ensure potential landscape and visual effects are avoided and minimised, and that beneficial environmental and cultural opportunities can be realised.	

DRAFT CONDITIONS

313. The draft Project Conditions include provisions to avoid, remedy and mitigate adverse effects on landscape visual amenity and natural character. In addition to the targeted measures for landscape, visual and natural character (detailed below) the conditions that address ecological effects and the ECDF are closely interrelated and combine to support each other to achieve mitigation measures that serve multiple purposes.

314. Condition 5 covers the requirements for the OPW, including the requirement to prepare a Landscape Management Plan ("**LMP**") (5.c) ii E). Condition 12 details what must be included in the LMP. The LMP needs to be consistent with the ECDF and provide detail on how the planting and vegetation management will be implemented and managed, how the earthworks will be integrated into the landscape and other measures that will assist to reduce adverse effects and restore affected areas.

315. Condition 5(e) specifically addresses the potential effects on natural character for the streams identified as having high natural character and sets out maximum envelopes of stream length that could be permanently modified.

316. Condition 11 requires that the preliminary ECDF must be updated during the detailed design phase of the project.

Boyden Evans

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4.A
NATURAL CHARACTER ASSESSMENT

Boffa Miskell

Te Ahu a Turanga; Manawatū Tararua Highway Project

Appendix 4.A: Natural Character Assessment
Prepared for NZ Transport Agency

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Document Quality Assurance

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The Figures referred to in this report are included in either Appendix 4.B (Supporting Photographs) of the Landscape, Natural Character and Visual Effects Assessment (Technical Assessment #4) or in the Drawing set, Volume 4.

1.0 NATURAL CHARACTER ASSESSMENT

This document provides the detail and background of the methodology for the natural character assessment and the findings and conclusions from the assessment undertaken in support of Technical Assessment #4 (*Landscape, Natural Character and Visual Effects Assessment)* for the Te Ahu a Turanga; Manawatū Tararua Highway Project NoR application.

1.1. Summary of Findings – Natural Character Assessment

Existing Levels of Natural Character

The assessment of existing levels of natural character of the rivers and streams was undertaken at two scales; a broad-scale assessment, and at a more detailed level focusing on specific locations where the Project crosses rivers and streams that were considered to have the highest level of natural character.

A region-wide natural character assessment of rivers, streams and wetlands has not yet been carried out by Horizons nor by the territorial authorities, so the broad-scale assessment is intended to provide a contextual baseline of the existing level of natural character. An assessment of effects by the Project on the level of natural character for the broad-scale reaches was not undertaken.

There were no areas of outstanding natural character identified at either scale.

One broad-scale reach (Manawatū Gorge) was identified as having a high level of natural character.

Three of the streams crossed by the Project were assessed as having a high level of natural character. Those streams and Project crossings are the:

- QEII West stream crossing to raupō wetland. (chainage 4000-6000);
- QEII East stream crossing (chainage 6100-6500); and
- Stream Crossing construction access to Saddle Road.

Effects on Natural Character

The assessment of effects on natural character is essentially understanding the degree of change from the existing level of natural character to the future level of natural character anticipated by a proposed development. This effects assessment did not consider the changes in natural character of the broad-scale reaches; instead, it focussed on the locations where the Project crosses streams and the Manawatū River.

The assessments have considered the long-term (permanent) effects of the Project. It is assumed that best practice stormwater management and erosion and sediment control measures will be implemented during construction to avoid or minimise short term adverse effects.

Assessments for the stream crossings were considered at two scales; the actual location of the crossing where the physical changes would occur, and on the stream overall. Generally, the direct effects of the modification to the stream have the greatest impact at that location. However, because streams are connected physical and biological systems from headwaters to the lower catchments, modifications can affect the whole stream system.

Based on the methodology, 10 natural character attributes were used to assess the level of natural character. Of these, the Project impacted most on the morphology of the active bed and margins, the aquatic taxa and ecosystem functioning of the active bed, the terrestrial ecology of the margins, and the experiential qualities. The flow regime, water quality, and absence/presence of exotic flora and fauna were not generally considered to be significantly affected over the long term.

The greatest impact of the Project relates to the scale and location of the proposed works' footprint in the active bed and margins of the streams. At the crossing points, the filling of the stream gullies with earth embankments results in permanent loss of existing vegetation, loss or modification of significant lengths of active bed and margin in what are relatively small catchments. At the broader scale, the Project results in fragmentation of ecological communities and disruption of ecosystem functioning along the streams.

Experientially, it is inevitable that the introduction of large scale earthworks, and road activity will dominate the natural environment and tranquil aspects of the small stream gullies, and within the Manawatū River corridor where the proposed new bridge will cross.

The areas of greatest sensitivity in terms of potential effects on natural character are those in locations where the existing natural character is highest. Three of the waterbodies crossed by the Project have high natural character.

A reduction in natural character from High to Moderate (or less) is considered to constitute a significant reduction in the level of natural character.[1] Waterbodies with high natural character are more sensitive to change that could adversely impact on the attributes and qualities than those that have a moderate or low level of natural character. A reduction from High to Moderate is considered to be significant as it requires reductions in several of the 10 natural character attributes for the overall level of natural character to be affected.

The assessment has determined that the existing high natural character of two streams would be significantly reduced by the Project if certain options for the final road alignment and design were selected (i.e. QEII West, chainage 4000-6000 and QEII East, chainage 6100-6400). In both situations, the footprint of the alignment and construction works could cause permanent loss to relatively large sections of the active bed and stream margins, in what are relatively small gullies and catchments.

However, if the final road alignment and design option for QEII West stream were to include a viaduct/long bridge, and the stream not diverted, the effects on natural character would be reduced. Similarly, with the QEII East stream, the effects on natural character could be reduced by an option where the footprint is minimised and bridges or small footprint structures used to span the three gullies instead of culverts.

In all locations, adoption of various mitigation measures will be integral to achieving reduced effects on natural character. This is especially so at the QEII West and QEII East stream locations.

Table 1 sets out the expected change to the level of natural character at the specific crossing locations. However, when considered at an overall stream scale, the change in the level of natural character is reduced. Table 2 summarises the change to natural character for the whole stream and considers just those streams with existing high natural character.

While natural character would be diminished or significantly diminished either at a crossing site or whole stream scale, opportunities exist within the proposed designation to undertake a detailed design of the road alignment and implement mitigation measures that would reduce the scale of impact on the waterbodies and their margins.

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[1] Interpretation of Horizons Objective 6.2 (b) (ii) *avoided where they would significantly diminish the attributes and qualities of areas that have high natural character…".* What constitutes "*significantly diminish" was d*iscussed and agreed to by the specialist contributors who undertook this assessment.

Table 1: Summary of changes to natural character (at crossing locations)

Location	Current Condition	Post Construction Condition
Manawatū River Crossing	Moderate/High	Moderate
Chainage 4000-6000 **Lower stream/wetland** **QE II West**	 High High	 Moderate/High Moderate
QEII East (chainage 6100-6400)	High	Moderate
East End Stream (chainage 12700-13100)	Moderate	Moderate/Low
Stream Crossing construction access to Saddle Road	High	Moderate/High

Table 2: Summary of changes to areas of high natural character (whole streams)

Location	Current Condition	Post Construction Condition
Chainage 4000-6000 QE II West & Lower stream/wetland	High	Moderate/High
QEII East (chainage 6100-6400)	High	High
Stream Crossing construction access to Saddle Road	High	High

Mitigation

The most effective form of mitigation would be to avoid and reduce the scale of the impact on waterbodies and their margins through design of the alignment. Other mitigation measures should seek to minimise the Project footprint in waterbodies through use of structures such as bridges and retaining walls in preference to earth embankments and culverts. Development and adoption of low impact construction methodologies are also key to mitigation of effects on natural character.

A second tier of mitigation would be to enhance the natural character of the stream catchments, including measures such as stock-proof fencing and permanent retirement from grazing, restoration planting, and permanent legal protection of these catchments.

1.2. Statutory Framework

Resource Management Act

Natural character in an RMA (section 6(a)) context relates only to waterbodies and their margins, rather than the landscape overall. The Project crosses the Manawatū River and several streams.

Horizons One Plan Provisions

Provisions in The Horizons One Plan RPS provides guidance for the assessment (noting "natural character" is not defined within the plan).

> *Objective 6.1.3*
>
> *Introductory Text in 6.1.3 Natural features, Landscapes and Natural Character*
>
> *"Preservation of the natural character of the coastal environment, wetlands, rivers, lakes and their margins is also a matter of national importance. Natural character is generally accepted as being an expression of:*
>
> *• natural landform,*
>
> *• natural water bodies (lakes and rivers) and the sea,*
>
> *• vegetation cover (type and pattern),*
>
> *• natural processes associated with the weather and the ecology,*
>
> *• wildness, exposure, and the natural sculpturing of landforms and vegetation, and*
>
> *• the wider landscape context and the site's* relationship to this.*
>
> *Natural character is a sliding scale and varies from a low degree of natural character, such as urban environments, to a high degree of natural character (for example, Tongariro National Park).*

The approach of the One Plan is to at least maintain, and enhance where appropriate, the current degree of natural character of the coastal environment, wetlands, rivers, lakes and their margins by:

• continuing to provide a regional policy on natural character to guide decision-making,

• protecting and managing indigenous biological diversity, important wetlands, rivers and lakes as described elsewhere in this Plan and restoring and rehabilitating natural character where appropriate.

The natural character of rivers, lakes and their margins can be adversely affected by activities, in particular structures and flood mitigation measures, such as stopbanks. It is important that preservation of the natural character of rivers, lakes and their margins, where this is reasonable, is considered when making decisions on relevant activities. The natural character of wetlands can best be provided for by proactively managing the top 100 wetlands in the Region (as provided for in the sections of this chapter dealing with indigenous biological diversity).”

Objective 6-2

(b) Adverse effects, including cumulative adverse effects, on the natural character of the coastal environment, wetlands, rivers and lakes and their margins, are:

> *(i) avoided in areas with outstanding natural character, and*
>
> *(ii) avoided where they would significantly diminish the attributes and qualities of areas that have high natural character, and*
>
> *(iii) avoided, remedied or mitigated in other areas.*

(c) Promote the rehabilitation or restoration of the natural character of the coastal environment, wetlands, rivers and lakes and their margins.

Policy 6-8

(a) The natural character of the coastal environment, wetlands^, rivers^ and lakes^ and their margins must be preserved, and these areas must be protected from inappropriate subdivision, use and development.

(b) The natural character of these areas must be restored and rehabilitated where this is appropriate and practicable.

(c) Natural character of these areas may include such attributes and characteristics as:

(i) Natural elements, processes and patterns,

(ii) Biophysical, ecological, geological, geomorphological and morphological aspects,

(iii) Natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks,

(iv) The natural movement of water and sediment including hydrological and fluvial processes,

(v) The natural darkness of the night sky,

(vi) Places or areas that are wild and scenic,

(vii) A range of natural character from pristine to modified, and

(viii) Experiential attributes, including the sounds and smell of the sea; and their content or setting."

6.7 Explanations and Principal Reasons

The preservation of the natural character of the coastal environment, wetlands, rivers and lakes and their margins is a matter of national importance. The approach of the One Plan is to maintain the current degree of natural character of the coastal environment, wetlands, rivers and lakes and their margins and to restore and rehabilitate natural character where appropriate. The objectives, policies and methods adopted in this document aim to achieve this by:

(a) providing policy guidance on matters to be taken into account when exercising functions and powers under the RMA and when making decisions on applications which may affect natural character;

(b) the restoration and rehabilitation of natural character where appropriate; and

(c) actively protecting and managing indigenous biodiversity, wetlands, and rivers and lakes as described in other parts of this document.

2.0 ASSESSMENT APPROACH AND SCOPE

2.1. Assessment Steps

The process to assess the level of natural character involves an understanding of the many systems and attributes that contribute to a waterbody including abiotic, biotic and experiential factors. Consequently, this requires input from a range of technical disciplines such as river hydrology and morphology, aquatic and terrestrial ecology, water quality, and landscape architecture. The natural character assessment was undertaken by a small team of experienced practitioners:

(a) Dr Olivier Ausseil (water quality);

(b) Dr Adam Forbes (terrestrial ecology);

(c) Kieran Miller (freshwater ecology); and

(d) Bronwyn Faulkner / Boyden Evans (landscape context / experiential).

The assessment involved the following broad steps:

(a) Reviewing and confirming the methodology and assessment criteria amongst the team (including geographical extent and identification of broad-scale reaches and detailed sites).

(b) Assessing the current condition of existing natural character (including identifying any areas of High or Outstanding natural character).

(c) Assessing the anticipated change to natural character resulting from the Project and the significance of that change (i.e. scale of effect on existing natural character).

2.2. Use of two scales for the assessment

The assessment of the existing level of natural character of the rivers and streams for this Project was carried out at two scales; a broad-scale assessment and at a more detailed level focusing on specific locations where the Project crosses streams and the Manawatū River (**Drawing C-11, Volume 4**).

Given that a regional natural character assessment has not been carried out, the broad-scale assessment provides a wider context and a suitable local baseline level of natural character beyond the designation corridor. The broad-scale assessment considers reaches of both the Manawatū and Pohangina Rivers in the general vicinity of the proposed designation corridor. This broader context covers a range of river environments with different attributes and qualities. The broad-scale assessment also provided a context for the identification of 'hot spots' at the river and stream crossings, which are the focus of the detailed assessment.

An assessment of the potential effects on the level of natural character was not undertaken for the broad-scale reaches. The effects assessment focussed on the locations where the Project crosses streams and the Manawatū River.

For the assessments of stream and river crossings, the existing level of natural character was first determined and subsequently, the changes to the level of natural character were assessed as a result of the potential effects of the Project.

3.0 NATURAL CHARACTER METHODOLOGY

The methodology used in this assessment is based on current best practice which has its foundations in the widely accepted methodology for natural character assessment in coastal environments (in relation to that developed in response to the NZCPS) and several previous and current South Island river assessments undertaken by Boffa Miskell for different regional councils (i.e. Marlborough, Otago, Canterbury).

The methodology set out below has been reviewed by John Hudson (landscape architect) from the joint team of technical experts appointed for this Project by Palmerston North City Council, Manawatū District Council, and Tararua District Council.

3.1. Natural Character

Natural character is a term used to describe the naturalness of river/stream environments. The degree or level of natural character within an environment depends on:

- the extent to which natural elements, patterns and processes occur;
- the nature and extent of modifications to the ecosystems and landscape/riverscape;
- the highest degree of natural character (greatest naturalness) occurs where there is least modification; and
- the effect of different types of modification upon the natural character of an area varies with the context and may be perceived differently by different parts of the community.

The attributes and qualities considered to assess the naturalness of rivers and other water bodies relate to the degree of intactness of the natural elements, patterns and processes, including the extent of any physical modifications to landforms or presence of built structures. It also includes the perceptual or experiential component of naturalness.

Natural elements incorporate all key river elements, such as the water, bed and banks, as well as particular attributes occurring within the river environment, such as geological formations, indigenous vegetation and fauna.

Natural patterns take the channel and the riparian edge into account, and those patterns created by humans on adjacent land, such as shelterbelts, land use boundaries, etc.

Natural processes include river / lake dynamics, flows and currents, erosion, freshes and floods, and regeneration processes of riparian vegetation and ecological health.

3.2. River Components

The natural character assessment of the rivers and streams comprise three components: context, margin, and active bed.

Context

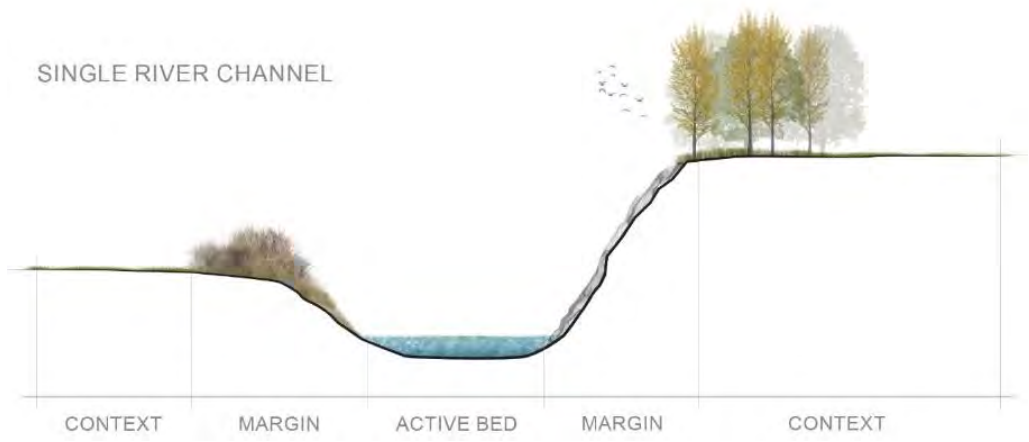
Refers to the wider landscape context of the catchment adjacent to the river/stream and considers the land use, landform and vegetation cover that contributes to the overall character of the river its margins.

Margin

Refers to the area between the active bed and the wider landscape context. River processes, patterns and influences will be evident in the margin, such as occasional flooding, former banks and channel patterns, and river gorge wind flow. From locations within a river/ margin, the active bed should be a dominant feature. The margin is typically narrow and may incorporate terraces, banks, stop banks, abandoned riverbed, small floodplains, river and stream estuaries and built infrastructure. Generally, topographic features define the extent of the margin such as the top of banks and the base of terraces. Vegetation boundaries can also define the margin extent such as where shrubland or forest adjoins grazed pasture.

Active Bed

For single stream incised rivers, the active bed comprises the actual river channel. For wider riverbeds and those with a braided character, the active river bed includes wetted areas/channels and may include dry margins, islands, banks, abandoned channels and bars of a braid plain that form part of the river's natural migration across the riverbed, as well as flood channels and side channels.




BRAIDED RIVER
FLOOD CHANNEL
ISLAND
CHANNEL
CONTEXT
MARGIN
ACTIVE BED
MARGIN
CONTEXT

3.3. Assessment Framework and Attributes

Table 3 below describes the assessment framework and the 10 natural character attributes and qualities assessed for each of the identified locations. The framework recognises that each of the three components of the river have different attributes and qualities to be considered. The attributes that comprise natural character of a river/stream can be clustered into three attribute groups- Abiotic, Biotic and Experiential.

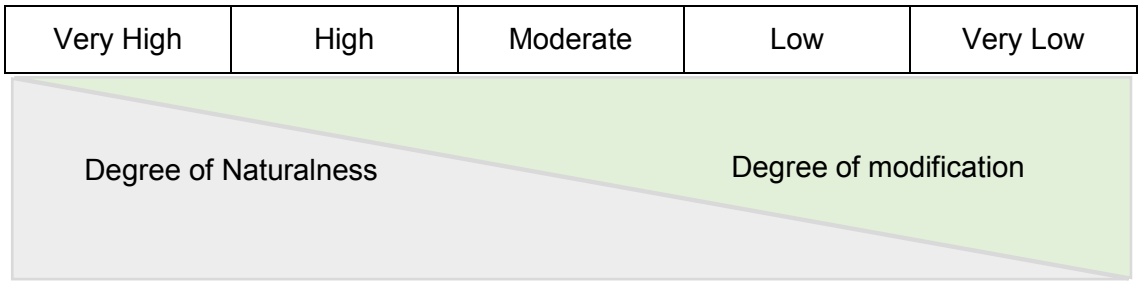
The attributes and qualities assessed (below) include, but are not limited to, the attributes and characteristics, relevant to freshwater environments, listed in Horizons One Plan Policy 6-8(c).

Table 3: Assessment Framework

Attribute Group	Natural Character Attributes
Active Bed	
Abiotic	Flow Regime – how natural/modified are the flows. Active bed/body shape, including, sedimentation structures and human modifications Water Quality
Biotic	Indigenous taxa assemblages Ecosystem functioning Presence / absence of exotic aquatic flora and fauna
Margin	
Abiotic	Structures and human modifications
Biotic	Terrestrial ecology
Context	
	Land use- degree of modification - broader scale landscape modification beyond the immediate river margin. Terrestrial ecology, including vegetation, animals, habitats.
All River Corridor	
Experiential	Human perception of how natural a place appears, underpinned by the biotic and abiotic attributes (above). It includes the remote/ untamed experience a place may provide and experiential attributes such as sounds, smells and transient values.

3.4. Level of Natural Character

The methodology adopted to assess the level of natural character involves a two-step process. In the first step, natural character is assessed in relation to a five-point scale with the ability for in-between ratings if required, as set out in the diagram below. This diagram also illustrates the relationship between the degree of naturalness and degree of modification. A high level of natural character means the waterbody is less modified and vice versa.



Each of the 10 natural character attributes for each location were assessed and assigned a level of natural character (very high to very low). These 10 ratings were then ordered/listed from very high to very low and the median rating (middle of the list) identified as the overall level of natural character for that location. No weightings were applied to any of the attributes.

3.5. Outstanding Natural Character (ONC)

The second step involves a re-assessment of those areas assessed as having High or Very High natural character to determine whether they qualify as Outstanding.

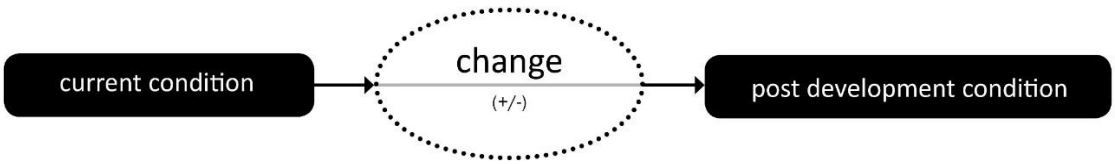
A river or stream reach with ONC should *"Exhibit a combination of natural elements patterns and processes that are exceptional in their extent, intactness, integrity and lack of built structures and other modifications"*[2]. An area of ONC should encompass the entire width of the river corridor, rather than simply applying to an individual component of a reach (i.e. context, margin, active bed), to ensure that intact interrelated sequences of ecological systems and natural processes are included.

[2] Boffa Miskell derived definition.

To determine areas of ONC, any river reach where all three components are identified as having High or Very High natural character will be considered to determine if any part of that reach would qualify as being Outstanding.

3.6. Effects on Natural Character

An assessment of the effects on natural character of an activity involves consideration of the proposed changes to the current condition compared to the existing. This can be negative or positive.



The natural character effects assessment involves the following steps;

(a) assessing the existing level of natural character;

(b) assessing the level of natural character anticipated; and

(c) considering the significance of the change.

Horizons One Plan Objective 6-2 (b) (ii) requires interpretation of the phrase "*significantly diminish the attributes and qualities of areas that have high natural character…*

In this assessment, a reduction in natural character from High to Moderate (or less) is considered to constitute a significant reduction in the level of natural character[3]. Waterbodies with high natural character are more sensitive to change that could adversely impact on the attributes and qualities that contribute to the high natural character, than those areas that have a moderate or low level of natural character. A reduction from High to Moderate is considered to be significant, as it requires reductions in several of the 10 assessment attributes for the overall level of natural character to be affected. The interrelated nature of the attributes means that modification of a waterbody will typically result in a reduction to the rating of several attributes, rather than just one.

[3] Interpretation of Horizons Objective 6.2 (b) (ii) *avoided where they would significantly diminish the attributes and qualities of areas that have high natural character.* The threshold of what constitutes *significantly diminish* was determined by the team of specialist contributors who carried out the Natural Character Assessment.

3.7. Natural Character Assessment Matrix

The assessment matrix below contains indicative descriptions for each of the assessment criteria and for each of the ratings from very high to very low (with the ability for in-between ratings if required). It provides consistency of ratings between sites and the changes to the level of natural character resulting from the Project. The initial development of the matrix by Boffa Miskell was grounded in natural character assessments prepared for coastal environments and rivers for various regional and district councils around New Zealand. The matrix was reviewed and refined by the team of specialists who undertook this assessment to make it applicable to this Project.

Table 4: Natural Character Assessment Matrix

Active Bed/Channel/Wetland Body	Very Low	Low	Moderate	High	Very High
Abiotic - Flow Regime The flow regime characteristics of a river with a given catchment size and location. Change to critical flow statistics relative to naturalised flow. Inflow/outflow controlled Occurrence of impoundments or large diversions of flows including flood harvesting. Proportion of flows diverted or impounded. Proportion of available allocation abstracted.	Very highly modified or diverted flow/water take (e.g. no natural flow regime through the obstruction by large-scale dams and diversions that drastically alter flood, fresh and low flow statistics relative to naturalised flows. Surface water takes over-allocated.	Highly modified or diverted flow. High level of alteration to flood, fresh and low flow statistics relative to naturalised flows. (e.g. through the introduction of small scale dams, substantial flood harvest irrigation takes, races or flood bypass channels. Surface water takes at or close to allocation.	Moderately modified or diverted flow (e.g. several irrigation takes removing a moderate proportion of 7DMALF or targeting flood flows. Moderate alteration of flow statistics.	Relatively low levels of modified or diverted flow (e.g. few irrigation takes removing a minor proportion of low surface water takes <50% of allocation, or no takes focussed on flood harvest.	Highly natural flow regime with no/very limited modifications to flow statistics. Minor water takes, no controlled in/out flows.
Physical change and dynamics of river and water movement resulting from natural seasonal floods and flows- movement of alluvial loads, sediments, flushing of algae and weeds.	Few or no natural elements, patterns, processes remain	Some key natural processes are no longer able to operate	Most natural dynamic processes generally intact with some interference	Natural dynamic processes largely intact	Natural dynamic processes virtually or completely intact
Degree of wetland hydrology intactness	Wetland surface and groundwater hydrology very highly modified, wetland extent largely reduced, overwhelming invasion by dryland species	Wetland surface or groundwater hydrology modified, wetland extent reduced and dryland species invaded	Wetland surface or groundwater hydrology may be modified but wetland extent represents close to natural extent. Invasions of dryland species localised and naturally contained	Wetland surface or groundwater hydrology intact. Wetland extent natural. Low levels of dryland species invasions	Wetland surface or groundwater intact. Natural wetland extent. Secure from dryland species invasions

Active Bed/Channel/Wetland Body	Very Low	Low	Moderate	High	Very High
Abiotic - Active bed/body shape, including structures and human modifications Includes, groynes, diversions, gravel extractions, irrigation infrastructure, roads, bridges, transmission lines or boat ramps. Extent of change to active bed or water surface profile. 'Training of braided rivers through straightening and narrowing of braid plain.	Channel/lake/wetland very Highly modified (i.e. by a dam, weir or flood defence structure, reclamation straightened, channelised (often with concrete or rock fill banks). Braid plain significantly narrowed and straightened	Highly modified. Semi natural reaches/body or channel shapes in some areas. Significant parts have been affected or by human intervention, modification (i.e. suburban/intensive Agriculture/hort land use: gravel extraction, Channel diversions and reshaping, narrowing and straightening of braid plain. Long stretches of flood protection structures (stopbanks, groynes, riprap). Substantial water take structure/physical modifications that modify the channel in localised areas. Jetties in lake bed.	Generally natural Occasional 'sections' with human modifications (i.e. a settled rural landscape with bridge/ aqueduct supports, pylon footing, long stretches of stopbanks, groynes). Removal of meanders from braid plain. Gallery water takes that modify the channel in localised areas. Moorings in lake bed.	A highly natural river/lake with limited human intervention (i.e. occasional bridge abutments/ power pole within the river channel); water monitoring devices/ gauges with very localised effect. Minor or short stretches of modifications to braid plain.	Overwhelmingly natural with no/ very limited evidence of human interference. Any water takes are ground water takes outside the channel. Braid plain unmodified
Wetlands	Wetlands extensively reclaimed or modified by hard structures	Large areas of wetland reclamation or surface modification	Few areas of wetland reclamation or modification by hard structures	Only localised areas of wetland reclamation or modification by hard structures	No impacts by reclamation or hard structures on wetland body

Active Bed/Channel/Wetland Body	Very Low	Low	Moderate	High	Very High
Abiotic - Water Quality Water quality and aquatic habitat quality; clarity, sedimentation, nutrient and bacterial levels etc. This should account for both the main channels of the river/the wetland body as well as lateral aquatic habitats if any (Including those outside of flood defences). Habitat changes due to fine sediment, draining, stock trampling or choking by exotic trees/ shrubs	Very highly contaminated or permanently discoloured water displaying very high levels of human induced changes to the water quality with limited life supporting capacity (e.g. within polluted urban/industrialised areas or intensive farming); Lateral habitats drained, removed or separated from the active channel or wetland body. No flushing flows. Measured by: Contaminant concentrations do not meet NPS-FM 2014 bottom lines, are causing national bottom lines for periphyton to be breached or exceed ANZECC 2000 80% protection guidelines.	Water usually displaying high levels of contamination mainly from adjacent diffuse sources from land use activities (agricultural leaching etc); Lateral streams and wetlands are diminished in area, unnaturally silted and/or choked with exotic weeds. Lateral channels not exposed to lateral migration of flooding/flushing by surface flows. Measured by: Median contaminant concentrations exceed the 95% confidence intervals (CIs) of the trigger values[4] set out in McDowell et al. (2013)[5].	Water displaying reasonable levels of naturalness although contains occasional high-moderate levels of human induced changes to part of the waterway or infrequent times; Some impact to habitat quality but lateral habitats generally intact and subject to active surface migration and flooding/ flushing, Measured by: Median contaminant concentrations are within the 95% CIs of the trigger values set out in McDowell et al. (2013) but exceed the trigger value thresholds.	Water displaying relatively high levels of water quality with small or rare amounts of impurities caused further upstream (e.g. by occasional stock crossing or forest harvesting); Lateral habitats in good condition despite occasional stock ingress or exotic vegetation. Lateral habitats subject to active channel migration and flooding/ flushing. Measured by: Median contaminant concentrations exceed the median reference conditions[6] set out in McDowell et al. (2013) but are below the trigger value thresholds. Note – in many cases contaminant concentrations will be within the 95% CIs of the median reference conditions.	Highly natural water and lateral habitat quality. Displaying no human induced changes. Measured by: Median contaminant concentrations are at or below the median reference conditions set out in McDowell et al. (2013).

[4] Trigger values indicate that there is a 'potential risk' of adverse effects at a site

[5] McDowell, R.W., Snelder, T.H., Cox, N. 2013. Establishment of reference conditions and trigger values for of chemical, physical and micro-biological indicators in New Zealand streams and rivers. AgResearch Client Report. Prepared for the Ministry for the Environment.

[6] Reference conditions are defined as the chemical, physical or biological conditions that can be expected in streams and rivers with minimal or no anthropogenic influence.

Active Bed/Channel/Wetland Body	Very Low	Low	Moderate	High	Very High
Biotic - Exotic Aquatic Flora and Fauna Presence of exotic aquatic flora and fauna within the river channel/wetland body or lateral habitats (including waterweeds, exotic fish, and invasive alga e.g. didymo) can reduce the natural character of the river/wetland. This does not include vegetation on 'islands' within the river channel. This is contained under 'braid plain vegetation'. Algal blooms may be evident in some rivers due to seasonal low flows. Expert ecological judgement will be required to assess extent and may have a bearing on the degree of naturalness of this primary attribute.	System "choked" with exotic aquatic flora and fish communities dominated by exotic species	Large areas of introduced flora and fauna (including exotic fish) evident (in approximately 75% of river/wetland)	Occasional stretches (some quite long) of introduced flora and fauna evident within waterway (approx. 50% of river/wetland)	Small, often isolated pockets of introduced flora and fauna evident (less than 20% of total river/wetland). However, river/wetland displaying very high levels of naturalness. Fish communities dominated by native species	No evidence of introduced flora or fauna within the river channel/wetland body
Biotic – Indigenous taxa assemblages The presence of species forming aquatic communities and the level that they are in terms of representing unmodified habitat potentials.	Expected species largely absent	Most expected species absent with remnant population structure highly modified	Some expected species absent with moderate modification to population structure	Virtually all expected species present but population structure is modified	Virtually all expected species present and their population structure virtually unmodified
Biotic – Ecosystem functioning	Original ecosystem functions rare or absent	Most ecosystem functions varying well outside natural range	Some ecosystem functions varying outside natural range	Almost all ecosystem functions intact	All ecosystem functions virtually intact

Margin	Very Low	Low	Moderate	High	Very High
Structures and human modifications Includes, dams, groynes, stopbanks, diversions, gravel extractions, irrigation infrastructure, roads, bridges, transmission lines or boat ramps, 4WD tracks, recreational facilities-carparks, toilets,	Completely modified or artificial (i.e. by a dam, weir or flood defence structure such as extensive stopbanks or groynes)	Significant parts of the margins have been affected or encroached upon by human intervention (i.e. suburban/highly managed agricultural land, including: gravel workings, part channelisation). Roads or railway lines immediately adjacent to the banks requiring protection	Occasional 'reaches' with human modifications (i.e. a settled rural landscape with bridge/ aqueduct supports, pylon footings across river corridor). Occasional localised water takes and pump stations. Informal occasional 4 WD track or walking trails on banks. Boat ramps on lake edge	Limited human intervention (i.e. occasional bridge abutments/ power pole within the river channel)	Overwhelmingly natural with no/ very limited evidence of human interference
Terrestrial Ecology Vegetation – Indigenous/exotic vegetation, ecological value, quality habitat. Natural patterns and processes. Fauna - including birds, lizards, pest animals	Absence of vegetation due to human induced changes or limited presence (in pockets) of managed exotic vegetation. Natural patterns and processes absent	Sporadic vegetation or predominance of managed exotic vegetation such as plantations/woodlots, pest plant species with few of native species and limited pattern and process	Includes some indigenous species (i.e. indigenous understorey regeneration or seral assemblages) but exotic vegetation (i.e. willows/ gorse) predominates and contributes most to natural pattern and process	Indigenous vegetation present in a fragmented mosaic of native and exotic communities. Several successional stages with mature ecosystem components present. Resembling high levels of natural pattern and process	Overwhelmingly indigenous vegetation, of predominantly mature ecosystem elements, with no or few introduced species and resembling reference levels of natural pattern and process
Bird Habitat River and lake margins provide habitat for resident and migratory bird populations. Larger river margins and riverbeds potentially provide more habitat	Expected species virtually absent	Most/many expected species absent with remnant population structure highly modified	Some expected species absent with moderate modification to population structure	All expected species present with slight modification to population structure. Very likely to contain species and habitats of high conservation value.	Contains species and habitats of high conservation value

Context	Very Low	Low	Moderate	High	Very High
Land use - Extent of intensification or modification. Modification of landforms and physical features such as stopbanks, gravel extraction. Agricultural use intensification of land use, including urban areas. Recreational facilities (carparks, campgrounds toilets, mown grass, signage, cycleways and paths) Roads and State Highways. Include catchment modifications if ecologically linked to the waterway. Protected natural areas such as reserves, parks and estates managed by DOC may indicate a higher natural character.	Heavily modified landscape (urban) with limited vegetation	Large areas of Suburban/residential development, or large-scale areas of intensive agriculture forestry, orchards, vineyards; road, rail, transmission line infrastructure follows river corridor	Settled pastoral landscape with areas of commercial forestry and pockets of indigenous vegetation. Road, rail, transmission line infrastructure crosses river corridor	Fragmented indigenous and rural landscape; Extensive pastoral farming; Informal occasional 4 WD track or walking trails	Overwhelmingly indigenous landscape with no or very little human modification
Terrestrial Ecology Including vegetation, animals, habitat	Exotic and invasive biota dominate. Indigenous ecosystems functions heavily impaired or absent	Exotic and invasive biota very common. Few/small areas indigenous ecosystems. Limited levels of ecosystem functionality remain	Exotic and invasive biota regularly present, pockets of intact indigenous ecosystems. Some ecosystem functionality	Exotic biota may occur and invasive biota rare Almost all ecosystem functions intact. Very likely to contain species and habitats of high conservation value	Exotic biota may occur but virtually no invasive species. Most ecosystem functions are intact Contains species and habitats of high conservation value

Experiential	Very Low	Low	Moderate	High	Very High
Views, sounds and smells Sense of untamed and remoteness	No or rare sense of wildness or remoteness Dominant human	Limited sense of wildness and remoteness for long stretches Strong human influences for long stretches	Regular opportunities to experience wildness and remoteness Human obvious but not dominant influence	Predominantly wild and remote Limited human interference	Overwhelming sense of wildness and remoteness Rare human influence

4.0 EXISTING LEVEL OF NATURAL CHARACTER ASSESSMENTS

4.1. Summary - Existing Level of Natural Character

This section includes the assessments of the existing level of natural character of the broad scale reaches and the detailed assessment areas.

Table 5: Summary Tables – Existing Level of Natural Character

		Existing Level of Natural Character
Broad-scale Reaches	Manawatū Gorge	High
	Manawatū River below SH3 bridge	Moderate/Low
	Lower Pohangina River	Moderate/High
	Generic streams along the designation corridor	Moderate

		Existing Level of Natural Character
Detailed Sites	New Manawatū River Crossing	Moderate/High
	West stream (QEII stream crossing to wetland north of Manawatū River)	High
	Stream crossing- construction access to Saddle Road	High
	East QEII Stream Crossing	High
	Streams at eastern end of designation	Moderate

Those areas assessed as having High or Very High natural character were subsequently considered to determine whether they would qualify as having outstanding natural character (refer section 3.5).

The study team did not consider that any of the reaches or sites achieved the threshold of 'outstanding'. That is, "*Exhibit a combination of natural elements patterns and processes that are exceptional in their extent, intactness, integrity and lack of built structures and other modifications*"[7].

[7] Boffa Miskell derived definition.

While sections of a reach or some attributes of a reach may have been rated as high or very high, there was no contiguous area/waterbody which was sufficiently unmodified, intact and of a high enough quality to be considered to have an outstanding level of natural character.

BROAD SCALE REACH ASSESSMENTS

4.2. Manawatū Gorge (Figure 3, Appendix 4.B)

The 7 km long Manawatū Gorge runs east west through the Tararua Ranges and is unique in New Zealand for being the only river to flow through a hill range. The Manawatū River starts east of the axial ranges and has its outflow on the west.

The river and gorge lie within the Manawatū Gorge Scenic Reserve, identified in Schedule G of the Horizons One Plan as an Outstanding Natural Landscape:

> *"Manawatū Gorge, from Ballance Bridge to the confluence of the Pohangina and Manawatū Rivers, including the adjacent scenic reserve*
>
> *(i) Visual and scenic characteristics, particularly provided by its distinctive landscape*
>
> *(ii) Geological feature, provided by being the only river in New Zealand to drain both east and west of the main divide*
>
> *(iii) Ecological significance, provided by its regenerating indigenous vegetation and remnant indigenous shrubland*
>
> *(iv) Scientific value, particularly for its geology."*

The upper catchment beyond the gorge is large and consists of four sub-catchments (Upper Gorge, Upper Manawatū, Tiraumea and Mangatainoka). The catchment land use includes intensive production farmland on the floodplains and flatter land, and farmed hill country, undeveloped land, exotic and indigenous forest and conservation areas.

Table 6: Manawatū Gorge – Existing Level of Natural Character

River Component	Attribute groupings	River Natural Character Attributes	
Active bed	Abiotic	Bed morphology/modification The narrowness of the gorge generally confines the river to a single channel, with minor braiding occurring in places, especially during low flows.	High

River Component	Attribute groupings	River Natural Character Attributes	
		The river has cut a gorge through sandstone and mudstone, with some basalt and mudstone (late Triassic to early cretaceous) (GNS Science, 2018). The active channel remains natural and largely unmodified with man-made structures restricted to the Ballance Bridge piers.	
		Flow regime Some abstraction upstream. Seasonal floods and freshes; low flows still occur.	High
		Water Quality Water quality in the Manawatū River through the gorge is moderately degraded. Concentrations of key nitrogen (NO3-N) and phosphorus species (DRP) are substantially higher than natural background levels. The high nutrient concentrations and poor water clarity the Manawatū River means there is a risk of environmental impairment. It is important to note that periphyton monitoring data collected at the Upper Gorge monitoring site suggests that, despite being increased above natural state, nutrients are not causing periphyton growth at levels that would significantly affect the aesthetics of this section of the Manawatū River. Water clarity is sufficiently reduced compared to natural level that some impairment of aesthetic and possibly ecological values can be expected. Under normal conditions pathogen levels are only slightly elevated above natural state in the Manawatū River through the gorge. However, sporadic faecal contamination does occur, and this section of the river is unsuitable for swimming up to 30% of the time (based on the swimming maps on the MfE website). Ammoniacal-nitrogen (NH4-N) concentrations are at or near natural state. Typical stormwater contaminants, such as copper, zinc and hydrocarbons, likely to be only very slightly elevated compared with natural state, as there is little impervious surface cover in the upstream catchment, noting however the historic stormwater inputs from the Manawatū Gorge Road.	Moderate
	Biotic	Aquatic indigenous taxa assemblages – Macroinvertebrate indices (MCI & QMCI) from 2017 sampling data (provided by Horizons) for the upper gorge area are indicative of good water quality. However, it must be noted that macroinvertebrate sampling is designed for wadeable streams as opposed to rivers. Greater stonefly diversity and abundance would have been expected within the sample. Fish diversity from the FFDB records show an array of indigenous species present within the Manawatū and Pohangina Rivers and connecting waterways. There are no downstream barriers to fish migration and, from a conservative approach, it could be assumed there is a natural assemblage of indigenous species using the Manawatū River as habitat or as a corridor.	High
		Ecosystem Functioning The river bed within the Manawatū Gorge is unmodified and functions are likely to be similar to what was occurring historically. Modification on the surrounding banks (and	High

River Component	Attribute groupings	River Natural Character Attributes	
		Parihaki Island) includes changes in vegetation type and a slight increase in impervious surfaces (adjacent road and railway corridor). Although this area is outside the active bed, it has an effect on the functions within the Manawatū River. These changes may have had an impact on functions such as organic matter input, decontamination of pollutants and habitat for aquatic fauna.	
		No exotic aquatic macrophytes were observed although some species are likely to be present. FFDB records show perch have been recorded within the general area, while brown trout were also recorded during the fish survey within a gully system (and in FFDB records). A conservative approach assumes fish populations are dominated by indigenous species.	High
Margin	Abiotic	Morphology/modification The margins of the river comprise the steep vegetated banks up to and including the SH3 and rail formations. Margins consist of steep vegetated slopes with rocky outcrops and cliff faces. Modifications related to the road and railway extend the full length of the gorge on both sides and combine to constitute significant physical modification of the river margins including cut platforms, associated buildings, bridges, culverts, signals, signs, bank stabilisation and retaining structures.	Moderate
	Biotic	Terrestrial Ecology The margins of the Manawatū River Gorge assessment reach are subjected to frequent disturbance meaning those species present at the margin are adapted to a high frequency of disturbance. This characteristic, limits the ecological quality of the marginal zone. Due to the confined nature of the active bed in the gorge, terrestrial flora and fauna elements associated with braided river beds naturally largely do not exist. Exotic species are a feature of frequently disturbed areas thus detracting from the natural state of the margin.	Moderate
Context	Abiotic and Biotic	Terrestrial Ecology Including vegetation, animals, habitat The hillslopes landward of the river margin are predominantly covered in indigenous forest of differing statures, compositions, and stages of succession. Upper slopes (i.e., above the road, (true left) or railway line (true right)) feature areas of well-developed high value indigenous forest communities representing pre-human vegetation cover types. The terrestrial ecology values (species and habitats) present are of high conservation value and the area has DoC Scenic Reserve status. The forests and associated habitats contribute to ecological pattern and process at landscape scales The river's context comprises the steep slopes either side of the river beyond the margins. The steep slopes are dominated by dense indigenous forest cover, and generally remain physically unmodified due to the protection of the Manawatū Gorge Scenic Reserve status. Grazed farmland extends almost to the railway line on the north bank at the eastern end of the gorge. While there is little evidence of	Very high

River Component	Attribute groupings	River Natural Character Attributes	
		man-made modification erosion of the steep grassed slopes is common. On the south side of the gorge, numerous and slips (and measures taken to control them) have been caused by the undercutting for the SH3 platform.	
All (focus on active bed and margin)	Experiential	The dramatic nature and significant scale of the 7km gorge with its steep vegetated slopes and swift river have high experiential values, albeit the road and rail modifications detract from the feeling of remoteness and pristine natural environment	High
		Overall level of natural character	**High**

4.3. Manawatū River Reach below SH3 Bridge (Figure 3, Appendix 4.B)

This reach extends approximately 9km from the SH3 to Forest Hill Road. The river catchment combines the Pohangina River and upper Manawatū catchments. The reach flows through high production farmland and includes several gravel extraction operations which occupy the old floodplains and river terraces.

Table 7: Manawatū Gorge below SH 3 Bridge – Existing Level of Natural Character

River Component	Attribute groupings	Natural Character Attributes	Level of Natural Character
Active bed	Abiotic	Bed morphology/modification The reach flows through unconsolidated to poorly consolidated mud, sand, gravel and peat. The alignment of the active bed of the river has been constrained and straightened removing several meanders and side channels (since 1949) and general narrowing of the river bed. Although constrained, the characteristic braided river channel and gravel islands and banks are evident at low flows. Modifications and structures in the active bed include the SH3 bridge piers.	Low
		Flow regime Flow regime remains natural with no management of flows in the upstream catchments. (any water abstraction upstream not included). Flows change with seasonal floods, higher flows in the winter and low flows in the summer. High flows in the order of 1200 cumecs, low summer flow in order of 14 cumecs. Summer low flows can result in poorer water quality. LAWA – no data	High
		Water Quality	Moderate

River Component	Attribute groupings	Natural Character Attributes	Level of Natural Character
		Below the SH3 bridge, water quality in the Manawatū River is moderately degraded. Concentrations of key nitrogen species (NO3-N & NH4-N) are substantially higher than natural background levels, but the potential for this to cause environment impairment is offset by the relatively low phosphorus concentrations in this section of the Manawatū River. That nutrients levels are not causing environmental impairment in this section of the Manawatū River is supported by the low level of periphyton growth observed at the Horizons Regional Council monitoring site at Upper Gorge. Water clarity is sufficiently reduced compared to natural level that some impairment of aesthetic and possibly ecological values can be expected. Under normal conditions pathogen levels are only slightly elevated above natural state in the Manawatū River downstream of the SH3 bridge. However, sporadic faecal contamination does occur, and this section of the river is unsuitable for swimming up to 30% of the time (based on the swimming maps on the MfE website). Typical stormwater contaminants, such as copper, zinc and hydrocarbons, likely to be only very slightly elevated compared with natural state, as there is little impervious surface cover in the upstream catchment, noting however the historic stormwater inputs from the Manawatū Gorge Road.	
	Biotic	Aquatic indigenous taxa assemblages Macroinvertebrate indices (MCI & QMCI) from 2017 sampling data (provided by Horizons) for the Manawatū River (at Teacher's College) are indicative of good/excellent water quality. However, macroinvertebrate sampling is designed for wadeable streams as opposed to rivers. Greater stonefly diversity and abundance would have been expected within the sample. Fish diversity from the FFDB records show an array of indigenous species present within the Manawatū and Pohangina Rivers and connecting waterways. There are no downstream barriers to fish migration and, from a conservative approach, it could be assumed there is a natural assemblage of indigenous species using the lower Manawatū River as habitat or as a corridor.	High
		Ecosystem Functioning The river bed within the lower Manawatū River is unmodified and functions are likely to be similar to what was occurring historically. Modification on the surrounding banks includes changes in vegetation type (to a catchment dominated by agriculture). Although this area is outside the active bed, it has an effect on the functions within the Manawatū River. These changes may have had an impact on organic matter input, decontamination of pollutants and habitat for aquatic fauna. Water infiltration within the riparian margins is also likely to have been affected through a change in catchment land use with higher rates of infiltration.	High
		Exotic aquatic Flora and Fauna No exotic aquatic macrophytes were observed, although some species are likely to be present. FFDB records show perch have been recorded within the general area, while brown trout were also recorded during the fish survey within	High

River Component	Attribute groupings	Natural Character Attributes	Level of Natural Character
		a gully system (and in FFDB records). A conservative approach assumes fish populations are dominated by indigenous species	
Margin	Abiotic	Morphology/modification The margins are predominantly modified through river protection works, willow planting and stopbanks. Several gravel extraction operations are located adjacent to the river. Other structures in the margins include stormwater outfalls and oxidation ponds.	Low
	Biotic	Terrestrial Ecology The margins of the lower Manawatū River assessment reach are lined with narrow stands of exotic trees. Intervening areas are dominated with exotic pasture and weed species. The margins are generally grazed, or a mixture of rank grass and weedland. The exposed gravel beach and wetted margin habitats provide seasonal habitat for bird species of conservation concern and reliant on the gravel river beds for breeding (e.g., black-fronted and banded dotterel). Thus, the terrestrial values of the riverbed vary with season (highest September to February). The terrestrial portions of the river bed make an important contribution to the breeding migration patterns of river bed birds and thus pattern and process values are high. The disturbance regime is too high for the persistence of other significant terrestrial fauna (lizards) and terrestrial invertebrate communities.	Moderate
Context	Abiotic and Biotic	Terrestrial Ecology Including vegetation, animals, habitat The wider floodplain landward of the river margin is predominantly exotic pasture, with horticultural crops, exotic conifer stands, aggregate extraction; effluent treatment ponds are also present. Indigenous vegetation communities are restricted to a sparse indigenous treeland and small areas of shrub-hardwood species regenerating where disturbance regimes allow. Ecological patterns, processes, and functions are highly impaired High production pasture and horticulture are the dominant land uses of the old floodplains adjacent to the river, which was historically lowland forest. Some of the low-lying land is potentially subject to flooding beyond the stopbanks. The topographical patterning of old river channels, meanders and terraces are still evident in places, often defined by vegetation.	Low
All (focus on active bed and margin)	Experiential	The modified margin and context of the river, dominated by exotic pasture, gravel extraction operations and stopbanks significantly reduce the overall naturalness of the river. The straightened river channel and lack of riparian vegetation gives the reach canal-like appearance.	Low
		Overall level of natural character	**Moderate Low**

4.4. Lower Pohangina River Reach (Figure 3, Appendix 4.B)

This 3 km reach extends from the Saddle Road bridge to the SH3 bridge and includes the confluence with the Manawatū River. The true left bank of the river is contained by the natural banks at the toe of the hills. The land on the true right is farmland overlying old braid plains and river terraces. The Pohangina catchment is a 55,000ha sub catchment of the Manawatū River with predominant land uses of grazed farmland and exotic and indigenous forest.

Table 8: Lower Pohangina River – Existing Level of Natural Character

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
Active bed	Abiotic	Bed morphology/modification The active bed of the river has been constrained and straightened removing meanders as part of physical training of the river upstream of the rail and SH3 bridges (based on historic maps) Within the constrained bed the river retains braided characteristics with meandering channels, exposed sand/gravel islands and margins. Frequent flood events shift the river channels across the bed and at the confluence of the two rivers. It appears that frequent high flows and floods run bank to bank as there is little vegetation established within the braid plain. Structures in the active bed include the bridge piers of the two road and rail bridges and groynes upstream of the SH3 bridge.	High
		Flow regime Flow regime remains natural with no management of flows in the upstream catchments. Flows change with seasonal floods with higher flows in the winter and low flows in the summer. High flows in the order of 339 cumecs, low summer flow in order of 2.8 cumecs. LAWA – no data	High
		Water Quality Water quality in this section of the Pohangina River is generally degraded. Concentrations of key nitrogen (NO3-N & NH4-N) and phosphorus species (DRP) are substantially higher than natural background levels, and water clarity is significantly reduced. The high nutrient concentrations and poor water clarity the Pohangina River means there is a risk of environmental impairment. It is important to note that periphyton monitoring data collected at the Mais Reach monitoring site suggests that, despite being increased above natural state, nutrients are not causing periphyton growth at levels that would affect the aesthetic values of this section of the Pohangina River. While pathogen levels are elevated above natural state, this section of the Pohangina river is generally	Moderate

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
		suitable for swimming (based on the swimming maps on the MfE website). Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at or near natural state, as there is very little impervious surface cover in this catchment	
	Biotic	Aquatic indigenous taxa assemblages – Macroinvertebrate indices (MCI & QMCI) from 2017 sampling data (provided by Horizons) for the Pohangina River (at Mais Reach) are indicative of excellent water quality. However, it must be noted that macroinvertebrate sampling is designed for wadeable streams as opposed to rivers. Fish diversity from the FFDB records show an array of indigenous species present within the Manawatū and Pohangina Rivers and connecting waterways. There are no downstream barriers to fish migration and, from a conservative approach, it could be assumed there is a natural assemblage of indigenous species using the Pohangina River as habitat or as a corridor.	Very High
		Ecosystem Functioning The river bed within the Pohangina River is unmodified and functions are likely to be similar to what was occurring historically. Modification on the surrounding banks includes changes in vegetation type (to a catchment dominated by agriculture). Although this area is outside the active bed, it has an effect on the functions within the Manawatū River. These changes may have had an impact on functions such as organic matter input, decontamination of pollutants and habitat for aquatic fauna. Water infiltration within the riparian margins is also likely to have been affected through a change in catchment land use with higher rates of infiltration.	High
		No exotic aquatic macrophytes were observed although some species are likely to be present. FFDB records show perch have been recorded within the general area, while brown trout were also recorded during the fish survey within a gully system (and in FFDB records). A conservative approach assumes fish populations are dominated by indigenous species.	High

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
Margin	Abiotic	Morphology/modification The margins of this river reach include Parahaki Island and other areas outside the active river bed (such as the island near the Ashhurst Domain). The river margins on the true left of the river are largely unmodified except for protection works and structure of the two bridge approaches. The true right margin has been modified to contain the river (based on historic maps). Parahaki Island it is flat low-lying river island with the main stem of the Manawatū River flowing around the north side and a secondary channel along the south. The shape and form of the island clearly expresses its the formative processes of a water formed landform. Vegetation on the island is dominated by exotic species (rank grass, pampas, willow, tree Lucerne).	Moderate
	Biotic	Terrestrial Ecology Exotic tree stands, and grassland predominate. Areas of mature kānuka and podocarp-broadleaved forest remnants occur and are in differing levels of modification resulting from land use impacts. The canopy composition of these indigenous forest areas is representative of pre-human land cover. Exotic and indigenous habitats exist for indigenous fauna. The most valuable habitat for fauna is the indigenous forest remnant at Ashhurst Domain. Natural pattern and process is moderate–high. Exotic habitats (riparian willows) also provide some habitat for species such as wetland and river birds. Due to habitat modifications some expected bird species are missing and the population structure is moderately modified. Indigenous river bed birds (e.g., dotterel) are likely to use the dry gravel substrates for seasonal nesting and feeding. The disturbance regime of the active bed means that populations of reptiles are unable to establish nor are terrestrial indigenous flora (e.g., cushion plants). Most expected species are absent. Remnant populations are low to absent	Moderate
Context	Abiotic and Biotic	The land use is dominated by grazed pasture farming on the hill country and the old river flood plains. The township of Ashhurst is located above a high river terrace which extends along the whole reach including the Ashhurst Domain. Ashhurst Domain is a popular destination for picnics, camping and walking. A significant lowland forest remnant (with totara, titoki, matai, kahikatea, maire) occupies the upper river terrace and the lower flood plain. The hill country on the true left bank supports areas of regenerating indigenous vegetation such as mānuka and kānuka. Terrestrial Ecology Including vegetation, animals, habitat	Moderate

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
		The indigenous forest ecosystems occurring in the river margins (kānuka forest, podocarp-broadleaved forest patches) extend landward and form part of the wider context. On the true right floodplain and terrace riser below Ashhurst, are areas of remnant treeland (kahikatea) and remnant forest with secondary regeneration. These areas are small but represent pre-human forest cover. The Ashhurst Domain has high habitat and potentially also fauna values. Other indigenous forest areas are degraded, and their habitat values and fauna values are diminished. Intervening areas are pastoral and urban with a predominant exotic vegetation and habitat status. These areas provide few habitat opportunities and their potential fauna values are limited.	
All (focus on active bed and margin)	Experiential	The Pohangina River reach retains a relatively high level of naturalness with the dynamic river processes highly evident on the island and gravel beds. The dense vegetation in the bed and the margins contribute to a remote and while experience from within the river bed.	Moderate High
		Overall level of natural character	**Moderate/High**

4.5. Generic Streams and Wetlands along the Designation (Figure 3, Appendix 4.B)

The route traverses the hill country north of the Manawatū Gorge and is primarily used for grazed pasture farming and the Te Āpiti Wind Farm. The route climbs steeply at its east and west extents and crosses flatter topography along the crest of the range. The hill country is characterised by numerous deeply incised gully and stream systems which drain localised catchments and run north to south eventually discharging to the Manawatū River. The east-west orientated corridor cuts across the drainage pattern of the hills and consequently intercepts many gullies, streams, and wetlands.

The waterbodies along the route include perennial, permanent and ephemeral streams, wetlands and constructed stock water ponds, most of which are accessible by stock. Most of the gullies support pasture and open scrub while some of the very steep sided gullies are densely covered in indigenous vegetation. There are five QEII open space covenants in the vicinity of the corridor, comprising densely vegetated gullies and slopes. The covenants are fenced.

The assessment below considers the generic condition of the collective waterbodies along the road corridor.

Table 9: Generic Streams – Existing Level of Natural Character

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
Active bed	Abiotic	Bed morphology/modification Stream base substrates vary depending on the location and stream gradient and include, rock, gravels, and muddy sediments. Structures such as culverts, stock water pond dams, fences and vehicle crossings modify the active bed at localised points. The stream beds in densely vegetated gullies are less modified or disturbed by stock than those in open pasture which suffer damage from cattle grazing. Pugging by grazing cattle has significantly modified wetland areas.	Moderate/High
		The flow regime remains natural with minor use for stock water and farm supply. The stream catchments are relatively small being limited to the surrounding hill country. Flows increase following rain events.	High
		Water quality in the smaller streams along the route is only moderately degraded. Concentrations of key nitrogen (NO3-N & NH4-N) and phosphorus species (DRP) are substantially higher than natural background levels in most streams which may be causing environmental impairment. However, water clarity and pathogen levels are generally at or near natural state. Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at or near natural state, as there is very little impervious surface cover in this area	Moderate
	Biotic	Aquatic Indigenous Taxa assemblages Macroinvertebrate samples collected from streams and gullies across the alignment were variable and reflective of land use within the catchment. Samples from streams within mostly forested catchments and fenced off from stock were generally reflective of macroinvertebrate communities, indicative of excellent water quality and diverse sensitive species. While some samples were affected by agricultural land use and lack of riparian margin, with abundant tolerant species and poor macroinvertebrate indices. Most streams assessed as part of the fish survey resulted in only one or two indigenous species present, despite there being a reasonable diversity within the Manawatū and Pohangina Rivers. It was noted at one site there was a perched culvert creating a partial fish barrier and likely reducing indigenous diversity. This is likely to be common, particularly within the gorge, where perched culverts are present beneath the railway line (and potentially SH3).	Moderate
		Ecosystem Functioning SEV values (excl. biotic function) varied across the assessed stream reaches and were often less than the reference sites (data provided by Horizons) which are >0.9. Functions of note which are reduced, include flood plain effectiveness, water temperature control, organic matter input, decontamination of pollutants, fish spawning habitat and habitat for aquatic fauna.	Moderate

		Many of these parameters stem from a lack (or reduced quality) of riparian margins.	
		Exotic aquatic Flora and Fauna There are numerous stream networks that feed into the Manawatū and Pohangina Rivers. The presence (and extent) of exotic aquatic macrophytes is variable depending on a range of factors within the catchment with some sites dominated by exotic species and other sites with no exotic species present. The fish survey across the sampled streams and gullies showed most waterways were dominated by indigenous species, although exotic species were found at one site.	Moderate
Margin	Abiotic	Some of the grazed steeper gully slopes are erosion prone with slips evident. Grazed areas generally lack riparian margins The steepest stream margins remain less modified by stock grazing due to difficulty of access, and these are generally more densely vegetated.	Moderate
	Biotic	The terrestrial ecology qualities vary among the streams in the generic grouping.	Moderate
Context	Abiotic and Biotic	Grazed farmland dominates the land use of the hill country, along with wind turbines and the associated access tracks.	Moderate
All (focus on active bed and margin)	Experiential	Rural working landscape dissected by the steep stream gullies, some of which support indigenous vegetation. The experience of naturalness varies greatly form high in the deep and densely vegetated gullies to highly modified in the upper parts of the stream gullies dominated by modified pasture.	Moderate /High
		Overall level of natural character	**Moderate**

DETAILED ASSESSMENT AREAS- Existing Natural Character

4.6. New Manawatū Bridge Crossing (Chainage 3600-4000)

Description of site: The margin on south bank of the river is dominated by the existing carpark and SH3 road environment. The north bank is less modified, but the railway embankment and line are a dominant feature in the river margin. The proposed bridge location is at the hinge point of the river where the gorge ends, and the river enters the wider bed, which include Parahaki Island and the confluence with the Pohangina River (**Figure 4, Appendix 4.B**).

Table 10: New Manawatū Bridge Crossing – Existing Level of Natural Character

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
Active bed	Abiotic	Morphology/modification The proposed bridge site is at the lower end of the gorge immediately upstream of Parahaki Island and the confluence with the Pohangina River. The rocky gorge gives way to wider gravel bed. Flood flows continuously shape the gravel bed and island margins. There are no structures in the bed.	High
		Flow regime Flow regime of the river is not managed and generally remains natural with seasonal floods, higher flows in the winter and low flows in the summer. Natural flow volumes have been assumed to be modified by water abstraction upstream.	High
		Water quality in this section of the Manawatū River is moderately degraded. Concentrations of key nitrogen (NO3-N & NH4-N) and phosphorus species (DRP) are substantially higher than natural background levels which may be causing environmental impairment. Water clarity is also moderately degraded from natural state. It is important to note that periphyton monitoring data collected at the Upper Gorge monitoring site suggests that, despite being increased above natural state, nutrients are not causing periphyton growth at levels that would affect the aesthetics of this section of the Manawatū River. Under normal conditions, pathogen concentrations are only slightly elevated above natural background levels. However, sporadic faecal contamination does occur, and this section of the river is unsuitable for swimming up to 30% of the time (based on the swimming maps on the MfE website). Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be increased above natural levels due to run-off from SH3.	Moderate
	Biotic	Indigenous taxa assemblages	High

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
		Macroinvertebrate indices (MCI & QMCI) from 2017 sampling data (provided by Horizons) for the upper gorge area (values are likely to be similar for the identified proposed bridge crossing site) are slightly less compared to reference sites (data provided by Horizons). However, macroinvertebrate sampling is designed for wadeable streams as opposed to rivers. Greater stonefly diversity and abundance would have been expected within the sample. Fish diversity from the FFDB records show an array of indigenous species present within the Manawatū River and connecting waterways (near the proposed crossing). There are no downstream barriers to fish migration and, from a conservative approach, it could be assumed there is a natural assemblage of indigenous species using the Manawatū River as habitat or as a corridor.	
		Ecosystem Functioning A SEV assessment is inappropriate for a large river system, instead functions have been assessed qualitatively. The river bed, at the location of the proposed bridge crossing is unmodified and functions are likely to be similar to what was occurring historically. Modification on the surrounding banks (and Parahaki Island within the river) includes changes in vegetation type and a slight increase in impervious surfaces (adjacent road and railway corridor). Although this area is outside the active bed, it has an effect on the functions within the Manawatū River. These changes may have had an impact on functions such as organic matter input, decontamination of pollutants and habitat for aquatic fauna.	High
		Exotic aquatic Flora and Fauna No exotic aquatic macrophytes were observed although some species are likely to be present. FFDB records show perch have been recorded within the general area, while brown trout were also recorded during the fish survey within a gully system (and in FFDB records). A conservative approach assumes fish populations are dominated by indigenous species.	High
Margin	Abiotic	The river margin is quite modified and includes the railway line, SH3 and the Manawatū Gorge carpark. The railway is located on a fill embankment with a large box culvert through which a stream discharges. Parahaki Island is also part of the river margin and remains physically unmodified (human induced) with gravel beaches on its upstream shore. Flood flows frequently inundate the upstream parts of the island.	Moderate
	Biotic	Terrestrial Ecology The margins of the Manawatū River crossing reach are subjected to frequent disturbance resulting in those species present at the margin are adapted to a high frequency of disturbance. There is some secondary broadleaved regeneration on higher bank elevations. Forest communities present on banks do not represent pre-human forest cover.	Moderate

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
		Willow and other exotic tree species are common on the margins of the river and Parahaki Island. The exposed gravel beach and wetted margin habitats provide seasonal habitat for bird species of conservation concern and reliant on the gravel river beds for breeding (e.g., black-fronted and banded dotterel). Thus, the terrestrial values of the riverbed vary with season (highest September to February). The terrestrial portions of the river bed make an important contribution to the breeding migration patterns of river bed birds and thus pattern and process values are high. The disturbance regime is too high for the persistence of other significant terrestrial fauna (lizards) and terrestrial invertebrate communities High (seasonal).	
Context	Abiotic and Biotic	Parahaki Island is a dominant river landform that clearly exhibits the river's formative processes. The island is physically unmodified by human activity but is dominated by exotic trees and vegetation including rank grass, pampas, willow, tree lucerne. The hillslopes landward of the river margin are predominantly covered in exotic pasture (true left) and remnant areas of indigenous forest with intervening exotic pasture grass (true right). The true right assessment area contains old-growth forest and a raupō seepage (wetland), both of which are habitats representing pre-human conditions. A small stand of threatened swamp maire is present. The ecological condition of the forests and wetland are impacted by past and current stock access. Due to the proximity to the extensive forests of the Manawatū Gorge Scenic Reserve, the contribution of the indigenous ecosystems in this area to pattern and process is heightened. The true left area makes little contribution in terms of ecological features and function.	Moderate High
All (focus on active bed and margin)	Experiential	The gorge with its steep vegetated slopes and swift flowing river have high experiential values, albeit the road and rail modifications detract from the feeling of remoteness and pristine natural environment. From the river bed the sounds and smells of the river are evident.	Moderate High
		Overall level of natural Character	**Moderate High**

4.7. QE II West Stream - including QEII open space covenant and wetland at the northern approach to new bridge (Chainage 4000-6000)

Description of site: The upper part of the stream lies within a QEII open space covenant and consists of a very deep ravine which features high ecological value old-growth forest (mature tawa forest) with areas of younger, diverse broadleaved forests and scrub. From there, the stream descends through steep hill country which is well vegetated with regenerating broadleaf treelands and pasture grazed by cattle. At the lower end of the catchment, the gradient flattens, and wetlands are perched above the Manawatū River. The raupō wetland is fed by groundwater seeping from the toe of the hill slopes to the east (**Figures 4 and 5, Appendix 4.B)**

Table 5: QEII west stream – Existing Level of Natural Character

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
Active bed	Abiotic	Morphology/modification Upper part of the stream is deeply incised through rocky substrate, including ravines and bluffs and is unmodified and has a very high level of natural character. The middle and lower section of the stream flows through steep hill country and is more modified. Stock have access to the middle and lower parts of the stream and wetlands, where there is some disturbance of the steam/wetland bed by cattle. There are no structures in the stream.	High
		Flow regime The flow regime remains natural with minor use for stock water and farm supply. The stream catchments are relatively small being limited to the surrounding hill country. Flows increase following rain events.	High
		Overall, water quality in this stream is expected to be good. While phosphorus (DRP) concentrations are substantially higher than natural background levels, the risk of this causing environment impairment is low as concentrations of key nitrogen species (NO3-N & NH4-N) are near natural state. Water clarity and pathogen levels are also in near pristine condition. Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at natural state, as there is no impervious surface cover in this catchment.	High
	Biotic	Indigenous taxa assemblages Macroinvertebrate indices (MCI & QMCI) are similar to reference sites (data provided by HRC). Limited diversity of stoneflies and caddisflies recorded within sample compared to reference data. Fish diversity (from survey) included two species (incl. 1 at risk). Other species which could have thought to have been present (based on FFDB records and habitat conditions) include upland bully, common bully, redfin bully and torrent fish. A culvert (railway	Moderate

		crossing) near the confluence of the Manawatū River likely provides a partial barrier to fish passage (in two locations) and has likely affected fish diversity within the stream.	
		Ecosystem Functioning Two SEV assessments were conducted on this waterway reach (upstream and downstream) with approximate values (excl. biotic function) of 0.83 and 0.79 (out of 1), respectively. This is less than reference sites (data provided by Horizons) which are >0.9. Functions of note which are reduced include flood plain effectiveness and fish spawning habitat.	High
		Exotic aquatic Flora and Fauna No exotic aquatic macrophytes observed within assessed stream reach. No exotic fish recorded from survey.	Very High
Margin	Abiotic	The steep and near vertical margins of the upper part if the stream are unmodified and densely vegetated and are unmodified by structures. Some of the grazed steeper gully slopes are erosion prone with slips evident. The steepest stream margins remain less modified by stock grazing due to difficulty of access, and these are generally more densely vegetated.	High
	Biotic	Terrestrial Ecology – The margins of the crossings feature a range of successional stages and vary between the lower (chainage 4400) and upper (chainage 5600) extents. The stream margin in the lower extent is grazed and features both old growth swamp forest and secondary broadleaved forest. The stream margin in the upper reach is set within a deep ravine and is unvegetated due to heavy shading. This, however, represents the natural state thus the conditions present are high in terms of natural character.	High
Context	Abiotic and Biotic	The stream catchment is typical of the area where the steep side gullies are well vegetated with trees and shrubs and the hill tops and flatter areas with improved pastures. The wider context is modified by farming infrastructure (fences, access tracks, and stock water structures. Terrestrial Ecology Including vegetation, animals, habitat The terrestrial vegetation in the lower extent features a mosaic of age classes of indigenous forest and scrub. Old-growth forests are present. The ecological condition is impaired due to past and current stock access. The area provides important bird habitats and potential habitat for long-tailed bat. Collectively, the vegetation and habitats in the lower extent of Area 2 makes an important contribution to pattern and process. The upper extent features old-growth forest (mature tawa forest) with areas of younger, diverse broadleaved forests and scrub. The old-growth forests represent pre-human vegetation cover and not grazed. The forest is legally protected, presents good quality habitat for terrestrial invertebrates and connects with the Manawatū Gorge Scenic Reserve. Further landward are pastoral environments comprising exotic	Moderate High

		grass species which would present some edge influence on the remnant and regenerating forests.	
All (focus on active bed and margin)	Experiential	From within the gully system the stream catchment has a high level of naturalness and remoteness due mainly to the enclosed nature of the steep topography and dense vegetation and lack of obvious modification.	High
		Overall level of natural Character	**High**

4.8. East Stream Crossing QEII Open Space Covenant (Chainage 6100-6300)

Description of site: The head of the stream catchment over in the Project comprises three small, steep head gullies which coalesce into a single stream below the route alignment. The gullies lie within a recently registered QEII open space covenant and is fenced to exclude stock (**Figure 6, Appendix 4.B**)

The outer extent of the margin is at the QEII boundary (extent of treeline).

Table 6: QEII East Stream – Existing Level of Natural Character

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
Active bed	Abiotic	Morphology/modification The stream beds are unmodified by structures and their steep and vegetated nature will have restricted access by stock.	High
		Flow regime The flow regime at the head of the catchment, remains natural with minor use for stock water and farm supply. The stream catchments are relatively small being limited to the surrounding hill country. Flows increase following rain events.	High
		Overall, water quality in this stream is expected to be good. While phosphorus (DRP) concentrations are substantially higher than natural background levels, the risk of this causing environment impairment is low as nitrogen (NO3-N) concentrations are near natural state. Water clarity and pathogen levels are also in near pristine condition. Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at or near natural state, as there is no impervious surface cover in this catchment.	High
	Biotic	Indigenous taxa assemblages Macroinvertebrate indices (MCI & QMCI) are similar to reference sites (data provided by Horizons). Although limited diversity of stoneflies recorded within sample compared to reference data. Fish diversity (from two surveys) showed no fish	High

		species present. Fish passage may be affected by natural or artificial barriers. Conservative approach assumes a natural barrier due to steep topography which means no fish would likely be present.	
		Ecosystem Functioning SEV value (excl. biotic function) is approximately 0.93 (out of 1) although it must be noted that the SEV assessment was conducted downstream within the Manawatū Gorge Scenic Reserve and values are likely to be improved, relative to the upstream reach. SEV value is more likely to be reflective of value obtained for the western most QEII covenant (0.83) as the upstream reach is more incised, similar to the western most QEII covenant. This is less than reference sites (data provided by Horizons) which are >0.9. Functions of note which are reduced include flood plain effectiveness and fish spawning habitat.	High
		Exotic aquatic Flora and Fauna No exotic aquatic macrophytes observed within assessed stream reach. No exotic fish recorded from survey.	Very High
Margin	Abiotic	The steep margins of this upper part of the stream catchment are unmodified by structures or earthworks. Livestock are excluded by the perimeter fencing.	High
	Biotic	The area is generally free of exotic weed species. Terrestrial Ecology – The margin of the Area 3 crossing (chainage 6100–6300) is retired from stock grazing and is regenerating in secondary indigenous forest. Vegetation cover varies from exotic pasture grass to mature shrub-hardwood cover. The margin forms part of a legally protected area	High
Context	Abiotic and Biotic	The area landward of the margin is secondary broadleaved forest with mānuka/kānuka regeneration grading upslope into rank exotic grass Further beyond is grazed exotic pasture. The area connects with the Manawatū Gorge Scenic Reserve and provides a forest habitat corridor extending to the north, thus making an important contribution to pattern and process. Although several successional stages are present, the canopy species present do not represent pre-human forest compositions. The surrounding pastoral land use would contribute a degree of edge effect on the regenerating forest. Fences and access tracks and improved pastures reduce the natural character of the area	Moderate High
All (focus on active bed and margin)	Experiential	From within the gully system, the head of the stream catchment has a high level of naturalness and remoteness due mainly to the enclosure by steep topography and dense vegetation, together with lack of obvious modification.	High
		Overall level of natural Character	**High**

4.9. Stream Crossing - Construction access to Saddle Road at western end (Chainage 12800-13000)

Description of site: Stream catchment is approximately 3km long, extending from the farmed hill country to the Pohangina River. The stream is deeply incised with steep and very steep margins. The margins and upper catchment are well vegetated with predominantly indigenous vegetation and some exotic weeds. Small groups of mature pine trees are located in the upper parts of the catchment. The proposed crossing point is at the existing farm track ford just upstream of the confluence with the Pohangina River (**Figure 6, Appendix 4.B**).

Table 7: Saddle Road Access Crossing – Existing Level of Natural Character

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
Active bed	Abiotic	Morphology/modification Physical modification of the stream bed is limited to the locations which can be accessed by stock. The steep vegetated margins restrict stock access along many parts of the stream.	High
		Flow regime The flow regime within the catchment, remains relatively natural with minor use for stock water and farm supply. The stream catchments are relatively small being limited to the surrounding hill country. Flows increase following rain events	High
		Overall, water quality in this stream is expected to be very good. While phosphorus (DRP) concentrations are moderately elevated above natural background levels, the risk of this causing environment impairment is low as concentrations of key nitrogen species (NO3-N & NH4-N) are at or near natural state. Water clarity and pathogen levels are also in near pristine condition. Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at or near natural state, as there is very little impervious surface cover in this catchment	Very High
	Biotic	Indigenous taxa assemblages Macroinvertebrate assemblages and associated indices are likely to reflect reference conditions (or close to) in the upper catchment as there appears to be a high level of contiguous riparian cover and likely to be limited (if any) human modification or other factors affecting water quality. There is evidence of grazing to the stream edge and erosion in places. These factors are likely to alter the macroinvertebrate assemblage with the loss of sensitive taxa (or reduction in density) and an increase in species tolerant of poorer water and habitat quality. That said there is also a substantial tall native riparian litter and woody debris source. Fish diversity (from survey) includes two native species. Other species which could have thought to	High

		have been present (based on FFDB records and habitat conditions) include upland bully, redfin bully, torrent fish and longfin eel.	
		Ecosystem Functioning Ecosystem function is likely to be similar to the Western most QEII covenant (steep sided gully with contiguous riparian cover in upper reaches). Riparian cover is less contiguous downstream and there appears to be stock access to some sections, particularly the downstream section which is used as a stock crossing. Function is likely to be reduced for some components including floodplain effectiveness and fish spawning habitat as well as functions affected by reduced riparian cover.	High
		Exotic aquatic Flora and Fauna A conservative approach assumes no exotic macrophytes are present within the stream. Fish survey showed brown trout were present at similar levels as native fish within the stream	High Moderate
Margin	Abiotic	The steep margins of the stream catchment are generally unmodified by structures or earthworks, except for works to form the existing ford.	High
	Biotic	The area is generally free of exotic weed species. Terrestrial Ecology – Both native and exotic vegetation occurring in a mosaic, several successional stages with mature ecosystem components present	High
Context	Abiotic and Biotic	Beyond the stream margins the land is used for the wind farm and grazed exotic pasture, with relatively bare hill tops and ridges, and vegetated gullies. Fences, access tracks, turbines and improved pastures reduce the natural character of the wider area Prevalence of indigenous vegetation increases on the lower slopes where they descend to the Pohangina River, consisting of semi-mature kanuka, and small clusters of remnant forest.	Moderate High
All (focus on active bed and margin)	Experiential	From within the gully system, the stream catchment has a high level of naturalness and remoteness due mainly to the enclosure by steep topography and dense vegetation, together with lack of obvious modification.	High
		Overall level of natural Character	**High**

4.10. Stream Crossing at Eastern End (Chainage 12800-13000)

Description of site: The proposed crossing is situated in a modified rural environment on the flat land at the toe of the hill slopes. The area is dominated by improved pasture, shelter planting and farm infrastructure (**Figure 4, Appendix 4.B**).

Table 8: Stream Crossing Eastern End – Existing Level of Natural Character

River Component	Attribute groupings	Natural Character Attributes	Level of natural Character
Active bed	Abiotic	The stream bed appears to have been straightened and channelised through the flat productive farmland. The stream bed is tightly contained by the banks on either side and is comprised of rocks and gravels. (moderate) The stream tributaries in the hills are less modified than in the lowlands with some modification by stock grazing and culverts (high)	Moderate
		The stream is fed from a local catchment in the steep hill country. As such, the flow would be expected to be reasonably unmodified with higher flows in winter and following rain events. It is assumed that some abstraction occurs for farm operations given the stream's size and reliability.	Moderate High
		Water quality in the two streams in this area is expected to be moderately degraded. Concentrations of key nitrogen (NO3-N & NH4-N) and phosphorus species (DRP) are substantially higher than natural background levels which may be causing environmental impairment. However, pathogen levels are generally at or near natural state, and only the northern stream has (slightly) degraded water clarity. Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at or near natural state, as there is very little impervious surface cover in this catchment	Moderate
	Biotic	Indigenous taxa assemblages – Macroinvertebrate indices (MCI & QMCI) are less than reference sites (data provided by HRC). Limited diversity of stoneflies and mayflies (species present are generally more tolerant). Fish diversity (from survey) includes four indigenous species (incl. 2 at risk). Other species which could have thought to have been present (based on FFDB records and habitat conditions) include upland bully and torrent fish.	Moderate
		Ecosystem Functioning SEV value (excl. biotic function) is approximately 0.55 (out of 1). This is far less than reference sites (data provided by HRC) which are >0.9. Functions of note which are reduced include flood plain effectiveness, water temperature control, organic matter input, decontamination of pollutants, fish spawning habitat and habitat for aquatic fauna.	Moderate
		Exotic aquatic Flora and Fauna No exotic aquatic macrophytes observed within assessed stream reach. No exotic fish recorded from survey.	High
Margin	Abiotic	The stream margins on the lowland section consist of steeply cut banks which appear to be man-made. The hill country stream margins remain reasonably unmodified except for stock tracking.	Moderate
	Biotic	Terrestrial Ecology –	Moderate

		The margin of the Area 4 crossing (chainage12100–12700) are a mix of gorse/wild broom and regenerating secondary indigenous forest. The vegetation and habitats are relatively young and have resulted from recent human disturbance (i.e. scrub cutting). A plantation of exotic conifers form part of the margin around chainage 12500–12700. Between chainage12700–13000 the margin is high-producing exotic pasture grassland, with no vegetated margins.	
Context	Abiotic and Biotic	Between chainage12100–12700 the area landward of the margin is a cover of exotic weeds (gorse and wild broom) along with secondary broadleaved forest having recently regenerated from gorse and wild broom following scrub cutting. The area of indigenous vegetation cover is relatively large and would serve a role in stabilising the underlying hillside. The indigenous cover is at the eastern extent of a network of indigenous habitat patches loosely connecting to the Manawatū Gorge Scenic Reserve. Although several successional stages are present (exotic weeds and secondary broadleaved forest), the canopy species present do not represent pre-human forest compositions. The surrounding pastoral land use would contribute a degree of edge effect on the regenerating forest. Between chainage12700–13000 the context is high-producing exotic pasture grassland.	Moderate Low
All (focus on active bed and margin)	Experiential	The lowland section of stream has a low level of naturalness, it lacks meanders and riparian margin vegetation. The flowing water in the channel retains the movement and sounds of a stream albeit in a channelised bed.	Moderate
		Overall level of natural character	**Moderate**

5.0 EFFECTS ASSESSMENT

The assessment of natural character effects has been undertaken for the major stream crossings (i.e. detailed sites). The effects assessment (undertaken at a workshop by the contributing experts on 13 August 2018) has considered various design options that were discussed at the previous Project design option and mitigation workshops.

The assessments have considered the long-term effects of the Project. It is assumed that best practice stormwater management and erosion and sediment control measures will be implemented during construction to avoid or minimise short term adverse effects.

While mitigation measures have been suggested for each site, the assessment of change to the level of natural character has not included any mitigation.

5.1. West Stream - from QEII West Crossing to Raupō wetland (chainage 4000-6000)

Design Assumptions

Embankment- East Alignment (CH4000-4400):

(a) indicative footprint shown plus 17m-20m construction zone;

(b) 200m of stream under the embankment requiring either diversion or culverts;

(c) 200m stream diversion (assumed trapezoid armoured channel at base of embankment), potential ground improvements; and

(d) loss of raupō wetland and swamp maire, some old growth forest and all vegetation under footprint.

Embankment- West Alignment (CH4000-4400):

(a) footprint shown plus 17m-20m construction zone, plus ground improvements;

(b) 500m + 200m of stream affected under footprint to be diverted/culverted (assumed trapezoid armoured channel); and

(c) loss of some raupō wetland, changed hydrology due to ground improvements, loss of most of the old growth forest.

Viaduct-(CH4000-4400)

(a) long span steel, 3 piers at 90m centres;

(b) construction/crane access 29m wide access for length of viaduct (+) and 10m wide access to each pier- localised disturbance at each pier; and

(c) stream remains intact in long-term with armour protection for piers, no culvert long term, bridge spans raupō wetland, potential to retain swamp maire with pruning/modification.

QEII West crossing:

(a) alignment cut down into gully margins, artificially retained (MSE or similar);

(b) secondary broadleaf vegetation lost under bridge and culvert footprint;

(c) bridge or culvert at main gully and 60m-80m long culvert in eastern gully; and

(d) footprint will occupy large portion of upper catchment.

Possible mitigation in stream catchment: retire whole stream gully from grazing and protect as QEII covenant or amalgamate with Manawatū Gorge Scenic Reserve.

There are limitations to quantum of mitigation within this catchment to offset effects given its relatively small size. The gully is already well vegetated, the permanent footprints are relatively large in terms of the scale of the gully size and therefore this reduces the length of stream that can be enhanced. However, removal of stock would result in a relatively fast regeneration given the excellent local seed source of indigenous species.

Opportunity to extend the QEII covenant above the road to improve the values of the headwaters and upper catchment would have significant benefits to water quality.

Table 9: QEII West Stream – Change to Natural Character

West Stream (chainage 4000-6000) Stream from QEII West Crossing to Raupō Wetland, old growth forest							
Current state			**Future state at site/reach scale**			**Future state at stream catchment scale**	
River Component	**Existing** (whole catchment)		Site Embankment	Site Viaduct	Site QEII crossing (culvert & bridge)	**Whole Stream** embankment and QEII west crossing	**Whole Stream** viaduct and QEII west crossing
Active bed	Morphology/modification	H	L	MH	M	M	MH
	Flow regime	H	M	H	MH	H	H
	Water quality	H	M	M	M	M	M
	Aquatic (indigenous taxa assemblages)	M	L	M	M	ML	M
	Ecosystem functioning	H	L	H	M	M	MH
	Exotic aquatic flora and fauna (absence)	VH	M	VH	VH	H	VH
Margin	Morphology/physical modification	H	VL	H	M	ML	MH
	Terrestrial ecology	H	VL	M	M	L	M
Context	Land use /modification	MH	M	M	M	M	M
All	Experiential	H	M	M	M	MH	MH
OVERALL LEVEL OF NATURAL CHARACTER *** Significantly Reduced**		**H**	**ML***	**MH**	**M***	**M***	**MH**

5.2. Stream Crossing Construction Access from Saddle Road

Design Assumptions

Either a single span bridge or box culverts will be required to cross the stream.

Table 10: Saddle Road Stream Crossing – Change to Natural Character

Stream Crossing- Construction Access to Saddle Road				
River Component		**Existing Whole Stream**	**Future Culvert at crossing**	**Future Whole Stream**
Active Bed	Active bed morphology/modification	H	M	H
	Flow regime	H	H	H
	Water quality	VH	VH	VH
	Aquatic (Indigenous taxa assemblages)	H	H	H
	Ecosystem Functioning	H	HM	H
	Exotic aquatic Flora and Fauna (absence)	HM	HM	HM
Margin	Morphology/Physical modification	H	M	H
	Terrestrial Ecology	H	H	H
Context	Land use /modification	MH	MH	MH
All	Experiential	H	MH	H
Overall Level of Natural Character		**H**	**MH**	**H**

5.3. East QEII Crossing

Design Assumptions

Alignment cut down into stream gullies, culverts over the three stream gullies permanent loss of vegetation under footprint, and modification of stream banks.

Possible mitigation: retire/extend QEII covenant to reserve. Most beneficial option is to extend retirement/restoration upstream of the road to replace pastoral upper catchment with indigenous forest.

Table 11: QEII East – Change to Natural Character

East QEII Crossing Final alignment assessments 28.8.18		Crossing Site only		Whole Stream	
		Existing	Future crossing	Existing	Future with crossing
Active Bed	Active bed morphology/modification	H	ML	H-VH	MH
	Flow regime	H	MH	H-VH	H
	Water quality	H	M	H	M
	Aquatic (Indigenous taxa assemblages)	H	M	H-VH	H
	Ecosystem Functioning	H	M	H-VH	H
	Exotic aquatic Flora and Fauna (absence)	VH	VH	VH	VH
Margin	Morphology/Physical modification	H	L	VH	MH
	Terrestrial Ecology	H	L	H-VH	MH
Context	Land use /modification	MH	M	H-VH	H
All	Experiential	H	ML	H-VH	H
Overall Level of Natural Character * Significantly Reduced		**H**	**M***	**H**	**H**

5.4. New Manawatū Bridge Crossing

Design Assumptions

300m-400m bridge, abutment located west of existing carpark, embankment/abutment on north side of river, assume one pier in river, riprap protection on north bank.

Possible mitigation: bridge alignment, design and materials to reflect and respect context. Attention to pier placement and treatment around pier and abutments and site rehabilitation.

Table 12: New Manawatū Bridge Crossing – Change to Natural Character

Manawatū River Crossing Final alignment assessments 28.8.18			
River Component		Existing	Bridge with Pier in River
Active Bed	Active bed morphology/modification	H	H
	Flow regime	H	H
	Water quality	M	M
	Aquatic (Indigenous taxa assemblages)	H	H
	Ecosystem Functioning	H	H

	Exotic aquatic Flora and Fauna (absence)	H	H
Margin	Morphology/Physical modification	M	ML
	Terrestrial Ecology	M	M
Context	Land use /modification	MH	M
All	Experiential	MH	M
Overall Level of Natural Character		**MH**	**M**

5.5. East End (Woodville) Stream Crossing

Design assumptions

Bridge over stream, long ramps across flat farmland

Traverses approximately 350m of stream tributary in the hills

Table 13: East End Stream Crossing – Change to Natural Character

East End Stream Crossing (Woodville) Final alignment assessments 28.8.18			
River Component		**Existing**	**Crossing**
Active Bed	Active bed morphology/modification	M	ML
	Flow regime	MH	MH
	Water quality	M	M
	Aquatic (Indigenous taxa assemblages)	M	ML
	Ecosystem Functioning	M	ML
	Exotic aquatic Flora and Fauna (absence)	H	H
Margin	Morphology/Physical modification	M	L
	Terrestrial Ecology	M	M
Context	Land use /modification	ML	ML
All	Experiential	M	ML
Overall Level of Natural Character		**M**	**ML**

6.0 DETAILED ASSESSMENT NOTES

This section of the report contains assessment notes, from the relevant expert contributor, for each of natural character attributes assessed.

6.1. Flow Regime

Flow regime assessment was based on desktop research and workshop discussions with the other specialist contributors' knowledge of the site conditions and local hydrological systems. Aspects of the flow regime considered were:

(a) The flow regime characteristics of a river/stream with a given catchment size and location

(b) Change to critical flow volumes and patterns relative to naturalised flow. Inflow/outflow controlled, texture and roughness of the river margin and catchments in relation to interception and infiltration and speeds of overland flow discharging into the waterway.

(c) Occurrence of impoundments or large diversions of flows, including flood harvesting. Proportion of flows diverted or impounded. Proportion of available allocation abstracted.

(d) Physical change and dynamics of river and water movement resulting from natural seasonal floods and flows- movement of alluvial loads, sediments, flushing of algae and weeds.

(e) Degree of stream catchment and wetland hydrology intactness.

The flow regime could be modified in the following ways, individually or cumulatively, by the Project.

(a) Relatively large embankment and culvert footprints in small gullies occupying a proportion of catchment space. These activities have the potential to change natural flow paths of main waterway stems (as well as associated perennial, intermittent and ephemeral tributaries) and volumes of streams such as creating barriers at the stream/groundwater interface.

(b) The road stormwater management system may divert flows away from a catchment or discharge more volumes into a catchment. Overall, the large areas of hard road

surface will reduce the area of land available for infiltration and alter runoff during rain events.

(c) Removal of vegetation from the catchment reduces the interception of rain and alters overland flows, and interception of sediments on the slopes before they reach the stream.

(d) The net result is generally an increase in peak flows and reduction in base flows.

(e) Permanent stream diversions and straightening (assumed to be rock armoured) modify the speed and movement of water through the channels and interrupt the natural interaction of water flows with movement and deposition of silts and sediments.

(f) Ground improvements in or near wetlands and streams can modify the hydrological system of the area. These changes are difficult to accurately predict.

(g) Stream diversions and ground improvements can also change the degree of water movement through the hyporheic zone (i.e. from the stream to the underlying groundwater and vice-versa).

(h) Fragmentation and modification of the catchment hydrological system with the introduction of large structures (e.g. culverts) in catchments and stream beds, can constrict and modify the natural flow patterns.

6.2. Context

The context of streams, rivers and wetlands refers to the wider landscape context of the catchment adjacent to the waterbody. It considers the naturalness or modification of the land use, landform and vegetation cover that contributes to the overall character of the waterbody. The type of land use and extent of intensification or modification can impact on and be impacted on by the natural qualities of the waterbodies.

Aspects of the context considered in the assessment were:

(a) Nature and extent of modification of landforms and physical features of the wider area and catchment (such as stopbanks, gravel extraction, access roads, stock water dams.

(b) Extent and nature of intensification of agricultural land use.

(c) Land use and modification by structures, such as wind turbines, roads and state highways, buildings, urban areas, recreational facilities (carparks, campgrounds, toilets, mown grass, signage, cycleways and paths).

(d) Land cover or terrestrial ecology. Type and quality of vegetation cover and indigenous habitat including ecological links to the waterbody and connections to wider ecological networks

(e) Protected natural areas such as reserves, and parks.

The addition of a four-lane road into the predominantly rural landscape will reduce the naturalness of the context to the waterbodies crossed by the Project.

6.3. Experiential

Experiential/perceptual- relates to how we experience naturalness the sense of untamed remoteness, the sounds and smells of a place and how natural it appears and feels. It is essentially underpinned by the biophysical attributes. This attribute was assessed at a stream/river corridor scale (including the steam/river bed and margins as well as the context).

Aspects of the experiential or sensory attribute considered for the assessment were:

(a) Experiential attributes such as the degree of remoteness, untamed, unmodified experience provided.

(b) Sensory attributes such as the sounds and silence (water, wildlife, wind noise from other activities such as wind turbines, farming and traffic noise).

(c) Transient values, including natural phenomenon such as flood flows and sounds, seasonal changes to vegetation and wildlife, sunlight through tree canopy.

(d) Other sensory experiences: smells, views, colours and light.

The addition of a four-lane road with associated structures, modifications and traffic noise will reduce the naturalness of the experiential and sensory qualities of the stream and river corridors.

6.4. Fresh water ecology assessment key notes

Author: Kieran Miller (Boffa Miskell)

West stream (QEII) crossings

Site	Component	Existing assessment	Future state (site/reach scale)			Future state (stream catchment scale)	
			Embankment (lower reach)	Viaduct	Upstream crossing	Embankment & upstream crossing	Viaduct & upstream crossing
West Stream (QEII)	Aquatic (indigenous taxa assemblages)	M	L High proportion of habitat loss & modification combined with reduced water quality (according to assessment) results in the presence of more tolerant macroinvertebrate species and less sensitive species. Fish diversity is unlikely to change however reduced habitat will decrease fish density.	M Reduced water quality (according to assessment) results in slight changes in macroinvertebrate species assemblages. However, modification to population structure remains moderate (some expected species absent).	M Culvert and reduced water quality results in slight changes in macroinvertebrate species assemblages. However, modification to population structure remains moderate (some expected species absent).	M / L High proportion of habitat loss & modification at two segments along the stream and reduced water quality. Results in changes to macroinvertebrate assemblages with some expected species absent and changes to population structure (lower densities in places). Fish diversity is unlikely to change but the development will reduce fish density.	M Culvert and reduced water quality results in slight changes in macroinvertebrate species assemblages. However, modification to population structure remains moderate (some expected species absent).

Site	Component	Existing assessment	Future state (site/reach scale)			Future state (stream catchment scale)	
			Embankment (lower reach)	Viaduct	Upstream crossing	Embankment & upstream crossing	Viaduct & upstream crossing
West Stream (QEII)	Ecosystem functioning	H	L Functions become reduced / modified including floodplain connectivity, connection to groundwater, water temp control, organic matter input, decontamination of pollutants, instream habitat and riparian vegetation.	H With minimal stream and riparian changes - functions remain largely unchanged.	M Some functions altered (approx. 25% of reach scale) including connectivity to groundwater, water temp control, organic matter input, decontamination of pollutants, instream habitat and riparian vegetation.	M Functions become reduced / modified including floodplain connectivity, connection to groundwater, water temp control, organic matter input, decontamination of pollutants, instream habitat and riparian vegetation.	M / H Some functions reduced, particularly at the upstream reach. Although over all, most ecosystem functions remain intact or have low levels of modification over the catchment scale.
	Exotic aquatic flora & fauna	VH	M Assumed channel will now have minimal riparian cover increasing the chances of large scale exotic macrophyte growth.	VH Minimal stream and riparian changes result in no changes to exotic species presence.	VH Culvert is unlikely to result in exotic species becoming established.	H Assumed channel at downstream end will now have minimal riparian cover increasing the chances of exotic macrophyte growth (potentially exotic species).	VH Culvert upstream and minimal changes downstream will not increase the habitat for exotic macrophyte species becoming established.

Embankment assumes 100m culvert and 200m stream diversion (highly engineered channel with extensive armouring and minimal riparian cover).

Viaduct assumes stream remains intact long-term.

Upstream crossing includes a bridge over the northern branch (vegetation loss) and a 60m culvert on the eastern branch (bridge over the ephemeral flow and culvert on the permanent flow).

Stream Crossing for Construction Access to Saddle Road

Site	Component	Existing (whole stream)	Future state	
			Culvert (Assessment at crossing)	Culvert (Assessment of whole stream)
Saddle Rd access road crossing	Aquatic (indigenous taxa assemblages)	H Macroinvertebrate assemblages and associated indices are likely to reflect reference conditions (or close to) in the upper catchment as there appears to be a high level of contiguous riparian cover and likely to be limited (if any) human modification or other factors affecting water quality. There is evidence of grazing to the stream edge and erosion in places. These factors are likely to alter the macroinvertebrate assemblage with the loss of sensitive taxa (or reduction in density) and an increase in species tolerant of poorer water and habitat quality. That said there is also a substantial tall indigenous riparian litter and woody debris source. Fish diversity (from survey) includes two indigenous species. Other species which could have thought to have been present (based on FFDB records and habitat conditions) include upland bully, redfin bully, torrent fish and longfin eel.	H A culvert at the downstream reach is unlikely to have large effect on macroinvertebrate or fish assemblages. A culvert may improve macroinvertebrate assemblages by providing an access for vehicles and stock to cross the stream without going into the waterway.	H A culvert at the downstream reach is unlikely to have large effects on macroinvertebrate or fish assemblages. A culvert may improve macroinvertebrate assemblages by providing an access for vehicles and stock to cross the stream without going into the waterway.

Site	Component	Existing (whole stream)	Future state	
Saddle Rd access road crossing	Ecosystem functioning	H Ecosystem function is likely to be similar to the Western most QEII covenant (steep sided gully with contiguous riparian cover in upper reaches). Riparian cover is less contiguous downstream and there appears to be stock access to some sections, particularly the downstream section which is used as a stock crossing. Function is likely to be reduced for some components including floodplain effectiveness and fish spawning habitat as well as functions affected by reduced riparian cover.	H/M Some functions might be reduced/ modified with the addition of a culvert (e.g. organic matter input, decontamination of pollutants, instream habitat and riparian vegetation), species passage (macroinvertebrates and fish) but these changes are likely to be relatively small. Ecosystem functions will largely remain intact (assuming culvert installation is undertaken appropriately).	H Some functions might be reduced/ modified with the addition of a culvert (e.g. organic matter input, decontamination of pollutants, instream habitat and riparian vegetation), and species passage (macroinvertebrates and fish) but these changes are, likely to be very small in the context of the wider gully and stream environment. Ecosystem functions will largely remain intact (assuming culvert installation is undertaken appropriately).
	Exotic aquatic flora & fauna	H/M A conservative approach assumes no exotic macrophytes are present within the stream. Fish survey showed brown trout were present at similar levels as indigenous fish within the stream.	H/M Culvert unlikely to have an effect on existing exotic aquatic flora and fauna provided passage parameters are maintained.	H/M Culvert unlikely to have an effect on existing exotic aquatic flora and fauna provided passage parameters are maintained.

East stream (QEII) crossings

Site	Component	Existing assessment (site/ reach scale)	Future state (site/reach scale)	Existing assessment (entire stream reach)	Future state (entire stream reach)
			Crossing		Upstream crossing
East Stream (QEII)	Aquatic (indigenous taxa assemblages)	H	M High proportion of local habitat loss & modification combined with reduced water quality (according to assessment) results in the presence of more tolerant macroinvertebrate species and less sensitive species. No fish species recorded during the surveys.	H / VH	H Lower part of the catchment remains unmodified. The development affects the stream reaches with lower values (relative to the downstream stream reach). Macroinvertebrate population likely to be modified upstream but downstream assemblages would likely remain intact.
	Ecosystem functioning	H	M Functions become reduced / modified including floodplain connectivity, connection to groundwater, water temp control, organic matter input, decontamination of pollutants, instream habitat and riparian vegetation.	H / VH	H Lower part of the catchment remains unmodified and functions remain largely intact. The development affects the stream reaches with lower values (relative to the downstream stream reach). Some functions altered in the upper reaches, however the functions across the entire reach are likely to remain intact.
	Exotic aquatic flora & fauna	VH	VH Culverts are unlikely to results in increased exotic species becoming established.	VH	VH Culverts are unlikely to results in increased exotic species becoming established.

Main stem and two tributaries affected (i.e. three crossings) all culverts.

Manawatū River bridge crossing

Site	Component	Existing assessment (site/ reach scale)	Future state (site/reach scale)
			Bridge
Manawatū River	Aquatic (indigenous taxa assemblages)	H	H The bridge is unlikely to change the population assemblages of aquatic fauna within the active bed.
	Ecosystem functioning	H	H Some functions might be reduced/ modified (e.g. organic matter input, decontamination of pollutants, instream habitat and riparian vegetation), but these changes are likely to be small. Ecosystem functions will largely remain intact.
	Exotic aquatic flora & fauna	H	H Bridge unlikely to have an effect on existing exotic aquatic flora and fauna.

300-400m bridge with 1 pier in the river. Abutments on both sides with some riprap protection on the northern bank.

Eastern end stream crossing (Woodville Gateway)

Bridge over main stem. Extensive culvert within the upper reaches of the tributary.

Site	Component	Existing assessment (site/ reach scale)	Future state (site/reach scale)
			Bridge
Eastern end	Aquatic (indigenous taxa assemblages)	M	M / L Macroinvertebrate and fish assemblages unlikely to change beyond existing state in non-impacted reaches. Extensive culvert will likely cause changes in macroinvertebrate assemblages (more tolerant species and changes to population densities) as well as reduced fish diversity and densities.

Site	Component	Existing assessment (site/ reach scale)	Future state (site/reach scale)
			Bridge
Eastern end	Ecosystem functioning	M	M / L Some functions will be further reduced/ modified particularly by the culvert (e.g. organic matter input, decontamination of pollutants, instream habitat and riparian vegetation). There will be reaches with almost all functions varying outside the natural range and reaches with functions that are more intact.
	Exotic aquatic flora & fauna	H	H Bridge and culvert unlikely to have an effect on existing exotic aquatic flora and fauna.

6.5. Terrestrial ecology key notes

Author: Dr Adam Forbes (Forbes Ecology)

Manawatū Bridge Crossing

River Component		Existing	Pier in River	Clear span
Margin	Terrestrial Ecology	M	M No differences in performance of the terrestrial ecology criteria	M No differences in performance of the terrestrial ecology criteria

West Stream - from QEII West Crossing to Raupō wetland. (chainage 4000-6000)

			Wetland/forest/stream			QE West	
Existing			Embankment	Viaduct	2 Culverts	1 culvert 1 Bridge	2 bridges & retaining wall
Margin	Terrestrial Ecology	H	VL Destruction of wetland, swamp maire, some of the old growth forest	M Moderate level of effect to old-growth forest, but permanent effects avoided. Effects to swamp maire and wetland avoided.	L Widespread old-growth forest loss for tracking, widespread loss of advanced secondary broadleaved regeneration	M Effect on old-growth much reduced and limited to bridge construction area, widespread impacts to secondary broadleaved forest.	H Terrestrial ecology effects largely contained due to structures used. Terrestrial ecology effects not warranting shift in score when wider gully area considered.

QEII East Crossing - Headwaters Down to Reserve (450m)

River Component		Existing	Current design	Alignment moves north (2&3)
Margin	Terrestrial Ecology	H Indigenous vegetation dominates with exotic grassland at fringes and in intervening areas	L Alignment cuts through middle of best quality forest and severs the protected forest, leaving an isolated remnant upstream/north of the alignment. Would be a relatively large proportion of the existing riparian vegetation what would be taken out.	M For both options, impacts to forest would be higher in vegetated area meaning no fragmentation and better quality part of the forest is avoided. Would be a relatively smaller proportion of the existing riparian vegetation what would be taken out.

East end Stream Crossing (Woodville Gateway)

River Component		Existing	Current design Option1	Option 2 moves south	Option 3 Further south
Margin	Terrestrial Ecology	M	M Terrestrial ecology effects similar among options.	M Terrestrial ecology effects similar among options.	M Terrestrial ecology effects similar among options.

6.6. Water quality methodology and results

(Dr Olivier Ausseil & Dr Michael Greer (Aquanet Consulting Ltd))

The commentary below describes the methodology and results of the water quality component of this Natural Character Assessment prepared for the Project.

CURRENT NATURAL CHARACTER

Methodology

The current natural character of the waterways in each assessment area was assessed by comparing modelled and measured water quality data for the relevant River Environment Classification[8] (REC) reaches with modelled estimates of natural state.

Data

The water quality model developed by Larned *et al.* (2017) was used to obtain estimates of existing median visual clarity and median dissolved reactive phosphorus, nitrate nitrogen, ammoniacal nitrogen and *E. coli* concentrations for the REC reaches within the assessment areas. Measured water quality data collected by Horizons at the Upper Gorge monitoring site on the Manawatū River were obtained from the Land Air Water Aotearoa website[9]. Periphyton data summaries from Kilroy (2016) were also used.

The REC categorises each river reach based on climate, topography and geology. For each REC category McDowell *et al.* (2013) modelled the following statistics for a range of water quality parameters:

[8] The REC is a database of catchment spatial attributes, summarised for every segment in New Zealand's network of rivers.
[9] https://www.lawa.org.nz/.

(a) The median reference condition: reference conditions are defined as the chemical, physical or biological conditions that can be expected in streams and rivers with minimal or no anthropogenic influence.

(b) The trigger value: trigger values indicate the point at which water quality has degraded to the extent that there is a 'potential risk' of adverse effects at a site.

(c) The upper/lower bounds of the 95% confidence interval of the trigger value: the outer bounds of the confidence interval around the trigger value indicates the point at which water quality has degraded to the extent that resource-managers can be confident that there is a potential risk of adverse effects at a site.

Assessment approach - individual water quality parameters

The table below describes how the modelled water quality from Larned *et al.* (2017) and the LAWA website were compared with the McDowell *et al.* (2013) thresholds to grade the natural character of each water quality parameter in each REC reach.

A water quality parameter was only graded as "Very low" if the median value did not meet NPS-FM 2014 bottom lines or was found to be causing national bottom lines for periphyton to be breached. The full natural character assessment matrix for water quality is provided in the table below.

Natural character grading methodology for individual water quality parameters

Natural character	Assessment metrics (presented in McDowell *et al*. (2013)	Explanation
Very high	The median value for the parameter meets the median reference condition threshold	Water quality in the reach is within the expected natural range for the relevant REC category, and there is a 50% probability that water quality reflects natural state.
High	The median value for the parameter meets the trigger value threshold, but not the median reference condition threshold.	There is a 50% probability that water quality in the reach is degraded from its natural state, but this degradation is not sufficient to suggest that there is a potential risk of adverse effects
Moderate	The median value for the parameter does not meet the trigger value threshold but is within the 95% confidence interval.	Water quality in the reach is degraded to the extent that resource managers can be moderately confident that there is a potential risk of adverse effects.
Low	The median value for the parameter is outside the relevant boundary of the trigger value 95% confidence interval	Water quality in the reach is degraded to the extent that resource managers can be highly confident that there is a potential risk of adverse effects.

Natural character assessment matrix - Water quality component

Component	Very Low	Low	Moderate	High	Very High
Water and Habitat quality - Aquatic ecology Water quality and aquatic habitat quality; clarity, nutrient and bacterial levels etc. This should account for both the main channels of the river as well as lateral aquatic habitats if any (Including those outside of flood defenses). Habitat changes due to fine sediment, stock trampling or choking by exotic trees/shrubs	Very highly contaminated or permanently discoloured water displaying very high levels of human induced changes to the water quality with limited life supporting capacity (e.g. within polluted urban/industrialised areas or intensive farming); Lateral habitats drained, removed or separated from the active channel. Measured by: Contaminant concentrations do not meet NPS-FM 2014 bottom lines, are causing national bottom lines for periphyton to be breached or exceed ANZECC 2000 80% protection guidelines.	Water usually displaying high levels of contamination mainly from adjacent diffuse sources from land use activities (agricultural leaching etc); Lateral streams and wetlands are diminished in area, unnaturally silted and/or choked with exotic weeds. Lateral channels not exposed to lateral migration of flooding by the active surface Measured by: Median contaminant concentrations exceed the 95% confidence intervals (CIs) of the trigger values set out in McDowell et al. (2013).	Water displaying reasonable levels of naturalness although contains occasional high-moderate levels of human induced changes to part of the waterway or infrequent times; Some impact to habitat quality but lateral habitats generally intact and subject to active surface migration and flooding Measured by: Median contaminant concentrations are within the 95% CIs of the trigger values set out in McDowell et al. (2013) but exceed the trigger value thresholds.	Water displaying relatively high levels of water quality with small or rare amounts of impurities caused further upstream (e.g. by occasional stock crossing or forest harvesting); Lateral habitats in good condition despite occasional stock ingress or exotic vegetation. Lateral habitats subject to active channel migration and flooding Measured by: Median contaminant concentrations exceed the median reference conditions set out in McDowell et al. (2013) but are below the trigger value thresholds. Note – in many cases contaminant concentrations will be within the 95% CIs of the median reference conditions.	Highly natural water and lateral habitat quality. Displaying no human induced changes. Measured by: Median contaminant concentrations are at or below the median reference conditions set out in McDowell et al. (2013).

Periphyton growth is dependent on both nitrogen and phosphorus, and elevated concentrations of nitrate nitrogen (the main component of plant available nitrogen in streams not impacted by point source discharges) are unlikely to have an adverse effect unless dissolved reactive phosphorus is also elevated (and vice versa). Accordingly, both parameters were assigned the grade of the least degraded nutrient.

Assessment approach – individual REC reaches

For each REC reach, the overall natural character of water quality was assessed by averaging the grades of each water quality parameter.

Assessment approach –assessment areas

The gradings of all REC reaches in an assessment area were compiled and used to make a subjective decision on the overall grade. Measured data was given a greater weight than modelled data.

To support the grading assigned to each assessment area, a narrative assessment was also developed. This assessment describes the reasoning behind the grade and presents any additional supporting information. Specifically, periphyton data (presented in Kilroy (2016)) and modelled *E. coli* data (presented in Snelder *et al.* (2016)) are discussed, and a qualitative assessment of the expected level of contamination by typical stormwater-borne contaminants (copper, zinc and hydrocarbons) is provided.

Results

The results of the water quality component of the natural character assessment is provided in the table below.

Natural character assessment

Assessment scale	Assessment area	Narrative assessment	Natural Character
Broad-scale	Manawatū Gorge	Water quality in the Manawatū River through the gorge is moderately degraded. Concentrations of key nitrogen (NO_3-N) and phosphorus species (DRP) are substantially higher than natural background levels, The high nutrient concentrations and poor water clarity the Manawatū River means there is a risk of environmental impairment. It is important to note that periphyton monitoring data collected at the Upper Gorge monitoring site suggests that, despite being increased above natural state, nutrients are not causing periphyton growth at levels that would significantly affect the aesthetics of this section of the Manawatū River. Water clarity is sufficiently reduced compared to natural level that some impairment of aesthetic and possibly ecological values can be expected. Under normal conditions pathogen levels are only slightly elevated above natural state in the Manawatū River through the gorge. However, sporadic faecal contamination does occur, and this section of the river is unsuitable for swimming up to 30% of the time (based on the swimming maps on the MfE website). Ammoniacal-nitrogen (NH_4-N) concentrations are at or near natural state. Typical stormwater contaminants, such as copper, zinc and hydrocarbons, likely to be only very slightly elevated compared with natural state, as there is little impervious surface cover in the upstream catchment, noting however the historic stormwater inputs from the Manawatū Gorge Road.	Moderate
	Manawatū River Reach below SH3 Bridge	Below the SH3 bridge, water quality in the Manawatū River is moderately degraded. Concentrations of key nitrogen species (NO_3-N & NH_4-N) are substantially higher than natural background levels, but the potential for this to cause environment impairment is offset by the relatively low phosphorus concentrations in this section of the Manawatū River. That nutrients levels are not causing environmental impairment in this section of the Manawatū River is supported by the low level of periphyton growth observed at the Horizons Regional Council monitoring site at Upper Gorge. Water clarity is sufficiently reduced compared to natural level that some impairment of aesthetic and possibly ecological values can be expected. Under normal conditions pathogen levels are only slightly elevated above natural state in the Manawatū River downstream of the SH3 bridge. However, sporadic faecal contamination does occur, and this section of the river is unsuitable for swimming up to 30% of the time (based on the swimming maps on the MfE website). Typical stormwater contaminants, such as copper, zinc and hydrocarbons, likely to be only very slightly elevated compared with natural state, as there is little impervious surface cover in the upstream catchment, noting however the historic stormwater inputs from the Manawatū Gorge Road.	Moderate

Assessment scale	Assessment area	Narrative assessment	Natural Character
Broad-scale	Generic Streams and Wetlands along the route	Water quality in the smaller streams along the route is only moderately degraded. Concentrations of key nitrogen (NO_3-N & NH_4-N) and phosphorus species (DRP) are substantially higher than natural background levels in most streams which may be causing environmental impairment. However, water clarity and pathogen levels are generally at or near natural state. Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at or near natural state, as there is very little impervious surface cover in this area	Moderate
	Pohangina River Reach	Water quality in this section of the Pohangina River is generally degraded. Concentrations of key nitrogen (NO_3-N & NH_4-N) and phosphorus species (DRP) are substantially higher than natural background levels, and water clarity is significantly reduced. The high nutrient concentrations and poor water clarity the Pohangina River means there is a risk of environmental impairment. It is important to note that periphyton monitoring data collected at the Mais Reach monitoring site suggests that, despite being increased above natural state, nutrients are not causing periphyton growth at levels that would affect the aesthetic values of this section of the Pohangina River. While pathogen levels are elevated above natural state, this section of the Pohangina River is generally suitable for swimming (based on the swimming maps on the MfE website). Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at or near natural state, as there is very little impervious surface cover in this catchment	Moderate
Detailed	West stream from QE2 West Crossing to Raupō wetland	Overall, water quality in this stream is expected to be good. While phosphorus (DRP) concentrations are substantially higher than natural background levels, the risk of this causing environment impairment is low as concentrations of key nitrogen species (NO_3-N & NH_4-N) are near natural state. Water clarity and pathogen levels are also in near pristine condition. Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at natural state, as there is no impervious surface cover in this catchment.	High
	East QE2 Crossing	Overall, water quality in this stream is expected to be good. While phosphorus (DRP) concentrations are substantially higher than natural background levels, the risk of this causing environment impairment is low as nitrogen (NO_3-N) concentrations are near natural state. Water clarity and pathogen levels are also in near pristine condition. Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at or near natural state, as there is no impervious surface cover in this catchment.	High

Assessment scale	Assessment area	Narrative assessment	Natural Character
Detailed	Manawatū Bridge Crossing	Water quality in this section of the Manawatū River is moderately degraded. Concentrations of key nitrogen (NO_3-N & NH_4-N) and phosphorus species (DRP) are substantially higher than natural background levels which may be causing environmental impairment. Water clarity is also moderately degraded from natural state. It is important to note that periphyton monitoring data collected at the Upper Gorge monitoring site suggests that, despite being increased above natural state, nutrients are not causing periphyton growth at levels that would affect the aesthetics of this section of the Manawatū River. Under normal conditions, pathogen concentrations are only slightly elevated above natural background levels. However, sporadic faecal contamination does occur, and this section of the river is unsuitable for swimming up to 30% of the time (based on the swimming maps on the MfE website). Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be increased above natural levels due to run-off from SH3.	Moderate
	East end (Woodville) Stream Crossing	Water quality in the two streams in this area is expected to be moderately degraded. Concentrations of key nitrogen (NO_3-N & NH_4-N) and phosphorus species (DRP) are substantially higher than natural background levels which may be causing environmental impairment. However, pathogen levels are generally at or near natural state, and only the northern stream has (slightly) degraded water clarity. Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at or near natural state, as there is very little impervious surface cover in this catchment	Moderate
	Saddle Road Access Road Crossing	Overall, water quality in this stream is expected to be very good. While phosphorus (DRP) concentrations are moderately elevated above natural background levels, the risk of this causing environment impairment is low as concentrations of key nitrogen species (NO_3-N & NH_4-N) are at or near natural state. Water clarity and pathogen levels are also in near pristine condition. Stormwater contaminants, such as copper, zinc and hydrocarbons, are likely to be at or near natural state, as there is very little impervious surface cover in this catchment	Very high

FUTURE NATURAL CHARACTER

Methodology

The potential effects of the proposed Manawatū Gorge Road have been assessed using the following assumptions:

(a) The assessment only considers the long-term effects of the operation of the road. Specifically, potential effects during construction (such as sediment inputs, short term disturbance etc.) have not been considered as part of the assessment.

(b) During the long-term operation of the road, the key potential effect(s) on water quality will therefore be associated with contaminants deposited on the road by passing vehicles and entrained by stormwater. These contaminants typically include metals (from tyres, brake pads, etc.), hydrocarbons (from fuel combustion, leaks, spills, etc.), sediment and microbial pathogens (from stock trucks, etc.).

(c) Stormwater runoff from the road will be intercepted by adequately designed devices/setups such as grassed swales, retention ponds and/or wetlands.

(d) Following interception (as above), stormwater runoff will be directed via gravity to the closest surface water body.

(e) The indicative alignment and options (e.g. bridges vs. culverts) were provided by Boffa Miskell from the Te Ahu a Turanga; Manawatū Tararua Highway Project team Mitigation Workshops.

The existing state of natural character was scored using the 5-point scale. Changes from the existing state were scored as a departure from the existing state, having regard to the following:

(a) The current natural state score: receiving environments with a higher score were considered more sensitive to change / stormwater inputs;

(b) The presence/absence of stormwater runoff into the stream under the current situation. For instance, the introduction of stormwater contaminants where there had been none before was considered a significant effect on the natural character of the water quality;

(c) The degree of dilution/ dispersion available, and the likeliness of causing detectable/measurable changes;

(d) The location of the crossing / stormwater discharge in the catchment and the proportion of catchment potentially affected by the discharge.

Results

Area/site	Option	Scores		Justification
		Current	Future	
Lower West QE2 Stream (Site scale)	Embankment	H	M	Introduction of stormwater-borne contaminants in a stream catchment of high natural character, justifying a full point reduction in score. The two options are expected to be equivalent in terms of long-term effects on stormwater-borne contaminant inputs/ concentrations
	Viaduct	H	M	
Upper West QE2 Stream (Site scale)	1 culvert, 1 bridge	H	M	Introduction of stormwater-borne contaminants in a stream catchment of high natural character, justifying a full point reduction in score
Lower West QE2Stream (Catchment scale)	Embankment (Lower reach) Culvert + bridge (upper reach)	H	M	Both the upper and lower reaches of the stream will be affected, and little further dilution is expected at the catchment scale compared with the site scale, justifying a full point reduction in score. The two options are expected to be equivalent in terms of long-term effects on stormwater-borne contaminant inputs/ concentrations
	Viaduct (Lower reach) Culvert + bridge (upper reach)			
East QE2 Stream (Site Scale)	Culvert	H	M	Introduction of stormwater-borne contaminants in a stream catchment of high natural character, justifying a full point reduction in score.
East QE2 Stream (Catchment Scale)	Culvert	H	M	Stormwater inputs are at the top of the catchment, and there are no significant side tributaries. Inputs are thus expected to affect the whole stream and only minimal dilution/dispersion, justifying a full point reduction in score.
Manawatū Bridge crossing	Bridge, 1 pier in river	M	M	No change due to (1) existing stormwater runoff in Manawatū River and (2) large dilution available, thus unlikely to be any measurable changes
East end (Woodville) Stream	Bridge + diversion	M	M	Existing water quality is already modified by rural land use/land cover and some (albeit limited) road runoff from Saddle Road higher in the catchment. Relatively large catchment, with significant dilution available. The additional road runoff inputs will likely result in only small changes.
Saddle Road Access Road Crossing	Culvert	VH	VH	The stream crossing is being installed to provide site access during construction of the new road. Traffic volumes in the catchment are not expected to increase in

(Site Scale)				the long-term. Therefore, stormwater-borne contaminant inputs are also unlikely to change.
Saddle Road Access Road Crossing (Catchment Scale)	Culvert	VH	VH	The stream crossing is being installed to provide site access during construction of the new road. Traffic volumes in the catchment are not expected to increase in the long-term. Therefore, stormwater-borne contaminant inputs are also unlikely to change.

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5 September 2018

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4.B
SUPPORTING PHOTOGRAPHS

Sector 1: Bridge to Bridge (existing SH3 bridge to new bridge)

View west over SH3 with the existing SH3 bridge in distance.

Looking across carpark on south bank of the Manawatū River. (New bridge location).

Carpark and location of the propsed south bridge abutment. The new bridge would link in to the terrace above the car-park.

Sector 2: New Manawatū River Bridge

Looking towards north bank and new bridge location lower end of Manawatū Gorge.

Parihaki Island at the lowere end of the gorge.

View across the river from existing carpark at the proposed new bridge site.

View downstream from the carpark to Parahaki Island.

Sector 3: Western Slope

New bridge location on north bank, old growth forest, raupo swamp, and kanuka forest.

Stream through old growth forest.

Raupo swamp and kanuka forest.

Looking along the Western Rise toward the Manawatū River, and a QEII open space covenant in foreground.

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Client: NZ TRANSPORT AGENCY
Project: TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
Title: CONTEXT PHOTOS

Original Size: A3
Project Number: 51-38113
Drawing Number: FIG-01
Rev:

Plot Date: 18 October 2018 - 7:53 AM
Cad File No: U:\2018\W18061_BEV_Manawatu_Gorge_LVA_for_NoR\TParty\GHD_data\20181002_drawings\NZ T A_A1_NZTA.dwg

Sector 4: Te Apiti Wind Farm

View over the flatter terrain on the ridge top from the Te Apiti Wind farm Lookout.

The wind farm infrastucture has altered the rural character of this area through the introduction of turbines and access roads.

The ridge top farmland is disected by steep vegetated gully systems.

Sector 5: Eastern Rise

View east from the ridge tops.

View towards Woodville, the steep hilly terrain, pine plantations and shelter belts.

A mix of native and exotic scrub regenerates in the steep gullies with open pasture on the ridges.

Towards the bottom of the Eastern Rise, the terrain becomes more broken and complex.

Sector 6: Woodville Gateway

View north were the Eastern Rise (left) meets the plains.

The plains at the aastern end of the designation are dominated by improved pasture.

View across the plains to the steep hill country of the eastern rise and Te Apiti Wind Farm beyond.

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Project: TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
Title: CONTEXT PHOTOS

Original Size: A3
Project Number: 51-38113
Drawing Number: FIG-02
Rev:

Plot Date: 18 October 2018 - 7:53 AM
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Manawatū Gorge

Manawatū River below SH3 Bridge

Pohangina River

Generic Streams (eastern end)

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Client: NZ TRANSPORT AGENCY
Project: TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
Title: NATURAL CHARACTER ASSESSMENT
BROADSCALE SITES

Original Size: A3
Project Number: 51-38113
Drawing Number: FIG-03
Rev:

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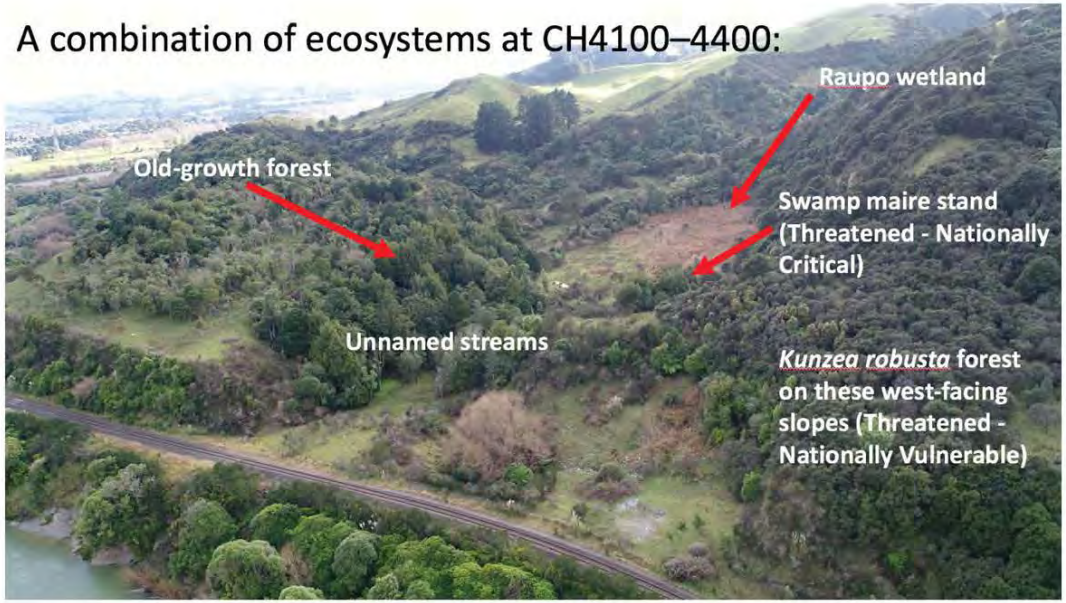
Manawatū River crossing

Manawatū River crossing



QEII west Stream lower catchment -Old growth forest, stream and Raupo wetland

Stream in old growth forest

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Project: TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
Title: NATURAL CHARACTER ASSESSMENT DETAILED SITES

Original Size: A3 | Project Number: 51-38113 | Drawing Number: FIG-04 | Rev:

Plot Date: 18 October 2018 - 7:53 AM Cad File No: U:\2018\W18061_BEV_Manawatu_Gorge_LVA_for_NoR\TParty\GHD_data\20181002_drawings\NZ T A_A1_NZTA.dwg

Stream crossing_ Construction Road to Saddle Road

Stream crossing_ Construction Road to Saddle Road

QEII west stream crossing, vew down stream

QEII Stream, upper catchment.

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Client	NZ TRANSPORT AGENCY
Project	TE AHU A TURANGA: MANAWATŪ TARARUA HIGHWAY
Title	NATURAL CHARACTER ASSESSMENT DETAILED SITES

Original Size A3 | Project Number: 51-38113 | Drawing Number: FIG-05 | Rev:

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QEII east stream crossing

QEII east stream crossing

East Streams _ Woodville Gateway

East Streams _ Woodville Gateway

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Title	NATURAL CHARACTER ASSESSMENT DETAILED SITES			
Original Size A3	Project Number: 51-38113	Drawing Number: FIG-06	Rev:	

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4.C
LANDSCAPE & VISUAL EFFECTS METHODOLOGY & ZTC METHODOLOGY

Landscape and Visual Effects Assessment Methodology

5 April 2018

Introduction

The landscape and visual effects assessment process provides a framework for assessing and identifying the nature and level of likely effects that may result from a proposed development. Such effects can occur in relation to changes to physical elements, the existing character of the landscape and the experience of it. In addition, the landscape assessment method may include an iterative design development processes which includes stakeholder involvement. The outcome of any assessment approach should seek to avoid, remedy or mitigate adverse effects (see **Figure 1**). A separate assessment is required to assess changes in natural character in coastal areas and other waterbodies.

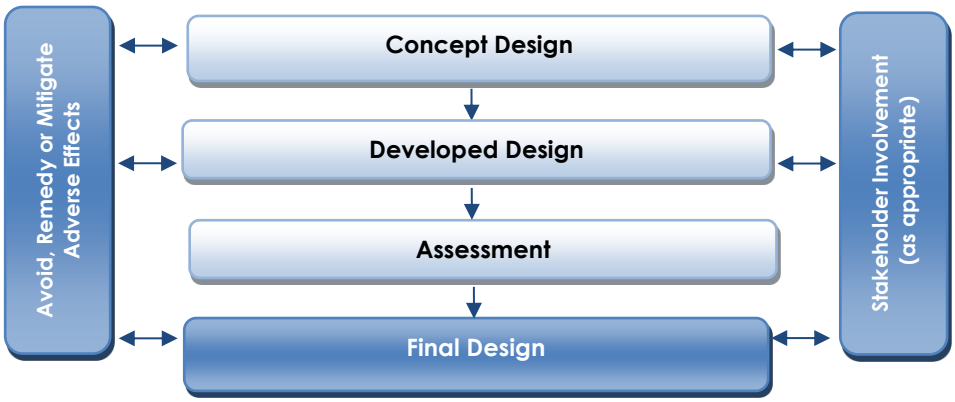

Figure 1: Design feedback loop

When undertaking landscape and visual effects assessments, it is important that a structured and consistent approach is used to ensure that findings are clear and objective. Judgement should always be based on skills and experience, and be supported by explicit evidence and reasoned argument.

While landscape and visual effects assessments are closely related, they form separate procedures. The assessment of the potential effect on the landscape forms the first step in this process and is carried out as an effect on an environmental resource (i.e. landscape elements, features and character). The assessment of visual effects considers how changes to the physical landscape affect the viewing audience. The types of effects can be summarised as follows:

Landscape effects:
Change in the physical landscape, which may change its characteristics or qualities.

Visual effects:
Change to views which may change the visual amenity experienced by people.

The policy context, existing landscape resource and locations from which a development or change is visible all inform the 'baseline' for landscape and visual effects assessments. To assess effects, the landscape must first be described, including an understanding of the key landscape characteristics and qualities. This process, known as landscape characterisation, is the basic tool for understanding landscape character and may involve subdividing the landscape into character areas or types. The condition of the landscape (i.e. the state of an individual area of landscape or landscape feature) should also be described alongside a judgement made on the value or importance of the potentially affected landscape.

This outline of the landscape and visual effects assessment methodology has been undertaken with reference to the Quality Planning Landscape Guidance Note[1] and its signposts to examples of best practice which include the UK guidelines for landscape and visual impact assessment[2] and the New Zealand Landscape Institute Guidelines for Landscape Assessment[3].

[1] http://www.qualityplanning.org.nz/index.php/planning-tools/land/landscape
[2] Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)
[3] Best Practice Note Landscape Assessment and Sustainable Management 10.1, NZILA

Landscape Effects

Assessing landscape effects requires an understanding of the nature of the landscape resource and the magnitude of change which results from a proposed development to determine the overall level of landscape effects.

Nature of the landscape resource

Assessing the nature of the landscape resource considers both the susceptibility of an area of landscape to change and the value of the landscape. This will vary upon the following factors:

- Physical elements such as topography / hydrology / soils / vegetation;
- Existing land use;
- The pattern and scale of the landscape;
- Visual enclosure / openness of views and distribution of the viewing audience;
- The zoning of the land and its associated anticipated level of development;
- The value or importance placed on the landscape, particularly those confirmed in statutory documents; and
- The scope for mitigation, appropriate to the existing landscape.

The susceptibility to change takes account of both the attributes of the receiving environment and the characteristics of the proposed development. It considers the ability of a specific type of change occurring without generating adverse effects and/or achievement of landscape planning policies and strategies.

Landscape value derives from the importance that people and communities, including tangata whenua, attach to particular landscapes and landscape attributes. This may include the classification of Outstanding Natural Landscape (RMA s.6(b)) based on important biophysical, sensory/ aesthetic and associative landscape attributes, which have potential to be affected by a proposed development.

Magnitude of Landscape Change

The magnitude of landscape change judges the amount of change that is likely to occur to existing areas of landscape, landscape features, or key landscape attributes. In undertaking this assessment, it is important that the size or scale of the change is considered within the geographical extent of the area influenced and the duration of change, including whether the change is reversible. In some situations, the loss /change or enhancement to existing landscape elements such as vegetation or earthworks should also be quantified.

When assessing the level of landscape effects, it is important to be clear about what factors have been considered when making professional judgements. This can include consideration of any benefits which result from a proposed development. **Table 1** below helps to explain this process. The tabulating of effects is only intended to inform overall judgements.

Contributing Factors		Higher	Lower
Nature of Landscape Resource	**Susceptibility to change**	The landscape context has limited existing landscape detractors which make it highly vulnerable to the type of change which would result from the proposed development.	The landscape context has many detractors and can easily accommodate the proposed development without undue consequences to landscape character.
	The value of the landscape	The landscape includes important biophysical, sensory and associative attributes. The landscape requires protection as a matter of national importance (ONF/L).	The landscape lacks any important biophysical, sensory or associative attributes. The landscape is of low or local importance.
Magnitude of Change	**Size or scale**	Total loss or addition of key features or elements. Major changes in the key characteristics of the landscape, including significant aesthetic or perceptual elements.	The majority of key features or elements are retained. Key characteristics of the landscape remain intact with limited aesthetic or perceptual change apparent.
	Geographical extent	Wider landscape scale.	Site scale, immediate setting.
	Duration and reversibility	Permanent. Long term (over 10 years).	Reversible. Short Term (0-5 years).

Table 1: Determining the level of landscape effects

Visual Effects

To assess the visual effects of a proposed development on a landscape, a visual baseline must first be defined. The visual 'baseline' forms a technical exercise which identifies the area where the development may be visible, the potential viewing audience, and the key representative public viewpoints from which visual effects are assessed.

The viewing audience comprises the individuals or groups of people occupying or using the properties, roads, footpaths and public open spaces that lie within the visual envelope or 'zone of visual influence' of the site and proposal. Where possible, computer modelling can assist to determine the theoretical extent of visibility together with field work undertaken to confirm this. Where appropriate, key representative viewpoints should be agreed with the relevant local authority.

Nature of the viewing audience

The nature of the viewing audience is assessed in terms of the susceptibility of the viewing audience to change and the value attached to views. The susceptibility of the viewing audience is determined by assessing the occupation or activity of people experiencing the view at particular locations and the extent to which their interest or activity may be focussed on views of the surrounding landscape. This relies on a landscape architect's judgement in respect of visual amenity and reaction of people who may be affected by a proposal. This should also recognise that people more susceptible to change generally include: residents at home, people engaged in outdoor recreation whose attention or interest is likely to be focussed on the landscape and on particular views; visitors to heritage assets or other important visitor attractions; and communities where views contribute to the landscape setting.

The value or importance attached to particular views may be determined with respect to its popularity or numbers of people affected or reference to planning instruments such as viewshafts or view corridors. Important viewpoints are also likely to appear in guide books or tourist maps and may include facilities provided for its enjoyment. There may also be references to this in literature or art, which also acknowledge a level of recognition and importance.

Magnitude of Visual Change

The assessment of visual effects also considers the potential magnitude of change which will result from views of a proposed development. This takes account of the size or scale of the effect, the geographical extent of views and the duration of visual change which may distinguish between temporary (often associated with construction) and permanent effects where relevant. Preparation of any simulations of visual change to assist this process should be guided by best practice as identified by the NZILA[4].

When determining the overall level of visual effect, the nature of the viewing audience is considered together with the magnitude of change resulting from the proposed development. **Table 2** has been prepared to help guide this process:

Contributing Factors		Higher	Lower
Nature of the Viewing Audience	**Susceptibility to change**	Views from dwellings and recreation areas where attention is typically focussed on the landscape.	Views from places of employment and other places where the focus is typically incidental to its landscape context. Views from transport corridors.
	Value attached to views	Viewpoint is recognised by the community such as an important view shaft, identification on tourist maps or in art and literature. High visitor numbers.	Viewpoint is not typically recognised or valued by the community. Infrequent visitor numbers.
Magnitude of Change	**Size or scale**	Loss or addition of key features in the view. High degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture). Full view of the proposed development.	Most key features of view retained. Low degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture. Glimpse / no view of the proposed development.
	Geographical extent	Front on views. Near distance views; Change visible across a wide area.	Oblique views. Long distance views. Small portion of change visible.
	Duration and reversibility	Permanent. Long term (over 15 years).	Transient / temporary. Short Term (0-5 years).

Table 2: Determining the level of visual effects

[4] Best Practice Guide: Visual Simulations BPG 10.2, NZILA

Nature of Effects

In combination with assessing the level of effects, the landscape and visual effects assessment also considers the nature of effects in terms of whether this will be positive (beneficial) or negative (adverse) in the context within which it occurs. Neutral effects can also occur where landscape or visual change is benign.

It should also be noted that a change in a landscape does not, of itself, necessarily constitute an adverse landscape or visual effect. Landscape is dynamic and is constantly changing over time in both subtle and more dramatic transformational ways, these changes are both natural and human induced. What is important in managing landscape change is that adverse effects are avoided or sufficiently mitigated to ameliorate the effects of the change in land use. The aim is to provide a high amenity environment through appropriate design outcomes.

This assessment of the nature effects can be further guided by **Table 3** set out below:

Nature of effect	Use and Definition
Adverse (negative):	The proposed development would be out of scale with the landscape or at odds with the local pattern and landform which results in a reduction in landscape and / or visual amenity values
Neutral (benign):	The proposed development would complement (or blend in with) the scale, landform and pattern of the landscape maintaining existing landscape and / or visual amenity values
Beneficial (positive):	The proposed development would enhance the landscape and / or visual amenity through removal of restoration of existing degraded landscapes uses and / or addition of positive elements or features

Table 3: Determining the Nature of Effects

Cumulative Effects

During the scoping of an assessment, where appropriate, agreement should be reached with the relevant local authority as to the nature of cumulative effects to be assessed. This can include effects of the same type of development (e.g. wind farms) or the combined effect of all past, present and approved future development[5] of varying types, taking account of both the permitted baseline and receiving environment. Cumulative effects can also be positive, negative or benign.

Cumulative Landscape Effects

Cumulative landscape effects can include additional or combined changes in components of the landscape and changes in the overall landscape character. The extent within which cumulative landscape effects are assessed can cover the entire landscape character area within which the proposal is located, or alternatively, the zone of visual influence from which the proposal can be observed.

Cumulative Visual Effects

Cumulative visual effects can occur in combination (seen together in the same view), in succession (where the observer needs to turn their head) or sequentially (with a time lapse between instances where proposals are visible when moving through a landscape). Further visualisations may be required to indicate the change in view compared with the appearance of the project on its own.

Determining the nature and level of cumulative landscape and visual effects should adopt the same approach as the project assessment in describing both the nature of the viewing audience and magnitude of change leading to a final judgement. Mitigation may require broader consideration which may extend beyond the geographical extent of the project being assessed.

[5] The life of the statutory planning document or unimplemented resource consents.

Determining the Overall Level of Effects

The landscape and visual effects assessment concludes with an overall assessment of the likely level of landscape and visual effects. This step also takes account of the nature of effects and the effectiveness of any proposed mitigation.

This step informs an overall judgement identifying what level of effects are likely to be generated as indicated in **Table 4** below. This table which can be used to guide the level of landscape and visual effects uses an adapted seven-point scale derived from NZILA's Best Practice Note.

Effect Rating	Use and Definition
Very High:	Total loss of key elements / features / characteristics, i.e. amounts to a complete change of landscape character.
High:	Major modification or loss of most key elements / features / characteristics, i.e. little of the pre-development landscape character remains. *Concise Oxford English Dictionary Definition* *High: adjective- Great in amount, value, size, or intensity.*
Moderate- High:	Modifications of several key elements / features / characteristics of the baseline, i.e. the pre-development landscape character remains evident but materially changed.
Moderate:	Partial loss of or modification to key elements / features / characteristics of the baseline, i.e. new elements may be prominent but not necessarily uncharacteristic within the receiving landscape. *Concise Oxford English Dictionary Definition* *Moderate: adjective- average in amount, intensity, quality or degree*
Moderate - Low:	Minor loss of or modification to one or more key elements / features / characteristics, i.e. new elements are not prominent or uncharacteristic within the receiving landscape.
Low:	No material loss of or modification to key elements / features / characteristics. i.e. modification or change is not uncharacteristic and absorbed within the receiving landscape. *Concise Oxford English Dictionary Definition* *Low: adjective- **1.** Below average in amount, extent, or intensity.*
Very Low:	Little or no loss of or modification to key elements/ features/ characteristics of the baseline, i.e. approximating a 'no change' situation.

Table 4: Determining the overall level of landscape and visual effects