Waverley Wind Farm

Resource Consent Applications and Assessment of Environmental Effects

April 2016

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

1. INTRODUCTION

1.1 Background

This Assessment of Environmental Effects ('AEE') has been prepared in support of resource consent applications under the Resource Management Act 1991 ('RMA' or 'Act') by Trustpower Limited ('Trustpower') to enable the construction, operation and maintenance of the Waverley Wind Farm ('WWF').

The WWF is to be located on an approximately 980 ha project site off Peat Road in the South Taranaki District. The project site is located partly adjacent to the Tasman Sea and the Whenuakura River, and is approximately 6 km south-east of Patea and 7 km south-west of Waverley. The project site is situated within the jurisdiction of the South Taranaki District Council ('STDC') and the Taranaki Regional Council ('TRC').

Figure 1 of Appendix A to the report entitled "*Proposed Waverley Wind Farm – Landscape and Visual Assessment"* by Isthmus Group ('Isthmus (2016)') provides a location map of the project site. This report is attached as **Appendix One** to this AEE.

In order to maximise the efficient generation of electricity and retain some flexibility regarding the selection and precise locations of turbines, Trustpower is seeking resource consent for development within a defined project envelope (as opposed to seeking consent for a proposal based on fixed / indicative turbine locations). The project envelope covers the total extent of the project site, excluding those areas which have been identified as part of the Environmental Buffer Zone ('EBZ'). Of the 979.84 ha project site, the project envelope comprises an area of 804.37 ha, whilst the EBZ comprises an area of 175.47 ha.

The proposed development rationale for the WWF is discussed further in section 3 of this AEE.

The WWF will involve the construction, operation and maintenance of up to 48 wind turbine generators ('turbines') within the project envelope, each with a maximum height up to 160 m above ground level (to blade tip). Ancillary infrastructure will include internal access roads, an operations / maintenance building, an electricity substation / switchyard, and permanent wind monitoring masts. The WWF will have an installed generation capacity of approximately 130 MW[1] and will generate approximately 490 GWh[2] of electricity per annum.

The WWF will also necessitate the construction and operation of an above ground 110 kV[3] transmission line from the WWF to an electricity substation operated by Transpower New Zealand Limited ('Transpower') on Mangatangi Road, Waverley. The transmission line will comprise a single circuit with three conductors (wires) suspended between transmission poles up to 22 m in height. The proposed route of the transmission line from the WWF to Mangatangi Road is approximately 13 km and crosses a number of rural properties, as well as road and rail reserves.

The transmission line will be developed within a 30 m wide transmission corridor where it is located on private land (a corridor is not, however, required along those sections of the transmission line route that are within road and rail reserve). A transmission corridor is proposed for the development of the transmission line on private land in order to

1 MW – Megawatt.
2 GWh – Gigawatt hours.
3 kV – Kilovolt (1,000 volts).

provide sufficient flexibility to account for any geotechnical, environmental, land use design or engineering constraints that may arise during detailed design and construction.

Figure 1 of Appendix A to Isthmus (2016) also provides a location map of the proposed route of the transmission line from the WWF to Mangatangi Road, Waverley.

1.2 Trustpower Limited

Trustpower is New Zealand's fourth largest electricity retailer and fifth largest electricity generator. It is a listed public company and is predominantly New Zealand owned. The company grew from the Tauranga Electric Power Board, which was established in 1924. Trustpower now employs approximately 750 staff and services 240,000 residential, commercial and industrial customers across New Zealand.

Trustpower's core business is the generation and retailing of electricity. Its business also incorporates the development of new electricity generation and water conveyance infrastructure, as well as the provision of telecommunication and broadband services. The Energy Companies Act 1992 requires that the principal objective of every energy company is to operate as a successful business. Consistent with this objective, Trustpower has built a reputation as a successful and responsible generator, developer and retailer of electricity. Trustpower considers that achieving strong environmental performance is an integral part of being a successful business.

Trustpower's electricity generation portfolio is predominantly derived from renewable energy sources. The company owns and operates 19 hydro-electricity generation schemes, two wind farms and a diesel peaking facility in New Zealand, which are geographically spread throughout the country. Trustpower also owns and operates three wind farms and three hydro-electricity generation schemes in Australia.

Trustpower's electricity generation facilities occupy substantial areas of land and are often situated in environmentally sensitive locations. The company's electricity generation portfolio in New Zealand differs from other electricity generators in that its assets are typically of small to medium output, are relatively numerous, and are spread across a number of districts and regions. This electricity generation portfolio provides a number of benefits to Trustpower's customers, as well as to New Zealand as a whole. In this regard, a number of the electricity generation schemes are embedded into the local electricity supply network and form a vital element in ensuring regional security of supply and a sustainable electricity supply within New Zealand. This commitment to local supply and proximity to demand centres is a key feature of Trustpower's generation philosophy and portfolio.

Trustpower also has an active programme of investigating and developing new electricity generation and irrigation opportunities throughout New Zealand and Australia. Within the past decade this programme has focussed on the consenting and development of new wind and hydro-electricity generation infrastructure. Notable projects in New Zealand have included the following:

- The Mahinerangi Wind Farm in Otago (200 MW) – 36 MW constructed;
- The Kaiwera Downs Wind Farm in Southland (240 MW) - consented;
- The Arnold Valley Hydro Scheme on the West Coast (46 MW) - consented;

- The Wairau Hydro Scheme in Marlborough (72 MW) - consented; and
- The Esk Hydro Scheme (3.8MW) – constructed.

1.3 Trustpower's Interests in the Taranaki and / Manawatu-Wanganui Regions

Trustpower owns and operates three hydro-electricity generation schemes within the Taranaki Region and one wind farm in the Manawatu - Wanganui Region. These assets are briefly described as follows:

- The Patea Hydro-Electric Power Scheme ('Patea HEPS') is located on the Patea River in the South Taranaki District, approximately 43 km from the coast. The Patea HEPS has an installed generation capacity of 30.7 MW and generates approximately 118 GWh of electricity per annum. The scheme consists of an 82 m high earth dam which has impounded water in the Patea River to create Lake Rotorangi. The lake is over 46 km long and provides approximately 6,600 m^3/s hours of storage within its consented 4.5 m operating range. The resource consents authorising the operation of the Patea HEPS expire in 2040;
- The Motukawa Hydro-Electric Power Scheme ('Motukawa HEPS') is located in the Manganui and Waitara River catchments. The scheme operates by diverting water from the Manganui River and conveying it via a race to Lake Ratapiko. Water is diverted from Lake Ratapiko through penstocks to the Motukawa Power Station, which then discharges into the Makara Stream (a tributary of the Waitara River). The Motukawa HEPS has an installed generation capacity of 5 MW and generates approximately 22 GWh of electricity per annum. The resource consents authorising the operation of the Motukawa HEPS expire in 2022;
- The Mangorei Hydro-Electric Power Scheme ('Mangorei HEPS') is located in the New Plymouth District and uses water from the Waiwhakaiho River and Lake Mangamahoe to generate electricity. The Mangorei HEPS has an installed generation capacity of 4.5 MW and generates approximately 20.9 GWh of electricity per annum. The resource consents authorising the operation of the Mangorei HEPS expire in 2021; and
- The Tararua Wind Farm ('TWF') is currently New Zealand's largest operating wind farm and is located on the foothills of the Tararua Ranges, within the jurisdiction of Palmerston North City Council and the Tararua District Council. The TWF has an installed generation capacity of 161 MW and has an average output of 620 GWh of electricity per annum. The TWF harnesses the predominant westerly winds that blow over the Tararua Ranges and is recognised internationally as a top performing wind farm, producing approximately 46% of its rated capacity on an annual basis.

1.4 Resource Consent Requirements

Trustpower is seeking all necessary resource consents from the STDC and TRC for the construction, operation and maintenance of the WWF and the transmission line (including all associated, and ancillary, activities). A summary of the resource consents

required from the STDC and TRC in accordance with the relevant statutory planning documents is provided in Tables 1.1 and 1.2 below.

Further information on the rules within the relevant statutory planning documents that apply to the construction, operation and maintenance of the WWF and the transmission line is provided in section 5 of this AEE.

Table 1.1: Resource Consent Requirements Summary - South Taranaki District Council.[4]

ACTIVITY	ACTIVITY STATUS	PROPOSED CONSENT DURATION
A **land use consent** for the construction, operation and maintenance of the Waverley Wind Farm, including: i) The construction, operation and maintenance of up to 48 turbines (including foundation works and platforms); ii) The construction, operation and maintenance of up to 48 externally housed transformers adjacent to each turbine; iii) The construction, operation and maintenance of up to four permanent wind monitoring masts; iv) The construction, operation and maintenance of an electricity substation / switchyard building; v) The construction, operation and maintenance of an underground 33 kV electrical and fibre optic cable network between the 48 turbines and the electricity substation / switchyard building; vi) The installation of medium intensity aviation obstacle lighting on the nacelles of the turbines; vii) The construction and maintenance of approximately 25 - 30 km of internal access roads; viii) The upgrading and maintenance of existing local roads; ix) The construction, operation and dis-establishment of a temporary concrete batching plant and other on-site	Discretionary	Unlimited

[4] Including resource consents required in accordance with the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

construction buildings / equipment (including diesel generators); x) The storage and use of hazardous substances; xi) The construction and use of an operations / maintenance building; xii) Vegetation clearance; xiii) Land disturbance and earthworks (including the establishment of spoil disposal areas and aggregate storage) associated with the establishment of the internal access roads, turbine foundations / hard stand areas, and related activities; xiv) The generation of heavy traffic movements; xv) The disturbance of potentially contaminated soil and a change to the use of land; xvi) Site rehabilitation works; and xvii) All other ancillary activities.		
A **land use consent** for the construction, operation and maintenance of a 110 kV transmission line between the Waverley Wind Farm and the electricity substation located on Mangatangi Road, Waverley, including: i) The construction, operation and maintenance of a single circuit 110 kV above ground transmission line on monopoles up to 22 m high; ii) Land disturbance and earthworks associated with the establishment of the monopoles (including access tracks); iii) The storage and use of hazardous substances; iv) The erection and maintenance of construction safety nets over roads and the railway network; v) The generation of heavy traffic movements; vi) Vegetation clearance; vii) Site rehabilitation works; and viii) All other ancillary activities.	Discretionary	Unlimited

Table 1.2: Resource Consent Requirements Summary - Taranaki Regional Council.

ACTIVITY	ACTIVITY STATUS	PROPOSED CONSENT DURATION
A **discharge permit** to discharge contaminants (dust) to air from earthworks associated with the construction of the Waverley Wind Farm and the transmission line.	Controlled	15 years
A **discharge permit** to discharge water, stormwater and contaminants to land and water associated with the construction of the Waverley Wind Farm.	Controlled	15 years
A **water permit** to take and use surface water from farm ponds and unnamed watercourses within the project envelope for construction related activities, including dust suppression.	Discretionary	15 years
A **water permit** to take and use groundwater from bores within the project envelope for construction related activities, including concrete batching.	Controlled	15 years
A **water permit** to take and use groundwater from bores within the project envelope for the de-watering of the turbine foundation sites.	Controlled	15 years
A **land use consent** for the construction, placement or use of culverts in, on, or over the bed of the Waipipi Stream and other unnamed watercourses within the project site.	Discretionary	35 years
A **land use consent** for the removal of existing culverts from the bed of the Waipipi Stream and other unnamed watercourses within the project site.	Controlled	15 years
A **water permit** to dam and divert water associated with the establishment of culverts in the Waipipi Stream and other unnamed watercourses within the project site, and the draining and infilling of ponds.	Discretionary	15 years
A **land use consent** to construct and extend drainage channels and infill ponds within the project envelope.	Discretionary	15 years
A **land use consent** to clear vegetation from the bed and margins of the Waipipi Stream and unnamed watercourses, and associated with the infilling of ponds.	Discretionary	15 years

In accordance with section 125 of the RMA, Trustpower seeks that all resource consents granted by the STDC and TRC lapse if not given effect to within ten years of them being granted. A ten year lapse period is sought to provide sufficient flexibility to time the construction and commissioning of the WWF with a range of conditions (e.g. electricity demand, the supply of turbine components and ancillary equipment from overseas,

foreign exchange rates, and the timing of the construction of other development projects).

A ten year lapse period is also consistent with the lapsing period applied to the resource consents for other projects consented by Trustpower, including the Kaiwera Downs Wind Farm and the Mahinerangi Wind Farm.

Trustpower also seeks that all land use consents be granted in the name of *"Trustpower Limited"* in accordance with section 134 of the RMA, and seeks a condition specifying that the consent may only be exercised by the consent holder, its successor, or any person acting under the prior written approval of the consent holder. This condition is necessary given that Trustpower does not own the land upon which the WWF will be constructed and operated. For the avoidance of doubt, Trustpower also seeks that all regional consents be granted in the name of *"Trustpower Limited"*.

1.5 Land Ownership

The properties upon which the construction, operation and maintenance of the WWF and the transmission line will occur are detailed in sections 1.5.1 and 1.5.2 below. Section 1.5.1 identifies those properties that will support the wind farm, whilst section 1.5.2 lists those properties that will support the transmission line.

1.5.1 Wind Farm Project Site

The project site for the WWF occupies land held by four separate landowners, as well as road reserve. The project envelope will contain all infrastructure, including the turbines, wind monitoring masts, internal access roads, operations / maintenance building, stormwater treatment devices, and the electricity substation components associated with the WWF. Works will only occur within the EBZ in identified exceptions. This is discussed further in section 3 of this AEE.

Table 1.3 below provides the legal description and associated land ownership of the project site.

Table 1.3: Legal Description and Landowner Details - Project Site.

OWNER	LEGAL DESCRIPTION	CERTIFICATE OF TITLE
John Fettes Alexander, David John Alexander, Warwick Isaac Lupton, Philip Thomas Crawford	Pt Sec 149, Sec 148, Sec 268 - 273, Sec 280, Sec 284, Sec 362, Sec 364 - 366, Sec 369 and Sec 536 Okotuku District	WN8A/548
Standalone Farms Limited	Lot 1 DP 75614	WN44C/642
Warwick Issac Lupton, Ruth Jennifer Lupton	Lot 2 and 3 DP 75614	WN44C/643
The Proprietors of Parininihi Ki Waitotara Block (fee simple); Parininihi ki Waitotara Farms Limited Partnership (leasehold);	Sec 370 Okotuku District	WN16B/193 (fee simple) 219344 (leasehold) 565794 (leasehold)

Standalone Farms Limited (leasehold)		
South Taranaki District Council	Road Reserve - Dryden Road and paper roads	N/A

Copies of the certificates of title for the properties listed in Table 1.3 above are attached in **Appendix Two** to this AEE.

1.5.2 Transmission Line Route

The transmission line will be established within a 30 m wide corridor where it is located on private land. The route for the transmission line is approximately 13 km long and will connect to an electricity substation owned by Transpower on Mangatangi Road, Waverley. Additional detail of the proposed transmission line route is provided in section 3 of this AEE.

Table 1.4 below provides the legal description and associated land ownership of the properties traversed by the transmission line (commencing from the Transpower substation on Mangatangi Road).

Table 1.4: Legal Description and Land Owner Details - Transmission Line Route.

OWNER	LEGAL DESCRIPTION	CERTIFICATE OF TITLE
Transpower New Zealand Limited	Section 1 Survey Office Plan 21572 (Waverley Substation)	WN33B/958
Geoffrey Richard Redington, Beryl Margaret Redington, Gresham Walkinton Trustee Co Ltd	Pt Sec 87 Okotuku District	WN466/128
South Taranaki District Council	Sec 28 - 32 Waverley Town Belt (Sec 29)	514574
South Taranaki District Council	Road Reserve – Fookes Street	N/A
South Taranaki District Council	Road Reserve – Swinbourne Street	N/A
NZ Transport Agency	Road Reserve – State Highway 3	N/A
Trustpower Limited	Pt Sec 335 Okotuku District	WN77/142
KiwiRail	Rail Reserve – Marton / New Plymouth Line	N/A
South Taranaki District Council	Road Reserve – Dryden Road	N/A
John Fettes Alexander, David John Alexander, Warwick Isaac Lupton, Philip Thomas Crawford	Pt Sec 149, Sec 148, Sec 268 - 273, Sec 280, Sec 284, Sec 362, Sec 364 -	WN8A/548

	366, Sec 369 and Sec 536 Okotuku District	
Warwick Issac Lupton, Ruth Jennifer Lupton	Lot 2 and 3 DP 75614	WN44C/643
Standalone Farms Limited	Lot 1 DP 75614	WN44C/642

Copies of the certificates of title for the properties listed in Table 1.4 above are attached in **Appendix Three** to this AEE.

1.6 Report Structure

This AEE comprises eight sections as follows:

Section 1 Introduction.

Section 2 Provides a description of the existing environment in which the WWF and transmission line will be constructed, operated and maintained.

Section 3 Describes the activities associated with the construction, operation and maintenance of the WWF and the transmission line.

Section 4 Provides an assessment of the actual and potential environmental effects associated with the construction, operation and maintenance of the WWF and the transmission line. This assessment includes consideration of potential effects on natural character, landscape and visual amenity values; coastal hazards; terrestrial, freshwater and avian ecology; traffic; noise; social, recreation and tourism values; cultural matters; archaeology and aviation. Section 4 also outlines how Trustpower proposes to avoid, remedy or mitigate the actual and potential effects of the WWF and the transmission line.

Section 5 Sets out the statutory planning framework against which the resource consent applications for the WWF and transmission line are to be assessed. This section includes a description of the resource consents required for the WWF and the transmission line, their activity status, and an analysis against the objectives and policies of the relevant national, regional and district planning documents.

Section 6 Considers the resource consent applications for the WWF and the transmission line against Part 2 of the RMA, as well as sections 105 and 107 of the RMA.

Section 7 Describes the consultation undertaken by Trustpower with relevant stakeholders and interested parties.

Section 8 Conclusion.

The various technical assessments that provide the detailed background information and the environmental assessments to support this AEE are appended to this AEE, and are referenced throughout.

2. EXISTING ENVIRONMENT

This section of the AEE provides a summary of the existing physical, social, environmental and cultural values of the project site and surrounding areas. This description of the existing environment provides the context against which the actual and potential effects of the WWF and the transmission line have been assessed.

A number of technical assessments have been commissioned by Trustpower to inform the description of the existing environment in this section of the AEE. These technical assessments are referenced, as appropriate, in the sections below and are appended to the AEE.

2.1 General Setting

As noted in section 1.1 of this AEE, the WWF will be located on an approximately 980 ha site that is partly adjacent to the Tasman Sea and the Whenuakura River. The project site is located approximately 6 km south-east of Patea and 7 km south-west of Waverley. It comprises four private landholdings, as well as road reserve vested in the STDC. The general location of the project site is illustrated in Figure 1 of Appendix A to Isthmus (2016).

Access to the project site is obtained via Peat Road and an unsealed private access road that extends into the site. Peat Road converges with State Highway 3 ('SH3') approximately 3 km to the north-east of the project site.

The topography of the project site is predominantly flat. However, it does feature a series of terraces that are the result of extensive iron sand mining operations that occurred across the site in the 1970's and 1980's. The northern extent of the project site is approximately 40 m above sea level ('a.s.l'), and it gradually lowers to an elevation of between 10 – 20 m a.s.l along the boundary adjacent to the Tasman Sea.

The vegetation cover within the project site is mainly developed pasture, with pockets of plantation forestry near the north-western boundary. The land is used for grazing cattle and some hay production.

A number of farm ponds are dispersed throughout the project site. Seven of the ponds within the project site have a width greater than 50 m, with the largest pond being approximately 2.6 ha in size. It is understood that water levels in the ponds are at least partially maintained by groundwater. Maimai for duck-shooting have been constructed on several of the ponds.

The Waipipi Stream traverses through the middle of the project site and is the only natural waterbody. Its upper reaches have been heavily modified by iron sand mining, land drainage and farming operations. The Waipipi Stream passes through the sand dunes bordering the project site before discharging onto the adjacent beach (when flows are sufficient).

The water table across the project site is reasonably high, with groundwater at a depth of approximately 2 – 3 m in some locations. As such, a number of channels and drains have been constructed over the years to improve shallow subsoil conditions for farming activities. The width of these drains is typically 1 m.

The prevailing winds across the site are from the north-west and south-east, with the former more dominant. The prevailing winds tend to be sub-parallel to the coast, rather than directly on-shore. A destructive wind storm in March 2012 caused considerable damage to a number of farm buildings within the project site and the surrounding forestry blocks.

The project site receives annual rainfall of between 800 - 1200 mm.

2.1.1 Surrounding Land Uses and Demographics

The land surrounding the project site, and much of the transmission line route, is predominantly used for agricultural activities associated with pastoral farming, with some horse breeding / training and cropping occurring on the alluvial river flats. There are also relatively small pockets of plantation forestry.

The rural settlement density of the surrounding area is reasonably sparse, particularly in the areas more exposed to the coastline. Most settlement tends to be concentrated inland towards SH3.

The nearest existing dwelling to the project envelope (i.e. a location where a turbine could potentially be constructed) is approximately 1 km to the south-east on Waipipi Road.[5] A map showing the location of existing dwellings within the surrounding area is provided in Figure 8 of Appendix A to Isthmus (2016). The predominant dwelling type in the vicinity of the project site are single level dwellings associated with reasonably large parcels of agricultural land.

The nearest settlements to the project site are:

- **Waverley:** A rural service town located on SH3 approximately 7 km inland of the project site. Waverley had a population of 798 in the 2013 census (a decrease of 7.3% from the 2006 census);

- **Waverley Beach:** A coastal bach settlement with approximately 50 lots and a camping ground owned by the STDC located at the end of Waipipi Road. It is approximately 4.5 km from the project site and sits above a rugged west coast beach;

- **Waipipi Beach:** A recent coastal subdivision development that is located approximately 3 km from the project site at the intersection of Waverley Beach Road and Waipipi Road. Subdivision consent for 97 lots was granted in 2006. It is understood that 10 lots have been sold to date and only a handful of residential dwellings have been constructed; and

- **Patea:** Is located approximately 6 km north-west of the project site and is based around a former river port, freezing works and SH3 near the mouth of the Patea River. Patea had a population of 1,098 in the 2013 census (a decrease of 3.9% from the 2006 census).

[5] This assessment includes those dwellings owned by the four landowners on which the WWF will be constructed.

2.1.2 Other Physical Resources

The project site and the surrounding area include other physical resources and infrastructure. In this respect, two 80 m wind monitoring masts are located on the project site. These masts were originally erected by Allco Wind Energy NZ Limited ('Allco') and enable the collection of data on the quality and consistency of the wind resource at the project site.

The Marton – New Plymouth Railway Line is located approximately 2 km to the north of the project site, near Dryden and Rangikura Roads. This line is owned and operated by KiwiRail. The rail crossing over the Whenuakura River is approximately 450 m from the western boundary of the project site. The Marton – New Plymouth Railway Line is a secondary railway line and links the Taranaki and Manawatu Regions. The line is only utilised for freight, with milk being the primary product that is transported.

With respect to the electricity transmission infrastructure, twin 220 kV transmission lines run between Stratford and Bunnythorpe. These 220 kV transmission lines travel inland of SH3 and Waverley. A single 110 kV transmission line also runs parallel to the 220 kV transmission lines in the vicinity of Waverley. This 110 kV transmission line connects into an electricity substation located on the edge of Waverley on Mangatangi Road. This infrastructure is owned and operated by Transpower and forms part of the National Grid.

The local electricity distribution network around Waverley is owned and operated by Powerco Limited ('Powerco'). Powerco's electricity distribution network includes sub-transmission lines rated at 11 kV and 33 kV. These lines are located both above and below ground, although the lines in rural areas are generally located above ground.

Finally, a beaconed trig station is situated approximately 3.5 km north of the project site which provides an important geographical reference point.

2.2 Geotechnical Values

2.2.1 Geology

Information on the geological characteristics of the project site is provided in the report entitled "*Geotechnical Investigation – Waverley Wind Farm"* by Riley Consultants Limited ('Riley - Geotechnical (2016)'). This report is attached as **Appendix Four** to this AEE.

The 2008 Geological Map 7 'Taranaki' by IGNS identifies the project site as being underlain by Holocene sand dunes (comprising predominantly sand and silt) and Pleistocene beach deposits consisting of marine terrace cover beds (conglomerate, sand, peat and clay). This map also indicates that Whenuakura Group rock deposits (limestone, pebbly sandstone and siltstone) underlie the marine terrace cover.

Exposures of all three major geological groups can be seen in road cuttings and outcrops at the surface.

As noted in section 2.1 above, the project site encompasses an area previously utilised for the mining of iron sand in the 1970's and 1980's. This has resulted in the project site having a relatively flat and slightly 'terraced' land surface. The iron sand mining targeted titano-magnetite rich iron deposits within the dune sands. The mining process included dredging and separation processes to remove the ore, followed by pumping back the unwanted tailings and reinstating the land surface, albeit to a highly modified state.

Photos 2 and 3 in Riley – Geotechnical (2016) provide an illustration of the iron sand mining operations that previously occurred within the project site.

Exploration drilling and investigations within the project site in 2007 and 2012 revealed black sand deposits averaging 9 m in depth. Riley - Geotechnical (2016) concludes that there is likely to be between 10 - 15 m depth of loose to medium dense sand with silt horizons (either fill material or dune deposits), underlain by medium to dense old beach deposits of silt, sand, clay and conglomerate, which in turn overlay extremely weak siltstone and sandstone.

There are no observable surface expressions of active faults within the project site. Riley - Geotechnical (2016) notes that the project site is in close proximity to the Waverley Fault Zone, which is made up of several active faults trending in a north-easterly direction. Riley - Geotechnical (2016) also identifies that an active fault is likely to run adjacent to the eastern extent of the project site. There are no indications of an active fault running through the western end of the project site.

2.2.2 Groundwater

Piezometers were installed in bores within the project site in 2012 to establish a groundwater profile across a representational area. The location of these bores is documented in Appendix E to Riley – Geotechnical (2016).

The piezometers measured the water level in two targeted zones - 2 m to 5 m deep (shallow water levels in the loose sand) and 17 m to 20 m deep (deeper water levels in the conglomerate / sand beach deposits and sandstone).

Groundwater levels were measured to be 2.7 m deep within the sands at bore MH1, reducing to a depth of 0.7m at bore MH2 near the coastline. Groundwater levels in the beach deposits was measured at 6 m deep, whilst the Whenuakura Group rock was dry. Sinclair Knight Mertz had previously measured groundwater levels at 2.6m deep in 2007.

Overall, Riley - Geotechnical (2016) consider it likely that groundwater is perched above the sandstone within the sands and beach deposits.

2.3 Coastal Processes

Information on the coastal geomorphology, landforms and processes in the vicinity of the project site is provided in the report entitled *"Waverley Wind Farm – Coastal Environment Description and Assessment of Effects"* by Shore Processes and Management Limited ('Shore Processes (2016)'). This report is attached as **Appendix Five** to this AEE.

In summary, Shore Processes (2016) concludes that the coast adjacent to the project site is dynamically stable. However, it is subject to episodic periods of fluctuation relating to changes in the process environment. In this regard, periods of storm waves can result in prolonged episodes of erosion of the cliffs and foredune, while strong winds can result in dune blowouts and significant movement of bare sand across the backshore.

Further discussion on these matters is provided in the sections below.

2.3.1 Coastal Geomorphology

2.3.1.1 Overview

The coastline adjacent to the project site is approximately 7.5 km long and is characterised by a 4 to 10 m high cliff at the south-eastern end of the project site, and a 4 to 8 m high cliff near the Whenuakura River. Shore Processes (2016) identifies that the backshore of the central section of the project site is formed by an active foredune system.

The foredunes are the seaward facet of a broad dune system that has a mix of well-vegetated and bare dune features, including some stable and unstable dunes. Sand dunes extend inland for approximately 140 to 700 m from both the cliff and foredune shoreline.

Landward of the dunes is relatively flat and the project site is dissected with drains. Shore Processes (2016) considers that the Waverley Dune Complex would have previously extended across, and beyond, the project site prior to the iron sand mining operations.

2.3.1.2 Wave Environment, Nearshore and Beach Processes

The coastal environment between Patea and Waipipi Point experiences combined sea and swell waves from the west and south. Although there is the potential for large gross alongshore transport of sediment, Shore Processes (2016) considers that net alongshore transport is low and most likely from the west to east.

The prevailing winds are from the north-west and south-east, with those from the north-west being more dominant. This has resulted in the dune system behind the foredunes being aligned at an angle to the shoreline, running in a west-north-west to east-south-east direction near the Whenuakura River, and in a north-northwest to south-south-east direction near Waipipi Point.

Shore Processes (2016) identifies that the beach system is well supplied with sand, with the sources being the local rivers, the nearshore seabed, and the erosion of cliffs to the west and east. Although the coast within the vicinity of the project site has an overall erosional trend, this is likely the result of retreat of the cliffs - which act as headlands to the sand dune section of the shore. There is also likely to be a net loss of sediment from the beach system to the dunes landward of the foredune.

2.3.1.3 Beach and Nearshore Morphology

Beach widths adjacent to the project site vary in width as a function of the backshore morphology. Near the western end of the project site the beach is approximately 50 to 70 m wide. However, wave run-up reaches the base of the cliffs at high tide during storms. Around the Waipipi Stream the beach width is approximately 90 to 120 m wide, with the wider beach area located adjacent to the active dune zone, east of the stream mouth along to Waipipi Point.

The increase in beach width towards the east also coincides with the occurrence of localised low tide outcrops or reefs (i.e. Pid's Point). These are likely to be an extent of the shelly conglomerate surfaces. The reef also causes waves to break offshore, dissipating energy in the surf zone. There is also a similar nearshore reef outcrop just west of Waipipi Stream. While these outcrops affect sedimentation processes, and hence influence the outline of the coast, irregular seabed topography may modify wave patterns, thereby also affecting sediment transport in the nearshore and on the beach.

River mouth processes also modify the local beach topography and can result in erosion of the cliff backshore. Shore Processes (2016) notes that this is especially noticeable near the Whenuakura River. The river mouth is often offset to the east, with the river running along the back of the beach against the cliff.

2.3.1.4 Terraces and Cliff Landforms

Shore Processes (2016) explains that the project site is located on the Hauriri Terrace, which slopes gently seaward and is dissected by a number of drains. The seaward margin of the Hauriri Terrace is a sea cliff. At the eastern end of the project site the cliff is approximately 10 m high and lowers to approximately 4 m around 1.2 km along the shore (after which it is covered by sand dunes until the shelly conglomerate outcropping along the southern side of Waipipi Point).

Along the cliff line where the shelly conglomerate bed is more elevated, eroded blocks provide armouring at the cliff base. Where this bed is lower, a narrow platform that is 1 -2 m wide may exist near the base of the cliff. Further to the east beyond the project site, the cliffs increase in height to approximately 20 m and only bare sand exists at the cliff base**.**

The cliffs at the western end of the project site are approximately 8 m high and extend from the 5.3 km mark to the mouth of the Whenuakura River (a distance of approximately 2 km). Gaps or recessions in the cliff (through which wind-borne beach sand can funnel landward) occur at its eastern terminus.

Gaps or recession in the cliff also occur between approximately 6.5 and 7 km mark along the shore. This characteristic may be related to localised weaknesses in rock properties or localised increases in beach width due to river mouth processes, thereby enabling dune sand to ramp up the cliff.

2.3.2 Historical Morphological Changes

Shore Processes (2016) calculates the extent of erosion along the cliff sections of the shore adjacent to the project site between 1905 and 2007. In this regard, the average erosion distance of the cliff at the eastern end of the project site was 5 m, while the average erosion distance of the cliff at the western end was 8.5 m.

Shore Processes (2016) considers that the lower rate of cliff retreat to the east is likely related to the control of the process by the more resistant shelly conglomerate.

With respect to the dune section of the shoreline, Shore Processes (2016) identifies that long-term retreat between 1905 and 2007 was 6.75 m over the 102 year period. In contrast to the cliff sections, there is considerable variation in the changes for different positions along the shore.

2.4 Landscape, Visual Amenity and Natural Character Values

An assessment of the existing landscape, visual amenity and natural character values around the project site and the transmission line route is provided in Isthmus (2016).

Trustpower also commissioned Brown NZ Limited to undertake an assessment of the natural character values of the coastal environment adjacent to the project site in response to the natural character mapping included in the Proposed South Taranaki District Plan ('Proposed Plan'). This report is titled *"Natural Character Values - Waverley Coastline"* ('Brown (2015)') and is attached as **Appendix Six** to this AEE.

An overview of the existing landscape, visual amenity and natural character values around the project site, and the surrounding area, is provided in the sections below.

2.4.1 Existing Landscape

2.4.1.1 Physical Features

Isthmus (2016) has characterised the landscape around the project site as comprising former marine terraces that extend up to 20 km inland and to approximately 200 m a.s.l. The terraces are an expression of tectonic uplift and fluctuating sea levels. From the air the terraces are characterised as manicured flat to rolling pasture, dissected by deeply incised streams and rivers. In addition, the former iron sand mining operations have also created stepped terraces across the project site.

Isthmus (2016) identifies that the coastline adjacent to the project site consists of a black sand beach and a band of sand dunes vegetated in a mix of exotic and native species, with herbs and reeds in the inter-dune hollows. The ecological values of these dunes are discussed further in section 2.5 of this AEE below.

The highest dunes are located inland of Pid's Point. An area of the dunes east of Pid's Point is identified as a significant natural area in the South Taranaki District Plan ('District Plan') and the Proposed Plan,[6] and is also identified in the Taranaki Regional Policy Statement ('RPS') as the Waipipi Dunelands - being a coastal area of regional or local significance.

The other main natural feature identified by Isthmus (2016) is the Whenuakura River, which runs adjacent to the north-western boundary of the project site. In its lower reaches adjacent to the project site, the Whenuakura River meanders across a flood plain and enters the sea by way of an estuary behind a shingle spit. The Whenuakura Estuary is listed as a coastal area of regional or local significance in the RPS. Likewise, it is identified as an area of outstanding coastal value in the Taranaki Regional Coastal Plan ('Coastal Plan').

There are ancient sand dunes, distinct from the active coastal dunes, on the raised marine terraces further inland. These dunes tend to become less pronounced further inland, but there are some areas (such as immediately south of Waverley) where there is a hummocky landscape of dune hills with lakes and wetlands (e.g. Lake Oturi).

The settlement / land use patterns, human modification and ecological values that inform the physical values of the landscape surrounding the project site are detailed in sections 2.1.1, 2.1.2 and 2.5 of this AEE respectively.

2.4.1.2 Associative Aspects

Trustpower understand that the project site and transmission line is located within the rohe of Ngaa Rauru, while the opposite side of the Whenuakura River is within the rohe

[6] SNA 22 in the District Plan and SNA 21 in the Proposed Plan.

of Ngati Ruanui. The District Plan and Proposed Plan both include statutory acknowledgement areas in favour of Ngaa Rauru and Ngati Ruanui in the vicinity of the project site.

Further detail on the cultural values of the project site and the surrounding environment is provided in section 2.12 of this AEE.

With respect to historical associations, Isthmus (2016) notes that the historical associations specific to the project site are predominately linked to the iron sand mining that previously occurred on site. There are some industrial ruins on the project site and along the coast toward Waverley Beach, which include remnant sections of pipeline, the framework of a large building, a stockpile area and remnants of a water storage dam. Street names in the recent coastal subdivision at Waipipi Beach also reference the previous iron sand mining activities.

Further information on the broad historical context for the Waverley area that informs the associative aspects of the landscape is provided in section 2.11 of this AEE. Likewise, further discussion on the recreational uses of the landscape is provided in section 2.10 below.

2.4.1.3 Perceptual (Visual) Aspects

Isthmus (2016) notes that the coastline and coastal dunes are the only areas in the vicinity of the project site that could be described as having high landscape amenity. While the coastline and dunes have a low level of use, they do have a character of quiet solitude. The remainder of the project site and surrounds has a rural character, but is relatively featureless.

Visibility of the project site itself is restricted. The nearest public roads to the project site are no-exit roads and / or paper roads. As previously discussed, settlement density on the surrounding farmland is low. Isthmus (2016) notes that the flat topography of the project site increases the extent to which trees in the intervening landscape are able to screen the site.

2.4.2 Natural Character and the Coastal Environment

2.4.2.1 Isthmus (2016)

Isthmus (2016) reviews the statutory provisions relevant to defining the extent of the coastal environment and the values and features comprising natural character. In particular, Isthmus (2016) considers Policies 1 and 13(2) of the New Zealand Coastal Policy Statement ('NZCPS') and CNC Policy 1 of the RPS - which list the matters that may contribute to the natural character of the coastal environment.

Isthmus (2016) identifies that the project site, and part of the transmission line route, sits within a coastal protection area in the District Plan. The District Plan identifies the coastal protection area as reflecting the extent of the coastal environment and the area within which coastal processes potentially impact on the use, development and subdivision of rural land. However, Isthmus (2016) considers that the inland boundary of the coastal protection area does not appear to be based on the degree of coastal influence or coastal qualities. In some locations it extends some distance inland where the coastal influences and qualities are low, but in other places (e.g. Waverley Beach) the line is drawn much closer to the coast, despite the coastal influence and qualities being more obvious and significant.

Isthmus (2016) also identifies two distinct zones of coastal environment within the vicinity of the project site in terms of coastal influence and natural character. These are:

- The coastal margins (including the beach, sand dunes and Whenuakura Estuary) have distinctly more significant coastal influence and qualities, and a higher degree of natural character than other areas. The coastal influences are significant in this zone. The degree of natural character is also relatively high. The zone has natural landforms, reasonably natural vegetative cover, is uncluttered by human structures, and the sea has a defining presence. However, Isthmus (2016) concludes that while the natural character is relatively high, it is not 'outstanding' because the dunes are modified by grazing and exotic vegetation and the adjacent backdrop is modified farmed; and

- The farmland inland of the dunes has distinctly lower coastal influence and a lower degree of natural character. Although exposed and windy, the farmland is substantially influenced by human management rather than coastal processes. Furthermore, while there are glimpses of the sea, the coast is much less prominent. Similarly, the degree of natural character is moderate at best. The landform itself is modified by the former iron sand mining activities, the vegetation cover is dominated by pasture, and there are built features such as the farm roads, drains and farm storage structures.

Isthmus (2016) also notes that the Proposed Plan delineates the coastline adjacent to the project site as an area of outstanding natural character (although this classification is subject to a submission by Trustpower and is yet to be tested via a hearing). However, Isthmus (2016) considers the 'outstanding' classification to be incorrect for the following reasons:

- In biophysical terms, the dune field is not intact but a remnant of what naturally would have been an extensive dune field that was removed by iron sand mining. The dune vegetation is similarly modified – while it contains indigenous plant assemblages in places, they are within extensive areas of rough grazing and weeds. Finally, the coast-to-inland sequence (which one would expect to see in an area of outstanding natural character) is abruptly truncated by a substantially modified area in terms of landform, vegetation cover, and watercourses; and

- In experiential terms, while there is a high sense of naturalness from places on the beach where views are restricted by the backdrop dunes, the modified context is clearly evident from the dunes themselves and to anybody accessing the beach across the adjoining land.

Isthmus (2016) concludes that the degree of natural character adjacent to the project site is not outstanding. At most, the degree of natural character on the dunes may be sufficient to warrant being classified as 'high'.

2.4.2.2 Brown (2015)

Brown (2015) examines the on the ground qualities of the coastal environment around the project site and seeks to ascertain the degree to which that coast exhibits the qualities that might be anticipated within an area of outstanding natural character, with reference to the policies of the NZCPS. It includes a peer review of the landscape and

natural character assessment undertaken by Boffa Miskell Limited, on behalf of the STDC, for the preparation of the Proposed Plan.

Brown (2015) agrees with Boffa Miskell Limited's approach to the identification of areas that display different levels of natural character value. However, Brown (2015) identifies reservations with respect to the biotic attributes assessment, where it is considered that more weight should be attributed to the retention of biotic systems that display ecological sequence and connection through multiple habitats. As the approach by Boffa Miskell Limited currently stands, greater, perhaps even excessive, weight is attributed to ecological remnants - even if they are relatively isolated.

The other area of concern identified by Brown (2015) relates to the ratings system utilised by Boffa Miskell Limited. During the initial evaluation, the Waverley coastline generated a mixture of 'high' and 'very high' ratings. Yet in the course of the more detailed second round of assessment it attained ratings that are consistently 'very high'. There is no explanation as to how this transition occurred or even how a coastline described as containing land inland of its coastal / terrace edge that "*has predominantly been cleared and managed for agricultural purposes*"[7] managed to attain a high rating for its biotic attributes. Brown (2015) notes that this classification was subsequently elevated to a 'very high' rating by Boffa Miskell Limited in the second round of assessment without clear justification.[8]

Brown (2015) considers this raises the issue of whether the entire coastal environment should be attributed an exceptionally high rating when only parts of the environment are actually 'natural', 'highly natural' or 'outstandingly natural'. Brown (2015) considers it unclear whether this has occurred because of the desktop nature of the assessment by Boffa Miskell Limited or because of a philosophical view that high values associated with one sector of the coastal environment should be extrapolated to the rest of that sector.

With respect to the classification of the natural character values of the coastal environment in the vicinity of the project site, Brown (2015) considers that the coastal sector identified in the landscape assessment by Boffa Miskell Limited can be appropriately split into two coastal corridors as shown in Table 2.1 below.

Table 2.1: Coastal Corridor Classifications (Brown (2015)).

AREA	NATURAL CHARACTER VALUES
The Waipipi Dunes, Waipipi Stream dunes, and the main cliff-lines and beachfront.	This area is attributed a **high** natural character rating. This area embraces the main dune sequences extending from north-west of the Waipipi Stream through to the end of the Waipipi Dunes, together with associated beachfronts. It is notable for its very strong abiotic characteristics and sense of isolation from the main farming activities inland. Even so, it is not entirely divorced from such activities, with both sporadic grazing inside the

7 South Taranaki Landscape Assessment, Boffa Miskell Limited, 2014, Page 102.

8 South Taranaki Landscape Assessment, Boffa Miskell Limited, 2014, Page 114.

	dune systems and the strong association of this coastline with the areas of rural production 'above' and behind it, precluding an outstanding rating.
The Whenuakura River margins and dune corridor behind the cliff-lines and main dunes.	This area is attributed a **moderate** natural character rating. A secondary area captures the margins of the Whenuakura River, together with the cliffs through to the mouth of the Whenuakura River and down to Waverley Beach, and the sequence of lower dunes that abut the sand mined area. It also includes the periphery of the lower section of the Waipipi Stream. This area contains a mixture of eroding escarpments, dunes, ponds, stream corridors and native plant communities, but is also appreciably infiltrated by pasture, fencing, tracks, vegetation clearance, weed species, and signs of regular browsing. Although the cliff-lines and associated beachfronts at each end of this sector are more clearly separated from farming operations nearby, they remain typical of large stretches of the South Taranaki coastline, with eroding cliffs topped by vegetation that is often highly modified and subject to grazing / browsing by stock. The absence of a more complete and more diverse plant mosaic hinders the overall sense of naturalness within these parts of the coastline, as does the persistent association with a highly modified environment beyond the immediate cliff tops and an increasingly narrow strip of low dunes.

The areas described in Table 2.1 are illustrated in Maps 1 to 5 appended to Brown (2015).

Brown (2015) concludes that it is difficult to see how the coastline around, and south-east of, the Whenuakura River might be regarded as being close to pristine and qualify as an area of outstanding natural character. In this regard, much of the coastal sector identified by Boffa Miskell Limited is considered to be highly modified and continues to be the subject of on-going physical degradation – both physically and perceptually. It fails to display the physical cohesion and visual integrity that would be expected for an area of outstanding natural character, and even though some significant ecological remnants can still be found among the dunes and other coastal formations, the site lacks the overall sense of naturalness that pervades areas of outstanding natural character identified at other locations.

Brown (2015) also concludes that the coastal environment is too strongly affected by neighbouring rural activities, both physically and in terms of its experiential character, to

qualify as an area of outstanding natural character. It is considered that the outstanding natural character rating attributed to the coastline adjacent to the project site is inappropriate – with reference to both Boffa Miskell Limited's assessment criteria and Policy 13 of the NZCPS.

2.4.3 Outstanding Natural Features and Landscapes

The District Plan does not identify any outstanding natural features or landscapes. As such, Isthmus (2016) considers whether there might be potential outstanding natural features or landscapes in the vicinity of the project site.

The assessment by Isthmus was originally undertaken prior to the preparation of the landscape assessment by Boffa Miskell Limited in 2014 for the Proposed Plan. The Proposed Plan does identify outstanding natural features or landscapes on the basis of the district wide assessment by Boffa Miskell Limited.

The nearest outstanding natural feature or landscape to the project site in the Proposed Plan is the Waverley Beach cliffs, which is approximately 4.5 km away. The identification of this feature as an outstanding natural feature or landscape is consistent with the assessment undertaken by Isthmus and which is discussed below.

2.4.3.1 Coastal Margins of the Project Site

Isthmus (2016) considers whether the coastline, beach and the coastal dunes adjacent to the project site have the following landscape attributes:

- High value for its biophysical attributes, largely for the ecological significance of the dunes and Whenuakura Estuary;
- Moderately high aesthetic attributes; and
- Moderately high value for its associative attributes. Such value is mainly related to the significance of the coast and the Whenuakura River to tangata whenua (and to a lesser extent the use of the beach by locals).

However, Isthmus (2016) concludes that, while the coast adjacent to the project site has reasonably high naturalness and landscape value, it is not sufficiently eminent or exceptional to be an outstanding natural feature or landscape.

2.4.3.2 Inland Parts of the Project Site

Isthmus (2016) concludes that the project site inland of the dunes has low landscape values. In this regard, the area is identified as having:

- Low value for its biophysical aspects because of the former iron sand mining and modified pastoral vegetation cover;
- Low aesthetic attributes, because it is modified and relatively featureless; and
- Moderate associative attributes. There are historical associations with the iron sand mining activities, although the mining activities compromised the natural landscape.

Taken as a whole, Isthmus (2016) concludes that the project site, inland of the dunes, is not considered to be an outstanding natural feature or landscape.

2.4.3.3 Waverley Beach Cliffs

The Waverley Beach cliffs are relatively bold sandstone cliffs, approximately 10 - 15 m high. They contain erosion sculpted features such as caves, stacks, blowholes and arches. They are a dramatic expression of the coastal erosion of uplifted marine terraces.

Isthmus (2016) considers that the cliffs themselves are natural features with sufficiently high values to be considered as a potential outstanding natural feature, notwithstanding the presence of the adjacent settlement and the boat ramp access from the top of the cliffs to the beach.

Isthmus (2016) identifies the Waverley Beach cliffs as having the following landscape attributes

- High value for biophysical attributes, because of the cliffs are a distinctive geomorphic feature and an example of the erosion by the sea of elevated marine terraces;
- High value for aesthetic attributes, because of the dramatic nature of the cliffs and the picturesque features around the headland including the arch and stack; and
- High value for associative attributes, because the area is a well-used recreation and scenic destination

Isthmus (2016) concludes that the Waverley Beach Cliffs are sufficiently eminent to be an ONF.

2.4.3.4 Raised Marine Terraces

Isthmus (2016) notes that NFL Policy 1 of the RPS refers to the following:

> *"Outstanding natural features and landscapes are to be protected from inappropriate subdivision, use and development, including protection of:*
>
> *(e) The rural features and landscapes of regional significance, including the scenic and landscape qualities of the raised marine terraces of south Taranaki and inland Taranaki hill country;"*

Isthmus (2016) comments that NFL Policy 1 appears to list types of landscapes characteristic of the Taranaki Region and indicate that outstanding natural features or landscapes would constitute examples of such features or landscapes that had outstanding scenic and landscape qualities. This interpretation is reinforced by the introduction to Chapter 10 of the RPS, which refers to *"parts of the coastline and cliffs of north and south Taranaki…"* rather than to the marine terraces as a whole.

Isthmus (2016) conclude that it would not be reasonable to interpret NFL Policy 1(e) as including all the raised marine terraces of the South Taranaki District, given that these terraces comprise a significant proportion of the entire district, including the project site.

Isthmus (2016) states that a sensible interpretation of the policy would be that outstanding examples of such terraces could be identified as outstanding natural features or landscapes.

2.5 Terrestrial Ecology Values

An assessment of the existing terrestrial ecology values of the project site is provided in the report entitled "*Waverley Wind Farm – Terrestrial and Freshwater Ecology Assessment"* by Ryder Consulting Limited ('Ryder (2016)'). This report is attached as **Appendix Seven** to this AEE.

An overview of the existing terrestrial ecology values within the project site, and along the transmission line route, is provided in the sections below.

2.5.1 Vegetation Overview

Ryder (2016) identifies 16 vegetation types within the project site and the adjacent sand dunes. Four vegetation types occur partly or entirely within the project envelope, and 12 occur entirely outside the project envelope. All vegetation types are shown in Table 5.1 and Figure 5.1 of Ryder (2016).

The dominant vegetation within the project envelope is pasture on sand-mined surfaces, which comprises 91% (732.3 ha) of the envelope. The next largest vegetation type in the project envelope is grazed pasture-scrub mosaic, which makes up 7.1% of the project envelope (56.8 ha). The remaining vegetation within the project envelope consist of sand flats (6.2 ha, 0.8%) and pine plantation (4.9 ha, 0.6%).

The project envelope also includes 11 farm ponds (4.3 ha, 0.5%), eight of which are less than 0.15 ha in area, and three of which are greater than 0.47 ha in area.[9]

2.5.2 Vegetation within the Project Envelope

2.5.2.1 Pasture on Previously Mined Dunes

Following iron sand mining operations, the reinstated surfaces were converted to pasture. The pasture varies considerably in composition from place to place in relation to the water table. Wet pasture is typically associated with drains and the terrace edges.

Ryder (2016) concludes that the pasture is of low botanical significance based on criteria set out in the RPS. Few indigenous plants were found in dry pasture on the previously mined surfaces. Some wetter areas have pockets of indigenous rushes, sedges and raupo.

2.5.2.2 Pasture-Scrub Mosaic

The areas mapped as pasture-scrub mosaic are areas of natural dune terrain. These natural dunes contain many of the plants found in the pasture areas of the project site, although marram grass is often the predominant exotic grass on dry dunes. Scattered shrubs of boxthorn, blackberry and lupin are also typical.

---

[9] A further three very small ponds (0.27 ha in total) also fall within the project site, but not within the project envelope (i.e. they are within the EBZ).

In the north-west block of the project envelope is an area of unmined dunes with small patches of sand coprosma shrubs. The densest patch of this vegetation included 12 shrubs in an area seemingly sprayed for blackberry.

In the unmined dunes there is a dendritic pattern of watercourses compared with the grid drainage patterns of the previously mined dunes. The watercourses are generally narrow, heavily trampled and grazed by stock in both the mined and unmined dunes. The indigenous vegetation around the watercourses most commonly consists of cutty grass, with scattered patches of raupo and kapungawha.

Overall, Ryder (2016) notes that most of the pasture-scrub mosaic (101.5 ha of 158.25 ha) is excluded from the project envelope, including all of the areas with more diverse plant communities. The pasture scrub mosaic included in the project envelope comprises rough pasture and is of low significance.

2.5.2.3 Pinus Radiata Plantation

Two small blocks of *Pinus radiata* (4.8 ha) occur within the northern extent of the project envelope. A further 50 ha of pines are present adjacent to the project site. These pine plantations have no botanical significance.

2.5.2.4 Sand Flats

Sand flats consist of wind-eroding dune sand, and mostly contain marram grass grassland. They are generally of low ecological significance.

Native pingao and sand carex are colonising the sand flats in places, increasing their ecological value. Most of the sand flats are outside the project envelope (19.5 ha of 25.7 ha) and those that are within the envelope are of low ecological significance.

2.5.2.5 Ponds within the Project Envelope

Ryder (2016) examined several artificial farm ponds in the project site. Most ponds are used for stockwater and several are also used for duck shooting. Some indigenous aquatic plants were identified in two of the larger ponds, including fennel-leaved pondweed which is listed as ‘At Risk – Nationally Uncommon’. As such, Ryder (2016) considers the two largest ponds to be of regional ecological significance in accordance with the RPS.

The remaining small ponds located within the project envelope are considered to be of low ecological value.

2.5.3 Vegetation located outside the Project Envelope

The vegetation types listed below occur entirely outside the project envelope but are within, or adjacent to, the project site. These vegetation types are also shown in Table 5.1 and Figure 5.1 of Ryder (2016).

Vegetation outside of the project envelope is discussed briefly to provide context to the existing ecological environment, although it will not be directly impacted upon. In this respect, the vegetation types identified by Ryder (2016) were:

- **Coastal Swamps** – the vegetation is dominated by raupo, but this is sparse in some parts allowing a range of other swamp species. The swamp is of high regional and local significance because of its rare, distinctive, and representative flora and fauna, its ecological context, and its sustainability;

- **Swamps** – swamp vegetation with some native plants occurs in numerous places at the foot of terraces within the sand mined area, mostly adjoining streams and drainage ditches. The swamp is relatively large and has a high proportion of indigenous plants, making it ecologically important;

- **Cabbage Tree Treeland** – a small area on the unmined dunes that contains the only stand of cabbage trees within the project site. It is fenced and young trees are growing as a result of protection from grazing;

- **Coastal Cliff Vegetation** – dominated by indigenous plants, several of which are nationally threatened or uncommon. Just east of the Whenuakura River are some of the largest intact patches of a mat-forming button daisy and rosettes of the native puwha (both of which are classified as 'At Risk');

- **Riparian Vegetation** – generally occurs within the project site as a mosaic of vegetation types adjacent to the Waipipi Stream. The vegetation in this area includes cabbage tree, mamaku tree fern, wheki tree fern and cliff kiokio fern. The riparian zone is of low ecological significance, but has the potential to protect ecological and water quality values in the stream;

- **Turf Vegetation and Reedland on Previously Sand-Mined Dunes** – this vegetation is considered to be at least of regional significance by Ryder (2016). On the seaward side of a strip of raupo is an area of bog, which is characterised by a dense sward of plants that are mostly shorter than 20 cm. The naturalness of the area has diminished since the survey of 2007 because of alteration to the local water regime;

- **Swamp in Dune and Hollows** – adjoining the eroding dune area is the most extensive natural area of oioi. This area is ecologically significant. To the west the oioi gives way to a turf dominated by *Schoenus nitens*;

- **Oioi Rushland** - This area is similar to, but more modified than, the extensive natural area of oioi rushland in the Swamp in Dune and Hollows area above. The biodiversity values of this area are of low significance;

- **Mosaic of Wetland Vegetation with Interspersed Dry Dunes** – this is the most extensive wetland within the project site (near the eastern boundary). It comprises a mosaic of different kinds of swamp and bog communities. The integrity of the wetlands in this area have been compromised by drains and grazing. The area of intact indigenous vegetation is much less than in 2007;

- **Cutty-Grass Sedgeland** – valuable as a filter for water entering the wetlands. These are previously mined areas with extrinsic conservation importance. In this regard, the native species are not in themselves ecologically significant, but the vegetation has a valuable downstream role;

- **Coastal Turf** – where the stream from the dune swamps drops over a mudstone cliff on to the beach there is a narrow gully which has not been grazed intensively. The gully has a number of coastal plants that are rare or

absent from the rest of the area surveyed, including a button daisy and coastal blechnum fern; and

- **Dune Slack** – The Waipipi Dune area has been recommended as an area for protection in the Protected Natural Areas Programme survey of the Foxton Ecological District. The dune slack is located on an area of natural dune terrain along a coastal and semi-coastal strip. Ryder (2016) notes that this area is recognised as being ecologically significant in the relevant statutory planning documents (including the District Plan and the Proposed Plan).

Further information on the ecological values of the vegetation types outside of the project envelope, including the mapped areas, is provided in Ryder (2016).

2.5.4 Vegetation along the Transmission Line Route

A field inspection of the proposed transmission line route was made in July 2012 by Ryder Consulting Limited. The field inspection confirmed that the vegetation along the proposed corridor consists almost entirely of pasture, with small areas of shelterbelts and pines.

Changes to the transmission line route since 2012 were accounted for using a combination of existing survey work and desktop analysis.

2.5.5 Significant Natural Areas

The project site contains an area of dunes that is listed as a site of regional significance in the TRC document entitled "*Key Native Ecosystems – Inventory of Sites with Indigenous Biodiversity Values of Regional Significance"*. This site is the Waipipi Dunes. As noted in section 2.4.1.1 above, the area is also identified as a significant natural area in the District Plan.[10]

The Waipipi Dunes are also identified as a regionally significant unprotected wetland in the Taranaki Regional Fresh Water Plan ('Freshwater Plan'), and a high quality or high value area of the coastal environment in the RPS. It is noted that this area is excluded from the project envelope.

The nearest other sites of regional significance identified by the TRC are:

- The Whenuakura Estuary;
- Waverley Beach; and
- Lake Oturi and the Ihupuku Swamp Wildlife Management Reserve. Both of these sites are located approximately 6.5 km to the north-east of the project site. Lake Oturi is also identified as a significant natural area in the District Plan[11] and as a regionally significant unprotected wetland in the Freshwater Plan.

10 SNA / 22.

11 SNA / 21.

2.5.6 Bats

Long-tailed and short-tailed bats have been recorded in various locations throughout the North Island, but mainly in the more forested central and northern regions. Bat distributions are not well-known because of the need for specialised surveys to detect them. The nearest record of bats in relation to the project site and transmission line route is the Waitotara Conservation Area in the Matemateaonga Ranges, approximately 40 km to the north-east. The continuous forest in the Matemateaonga Ranges gradually gives way to shrublands and scattered forest towards the coast, and approximately 20 km from the project site only small remnants of native forest can be found among the foothills.

A bat survey was undertaken at the project site over two days in February 2007.[12] Anabat II echolocation recorders were set up overnight at four locations during that survey, including at the edge of a pine forest and near ponds. No bats were detected during the course of that survey.

Ryder (2016) concludes that whilst it is possible that bats could be present within the vicinity of the project site, it is unlikely because of the lack of suitable habitat. The highly modified agricultural landscape has no old growth native forest and only small scattered stands of plantation forestry. In addition, storms in 2012 caused wind damage to many older trees and pine plantations in the area that may have conceivably provided bat habitat - further reducing the likelihood of bats being present.

2.5.7 Lizards

Fifteen lizard species are known to the Taranaki Region and the Whanganui Conservancy, comprising 14 indigenous species and one introduced species (the rainbow skink). Of these species, few are likely to occur within the project envelope due to the grazed pasture which does not provide suitable lizard habitat.

Notwithstanding the above, common skinks (or possibly brown skinks) were observed by Ryder Consulting Limited in dense low vegetation (e.g. along fences and drains) within the project envelope during field surveys. Old steel pipes scattered throughout the project site also provide potential cover for common skinks. Both common and brown skinks are classified as ‘Not Threatened’.

A greater abundance and diversity of lizards is likely to be present within those parts of the project site that have been excluded from the project envelope, particularly the coastal dunes. Pacific gecko, goldstripe gecko, common gecko and copper skink are known to inhabit coastal vegetation and / or driftwood. As such, some of these lizards may be present within the dunes or along the beach adjacent to the project site.

Ryder (2016) also considers that the Southern North Island speckled skink (also known as the Kupe or Tamatea skink) is also likely to be present within the coastal dunes, but is very unlikely to occur within the project envelope because of a lack of suitable habitat.

2.6 Avifauna

An assessment of the existing avifauna values of the project site and surrounding environment is provided in the report entitled “*Waverley Wind Farm – Assessment of*

12 Harper, Somers, O’Sullivan (2007) - commissioned by Allco.

Potential Collision Risk to Birds" by Boffa Miskell Limited ('Boffa (2016)'). This report is provided as **Appendix Eight** to this AEE.

An overview of the existing avifauna values of the environment surrounding the project site, and along the transmission line route, is provided in the sections below.

2.6.1 Investigations

Bird investigations by Boffa Miskell Limited commenced in September 2010 with an initial site visit and a desktop review of available information about bird habitats and migration routes in the vicinity of the project site. The initial review showed that the project site provided little suitable bird habitat and was not located near major bird habitats (e.g. estuaries, extensive forest or undeveloped high country). However, the project site is on the coast, which meant that shorebirds would be present, and some migratory species could be expected to traverse along the coast, and potentially across the site. The small farm ponds and wetlands on the project site were also considered by Boffa (2016) to potentially support wetland birds that might be at risk from the operation of a wind farm.

Four periods of detailed observations of local and migratory birds at the project site were undertaken during 2011 and 2012, using the following methods:

- Fixed-point, fixed-period surveys entailing detailed flight and behavioural observations of key species and general observations of other species;
- Bio-acoustic surveys using recording devices that collected continuous sound recordings for the duration of the observation period, which were later analysed to identify bird vocalisations at night (when visual observations could not be made); and
- Incidental surveys during other site visits or when moving between count locations, recording the same data as for general observations.

The migration periods chosen were based on data collected from intensive monitoring at a proposed wind farm site at Taharoa, approximately 190 km north of Waverley. However, the time of the day during which peak activity occurs at the two sites differs. In this regard, Boffa (2016) considers that there is a difference of approximately five hours between the peak migration periods at Taharoa and the project site.

The location of the observation stations within the project site is provided in Figure 5.1 of Boffa (2016).

2.6.2 Observed Birds

A total of 56 bird species were recorded at, or adjacent to, the project site during the course of the investigations by Boffa Miskell Limited - comprising 18 introduced species, 37 native species, and one migrant species. The majority of sightings were of species that are common and widespread in open, developed country throughout New Zealand. Southern black-backed gulls, harriers, and skylarks were seen during almost all observation sessions.

Other species observed frequently were spur-winged plovers, magpies, starlings and various finches. New Zealand pipits were frequently seen amongst the dune vegetation and sometimes on pasture.

In general, very few birds were recorded over the open pasture that makes up the majority of the project site. Bird diversity was greatest along the coast (with typical seabird activity over the beach and offshore), and amongst the more diverse vegetation and habitat of the dunes.

Small numbers of waterfowl and welcome swallows were often present in the farm ponds within the project site. Three species of shags, grey teal, and New Zealand dabchick were also sometimes seen at the largest farm pond.

2.6.3 Key Species Identified

2.6.3.1 Surveys

A total of 22 key species[13] were recorded during the fixed-point, fixed-location surveys by Boffa Miskell Limited. The majority of birds (84%) were seen offshore or over the surf / beach. In addition, 54% of the birds seen were fluttering shearwaters traversing along the coast.

Seventeen of the 22 key species were seen within the boundary of the project site, comprising 212 sightings and 1375 birds over the duration of the study. Most of these sightings (85%) were of the following five species:

- Banded dotterel (Threatened – Nationally Vulnerable);
- New Zealand pied oystercatcher (At Risk – Declining);
- Pied stilt (At Risk – Declining);
- Little black shag (At Risk – Naturally Uncommon); and
- Black shag (At Risk – Naturally Uncommon).

All of the other key species were seen five or fewer times over the project site, except for white-fronted terns which were seen eight times.

Repeat sightings were made of a resident flock of approximately 45 banded dotterels that frequently traversed between the beach and the dunes. It is also highly likely that the same individual shags were seen repeatedly as they moved between foraging and roosting habitats on a daily basis. Conversely, the timing and flight patterns of pied stilts and New Zealand pied oystercatchers suggested that they were migrating birds.

Other sightings included New Zealand dabchick (seen on four occasions), one bittern (two sightings) at a swamp adjacent to Whenuakura River, and one or two royal spoonbills on pasture and at the mouth of the Whenuakura River.

---

13 Defined as species classified as ‘Threatened’, ‘At Risk’ or migrant species.

2.6.3.2 Bio-acoustic Recordings

Twenty four species were detected from the bio-acoustic recordings during the hours of darkness over the course of the investigations at the project site. Vocalisations of the various species were detected fairly evenly from all recording stations and no obvious spatial patterns were apparent.

The most frequently detected species were spur-winged plovers, skylarks, black-backed gulls, magpies, pukeko, and yellowhammers. The bio-acoustic recordings detected one species that was not seen during any of the visual observations - this was a myna (a common introduced species in the North Island). Some wing beats without associated vocalisations (probably waterfowl) were also recorded.

Three key species were detected in sound recordings – New Zealand pied oystercatcher, pied stilt, and white-fronted tern, although the white-fronted tern was recorded only once. Pied stilt calls tended to be recorded around dawn and dusk in the winter of 2011. No other patterns in the timing of calls were apparent.

2.6.4 Bird Flight Patterns

Boffa (2016) identifies that 19 bird species were recorded flying at heights greater than 31m – the height above which birds are considered to be at risk of colliding with turbine rotors for the purpose of collision risk analysis. However, the majority of flocks (78%) had a maximum height of less than 31 m.

Mean flight heights were less than 31 m for all species, except for pied oystercatchers, paradise shelducks, and white faced herons. New Zealand pied oystercatcher flights had a mean height of 38 m, with 60% of the flights having a maximum height greater than 31 m.

The timing of winter and summer / autumn sightings of banded dotterel, pied stilt and NZ pied oystercatcher are assessed in Boffa (2016). All three species were seen throughout the day with no obvious patterns in winter. Boffa (2016) observes that in summer pied oystercatchers and pied stilts tended to be seen more frequently during the first half of the day, which is consistent with the predictions of timings based on previous observations at the proposed wind farm at Taharoa.

2.6.5 Transmission Line Route

Boffa (2016) also considers the existing avifauna values within, and adjacent to, the transmission line route.

The bird life in the vicinity of the transmission line route consists of common native and introduced species typically found in agricultural landscapes. The species most commonly seen or heard during the site visit in July 2016 were harrier, southern black-backed gull, starlings, goldfinch, greenfinch, magpies and skylark.

2.7 Aquatic Ecology Values

An assessment of the existing aquatic ecological values of the project site is provided in Ryder (2016). As noted in section 2.5 above, this assessment is attached as **Appendix Seven** to this AEE.

An overview of the existing aquatic values within the project site, based on the sampling undertaken by Ryder Consulting Limited, is provided in the following sections.

2.7.1 Physico-Chemical Parameters

Physico-chemical parameters were sampled in the Waipipi Stream, the outlet of the large pond in the central part of the project site (which flows into Waipipi Stream), and in one of the larger watercourses / farm drains at the western end of the project site. These locations are identified in Figure 5.1 of Ryder (2016).

The physico-chemical parameter at the three sites is summarised in Table 2.2 below.

Table 2.2: Physico-Chemical Parameters (Ryder (2016)).

PARAMETER	WAIPIPI STREAM	POND OUTLET	WEST
pH	6.69	7.07	6.76
Temp C	10.6	9	13.7
Conductivity (mS/cm)	0.374	0.396	0.476
NTU	3.80	11.80	5.43
TSS g/m^3	0.67	0.67	3.33

Turbidity and total suspended solids were moderately high at all three sampling locations, reflecting the fact that stock have access to these waterways. In addition, waterfowl were considered responsible for disturbance and pollution in the large pond which was assessed.

Conductivity was also moderately high, which probably reflects nutrient inputs and salinity from the site's proximity to the coast.

2.7.2 Aquatic Macroinvertebrates

Detailed macroinvertebrate results are presented in Appendix B of Ryder (2016). Taxonomic richness was low and the fauna was dominated by large numbers of pollution-tolerant taxa, particularly oligochaete worms, molluscs, and chironomid larvae.

Very low MCI and SQMI scores were obtained for samples from the pond outlet and the drain in the west of the project site. These scores indicate that the small streams and drains are in poor condition and suggest probable moderate to severe pollution. Low to moderate scores were obtained from Waipipi Stream, which indicate that the stream is in fair condition.

These results are consistent with the visual assessment of disturbance and pollution by stock especially in the smaller waterways, and by waterfowl in the pond, noted by Ryder Consulting Limited during its investigations.

2.7.3 Freshwater Fish

Four fish species are recorded as existing in the Waipipi Stream in the New Zealand Freshwater Fish Database ('FFDB'). In addition, the FFDB identifies a total of 16 species existing in the Waipipi Stream catchment and the adjacent three catchments combined.

Of the four species recorded in the Waipipi Stream, longfin eel, redfin bully and inanga are all identified as 'At Risk'. Banded kokopu are not identified as threatened.

In addition to the species recorded in the FFDB, an electric fishing survey of Waipipi Stream found two shortfin eels and six longfin eels downstream of the main culvert. One unidentified bully was seen in April 2012, also below the main culvert.

No fish were found above the main culvert of Waipipi Stream in any of the surveys. Ryder (2016) suggests that the culvert, which is perched, may be a barrier to upstream fish passage. During a separate field visit, elvers were also observed at the downstream end of the culvert attempting to climb up the concrete debris to get past the culvert. None succeeded during approximately 30 minutes of observations.

In the pond outlet, two longfin eels were captured and two unidentified eels were seen but not captured. No other fish were found at that location.

Ryder (2016) concludes that whilst the Waipipi Stream is modified and somewhat degraded, it has ecological value as habitat for longfin and shortfin eels, banded kokopu and redfin bully. The drains within the project site are in poor ecological condition, but could possibly support non-migratory fish such as brown mudfish.

2.8 Roading and Traffic

An assessment of the existing roading infrastructure and traffic patterns around the project site and transmission line route is provided in the report entitled "*Waverley Wind Farm –Transport Assessment Report"* by Traffic Design Group ('TDG (2016)'). This report is attached as **Appendix Nine** to this AEE.

An overview of the assessment in TDG (2016) is provided in the sections below.

2.8.1 Roading Hierarchy

The purpose and function of the roads within the South Taranaki District is detailed in the District Plan. SH3 is the dominant road in the district, with arterial roads radiating from it at intervals. The only arterial route of note near the project site is Oturi Road / Waverley Beach Road, connecting Waverley with Waverley Beach and Waipipi Beach.

There are no collector roads in the vicinity of the project site.

The Proposed Plan describes the roading hierarchy in a different manner. The status of SH3 has not been changed, but Waverley Beach Road is identified as a primary collector road. All of other roads in the vicinity of the project site are referred to as 'other roads' in the Proposed Plan.

An overview of the roading hierarchy in the context of the project site is provided in Figure 1 of TDG (2016).

2.8.2 State Highway 3

SH3 is designated as a state highway route in the District Plan and the Proposed Plan. SH3 generally runs inland, but parallel to, the coastline within the South Taranaki District. It is maintained to a relatively high standard commensurate with its state highway status and its regional importance as a link with Port Taranaki.

The section of SH3 within the vicinity of the project site (i.e. the section near the intersection with Ihupuku Road) has a sealed carriageway width of approximately 7.8 m and is marked with a centreline and edge lines. The road is generally characterised by long straights with gentle curves and has a posted speed limit of 100 km/h.

Traffic volumes on SH3 have been identified by TDG (2016) as 3,447 vehicles per day ('vpd'). Peak hour traffic volumes on SH3 are approximately 300 vehicles per hour ('vph') and are generally experienced between 3 and 4pm.

2.8.3 Peat Road

The initial 150 m section of Peat Road (commencing from SH3) has a sealed width of approximately 6 m, with level grassed berms each side. The sealed width of the road south of Ihupuku Road is generally 5.5 m through to the start of a vertical curve that limits forward visibility. There is some localised widening out to a width of 6.5 m, extending for 180 m in the vicinity of the vertical curve.

At approximately 0.5 km the carriageway width of Peat Road reduces to approximately 3.5 m. This effectively makes much of the remaining length of the road one-way, with vehicles needing to move partly off the seal road when passing an approaching vehicle. There is also evidence of vehicle damage to the berm on either side of the carriageway.

At 0.75 km the carriageway widens again to approximately 5.8 – 6 m extending over a local crest curve and through to the Rangikura Road intersection at 0.95 km. The carriageway width reduces back to approximately 3.8 m beyond Rangikura Road. At 1.15 km is the first of two sharp right angle bends and at 1.5 km there is another crest curve, where the road widens to approximately 4.3 m and visibility between approaching drivers is restricted. There are further sharp bends over the next section through to the Stewart Road intersection at 2.5 km.

At the intersection with Stewart Road (which is unsealed) there is evidence of edge break and pot-holing. Beyond Stewart Road, Peat Road extends west with a sealed carriageway of approximately 4 m through to, and beyond, the private accessway into the site.

The short section of Peat Road between SH3 and Ihupuka Road carries approximately 140 vpd. The next section through to Rangikura Road typically carries an estimated 77 vpd, which is consistent with the designation of Peat Road as a local road. In particular the traffic volume reduces notably along Peat Road to the project site and is estimated to be approximately 28 vehicles per day. STDC estimate that approximately 10% of the traffic using Peat Road is heavy traffic consisting of regular milk tankers and occasional logging trucks, stock trucks and farm machinery.

2.8.4 Railway Level Crossing

A railway level crossing is located on Peat Road near the intersection with SH3. Approximately ten trains per day cross Peat Road with an increased frequency expected during the peak dairy season. Train running speeds are restricted to 70 km/h.

In general, TDG (2016) considers that there is good visibility between trains and drivers on both Peat Road and SH3. However, the most significant constraint identified is the short distance between the junction at Peat Road / SH3 and the railway line crossing. In this regard, while there is sufficient distance to accommodate single-unit trucks or buses, a truck and trailer unit (or similar) stopped on Peat Road on the approach to SH3 will extend across the railway tracks.

The frequency of articulated trucks using Peat Road is low, such that there have been no reported incidents of collision to date.

2.8.5 Other Roads

2.8.5.1 Rangikura Road

Rangikura Road is a local sealed road that intersects with SH3 approximately 4.3 km north of Peat Road. It is controlled by a give way onto SH3. Sightlines to, and from, the south are somewhat constrained at the intersection with SH3.

Rangikura Road is of relatively low standard and extends some 9.7 km through to its intersection with Peat Road, for a total distance of some 12 km between SH3 and the project site. The width of the road is typically around 3.6 m, with intermediate sealed intersections with Wybourne Road, Elslea Road, and Dryden Road respectively.

Given its relatively narrow width throughout, Rangikura Road is effectively one-way with vehicles needing to move partly off the seal when passing an approaching vehicle. Accordingly, there is evidence of edge break and the occasional pot-hole. There is also a series of undulating humps and hollows over the kilometre section of roadway closest to Peat Road.

Traffic levels for Rangikura Road are estimated to be approximately 34 vpd by the STDC.

2.8.5.2 Ihupuku Road - Waverley Beach Road

Ihupuku Road is a sealed local road that intersects with Peat Road approximately 150 m south of SH3 and south of the railway level crossing. This intersection was recently resealed and is marked with priority to Ihupuku Road over Peat Road.

Ihupuku Road extends approximately 3.5 km from Peat Road through to Waverley Beach Road and intersects with Stewart Road part way along its length - approximately 2.2 km from Peat Road. Ihupuku Road is sealed throughout, typically to a width of approximately 4 m between Peat Road and Stewart Road. It has recently been widened to 5.5 m between Stewart Road and Waverley Beach Road.

Waverley Beach Road is a relatively high standard arterial route with a sealed width of approximately 7.5 m. It is intersected by a railway level crossing 500 m from SH3 in Waverley and travels out to Waverley Beach. The section of road between Ihupuku Road and the railway level crossing is approximately 2.3 km.

Oturi Road comprises the balance 500 m of the arterial route connecting Waverley Beach Road with SH3. The road has wide shoulders approaching the SH3 intersection in Waverley. This intersection is in the form of a slightly off-set cross-road, with generous road width on all approaches including opposing right-turn lanes on SH3. The intersection is within a 50 km/h speed zone and excellent sight distance is provided between traffic on the highway and traffic on the Oturi Road approach.

Ihupuku Road carries an estimated 100 - 150 vpd.

2.8.5.3 Stewart Road

Stewart Road has an unsealed formation along much of its length. The road width is between 4 - 5m over the 4.2 km section between Peat Road and start of the seal. The 1.6 km section closest to Ihupuku Road is sealed to a width of approximately 3.5 m and has a relatively 'tight' winding alignment.

Stewart Road carries an estimated 28 vpd.

2.8.6 Road Safety

2.8.6.1 Local Area

TDG (2016) identifies that a total of 30 crashes were reported along the section of SH3 near the project site between 2005 and 2014. Ten of these crashes occurred within 500 m of the SH3 / Rangikura Road intersection. By comparison, there were only two reported crashes within 500 m of the SH3 / Peat Road intersection. The location of the crashes along SH3 is shown in Figure 8 of TDG (2016).

The data indicates that the crashes on SH3 are mostly single vehicle loss of control crashes. Of the crashes reported on SH3, one involved fatalities, six involved serious injury, and a further ten involved minor injury. No crashes were reported as having an over-dimension load contribute to the cause of the crash.

In addition, four crashes were reported on local roads near the project site over the last ten years. Three crashes occurred on Waverley Beach Road and involved loss of control. The other crash occurred on Ihupuku Road and was attributed to alcohol and speed.

2.8.6.2 Overtaking

A search has been undertaken by TDG (2016) to identify the extent to which overtaking vehicles and / or a line of vehicles may have contributed to crashes on the roads around the project site. A total of 12 such crashes were identified, of which five were related to a line of vehicles, and seven were related to overtaking manoeuvres.

TDG (2016) notes that the New Zealand Transport Agency ('NZTA') has been active in looking to reduce driver frustration and consequent crashes by progressively constructing passing lanes along SH3 over the last 25 years, with passing lanes now at frequent intervals.

2.9 Noise

An assessment of the existing noise environment within, and surrounding, the project site is provided in the report entitled "*Waverley Wind Farm – Assessment of Noise Effects*" by Hegley Acoustic Consultants ('Hegley (2016)'). This assessment is attached as **Appendix Ten** to this AEE.

An overview of the existing noise environment is provided in the section below.

2.9.1 Existing Noise Environment

Hegley (2016) considers that the main contributors to the existing noise environment around the project site are from farm activities, minor road traffic, and from the effects of wave and wind generated noise in locations near the coast.

Background noise monitoring was previously undertaken by Malcolm Hunt Associates on behalf of Allco in 2007 for a period of two weeks. Background sound levels ($L_{A90\ 10min}$) was measured at four sites that were considered to be representative of the existing noise environment in the area. In addition, the representative wind speed was measured from the relevant wind monitoring mast during the same period.

All noise monitoring equipment had appropriate calibration certificates and the field surveys were undertaken using approved wind screens to minimise any wind generated noise at the microphone.

The location of the noise monitoring sites is illustrated in Figure 2 of Hegley (2016).

Existing background noise level and wind speed measured at each of the four sites are shown in Figures 3 to 6 of Hegley (2016).

Hegley (2016) concludes that the relationship between wind speed and the resulting noise level is generally good at each of the sites. However, there are inconsistencies during some periods, such as shown in Figure 6 of Hegley (2016). In this regard, just before half way through the measurement there was a drop in wind speed but the noise level remained high.

2.10 Social, Recreation and Tourism Values

An assessment of the social, recreational and tourism values in the area around the project site and the transmission line route is provided in the report entitled "*Waverley Wind Farm – Recreation and Tourism Assessment"* by Tourism and Recreation Consulting ('TRC Tourism (2016)'). This assessment is attached as **Appendix Eleven** to this AEE.

An overview of the social, recreation and tourism values in the area around the project site, and the transmission line route, is provided in the sections below.

2.10.1 Recreation in the Taranaki Region / South Taranaki District

The main recreation activities identified by TRC Tourism (2016) in the vicinity of the project site include swimming, beach walks, shellfish gathering, fishing and surfing. Specific areas / recreational activities are briefly discussed below.

2.10.1.1 Saltwater Fishing

Both surfcasting and boat fishing are popular along the coastline of the South Taranaki District. The mouth of the Patea River is a popular boat launching site. The majority of boat fishing takes place up to six miles offshore, depending on the fish species being targeted and the time of year.

During the summer there can be up to 30 recreational boats fishing along the coastline at Patea. Fish species generally targeted are snapper, blue cod, lemonfish and kahawai.

There are at least two charter-based operators located within the South Taranaki District, with one based in Hawera.

2.10.1.2 Surfing

Some surf breaks in the Taranaki Region are recognised as being nationally significant in the NZCPS. In particular, Surf Highway 45 begins at Hawera and runs along the coast for approximately 100 km through to New Plymouth.

Overall, there are few surf breaks of note within the South Taranaki District. The better known / documented breaks near the project site are the mouth of the Patea River and Waverley Beach.

The RPS does identify Pid's Point as a surf break of high quality or high value adjacent to the project site. However, TRC Tourism (2016) notes that this break is not acknowledged in the New Zealand Surfing Guide by Wavetrack - nor is it well known to the local surfing community.

2.10.1.3 The South Taranaki Coastal Walkway

The South Taranaki Coastal Walkway concept envisions a walkway from Wainui Beach to Stony River. The STDC intends to focus on the continued development of sections of the walkway. It is understood that the STDC will select easy stages which have no access issues or potential negative impacts on neighbouring environments or heritage sites, with a focus on the northern coast between Opunake and Okato.

The individual project sections are largely community driven initiatives with support from the STDC. There are no confirmed plans for the section of the walkway between Waverley Beach and Whenuakura River.

The intended route of the South Taranaki Coastal Walkway past the project site is illustrated in Appendix 2 of TRC Tourism (2016).

2.10.1.4 Golf

Waverley has an 18 hole golf course located on Ihupuku Road. The club has approximately 130 members. The summer months are the most popular, with peak use occurring on the weekends. There are generally 50 - 60 golfers on Sundays and 30 - 40 on Saturdays during the summer. Winter numbers are typically about half of those in the summer.

The Waverley Golf Club hosts six tournaments a year that average 80 - 100 players, most of whom are locals.

2.10.1.5 Freshwater Activities

The rivers and lakes in the South Taranaki District provide a range of recreational opportunities. Water skiing, wakeboarding and swimming are popular at Lupton Lake, which is located approximately 5 km north-east of the project site on Lower Ihupuku Road.

Trout fishing and whitebaiting are common activities on many of the rivers in the South Taranaki District. Whitebaiting occurs from 15 August to 30 November each year and is one of the most popular recreational activities in the Taranaki Region. TRC Tourism (2016) note that the Whenuakura River is valued for whitebaiting. The northern bank of the river mouth is also an important whitebait spawning area. However, there is minimal recreational activity on the section of the river adjacent to the project site, with most whitebaiting occurring near the SH3 bridge.

In addition, the lakes and rivers provide opportunities for swimming, kayaking and rafting.

Game bird hunting (primarily duck shooting), when in season, is also popular on the lakes, ponds and dams in the South Taranaki District.

2.10.2 Tourism Values of the Taranaki Region / South Taranaki District

The Taranaki Region is a relatively small player in the New Zealand tourism industry. The Taranaki Region has a total tourism income of approximately $240 million and approximately 2,843 jobs are supported by tourism (approximately 1.6% of the national total).[14]

Tourism is not a major economic contributor around Waverley or within the South Taranaki District. The South Taranaki Visitor Guide lists a range of local attractions in, and around, Waverley. These include:

- The Waverley Railway Museum;
- The Woolshed Museum;

  Waverley Racecourse; and
- Ashley Park in Waitotara.

TRC Tourism (2016) considers that the Aotea Utanganui / Museum of South Taranaki in Patea would likely be the most visited attraction in the District. It currently receives approximately 5,056 visitors per annum. The Waverley i-SITE receives approximately 28,000 visitors per annum.

2.10.3 Recreation Values at the Project Site

2.10.3.1 Public Access

Informal public access across the project site to the coast is provided by one of the landowners.[15] The route generally follows the boundary between the properties of John

---

14 South Taranaki Economic Development Strategy, 2007.

15 David Alexander.

and David Alexander (et al) and Standalone Farms Limited, and concludes nears Pid's Point. This access route is available at the discretion of the landowner and is generally only used by a small number of locals (less than 30), who use the access route to go surfcasting, gather shellfish, or surfing / swimming.

The legal unformed road access routes / paper roads on, or near, the project site are:

- The end of the formed Dryden Road extending west towards the mouth of the Whenuakura River;
- The end of Dryden Road extending straight towards the dunes and coast; and
- The end of Waipipi Road along the east boundary of the project envelope to the dunes.

Figure 5 of TRC Tourism (2016) provides an overview of the existing access routes across, and around, the project site.

2.10.3.2 Duck Shooting

Land based recreation on the project site is limited primarily to seasonal hunting. Hunting is almost exclusively related to duck shooting in May. Only one of the landowners,[16] along with their friends and relatives (approximately 10 - 20 people per season), undertake duck shooting on the project site. Maimai are located on the two main ponds used for hunting.

Hunting for pheasant and quail in the forest blocks along the northern boundary of the project site was historically a popular recreational activity. However, much of the ground cover habitat has been removed. As such, it is understood that the birds have now disappeared.

2.10.3.3 Tourism Values

There are no current tourism activities adjacent to, or within, the project site. The only potential tourism activity in the vicinity is likely to be the occasional fishing charter off the coast.

2.10.4 Transmission Line Route

The transmission line route traverses close to the Okotuku Domain, which includes the Waverley Racecourse. The racecourse is accessed from SH3 and has been located in the Okotuku Domain since 1913.

Three race meetings are hosted at the racecourse each year. The main event is the Waverley Community Cup Day, held annually in March. This is a major event held in March which attracts 1,500 - 2,000 people. Other race days are in July and September and attract smaller crowds of 300 - 500 per event.

The land which is not used for the racing club in Okotuku Domain is leased out for grazing by the racing club.

---

16 David Alexander.

There is also a second parcel of public reserve land immediately south of Transpower's electricity substation on Mangatangi Road. The STDC currently lease this land for grazing and there are no current plans to use it for recreation.

2.11 Historical and Archaeological Values

An assessment of the existing archaeological values within, and surrounding, the project site and transmission line route is provided in the report entitled "*Waverley Wind Farm – Archaeological Assessment"* by Heritage Solutions ('Heritage Solutions (2016)'). This report is attached as **Appendix Twelve** to this AEE.

An overview of the existing archaeological and heritage values is provided in the sections below.

2.11.1 Pre-European Settlement

The coastal areas of Taranaki - Whanganui were among the most densely settled parts of New Zealand in pre-European times. The coastal area was rich in resources and the local economies were based on fishing, hunting and gathering, and gardening.

The most common archaeological sites found in Taranaki – Whanganui are storage pits and pa. These two types of sites are indicative of fertile agricultural land and resources worth defending.

Most recorded pa sites in Taranaki – Whanganui are located within 5 km of the coast or up rivers. Heritage Solutions (2016) suggests that this distribution of the pa infers that groups of people lived near their gardens and made periodic trips to the coast to fish, returning home with fish and other seafood resources.

With respect to the project site, recovered archaeological material suggests that fishing was also a major activity undertaken by local Maori. In this regard, evidence of fishing camps within the coastal dunes at Waipipi has previously been recorded. These records included evidence of midden, ovens and stone net sinkers. The precise location of these sites is not known and they have not been included in the archaeological record.

In addition, a block of land on the coast immediately adjacent to the project site has been identified as the Waipipi fishing village. Fishing stations were established as part of the West Coast Commission of Inquiry during the early 1880's. The West Coast Commission was set up following the Taranaki Wars to return certain areas of land to iwi following confiscation by the Government.

Figure 4 of Heritage Solutions (2016) delineates the general location of the Waipipi fishing village.

2.11.2 European Settlement

Whanganui was established in 1841 by European settlers. The town was the New Zealand Company's second settlement and was intended as an addition to their first settlement (Wellington). European settlement spread into farmland north and south of Whanganui, as settlers recognised the rich soils and favourable conditions for stock and crops.

From the outset there was confusion about the exact nature and extent of the New Zealand Company's purchase, with local Maori often choosing to ignore deeds or arrangements they considered had no legal basis. The confusion and uncertainty that had surrounded the New Zealand Company's land purchases in Whanganui erupted into violence in 1846.

In 1866 another specific campaign in the New Zealand Wars took place. This is known as the second Taranaki War. The army systematically took possession of Maori land by driving off the inhabitants and destroying villages / cultivations. The Government built an expanding line of redoubts, behind which settlers built homes and developed farms.

An archaeological site within Waverley dates from the second Taranaki War. A redoubt built in 1868 provided a defensive base. The site[17] has now been inundated by the town's growth. The clock tower is in the middle of the site but the sites trenches have been destroyed.

The area around Waverley also has notable European industrial heritage. The commercial potential of the iron sand resources along the Taranaki coast was first recognised in 1841 by a Cornish immigrant, John Perry. Commercial operations followed in the 1850's and 1860's.

In addition, and as discussed in section 2.1 above, an iron sand mining operation commenced over much of the project site in 1971. The operation closed in 1987 having produced approximately 15.7 million tonnes of iron sand concentrate.

2.11.3 Recorded Archaeological Sites

2.11.3.1 Project Site

Heritage Solutions (2016) identifies nine recorded archaeological sites within, or immediately adjacent, to the project site. Of these recorded sites, seven are within the project site or abut it along the coastal margin. These sites are identified in Figures 9 and 10 of Heritage Solutions (2016).

The recorded sites follow an obvious geographical pattern of distribution along the coast and adjacent to the Whenuakura River. In this regard, the recorded sites are predominately associated with fishing activities of Maori origin. Table 2.3 below summarise the details of each recorded archaeological site within, or immediately adjacent to, the project site.

Table 2.3: Recorded Archaeological Sites (Heritage Solutions (2016)).

SITE NUMBER	SITE TYPE	DATE RECORDED	DESCRIPTION
Q22/49	Firestone	1988	Recorded as one large fire reddened cobble exposed in the side of a stock track. This cobble is evidence of a Maori hangi or oven.
Q22/60	Ovens / artefacts	1988	Recorded in the Waipipi dunes, within a deflated dune, beside a small stream. Two stone fishing sinkers were found, as

[17] Recorded site R22/455.

			well as oven stones and two bones of probable human origin.
Q22/61	Oven stones	1988	Recorded in the fore dunes immediately above the high tide area. A scatter of fire cracked rocks was recorded.
Q22/62	Oven / flaking area	1988	Recorded on the fore dunes above the high tide area, within a deflated dune. This site is a small area of flaked cobbles of quartzite, with fire cracked stones.
Q22/63	Oven / artefact	1988	Recorded in the dunes about 100m from the high tide zone. An intact oven, or hangi, was recorded, containing fire cracked rock, a small amount of bird bone and mussel shell. Also present were flaked cobbles of quartzite and two stone fishing sinkers.
Q22/64	Occupation area	1988	Recorded in the coastal dunes, approximately 200m from the high tide zone. The site is comprised of an area of stone flaking, an area of ovens and stone flaking and an oven area.
Q22/83	Artefact	2007	A stone fishing sinker was found on top of dune sand at the base of a very high distinct seaward facing dune.

No sites in the area or vicinity of the proposed site are included in Heritage New Zealand's register of historic places, historic areas, and wahi tapu areas.

2.11.3.2 Transmission Line Route

Heritage Solutions (2016) identifies that there are no recorded archaeological sites located along the proposed transmission line route. However, a number of archaeological sites have been identified within the general vicinity of the transmission line route envelope. These sites are shown in Figures 16 to 18 of Heritage Solutions (2016).

The location and type of recorded archaeological sites in the vicinity of the proposed transmission line are summarised in Table 2.4 below.

Table 2.4: Recorded Archaeological Sites – Transmission Line Route (Heritage Solutions (2016)).

NZAA SITE NUMBER	SITE TYPE	LOCATION
R22/455	Redoubt	Waverley township, on SH3, beneath the war memorial clock tower.
Q21/246	Flour mill	North of Waverley township, on west bank of stream,
Q22/70	Pit	Edge of Lake Oturi.
Q22/71	Borrow pit	Edge of Lake Oturi.

Q22/74	Midden of freshwater mussel	Edge of Lake Oturi.
Q22/30	Agricultural borrow pit	On plateau beside small lake.
Q22/31	Pits	On plateau beside stream.
Q22/36	Agricultural borrow pit	On former dune.
Q22/37	Pits / terraces	On plateau beside stream.
Q22/38	Pits	On plateau beside stream.
Q22/39	Pits	On plateau beside stream.

2.12 Cultural Values

Trustpower has engaged with Ngaa Rauru since it acquired the site in 2010, as it understands that the project site and transmission line route are located within the rohe of Ngaa Rauru. This engagement with Ngaa Rauru is ongoing and Trustpower has committed to the preparation of a new Cultural Impact Assessment ('CIA') by Ngaa Rauru about the values of the project site and the potential cultural effects of the project (including possible mitigation options). The CIA is due to be completed in May 2016.

Trustpower also understands that the rohe of Ngati Ruanui generally aligns with the Whenuakura River.

2.12.1 Statutory Acknowledgement Areas – Ngaa Rauru

The District Plan and Proposed Plan both include statutory acknowledgement areas in favour or Ngaa Rauru. Its statutory acknowledgement areas include the following:

- Nukumaru Recreation Reserve;
- Tapuarau Conservation Area;
- Lake Beds Conservation Area;
- Patea River;
- Whenuakura River; and
- Waitotara River.

The statutory acknowledgement in the District Plan and Proposed Plan acknowledges that the Whenuakura River is the life force that sustained all whanau and hapu of Ngaa Rauru that resided along, and within, its area. The Whenuakura River is known by Ngaa Rauru as 'Te Aarei o Rauru', while the area along the river is known as 'Paamatangi'.

The statutory acknowledgement notes that one of the oldest known Ngaa Rauru boundaries was recited as "*Mai Paamatangi ki Piraunui, mai Piraunui ki Ngawaierua, mai Ngawaierua ki Paamatangi"*. Ngaati Hine Waiata is the main Ngaa Rauru hapu of Paamatangi. The Maipu Pa is situated near the western bank of Te Aarei o Rauru.

There are many urupa sites and wahi tapu situated along the Whenuakura River. The Whenuakura marae is also located on the banks of the river.

The statutory acknowledgement also notes that Ngaa Rauru hapu used the entire length of the Whenuakura River for food gathering. Sources of food included tuna, whitebait, smelt, flounder and sole. The river remains significant to Ngaa Rauru, not only as a source of kai that sustains its physical well-being, but also as a life force throughout the history of Paamatangi and for the people of Ngaati Hine Waiata over the generations.

2.12.2 Statutory Acknowledgement Areas – Ngati Ruanui

The District Plan and Proposed Plan both also include statutory acknowledgement areas in the South Taranaki District in favour or Ngati Ruanui. Its statutory acknowledgement areas include the following:

- Otoki Gorge Scenic Reserve;
- Te Moananui A Kupe O Ngati Ruanui;
- Tangahoe River;
- Whenuakura River; and
- Patea River.

The statutory acknowledgement in the District Plan and Proposed Plan acknowledges that the name of the Whenuakura River originated during the time of Turi Arikinui, Kaihautu of the Aotea waka, and his wife Rongorongo Tapairu. They lived with their families between the two rivers - Patea nui a Turi and Whenuakura. Turi was the Ariki (Rangatira of highest rank) of the Aotea Waka.

The Whenuakura River provided the people of the Aotea waka, and later the people of Ngati Hine and Ngati Tupito, with all the resources of life they required to survive. The valley through which the river flowed provided multiple bird life, animals, clothing, building, gardening, and warfare implements, as well as places where social activities, fishing, and waka racing could take place.

Sporting activities took place within and outside the surrounding forests. There were also places that tohunga, rangatira, and other whanau / hapu / iwi representatives used for burial, washing, baptising, and special activities. It was a place where people would go to find peace within themselves.

The Whenuakura River is recognised as an integral part of the social, spiritual, and physical lifestyle of the Ngati Ruanui people.

2.12.3 Allco Cultural Impact Assessment

The CIA for the wind farm proposed by Allco was undertaken by the Wai O Turi Marae Trust in 2007. It identified that Te Pakakohe and Ngaa Rauru tribes used to occupy Waipipi - the area between the Waitotara and Patea Rivers - before the arrival of Pakeha settlers. There were a large number of pa sites that were scattered along the coastline and food sources were abundant.

The CIA identifies that the Taranaki Wars had a significant impact on Ngaa Rauru and lead to the confiscation of land between Waitotara and Waingongoro. Ngaa Rauru were removed to the Whanganui District.

In March 1882 the Maori Land Court issued four crown grants to the people of Waipipi. This included the Waipipi Reserve, which is located immediately adjacent to the project site and is divided by a paper road (Dryden Road). The CIA describes this land as *"an over-sized sand pit with a swamp running through the middle of it."*

With respect to mahinga kai and customary use values, the CIA records conversations from tangata whenua with memories of Waipipi from the early 20th century. These conversations noted that eels could be caught in the Waipipi Stream and that the first fish caught from sea voyages were taken to the Rangitaawhi cliffs to be buried. It also notes that there were four mussel reefs along Waipipi Beach. The gathering of pipi and seagull eggs was also an additional food source.

Finally, the CIA notes that kaumatua and mokopuna still fish at Waipipi, but that a locked gate hinders their path to the sea.

2.13 Aviation

The Civil Aviation Authority ('CAA') have described the airspace in the coastal area around the project site as akin to *"State Highway 1"* for light aircraft transiting north or south - particularly when the weather precludes flight through the central area of the North Island.[18]

In addition, the CAA have identified that a low flying area (NZL364) has been re-established around the mouth of the Waitotara River - which is approximately 12 km south-east of the project site. Low flying areas are established to allow low level flight training. The low flying area is only utilised by the Wanganui Aero Club during daylight hours. The low flying area extends to 150 m above ground level.

Furthermore, there are two former or existing airfields within the vicinity of the project site. These are:

- The Waverley Aerodrome - located adjacent to Waverley Racecourse, approximately 5 km north-east of the project site; and
- The Waverley Beach Aerodrome - located approximately 2 km south-east of the project site.

2.14 Radio Services

An assessment of the existing radio infrastructure within the surrounding environment is provided in the report entitled "*Waverley Wind Farm – Radio Effects Report"* by Rodgers Hulston & White Limited ('Rodgers (2015)'). This report is attached as **Appendix Thirteen** to this AEE.

Appendix A to F of Rodgers (2015) include a series of maps that identify the location of fixed radio links, cellular sites, land mobile radio repeaters, broadcast and maritime repeater sites within the wider environment around Waverley. These maps indicate that nearest cellular sites are approximately 10 km from the project site, and the nearest

18 Letter from CAA to Trustpower dated the 4 April 2012.

broadcast sites for television or FM radio transmitters are in excess of 46 km from the site.

The nearest radio repeater for maritime communications is located at Hurleyville, approximately 18 km from the project site.

2.15 Consented Activities

In accordance with established case law regarding the existing environment applying to the assessment of the effects of an activity, it is appropriate to consider any unimplemented resource consents that are reasonably likely to be implemented at some point in the future.

Trustpower has not identified any unimplemented resource consents issued by the STDC or the TRC, within the immediate vicinity of the project site or the transmission line route, which may affect the status of the existing environment. Trustpower has, however, updated its inventory of known residential dwellings in close proximity to the project site in recognition of the period of time that elapsed between the noise and visual / landscape assessments first being commissioned and being finalised for lodgement with this AEE. These residential dwellings are documented in Isthmus (2016).

In addition, and as noted in section 2.1.1, consideration has been given to the coastal subdivision development that is located at the intersection of Waverley Beach Road and Waipipi Road (approximately 3 km from the project site) – particularly in the landscape and noise assessments. While subdivision consent for 97 lots was granted in 2006, only a small number of residential dwellings have been constructed to date.

2.16 Permitted Baseline

Section 104(2) of the RMA allows a consent authority to disregard any actual or potential adverse effects on the environment if the relevant plan permits an activity with that effect. As such, this section of the AEE establishes the potential permitted baseline that applies to the project site.

2.16.1 Operative South Taranaki District Plan

2.16.1.1 Development within the Coastal Protection Area

The project site is zoned ‘Rural’ in the District Plan, but is also subject to a coastal protection area overlay. In accordance with Rule 3.01.4(b) of the District Plan all activities within the coastal protection area are a discretionary activity, with the exception of temporary military training activities.

Section 14.01 of the District Plan does specify that the *“following provisions for utilities and services shall apply throughout the District”,* although it does not specify whether the rules over-ride or ‘trump’ rules in other sections of the District Plan.

As such, and due to the fact that Rule 3.01.4 refers to *“any activity”* in the coastal protection area as being a discretionary activity, the permitted baseline within the project site is limited. In this respect, farming activities, forestry activities, subdivision, and the establishment of residential dwellings all require resource consent within the coastal protection area.

2.16.1.2 Development outside the Coastal Protection Area

The land area adjacent to the project site, but outside the coastal protection area, is also zoned 'Rural' in the District Plan. The following activities could conceivably be established on rural land around the project site without the need for resource consent in accordance with Rule 3.01.1 of the District Plan:

- Farming and intensive farming activities;
- Residential activities (noting that subdivision is either a limited discretionary or discretionary activity);
- Community activities and essential activities (i.e. a day care facility); and
- Forestry activities (including the harvesting of trees).

Transformers and electricity transmission lines up to 110 kV and 100 MVA[19] per circuit can also be established as of right in the Rural Zone (with no limit on the height of the poles). As such, they are an anticipated element of the rural environment in the South Taranaki District.

In terms of vegetation clearance, Rule 15.01.1 of the District Plan allows the clearance, modification, damage or destruction of up to one hectare of contiguous indigenous vegetation as a permitted activity provided that it is not included within Schedule II of the District Plan.

2.16.2 Proposed South Taranaki District Plan

The Proposed Plan was publically notified by the STDC on 15 August 2015 and will eventually replace the District Plan once it becomes operative.

In accordance with section 86B(3) of the RMA, rules in a proposed plan have immediate legal effect if it protects or relates to water, air, or soil (for soil conservation), protects areas of significant indigenous vegetation, protects areas of significant habitats of indigenous fauna, or protects historic heritage. The rules in the Proposed Plan which have immediate legal effect in accordance with section 86B of the RMA are identified on the STDC website.[20]

The relevant permitted activity rules in the Proposed Plan that have immediate legal effect provide for the following:

- Species protection and conservation management work within the coastal protection area, including indigenous vegetation restoration and re-planting work; and
- The clearance of vegetation not exceeding 100m^2 in area within the coastal protection area (although outside of significant natural areas, outstanding natural features or landscapes, or areas of outstanding natural character).

---

19 Mega Volt Amp.

20 http://www.southtaranaki.com/Council/Proposed-District-Plan-2015/

2.16.3 Taranaki Regional Council

With respect to the various statutory planning documents administered by the TRC, they establish the following permitted baseline for activities within the project site and the surrounding rural environment:

- The discharge of contaminants to air from earthworks is permitted in accordance with Rule 43 the Taranaki Regional Air Quality Plan ('Air Plan') so long as the exposed contiguous area of soil is 4 hectares or less;

- The discharge of contaminants to air from equipment burning diesel / petroleum on production land is a permitted activity in accordance with Rule 6 of the Air Plan. Activities permitted under Rule 6 are restricted to a maximum generation capacity of 10 MW on the premise (and 5 MW per combustion chamber) and other standards related to the chimney stack height, emission concentrations (125 mg/m^3) and a minimum vertical efflux velocity (5 ms^{-1});

- The taking of surface water is a permitted activity in accordance with Rule 15 of the Freshwater Plan provided that the rate of abstraction does not exceed 1.5 l/s (or 5 l/s for not more than 30 minutes per day), the daily volume does not exceed 50 m^3, and no more than 25% of the instantaneous flow is abstracted;

- The discharge of stormwater to land or water (but excluding significant wetlands) is a permitted activity in accordance with Rule 23 of the Freshwater Plan provided that the discharge is not from an industrial or trade premise, the discharge rate is limited to a pipe diameter of 900 mm, and the discharge does not exceed water quality standards, including those related to pH, suspended solids and biochemical oxygen demand;

- In addition to the above, the discharge of stormwater and sediment to land and water derived from soil disturbance activities up to 8 ha in area are permitted in accordance with Rule 26 of the Freshwater Plan. The permitted activity conditions limit the associated volume of soil disturbance to 24,000 m^3 and the timing of such activities (i.e. not between 1 May and 31 October each year). Furthermore, any discharge must comply with general water quality standards – including a suspended sediment limit of 100 g/m^3;

- The drilling of a bore is a permitted activity in accordance with Rule 46 of the Freshwater Plan provided that notification is given to the TRC, all bores are cased and sealed, the bore is located at least 50 m from a effluent treatment pond / septic tank, and shall be located 25 m from the sea and surface waterbodies;

- The taking of groundwater from a bore is a permitted activity in accordance with Rule 48 of the Freshwater Plan provided that the daily volume of the abstraction does not exceed 50 m^3, the maximum abstraction rate does not exceed 1.5 l/s, and the bore from which the groundwater is being taken is at least 500 m from the sea or adjacent bores; and

- The establishment and use of culverts in, on or under the bed of a river is a permitted activity in accordance with Rule 57 of the Freshwater Plan, subject to a number of conditions. These conditions relate to the cross-sectional size of the river bed (10 m^2), structures not altering the course of the river, no significant erosion occurring, culverts not restricting fish passage, no works

occurring in water between 1 May and 31 October each year, and culverts not exceeding 25 m in length.

In light of the above, the permitted baseline clearly assumes that construction related activities of a moderate scale can occur within the project site (and streams running through the site) as of right.

3. THE PROPOSAL

This section of the AEE describes the activities to be undertaken as part of the construction, operation and maintenance of the WWF and the transmission line. This section also provides an overview of the rationale for the development of the WWF at this particular location, and the route selection process for the proposed transmission line.

3.1 Drivers for Electricity

3.1.1 Electricity Supply and Demand in New Zealand

New Zealand has a mix of hydro, thermal, geothermal, wind and biogas electricity generation capacity. Most of the generation capacity in the South Island is hydro generation, which is reliant on rainfall and spring snow-melt and provides limited storage of water to spread generation over longer periods. For much of the time the South Island provides surplus generation for transmission to demand centres in the North Island.

The North Island has more diverse generation sources with a cluster of generation plant in the Taranaki Region based on gas; hydro generation concentrated in the Waikato, Bay of Plenty, Poverty Bay and Taranaki Regions; and geothermal plant within the Taupo Volcanic Zone. In addition, wind generation has been increasingly developed in the Manawatu and Wellington Regions over the past decade.

New Zealand's total installed generation capacity in 2014 was 9,073 MW, which generated 42,216 GWh of electricity. 5.2% of this electricity generation came from wind generation sources. The WWF would add the equivalent of 1.4% of installed generation capacity and 1.1% of net annual generation output.

However, since 2014 electricity generation companies have announced the impending de-commissioning of over 1,000 MW of thermal capacity. In this regard:

- Mighty River Power announced the closure of the 170 MW gas-fired Southdown Power Station in March 2015;
- Contact Energy announced the closure of the 380 MW gas-fired Otahuhu B Power Station in September 2015; and
- Genesis Energy has announced the closure of 500 MW of gas / coal fired units at the Huntly Power Station by 2018 (although these might continue in operation beyond then, probably fuelled by gas, under favourable conditions).

Another uncertainty in electricity supply is the future of the Tiwai Point Aluminium Smelter, which currently consumes approximately 12% of New Zealand's electricity generation per annum. The smelter is currently contracted to run until 2018 and its operation could be extended beyond then. However, if it were to close it would increase the supply of electricity available and lower prices - risking the stranding of investments in new (typically thermal) peaker plants that depend on the frequency of high price periods.

As at June 2015, the Electricity Authority listed 7 MW of new generation capacity as under construction, 4,750 MW as consented, 7 MW as consent under appeal, and 290

MW as applied for consent.[21] Earliest commission dates for the new electricity generation capacity range between 2016 and 2020. Of this new capacity, 68% would be wind powered and 10% hydro.

Although it might seem that there is plenty of new electricity generation capacity in the pipeline, this does not preclude the need to consent new proposals in suitable locations. In this regard, electricity generators still need to find options for developing new electricity producing facilities with which to respond to changes in market conditions. With the Government's preference for expanding renewables' share of total generation,[22] this means having a number of sites consented and available for construction if the market conditions are right.

3.1.2 Forecast Growth in Electricity Demand

Between 1979 and 2009, New Zealand's net generation output increased from 22,175 GWh to 42,010 GWh.[23] This increase in electricity supply over 30 years is equivalent to a compound growth rate of 2.2% per year. Over the long term electricity consumption has moved in line with economic growth.

After 2008 the combined effect of falling demand in the face of the Global Financial Crisis ('GFC') and improving energy efficiency caused the rate of electricity growth to drop to -0.1% per year on average over the period 2009-2013. During the same period average annual economic growth per capita was 2.1% in nominal dollar terms and 0.9% in constant dollar terms, indicating there has been some decoupling of electricity use from economic growth.

In 2013 the Ministry of Business, Innovation and Employment ('MBIE') issued new electricity outlook forecasts for the period 2013-2050. These presented a range of different potential futures reflecting significant uncertainties around the scale and timing of electricity consumption recovery, whether the Tiwai Point Aluminium Smelter would continue in operation, and whether electric vehicles would become sufficiently economic in operation to make a significant increase in electricity usage. These forecasts envisaged annual average growth in demand of between 0.7% and 1.3%.[24] These forecasts are a reduction from the pre-GFC outlook forecasts of 1.3% growth per year over the period 2005 to 2030, but an increase on the lower rate of electricity consumption growth of 0.9% per year in the 2010 electricity outlook.

While the forecast growth rates are low by historical standards, there are material uncertainties involved. Actual growth rates could be somewhat lower or higher than these forecasts. In particular, consumer behavioural responses to changes in price and reliability of electricity or new sources of demand (i.e. household appliances, automation, and electric cars) make future demands inherently difficult to predict.

3.1.3 Supply Considerations

As noted above, there remains a need to have good prospective renewable electricity generation options consented and ready to be developed when required, either to expand electricity generating capacity or replace old plant that need to be retired. Apart

---

21 Electricity Authority (2015).

22 New Zealand Energy Strategy 2011-2021.

23 Ministry of Business, Innovation and Employment (2015), *New Zealand Energy*.

24 With a modal rate of 1.1%.

from the preference for renewable electricity generation, there are other factors that make it desirable to change the current configuration of electricity generation plant.

Although New Zealand currently has sufficient electricity generating capacity to meet electricity demand in most years, our reliance on hydro sources makes us vulnerable to sharp increases in wholesale prices in dry years - when low hydro storage levels in the autumn and winter coincide with peak demand. Dry year events that have affected wholesale prices occurred in 2001, 2003, 2006 and 2008. The amplitude of the price fluctuations has narrowed in recent years due to a number of contributory factors, including the commissioning of new geothermal and wind generation capacity and improvements to the HVDC inter-island link and the transmission grid in the North Island.

Providing additional electricity generation capacity with output that is not closely correlated with the weather patterns that feed the main hydro lakes in the South Island will improve the diversity of the national electricity generation capacity and strengthen resilience against dry year events.

Gas is the second most important source of electricity generation after hydro sources, although New Zealand faces uncertainty over the availability of gas for electricity generation in the medium term due to depletion of the Maui gas field reserve, and insufficient new gas discoveries (despite policies encouraging gas exploration).

Contact Energy recently constructed a 200 MW open cycle gas turbine plant at Stratford, which is designed to be a peaking plant. It operates at times of high prices and will have more modest annual fuel requirements than a base-load gas-fired plant. The recent announced closures of base-load gas plant suggest they have struggled to be profitable in current market conditions.

While market conditions have favoured further gas exploration in New Zealand, recent fields brought into production have not significantly changed gas supply and demand conditions, and there is unlikely to be much expansion in gas-fired baseload generation in the next few years (unless gas discoveries exceed current expectations). It is expected that other sources of electricity will expand as the contribution of gas declines.

3.2 Site Considerations and Rationale

3.2.1 Identification of Sites

As discussed in section 1.2 of this AEE, Trustpower has an active programme of investigating and developing new electricity generation opportunities throughout New Zealand. This programme includes actively monitoring the wind resource at a number of potential development sites - including sites within the Taranaki Region. The investigation of the wind resource at a number of sites throughout New Zealand assists Trustpower in determining general and specific areas that may be viable for the development of utility scale wind farms.

With respect to the South Taranaki District, it is recognised that numerous coastal locations in the district may have a wind resource that is potentially suitable for the development of a wind farm. This is acknowledged in Policy 2.9.14 of the Proposed Plan, which seeks to *"recognise the potential of the available wind resource along the coast in South Taranaki to provide for renewable electricity generation activities."*

However, the identification of potentially suitable sites in the South Taranaki District for the development of a wind farm is not restricted to the evaluation of the wind resource. In this respect, other relevant features include:

- Proximity to the electricity transmission network and potential transmission constraints;
- Land tenure and availability;
- Geotechnical conditions and site suitability;
- Road and site access;
- The regulatory and statutory planning framework; and
- Environmental values within, and adjacent to, the proposed site.

In terms of the above matters, it is critical that a site is not a significant distance from an electricity transmission network and that this network is not constrained. Otherwise, the viability of a wind farm will be limited and there will be restrictions on the amount of electricity that can be generated from the site. For this project it is noted that Transpower have 220 kV and 110 kV transmission lines that run through the South Taranaki District – with existing substations at Waverley and Hawera.

Land tenure and availability are also critical factors in site selection for wind farm development. It is obviously necessary to have landowners who are either willing to sell large parcels of suitable land for development or enter into a commercial agreement for the development of a wind farm. In addition, sites set aside for conservation or other infrastructural purposes, or sites with geotechnical issues, would not typically represent a viable alternative site for development.

It is also important that sites are suitably located away from large residential populations, such that any potential noise or visual effects of the wind farm are minimised. This would conceivably limit the possibility for development immediately adjacent to the communities at Patea, Hawera, Ohawe and Opunake.

Environmental values and statutory planning frameworks also have the potential to limit the viability of potential sites. In this regard, not all sites with a suitable wind resource and access to an electricity transmission network will be appropriate for development due to environmental reasons (e.g. due to potential ecological, archaeological or wahi tapu constraints), or because the underlying zoning or statutory planning framework for the site strongly discourages such activities.

In summary, Trustpower acknowledges that there will be other sites along the coastline of the South Taranaki District that have a wind resource that is potentially suitable for the development of a commercially viable wind farm. However, any such sites will also face a range of constraints to development due to a variety of reasons (including the factors identified above). As such, Trustpower does not consider any other location in the South Taranaki District would represent a materially more appropriate site for the development of a wind farm over the proposed site of the WWF.

The viability of the WWF site for development is discussed in more detail in section 3.2.2 below.

3.2.2 Viability of the Project Site

The project site has been identified as having a suitable wind resource for a number of years. Much of the project site was previously subject to a resource consent application for a wind farm by Allco in 2007. The consenting process for the application by Allco was never completed. However, the wind data previously collected provided some confidence to Trustpower that the project site has a good and consistent wind resource.

Trustpower has continued to monitor the wind resource at the project site since securing land access with the four landowners whose properties encompass the site.

In terms of the other factors relevant to determining the viability of the project site, as noted in the section above, a 110 kV transmission line forming part of the National Grid and an existing electricity substation (grid exit point) is located on the northern side of Waverley. The close proximity of the National Grid to the project site minimises the potential for transmission losses and the need for lengthy transmission connections. Transpower's Transmission Planning Report also acknowledges plans for a wind farm near Waverley and that the existing 110 kV transmission line has been upgraded to accommodate 165 MW of new electricity generation (greater than the planned capacity of the WWF).[25]

The project site also provides favourable conditions for construction. The site essentially compromises flat rural pasture with good access. Compared to many wind farm developments within New Zealand, the project site will require minimal earthworks for turbine platforms, hard stand areas and the construction of the internal access roads. Furthermore, and as described in section 2 of this AEE, the project envelope defined for the establishment of the WWF is considered to have relatively low environmental values in light of the fact that most of the area was formerly utilised for iron sand mining.

The regulatory and statutory planning framework that applies to the project site is explained in more detail in section 5 of this AEE. It is, however, noted that the resource consents required from the STDC and the TRC for the construction, operation and maintenance of the WWF and the transmission line are discretionary activities.

In terms of the WWF's strategic fit with Trustpower's existing electricity generation portfolio, the site is considered to provide significant benefits due to its reasonable proximity to the Patea HEPS and the TWF. With respect to the relationship between the WWF and the Patea HEPS, the WWF will assist Trustpower in managing the storage of water in Lake Rotorangi and increase the potential for the Patea HEPS to generate at times when there is a lack of alternative generation sources. That is, wind generation enables hydro-electricity generation plant to conserve water and build up storage for use in generation when there is no wind and hydro generation becomes more valuable. A similar strategy has been successfully applied by Trustpower in the South Island with respect to the Waipori HEPS and the Mahinerangi Wind Farm.

The WWF will also complement the generation of electricity by Trustpower at the TWF in the Manawatu - Wanganui Region. As noted in section 1.3 of this AEE, the TWF utilises the predominant westerly winds that blow over the Tararua Ranges for the generation of electricity. In contrast, the WWF will principally rely on north-west and south-easterly winds across the site for the generation of electricity. As such, the WWF will contribute towards Trustpower being able to provide a relatively consistent load of wind generation to the electricity market by having two similar scale wind farm

[25] Transmission Planning Report, Section 12.11.2, July 2015

developments in reasonable proximity, but which are reliant on different predominant wind directions.

Given the above, the project site is considered to represent a unique development opportunity for Trustpower.

3.3 Design Approach

As already noted, much of the project site was previously part of a resource consent application by Allco to construct, operate and maintain a wind farm comprising 45 turbines with an installed generation capacity of 135 MW. The general layout of the proposal by Allco comprised two separate clusters of turbines, with a western block comprising 180.3 ha and an eastern block of 257.4 ha.

Trustpower reviewed the turbine layout / configuration proposed by Allco upon securing access to the WWF site in 2010. Trustpower considered that the layout proposed by Allco could be improved to enable a more efficient use of the site and to allow for the ability to take advantage of improvements in technology that might require a larger site. As a result, Trustpower sought to extend the boundaries of the project site to include property owned by Parininihi Ki Waitotara, and Standalone Farms Limited. The boundaries of the project site which form part of Trustpower's resource consent application are shown in Figure 1 of Appendix A to Isthmus (2016).

As discussed briefly in section 1.1 of this AEE, Trustpower is seeking resource consent for a project envelope (as opposed to seeking consent based on fixed / indicative turbine locations) in order to maximise the potential and efficiency for electricity generation. The project envelope covers the total extent of the project site, but excludes the areas within the project site where development cannot occur due to the EBZ.

The project envelope comprises an area of approximately 804.37 ha, whilst the EBZ comprises approximately 175.47 ha. Trustpower is proposing that no turbines, ancillary buildings, roads or earthworks occur within the EBZ, unless a specific exemption is provided for by way of the resource consent conditions for the WWF (although dune planting and restoration may take place in the EBZ). This matter is discussed further in sections 3.4 and 3.5 below.

The formulation of the EBZ within the project site has been informed and refined in response to the various environmental assessments that have been commissioned by Trustpower. In this regard, following site assessments and preliminary investigations the environmental consultants retained by Trustpower were asked to identify whether there were any locations within the project site where the establishment of turbines, ancillary buildings, roads or earthworks should be avoided. The areas recommended for avoidance by the environmental consultants were then overlain on the project site and the EBZ was generated.

The EBZ includes constraints and buffers relating to coastal bird flight paths, visual / natural character values in the coastal environment, terrestrial ecology values, aquatic ecology and riparian margin values, potential archaeological values and suitable noise setbacks. Many of the constraints and buffers identified by the environmental consultants overlap with each other. The extent of the EBZ is shown in Figure 3 of Appendix A to Isthmus (2016).

The project envelope will enable Trustpower to retain some flexibility over the choice of turbine and the detailed design of the WWF. Trustpower is not proposing to micro-site the turbine locations as part of this resource consent application. The potential for the clustering of the wind farm in one part of the project envelope will, however, be minimised due to the fact that the turbines need to be suitably spaced for efficiency and operational reasons. In this regard, the proposed consent conditions attached as **Appendix Fourteen** to this AEE require that any wind turbines within the project envelope shall be spaced so that an ellipse drawn around each wind turbine and orientated to the prevailing wind at 315 degrees from due north, with the long axis being four times the diameter of the rotor and the narrow axis being 2.5 times that diameter, does not overlap the ellipse drawn around any other wind turbine.

Due to the flat, open nature of the project site, the potential turbine configuration will be heavily influenced by the final rotor diameter of the turbine selected by Trustpower. Recent and continuing advances in turbine technology mean that there are a large number of potentially suitable turbines for the site. This trend is expected to continue for the foreseeable future. Therefore, having flexibility over turbine micro-siting (but subject to the constraints relating to the EBZ and spacing) will ensure the WWF can be fully optimised using the best available turbine technology. This will also ensure the most efficient use is made of the available wind resource.

3.4 Project Description - Overview

This section of the AEE describes the activities and works associated with the construction, operation and maintenance of the WWF and the transmission line. By way of summary, the activities and works will include:

Wind Farm

a) The erection of up to 48 turbines with a maximum height of 160 m above ground level (to blade tip) for the generation of electricity within the project envelope;

b) The erection of up to 48 externally housed transformers adjacent to each turbine within the project envelope;

c) The erection of up to four permanent wind monitoring masts within the project envelope with a maximum height of 110 m above ground level, but which will likely be constructed to a height equivalent to the hub-height of the installed turbines;

d) The installation of medium intensity aviation obstacle lighting on the nacelles of the turbines marking the extremities of the WWF as approved by the CAA;

e) An underground 33 kV electrical and fibre optic cable network between the 48 turbines and the electricity substation / switchyard building within the project envelope;

f) An internal access road network of approximately 25 - 30 km within the project envelope (excluding road crossings required over the Waipipi Stream);

g) The upgrade and maintenance of existing local roads approaching the project site;

h) Land disturbance of approximately 53.6 – 66.25 ha for the hard stand platforms and internal access roads within a project envelope of 804.37 ha;

i) Earthworks comprising the following estimates:

- Cut volumes:
  - Tracks 108,000 – 140,000 m^3
  - Platforms[26] 192,000 – 250,000 m^3
- Fill volumes:
  - Tracks 37,000 – 60,000 m^3
  - Platforms 12,000 – 25,000 m^3
- Surplus to fill disposal sites[27] 251,000 – 305,000 m^3

j) The clearance of vegetation;

k) The use and storage of hazardous substances;

l) The damming and diversion of water and the establishment of culvert structures for site access / internal road network purposes within the Waipipi Stream and a number of unnamed watercourses / drainage channels within the project site;

m) The taking of groundwater via two bores for concrete batching and other construction activities;

n) The taking of surface water from farm ponds and unnamed watercourses / drainage channels within the project envelope for construction related activities, including dust suppression;

o) The de-commissioning and infilling of three farm ponds within the project envelope;

p) The diversion and discharge of groundwater associated with de-watering of the turbine foundations;

q) The establishment of a concrete batching plant and other temporary buildings, structures, signage and construction equipment within the project envelope;

r) The establishment of a permanent operations / maintenance building within the project envelope;

s) Sediment and stormwater control measures across the project envelope; and

t) Site rehabilitation works.

---

[26] This excludes foundation excavations.

[27] Fill disposal sites include the existing ponds that are to be drained.

Electrical Transmission Facilities

u) The construction of a central electricity substation / switchyard building within the project envelope, which includes a control room, transformers, switchgear, insulators and other ancillary equipment;

v) The erection of a single circuit 110 kV / 130 MVA above ground transmission line between the WWF and Transpower's electrical substation on Mangatangi Road, Waverley. The transmission line would be established within a transmission envelope that is 30 m wide and generally on monopoles (with double structures being utilised only where necessary) with a maximum height of 22 m above ground level;

w) The undergrounding of sections of Powerco's existing 11 kV transmission line network in the vicinity of Waitangi Road, Waverley;

x) Earthworks associated with:

- The installation of the 22 m high transmission poles; and
- The trenching of a section of Powerco's existing 11 kV transmission line.

y) The use and storage of hazardous substances;

z) The trimming and clearance of vegetation;

aa) Site rehabilitation works.

Further detail on the proposed activities and works associated with the construction, operation and maintenance of the WWF and associated transmission line is provided in sections 3.5 - 3.7 below.

3.5 Wind Turbines

The WWF will involve the construction and operation of up to 48 turbines within the project envelope. The WWF will have an installed generation capacity of approximately 130 MW and generate approximately 490 GWh per annum.

Each turbine consists of a tower, nacelle, hub and rotor. These elements will all be painted the same colour, which will be within the off white colour palette. The painted surface will be non-reflective. The turbines will have a maximum height above ground level of 160 m (to the blade tip) and will be supported by either a mass gravity concrete foundation or deep piled foundation. The height and colour of the turbines is intended to be controlled via the proposed consent conditions attached as **Appendix Fourteen** to this AEE.

In addition, a hard stand area will be required around each turbine location. The hard stand area is required to enable the assembly and erection of the tower, nacelle and blade components. It provides a flat space for the lay down of components and working areas for assembly cranes. Each hard stand will cover an area of approximately 82 m by 30 m (within which the foundation will also be located), and will be rehabilitated following construction such that pasture is restored as close as practicable to the turbine towers.

Depending on the type of turbine selected each hard stand area may also support an external transformer unit adjacent to each turbine. Each external transformer unit will be approximately 5 m by 5 m, with a height of approximately 2.5 m. An alternative configuration would result in the transformer units being housed within the base of the tower of each turbine.

The nacelle is the housing that sits on the top of the turbine tower and accommodates, amongst other things, the turbine's gearbox, control systems, pitch and yaw drives, and generator. Given the nature of the components contained within the nacelle, oil containment and sound insulation will be provided for within each individual turbine unit. The nacelle will be constructed of fibreglass, and access into the unit will be provided through an opening in the floor which leads to the tower.

The rotor is the portion of the turbine that captures the energy from the wind. The turbines will have three blades, which are mounted to the hub. Generally the blades are made of fibreglass reinforced with epoxy and carbon fibre. The rotor, which includes the blades, will be controlled by a central wind turbine control unit (microprocessor). The microprocessor will control the rotational speed of the rotor and the pitch of the blades - thus enabling the rotor to maximise energy production from the wind resource and ensure the safe and reliable operation of the turbine. When wind speeds get too high the microprocessor is able to control the pitch of the blades to stop the turbine rotating, minimising wear on the components from operating at too high wind speeds, and also stopping the turbines from causing noise from braking systems.

Most of the consented wind farms in New Zealand have relied upon varying degrees of flexibility within the resource consents they have been granted to cater for the selection of turbines and / or for engineering considerations. This flexibility has been achieved via turbine consent areas within a site or the utilisation of specific turbine locations with provision for micro-siting to occur within a specific distance out from these locations (i.e. 'dots and circles'). As already noted in section 3.3 of this AEE, Trustpower is not proposing to confirm the exact location of each of the turbines as part of this resource consent application. Rather, it is proposed that each of the 48 turbines be micro-sited following the securing of resource consents in a manner consistent with the following principles:

- Turbines must not be established in the EBZ;
- Turbines must be set back at least one blade length from the project site boundaries;
- The layout of the WWF must be designed so that any wind turbines within the project envelope shall be spaced such that an ellipse drawn around each wind turbine and orientated to the prevailing wind at 315 degrees from due north, with the long axis being four times the diameter of the rotor and the narrow axis being 2.5 times that diameter, does not overlap the ellipse drawn around any other wind turbine;
- Turbines (excluding hard stand areas) must not be established on the road reserve / paper roads within the project envelope; and
- Turbine blades may overhang the EBZ.

Notwithstanding the fact that micro-siting of the turbines will occur after resource consents have been granted, an indicative configuration / layout of the WWF is provided in the report entitled *"Civil Assessment of Access Tracks and Hard Stands – Waverley Wind Farm"* by Riley Consultants Limited ('Riley – Civil (2016)'). A copy of this assessment is provided in **Appendix Fourteen** to this AEE. The indicative turbine configuration / layout represents a realistic and 'real world' design. However the technical assessments have also addressed a worst case scenario in order to be conservative with the effects analysis given the flexibility sought by Trustpower.

3.6 Supporting Infrastructure

There will be a number of ancillary facilities and works undertaken to support the construction, operation and maintenance of the WWF. These include the following:

- An operations / maintenance building;
- Wind monitoring masts;
- Internal access road network;
- Culvert works;
- Existing local roads;
- Concrete batching plant(s);
- Water supplies;
- Earthworks; and
- Decommissioning of existing ponds.

Each of these facilities and works are discussed further below.

3.6.1 Operations / Maintenance Building

The operations / maintenance building will provide a base for WWF personnel and contractors. To operate the WWF, approximately eight to ten people will be employed on site. These staff will be responsible for the monitoring, operation and maintenance of the WWF and will also be on-call to respond to any adverse conditions that affect the operational safety of the plant.

A vital component of facility monitoring is the Supervisory Control and Data Acquisition ('SCADA') system which connects each of the turbines, the electricity substation, and the wind monitoring masts to a central computer. This computer and associated communication system will allow Trustpower to remotely monitor wind conditions, adjust and monitor the turbines, and to generally supervise the WWF as a whole. The operations / maintenance building will house the central computer associated with the SCADA system.

The operations / maintenance building will be of sufficient size to accommodate offices, equipment and any spare parts required for the on-going maintenance of the turbines.

In this respect, it will be approximately 7 m in height and require an area of approximately 40 m by 15 m.

The exact location of the operations / maintenance building within the project envelope is yet to be confirmed, but it is likely to be located in an area where it is readily accessible to site staff and visitors to the site.

A potable water supply for the operations / maintenance building will be provided via a rain water collection system. A small kitchen and toilet facilities will also be housed within the operations / maintenance building. As such, an on-site waste water treatment and disposal system will be required. The on-site waste water treatment and disposal system will be designed and constructed in accordance with the New Zealand Standard (AS/NZS 1547:2000 *"On-site Domestic Waste Water Management"*).

There will be no reticulated storm water system associated with the operations / maintenance building. In this respect, storm water run-off from the operations / maintenance building will be collected and discharged to ground.

A hard stand area will also be constructed adjacent to the operations / maintenance building to enable the delivery and storage of ancillary equipment required for the construction of the WWF (i.e. cabling, bulk materials).

3.6.2 Wind Monitoring Masts

In addition to the 48 turbines, up to four wind monitoring masts will be established within the project envelope (in addition to the two existing masts on site) in locations yet to be confirmed. All masts will be permanent structures and will be supported by a small concrete foundation and guy wires.

The maximum height of each wind monitoring mast will be 110 m above ground level, but will likely be constructed to a height equivalent to the hub-height of the installed turbines.

3.6.3 Internal Access Road Network

An internal access road network will also be developed as part of the construction of the WWF. The internal access roads will facilitate all-weather access between the turbines, substation / switchyard building, operations / maintenance building and the wind monitoring masts. The internal access roads will be designed to accommodate 'over-sized' vehicles and associated loads (e.g. a 600 tonne crawler crane) during construction.

An indicative layout of the internal access road network for the site is provided in Riley - Civil (2016). The internal access road network will be located within the project envelope, except where the internal access roads need to cross the Waipipi Stream and its tributaries at six locations. This is an identified exception to works within the EBZ and is discussed further in section 3.6.4 below.

It is estimated that 25 - 30 km of internal access roads will be required within the project envelope. During construction of the WWF the internal access roads will have a maximum width of approximately 10 m (plus 1 m shoulders on either side) and will have a pavement thickness between 200 - 500 mm.

Once construction of the WWF is completed, the internal access roads will be reduced to a width of approximately 5 m (plus 0.5 m shoulder on either side), with the superfluous area rehabilitated and re-vegetated. Aggregates and materials for use in the construction of the internal access roads will most likely be sourced from quarries in the surrounding area and beyond.[28] The volume of aggregate potentially required for the construction of the internal access road network is detailed in Table 8 of Riley – Civil (2016).

Further detail on the design of the internal access road network is provided in Riley – Civil (2016).

Where possible, the internal road network will be aligned along existing farm access tracks and will maintain a vertical alignment in order to minimise the interception of stormwater. However, any stormwater runoff that is collected from the internal access road network and hard stand areas will be conveyed by channel and / or pipe systems to designated disposal locations (e.g. soak pits or discharges into the existing drainage channels on site). Energy dissipation measures (e.g. rock lining and culvert wing walls) may be required in some locations to reduce the potential for erosion during storm events.

Dust suppression will be applied to the internal access roads on an as required basis using water carts and other applicable measures during construction activities. Water supplies for the WWF are discussed further in section 3.6.7 below.

3.6.4 Culvert Works

New culverts will be required in the bed of Waipipi Stream and its tributaries at six locations in order to facilitate the construction of the internal access road network. These six locations are identified exceptions to works within the EBZ and are identified in Riley – Civil (2016).

Table 3.1 below provides detail on the catchment area and peak flow events expected in the Waipipi Stream and its tributaries.

Table 3.1: Stream Storm Event Calculations (Riley – Civil (2016)).

CULVERT NUMBER	EASTING (M)	NORTHING (M)	CATCHMENT AREA (ha)	RAINFALL INTENSITY (mm / hr)	2% AEP PEAK DISCHARGE (m^3/s)
1	1732795	5593168	908	36	23.5
2	1732963	5593451	869	38	25
3	1733171	5593638	858	39	26.8
4	1733525	5593673	119	62	6.1
5	1733777	5593605	109	66	6
6	1733245	5593857	86	54	3.9

Hydraulic analysis in Riley – Civil (2016) indicates that the culvert sizes specified in Table 3.2 below will be required to pass the peak discharge in the Waipipi Stream and its tributaries, whilst allowing for a maximum culvert surcharge of 1 m.

[28] For example, the quarries located on Rangitatau West Road.

Table 3.2: Culvert Size Options (Riley – Civil (2016)).

CULVERT NUMBER	CIRCULAR CULVERT DIAMETER (M)		RETANGULAR CULVERT HEIGHT (M)	
	x 1	x 2	4 M WIDTH	1.5 M WIDTH
1	3	2.3	2	N/A
2	3	2.3	2	N/A
3	3	2.3	2	N/A
4	1.5	N/A	N/A	1.5
5	1.5	N/A	N/A	1.5
6	1.5	N/A	N/A	1.5

The design of the new culverts in the Waipipi Stream and its tributaries will be undertaken in accordance with TRC guidelines for fish passage. In addition, wing walls, rock gabion matting and / or rock lining will be used to provide protection against erosion at the inlet and outlet of the culvert structures. Diversion channels and temporary dam structures may also need to be installed in Waipipi Stream and its tributaries in order to complete the construction of the culvert structures. Indicative culvert designs are provided in Riley – Civil (2016).

Furthermore, a number of existing culverts in the drainage channels within the project site will need to be upgraded as part of the internal road access network. These culverts are typically single 350 mm diameter steel pipes. These culverts will be replaced with culverts of a similar size or larger and will be designed to pass flows from a 10% AEP (10 year ARI) rainfall event.

3.6.5 Existing Local Roads

In order to enable the safe transportation of equipment and personnel to the project site, Trustpower is proposing to undertake minor upgrade works to some of the existing local roads in the surrounding area. All of these upgrade works are detailed in TDG (2016) and briefly described as follows.

3.6.5.1 State Highway 3 / Peat Road Intersection

The existing intersection of SH3 / Peat Road is to be upgraded as required in full accordance with NZTA standards in accordance with Austroads. It is noted that existing sightlines meet NZTA requirements and the layout design of the intersection can be assessed based on the projected traffic patterns during construction.

Development of a left-turn lane on SH3 that is suitable for regular use by heavy vehicles is likely to be warranted, taking into account peak-hour flow of traffic as well as safe queuing requirements clear of the highway and rail level crossing in the event of queuing for a train. Initial discussions between Trustpower, KiwiRail and NZTA have confirmed this requirement.

From a safety perspective, it will also be important to provide a short left-turn layby area for any larger vehicles turning out of Peat Road to the west, in order ensure adequate

queuing space clear of the level crossing when trains are using the crossing. Such provision will also assist in providing additional width to accommodate the tracking turning paths of larger vehicles.

All of these improvements can all be accommodated in the existing road reserve.

3.6.5.2 Peat Road

Peat Road will require reconstruction in terms of road width and pavement strength requirements to accommodate the number and weight of heavy loads expected. In this regard, initial indications from the STDC are that the existing pavement depth is expected to be only of the order of 300 mm at best.

It is considered that the majority of any necessary road widening / reconstruction required can be contained within the available road reserve width. However, there are one or two possible exceptions identified along Peat Road (all measurements from SH3 centreline at Peat Road intersection):

- There are a number of locations where the existing fence is within the road reserve and may require to be setback to the legal boundary, or as otherwise agreed with the landowner, in order to accommodate the additional road formation and any earthworks or drainage, as well as the swept path of the over-length loads;

- 1780 – 1850 m: although the physical road is able to remain entirely within the road reserve at this location, the swept path of the turbine blade is unable to be accommodated within it. In order to enable the passage of the blades the fence will need to be setback on one side of the road (with the likelihood of some earthworks also extending into private land). Following passage of the blades, the fence could then be reinstated along the existing boundary;

- 1950 – 2000 m: although it is feasible for all necessary widening to be on the side of the road that lies within the road reserve, reconstruction of the existing (thin) pavement outside the legal road reserve will also be required. Depending on the treatment at the previous curve, it is expected that some encroachment onto adjoining land may be required at this bend; and

- 2940 – 2960 m: a significantly wider driveway crossing and road approaches are necessary to accommodate the wheel-tracking and swept path of the turbine transporters. The swept path of the blades is able to be contained within the road reserve, although the existing fence-line within the road reserve will need to be set back onto the boundary during construction.

3.6.5.3 Site Access from Peat Road

A new driveway intersection arrangement onto Peat Road to provide access into the project site is also proposed. This is indicated in Figure 12 of TDG (2016).

The access point has been designed to safely accommodate the manoeuvring of large vehicles into the project site, with fence-lines set back so as to accommodate the swept paths of over-length vehicles. It is proposed that a security gate be established and be controlled by 24 hour security during construction.

3.6.5.4 Transmission Line Access Route

Much of the proposed transmission line route is located within road and rail reserve, with only relatively short sections crossing private land. Construction traffic may need to access the transmission line route via new or existing private accesses from the public road network. Vehicles associated with construction of the transmission line are expected to have all-terrain capability.

3.6.6 Concrete Batching Plant

A temporary concrete batching plant will be centrally established within the project envelope. The concrete batching plant will have a height of approximately 10 m and require a working area of approximately 100 m by 75 m.

The concrete batching plant will receive aggregate material from off-site.[29] The volume of aggregate potentially required for the construction of the wind farm is detailed in Table 8 of Riley – Civil (2016). Aggregate material will be stored in separate bays for the preparation of concrete on site. The cement will be stored in a silo adjacent to the batching process machinery. Concrete agitators will transfer the concrete from the batching plant to the turbine foundation locations within the project envelope.

The concrete batching plant will be removed once construction of the WWF is completed. The underlying land will be rehabilitated and returned for agricultural use.

3.6.7 Water Supplies

Water supplies for the concrete batching plant, dust suppression and other construction activities will be required on-site throughout the construction of the wind farm. Water supplies for the operations / maintenance building will be provided via a rain water collection system.

Water for the concrete batching plant will be supplied from groundwater bores within the project envelope. The taking of water from bores within the site was previously authorised by the TRC as part of Consent 7155-1 (a copy of which is provided in **Appendix Sixteen** to this AEE). Consent 7155-1 authorised the abstraction of groundwater for construction purposes at a rate of 2 litres per second and a limit of 88 m^3 per day. However, this resource consent has now lapsed.

The volume of water required to produce the concrete for a single turbine foundation is approximately 190 m^3 per day (based on pile foundation type). Therefore, an increased rate and volume of extraction will be required from the shallow marine terrace aquifers and the Whenuakura Formation aquifer. In this respect:

- The maximum cumulative rate of abstraction from all bores within the shallow marine terrace aquifers will not exceed 2 litres per second and a maximum cumulative allocation of 88 cubic metres per day; and

- The maximum cumulative rate of abstraction from all bores within the Whenuakura Formation aquifer will not exceed 4 litres per second and a maximum cumulative allocation of 120 cubic metres per day.

---

[29] Possibly from quarries located on the banks of the Rangitikei River, approximately 100 km from the project site.

On-site storage tanks may also be required to ensure a continuous supply of water for operations at the concrete batching plant(s).

In addition, surface water may be taken from the three farm ponds and unnamed watercourses / drainage channels within the project envelope for the purpose of other construction activities - including dust suppression along the internal access roads and exposed surfaces.

3.6.8 Earthworks

3.6.8.1 Earthwork Volumes

Substantial earthworks will be required within the project envelope to construct the various components comprising the WWF. In this regard, it is estimated that the following earthwork quantities will be required for the construction of the turbine foundations, hard stand areas, internal access road network, and spoil disposal areas:

- Cut volumes:
  - Tracks 108,000 – 140,000 m^3
  - Platforms[30] 192,000 – 250,000 m^3
- Fill volumes:
  - Tracks 37,000 – 60,000 m^3
  - Platforms 12,000 – 25,000 m^3
- Surplus to fill disposal sites[31] 251,000 – 305,000 m^3

Further information on the management of stormwater and sediment during earthworks activities on the project site is provided in section 4.12 of the AEE.

3.6.8.2 Spoil Disposal

Excess spoil from the construction activities will be placed in specific spoil disposal areas within the project envelope (approximately 15 sites are identified on the indicative layout in Appendix C to Riley – Civil (2016). Whilst the final locations of the spoil disposal areas have yet to be confirmed, the locations where excess spoil will be disposed of will have the following characteristics:

- Typically located in small depressions;
- Easy access for construction vehicles;
- Situated in an area of stable ground;
- Located in close proximity to an area of surplus cut materials; and
- Will avoid the EBZ.

Some of the excess spoil may also be used to rehabilitate the access tracks and other construction areas (e.g. the concrete batching plant).

---

30 This excludes foundation excavations.

31 Fill disposal sites include the existing ponds that are to be drained.

3.6.8.3 Site De-watering

Riley – Geotechnical (2016) identifies that de-watering will be required during the excavation of the turbine foundations in some locations due to high groundwater levels.

Pumping rates up to 4 m^3 per day per well point are anticipated to achieve a drawdown of 2.2 m around the turbine foundations. However, once the required drawdown in the excavation is achieved the pumping rate required to maintain the drawdown will decrease to an estimated 2.5 m^3 per day per well point.

Depending on the depth of the excavation and the depth of the water table at each individual site, a lead time for dewatering prior to excavation will be required. This will be approximately 20 days in a worst case scenario (i.e. where the water table is highest and the excavation deepest).

The site is drained by a network of farm drains. Water from de-watering operations will be discharged to these drains. The discharge will be at least 50 m from the well points in order to avoid the recharge of the water back into the de-watered zone. In locations close to areas sensitive to groundwater changes (e.g. wetlands), the discharge could be reduced in order minimise the potential for adverse effects.

3.6.9 Decommissioning of Existing Ponds

Three man-made ponds located within the project envelope will be reclaimed and returned to pasture following the completion of earthworks for the WWF (i.e. once they are no longer required to provide water for dust suppression purposes). The ponds vary in size between 0.5 – 2.5 ha and their location is indicated on Riley Drawing 10WAR/RC-11, which is attached as Appendix C to Riley – Civil (2016).

The ponds are being removed in response to the recommendations in Boffa (2016) regarding avian considerations.

The ponds will be filled with surplus fill from the earthworks on the site so that they are level with the surrounding ground. This will involve the following:

- The capture and relocation of fish species from the ponds. In addition, propagules of two aquatic plant species will be collected and transferred to other ponds within the project site, with the aim of establishing replacement populations;
- The filling of the ponds will commence from opposite ends of each pond to the downstream channel drain to allow water displaced during filling to flow into the drain;
- Excavators and bulldozers will progressively place fill from adjacent stockpiles deposited by dump trucks into the ponds;
- The excavators and bulldozers will track roll the placed fill, providing sufficient compaction to enable dump trucks to track over the filled pond without becoming bogged, and to facilitate filling to proceed further into the pond;
- Before filling the final portion of the pond, stabilisation earthworks of the filled pond with topsoil and hydro-seed or mulch will occur; and

- Drainage channels will be installed through the filled ponds to allow the area to drain.

It is not considered practical to drain the ponds via pumping prior to filling due to the high groundwater recharge and highly permeable sandy soils.

3.7 Transmission Infrastructure

The electricity transmission infrastructure associated with the WWF consists of three main components. These are:

- An electricity substation / switchyard within the project envelope;
- The undergrounding of a 33 kV electrical cable and fibre optic network between each of the 48 turbines and the electricity substation / switchyard building within the project envelope; and
- The establishment of a 110 kV / 130 MVA transmission line from the WWF to Transpower's electricity substation on Mangatangi Road, Waverley.

3.7.1 Electricity Substation / Switchyard

An electricity substation / switchyard will be established within the project envelope. It is likely that the electricity substation / switchyard will be centrally located within the project envelope in order to minimise the need for cabling across the WWF.

The electricity substation / switchyard structure will be approximately 4 – 5 m high, but with gantry structures and lighting / lightening arrestors up to approximately 22 m in height. The electricity substation / switchyard will also require a footprint of approximately 10,000 m^2, inclusive of car parking.

The primary purpose of the electricity substation / switchyard is the reception, transformation and distribution of electrical power and energy. The electrical substation / switchyard will house up to two dual rated transformers (75 MVA), associated ventilation equipment, switch gear, and ancillary equipment for the transformation and distribution of energy.

Each transformer will be capable of handling most, or all, of the capacity of the WWF should the other transformer be out of service.

The transformers and radiators in the electrical substation will be located on pedestal foundations and will be surrounded by concrete bunds. These bunds will have sufficient capacity to retain all of the oil utilised in each transformer.

3.7.2 33 kV Cable and Fibre Optic Network

Each of the 48 turbines within the project envelope will be connected to the central electricity substation / switchyard via a network of 33 kV underground electrical cables. The 33 kV electrical cabling will be placed in a trench approximately 1 m deep.

The trench will also contain a network of fibre optic cables. These cables will connect the turbines and wind monitoring masts with the SCADA system located within the

operations / maintenance building, and will enable Trustpower to remotely control and monitor each of the individual turbines on site.

The underground 33 kV electrical cable and fibre optic network will generally follow the alignment of the internal access road network and will have a total length of approximately 25 - 30 km.

3.7.3 110 kV Transmission Line

The proposed transmission line route between the WWF and Transpower's electricity substation on Mangatangi Road, Waverley is illustrated in Figure 1 of Appendix A to Isthmus (2016). The transmission line route is approximately 13 km.

The proposed transmission line involves a 110 kV / 130 MVA single circuit transmission line (comprising 3 wires) on 22 m monopoles for the most part. Some double pole structures may be required in select locations due to topography or other technical requirements. Figure 9 of Appendix A to Isthmus (2016) provides information on the likely configuration of the transmission line.

The average span between each pole would be approximately 200 m, although this may vary between poles due to topography, vegetation or landowner requirements.

A 30 m wide transmission corridor is proposed for the construction of the transmission line in order to account for any geotechnical, environmental, landowner, design or engineering constraints encountered during the construction phase.

The section of the transmission line route along the road reserve of Waitangi Road will require an existing section of an 11 kV transmission line to be placed underground. This existing line is owned by Powerco. The existing 11 kV line will be placed in a trench approximately 1 m deep.

3.7.3.1 Transmission Line Route Rationale

In assessing potential transmission line routes, Trustpower firstly identified the shortest potential route available from the WWF to Mangatangi Road, Waverley. This route measures approximately 9 km and the underlying land is predominantly used for rural activities. It also involves crossing SH3 and the Marton – New Plymouth Railway Line.

However, traversing the shortest route between the WWF and Mangatangi Road takes no account of potential environmental effects or affected landowners. As such, Trustpower sought to develop a transmission line route that avoided or minimised potential adverse effects on the surrounding environmental values and landowners as far as practicable.

Trustpower began liaising with landowners between the WWF and Mangatangi Road in 2011 in order to identify a potentially viable transmission line route with minimal environmental effects. Trustpower's objective was to locate the transmission corridor in a manner that avoided dwellings as far as practicable and utilised existing road and rail reserves where possible.

In addition to the above, the various environmental consultants commissioned by Trustpower assessed indicative transmission line routes in order to identify areas which should be avoided for visual, landscape, ecology or heritage / archaeological reasons. In this regard, Trustpower was advised to locate the transmission line route away from

features such as a dune lake adjacent to Peat Road (approximately 500 m from the junction with Stewart Road) and Lake Oturi.

3.8 Vital Statistics

The following summarises the 'vital statistics' associated with the construction, operation and maintenance of the WWF and the transmission line:

- Project site: 979.84 ha
- Project envelope: 804.37 ha
- Environmental Buffer Zone: 175.47 ha
- Approximate installed capacity (wind farm): 130 MW
- Anticipated annual electricity output (wind farm): 490 GWh
- Maximum number of turbines: 48
- Maximum turbine height (to blade tip): 160 m
- Operational facility areas:
    - Turbine platforms: 0.09 ha
    - Substation and O&M building: 1.06 ha
- Length of new internal access roads: 25- 30 km
- Length of transmission line: 13 km
- Voltage of overhead transmission line: 110 kV / 130 MVA
- Average span between transmission poles: 200 m
- Approximate earthwork volumes:
    - Cut volumes:
        - Tracks: 108,000 – 140,000 m^3
        - Platforms (excluding foundations): 192,000 – 250,000 m^3
    - Fill volumes:
        - Tracks: 37,000 – 60,000 m^3
        - Platforms: 12,000 – 25,000 m^3
    - Surplus to fill disposal sites and ponds: 251,000 – 305,000 m^3
- Estimated maximum area of disturbance for roads and platforms: 53.6 – 66.25 ha

4. ASSESSMENT OF EFFECTS

4.1 Introduction

This section addresses the actual and potential effects associated with the construction, operation and maintenance of the WWF and the transmission line.

A number of technical assessments have been prepared to inform this assessment of environmental effects. These technical assessments are referenced, as appropriate, in sections 4.2 to 4.19 below. In summary, sections 4.2 to 4.19 address the following matters:

Section 4.2 Positive / economic effects;

Section 4.3 Effects on landscape, visual amenity and natural character;

Section 4.4 Effects of shadow flicker;

Section 4.5 Effects on terrestrial ecology;

Section 4.6 Effects on avifauna;

Section 4.7 Effects of stormwater, erosion and sedimentation;

Section 4.8 Effects on aquatic ecology;

Section 4.9 Traffic effects;

Section 4.10 Noise effects;

Section 4.11 Effects on social, recreation and tourism values;

Section 4.12 Effects on heritage and archaeological values;

Section 4.13 Effects on cultural values;

Section 4.14 Effects on aviation;

Section 4.15 Effects on radio / communication services;

Section 4.16 Electro-magnetic effects on human health;

Section 4.17 Coastal hazard effects;

Section 4.18 Other potential construction and operational related effects, including dust, the storage of hazardous substances, and groundwater management; and

Section 4.19 Conclusion.

Within these sections, a number of measures to avoid, remedy or mitigate the actual and potential effects of the WWF are identified. It is expected that these measures will form the basis of resource consent conditions for the WWF. This is reflected in the proffered resource consent conditions in **Appendix Fourteen** to this AEE.

The activities associated with the construction, operation and maintenance of the WWF and the transmission line which are permitted by the various regional plans administered by the TRC are detailed in section 5.1.4 to 5.1.6 of this AEE. In accordance with section 104(2) of the RMA, a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect.

4.2 Positive / Economic Effects

The construction and operation of the WWF has the potential to generate a number of positive / economic benefits for the local and regional communities, as well as New Zealand. These include the use of renewable energy resources and a contribution to a more secure electricity supply for New Zealand.

Many of the potential positive / economic effects of the WWF are documented in the report entitled "*Economic Assessment of the Waverley Wind Farm"* by the New Zealand Institute of Economic Research Incorporated ('NZIER (2015)'). This report is provided in **Appendix Seventeen** to this AEE.

A summary of the key positive / economic effects of the WWF is provided as follows:

- The WWF will generate approximately 490 GWh of electricity per annum from an installed generation capacity of 130 MW;
- The WWF will not produce any emissions in generating electricity. The WWF will potentially avoid 337,412 tonnes of CO_2 per year if this electricity were to otherwise be generated from a coal-fired plant (or 196,824 tonnes per year if generated from a gas-fired plant);
- In light of the above two bullet points, the WWF has a good strategic fit with the Government's strategic policy directions contained with the New Zealand Energy Strategy in terms of raising the proportion of electricity generated from renewable sources and restraining greenhouse gas emitting activities;
- NZIER (2015) consider the despatch of wind generation to be complementary to the predominant hydro-generation plant that exists in New Zealand. It is also considered to be beneficial to the national electricity system in terms of keeping costs down by helping to conserve water for use when its value is higher, and by alleviating constraints on the National Grid that might limit hydro-generation and despatch. Wind generation also offers the potential to provide additional generation capacity and diversify New Zealand's energy sources;
- The location of WWF roughly midway between Auckland and Wellington will have a positive effect on the electricity system, as it will be able to despatch electricity to large urban loads to the north and the south, displacing the need to transmit electricity from further afield with higher transmission losses. In addition, and as noted in section 3.2.2 of this AEE, the WWF will assist Trustpower in managing the storage of water in Lake Rotorangi and increase the potential for the Patea HEPS to generate at times when there is a lack of alternative generation sources;

- NZIER (2015) estimate that the construction and commissioning of the WWF will generate $325 million of capital expenditure over a 24 month period. This would inject $82 million of expenditure into the Taranaki economy, which will contribute a net $40 million in value-added;

- The establishment of the WWF will require a construction workforce of between 80 and 100 people over a period of 24 months;

- The operation of the WWF will require the employment of between eight and ten people, while NZIER (2015) estimate that annual operating and maintenance expenditure for the WWF will contribute approximately $3.3 million to the local economy in value-added each year; and

- The land on which the WWF will be established will be able to continue to be utilised for agricultural activities (grazing cattle and some hay production) following the completion of construction. As such, the existing economic benefits generated by existing land uses on the project site will be able to continue.

In addition to the above, a number of environmental enhancement / mitigation initiatives are proposed by Trustpower within the project site – particularly the establishment of fencing along Waipipi Stream and around several wetlands within the EBZ in order to protect them from stock access. These are discussed in more detail in the sections below.

4.3 Landscape, Visual Amenity and Natural Character Effects

An assessment of the actual and potential effects of the WWF and associated transmission line on the landscape, visual amenity and natural character values of the surrounding environment is provided in Isthmus (2016). Appendix A of Isthmus (2016) also includes photo-simulations of the WWF from various locations in the surrounding environment.

An overview of the assessment of potential landscape, visual amenity and natural character effects by Isthmus (2016) is provided in the sections below.

4.3.1 Construction Effects

Potential construction effects fall into two categories:

- Temporary visual effects arising from the appearance of structures (e.g. the concrete batching plant), exposed earthworks and construction activities themselves - including traffic to, and from, the site; and

- Temporary biophysical effects arising from such things as un-stabilised earthworks.

Isthmus (2016) concludes that temporary construction effects on landscape, visual amenity and natural character values will be minimal due to the following:

- There will be very low visibility of earthworks and ground level construction, which contrasts to many wind farms located on hilly (and, therefore, visible) sites;

- Similarly, there will be low visibility of the construction areas and the concrete batching plant. Views from the north are restricted by the pine plantation, the nearest public road is some distance from the project site, and there is a low viewing audience in this area. Views from the beach would also be restricted by the coastal dunes; and

- With regard to biophysical effects during construction, matters relating to the stabilisation of earthworks and the effects of the construction of culverts on the Waipipi Stream are addressed in sections 4.7 and 4.8 of this AEE.

4.3.2 Natural Character Effects – Wind Farm

Isthmus (2016) identifies that in biophysical terms the earthworks required to construct the WWF will alter the physical landform within the project envelope. However, Isthmus (2016) notes that several factors will avoid, remedy and mitigate the degree of effects on the biophysical aspects of natural character. These factors include:

- Environmental constraints were mapped and avoided as part of the development of the EBZ. In this regard, the turbines will avoid the band of largely unmodified coastal dunes and will instead be located on the modified former iron sand mining area inland of the dunes. In short, the turbines will avoid areas of higher natural character and significant coastal influence;

- The effects on the biophysical aspects of natural character will be minimised due to the WWF being located on the former iron sand mining area, which has little remaining natural features or topography. Features of value within the project site have been incorporated into the EBZ. The flat terrain of the project envelope and open pasture will also minimise the potential effects of earthworks / construction activities on the biophysical environment; and

- Fencing and planting proposed along the margins of Waipipi Stream will help remedy its diminished natural character values.

Overall, Isthmus (2016) concludes that any effects on biophysical aspects of natural character will be largely avoided and that all natural coastal processes will continue to occur unhindered.

With respect to the experiential aspects of natural character, Isthmus (2016) considers that there will be adverse visual effects on the perception of natural character because the turbines will be a prominent backdrop to views inland from the coast and dunes. Such effects will be mitigated by the fact that the turbines will be setback inland of the dunes, which will also increase the perspective depth in views from this area and help increase the perception of separation between the coast and the WWF.

Isthmus (2016) also considers that it is relevant to take into account that the turbines directly respond to the natural processes of the wind, and that the effects of the turbines on natural character are reversible and that they could potentially be removed and the site rehabilitated with almost no lasting effects on natural character if the WWF was to be decommissioned.

Taking the matters above into account, Isthmus (2016) considers that the adverse effects of the WWF on the overall natural character of the coastal character will not be significant.

4.3.3 Effects on Outstanding Natural Features and Landscapes – Wind Farm

As already noted in section 2.4.3 of this AEE, the only potential outstanding natural feature within the vicinity of the project site, as identified by Isthmus (2016) and the Proposed Plan, is the Waverley Beach cliffs.

While the WWF will be a visible feature and landmark from the cliffs, it will not compromise the landscape values of the cliffs. In this regard, the WWF will not be visible from most places on the beach in the vicinity of the cliffs. From those places with line of sight to the WWF (e.g. the car park above the cliffs) it will be reasonably distant and beyond an intervening headland. It will, therefore, appear quite separate and part of the background landscape.

Further, Isthmus (2016) considers that the WWF will not compromise the scenic and landscape qualities of the raised marine terraces of South Taranaki identified as an example of an outstanding natural feature or landscape in the RPS because the extensive modification of the project site by iron sand mining means any natural features or surfaces related to marine terraces are already modified. The turbines themselves are also slender vertical structures that do not diminish the legibility of the underlying land surface.

Isthmus (2016) concludes that the WWF will not be out of place with the character of the inland landscape, which comprises productive farming and the Waverley Beach settlement itself.

4.3.4 Landscape and Visual Amenity Effects – Wind Farm

4.3.4.1 Community Perception

Landscape and visual effects are influenced by the different perceptions and dispositions of individuals. However, Isthmus (2016) notes the following general points can be made regarding the perceptions of wind farms:

- Surveys of attitudes to wind farms in New Zealand and overseas suggests that communities hold a range of views - from people who are strongly for or against wind farms, to those who hold more neutral positions;
- Attitudes may vary depending on whether one is a visitor or resident in the vicinity of a wind farm, as well as the proximity of a residence to a wind farm;
- The use of wind farm images in popular media suggests that, at least in a generic sense, wind farms have positive values associated with green technology; and
- In some instances wind farms are used as an aspect of local identity.

4.3.4.2 Relationship to Landscape Character

Isthmus (2016) considers the project site to be an appropriate location for a wind farm in terms of landscape character for the following reasons:

- It is a working landscape characterised by productive rural activities. These existing activities will continue on the site, helping to maintain the underlying rural character;
- The project envelope has been modified by the former iron sand mining operations; and
- There is a relatively low density of nearby dwellings. Settlement tends to be concentrated inland towards SH3 or along the coast. In this regard, settlement is limited to 15 dwellings within 2 km of the project envelope.

4.3.4.3 Project Scale

The turbines will have a maximum height (to blade tip) of 160 m. By way of comparison, the following wind farms in New Zealand have, or are consented to have, turbines up to the following heights:

- Te Uku Wind Farm (Waikato) - 130 m;
- Mahinerangi Wind Farm (Otago) – 125 m;
- Hauauru a ma Raki Wind Farm (Waikato) – 150 m; and
- Waitahora Wind Farm (Manawatu) – 150 m.

Turbines of the scale proposed by Trustpower are a different order of height to most other vertical elements in the landscape. As such, it entails a figure-ground relationship between the vertical slender turbines and the horizontal landscape mass. Because of the lack of vertical references, and also because turbines have a generic scalable form, it is relatively difficult to perceive differences in turbine height unless turbines of different size are seen side-by-side.

Further, the degree of prominence or visual effect is not a linear function of height. Factors such as the proportion of rotor diameter to height can have a greater influence on visual appearance than height.

With respect to the WWF, Isthmus (2016) concludes that the flat topography in the vicinity of the project site has a broad horizontal scale that can accommodate the proposed maximum 160 m height of the turbines. That is, the turbines will appear in scale with the landscape as a whole and will be ‘visually anchored’ by the horizontal scale of the landscape.

It is also noted that resource consent is being sought for external transformers which are common for some turbine models. Such transformers are mounted on the ground near the base of the turbine and are typically contained within an enclosure. They will also have very low visibility, with the intersection of Peat Road and Stewart Road being the only viewing area of note.

4.3.4.4 Public Views

Isthmus (2016) identifies that viewing audiences of the WWF will include:

- Residents of Waverley, Patea, Waverley Beach, Waipipi Beach and the surrounding farm land;
- People driving on SH3 and local roads; and
- Recreational users of the Okotuku Domain and beaches in the area adjacent to the project site (including those in boats off the coast).

Overall, Isthmus (2016) considers that most public views with reasonably large viewing audiences are located several kilometres away from the project site. SH3 is typically 2.6 - 3 km away from the project site, with closet point being approximately 1.8 km away. The lookout and carpark above the mouth the Patea River is also approximately 2.7 km away.

In contrast to other wind farms in New Zealand, the WWF is roughly at a similar elevation to public viewpoints rather than elevated on a hill. This will reduce the potential for dominance and increases the screening potential of vegetation and other elements in the intervening landscape. Shelter vegetation in the intervening landscape will either screen the WWF or at the least create perspective depth which helps to establish a sense of separation between the viewer and the WWF.

Isthmus (2016) considers the most sensitive readily accessible public viewpoints are located at Patea Beach, Waverley Beach and Waipipi Beach. The views along the coast from these locations are relatively open and there is typically a heightened sensitivity to natural character from such locations. Even so, Isthmus (2016) considers that there will be only a 'moderate' degree of effect from these locations. In this respect, the wind farm will be reasonably distant from these locations, will appear as a background feature separated by intervening landforms, will occupy a small proportion of the field of view, and it will be to one side of the main focus of the coastal outlook from such places.

Isthmus (2016) also considers that there will be adverse visual effects from the beach immediately adjacent to the WWF. Practical access to this area is limited to access granted by the landowner across the project site itself or by an approximately 2.5 km long walk along the coast. The turbines will be very prominent (or dominant) structures as a backdrop to views from the beach adjacent to the project site and from the margins of the Whenuakura Estuary. However, the base of the turbines will be inland of the dune landforms, which will help create perspective depth and a degree of separation. In this regard, it will be possible to find locations on the beach in front of the steeper dunes and wave-cut banks where the turbines will not be visible.

4.3.4.5 Views from Private Properties

Isthmus (2016) establishes an inventory of dwellings within 5 km of the project site and assessed the degree of visual effect of the WWF for each dwelling. Dwelling locations within a 5 km radius of the WWF are indicated in Figure 8 of Appendix A to Isthmus (2016).

The assessment of views from private properties was based on desk top analysis and roadside assessments. The assessments undertaken by Isthmus (2016) are of the 'degree of visual effect' taking into account such factors as distance, the orientation of the dwelling, the extent of screening, and the features in the intervening landscape that

would increase perspective depth. The assessments of visual effect by was made on a seven point scale from 'very high' to 'very low'.

The assessment of visual effects for dwellings identified in Isthmus (2016) is provided in Table 4.1 below.

Table 4.1: Visual Assessment of Prominence (Isthmus (2016)).

DEGREE OF EFFECT	VERY HIGH	HIGH	MOD - HIGH	MOD	MOD - LOW	LOW	VERY LOW
NUMBER OF HOUSES	1	13	5	28	8	64	-

The dwelling that will be most affected[32] is located on the neighbouring dairy farm south-east of the project site. The effect on this dwelling will be 'very high' because of its proximity to the project site (approximately 1 km), its outlook, and its slightly elevated location.

Two other consented dwelling sites on the farm[33] (at least one of which has been built) were assessed as having 'high' visual effects. They are also relatively close to the project site (approximately 1.3 km and 1.4 km respectively) and have an open outlook to the site.

There are five dwellings, and approximately 40 vacant sites, at Waipipi Beach approximately 2.9 – 3.1 km to the south-east of the project site. The degree of effect at the existing dwellings[34] was assessed as 'moderate' and potentially 'high' by Isthmus (2016) on the vacant sites. The effects at the vacant sites will ultimately depend on the orientation of future dwellings and the degree of screening / perspective depth that might be provided by other dwellings to be constructed.

The nearest dwelling to the north-east of the project site is a new house on Stewart Road,[35] which is located approximately 1.3 km away. It has been assessed as having 'high' visual effects, although it is oriented to the north (in the opposite direction from the project site). A pine plantation in the middle distance will also provide some perspective depth.

There are also seven dwellings (and a dwelling that appears abandoned) north of the project site in the area around Elslea Road, Wybourne Road and Rangikura Road. The degree of visual effect was assessed as 'high' from four of these dwellings[36] and 'mod-high' from one dwelling.[37] These dwellings are reasonably close to the project site (approximately 1.3 – 1.7 km) and have views across an open intervening landscape. However, potential visual effects are reduced by the orientation of each house away from the project site, some partial screening vegetation in each case, and occasional shelter belts and rolling topography in the intervening landscape that provides some perspective depth.

32 Dwelling No. 110 in Figure 8 of Appendix A to Isthmus (2016).

33 Dwelling Nos. 57 and 109 in Figure 8 of Appendix A to Isthmus (2016).

34 Dwelling Nos. 111, 112, 113, 156 and 160 in Figure 8 of Appendix A to Isthmus (2016).

35 Dwelling No. 155 in Figure 8 of Appendix A to Isthmus (2016).

36 Dwelling Nos. 53, 54, 55 and 56 in Figure 8 of Appendix A to Isthmus (2016).

37 Dwelling No. 51 in Figure 8 of Appendix A to Isthmus (2016).

With respect to the Whenuakura Marae, the buildings are oriented north-west away from the project site. Most of the WWF will be screened by topography because the marae is at a relatively low elevation, but the top part of several turbines will be visible beyond river terraces at a distance of approximately 2.4km. The intervening landscape is also reasonably complex, and as such, Isthmus (2016) concludes that the visual effects on the marae will be 'moderate'.

Overall, Isthmus (2016) concludes that any wind farm will result in visual effects from some private properties given the nature of the turbines. However, the following matters are considered relevant with respect to the visual effects of the WWF:

- The number of affected properties is limited by the reasonably sparse settlement density near the project site and the reasonable distance between the project envelope and the nearest towns / settlements (between 3 - 6 km);

- The flat topography reduces the relative elevation compared to most wind farms and increases the potential and actual extent to which shelter belts provide screening; and

- Most dwellings are located north-west, north or north-east of the project site. They are typically oriented north-west through north-east in the direction of the sun, rather than towards the project site. A number also have shelter planting in the direction of the project site. Those properties at Waverley Beach are south-east of the project site and are typically oriented either to the north-east or to the south-west.

4.3.5 Transmission Line Route

4.3.5.1 Effects on Natural Character

While the electricity substation / switchyard and part of the transmission line route fall within the coastal protection area overlay in the District Plan, Isthmus (2016) concludes that any effects on natural character will be negligible for the following reasons:

- The part of the coastal environment potentially traversed by the transmission line, and in which the electricity substation / switchyard site is to be located, has a low degree of coastal influence and low natural character;

- The character of the transmission line route is dominated by open pasture and pine plantation;

- The effects on biophysical aspects of natural character will be minimal because of the flat terrain and open pasture land cover; and

- The effects on perceptual aspects of natural character will be low because the substation / switchyard will be screened from the north by the pine plantation, and will mostly be seen against a backdrop of pines from the south.

4.3.5.2 Landscape and Visual Amenity Effects

In terms of overall landscape character and amenity, Isthmus (2016) concludes that the transmission line will not look out of place in the rural landscape. Infrastructure such as transmission lines are a regular feature of these landscapes. The monopoles proposed are relatively unobtrusive and unremarkable structures. While the monopoles will be

taller than those used locally by Powerco, they will nevertheless be of a similar order of scale to other features such as trees.

Isthmus (2016) includes an inventory of dwellings potentially affected by the transmission line route and made an assessment of the likely visual effect on those dwellings. This is provided in Figure 10 of Appendix A to Isthmus (2016).

Overall, Isthmus (2016) considers that the proposed transmission line will have some effects on landscape and visual amenity. In particular, the main effects on the visual amenity of individual dwellings will occur around the outskirts of Waverley – where some dwellings will be between 20 – 50 m of the transmission line. The main mitigating factor will be the use of monopoles and that the transmission line will be seen in the context of existing overhead services in the road reserve.

Effects on the rural character of the surrounding environment will be minimised by the use of relatively unobtrusive monopoles and the utilisation of a route that mostly follows either minor local roads or the railway corridor.

4.3.6 Mitigation Measures

In addition to the adoption of landscape and natural character matters in the development of the EBZ, a number of other measures are proposed by Trustpower in order to avoid, remedy or mitigate the potential effects of the project on landscape, visual amenity and natural character values. These measures include:

- All turbines will be the same design and dimensions, and painted an off-white colour;
- Spoil disposal sites will be contoured to reflect typical dune landforms. Such landforms may also be located on the seaward side of the project envelope to help increase depth perspective;
- Any cut batters will be contoured to merge with the surrounding landform;
- All construction facilities (such as the concrete batching plant) not required for on-going operation and maintenance of the WWF will be removed following the completion of construction works;
- The width of the internal access road network will be reduced to approximately 5 m following the completion of construction works and the surrounding area rehabilitated; and
- Offering off-site planting for the 14 dwellings identified as having ‘high’ or ‘very high’ adverse visual effects as a result of views of the WWF (depending on the final configuration of the turbines). Such planting would be subject to the wishes and agreement of affected property owners, and would typically entail shelter or amenity trees planted behind a dwelling in the direction of the WWF. This offer is incorporated into the proffered resource consent conditions in **Appendix Fourteen** to this AEE.

4.3.7 Summary

Overall, Isthmus (2016) considers that the project site is an appropriate location for a wind farm (in landscape terms) due to the expansive scale of the landscape, the surrounding productive farmland, and the low density of dwellings in the area around the project site.

The main landscape issue identified by Isthmus (2016) is the potential effects on natural character of the coastal environment. While it would be impossible to avoid all effects on natural character values, particularly immediately adjacent to the site, Trustpower has designed the WWF to avoid significant adverse effects on natural character. This includes by avoiding the band of coastal dunes where the coastal influences and qualities are highest. As such, turbines will only be located inland of the dunes on those parts of the site already modified. Features within the project site, such as the Waipipi Stream and some small wetlands, will also be protected via the EBZ and the proposed enhancement planting and fencing.

The monopoles proposed for the transmission line are also considered to be relatively unobtrusive elements in a rural landscape, and the proposed alignment is acceptable in landscape and visual terms. In this regard, the alignment mostly follows minor local roads and the railway corridor. Further, and as noted in section 2.16.1.2 of this AEE, transmission lines up to 110kV and 100MVA per circuit are permitted activities within the Rural Zone in accordance with the District Plan. The visual differences between a permitted transmission line and the proposed transmission line to support the WWF are negligible. As such, it is appropriate to apply the permitted baseline in accordance with section 104(2) of the RMA.

4.4 Shadow Flicker

Shadow flicker occurs due to the rotating shadow of a turbine rotor passing over a receiver location (i.e. typically a dwelling window). The flicker frequency is related to the speed of rotation of the turbines and the number of blades.

An assessment of the shadow flicker durations for sites around the WWF is provided in the report entitled *"Shadow Flicker Assessment for the Proposed Waverley Wind Farm"* by Garrad Hassan ('Garrad Hassan (2016)'). This report is provided in **Appendix Eighteen** to this AEE and is summarised below.

4.4.1 Assessment

Garrad Hassan (2016) modelled the indicative turbine layout for the project envelope. This modelling took into account the location of the surrounding dwellings, as well as the topography of the site and the surrounding area. It was also assumed that the turbines would be constantly yawed to the worst case position of facing into or away or from the sun. As such, the modelling will tend to over-estimate the potential hours of shadow flicker at a dwelling.

The estimates of theoretical and probable shadow flicker at dwellings are shown in Table 4.2 below:

Table 4.2: Shadow Flicker Estimates (Garrad Hassan (2016)).

HOUSE IDENTIFER[38]	THEORETICAL HOURS / YEAR	THEORETICAL MAX MINUTES / DAY	PROBABLE HOURS / YEAR	DISTANCE TO TURBINES CAUSING MOST FLICKER (M)
57	25.4	22	7.9	1,416
98	0.8	4	0.2	2,072
109	24.3	23	7.5	1,436
110	20.5	22	6.3	1,465
155	5	-	10	-

Garrad Hassan (2016) notes that there are no New Zealand standards for the assessment of shadow flicker, and that Australian standards ("*National Wind Farm Development Guidelines – Draft. July 2010*") have generally been adopted for other wind farm projects. These standards have a recommended exposure limit for shadow flicker of 30 hours per year at any dwelling.

The modelling in Garrad Hassan (2016) shows that no existing dwellings will have annual shadow flicker durations greater than 30 hours. Further, the dwellings potentially affected by shadow flicker are located a reasonable distance away from the turbines, which is an important consideration as shadow flicker becomes less intense the greater the distance from the turbine. As such, Garrad Hassan (2016) concludes that any potential shadow flicker effects will be minor and that no mitigation measures by Trustpower are considered necessary.

It is, however, recognised that the final turbine configuration may alter due to the project envelope approach that has been adopted by Trustpower. As such, the modelling results illustrated in Table 4.2 may be subject to change. Trustpower are, therefore, proposing that a condition be imposed on the resource consent for the WWF that requires a further shadow flicker assessment once the final turbine locations within the project envelope have been selected. This assessment will need to confirm that shadow flicker durations at all existing dwellings (at the time the final turbine locations are provided to the STDC) will be less than 30 hours per year.

Proposed resource consent conditions addressing this matter are included in **Appendix Fourteen** of this AEE.

4.4.2 Summary

The assessment of potential shadow flicker durations at dwellings adjacent to the WWF by Garrad Hassan (2016) has demonstrated that the durations at all dwellings will be within the limits prescribed in the relevant Australian standards. As such, any potential effects will be minor.

A further shadow flicker assessment will be undertaken once the final turbine locations within the project envelope have been confirmed.

[38] House identifiers based off dwelling inventory in Isthmus (2016).

4.5 Terrestrial Ecology Effects

An assessment of the actual and potential effects associated with the construction and operation of the WWF and the transmission line on terrestrial ecology values is provided in Ryder (2016), and summarised in the sections below.

4.5.1 Project Site

4.5.1.1 Vegetation

Ryder (2016) identifies that the construction of the WWF within the project envelope will result in the disturbance of approximately 70 – 87 ha of pasture on previously-mined surfaces. This pasture is of no ecological significance.

Ryder (2016) does also note that some native plants do occur in various places throughout the project envelope, and will be disturbed in places. However, because all ecologically important and significant areas of indigenous terrestrial and riparian vegetation have been excluded from the project envelope, any adverse effects will be negligible.

The construction of crossings over Waipipi Stream will also result in very localised loss of vegetation. As the existing riparian vegetation has low botanical value, the construction of these crossings will have negligible effects on indigenous vegetation. Further, the proposed enhancement of the Waipipi Stream (discussed below) will result in positive effects on riparian vegetation along 4.7 km of the stream and tributary drains.

The proposed infilling of the three largest ponds within the project site will result in the loss of some habitat for aquatic plants, including blunt pondweed, horse's mane weed and fennel-leaved pondweed. Mitigation to minimise the adverse effect of this loss of aquatic plant habitat is discussed in section 4.5.3 of this AEE below.

4.5.1.2 Bats

Given the lack of suitable habitat for bats within the project site and the surrounding environment, the long distance to the nearest suitable bat habitat, and the exposed wind conditions of the project site, Ryder (2016) concludes that it is highly unlikely that bats use the project site. As such, there is a very low risk of any adverse effects on bats.

Because the potential for adverse effects on bats is negligible, Ryder (2016) concludes that no mitigation or monitoring is required.

4.5.1.3 Lizards

During the construction of the WWF it is possible that some common and brown skinks will be killed or displaced. However, Ryder (2016) considers that these effects will be restricted to localised areas, such as where roads cross existing fence lines or drains. In addition, such effects will occur only during construction.

Overall, Ryder (2016) concludes that the construction works will have negligible effects on skink populations. The distribution and abundance of skinks within the project site will continue to be strongly influenced by the availability of suitable habitat and cover, such as rough pasture, dense low vegetation and old pipes from the former iron sand mining operations.

Whilst other lizard species of more ecological significance are likely to be present within the coastal dunes in the EBZ, they are highly unlikely to occur within the project envelope because of a lack of suitable habitat. Therefore, they are highly unlikely to be affected by the construction works.

The rehabilitation planting proposed by Trustpower, and the exclusion of stock from the Waipipi Stream, will benefit lizards by providing a greater area and diversity of habitat. Ryder (2016) also considers that species other than common skinks may colonise in this area as the riparian vegetation develops.

In light of the above, Ryder (2016) concludes that any adverse effects on lizards will be negligible and that no specific monitoring or mitigation is necessary.

4.5.2 Transmission Line Route

The installation of the monopoles and the transmission line will entail the use of heavy machinery and the drilling / excavation of post holes. Because this activity will be restricted to exotic pasture on farmland Ryder (2016) concludes it will not cause adverse ecological effects.

Potential bird mortality issues related to the transmission line are addressed in section 4.6 of this AEE below.

4.5.3 Mitigation Measures

Whilst Ryder (2016) concludes that no specific mitigation related to the potential construction effects of the WWF on terrestrial, riparian or wetland vegetation ecology is necessary, Trustpower is proposing to implement a number of measures within the project site. These enhancement measures include:

- The section of Waipipi Stream within the project site will be fenced to exclude stock and riparian margins of the stream will be planted with locally-sourced indigenous plants. The fencing and planting initiative will also include the main pond outflow which flows into Waipipi Stream; and

- The wetlands in the south-eastern corner of the project site will be fenced to exclude stock (an area of approximately 15 - 20 ha), and drains through these sites will be infilled.

These measures will enable the recovery of vegetation within the project site, improve the ecological condition of Waipipi Stream and the wetlands, and provide habitat for lizards and terrestrial invertebrates.

To mitigate the loss of aquatic plant habitat as a result of pond infilling, Trustpower also propose to transfer fennel-leaved pondweed, blunt pondweed and horse's mane weed to other ponds within the project site, with the aim of establishing new populations of these species. Propagules of these species will be transferred to other ponds within the project site within six months of commencement of construction and the translocation sites will be monitored after commissioning of the WWF to determine the success of establishment.

4.5.4 Summary

In light of the incorporation of areas of ecological value into the EBZ, and the fact that the project envelope was previously utilised for iron sand mining, it is considered any potential effects on terrestrial ecology values resulting from the construction of the WWF will be negligible. Likewise, the proposed transmission line route is located over pasture and will avoid open waterbodies and areas of ecological value – ensuring that any potential effects on terrestrial ecology values are negligible.

Notwithstanding the above, Trustpower is proposing to implement stream / wetland fencing and riparian planting within the project site in order to enhance the ecological values of the area.

Trustpower is also proposing to mitigate the loss of aquatic plant habitat as a result of the pond infilling via the transfer fennel-leaved pondweed, blunt pondweed and horse's mane weed to other ponds within the project site.

4.6 Avifauna Effects

An assessment of the actual and potential effects associated with the operation of the WWF and the transmission line on avifauna is provided in Boffa (2016). An overview of this assessment is provided in the sections below.

4.6.1 Project Site

4.6.1.1 Modelling

Collision risk assessments were modelled by Boffa (2016) for the following key species:

- Banded dotterel;
- New Zealand pied oystercatcher;
- New Zealand pied stilt;
- Little black shag;
- Little shag; and
- Black shag.

Two different methods were used for mortality modelling based on the ability to obtain passage rates and correlate them with wind. A simplified reversed band model was used to determine the number of mortalities that would lead to a population level effect. The model was then used to determine the number of traverses that would be required to result in these levels of mortality. The level of mortality that is considered to constitute a significant population level effect was a 2% decline in the national population over a period of 50 years.

For the resident species (i.e. banded dotterel, black shag, little shag and little black shag) this was the only modelling done as they were seen in too low numbers to realistically model actual mortality.

For the New Zealand pied oystercatcher and pied stilt there was sufficient information to derive meaningful data on passage rates across the site. The standard band model was used, taking into account the revised method for determining collision risk which forms part of this model. Boffa (2016) also applied a range of recommended rates of avoidance to give upper and lower levels of potential risk.

The results of these collision risk assessments for these species are detailed in sections 4.6.1.2 to 4.6.1.7 below.

4.6.1.2 Collision Risk Assessment Results – Banded Dotterel

A small local population of banded dotterels (approximately 45) was regularly present on the beach adjacent to the project site during the survey investigations. These birds regularly flew along, or inland, across the dunes to roost or feed in the pasture immediately landward of the dunes.

From the reverse band modelling, Boffa (2016) estimates that a 2% reduction in the national population over a 50 year period would require an annual loss of ten birds (i.e. 500 birds over 50 years). The modelling indicates that an annual loss of ten birds would require 1,050,000 traverses of the WWF each year.

However, it is highly improbable that the operation of the WWF will cause an annual loss of ten banded dotterels per annum over 50 years as this would require each bird to make 60 traverses through the project envelope within the at risk height, every day. Field observations documented in Boffa (2016) show that they make a few short low flights through a small part of the envelope, as discussed below.

Boffa (2016) concludes that the risk to banded dotterels is low for the following reasons:

- Although they regularly forage or roost on pasture within the project envelope, the area visited is restricted almost entirely to 5 - 10% of the project envelope, immediately inland of their beach habitat, where they would encounter few turbines (between two and five);
- They spend almost all of their time on the ground on the beach or roosting or foraging on pasture, and typically make short, low flights;
- When the dotterels do fly, maximum flight height is almost always below the nominal at risk height of 31 m and only rarely above the minimum blade tip height of 48 m.

For these reasons, Boffa (2016) concludes the mortality rate of banded dotterels at the WWF is likely to be negligible with regard to the local and national population. The risk or mortality will be further reduced by the fact that turbines will not be placed within the EBZ. They do, however, recommend monitoring of this potential effect and the avoidance and mitigation by way of the measures discussed further in section 4.6.3 of this AEE.

4.6.1.3 Collision Risk Assessment Results – New Zealand Pied Oystercatcher

A total of 195 individual New Zealand pied oystercatchers were observed crossing the project site over the two seasons. Accounting for night time activity and periods of observer absences, Boffa (2016) estimate a total of 1,565 birds traversed over the project site over the two migration periods, of which 1,034 movements occurred at rotor

swept area ('RSA'). Scale-ups to take account of site visibility provide a conservative estimate of approximately 3,128 birds traversing the WWF per annum (2,068 at RSA).

From the reverse band modelling, Boffa (2016) estimate that a 2% reduction in the national population over a 50 year period would require the annual loss of 45 birds per annum. After applying various scale-ups, Boffa (2016) calculates the total annual movement of birds from the two seasons sampled was 2,068. This equates to annual mortality rates for New Zealand pied oystercatchers of 2.4 birds per annum. This would equate to a 0.1% decline in the national population over 50 years.

Boffa (2016) considers that this potential effect should be monitored and can be mitigated by Trustpower contributing resources to existing management and / or research programmes designed to benefit New Zealand pied oystercatchers. This is discussed further in section 4.6.3 of this AEE.

4.6.1.4 Collision Risk Assessment Results – Pied Stilt

Boffa (2016) notes that a total of 327 pied stilts were observed crossing the project site over two seasons. Accounting for night time activity and periods of observer absences, Boffa (2016) estimates a total of 3,469 birds traversed over the project site for the two migration periods (of which 932 birds traversed within the RSA). Scale-ups of these numbers to take account of site visibility provide a conservative estimate of approximately 6,939 birds traversing of the WWF per annum (1,864 at RSA).

No pied stilts were observed in March or April, indicating that there are no (or very few) resident birds at the project site. Thus, Boffa (2016) determines that all pied stilt that were observed were part of a migration movement and short term stop-overs.

From the reverse band modelling, Boffa (2016) estimates that a 2% reduction in the national population over a 50 year period would require the annual loss of 12 birds per annum.

The band modelling predicts mortality rates of pied stilts at the WWF at 0.8 per annum (lower limit of 0.2 and upper limit of 2.01). Boffa (2016) concludes that losses of between 0.2 and 2.01 pied stilts per year would have a negligible effect on the national population of this species. A loss of 0.8 birds per annum would result in a 0.13% decline in the national population over 50 years.

Boffa (2016) consider that this effect should be monitored and can be mitigated by Trustpower contributing resources to existing management and / or research programmes designed to benefit New Zealand pied oystercatchers. This is discussed further in section 4.6.3 of this AEE.

4.6.1.5 Collision Risk Assessment Results – Little Black Shag

There were ten observations of little black shag (a total of 87 birds) entering or departing the project site over two seasons. They were usually seen in flocks of between four and 17 and were seen on 25% of days in summer. Boffa (2016) notes that 25% of observations of little black shag movement were within the RSA.

Boffa (2016) considers it likely that there is a dispersed local population of little black shag and that the ponds within the project site, especially the large pond, are used throughout the season.

From the reverse band modelling, Boffa (2016) estimates that a 2% reduction in the national population over a 50 year period would require the loss of one bird per annum. The modelling indicates that this level of loss would require 5,000 traverses of the WWF each year. This level of activity would be possible if a large flock of birds frequented the site daily, but is unlikely given the low rate of usage (i.e. 6% of days and not during winter).

Boffa (2016) concludes that there is no risk to the national population of little black shag, but that at a local population level it is likely that over time mortalities would occur and accumulate. Boffa (2016) concludes that there is a high risk that over time the sustainability of the local population could be adversely affected. This risk will, however, be avoided by the infilling of three ponds within the project envelope in order to displace shags.

In addition, Trustpower is proposing conservation management at local sites that provide breeding or foraging habitat for shag to mitigate the loss of pond habitat within the project site. This is discussed further in section 4.6.3 of this AEE.

4.6.1.6 Collision Risk Assessment Results – Black Shag

Boffa (2016) notes that there were 43 observations of black shag (a total of 48 birds) entering or departing the project site over two seasons and that all observations were in summer (between January and April). 44% of observations of black shag movement were within the RSA.

From the reverse band modelling, Boffa (2016) estimates that a 2% reduction in the national population over 50 years would require loss of four birds per annum. The modelling indicates that this level of loss would require 8,600 traverses of the WWF each year (or 23 traverses per day).

Boffa (2016) concludes that there is no risk to the national population. However, the small local population is regularly present in summer and often flies at the risk height. As such, collisions may reduce the local population over time. This effect will be avoided and mitigated in the same manner noted in the section above for little black shag.

4.6.1.7 Collision Risk Assessment Results – Little Shag

Boffa (2016) notes that there were four observations of little shag (a total of 15 birds) entering or departing the project site over two seasons. After breeding the little shag dispersed widely from their colonies, and large flocks congregated around good food sources or roosting sites. All observations of little shag occurred between January and February.

73% of observations of little shag movement were within the RSA.

From the modelling, Boffa (2016) estimates that a 2% reduction in the national population over 50 years would require the loss of four birds per annum. The modelling indicates that this level of loss would require 10,500 traverses of the WWF each year. This level of activity does not occur at the project site as flocks are smaller and only occasionally present.

Boffa (2016) concludes that there is no risk to the national population. However, mortalities for the local population would accumulate over time and could be adverse.

As such, Trustpower is proposing to avoid and mitigate this effect in the same manner noted in the section above for little black shag.

4.6.2 Transmission Line Route

As with all transmission lines, some bird mortality is likely to result from collision with the transmission lines. The species that could be potentially affected by the operation of the transmission line are species typically found in agricultural landscapes - such as harrier, starlings, magpies and skylark.

Boffa (2016) considers that collision mortality rates for the above species are likely to be low and that the transmission line will have negligible effects on local populations.

With respect to the electrocution to birds from perching on lines, any potential risk is also considered to be negligible given that transmission lines are specifically designed to prevent birds forming a contact between phase and earth wires, between phase wires, or between wires and the poles.

4.6.3 Monitoring / Mitigation

In addition to the measures that have already been adopted in the development of the project envelope and EBZ, Trustpower is proposing the following measures to better understand the actual effects of the WWF on avifauna and to avoid, remedy or mitigate potential effects. These measures include:

- Post construction mortality monitoring will be undertaken for a period of three years following the commissioning of the WWF. Monitoring will occur during the peak migration season and will include annual reporting. Following the three years of monitoring it is expected that the results will be reviewed by the STDC and decisions made about the need for additional monitoring / mitigation;

- The post-construction mortality monitoring will be designed in accordance with national and international best practice, and take account of the latest available results and methodological developments from mortality monitoring at other wind farms in New Zealand;

- The monitoring will target New Zealand pied oystercatchers, pied stilts, banded dotterel, black shag, little shag, and little black shag, grey teal and dabchick (although any incidental observations of mortality of other species will also be recorded);

- Trustpower will contribute resources to existing management and / or research programmes designed to benefit New Zealand pied oystercatchers and pied stilts as mitigation for the predicted mortality of these species at the WWF. This contribution would be targeted in consultation with organisations running these existing programmes (e.g. the Department of Conservation or volunteer groups);

- The removal of the open water habitats within the project site in order to displace shag species (and other water birds) to locations outside of the WWF, where they will not be at risk of colliding with turbine rotors; and

- The loss of pond habitat at the project site would be mitigated by Trustpower contributing to conservation management at a local site or sites that provide breeding or foraging habitat for water birds. The aim would be to maintain or enhance that habitat and/or the breeding success of shags and other water birds.

4.6.4 Summary

Overall, Boffa (2016) identifies that modelling of the activity of New Zealand pied oystercatcher and pied stilt activity predicts that while occasional mortalities may occur, they will not be at levels that will have an impact on the long term sustainability of the national populations of these species. In addition, it is noted that monitoring to confirm the modelling is proposed and that a contribution to local habitat or species restoration programmes is proposed by Trustpower to mitigate for any annual losses.

Banded dotterel only uses a small part of the project site and only rarely fly at RSA. As such, Boffa (2016) concludes that banded dotterel are not at risk from the WWF.

With respect to the three species of shag which have small local populations around the site, Boffa (2016) concludes that long term daily activity could result in mortalities which will have a significant adverse effect on these small local groups. However, any likely mortalities will not have an effect at the level of the national population.

In addition, it is considered that this risk can be appropriately managed through the removal of three ponds which attract waterfowl within the project site, and via mitigation for the displacement of local shag populations by contribution to local habitat restoration works.

4.7 Stormwater, Erosion and Sedimentation

Riley – Civil (2016) provides an overview of the stormwater, erosion and sediment control measures that will be undertaken during the construction of the WWF in order to avoid or mitigate potential adverse effects on water quality and aquatic ecology values within the project site and surrounds.

The proposed stormwater, erosion and sediment control measures are summarised below and will form part of an Earthworks Construction Management Plan ('ECMP') that will be submitted to the STDC and TRC for certification before any construction works commence on site. A draft version of the ECMP is also attached as **Appendix Nineteen** to this AEE.

4.7.1 Stormwater Management – Earthworks and Roads

The development of the internal access road network and hard stand areas will generate some effects on existing drainage patterns within the project envelope. Minimising the degree to which this occurs will be an important consideration in stormwater control measures and the design of the internal access road network. Key design principles to be adopted for the WWF will include:

- Aligning the internal access road network along existing established tracks where practicable and maintaining a vertical alignment close to the existing

contours - thus reducing the area of contributing catchment and minimising storm water run-off that may be intercepted;

- Where possible, allowing stormwater runoff to sheet flow from the internal access road network and across the natural topography. Where stormwater run-off is collected, it will need to be conveyed by channel and / or pipe systems to a designated disposal location;

- The use of rock energy dissipation within channels and outfalls; and

- Providing adequately sized culverts and regular outlets for track culverts and 'V' ditch drains. In addition, the area around the inlet of culverts will be excavated to provide additional storage capacity where suspended sediments can settle out.

The capacity and operation of the stormwater drainage channels and internal access road network culverts will be designed and constructed in accordance with the New Plymouth District Council's "*Code of Practice for Infrastructure 2009"* (which has been adopted by the STDC).

The culverts used to divert stormwater flows from the track side 'V' ditch drains to outlet points will generally be placed at sag points in track alignment and where the catchment area exceeds the capacity of a 375 mm diameter culvert. The minimum diameter for all culverts shall be 375 mm, irrespective of the catchment area and design flow rates.

Due to the potential for stream channel erosion and scour at the culvert crossing inlets and outlets, adequate mitigation measures will also need to be considered during detailed design. It is envisaged that geotextile fabric will be provided as a filter material between erodible soils and the suitably sized and graded competent rock or riprap.

4.7.2 Erosion and Sediment Control

Given the sandy soils prevalent within the project envelope, sediment control during the construction of the WWF will focus on the implementation of measures that reduce the potential for erosion of exposed soils during land disturbance activities. In addition, devices will need to be installed that intercept and treat sediment laden water prior to it entering water.

As noted above, an ECMP will be prepared before construction of the WWF commences. The measures proposed in the ECMP will be undertaken in accordance with the TRC's *"Guidelines for Earthworks in the Taranaki Region 2006"* and will include the following:

- Limiting areas of exposed soil (i.e. staging of earthworks);

- Constructing clean water diversion bunds to divert clean water run-off around construction areas;

- Stabilising exposed surfaces with roading aggregate or topsoil and mulch once finished levels are reached;

- A stabilised pad will be located at the entrance of sites where construction traffic will be entering and leaving. The pad will prevent the entrance from

becoming a sediment source and will minimise dust generation and tracking of soil onto the adjacent environments;

- A wheel wash will be established adjacent to the stabilised pad at the main entrance to the project site;

- Silt fences will be used at various locations and times during construction on slope lengths up to 25 m (for slopes less than 5 %). The silt fences will be used to detain flows from the construction area so that the deposition of transported silt can occur through settlement;

- Decanting earth bunds will be used to provide treatment of sediment laden run-off from the turbine platforms and fill disposal sites. The bunds will be intercept sediment laden run-off, while the decant structure will be used to increase settlement time for suspended sediments. The maximum catchment area contributing to earth bunds will be 0.3 ha. The bund will be sized to have a volume of approximately 2 % of the catchment area and will have a spillway to pass a 1 % Annual Exceedance Probability ('AEP') storm event;

- Runoff diversion channels will be used to divert water into decanting earth bunds;

- Excavation around the inlet of culverts in the drains adjacent to the internal access road network to form a sump to allow settlement of suspended material from storm water. During construction, geotextile fabric may also be wrapped around the inlet of the culvert to intercept sediment laden runoff collected by the drain; and

- Bunds and drains on slopes greater than 2 % will be stabilised to provide erosion protection. In particular, a geotextile fabric and rock will line the channels of the diversion bunds.

4.7.3 Concrete Batching Plant – Stormwater Management

The layout and operation of the concrete batching plant will also require measures to contain / manage stormwater run-off. Whilst the specific measures to be employed will be detailed in the ECMP, such measures may include:

- The construction of bunds around the batching plant area to divert clean water and contain sediment laden run-off;

- A containment area to provide sufficient settlement of sediments prior to discharge to the downstream environment or transport off site;

- Provision of silos for the storage of cement and fly ash; and

- The construction of temporary concrete slabs at heavily trafficked areas such as the concrete loading area.

4.7.4 Site Rehabilitation

At the completion of the construction of the WWF all construction buildings and equipment that is not required for the continued operation and maintenance of the wind

farm will be removed from site (e.g. the concrete batching plant, temporary site buildings). The land occupied by these construction buildings and areas utilised for hard stand areas or stormwater bunds will be re-contoured (where necessary) and rehabilitated back to pasture.

Likewise, exposed areas around the turbine platforms, internal access road network (which will be reduced to 5 m), electricity substation / switchyard and operations and maintenance building will be rehabilitated back to pasture in consultation with the relevant landowners.

Following the completion of works the spoil disposal sites will be re-contoured in a manner consistent with the surrounding dune features, reinstated with topsoil, and progressively revegetated.

Finally, the proffered resource consent conditions in **Appendix Fourteen** to this AEE also include specific measures related to the rehabilitation of the site.

4.7.5 Summary

The construction of the WWF will result in material being disturbed and excavated across the project envelope and within discrete areas of the EBZ (for the culvert crossings). However, the flat and gentle terrain of the project envelope will limit the potential for the loss of sediment to waterways or on-site erosion compared to other wind farm sites in New Zealand.

Furthermore, Trustpower will employ stormwater, erosion and sediment control measures in accordance with the TRC's "*Guidelines for Earthworks in the Taranaki Region, 2006"* in order to manage the effects of land disturbance activities on water quality and aquatic ecology values within the project site and surrounds.

4.8 Aquatic Ecology Effects

An assessment of the actual and potential effects associated with the construction of the WWF on aquatic ecology values is provided in Ryder (2016). A summary of this assessment is provided in the sections below.

4.8.1 Assessment

The construction of the internal access road network, and the 33 kV electrical / fibre optic cable network, will require the crossing of streams and drains within the project envelope, as well as sections of the Waipipi Stream that are within the EBZ. The construction of the WWF will also require the infilling of the three largest farm ponds within the project envelope, which will result in loss of aquatic habitat that may support indigenous freshwater fish.

Ryder (2016) considers that potential adverse effects on freshwater values will be avoided and mitigated, and existing stream crossings improved, by adhering to good practice construction and stream crossing design guidelines. Specifically, and as noted in section 4.7 of this AEE, construction works will be undertaken in accordance with the TRC's "*Guidelines for Earthworks in the Taranaki Region, 2006."*

Further, all new or replacement culverts will be designed to ensure that fish passage is maintained or restored in accordance with the *"Fish Passage Guidelines for the Auckland Region, 2000"*.

Key design criteria for culverts to be installed as part of the construction works include:

- Culvert widths shall be greater than average streambed width during average flow;
- The culvert shall be positioned so that both its gradient and alignment are the same as that of the existing stream;
- The culvert floor shall be set below the current streambed (minimum 20% of culvert diameter at downstream end and maximum 40% of diameter at upstream end);
- Headwalls shall be provided at both the culvert inlet and outlet. Headwalls should ideally be sloped and should be protected from scour by using riprap;
- All the ends and junctions of the culvert shall be rounded to allow climbing fish species to pass; and
- The outlet pool shall be twice as wide as the original stream.

Upgrading the existing culvert under the existing access road within the project site and the perched culvert will also facilitate upstream fish passage. Ryder (2016) concludes that this should result in an increase in the distribution and abundance of migratory fish in Waipipi Stream above the culverts – a benefit that should extend upstream beyond the project site.

Whilst most of the drains within the project envelope will continue to be of limited ecological value as a result of ongoing farming practices, the upgrading of culverts associated with the internal access road network will facilitate fish passage in those larger waterways where fish may be present. New and upgraded culverts will also provide improved permanent stock and vehicle crossings, reducing disturbance and pollution of the waterbodies.

4.8.2 Monitoring / Mitigation

Monitoring will be required during construction to ensure that sediment and erosion control management is undertaken in accordance with the relevant earthworks and fish passage guidelines referenced above. This will be detailed in the ECMP.

To minimise the effects of the infilling of the three farm ponds on fish, the ponds will be partially drained prior to infilling to allow fish to naturally move downstream. Any remaining fish will be captured and relocated to suitable habitats within the project site or beyond. Likewise, any fish stranded will be re-located upstream of instream works during the installation of new culverts.

Given the predicted absence of significant adverse effects and the anticipated positive effects of the proposed stream rehabilitation measures, no post-construction mitigation or monitoring is required with regard to freshwater fish, water quality or aquatic macroinvertebrates.

Trustpower is also proposing to rehabilitate 4.7 km of Waipipi Stream within the project site by upgrading the fencing and carrying out extensive riparian planting. The expected benefits of the stream rehabilitation measures include reductions in sedimentation, bank erosion, pugging and nutrient inputs from stock. The removal of the three largest farm ponds will also result in a reduction of nutrient input from water birds.

As a result of the above measures, a more diverse freshwater macroinvertebrate community can be expected to develop. The quality of habitat for freshwater fish in Waipipi Stream should improve and the species already present are likely to become more abundant in the long term.

4.8.3 Summary

All construction works that need to occur within the bed of the stream or its tributaries / drains will be undertaken in accordance with the relevant guidelines related to the minimisation of sediment and erosion in waterbodies. In addition, an ECMP will be developed prior to construction of the WWF that will detail the specific management measures to be undertaken on-site.

In light of the above, any potential adverse effects on aquatic ecology values will be minimal.

4.9 Traffic Effects

An assessment of the potential traffic related effects associated with the construction and operation of the WWF is provided in TDG (2016). An overview of this assessment is provided in the sections below.

4.9.1 Traffic Generation

4.9.1.1 Construction Traffic

The majority of the traffic generated by the WWF will occur over a construction period of approximately 24 months. The project is expected to transition after approximately 18 months from being a machinery-intensive civil engineering project to a more personnel-intensive electrical engineering project. Accordingly, the level of truck traffic will significantly reduce at that point, although light vehicle traffic levels may remain similar or even increase.

The key elements that will contribute to the overall traffic generated by the WWF are summarised in Table 4.3 below.

Table 4.3: Traffic Generating Activities.

ACTIVITY	DESCRIPTION
Rock Aggregate	The reconstruction of the public road will require approximately 25,000 - 30,000 tonnes of aggregate be delivered to the project site over a three month period. TDG (2016) have estimated that the average daily number of delivery vehicles associated with this task will be 20 vpd, with an hourly peak of 4 vehicles vph.

	The demand for rock aggregate will be concentrated during construction of the internal access road network and turbine foundations. The internal access road network will require approximately 25,000 truck and trailer loads of rock aggregate and hard fill material. The concrete aggregate for the turbine foundations will require up to 4,800 truck and trailer loads to be delivered to the site.
Water	Water supplies will be sourced from within the project envelope.
Steel	Steel and delivery of sundries will generate traffic (approximately 200 truck loads). However, it is expected that these deliveries will occur outside the busiest delivery periods associated with the concrete pours.
Substation and Transmission Line	Approximately 1,200 deliveries of materials will be required to construct the electricity substation / switchyard and the operations / maintenance building. In addition, the delivery of cranes and scissor lifts will generate approximately 200 additional vehicle movements. This equates to around 2,800 truck movements over a five month period (or 25 vpd). Approximately 20 to 40 light vehicle movements per day are expected on average associated with personnel. Approximately 80 to 100 truck deliveries may be required to construct the transmission route, with a crew of around ten people, bringing an additional five or six vehicles (including some trucks) to the site each day.
Turbine Components / Oversized Loads	The turbine components will be shipped to Port Taranaki and transported to the project site. Each of the 48 turbines may constitute up to eight or nine oversize components and up to 20 loads per turbine, or up to 1000 loads (2000 truck movements) for the total number of turbines. These are expected to be required over a period of around six to nine months. It is likely that three or four deliveries (six or eight movements) will occur each day.
Transformer	A transformer for the substation will be carried as an overweight load. It is likely to be the heaviest load and will also be carried on a trailer with multiple axles to distribute the load on the pavements.
Consumables	Trucks associated with the transport of consumables are expected to amount to 20 - 30 truck movements per day. In general, truck activity tends to reduce once civil works are complete and turbine erection begins.
Construction Personnel	There will be up to 40 personnel on site during the civil phases of construction and up to 100 personnel during the overlap period with turbine installation. This will reduce over the last few months of construction to less than 50.

	TDG (2016) expect that there will be car / van pooling by a number of the personnel. Light vehicle movements are estimated to be up to 150 vpd.

4.9.1.2 Operational Traffic

Between eight and ten staff will work on-site to maintain the WWF once it is commissioned. Therefore, TDG (2016) expects less than 20 light vehicle movements per day will be associated with the operation of the WWF. This is less than the traffic movements typically generated by four households in this locality, and will be readily accommodated on the upgraded Peat Road.

Some heavy vehicle access will also be required from time to time, including for the delivery of replacement parts and scheduled major overhauls. This will be similar to the periodic heavy vehicle demands associated with normal farming operations, except where significant over-dimension parts (such as a replacement blade) may be required on occasion.

4.9.2 Route Assessment

TDG (2016) notes that all heavy traffic, and the majority of light traffic, associated with the construction of the WWF will rely upon SH3 either from the west or the east. By way of example, all of the turbine components will be transported to site from Port Taranaki via SH3. In addition, TDG (2016) concludes that the combination of SH3 and Peat Road provide the most direct route to the project site.

SH3 is readily able to accommodate any projected traffic, subject to permitting for over-length and over-weight loads as required. However, and as noted in section 3.6.5 of this AEE, its intersection with Peat Road will need upgrading to accommodate the projected turning traffic volumes as well as the tracking paths of over-length vehicles.

In addition, Peat Road will not able to accommodate the expected frequency of two-way, laden construction vehicles and other construction traffic in addition to existing local traffic without reconstruction. As such, it is proposed that some road reconstruction works be undertaken on Peat Road (as described in section 3.6.5 above).

With the implementation of various improvements to the intersection of SH3 / Peat Road and Peat Road itself, along with the development and implementation of the Construction Traffic Management Plan ('CTMP') (discussed in section 4.9.4 below), the proposed access routes to the project site are expected to continue to operate a high level of safety and level of service for all road users during construction of the WWF.

4.9.3 Driver Distraction

The only potential on-going distraction to drivers identified by TDG (2016) is from the turbines. While wind farms are becoming increasingly common in New Zealand, the WWF will be a new experience to some drivers. In contrast, the placement of transmission poles near road corridors and the transport of over-size components are considered to be a routine expectation in the road environment.

East bound drivers on SH3 will initially be able to see the WWF in the distance (approximately 5 -10 km away) on their approach to Patea. By gradually coming into

view it is anticipated that the WWF will have minimal distractive effect on drivers coming from this direction.

The closest direct views of the WWF from SH3 will be for east-bound drivers on SH3 after they rise up from the Whenuakura River near the Rangikura Road intersection - where the closest turbines will be approximately 2.5 km away and straight ahead of drivers. The turbines will then remain clearly visible for a distance of approximately 500m along SH3. Thereafter, views of the turbines to east bound motorists will only be peripheral.

West-bound motorists will have distant views of the WWF from up to 12 km away on the approach into Waverley. Travelling through, and to the west of, Waverley the turbines will be in the peripheral vision of drivers. The most direct views of the turbines will be adjacent to Okotuku Domain. In this regard, motorists will have a clear view of the turbines straight ahead, with the nearest turbines approximately 4 km away.

While distant views will be available to drivers that will absorb some of the novelty characteristics of the WWF, closer up views of the turbines directly in front of drivers will be available for several hundred metres of travel on both west and east-bound approaches. As such, Trustpower is proposing to install information signage to inform motorists of the upcoming near views in order to minimise any risk of driver distraction. This signage will be placed before the terrace above the Whenuakura River for east bound drivers and before the bend before the Waverley Racecourse for west bound drivers.

With respect to the transmission line, and in particular where it crosses SH3, there may be a temporary novelty factor during construction when safety nets are temporarily deployed. However, this will be mitigated by traffic management measures, including any temporary speed control as is warranted over the section of affected highway.

4.9.4 Construction Traffic Management Plan

A CTMP will be prepared and implemented for the duration of the construction period. The CTMP will provide stakeholders with a clear understanding of the confirmed construction programme, traffic volumes during each stage, the improvements to be undertaken, and the management measures being implemented. As a minimum, the CTMP address the following:

- Construction programme and traffic volumes;
- Driver protocols;
- Over-size loads;
- Road and intersection improvements;
- Traffic management at intersections, level crossings, stock crossings and access points to local properties;
- School bus timetables;
- Monitoring; and
- Communication arrangements.

A draft of the CTMP for the construction of the WWF is provided in Appendix E of TDG (2016).

4.9.5 Summary

TDG (2016) have concluded that the WWF and the transmission line can be constructed and operated in a way that ensures potential adverse transportation-related effects are avoided or mitigated to an acceptable level.

TDG (2016) have also concluded that an upgrade of the SH3 / Peat Road intersection and Peat Road will be required. These upgrade works, along with the utilisation of the CTMP, will enable the construction of the WWF to proceed with only minor and temporary adverse effects on other road users.

Furthermore, the proposed roading upgrades will likely provide significant enduring improvements for all users of Peat Road once construction of the WWF is complete.

4.10 Noise Effects

An assessment of the potential noise effects related to the construction and operation of the WWF and the transmission line is provided in Hegley (2016). An overview of this assessment is provided in the sections below.

4.10.1 Construction Noise – Wind Farm

Plant machinery associated with the construction of the WWF will include earthmoving equipment to prepare the roads, hard stand areas and turbine foundations, the operation of a concrete batching plant, possible pile driving, and cranes to erect the turbines.

Hegley (2016) summarises the potential construction noise effects as follows:

- Noise levels at the nearest dwellings during the construction of the internal access road network are not predicted to exceed 28 dBA (L_{eq});
- Noise levels at the nearest dwellings during the preparation of the turbine foundations are not predicted to exceed 24 dBA (L_{eq}) during calm conditions;
- Noise levels at the nearest dwellings during the establishment of the turbine foundations will be up to 32 dBA (L_{eq});
- Noise levels from constructing the turbine towers will be up to 19 dBA (Leq);
- Driving a pile at the closest possible turbine foundation to the boundary of the project envelope will generate noise levels up to 62 dBA (L_{eq}) and 74 dBA (L_{max}) at the nearest dwelling; and
- Noise levels from the concrete batching plant based will not exceed 41 dBA (L_{eq}) at the nearest dwelling – assuming that the plant involves the use of a 150 kW loader and is located within 100 m of the project envelope boundary.

Hegley (2016) considers the greatest potential noise levels from the construction of the WWF will be generated when bolting the tower sections of the turbines together. In this respect, the noise of an impact wrench used inside of the turbine tower to tighten the connecting bolts is estimated to reach 69 dBA (L_{eq}) at a distance of 80 m. This will result in a noise level of approximately 37 dB (L_{eq}) and a maximum level of 43 dBA (L_{max}) at the nearest dwelling to the WWF.

The nacelle and turbine blades will be lifted into position with a 400 tonne crane or similar. The noise from this operation when measured at 50 m is typically 65 dBA (L_{eq}) and 73 dBA (L_{max}). This equates to a noise level of up to 29 dBA (L_{eq}) and 37 dBA (L_{max}) at the nearest dwelling to the WWF.

Overall, Hegley (2016) concludes that the construction of a turbine to the nearest dwelling to the WWF will generate noise levels that will be well within the requirements of NZS6803:1999 *Acoustics – Construction Noise* at all times. In addition, the potential noise levels generated from construction works we generally be below or just above the existing noise environment during the daytime. As such, the noise is unlikely to cause a nuisance for neighbours in the area.

4.10.2 Construction Noise - Traffic

Hegley (2016) has relied on TDG (2016) for information relating to the number and types of vehicles accessing the project site during the construction of the WWF. In addition, Hegley (2016) has identified NZS 6806:2010 *Acoustics – Road Traffic Noise - New and Altered Roads* as the relevant standard to assess potential traffic noise effects.

The lowest noise level adopted in NZS6806:2010 is 57 dBA measured as a 24 hour (L_{Aeq}). Even for the dwellings nearest to the roads to be utilised by construction traffic, Hegley (2016) has assessed that the one hour levels are within the lowest value of 57 dBA (L_{Aeq}) 24 hour as set out in the standard.

In addition, the noise is only generated during the daytime as there will not be any additional traffic generated during the night time - eliminating any possible sleep disturbance for the neighbours. Further, traffic noise is only related to the maximum likely traffic flows during construction of the WWF so is of limited duration compared to the ongoing traffic noise addressed by *NZS 6806:2010 Acoustics – Road Traffic Noise - New and Altered Roads.*

4.10.3 Construction Noise – Transmission Line

Construction equipment required to establish the transmission line and poles will include (at worst) plant such as an excavator, dump trucks, concrete trucks and a crane.

Hegley (2016) has predicted a noise level of approximately 55 dBA (L_{Aeq}) at the nearest dwelling in the rural area, and 8 – 10 dBA on the edge of Waverley. As this is a minimum of 5 dBA lower than the requirements of NZS6803 (when applying the long term duration noise limits), no further evaluation of construction noise associated with the establishment of the 110 kV transmission line is considered necessary.

4.10.4 Operational Noise – Wind Farm

4.10.4.1 Introduction

The two main noise sources from the operation of the turbines identified by Hegley (2016) are mechanical noise and aerodynamic noise. All mechanical noise sources will be located within the turbine nacelle on the top of the tower. The noise from the gearbox (if utilised) and drive motors is minimised by the manufacturer's design, making any mechanical noise secondary to the aerodynamic noise generated from the turbine blades rotating.

An example of the test data available for the maximum sound power level is set out in Table 1 of Hegley (2016).

Turbines typically start generating electricity at wind speeds of approximately 4 m/s. Once the wind speed reaches approximately 25 m/s the turbine is temporarily shut down to prevent possible damage to the equipment.

When close to the operating turbines the characteristic sound of the blades passing is apparent.[39] However, at distances greater than approximately 300 m this noise becomes steady with little variation to the noise level. With more than one turbine operating, the cumulative noise is a steady sound with the only variation being due to turbulent wind effects. It is noted that the noise from a wind farm does not have any significant directivity characteristics so the direction that the turbines face is not critical in the analysis of the noise effects.

During calm weather conditions (up to 4 m/s) the turbines will be either stationary or will idle without generating any electricity. Under these conditions there will not be any noise from the turbines. In a gentle to moderate breeze (between 7 – 9 m/s) the turbines will generate the maximum noise level.

If a turbine has a special audible characteristic (determined at a noise sensitive dwelling), such as a tonal component, there is a 5 dBA penalty to the sound as required by NZS6808: 2010 *Acoustics – Wind Farm Noise*. However, by selecting modern turbines the potential for special audible characteristics at noise sensitive dwellings can be eliminated.

4.10.4.2 Assessment

Given that Trustpower has not micro-sited the proposed turbine locations within the project envelope, Hegley (2016) considers the following scenarios in the noise assessment:

- Turbines located as close as possible to the west;
- Turbine located as close as possible along the north-east boundary;
- Turbines located as close as possible to the east within the site;
- Turbines located as close as possible to the south within the site;
- Turbines modelled as an indicative site layout; and

[39] Within approximately 50 m.

- The envelope of the above options.

Table 2 of Hegley (2016) identifies the sites where predicted noise level from the WWF will be at, or above, 30 dBA ($L_{A90\ (10min)}$) for each of the layout scenarios noted above. The location of the listed dwellings in Table 2 is shown in Figure 27 of Hegley (2016).

Overall, Hegley (2016) concludes that noise levels at any dwelling identified in Table 2 will be within the requirements of NZS6808:2010, even when considering the noisiest possible configuration of the WWF for the individual dwellings. That is, the predicted noise levels will not exceed the background sound by more than 5 dB, or a level of 40 dB ($L_{A90\ (10min)}$), whichever is the greater.

With respect to the beach adjacent to the project site, Figure 24 of Hegley (2016) illustrates that the turbines will result in a noise level of up to 50 dBA ($L_{A90\ (10\ min)}$) on the beach (if they are located at the closest point to the beach within the project envelope). However, the degree of noise intrusion experienced on the beach will depend on the condition of the sea and if the tide is in or out.

At half-tide with a relatively calm sea the noise experienced at the top of the beach will be typically 55 dBA (L_{A90}), and this level will increase to 65 dBA (L_{A90}) or more with 1 – 1.5 m waves and no effects from the WWF. As a result of wave noise, this area is relatively noisy and will mask much of the noise from the WWF. The noise from the WWF will be heard when the sea is calm, but will not have any adverse noise impact as the level will be similar to that from the wind farm on a calm day.

4.10.4.3 Low Frequency Noise

The effect of low frequency noise is addressed in NZS6808:2010 where it is stated in Clause 5.5:

> *5.5.1 Although wind turbines may produce some sound at (ultrasound and infrasound) frequencies considered to be outside the normal range of human hearing these components will be well below the threshold of human perception.*
>
> *5.5.2 Claims have been made that low frequency sound and vibration from wind turbines have caused illness and other adverse physiological effects among a very few people worldwide living near wind farms. The paucity of evidence does not justify at this stage, any attempt to set a precautionary limit more stringent than those recommended in 5.2 and 5.3.*

In addition, numerous acoustic publications on wind farms and low frequency noise have been researched, including by the committee reviewing NZS6808:2010.

The results of a measurement undertaken at the TWF show that if the frequency level follows any particular curve, the loudness sounds the same to the observer at the different frequencies. This shows the noise level must be higher at the lower frequencies to sound as loud as the higher frequencies. Similar results were found at the Te Apiti Wind Farm and the Te Uku Wind Farm.

In addition, a study by the British Wind Energy Association has reported[40] that *"to date, there is no evidence which links the levels of low frequency noise emitted by wind turbines with impacts on human health. With over 50,000 wind turbines in operation around the world, some of which have been in place for 20 years, there has been ample opportunity for any ill effects to have been identified; that none have is further proof of the benign nature of this technology."* This is referring to what is sometimes called vibro-acoustic disease.

A range of turbines that may be selected for the WWF have been evaluated and none have high levels of low frequency noise. When taking this into account and the fact there is no substantiated evidence that indicates that modern turbines generate high levels of low frequency noise, Hegley (2016) concludes there is no reason to suspect the WWF will generate high levels of low frequency noise.

4.10.4.4 Vibration Noise

Vibration monitoring has been carried out by Hegley Acoustic Consultants at the base of a 3 MW turbine. No unusual vibrations were measured and these results are consistent with published data relating to vibration noise for modern turbines.

4.10.4.4 Traffic

Once the WWF is operational it is expected that staff will bring approximately 20 vehicles per day to the project site. Although the noise from individual vehicles passing will be heard, the overall noise effects in terms of both the 1 hour and 24 hour L_{Aeq} levels will be negligible.

4.10.4.5 Noise Effects on Animals

Hegley (2016) also considers the potential noise effects of the WWF on farm animals within the project envelope and in the surrounding environment. Hegley (2016) references a number of overseas papers and reports on the noise effects of wind farms and other noise producing sources (e.g. aircraft). These studies have found that other noise producing sources do not have a significant impact on milk production in cows.

It is also noted that almost all of the existing wind farms in New Zealand are located on farms containing cows and sheep. To this extent, Trustpower has not been notified of any adverse effects on farm animals by the landowners whose properties accommodate the TWF and the Mahinerangi Wind Farm.

4.10.5 Operational Noise – Electricity Substation and Transmission Line

For the purposes of a worst case scenario assessment, Hegley (2016) assumes that the electricity substation / switchyard will be located along the northern boundary of the project envelope - where the potential exposure to a dwelling is highest.

Based on noise measurements from an existing electricity substation at another power station, Hegley (2016) estimates the noise levels to be 50 dBA (L_{10}) at 25 m and below 18 dBA at the nearest dwelling. These noise levels are well below the existing night time background sound level, so will not be noticed by the nearest residents.

---

40 BWEA Briefing Sheet, Low frequency noise, wind turbines and health effects, March 2004.

With respect to the transmission line, the nearest dwellings are expected to be a minimum of 100 m from the line in rural areas and between 20 – 50 m around the outskirts of Waverley - although the exact distance will depend on the final route and location of the poles within the transmission corridor.

Under normal conditions the transmission line will be silent once in use. However, there is the potential of wind noise and noise from corona and surface electrical discharging. Hegley (2016) carried out field tests on existing lines under conditions favourable for the higher levels for corona (with light rain) and wind generated noise (wind above about 15 m/s). The highest level recorded was 42 dBA from corona and 43 dBA from wind (both L_{10}) within approximately 20 m of the lines.

For context, Hegley (2016) notes that the District Plan adopts a level of 45 dBA (L_{10}) as the night time noise limit. As such, any dwellings on the outskirts of Waverley will not experience noise levels from the transmission line that exceed the limits in the District Plan and dwellings in rural areas (which will be up to 100 m away from the line) will experience noise levels that are approximately 29 dBA (L_{10}).

4.10.6 Monitoring / Mitigation

In order to mitigate the potential noise effects associated with the construction of the WWF and the transmission line, Trustpower is proposing to prepare and implement a Construction Noise Management Plan ('CNMP'). The CNMP will set out measures to monitor and mitigate the potential noise effects. It will be submitted to the STDC (for certification in a technical capacity) prior to any construction works commencing. A draft version of the CNMP is attached as **Appendix Twenty** to this AEE.

In addition, Trustpower is proposing to prepare a Noise Management Plan ('NMP') prior to the commencement of the operation of the turbines at the WWF. The NMP shall include, as a minimum, the following information:

- An assessment of background sound levels;
- The turbine selected for the WWF, having regard to the sound power level predictions obtained in accordance with Section 6.2, and the special audible characteristics in Clause 5.4.1 of NZS6808;
- Procedures for ensuring compliance with the noise conditions, including noise compliance testing, methods for addressing non-compliance, and contacts and complaints procedures;
- Procedures for addressing turbine malfunctions that cause material noise effects beyond typical operational noise;
- Requirements for post construction noise monitoring and assessment; and
- Provisions regarding review and updating of the NMP.

The NMP will also be submitted to the STDC (for certification in a technical capacity) prior to the operation of the WWF commencing.

In addition to the above, proposed resource consent conditions relating to the management of potential construction and operational noise effects are detailed in **Appendix Fourteen** of this AEE.

4.10.7 Summary

Hegley (2016) concludes that the noise during the construction of the WWF will comply with the requirements of NZS6803:1999.

With respect to the operational noise of the WWF, Hegley (2016) has modelled the range of different layout scenarios associated with the project envelope approach. The noise contours developed for each of these scenarios have then been used to develop noise contours that encompass the highest noise level for each of the options considered using indicative turbines. This modelling has demonstrated that the operation of the WWF will be within the requirements of NZS6808:2010.

Finally, Hegley (2016) concludes any potential noise effects associated with the construction and operation of the transmission line will be minor and will comply with the noise limits in the District Plan.

4.11 Social, Tourism and Recreation Effects

An assessment of the actual and potential effects of the WWF and transmission line on social, tourism and recreational activities within the South Taranaki District is provided in TRC Tourism (2016). An overview of this assessment is provided in the sections below.

4.11.1 Construction Effects – Wind Farm Site

The possible recreational effects associated from construction of the WWF relate to restrictions on walking and vehicle access across the project site and potential impacts on general recreational amenity along the coast.

With respect to recreational access through the project site, this will be restricted during the period of construction of the WWF (approximately 24 months) due to health, safety and security reasons. However, any potential effects will be limited given the low number of people that currently access the coast through project site and due to the fact that alternative recreational access will continue to be available at Waipipi Beach and Patea.

In terms of the mouth of the Whenuakura River, current recreational use at this site is limited given the existing access constraints and the fact that the majority of recreational whitebaiters prefer sites further up the river. For the small number of people who do recreate at the river mouth, the potential effects from construction are likely to relate to traffic and noise associated with construction works - particularly works at the western end of the project envelope. These matters are addressed in detail in sections 4.9 and 4.10 of this AEE respectively. It is, however, noted that a CTMP and CNMP are proposed by Trustpower in order to manage potential traffic and noise construction effects.

In addition to the above, construction noise at the coast will generally be secondary to wave noise for any recreationalists on the beach. However, given that there will be no access through the project site during the construction of the WWF it is likely that the smaller number of existing users will likely make temporary arrangements and substitute their activities at other nearby sites.

4.11.2 Construction Effects – Transmission Line

TRC Tourism (2016) considers that any potential effects on recreational amenity at the Waverley Racecourse during construction of the transmission line will be minor given the irregular use of the racecourse. In this respect, the grandstand and visitor infrastructure at the Waverley Racecourse is located in the northern corner of the Okotuku Domain - which is approximately 10 m from the transmission line corridor.

Any potential traffic effects for recreational activities are addressed in section 4.9 of this AEE and will be managed by the CTMP.

4.11.3 Operational Effects – Wind Farm Site

As with the construction effects at the project site, TRC Tourism (2016) considers the key potential effects on recreational values associated with the operation of the WWF relate to public access to the coast and amenity values.

In relation to public access, it is expected that access through the project site will be available again once the construction of the WWF is complete (noting, however, that this access is at the discretion of the landowners). In this respect, there will be no need to restrict access due to the wind farm operating on site – although access tracks may need to be altered slightly depending on the final layout of the turbines.

In terms of recreational amenity, Hegley (2016) notes that the level of turbine noise at the Whenuakura River could be approximately 45 dBA, which may have a limited impact on recreational amenity in low wind speed conditions.

In addition, the turbines will be visible to whitebaiters and recreationalists from both sides of the Whenuakura River. This may also have some effect on recreational amenity given the somewhat isolated and undeveloped nature of the river mouth. Isthmus (2016) notes that the turbines will be prominent structures in these locations. However, the base of the turbines will be inland which will help create perspective depth and a degree of separation.

Finally, there may be some effects on recreational amenity along the coast from the operation of the WWF. Hegley (2016) predicts noise levels at the beach could be up to approximately 50 dBA depending on the final turbine layout and location on the beach. Likewise, Isthmus (2016) considers that the turbines will be prominent structures in the backdrop to the beach – although the dunes will create a degree between the coast and the WWF.

No existing tourism operations are considered to be affected by the operation of the WWF.

4.11.4 Operational Effects – Transmission Line

Given the location of the proposed transmission corridor any potential effects on recreational amenity at the Waverley Racecourse will be minor. Whilst the transmission line will be within close proximity to the racecourse, transmission lines are a common feature in this environment and will be unremarkable to users of the racecourse.

The transmission lines are 640 m from the golf course but their effect on recreational amenity would be negligible.

4.11.5 Mitigation

Mitigation measures to be adopted by Trustpower during the construction of the WWF will include:

- The timing of the temporary closure of the access routes through the WWF will be communicated to recreationalists;
- Potential construction traffic effects on recreationalists will be managed via the CTMP; and
- Potential construction noise effects on recreational amenity along the coast and Whenuakura River will be managed by the CNMP.

4.11.6 Summary

Overall, TRC Tourism (2016) concludes that potential social, recreation and tourism effects from the construction of the WWF will be minimal and can be appropriately managed – primarily through the measures outlined in the CTMP and CNMP.

The effects of the operation of the WWF on recreational amenity along the coast and the Whenuakura River will be more noticeable, given the scale of development and its proximity to the coast. The scale of these potential effects on amenity values generally has already been discussed in detail in sections 4.2 and 4.10 of this AEE.

4.12 Heritage and Archaeological Effects

An assessment of the potential effects of the WWF on heritage and archaeological values within the project envelope and along the transmission line route is provided in Heritage Solutions (2016). A summary of this assessment is provided below.

4.12.1 Wind Farm Effects

Heritage Solutions (2016) notes that there are no recorded archaeological sites within the project envelope and any potential effects on recorded sites within the EBZ will be avoided.

With respect to the construction of the WWF within the project envelope, Heritage Solutions (2016) considers that the potential for the disturbance of archaeological sites is highly unlikely as the majority of the project envelope is located over the former iron sand mining operations. In addition, site investigations by Heritage Solutions have resulted in areas adjacent to the sand dunes being included in the EBZ.

4.12.2 Transmission Line Effects

The transmission line route was traversed by Heritage Solutions as part of their assessment. No archaeological sites were identified or recorded.

Unrecorded sites are unlikely in open paddocks and any potential for construction effects is considered to be minimal) based on the relative low impact of the work (e.g. the occasional excavation of a hole to place the pole).

4.12.3 Monitoring / Mitigation

In order to monitor the potential discovery of archaeological / heritage sites and to avoid or mitigate the potential for adverse effects, Trustpower is proposing to implement the following measures:

- An Archaeological Discovery Protocol and Management Plan ('ADPMP') will be prepared for the construction of the WWF. This plan will detail the roles and responsibilities of the project archaeologist, project manager and contractors;

- An archaeologist will be on site to monitor surface clearing, trenching, roading construction, excavations for turbine foundations or other subsurface ground work required for construction of the front row of turbines adjacent to the unmodified coastal dunes, the Whenuakura River edge, and the inland waterways;

- An archaeologist will be 'on call' to monitor surface clearing, trenching, roading construction or other subsurface ground work required for construction in all other areas; and

- Artefacts and material uncovered and recorded during site clearing work will be lodged with an appropriate repository.

4.12.4 Summary

Heritage Solutions (2016) notes that archaeological sites have been recorded within the wider, and immediate vicinity, of both the project site and the transmission line route. Some of the sites recorded, and archaeological material recovered, is of archaeological significance as they contribute information on resource use, lifestyles and occupation of the area.

However, the previous iron sand mining operations will have destroyed archaeological sites that may have been located within the former coastal dunes. Thus, the likelihood of finding intact sites within the project envelope is considered low.

Likewise, Heritage Solutions (2016) concludes that the potential for the construction of the transmission line to disturb undiscovered archaeological sites is low given the minor nature of the land disturbance required to establish the poles.

4.13 Cultural Effects

Trustpower commenced its engagement with Ngaa Rauru in relation to the WWF in late 2010. This included several meetings and discussions between Trustpower and Ngaa Rauru, before an external consultant was engaged by Ngaa Rauru in 2011 to prepare a CIA for the WWF. The CIA was never finalised as the consenting of the WWF was put on hold by Trustpower in 2013.

Trustpower recommenced engagement with Ngaa Rauru in 2015 and has discussed its intention to seek resource consents for the WWF in 2016. Due to the time since the development of the previous draft CIA, it was agreed by Trustpower and Ngaa Rauru that an updated CIA should be prepared and that provision be made for a period of consultation on the CIA with the local hapu to ensure it accurately represents their views

on the WWF. This process is currently underway and hui are to be held to ensure the CIA accurately represents the views of the hapu. It is anticipated the CIA will be finalised and available for wider circulation in May 2016.

Ngaa Rauru have advised that matters raised during its discussions with the local hapu to date included:

- Water usage during construction;
- The decommissioning process and land use opportunities post any decommissioning;
- Effects of shadow flicker on people with epilepsy;
- Driver distraction;
- Noise effects; and
- Opportunities for employment.

Additional information addressing the above matters has been provided to Ngaa Rauru and information on these potential effects is also discussed in this AEE. Trustpower is continuing to consult with Ngaa Rauru through the consenting process.

The CIA that was commissioned for the previous wind farm proposal by Allco on the site is also considered relevant for contextual purposes, given that a similar development was proposed on parts of the project site. This CIA identified that:

- Wai o Turi Marae view native flora and fauna, wetlands and waterways as important elements of the earth and are, therefore, concerned with protecting these elements;
- Wai o Turi Marae acknowledge that the project addresses human-induced climate change and will displace generation from coal or gas-fired power stations;
- Wai o Turi Marae believe that, where possible and practicable, employees of the wind farm should be sourced from the local communities of South Taranaki;
- It was accepted that there are no identified archaeological sites within the wind farm site. However, as a precaution Wai o Turi Marae sought that the soil stripping stage of construction be supervised; and
- Wai o Turi Marae sought that tangata whenua perspectives or artistic contributions be appropriately recognised in the wind farm development (e.g. through the naming of the wind farm).

With respect to the above matters, it is noted that the construction of the WWF and the transmission line is unlikely to disturb previously unrecorded archaeological sites of significance to Ngaa Rauru in light of the previous iron sand mining operations. This conclusion is endorsed in Heritage Solutions (2016). Trustpower would, however, be willing for a representative of Ngaa Rauru to be present on site during earthworks

construction any sites where Ngaa Rauru consider there may be the potential for archaeological material to be uncovered.

In addition, Trustpower intends to employ standard accidental discovery protocols in the ADPMP in order to manage the potential discovery of archaeological material or human remains. These are addressed in further detail in Heritage Solutions (2016).

Trustpower is also proposing an extensive range of ecological rehabilitation measures within the project site in order to enhance ecological values. As noted above, these measures include the fencing of streams and wetlands, riparian and dune planting, and the replacement of existing culverts that present a barrier to fish passage. These measures should contribute to restoring and protecting values previously identified as important by Wai o Turi Marae.

Trustpower remains committed to on-going dialogue and constructive consultation with Ngaa Rauru.

4.14 Effects on Aviation

Civil Aviation Rule ('CAR') Part 91 permits flights as low as 152.4 m (500 feet) above ground level in the vicinity of the project site. As such, the CAA has concluded that there may be a flight path hazard generated by the height of the turbines in accordance with CAR Part 77.19(a).

Given that the CAA have concluded the WWF will constitute a hazard in navigable airspace,[41] Trustpower is proposing to install medium intensity aviation obstacle lighting on the nacelles of the turbines to avoid or mitigate effects on the safety of aircraft operations. Obstacle lighting will be installed as per the conditions of the CAA and in accordance with CAR Part 77 as follows:

- The highest turbines, and those around the extremities of the project envelope, will be lit. The spacing between the lit turbines will not exceed 1,850 m;
- The lighting will have an intensity of not less than 1,600 candela of red light as defined in CAR Part 77, Appendix B10 and will flash between 20 and 60 times per minute; and
- The obstruction lights will be located on, or above the top of, the nacelle and will be visible from all directions. It is noted that the lights may be shielded from the horizontal plane.

In addition, Trustpower will provide the CAA with the finalised geographical co-ordinates of each turbine and aviation obstacle lighting on the nacelles at least six months prior to the commencement of construction of the WWF. Trustpower will also submit a registered surveyor's determination of the height and position of the turbines and proof of compliance with the lighting standards within five working days of completion of the WWF. This will enable the location of the WWF to be accurately marked on aeronautical charts for future operations.

With respect to airstrips at Waverley and Waverley Beach, it is noted that the CAA does not recognise these as aerodromes in their Aeronautical Publication New Zealand. In

41 Letter from the CAA to Trustpower - 28th May 2012.

this regard, it is understood that the frequency of use of these airstrips is extremely limited (if not abandoned). Any aircraft that did use these airstrips would be able to operate below 150 m (500 feet) within 9 km of an aerodrome boundary.

However, it is considered that the utilisation of the aviation obstacle lighting on the nacelles of the turbines marking the boundary of the WWF, and marking it on aeronautical charts, would provide sufficient navigation hazard warning for aircraft.

4.15 Effects on Radio / Communication Services

An assessment of the potential effects of the WWF on radio / communication services within the area surrounding the project site is provided in Rodgers (2015).

Rodgers (2015) notes that wireless communication systems use radio waves to relay information from a transmitter to a receiver. In some circumstances, it is possible for wind turbines to cause interference to wireless receivers. There are four distinct mechanisms that can potentially cause interference to a radio service:

- Electro-magnetic Interference ('EMI');
- Near-field effects;
- Diffraction; and
- Reflection (or Scattering).

4.15.1 Electro-magnetic Interference

Rodgers (2015) notes that EMI occurs when the electrical and electronic equipment inside a turbine radiates radio frequency energy in a frequency band used by a radio service.

With respect to the WWF, the risk of interference to communication services (e.g. fixed cellular, cellular, broadcast and maritime radio) is very low as the turbines will be located at least 1 km away from nearest house in terms of affecting radio / phone / TV / wireless broadband reception.

Rodgers (2016) also concludes that there is no risk to radio sites in the surrounding area since they all are at least 10 km way from the WWF.

4.15.2 Near-Field Effects

Near-field effects occur when a turbine is located in close proximity to an existing antenna, such that it modifies the radiation characteristics of the antenna.

Rodgers (2016) concludes there will be no risk of near-field effect as all turbines within the WWF will be in the far field region for any antenna associated with the nearest radio sites. The minimum distance from the radio site increases with frequency and is typically at least 500 m at microwave frequencies.

4.15.3 Diffraction

Diffraction occurs when a turbine's location causes radio waves to be partially blocked, causing some signal power loss. There is a moderate risk that maritime VHF radio coverage from the Kuranui radio repeater site will be affected.

However, Rodgers (2016) considers this is unlikely to be a problem in practice given coverage from other Maritime New Zealand repeaters in the area.

4.15.4 Reflection

Reflection occurs when radio waves are reflected from a turbine's surface.

With respect to fixed linking communications, Rodgers (2016) notes there are no links that either cross the wind farm or pass close to it. For cellular and broadcast communication services any risk of interference is low given the WWF will be approximately 3 km away from SH3 between Waverley and Patea, and the nearest dwelling to wind farm is approximately 1km away. Rodgers (2016) does, however, consider that non-wireless communication options will need to be utilised within the WWF.

For wireless access sites and maritime communications there is a very low risk of reflection. In this regard, the nearest dwellings will be at least 1km from the WWF and most boats will be typically at least 1 km off the coast.

4.15.5 Summary

Overall, it is considered that any potential effects on wireless communication systems as result of the construction and operation of the WWF will be minimal in practice. It is, however, acknowledged that there is a high risk that cellular reception will be unreliable within the WWF and that non-wireless communication options may be required.

4.16 Electro-Magnetic Effects on Human Health

All electro-magnetic fields from the WWF and the transmission line will comply with the relevant limits for general public and occupational exposure, set in the 2010 International Commission on Non-Ionizing Radiation Protection ('ICNIRP') Guidelines – which have been endorsed by the Ministry of Health. Minimisation of electromagnetic fields can be readily achieved by conventional engineering techniques.

Compliance with ICNIRP Guidelines will ensure that there will be no risk to public health and safety from electro-magnetic fields. Overall, the design of the WWF and the transmission line will have no biological or health effects from electromagnetic fields, and there are no specific design or mitigation requirements other than compliance with the ICNIRP Guidelines to ensure that the effects are no more than minor.

4.17 Coastal Hazards

An assessment of the potential coastal hazards to the WWF, including potential climate change effects, is provided in Shore Processes (2016). An overview of this assessment is provided below.

4.17.1 Potential Future Shoreline Position

Shore Processes (2016) notes that the coast adjacent to the project site is dynamically stable, but is subject to episodic periods of fluctuation relating to changes in the process environment. Periods of storm waves can result in prolonged episodes of erosion of the cliff and foredunes, while periods of strong winds can result in dune blowouts and movement of bare sand across the backshore.

In addition, climate change scenarios indicate changes in sea level and weather patterns over the next 100 years. Sea level rise, for example is projected to result in erosion of sandy shores. Long-term climate changes may also result in more sand moving off the beach onto the backshore area or may increase the occurrence of such events.

Shore Processes (2016) notes that the projected erosion for the dune section of the coast adjacent to the project site will be between 131 m in the east and 101 m in the west over a 100 year period. The projected erosion of the cliffs along the shoreline is between 25 – 43 m over the same 100 year period (with a factor safety included).

These changes to the shoreline profile will not extend into the project site and Shore Processes (2016) concludes that the site is not susceptible to coastal erosion when considering a 100 year period (and with regard to climate change and sea-level rise).

4.17.2 Coastal Flooding and Wind Erosion

The types of coastal processes adjacent to the site that may result in wind erosion and landward migration of sand dunes. In addition, there is potential for inundation of low lying land adjacent to Waipipi Stream due to extreme wave run-up or impounding of floodwaters by natural blocking of the stream outlet through the beach.

The potential areas that may be subject to wind erosion and landward migration of sand dunes are shown on Figure 5.1 of Shore Processes (2016). These areas were determined, based on historical precedence for the area and theoretical principles of wind potential and sand transport properties. The main factor in locating these areas is the presence of un-vegetated sand over the last ten years.

Shore Processes (2016) identifies that the management of areas of bare sand within the project site may avoid wind erosion hazards. As such, a Dune Management Plan will be prepared and implemented by Trustpower. The plan will include requirements for the monitoring of the areas of bare sand to identify changes in size and movement of the extent of vegetation cover. Planting on bare sand within the project envelope and the EBZ will also enhance the avoidance or mitigation of wind-blown sand and dune movement. The species to be utilised will be confirmed as part of the Dune Management Plan, but may include sand binding plants such as pingao, silvery sand grass or spinifex.

In addition, Shore Processes (2016) advises that unstable dunes within the project envelope could be reshaped to produce a more stable form before planting. This recommendation does not currently form part of the measures proposed by Trustpower as part of the construction, operation and maintenance of the WWF.

With respect to the coastal flooding, the areas of potential inundation over a 100 year period are located either seaward of the project site, along the Waipipi Stream, or within the EBZ. As such, Shore Processes (2016) considers that coastal flooding does not present a hazard to the WWF.

4.17.3 Additional Mitigation

Shore Processes (2016) identifies that the utilisation of the EBZ has allowed for the accommodation of avoidance of areas where construction works may result in adverse effects on the physical coastal environment. In this regard, areas of dunes are generally already contained within the EBZ, or are seaward of the WWF boundary.

Additional mitigation measures proposed by Trustpower that will address potential adverse effects on the coastal environment include:

- Aligning the internal road network with the existing farm tracks where possible;
- Roads maintaining a vertical alignment in order to minimise the interception of stormwater;
- Once construction is complete, reducing the width of the internal access roads;
- Stormwater run-off that is collected from the internal access road network and hard stand areas be conveyed by channel and / or pipe systems to designated disposal locations; and
- Excess spoil from the construction activities be placed in specific spoil disposal areas within the project envelope.

4.17.4 Summary

Shore Processes (2016) concludes that the shore adjacent to the project site is erosional, but at slow long-term rates. Overall, it is characterised as dynamically stable. Changes in the shoreline profile will not impact on the WWF over a period of at least 100 years.

The project envelope is located landward of projected long-term coastal erosion, but could be subject to the effects of blown sand and migrating sand dunes. These natural processes can be addressed by a Dune Management Plan, which is to be implemented by Trustpower to manage potential effects that may arise due to coastal hazards.

4.18 Other Construction / Operational Effects

4.18.1 Dust / Air Emissions

Dust generated during the construction of the WWF could affect vegetation, become a nuisance to site personnel and neighbouring landowners, and could also potentially contribute to sediment loads in the Waipipi Stream. Dust can be made airborne by wind or vehicle movements (or both).

Riley - Civil (2016) notes that dust will need to be managed during the construction of the WWF. In this respect, a number of activities are likely to generate dust including vehicle movements, excavations, stockpiling of material, foundation construction and the loading of vehicles.

In the event that dust generation on site becomes obvious, appropriate mitigation measures will be adopted. Such measures may include:

- Ensuring that track surfaces remain damp, including via the use of water trucks;
- Limiting traffic speeds on site;
- Staging earthworks during construction in order to reduce the area of exposed surfaces and the revegetation of expose areas as soon as practicable;
- Stabilise entry / exit points to the WWF; and
- In high winds it may also be necessary to limit earthworks.

In addition, suitable measures will be utilised at the concrete batching plant in order to contain dust emissions. These will include:

- The use of silos for the storage of cement and fly ash;
- Water sprays of any aggregate stockpiles;
- The installation of a bag filter on the cement silo; and
- The construction of temporary hardstand areas at the concrete loading area.

4.18.2 Hazardous Substances

Construction and operational activities at the WWF will require the storage and use of potentially hazardous substances, such as diesel, oil and concrete. The use and handling of these substances will be undertaken in a manner that complies with all relevant requirements of the Hazardous Substances and New Organisms Act 1996 ('HSNO').

Careful management of potentially hazardous materials will substantially reduce the risk of spills. To avoid spillages, an appropriate location for re-fuelling and a suitable storage facility will be decided by the appointed contractor prior to the commencement of construction. The fuel storage location will be located at least 50 m away from waterbodies (including farm drains) and will be appropriately bunded and spill kits will be stored at this location at all times.

Significant oil leaks are highly unlikely with the electricity substation / switchyard, but should oil leak from the transformer tanks, or the radiator body, the full volume will be able to be safely drained and accommodated within the electricity substation facility. In this regard, bunded areas will contain more than 110% of the total volume of oil in the transformers.

A Spill Contingency Management Plan ('SCMP') will also be developed by Trustpower, which will detail measures to minimise the risk of a spill events occurring. The SCMP will also provide an internal and external notification procedure in the event of a spill occurring and identify any measures to be undertaken to remediate a contaminant spill.

In addition, appropriate containment will be adopted for the storage of hazardous substances required for the ongoing operational phase of the WWF. These will be stored within the operations and maintenance building in a designated hazardous substances

store. The types of substances required will include operational quantities of solvents, oils, grease and similar materials.

Overall, it is considered that any potentially adverse effects associated with the storage and use of hazardous substances can be appropriately avoided, remedied or mitigated.

4.18.3 Groundwater Abstraction

Riley – Civil (2016) notes that the volume of water required to produce the concrete for a single turbine foundation is approximately 190 m^3 per day (based on pile foundation type). The taking of groundwater will require additional bore(s) drilled down to the deeper Whenuakura Formation Aquifer, which has a higher yield than the shallow Marine Terrace Aquifers.

To enable sufficient water for construction of turbine foundations on consecutive days, the groundwater take will need to provide for:

- The abstraction of up to 88 m^3 per day at rate not exceeding 2 litres per second from the shallow Marine Terrace Aquifers; and

- The abstraction of up to 120 m^3 per day at rate not exceeding 4 litres per second from the shallow Whenuakura Formation Aquifer.

Dependant on the yield from the consented bores, on-site storage tanks may be needed to store water extracted from the bores and ensure continuous operation of the concrete batching plant. This approach was adopted for the construction of the TWF.

4.18.4 Groundwater De-Watering

Riley – Geotechnical (2016) identifies that to achieve the required groundwater drawdown at the turbine foundation sites in a period of ten days will require a pumping rate of approximately 5.3 m^3 per day / well point. However, this is beyond the capacity of available well point systems, which have an upper capacity of approximately 4 m^3 per day / well point.

To accommodate this, the de-watering period will need to be extended to enable the lower pumping rate to be used. A lead time before excavation starts will be required – which could be up to 30 days.

Once the required drawdown in the turbine foundation sites is achieved, the pumping rate required to maintain this drawdown will decrease to an estimated 2.5 m^3 per day / well point.

To avoid recharge of the abstracted water back into the de-watered zone, the discharge will be made to a drain that is at least 50 m from the well points. In locations in close proximity to areas sensitive to groundwater (e.g. wetlands) it may, however, be necessary for discharges to be subject to a reduced setback distance.

4.19 Conclusion

This section of the AEE has been informed by a number of comprehensive technical assessments commissioned by Trustpower to assess the potential environmental effects

associated with the construction, operation and maintenance of the WWF and the transmission line.

Overall, and based on the technical assessments that have been prepared, it is considered that the WWF and transmission line can be constructed and operated in a manner that will appropriately avoid, remedy or mitigate potential adverse effects on the environment. Importantly, the project site is considered to be an appropriate location for a wind farm due to the expansive scale of the landscape, the surrounding productive farmland, and the low density of dwellings in the area around the project site.

It also recognised that it will not be possible to ensure that all potential adverse effect are avoided, remedied or mitigated. In this regard, there will be some visual effects associated with the WWF. However, Trustpower have designed the project envelope to avoid the band of coastal dunes where the coastal influences and ecological values are highest. As such, the WWF will not cause significant adverse effects on the natural character values of the coastal environment.

A number of the measures that have been identified within this section for avoiding, remedying or mitigating adverse effects are also reflected in the proposed resource consent conditions proffered in **Appendix Fourteen** to this AEE, and within the draft management plans. Further, it is recognised that many of the potential effects associated with the construction and operation of the WWF and the transmission line will comply with recognised international and national standards (e.g. construction and operational noise effects, shadow flicker effects, construction traffic).

5. STATUTORY PLANNING FRAMEWORK

This section of the AEE sets out and considers the relevant statutory planning framework against which the resource consent applications for the WWF are to be assessed in accordance with the RMA. In particular, this section of the AEE comprises the following:

Section 5.1 Identifies the various resource consents required from the STDC and TRC for the construction, operation and maintenance of the WWF and the transmission line under the relevant statutory planning documents.

Section 5.2 Provides an assessment of the project against the objectives and policies of the relevant statutory planning documents in accordance with section 104 of the RMA.

Section 5.3 Provides an overall conclusion summarising all of the above.

5.1 Resource Consent Requirements and Activity Status

5.1.1 Introduction

The District Plan, Proposed Plan, Freshwater Plan, Air Plan, Taranaki Soil Plan ('Soil Plan'), and the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 ('NES') all contain rules against which the various activities associated with the construction, operation and maintenance of the WWF and the transmission line must be assessed.

Accordingly, these statutory planning documents are considered further in the sections below.

5.1.2 South Taranaki District Plan

The District Plan contains rules that apply to the use of land, the erection of buildings / structures, earthworks, vegetation clearance, the disturbance of heritage sites, and the storage and use of hazardous substances within the South Taranaki District (amongst other things). The District Plan was made operative in December 2004.

The District Plan identifies the project site and the transmission line route as having the following values / features:

- The project site and the transmission line route are zoned 'Rural';
- All of the project site and part of the transmission line route are located in the coastal protection area;
- The project site contains part of a significant natural area, being the Waipipi Dunes. However, this significant natural area is located outside of the project envelope;
- Archaeological sites are identified around the boundary of the project site and in the general proximity of the transmission line route; and

- The electricity substation on Mangatangi Road is designated in favour of Transpower.

The resource consents required for the WWF and the transmission line under the District Plan are set out in Table 5.1 below and are described in more detail as necessary in sections 5.1.2.1 to 5.1.2.6 below.

Table 5.1: Resource Consents Required under the District Plan.

ACTIVITY	RULES	OVERALL ACTIVITY STATUS
A **land use consent** for the construction, operation and maintenance of the Waverley Wind Farm, including: i) The construction, operation and maintenance of up to 48 turbines (including foundation works and platforms); ii) The construction, operation and maintenance of up to 48 externally housed transformers adjacent to each turbine; iii) The construction, operation and maintenance of up to four permanent wind monitoring masts; iv) The construction, operation and maintenance of an electricity substation / switchyard building; v) The construction, operation and maintenance of an underground 33 kV electrical and fibre optic cable network between the 48 turbines and the electricity substation / switchyard building; vi) The installation of medium intensity aviation obstacle lighting on the nacelles of the turbines; vii) The construction and maintenance of approximately 25 - 30 km of internal access roads; viii) The upgrading and maintenance of existing local roads; ix) The construction, operation and dis-establishment of a temporary concrete batching plant and other on-site construction buildings / equipment (including diesel generators); x) The storage and use of hazardous substances;	**Section 3 – Rural Zone** Rule 3.01.3(k); Rule 3.01.4(b); and Rule 3.01.4(g). **Section 11 – Hazardous Substances** Rule 11.01.4(a). **Section 12 – Natural Hazards** Rule 12.01.3; and Rule 12.01.4. **Section 14 - Utilities** Rule 14.01.3(e); and Rule 14.01.4.	Discretionary

xi) The construction and use of an operations / maintenance building; xii) Vegetation clearance; xiii) Land disturbance and earthworks (including the establishment of spoil disposal areas and aggregate storage) associated with the establishment of the internal access roads, turbine foundations / hard stand areas, and related activities; xiv) The generation of heavy traffic movements; xv) Site rehabilitation works; and xvi) All other ancillary activities.		
A **land use consent** for the construction, operation and maintenance of a 110 kV transmission line between the Waverley Wind Farm and the electricity substation located on Mangatangi Road, Waverley, including: i) The construction, operation and maintenance of a single circuit 110 kV above ground transmission line on monopoles up to 22 m high; ii) Land disturbance and earthworks associated with the establishment of the monopoles (including access tracks); iii) The storage and use of hazardous substances; iv) The erection and maintenance of construction safety nets over roads and the railway network; v) The generation of heavy traffic movements; vi) Vegetation clearance; vii) Site rehabilitation works; and viii) All other ancillary activities.	**Section 3 – Rural Zone** Rule 3.01.3(k); Rule 3.01.4(b); and Rule 3.01.4(g). **Section 11 – Hazardous Substances** Rule 11.01.4(a). **Section 12 – Natural Hazards** Rule 12.01.3; and Rule 12.01.4. **Section 14 - Utilities** Rule 14.01.3(a); and Rule 14.01.4.	Discretionary

5.1.2.1 Definition of Utility / Application of Section 14

Section 1 of the District Plan defines a utility as having the "*same or similar meaning as network utility operation in section 166 of the Resource Management Act 1991...".* Wind farms or other electricity generating facilities are not considered network utility operations in accordance with section 166 of the RMA. However, clause (1)(a) of the definition of utility in the District Plan also refers to "…*and all land uses associated with or ancillary to generating facilities*".

The definition of utility in the District Plan is ambiguous. In this respect, rather than specifically listing electricity generation facilities as utilities in the same manner as substations or transformers, the definition suggests that land uses which accompany or

support electricity generation facilities are considered utilities. The definition does not clarify whether electricity generation facilities are utilities themselves. The relevant objectives and policies in section 2 of the District Plan do not provide any further clarity in relation to this matter.

In light of this uncertainty, Trustpower has assessed the WWF against the provisions in sections 3 and 14 of the District Plan. The overall classification of the WWF is a discretionary activity under both sections of the District Plan, meaning that the interpretation issues are of little material consequence from a rule assessment perspective.

5.1.2.2 Conflicting Sections of the District Plan

Whilst section 14 of the District Plan specifies that the *"following provisions for utilities and services shall apply throughout the District",* Rule 3.01.4 refers to *"any activity"* in the coastal protection area identified on the planning maps as being a discretionary activity (with the exception of temporary military training activities). The performance standards and notes / exemptions in section 14.02 of the District Plan also make no mention of the possibility of utility development in the coastal protection area.

In light of the above, and out of an abundance of caution, Trustpower has assumed that the development of any utilities in the coastal protection area will be a discretionary activity in accordance with Rule 3.01.4 of the District Plan despite the permitted activity rules in Rule 14.01.1.

5.1.2.3 Network Utilities

In light of the analysis provided in section 5.1.2.2 above, and out of an abundance of caution, Trustpower has also assessed that the externally housed transformers, and the 33 kV transmission lines and fibre optic cables between each of the turbines and the electricity substation / switchyard, will require resource consent for a discretionary activity in accordance with Rule 3.01.4 – notwithstanding that these activities can comply with the permitted activity and performance standards in section 14 of the District Plan. This is because these utilities will occur within the coastal protection area identified on the planning maps.

The undergrounding of a section of Powerco's 11 kV electricity transmission network in the vicinity of Waitangi Road, Waverley is, however, considered to be a permitted activity under Rule 14.01.1(a) of the District Plan, as the works will occur outside the coastal protection area and section 14.02.2 specifies that utilities within legal road reserve or underground do not need to comply with the performance standards for the relevant zone.

5.1.2.4 Natural Hazards

The applicability of section 12 of the District Plan to the WWF and the transmission line is also ambiguous. In this regard, the introduction to section 12 states that it is focused on "*local and generally small-scale activities*" associated with human habitations in areas which are potentially subject to natural hazards.

However, Rules 12.01.3 and 12.01.4 of the District Plan refer to "*all development"* and *"all vegetation clearance"* respectively. That is, the rules themselves do not include any qualifier relating to activities associated with human habitation.

In light of the above, and the fact that the project site is located on land identified as Land Use Capability Classes 6, 7 and 8 New Zealand Land Use Inventory Worksheets, it is considered that the WWF and the transmission line will require resource consent for a restricted discretionary and discretionary activity in accordance with Rules 12.01.3 and 12.01.4 of the District Plan.

5.1.2.5 Safety Netting

The erection of safety netting over any roads or the Marton - New Plymouth Railway Line in order to construct the transmission line between the WWF and Mangatangi Road is considered to be a 'building' in the Rural Zone. As such, the erection of safety netting is either a discretionary activity in accordance with Rule 3.01.4(b) or Rule 3.01.4(g) – with the different rules applying depending on the whether the safety netting is located inside or outside the coastal protection area.

5.1.2.6 All Other Ancillary Activities

Ancillary activities associated with the construction, operation and maintenance of the WWF and the transmission line may include the following activities, structures and works:

- The construction and operation of temporary dams or impoundments;
- The construction of temporary and permanent water diversion channels;
- The construction of decanting earth bunds and settlement ponds;
- The installation of a wheel wash pad;
- The erection of silt fences; and
- The infilling of existing ponds on the site.

These ancillary activities will require resource consent for a restricted discretionary or discretionary activity in accordance with Rules 3.01.4(b), 12.01.3 and 12.01.4 of the District Plan - these being the rules typically applying to all development and activities within the coastal protection area and natural hazard areas.

5.1.3 Proposed South Taranaki District Plan

The Proposed Plan was publicly notified by the STDC on 15 August 2015 and will replace the District Plan once it becomes operative. Its primary purpose is to ensure that land use, development and subdivision in the South Taranaki District is sustainably managed.

The period for submissions on the Proposed Plan closed on 12 October 2015 and 103 submissions were received. The period for further submissions closed on 29 January 2016. It is currently understood that hearings on the Proposed Plan will commence in late April 2016.

In accordance with section 86B(3) of the RMA, rules in a proposed plan have immediate legal effect if it protects or relates to water, air, or soil (for soil conservation), protects

areas of significant indigenous vegetation, protects areas of significant habitats of indigenous fauna, or protects historic heritage. The rules in the Proposed Plan which have immediate legal effect in accordance with section 86B of the RMA are identified on the STDC website.[42]

Section 86F(a) of the RMA also states that rules in a proposed plan must be treated as operative (and any previous rule as inoperative) if the time for making submissions or lodging appeals on the rule has expired and, in relation to the rule, no submissions in opposition have been made or appeals have been lodged. However, it is noted that the rules relating to the establishment of renewable electricity generation activities and activities within the coastal protection area are subject to submissions, including a submission by Trustpower. As such, no applicable rules are considered to be operative pursuant to section 86F of the RMA.

The Proposed Plan identifies the project site and the transmission line route as having the following values / features:

- The project site and the transmission line route are zoned 'Rural';
- Those parts of the project site within 200 – 400 m of the coast, as well as Waipipi Stream, are located in the coastal protection area;
- The project site contains part of a significant natural area, being the Waipipi Dunes. However, this significant natural area is located outside of the project envelope;
- Part of the project site is located within an identified area of outstanding natural character;
- Archaeological sites are identified around the boundary of, and within, the project site. However, these sites are located outside of the project envelope. There are also unidentified archaeological sites in the general proximity of the transmission line route; and
- The electricity substation on Mangatangi Road is designated in favour of Transpower.

The resource consent requirements in accordance with the rules in the Proposed Plan that have legal effect are set out in Table 5.2 below.

42 http://www.southtaranaki.com/Council/Proposed-District-Plan-2015/

Table 5.2: Resource Consents Required under the Proposed Plan.

ACTIVITY	RULES	OVERALL ACTIVITY STATUS
A **land use consent** for the storage and use of hazardous substances in a hazardous facility associated with the construction, operation and maintenance of the Waverley Wind Farm and associated transmission line.	**Section 12 – Hazardous Substances** Rule 12.2.4(a);	Discretionary

The WWF and the transmission line are considered to be a hazardous facility in accordance with the rules in section 12 of the Proposed Plan, because they involve activities involving the storage, use and handling of hazardous substances.

The permitted activity standards of Rule 12.3.2 will potentially not be met as the project site is located *"adjacent to"* a significant waterbody and regionally significant wetlands. However, it is noted that this term is not defined in the Proposed Plan – which makes it difficult to confirm the applicability of the rules in section 12 to the WWF.

5.1.4 Taranaki Regional Fresh Water Plan

The Freshwater Plan contains rules that apply to the take, use, damming and diversion of water from waterbodies in the Taranaki Region. In addition, the Freshwater Plan includes rules governing the discharge of water, stormwater and contaminants to land and water. The Freshwater Plan was made operative by the TRC in 2001.

The Freshwater Plan identifies the project site and the transmission line route as having the following values / features:

- The Whenuakura River is identified as having high recreational value for whitebaiting; and
- The Waipipi Dunes are identified as a regionally significant unprotected wetland and having one of the best examples of early foredune / swale colonising vegetation in the Foxton Ecological District.

The resource consents required under the Freshwater Plan are set out in Table 5.2 below and are described in more detail as necessary in Sections 5.1.4.1 to 5.1.4.5.

Table 5.3: Resource Consents Required under the Freshwater Plan.

ACTIVITY	RULES	OVERALL ACTIVITY STATUS
A **land use consent** for the construction, placement or use of culverts in, on, or over the bed of the Waipipi Stream and other unnamed watercourses within the project site.	Rule 64	Discretionary

A **land use consent** for the removal of existing culverts from the bed of the Waipipi Stream and other unnamed watercourses within the project site.	Rule 56	Controlled
A **discharge permit** to discharge water, stormwater and contaminants to land and water associated with the construction of the Waverley Wind Farm.	Rule 27	Controlled
A **water permit** to take and use surface water from farm ponds and unnamed watercourses within the project envelope for construction related activities, including dust suppression.	Rule 16	Discretionary
A **water permit** to take and use groundwater from bores within the project envelope for construction related activities, including concrete batching.	Rule 49	Controlled
A **water permit** to take and use groundwater from bores within the project envelope for the de-watering of the turbine foundation sites.	Rule 49	Controlled
A **water permit** to dam and divert water associated with the establishment of culverts in the Waipipi Stream and other unnamed watercourses within the project site, and the draining and infilling of ponds.	Rule 20 Rule 79	Discretionary
A **land use consent** to construct and extend drainage channels and infill ponds associated with the infilling of ponds.	Rule 76 Rule 79	Discretionary
A **land use consent** to clear vegetation from the bed and margins of the Waipipi Stream and unnamed watercourses, and associated with the infilling of ponds.	Rule 68	Discretionary

5.1.4.1 Water Supplies

Trustpower did hold a resource consent from the TRC for the take and use of groundwater for construction activities from two bores within the project envelope (Consent 7155-1). This resource consent was initially granted to Allco and was subsequently transferred to Trustpower. However, this resource consent has now lapsed. A copy of this resource consent is provided in **Appendix Sixteen** to this AEE.

The creation of bores or wells for the purpose of taking of groundwater or the de-watering of parts of the site for the construction of turbine foundations is a permitted activity in accordance with Rule 46 of the Freshwater Plan. In this regard, the bores will be cased and sealed and will be located more than required distances from the sea, other bores, effluent treatment ponds or septic tanks.

The taking and use of groundwater from the bores for the purpose of supplying water for the construction batching plant and other construction-related activities is a controlled activity in accordance with Rule 49 of the Freshwater Plan as the abstraction will exceed the instantaneous take and daily limits specified in Rule 48. The taking and use of surface water from three ponds within the project site for supplementary water supply purposes (e.g. dust suppression) is a discretionary activity in accordance with Rule 16 of the Freshwater Plan, as the abstraction may exceed the instantaneous take and daily limits specified in Rule 48 also.

Finally, the taking of water associated with the de-watering of the turbine foundation sites also requires resource consent as a controlled activity in accordance with Rule 49 of the Freshwater Plan (although the discharge of this water is a permitted activity in accordance with Rule 21).

5.1.4.2 Discharge of On-Site Wastewater

The discharge of on-site treated wastewater to land from the operations / maintenance building will meet the permitted activity standards set out under Rule 22 of the Freshwater Plan. In this regard, the treatment system will be designed and located so that it does not result in surface ponding or run-off, is 25 m from any surface waterbody and 50 m from any bore, and will not result in noxious, objectionable or offensive discharges.

5.1.4.3 Discharge of Stormwater / Wastewater from Concrete Batching Plant

The discharge of stormwater on to land from the concrete batching plant is considered to be a permitted activity under Rule 23 of the Freshwater Plan. Whilst the concrete batching plant is considered to be an industrial and trade premise, the utilisation of an interceptor system to separate stormwater and waste water will mean that the discharge can comply with standards 1 and 2 of Rule 23.

In addition, while the concrete batching plant will involve the movement of rock (e.g. aggregate for the production of concrete), this activity is considered to be undertaken in connection with the installation and construction of buildings / structures. As such, it is considered that standard 3 of Rule 23 can also be complied with.

As the discharge of stormwater from the concrete batching plant will be to land, it is not considered that the standards in Rule 23 relating to water quality will be exceeded.

With respect to wastewater from the concrete batching plant, it is considered that any discharge to land can be designed and located so that it does not result in surface ponding or run-off, is 25 m from any surface waterbody and 50 m from any bore, and will not result in noxious, objectionable or offensive discharges. It is, therefore, considered that the discharge of waste water to land is a permitted activity in accordance with Rule 29 of the Freshwater Plan.

5.1.4.4 Stormwater from Land Disturbance Activities

Resource consent is required for the discharge of stormwater to land and water within the project envelope in accordance with Rule 27 of the Freshwater Plan given that the area of soil disturbance activities will exceed 8 ha. The activity status is controlled.

Rule 27 of the Freshwater Plan also requires Trustpower to submit a site erosion and sediment control management plan to the TRC. As discussed in section 4.7 of this AEE, and noted in the proposed consent conditions in **Appendix Fourteen**, Trustpower proposes to prepare and submit such a plan to the TRC before any construction works commence on site.

5.1.4.5 Pond Infilling

The infilling of the three farm ponds within the project envelope will require the extension of the downstream channel drains if they are not already to the farm ponds. Given that the drain extensions may be greater than 300 mm in diameter, resource consent is required for a discretionary activity in accordance with Rule 79 of the Freshwater Plan.

The clearance of vegetation from the bed and margins of the Waipipi Stream and its tributaries associated with the establishment of culverts, and from the ponds prior to their infilling, requires resource consent for a discretionary activity in accordance with Rule 68 of the Freshwater Plan. In this regard, the clearance of vegetation is not for any of the permitted purposes set out in Rules 65 and 66 of the Freshwater Plan.

5.1.4.6 Transmission Line

The transmission line will pass over Waipipi Stream (and possibly other small waterbodies). However, all construction works associated with the excavation of the pole foundations will be undertaken entirely on farmland or road reserve. In this respect, no works are proposed within the bed of any waterbody. As such, those sections of the transmission line corridor that cross over the bed of a waterbody are considered to be a permitted activity under Rule 61 the Freshwater Plan.

5.1.5 Taranaki Regional Air Quality Plan

The Air Plan contains rules that apply to the discharge of a variety of potential contaminants to air in the Taranaki Region. Potential contaminant discharges controlled by the Air Plan include discharges of dust, and discharges from combustion equipment and agricultural processes. The Air Plan was made operative by the TRC in July 2011.

The resource consent required under the Air Plan are set out in Table 5.4 below and are described in more detail as necessary in the sections 5.1.4.1 to 5.1.4.3.

Table 5.4: Resource Consents Required under the Air Plan.

ACTIVITY	RULES	OVERALL ACTIVITY STATUS
A **discharge permit** to discharge contaminants (dust) to air from earthworks associated with the construction of the Waverley Wind Farm.	Rule 44	Controlled

5.1.5.1 Earthworks

The construction of the WWF will result in the disturbance of up to approximately 66 ha of land within the project envelope, with the potential for an area greater than 4 ha to be disturbed at any one time. As such, a resource consent to discharge contaminants to air from large-scale earthworks is required as a controlled activity in accordance with Rule 44 of the Air Plan.

A Dust Management Plan ('DMP') will be submitted to the TRC for certification before any land disturbance activities occur within the project envelope.

5.1.5.2 Portable Diesel Generator Units

The discharge of contaminants to air from portable diesel generator units within the project envelope is considered to meet the permitted activity standards for such activities in accordance with Rule 6 of the Air Plan. In this regard, no individual diesel generator unit used on-site will exceed 5 MW in capacity and the cumulative capacity of all diesel generator units on-site during construction will not exceed 10 MW.

Furthermore, any diesel generator units utilised by Trustpower will comply with the height requirements for chimneys (which are calculated based on the isolation of the site and fuel being burned).

5.1.5.3 Concrete Batching Plant

Rule 13 of the Air Plan is considered relevant to the concrete batching plant as it applies to "*premises used for the manufacture of concrete products*". That said, the discharge of any contaminants to air from the concrete batching plant will meet the permitted activity standards of Rule 13. In this respect, the concrete batching plant will be located within the project envelope, and operated such that it does not result in noxious, objectionable or offensive discharges to air beyond the boundaries of the project site.

5.1.6 Taranaki Regional Soil Plan

The purpose of the Soil Plan is to assist the TRC with its soil conservation functions under the RMA. The Soil Plan was made operative in 2001 and most of the provisions in the plan are non-regulatory.

Overall, it is considered that the construction, operation and maintenance of the WWF and the associated 110 kV transmission line is a permitted activity in accordance with the Soil Plan. In this regard, the Soil Plan only requires a resource consent to be obtained for vegetation disturbance activities in circumstances where the area being cleared is greater than 5 ha and when the land slope is greater than 28 degrees.

While vegetation / land disturbance with the main part of the project envelope will exceed 5 ha, the flat nature of the site means that no works will be undertaken on land with a slope exceeding 28 degrees.

5.1.7 Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations

The NES came into effect on 1 January 2012. The NES deals with territorial authority functions under section 31 of the RMA with respect to the management of potentially contaminated land. The NES applies to the disturbance of soil and the changing of land uses on land that is potentially contaminated.

Land that is covered by the NES is specified in Regulation 5 of the NES as follows:

> *(7) The piece of land is a piece of land that is described by 1 of the following:*
> *(a) an activity or industry described in the HAIL is being undertaken on it:*
> *(b) an activity or industry described in the HAIL has been undertaken on it:*
> *(c) it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it.*

The Hazardous Activities and Industries List ('HAIL') is a compilation of activities and industries that are considered likely to cause land contamination. The HAIL has grouped similar industries together which typically use or store hazardous substances that could cause contamination if these substances escaped from safe storage, were disposed of on the site, or were lost to the environment through their use. The HAIL is intended to identify most situations in New Zealand where hazardous substances could cause, and in many cases have caused, land contamination.

Based on this historical land uses on the site, potentially hazardous activities identified in the HAIL include E.7 - mining industries.

In light of the above, resource consent is required for a discretionary activity for the disturbance of soil that exceeds the limit of 25 m^3 per 500 m^2 and to change the use of the project site in accordance with Regulation 11 of the NES. While the project site will continue to be used for farming practices once the WWF is constructed, it is considered that the wind farm represents new use of the site – and hence a change in use.

5.2 Objectives and Policies of Relevant Planning Documents

Sections 5.2.1 to 5.2.9 provide an analysis of the WWF and the transmission line against the objectives and policies of the relevant statutory planning documents. The national, regional and district planning documents considered relevant to the project are as follows:

- New Zealand Coastal Policy Statement;
- National Policy Statement on Freshwater Management;
- National Policy Statement for Renewable Electricity Generation;
- Taranaki Regional Policy Statement;
- Taranaki Regional Fresh Water Plan;

- Taranaki Regional Air Quality Plan;
- Taranaki Regional Soil Plan;
- Taranaki Regional Coastal Plan;
- South Taranaki District Plan; and
- Proposed South Taranaki District Plan.

As the resource consents required for the construction, operation and maintenance of the WWF and the transmission line from the STDC and TRC are (collectively) discretionary activities, a consent authority is only required to have regard to the relevant provisions of the statutory planning documents listed above in accordance with section 104(1) of the RMA.

It is recognised that there will be conflicting objectives and policies within, and between, the various statutory planning documents, particular with respect to the provision of land use activities and development for social and economic wellbeing, and the protection of significant environmental or cultural values. In these circumstances it is appropriate to consider the conflicting objectives and policies subject to the relevant matters under Part 2 of the RMA.

5.2.1 New Zealand Coastal Policy Statement 2010

The NZCPS sets out a number of objectives and policies for achieving the purpose of the RMA in relation to the coastal environment of New Zealand. The 'second generation' version of the NZCPS was formally gazetted in December 2010.

The NZCPS is relevant to the WWF given that at least the front edge of the project site (along the inland edge of the dunes) will be located in the coastal environment. The relevant themes in the NZCPS relate to social and economic wellbeing / provision of infrastructure, indigenous biodiversity, natural character / landscape values, tangata whenua values, and amenity and access.

These key themes are discussed in the sections below.

5.2.1.1 Social and Economic Wellbeing / Provision of Infrastructure

Objective 6 and Policy 6 of the NZCPS seek to, amongst other things, enable people and communities to provide for their social and economic wellbeing. This includes through recognising the potential renewable energy resources in the coastal environment and the ability of these resources to provide for the needs of future generations. Objective 6 also recognises that the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms.

As already noted in sections 3 and 4.2 of this AEE, the WWF seeks to harness a recognised renewable resource (wind) in the coastal environment of the South Taranaki District in order to provide for the social and economic wellbeing of people and communities. In this regard, the project will enable the generation of up to 490 GWh per year of electricity from a renewable energy source.

Section 3 of this AEE has also discussed the wind resource values at the project site and the challenges associated with identifying suitable locations for the development of utility scale wind farm developments. In particular, renewable electricity generation facilities such as wind farms will need to be located where the resource is located.

With respect to development occurring in appropriate places and forms within the coastal environment, the visual, landscape and natural character assessment by Isthmus (2016) concludes that the project site is an appropriate location for the wind farm due to the expansive scale of the landscape, the surrounding productive farmland, and the low density of dwellings in the area around the project site. The utilisation of the EBZ will also ensure that adverse effects on significant biophysical values in the coastal environment will be avoided.

5.2.1.2 Indigenous Biodiversity

A number of the provisions in the NZCPS seek to protect ecosystem or indigenous biodiversity values in the coastal environment. Objective 1 seeks to maintain or enhance natural biological and physical processes in the coastal environment, and protect representative or significant natural ecosystems and sites of biological importance. In addition, Policy 11 seeks to protect indigenous biodiversity in the coastal environment by avoiding adverse effects on indigenous taxa that are listed as 'Threatened' or 'At Risk' and other indigenous vegetation values that are rare or nationally significant.

With respect to indigenous vegetation within the project site, the EBZ has been developed so that the construction of the WWF will avoid any areas within the largely unmodified coastal dunes that are of ecological significance. Adverse effects on the pondweeds in the farm ponds that are to be infilled will be avoided via the translocation of these plants to other ponds within the project site. However, these ponds may also be located outside of the coastal environment based on the mapping of the coastal protection area in the Proposed Plan and the assessment of the extent of the coastal environment in Isthmus (2016).

In addition, Trustpower is proposing to fence off significant wetland features within the project site and undertake riparian planting along the Waipipi Stream in order to enhance its ecological value. As such, it is considered that the construction of the WWF will avoid adverse effects on significant indigenous vegetation values in the coastal environment.

In terms of the bird species that have habitat or fly within the vicinity of the project site, section 4.6 of this AEE has discussed the potential for bird mortality for key species – particularly those that are listed as 'Threatened' or 'At Risk'. It is noted that modelling of the potential effects of the WWF identifies that New Zealand pied oystercatcher and pied stilt may experience in occasional mortalities, but not at a level that will impact on the long term sustainability of the national populations. Trustpower will, however, contribute resources to local habitat or species restoration programme in order to mitigate for any small losses to the local population.

Banded dotterel only use a small part of the project site and only rarely fly at heights where there is a risk of collision. As such, Boffa (2016) concludes that banded dotterel are not at risk from the WWF.

With respect to the three species of shag which have small local populations around the site, Boffa (2016) concludes that long term daily activity by shags could result in mortality levels which would have a significant adverse effect on these small local populations. However, any mortality will not have an effect at the national population level.

Trustpower is, however, proposing to manage the risk to the shag species via the removal of three farm ponds which attract them and other waterfowl to the project site, and contributing to local habitat restoration projects to address displacement effects.

In summary, adverse effects on the sustainability of any national populations of bird species identified as 'Threatened' or 'At Risk' will be avoided. The management measures proposed by Trustpower in order to address potential effects on the local populations of bird species will ensure that the WWF is not contrary to the intent of the outcomes sought by the provisions concerning the protection of indigenous biodiversity in the NZCPS.

5.2.1.3 Natural Character / Landscape Values

Objective 2 of the NZCPS seeks to preserve the characteristics and qualities that contribute to the natural character of the coastal environment and protect natural features and landscape values (including through the identification of areas where subdivision, use or development would be inappropriate). Policies 13 and 15 of the NZCPS go on to seek the avoidance of adverse effects on areas of outstanding natural character and on outstanding natural features and landscapes.

The Proposed Plan identifies the coastal frontage of the project site (including part of the project envelope) as being an area of outstanding natural character based on a desktop assessment undertaken on behalf of the STDC. Given the preliminary nature of this assessment, and the fact that submissions on the Proposed Plan have not yet been considered, Trustpower commissioned Isthmus Group and Brown NZ Limited to undertake a detailed assessment of the natural character values of the project site and the surrounding. Whilst Isthmus (2016) and Brown (2015) conclude that some areas around the coastal dunes are largely unmodified and have high natural character, they consider the coastal frontage and dunes fail to display the physical cohesion and visual integrity that would be expected for an area of outstanding natural character. They also consider the project site lacks the overall sense of naturalness that pervades areas of outstanding natural character identified at other locations.

In light of the detailed site assessments by Isthmus (2016) and Brown (2015) it is considered that the natural character values at the project site are not outstanding and that no aspect of the WWF will impact upon the management of an area of outstanding natural character.

Policy 13(1)(b) of the NZCPS provides the most relevant guidance for assessment purposes. In seeking to preserve the natural character of the coast and protect it from inappropriate use and development, Policy 13(1)(b) requires that decision makers "*avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment"*. In relation to this policy, Isthmus (2016) concludes that there will be no direct effects on biophysical aspects of natural character of any significance. With respect to the experiential aspects of natural character, Isthmus (2016) considers that there will be adverse visual effects on the perception of natural character because the turbines will be a prominent backdrop to views inland from the coast and dunes. Such effects will be mitigated by the fact that the turbines will be setback inland of the dunes, which will also increase the perspective depth in views from this area and help increase the perception of separation between the coast and the WWF.

The effects of the turbines on natural character are also reversible. The turbines could potentially be removed and the site rehabilitated with almost no lasting effects on natural character if the WWF was to be decommissioned.

Taking the matters above into account and Policy 13(1)(b) of the NZCPS, Isthmus (2016) considers that the adverse effects of the WWF on the overall natural character of the coastal environment will not be significant.

In terms of Policy 15 of the NZCPS, the only potential outstanding natural feature or landscape in the surrounding environment is the Waverley Beach cliffs (based on the Proposed Plan and Isthmus (2016). Isthmus (2016) concludes that the WWF will not compromise the landscape values of this site given its distance from project site and orientation along the coast. As such, any adverse effects on outstanding natural features and landscapes in the coastal environment will be avoided.

Adverse effects on other landscape values will be mitigated by the fact that the site is identified as being an appropriate one for a wind farm in terms of landscape character due to the surrounding working landscape, the modified nature of the project site, and the relatively low density of dwellings in the coastal environment.

5.2.1.4 Tangata Whenua Values

Objective 3 and Policy 2 of the NZCPS relate to the principles of the Treaty of Waitangi, recognition of the role of tangata whenua as kaitiaki of the coastal environment, and provision for tangata whenua involvement in the management of the coastal environment.

As noted in section 4.13 of this AEE, Trustpower has been engaging with Ngaa Rauru regarding the WWF since late 2010. It has been agreed by Trustpower and Ngaa Rauru that an updated CIA should be prepared and that provision be made for hui with the local hapu on the CIA to ensure it accurately represents their views on the WWF. This process is currently underway.

Ngaa Rauru have advised that matters raised during its discussions with the local hapu to date included:

- Water usage during construction;
- The decommissioning process and land use opportunities post any decommissioning;
- Effects of shadow flicker on people with epilepsy;
- Driver distraction;
- Noise effects; and
- Opportunities for employment.

Additional information addressing the above matters has been provided to Ngaa Rauru and is also discussed in this AEE. Trustpower is continuing to consult with Nga Rauru through the consenting process.

Based on the matters identified by Ngaa Rauru hapu to date, and the fact that potential archaeological effects during construction will be managed and extensive ecological rehabilitation measures will be undertaken within the project site, it is considered that the construction, operation and maintenance of the WWF and the transmission line should be able to be undertaken in a manner that suitably addresses any potential adverse effects on the relationship of Ngaa Rauru with the coastal environment.

In addition to the above, there may be other opportunities available that contribute to Ngaa Rauru's role as kaitiaki of the environment (e.g. involvement in rehabilitation works or site monitoring).

5.2.1.5 Amenity and Access

Objective 4 and Policies 18 and 19 of the NZCPS relate to the maintenance and enhancement of public access to the coastal environment and seek to recognise the open space qualities and recreation opportunities of these areas.

With respect to public access to the coastal environment, section 2.10 of this AEE details that public access opportunities to the coast from across the project site are currently limited and at the discretion of the landowners of the project site. Access will be restricted across the project site during the construction period, which is considered to be consistent with the circumstances for the restriction of access set out in Policy 19(3) of the NZCPS.

Once construction of the WWF is completed, existing public access opportunities across the project site will be able to be maintained, subject to the landowners' continuing approval.

In terms of the potential effects of the WWF on the open space qualities and amenity values of the coastal environment, these matters are addressed in detail in sections 4.3, 4.10 and 4.11 – primarily in relation to visual amenity, noise and recreation effects. These sections acknowledge that there will be the potential for adverse effects on amenity values along the coastal environment related to the visual prominence and noise of the turbines. That said, it is also noted that the number of people using the coastal environment adjacent to the project site is small and the potential effects will be consistent with national standards with respect to construction and operational noise.

5.2.1.6 Coastal Hazards

Objective 5 of the NZCPS seeks to ensure that coastal hazard risks taking account of climate change are managed by locating new development away from areas prone to such risks. Policy 25 goes on to specify that any in areas potentially affected by coastal hazard over at least the next 100 years that the risk of social, environmental harm should be avoided, and that locating infrastructure away from areas of hazard risk should be encouraged where practicable.

The potential coastal hazards risks to the project, including from climate change are considered in section 4.17 of this AEE. Overall, Shore Processes (2016) concludes that the shore adjacent to the project site is erosional, but at slow long-term rates. Changes in the shoreline profile will not impact on the operation of the WWF over a period of at least 100 years. It has also been identified that the project envelope could be subject to the effects of blown sand and migrating sand dunes – although this will be managed via the implementation of a Dune Management Plan.

On the basis of the above, the proposed location of the turbines within the project envelope will not result in the location of development in an area prone to coastal hazard risks and any potential issues associated with the migration of the sand dunes into the project envelope can be managed.

5.2.1.7 Summary

The objectives and policies of the NZCPS seek to enable development in the coastal environment that provides for the social and economic wellbeing of people and communities, but also establish clear management expectations with respect to the potential environmental effects of activities on natural character, landscape values, indigenous biodiversity, cultural values, public access and amenity, and coastal hazard risk.

The analysis above has detailed that the WWF will be consistent with those provisions of the NZCPS that recognise the potential importance of the coastal environment for renewable electricity generation activities and the provision of social and economic wellbeing. Considerable effort has also been put into designing the WWF such that adverse effects on significant values within the coastal environment are directly avoided. This will be largely achieved by the EBZ incorporating indigenous vegetation of significance, and the infilling of the ponds within the project site to minimise the possibility of bird strike for resident populations.

The analysis also details that the project site is not within an area of outstanding natural character (notwithstanding the preliminary classification in the Proposed Plan), and this conclusion is supported by the detailed assessments of Isthmus Group and Brown NZ Limited. As such, the WWF is also consistent with many of the provisions in the NZCPS related to the management of environmental values in the coastal environment, and cannot be said to be directly contrary to any objectives or policies when effects are considered at an appropriate scale.

5.2.2 National Policy Statement on Freshwater Management 2014

The National Policy Statement for Freshwater Management ('NPSFWM') was formally gazetted in May 2011, and subsequently updated in 2014. It establishes objectives and policies to manage New Zealand's water resources in an integrated and sustainable way, while providing for economic growth within set water quantity and quality limits.

5.2.2.1 Water Quality Provisions

The water quality provisions of the NPSFWM are mainly targeted at regional councils amending their regional plans to establish water quality objectives and limits, and then managing activities within these limits. That said, Objectives A1 and A2 are considered directly relevant to the WWF. These objectives seek, amongst other things to safeguard the life-supporting capacity, ecosystem processes and indigenous species of fresh water; and to maintain or improve the overall quality of fresh water within a region.

The life-supporting capacity of fresh water within the project site and transmission line route will be safeguarded as a result of the design approach for the WWF adopted by Trustpower. In particular, all potentially sensitive waterbodies have been incorporated into the EBZ in order to limit construction activities and the potential for the discharge of contaminants. Furthermore, appropriate stormwater and erosion management measures will be utilised during the construction works in accordance with ECMP.

In addition to the above, water quality and ecological values within the Waipipi Stream and the wetlands within the project site will be enhanced in the long term as a result of the fencing and riparian planting that is proposed by Trustpower. This will reduce the effects of stock on these waterbodies. Trustpower is also proposing to remove culverts that are an impediment to the movement of native fish in the Waipipi Steam and unnamed waterbodies.

5.2.2.2 Water Quantity Provisions

Objectives B1 and B4 of the NPSFWM refer to safeguarding the life-supporting capacity, ecosystems and indigenous species of fresh water, as well as the protection of the significant values of wetlands.

As noted above, the utilisation of the EBZ to avoid the potential for construction works within sensitive waterbodies and the implementation of the stream / wetland fencing and riparian planting proposed by Trustpower will safeguard the life-supporting capacity of waterbodies and protect the significant values of wetlands.

Furthermore, the taking of groundwater and surface water from ponds and drains within the project envelope will managed so that they do not potentially impact on the life-supporting capacity or the ecosystem processes of freshwater.

5.2.2.3 Tangata Whenua Roles and Interests

Objective D1 seeks to provide for the involvement of iwi and hapu, and to ensure that tangata whenua values and interests are identified and reflected in the management of fresh water and ecosystems. Likewise, Policy D1 specifies that local authorities shall take reasonable steps to involve iwi and hapu in the management of fresh water.

While these provisions are considered to be aimed at the regulatory functions of regional and district councils', it is considered that the stream fencing, riparian planting and removal of culvert barriers to fish passage within the project site that is proposed by Trustpower should contribute to enhancing the objectives of Ngaa Rauru with respect to the management of fresh water resources.

5.2.2.4 Summary

Given that development will avoid many of the wetland and fresh water ecosystem values within the project site, best practice sediment and erosion control measures will be employed via the ECMP, and a number of enhancement initiatives will be undertaken along the Waipipi Stream, it is considered that the WWF will be consistent with the objectives and policies of the NPSFWM.

5.2.3 National Policy Statement for Renewable Electricity Generation 2011

The National Policy Statement for Renewable Electricity Generation ('NPSREG') was formally gazetted in April 2011. It seeks to enable the sustainable management of renewable electricity generation under the RMA.

The sole objective of the NPSREG seeks to provide for the development and operation of new and existing renewable electricity generation activities, such that the proportion

of New Zealand's electricity generated from renewable energy sources increases to levels that meet or exceed the Government's national target for renewable electricity generation. As discussed in sections 3 and 4.2 of this AEE, the WWF will enable the development of additional renewable electricity generation and contribute to the Government's strategic target of 90% of New Zealand's electricity generated from renewable sources by 2025.

Policies A, B and C1 of the NPSREG are considered most relevant to the WWF as they seek to ensure decision makers:

- Recognise the benefits of renewable electricity generation activities;
- Acknowledge the practical implications of achieving an increase in the proportion of electricity generated from renewable sources; and
- Acknowledge the practical constraints associated with the development, operation, maintenance and upgrading of new and existing renewable electricity generation activities.

The proposed benefits of the WWF are documented in section 4.2 of this AEE and include contributing towards the Government's national target of 90% of New Zealand's electricity being generated from renewable sources by 2025, and displacing up to 337,412 tonnes of greenhouse gas emissions per year (depending on which fuel it displaces).

The development of the WWF is also considered to be consistent with clause (c) of Policy B, which notes that meeting or exceeding the Government's strategic target for the generation of electricity from renewable resource will require the *"significant development"* of renewable electricity generation activities.

Policy C1 of the NPSREG recognises the practical and locational constraints associated with the development of renewable electricity generation activities. Section 3.2 of this AEE has identified that there are a number of factors that influence the identification of a site as being suitable for the development of a wind farm – not least being the quality and consistency of the wind resource at the site. As such, it needs to be recognised that potentially suitable sites for wind farms in the South Taranaki District are reasonably limited. This policy is also considered to build upon Objective 6 and Policy 6 of the NZCPS, which identify that:

- Some uses and developments can only be located on the coast for functional reasons; and
- The coastal environment contains renewable energy resources of significant value which need to be taken into account by decision-makers.

With respect to Policy C2, it seeks that decision-makers have regard to any offsetting measures or environmental compensation when considering any residual environmental effects associated with renewable electricity generation activities that cannot be avoided, remedied or mitigated. The *"National Policy Statement for Renewable Electricity Generation – Implementation Guidance"* by the Ministry for the Environment notes that it is up to the applicant for renewable electricity generation activity to volunteer the offsetting or compensation measure.

While appropriate consideration and effort has gone into avoiding, remedying or mitigating the potential adverse effects of the WWF, Trustpower is proposing some environmental compensation measures in order to enable positive environmental outcomes at, and around, the project site. These measures include various enhancement initiatives around the waterbodies, wetlands and dunes. These are discussed in detail in section 4 of this AEE. In addition, Trustpower is proposing to:

- Contribute resources to existing management or research programmes designed to benefit New Zealand pied oystercatchers and pied stilts as compensation for the very small amount of predicted mortality of these species; and

- Contribute to conservation management at a local site or sites that provide breeding or foraging habitat for water birds (especially little shag and little black shag) to mitigate for the loss of the three ponds within the project envelope. The aim would be to maintain or enhance that habitat and / or the breeding success of shags and other water birds.

These measures are considered to be environmental compensation which should be given regard to by decision-makers considering these resource consent applications in accordance with Policy C2 of the NPSREG.

In light of all of the matters identified above, the development of the WWF will be consistent with the stated objective and policy directives of the NPSREG.

5.2.4 Taranaki Regional Policy Statement

The RPS provides an overview of the resource management issues of significance to the Taranaki Region and the policies and methods to be adopted to address those issues. The ‘second generation’ version of the RPS became operative in 2009.

The objectives and policies in the RPS cover a broad range of topics that are relevant to the WWF. These include the management of the natural character of the coastal environment, indigenous biodiversity, amenity values, water quality, soil erosion, heritage, cultural values and energy. It is noted that the RPS was prepared prior to the NZCPS, NPSFWM and NPSREG coming into effect.

The RPS identifies the project site and the transmission line route as having the following values / features:

- The Whenuakura River is identified as having high recreational value for whitebaiting;

- The Whenuakura Estuary and the Waipipi Dunelands are identified as coastal areas of local or regional significance; and

- Pid’s Point is identified as a high quality or high value surf break.

The key themes in the RPS are set out as follows.

5.2.4.1 Land and Soil

AER Objective 1 and AER Policies 1 and 2 seek to maintain and enhance the soil resource through the sustainable use and development of land and soil resources. In particular, the RPS seeks that land management practices avoid, remedy or mitigate the adverse effects of activities on soil disturbance and erosion.

The geological and ground conditions of the project site are discussed in section 2.2 of this AEE, which generally describes the project site as having relatively sandy soils that are potentially erodible. In order to mitigate potential adverse effects on the land and soil resources of the project site, Trustpower is proposing to develop and implement an ECMP which will document a range of sediment and erosion control measures to be employed on site. Many of these measures are also detailed in section 4.7 of this AEE.

Furthermore, disturbed areas will be progressively rehabilitated following the completion of construction of the WWF such that only a small area of the project envelope will be occupied by turbines and the internal access road network once the WWF is operational. As such, it considered that the WWF will suitably maintain the land and soil resource of the project site.

5.2.4.2 Hazardous Substances

HZC Objective 1 and HZC Policy 2 relate to the avoidance, remediation or mitigation of adverse effects arising from the storage, use, transportation and disposal of hazardous substances.

Details on the measures proposed by Trustpower to avoid, remedy or mitigate potential effects associated with the storage and use of hazardous substances during the construction and operation of the WWF (including the transmission line) are detailed in section 4.18 of this AEE. The proposed measures include the utilisation of a central and bunded refuelling station within the project envelope and the development / adoption of a SCMP to manage the potential risk of spill events.

The above measures will suitably manage any potential risks associated with the storage and use of hazardous substances during construction and operation of the WWF in accordance with HZC Objective 1 and HZC Policy 2.

5.2.4.3 Water Quality

WQU Objective 1 seeks to maintain and enhance surface water quality by avoiding, remedying or mitigating any adverse effects from point source and diffuse discharges to water. In addition, WQU Policies 1, 5 and 6 focus on using disposal practices to manage discharges and improving biological health and water quality where life-supporting capacity is being threatened (including via the restoration of riparian planting).

Whilst these provisions were developed prior to the NPSFWM, they still generally reflect the requirements in the NPSFWM related to water quality. As such, the analysis in section 5.2.2.1 above is considered to equally apply to WQU Objective 1 and WQU Policies 1, 5 and 6 of the RPS.

Discharges of stormwater to the Waipipi Stream and its tributaries will also be managed such that settlement and treatment occurs before any discharge of stormwater to water occurs. Measures to ensure this outcome are detailed in the draft ECMP for the construction of the WWF attached as **Appendix Nineteen** to this AEE.

5.2.4.4 Wetlands

WET Objective 1 and WET Policies 1 and 2 are relevant to the WWF as they seek to protect the natural character of wetlands from inappropriate development and enhance / create wetland areas where appropriate.

The management of the wetland values within the project site has been detailed in sections 5.2.2.1 and 5.2.2.2 in relation to the objectives and policies of the NPSFWM. In summary, wetland values within the project site will be protected via their inclusion in the EBZ. Furthermore, Trustpower is proposing to fence off the wetlands within the south-east corner of the project site from stock and infill the drains in this area - such that enhanced wetland values are expected in the long term as a result of the WWF.

5.2.4.5 Beds of Rivers

RBL Objective 1 provides for the appropriate use of and disturbance within river and lake beds in the Taranaki Region, while avoiding, mitigating or remedying any adverse effects of such activities. The related policies to RBL Objective 1 primarily seek that adverse effects on natural character, amenity, biodiversity and fishery values be avoided, remedied or mitigated.

In order to construct the internal access road network it will be necessary to establish culverts within Waipipi Stream and its tributaries. The construction of these works will require temporary damming and diversion works within the waterbodies. Ryder (2016) identifies that these waterbodies are degraded due to historic and existing land use practices on the site.

Trustpower recognises that works in the bed of the Waipipi Stream could cause potential adverse effects associated with sedimentation, erosion, contaminant discharges or the disruption of fish passage. However, potential adverse effects will be avoided or mitigated by adopting the relevant guidelines from the TRC and Auckland Council for earthworks and stream crossings. In this regard, all of the culvert structures will enable fish passage and include appropriate erosion protection measures along the inlets and outlets to minimise the potential for bed erosion.

In light of the above, the proposed culverts and temporary instream works necessary to construct the WWF are considered appropriate and any potential adverse effects will be appropriately avoided, remedied or mitigated via the measures proposed in Riley – Civil (2016) and Ryder (2016).

5.2.4.6 Effects of Climate Change

CCH Objective 1 and CHC Policy 1 seek to avoid or mitigate adverse effects on the environment arising from climate change. The measures promoted in CHC Policy 1 include recognising and providing for development of infrastructure that takes into account the potential effects of rising sea levels and more variable / extreme weather patterns.

Section 4.17 of this AEE has considered the potential climate change effects associated with the use of a coastal site for the development of a wind farm. In particular, this section notes that the relevant Ministry for the Environment guidelines with respect to planning for climate change and sea level rise recommend allowance for a rise in sea level of 0.5 m by 2100, and that the consequences of a rise of 0.8 m relative to the 1980 to 1999 average sea level should be examined.

It is noted that in section 4.17 of this AEE, that coastal retreat would not impact on the WWF at least through to 2115 and that coastal flooding is not an issue within the project envelope. As such, it is considered that appropriate recognition has been given to ensuring that potential climate change effects will be avoided through the life of the WWF.

5.2.4.7 Natural Character of the Coastal Environment

The RPS includes a number of provisions related to the management of the natural character of the coastal environment. Objectives CNC 1 and CNC 2 seek the protection of the coastal environment from inappropriate development and the provision for appropriate development within the coastal environment respectively. Objective CNC 1 goes on to note that natural character will be protected by the avoidance, remediation or mitigation of adverse effects.

Policy CNC 1 identifies the matters / values to be considered in determining the natural character of the coastal environment, whilst Policy CNC 2 identifies the matters to be considered when considering whether a proposed development is appropriate or not. The listed matters in Policy CNC 2 include:

- The degree and significance of potential adverse effects on the natural character of the coastal environment;
- The relationship of tangata whenua with the coastal environment
- The need for the development to occur in the coastal environment;
- The degree of existing modification of the natural character of the coastal environment;
- The degree to which the development will disrupt natural processes or will be threatened by natural hazards (particularly coastal erosion);
- The degree to which financial contributions associated with any development can be used to offset potential unavoidable adverse effects; and
- The benefits to be derived from the use and development of renewable energy sources, including national, regional and local benefits.

With respect to the guidance provided by CNC Policy 2, Isthmus (2016) concludes that there will be no direct effects on biophysical aspects of natural character of any significance. With respect to the experiential aspects of natural character, Isthmus (2016) considers that there will be adverse visual effects on the perception of natural character because the turbines will be a prominent backdrop to views inland from the coast and dunes. Such effects will be mitigated by the fact that the turbines will be setback inland of the dunes, which will also increase the perspective depth in views from this area and help increase the perception of separation between the coast and the WWF. The effects of the turbines on natural character are also reversible.

This matter is detailed further in section 4.3 of this AEE and Isthmus (2016).

Furthermore, and as discussed in detail in section 5.2.1.3 of this AEE, the project site is not considered to be an area of outstanding natural character based on the detailed

assessments provided by Isthmus (2016) and Brown (2015) – despite the preliminary mapping in the Proposed Plan. .

The degree to which the WWF could be affected by natural hazards is detailed in section 4.17 of this AEE. Overall, it is concluded that the project site is not susceptible to coastal erosion from climate change and sea-level rise over at least a one-hundred year period. Any potential inundation form coastal flooding will either occur seaward of the project site or in areas within the EBZ.

Finally, it is noted that Policy CNC 2 acknowledges the need for development to occur in the coastal environment and the potential benefits to be derived from the use of renewable energy resources in the coastal environment. Section 3.2 of this AEE discusses the rationale for Trustpower selecting the project site, while section 4.2 documents the potential benefits of the WWF. Overall, it is considered that the WWF will provide significant social and economic benefits to the wider community through the generation of renewable energy.

In light of the above, it is considered that the WWF is an appropriate development in the coastal environment in accordance with the guidance framework established via Policy CNC 2 of the RPS.

5.2.4.8 Indigenous Biodiversity

The RPS also contains several provisions related to the maintenance of indigenous biodiversity in the Taranaki Region. In particular, BIO Objective 1 and BIO Policies 1 – 5 aim to maintain and enhance indigenous habitats and ecosystems, protect significant indigenous biodiversity values, and avoid, remedy or mitigate adverse effects as far as practicable.

These matters have already been addressed in detail in section 5.2.1.2 above with respect to the NZCPS. As such, this analysis is also considered to apply to the application of BIO Objective 1 and BIO Policies 1 – 5 of the RPS to the WWF.

5.2.4.9 Natural Features and Landscapes

NFL Objective 1 of the RPS seeks to protect outstanding natural features and landscapes from inappropriate development, and the appropriate management of other areas of value to the Taranaki Region. NFL Policy 1 largely repeats the objective but goes on to identify a number of features that should be protected. These include the raised marine terrace of South Taranaki.

Section 2.4.3.4 of this AEE has already discussed the application of the *"raised marine terraces of South Taranaki"* in NFL Policy 1 to the project site. In this regard, Isthmus (2016) comments that NFL Policy 1 appears to list types of landscapes characteristic of the Taranaki Region and indicate that outstanding natural features or landscapes would constitute examples of such features or landscapes that had outstanding scenic and landscape qualities. It is noted that this interpretation is reinforced by the introduction to section 10 of the RPS, which refers to *"parts of the coastline and cliffs of north and south Taranaki…"* rather than to the marine terraces as a whole.

In light of the above, it is not considered that the development of the WWF will adversely affect the protection of any outstanding natural features or landscapes identified in the RPS.

5.2.4.10 Historic Heritage

HIS Objective 1 and HIS Policy 1 seek the protection of historic heritage values from inappropriate development and the maintenance or enhancement of those where practicable.

An assessment of the potential effects of the WWF and the transmission line is provided in section 4.12 of this AEE. Overall, Heritage Solutions (2016) concludes that the probability of an archaeological or heritage site being disturbed during the construction of the WWF is low due to the previous iron sand mining operations that occurred on site. Furthermore, the configuration of the project envelope has been designed to avoid the unmodified dunes along the coastal and river edges.

Trustpower is, however, proposing that an archaeologist monitor the construction of key phases of the WWF and that appropriate protocols be established in the event of the accidental discovery of archaeological, heritage or cultural sites.

In light of these matters, it is concluded that appropriate provision has been made to provide for the protection of historic heritage in accordance with HIS Objective 1 and HIS Policy 1 of the RPS.

5.2.4.11 Amenity Values

AMY Objective 1 seeks to recognise the positive contributions of appropriate development in terms of providing for the maintenance and enhancement of amenity values, whilst also avoiding, remedying or mitigating the adverse effects of inappropriate development on amenity values. AMY Policy 1 is more self-explanatory with respect to its intentions. It seeks that the adverse effects of resource use and development on rural and urban amenity be avoided, remedied or mitigated. It also notes the following qualities and characteristics, amongst others, that contribute to amenity values:

- Safe and pleasant living environment free of nuisance arising from excessive noise, odours and contaminants, and from traffic and other risks to public health and safety;

- Scenic, aesthetic, recreational and educational opportunities provided by parks, reserves, farmland, and other open spaces, rivers, lakes, wetlands and their margins, coastal areas and areas of vegetation; and

- Aesthetically pleasing building design, including appropriate landscaping and signs.

The construction, operation and maintenance of a development of the scale of the WWF may have impacts on amenity values related to the enjoyment of natural character values, visual effects for the surrounding community, construction and operational noise effects, the enjoyment and utilisation of recreational areas, construction traffic on local roads, and other potential construction related activities (i.e. dust emissions).

All of these matters have been thoroughly assessed in section 4 of this AEE and the various technical assessments to this AEE. Whilst considerable effort has gone into designing the WWF and transmission line route to avoid the potential for disturbance to the amenity enjoyed by individuals and the local community, there will be some changes in amenity for some individuals. Some amenity effects will be temporary (i.e. during the construction of the WWF), whilst others will exist for the duration of the project (i.e. visual effects).

That said, Trustpower is seeking to mitigate or minimise potential amenity effects on individuals and the local communities through the establishment of appropriate setbacks from existing / consented dwellings, the establishment of riparian planting and stream fencing, the control of shadow flicker, compliance with appropriate New Zealand standards related to noise (including monitoring), and a range of other resource consent conditions – as set out in **Appendix Fourteen**.

As such, it is considered that appropriate regard has been given to avoiding, remedying and mitigating the effects of the WWF and the transmission line on rural and urban amenity.

5.2.4.12 Energy

The RPS includes a number of objectives which seeks to promote the development production, transmission and distribution of energy and, in particular, the use of renewable energy - provided that adverse effects on the environment are avoided, remedied or mitigated.

The WWF will clearly promote the production of energy from renewable energy sources so will be consistent with the relevant elements of ENE Objective 1 and 2 of the RPS. With respect to the avoidance, remediation or mitigation of adverse effects on the environment, Trustpower has put considerable effort into avoiding potential environmental effects associated through the development of the EBZ and the alignment of the transmission line route.

Furthermore, section 4 and **Appendix Fourteen** of this AEE provide details on the measures proposed to avoid, remedy or mitigate the potential environmental effects of the WWF and the transmission line.

5.2.4.13 Maori Culture and the Treaty of Waitangi

The RPS also includes a range of objectives and policies related to the resource management issues of significance to tangata whenua. These objectives and policies relate to taking into account the principles of the Treaty of Waitangi, the provision for iwi to exercise kaitiakitanga, and protection of wahi tapu and other taonga.

It is acknowledged that the Whenuakura River is identified as a statutory acknowledgement area in recognition of Ngaa Rauru and Ngati Ruanui's cultural, spiritual, historical and traditional associations with the river.

These matters have already been addressed in detail in section 5.2.1.4 above with respect to the NZCPS. As such, this analysis is also considered to apply to the application of the objectives and policies in the RPS concerning the resource management issues of significance to tangata whenua.

5.2.4.14 Summary

There are a series of competing tensions within the objectives and policies of the RPS with respect to the utilisation of natural and physical resources for social and economic wellbeing, and the protection or maintenance of natural character, landscape, amenity, indigenous biodiversity and cultural values. That said, many of the policies related to the

management of natural resources simply seek the protection or maintenance of such values via the avoidance, remediation or mitigation of adverse effects.

Overall, it is considered that the development of the WWF will be consistent with the objectives and policies of the RPS seeking to enable resource use and regionally / nationally significant infrastructure. With respect to the protection of natural resource values, it is considered that the project will be generally consistent with the relevant provisions – particularly in light of the focus in the provisions on the avoidance, remediation or mitigation of adverse effects.

The various measures proposed by Trustpower to avoid, remedy or mitigate the adverse effects of the WWF and the transmission line are extensively detailed in section 4 and **Appendix Fourteen** of this AEE.

5.2.5 Taranaki Regional Freshwater Plan

The Freshwater Plan has been prepared by the TRC to promote the sustainable management of the freshwater resources of the Taranaki Region. One of the main objectives (6.2.1) of the Freshwater Plan is to maintain and enhance the quality of the surface water resources of Taranaki by avoiding, remedying or mitigating the adverse effects of contaminants discharged to land and water from point-sources.

As with the NPSFWM and the RPS, the Freshwater Plan is relevant to the WWF given that the construction works will involve the discharge of stormwater, sediment and other contaminants to land which may enter ground or surface water resources. In addition, the construction of the WWF requires the taking of groundwater and surface water for various purposes.

A discussion on the objectives and policies in the FWP relevant to the WWF is provided in sections 5.2.5.1 to 5.2.5.8 below

5.2.5.1 Natural Character, Ecology and Amenity Values

Objectives 3.1.2 to 3.1.5 and Policies 3.1.2 and 3.1.6 of the Freshwater Plan seek to protect, safeguard or maintain and enhance the natural, ecological and amenity values of the rivers, lakes and wetlands of the Taranaki Region.

As already noted in relation to the analysis of the objectives and policies in the NPSFWM and RPS, it is considered that the construction of the WWF will protect, safeguard or maintain the natural character, ecological and amenity values of streams and wetlands within the project site. This will be achieved through the inclusion of the Waipipi Stream and wetlands within the EBZ, the use of best practice guidance for the management of stormwater and sediment run-off during construction, and the enhancement measures proposed along the Waipipi Stream and key wetland features within the project site.

As such, it is considered that the WWF will be consistent with the direction provided by Objectives 3.1.2 to 3.1.5 and Policies 3.1.2 and 3.1.6 of the Freshwater Plan.

5.2.5.2 Public Access

Objective 3.2.1 seeks to maintain and enhance public access to and along rivers, lakes and wetlands. In addition, Policy 3.2.3 seeks to improve the ability of the public to reach and use rivers and lakes in circumstances where access is limited.

No formal public access to the Whenuakura River is provided via the project site. While some people have informal access through the project site at the discretion of one of the project site landowners, this access location is still 5 km from the mouth of the Whenuakura River. As such, it is not considered that temporary restrictions on access through the project site during the construction of the WWF will have any material impact on the maintenance of public access to lake and rivers within the Taranaki Region generally.

With respect to the wetland values within the project site, these are located on private farmland. Whilst some of the wetlands within the project site will be enhanced as part of the construction of the WWF, Trustpower does not have any responsibility for enabling public access to these wetlands as part of its development.

5.2.5.3 Tangata Whenua Values

Objective 4.1.1 and Policy 4.1.1 of the Freshwater Plan seek to recognise and provide for the relationship and values of tangata whenua with water and to protect wahi tapu and other sites of cultural significance associated with water.

Given that these provisions seek similar outcomes to those set out in the NPSFWM and the RPS, it is considered that the analysis in sections 5.2.2.3 and 5.2.4.3 applies equally to the Freshwater Plan.

5.2.5.4 Use and Development of Fresh Water

Objective 5.1.1 of the Freshwater Plan seeks to enable people and communities to use and develop fresh water resource and the beds of lakes and rivers for their social and economic wellbeing.

The construction activities associated with the WWF will comply with this approach as the take and use of water for dust suppression and the establishment of culverts in the Waipipi Stream and its tributaries are necessary elements to enable the efficient and effective development of the site.

5.2.5.5 Discharges

Objective 6.2.1 and Policies 6.2.1, 6.2.2 and 6.2.4 all relate to the management of the adverse effects of discharges of contaminants to land and / or surface waterbodies. In particular, these provisions focus on the adverse effects of discharges being avoided, remedied or mitigated and the adoption of the best practicable options to prevent or minimise discharge effects.

As acknowledged in 4.7 of this AEE, the potential effects associated with the discharge of stormwater and sediment during the construction of the WWF will be managed in accordance with an ECMP (**Appendix Nineteen**) and the TRC's *"Guidelines for Earthworks in the Taranaki Region, 2006"*. These measures will ensure that all potential discharges appropriately avoid, remedy or mitigate potential effects on surface waterbodies and that the best practicable options are employed. The ECMP will also be submitted to the TRC for certification before construction of the WWF commences.

All other wastewater and contaminant discharges associated with the construction of the WWF are a permitted activities in accordance with the rules in section 7 of the Freshwater Plan.

5.2.5.7 Effects on Wetlands

Objective 6.8.1 provides for the protection of wetlands from inappropriate use and development, whilst Objective 6.8.2 seeks the avoidance, remediation or mitigation of the adverse effects of appropriate use and development. As all wetlands within the project site will be incorporated within the EBZ it is considered that any potential adverse effects will be avoided. Therefore, the construction of the WWF will be consistent with the outcomes sought by Objectives 6.8.1 and 6.8.2.

5.2.5.8 Summary

Based on the analysis above, the development of the WWF will be consistent with the relevant objectives and policies of the Freshwater Plan. In this respect, the management of potential stormwater and sediment run-off during construction of the WWF will occur in accordance with the relevant guidelines published by the TRC.

Furthermore, the taking and use of groundwater and surface water during the construction of the WWF will not impact on the life-supporting capacity or the ecosystem processes of freshwater.

5.2.6 Taranaki Regional Air Quality Plan

The Air Plan has been prepared by TRC to promote the sustainable management of the air resource of the Taranaki Region. The Air Plan is relevant to the WWF given that the construction of the WWF will involve the operation of a temporary concrete batching plant, portable diesel generating units, and the potential discharge of dust / particulate to air during earthworks.

Objective 1 of the Air Plan seeks to maintain the existing air quality of the Taranaki Region, while Objective 3 aims to provide for those activities that require the discharge of contaminants to air. In addition, Objective 4 and Policies 1.1, 2.3, 2.7, 3.2, 4.1, and 6.1 all seek to avoid remedy or mitigate the effects of air discharges from a range of activities using the best practicable options.

As noted in section 5.1.5 of this AEE, the discharge of contaminants to air associated with the operation of the concrete batching plant and the use of portable diesel generator units is a permitted activity in accordance with the rules in the Air Plan. As such, it is considered that these activities comply with the identified objectives and policies.

In terms of the discharge of dust / particulates to air during earthworks, section 4.18.1 of this AEE details the measures to be adopted by Trustpower in the event that dust generation on site becomes problematic. The most notable measure to be employed will be the use of water trucks to keep the internal access road network damp during construction. In addition, a DMP will be submitted to the TRC for certification prior to any construction works beginning on site.

In light of the above, the various discharges to air associated with the construction of the WWF will be consistent with the relevant objectives and policies of the Air Plan.

5.2.7 Taranaki Regional Soil Plan

The Soil Plan has been prepared by the TRC in order to promote soil conservation in the Taranaki Region. The only matter of relevance to the WWF in the Soil Plan is the issue of accelerated soil erosion.

Objective 1 of the Soil Plan seeks to maintain and enhance the soil resources of the Taranaki Region by avoiding, remedying or mitigating accelerated erosion. Policies 1 - 3 encourage sustainable and appropriate land management practices on erosion-prone land. The Soil Plan also identifies two types of landforms as occurring within the project site - coastal terraces and coastal sand country. Areas of coastal sand country are recognised as experiencing accelerated erosion problems.

As noted in section 5.2.4 above, Trustpower is proposing to develop and implement an ECMP (**Appendix Nineteen**) which will document a range of sediment and erosion control measures to be employed in order to mitigate potential adverse effects on land and soil resources. In addition, disturbed areas will be progressively rehabilitated following the completion of construction works.

In light of the above, the construction of the WWF will be consistent with the objectives and policies of the Soil Plan.

5.2.8 Regional Coastal Plan for Taranaki

The preface to the Coastal Plan states that its purpose is to promote the sustainable management of natural and physical resources in relation to the CMA. The Coastal Plan was made operative by the TRC in 1997.

Whilst the project site is not located within the CMA, and does not require any resource consents under the Coastal Plan, it is noted that some of the objectives and policies in the plan do apply to the coastal environment generally. In this regard, Objective 3a of the Coastal Plan seeks to maintain and enhance the natural character and amenity values of the coastal environment. This approach contrasts with the management expectations now set out in the NZCPS and, to a lesser extent, the RPS.

Objective 4 of the Coastal Plan also seeks to protect those areas within the CMA with significant conservation values from the adverse effects or use or development. Policy 4.1 goes on to acknowledge that the Whenuakura Estuary is an area of "*outstanding coastal value*" and that that priority should be given to avoiding adverse effects on this area. The policy notes that the Whenuakura Estuary has the following outstanding coastal values:

- Relatively unmodified estuary;
- Habitat of threatened caspian tern and rare variable oyster catcher;
- Part of route for migratory birds; and
- Whitebait spawning on northern bank.

The potential effects of the WWF on the natural character of the coastal environment and terrestrial / avian ecology are addressed in sections 4.3, 4.5 and 4.6 of this AEE, and have also been considered with respect in relation to the provisions of the NZCPS

in section 5.2.1 above. The analysis in these sections is also considered applicable to the provisions of the Coastal Plan.

5.2.9 South Taranaki District Plan

The District Plan contains a suite of objectives and policies that are potentially relevant to the WWF and transmission line in light of it being situated within the Rural Zone and the coastal protection area overlay.

The objectives and policies of potential relevance to the WWF are discussed in Section 5.2.9.1 to 5.2.9.14 below.

5.2.9.1 Land Resource

Objective 1 and Policies 1(a) and 1(b) seek the protection of land and soils in a manner that does not restrict the ability of future generations to use the land. In addition, there is a focus on avoiding, remedying or mitigating the potential effects of accelerated soil erosion on land and soil resources.

The development of the WWF will not restrict the potential use of the land and soil resources of the project site for future generations. In this regard, the WWF will have a limited footprint once it is operational and existing farming practices will be able to continue with little disturbance from the wind farm.

In terms of the avoidance, remediation or mitigation of potential adverse effects of accelerated soil erosion, the approach adopted in the District Plan is similar to that set out in the RPS and the Soil Plan. As such, the analysis and commentary provided in section 5.2.4 and 5.2.7 of the AEE also applies with respect to Objective 1 and Policies 1(a) and (b) of the District Plan.

5.2.9.2 Riparian Management and Surface of Water

Objective 2 of the District Plan aims to preserve the natural character of riparian margins and their protection from inappropriate use development. Related to this objective, Policies 2(a), 2(c) and 2(d) seek to manage the effects of land uses on freshwater resources and enhance riparian margins and the natural functioning of waterbodies.

As noted in section 2 of this AEE, the natural character and ecological values of the waterbodies within the project site have been degraded by previous and existing land use activities on the site. However, Trustpower is proposing to enhance the overall values of the waterbodies within the project site by fencing them off from stock and implementing riparian planting along stream margins. As such, it is considered that the development of the WWF will enable the enhancement of the natural character values of the waterbodies within the project site over time.

Furthermore, and as discussed in section 4.7 of this AEE, appropriate measures will be implemented via the ECMP (**Appendix Nineteen**) to ensure that the potential effects of earthworks on waterbodies within the project site are appropriately mitigated and that the natural functioning of waterbodies is able to continue. In addition, and as noted in section 3.6.4 of this AEE, consideration has already been given to the appropriate size for culverts in Waipipi Stream and its tributaries so that they are able to suitably pass freshes and floods.

5.2.9.3 Tangata Whenua

Objectives 3.1 and 3.2 of the District Plan seek to enable the exercise of kaitiakitanga by tangata whenua and recognise and implement the principles of the Treaty of Waitangi. These objectives are supported by Policies 3(b), 3(d) and 3(e) of the District Plan which promote consultation between resource consent applicants and tangata whenua, and the recognition and protection of wahi tapu and other cultural values of significance.

The District Plan also identifies the Whenuakura River as a statutory acknowledgement area in favour of Ngati Ruanui and Ngaa Rauru.

As noted in section 4.13 of this AEE, Trustpower has been engaging with Ngaa Rauru regarding the WWF since late 2010. It has been agreed by Trustpower and Ngaa Rauru that an updated CIA should be prepared and that provision be made for hui with the local hapu on the CIA to ensure it accurately represents their views on the WWF. This process is currently underway.

Ngaa Rauru have advised that matters raised during its discussions with the local hapu to date included:

- Water usage during construction;
- The decommissioning process and land use opportunities post any decommissioning;
- Effects of shadow flicker on people with epilepsy;
- Driver distraction;
- Noise effects; and
- Opportunities for employment.

Additional information addressing the above matters has been provided to Nga Rauru and is also discussed in this AEE. Trustpower is continuing to consult with Nga Rauru through the consenting process.

Based on the matters identified by Ngaa Rauru hapu to date, and the fact that potential archaeological effects during construction will be managed and extensive ecological rehabilitation measures will be undertaken within the project site, it is considered that the construction, operation and maintenance of the WWF and the transmission line should be able to be undertaken in a manner that suitably addresses any potential adverse effects on the relationship of Ngaa Rauru with the project site.

In addition, there may be other opportunities available that contribute to Ngaa Rauru's role as kaitiaki of the environment (e.g. involvement in rehabilitation works or site monitoring).

5.2.9.4 Coastal Environment

Objective 4 and Policies 4(c), 4(e) and 4(f) all relate to the management of the coastal environment. Objective 4 seeks the preservation of the natural character, ecosystems and historic heritage of the coastal environment, whilst the policies relate to public

access, coastal hazards and the restoration of the natural character of the coastal environment.

These matters have already been considered in detail in relation to the NZCPS. As such, the commentary and analysis provided in section 5.2.1 of this AEE equally applies to Objective 4 and Policies 4(c), 4(e) and (f) of the District Plan.

In addition to the above, it is noted that the project site and part of the transmission line route is located within the coastal protection area overlay in the District Plan. The coastal protection area is an area of land identified as "*representing the extent of the coastal environment*" and being "*particularly susceptible to damage from the adverse effects of activities*".[43] It is also the area most affected by natural coastal processes including erosion to coastal cliffs. The District Plan goes on to note that the coastal environment is a "*high energy wave and wind environment*" and that additional protection will be given to the natural character of the coast.[44]

Also of particular relevance to the WWF is Policy 4(h), which recognises that utilities may require a coastal location but that these activities should have special regard to the sensitivity of the coastal environment. In effect, the policy accepts that utilities like wind farms may require a coastal location due to the high energy wind environment available, but that suitable consideration needs to be given to the sensitivity of the receiving environment and suitable measures to avoid, remedy or mitigate potential adverse effects.

5.2.9.5 Environmental Quality

Objectives 5 and 5.1 of the District Plan seek to maintain and improve the environment around residential dwellings people's houses / farms, as well as the social and cultural wellbeing of people and communities in the South Taranaki District. The related policies seek to control the noise emissions to an acceptable level and recognise the role of public open space and natural areas in maintaining amenity values.

Detailed assessments of potential noise, traffic, visual amenity and shadow flicker effects have been commissioned by Trustpower and are summarised in section 4 of this AEE. Overall, these assessments demonstrate that whilst considerable effort has gone into designing the WWF and transmission line corridor in a manner that will minimise the potential for disturbance to the amenity enjoyed by individuals and the local community, it is inevitable that there will be some loss of amenity for some individuals close to the WWF.

Trustpower is, however, seeking to mitigate or minimise potential effects on amenity values / the quality of the environment, including through the establishment of appropriate setbacks from existing dwellings, the management of traffic effects, the control of shadow flicker, and designing the WWF to comply with NZS6808:2010 *Acoustics – Wind Farm Noise*. These mitigation measures are intended to be secured via the resource consent conditions proffered in **Appendix Fourteen** to this AEE.

5.2.9.6 Infrastructure

Objectives 6 and 6.1 and Policy 6(f) support the development of infrastructure within the South Taranaki District, but also seek that the potential adverse effects of such activities

---

43 Page 14 of Section 2 of the District Plan.

44 Page 14 of Section 2 of the District Plan.

on residents and the environment be avoided, remedied or mitigated in a manner that balances environmental requirements and individual rights with community needs.

As discussed in section 3 and 4.2 of this AEE, the WWF will provide significant local, regional and national benefits. In addition, sections 3.2 and 5.2.3 of this AEE have documented that the identification of suitable sites for the development of commercially viable wind farms is constrained by a number of technical, logistical and regulatory factors. Therefore, it is not possible to simply develop alternative sites that will avoid all adverse effects on local residents and the environment.

Sections 3 and 4 of this AEE do, however, discuss the design refinements that have been made to the WWF and the transmission line route in order to avoid potential adverse effects on local residents and the environment as far as practicable. Likewise, the measures proposed to mitigate potential effects on the environment are detailed throughout section 4 of this AEE and within the consent conditions in **Appendix Fourteen**.

While the adverse effects associated with the WWF and transmission line cannot be completely avoided, remedied or mitigated to the extent that there are no residual adverse effects, it is considered that considerable effort and attention has been made by Trustpower to address potential effects – including through the use of the EBZ.

5.2.9.7 Natural Hazards

Objectives 7 and Policy 7(e) seek to identify the risks of natural hazards and to enable the adverse effects on the environment from those hazards to be avoided or mitigated. These provisions include reference to control the location of buildings on land prone to flooding or other natural hazards.

The main potential hazard at the project site comes from the coast. In this regard, climate change and sea level rise could potentially lead to coastal flooding or inundation. However, section 4.17 of this AEE notes that the assessment by Shore Processes (2016) notes that coastal retreat will not impact on the site over a period of at least 100 years and that coastal flooding is not considered a hazard to the WWF. As such, it is considered that appropriate recognition has been given to ensuring that potential climate change effects will be avoided through the life of the WWF.

5.2.9.8 Outstanding Natural Features and Landscapes

Objective 9 and Policies 9(a), 9(b) and 9(c) seek to protect, identify and enhance outstanding natural features and landscapes in the South Taranaki District.

The project site is not identified as an outstanding natural feature or landscape in the District Plan or in Isthmus (2016). The only potential outstanding natural feature within the vicinity of the project site identified by Isthmus (2016) is the cliffs at Waverley Beach.

While the WWF will be visible from Waverley Beach, Isthmus (2016) notes that it will not compromise the landscape values of the cliffs. From places in the vicinity of the cliffs with line of sight to the WWF, it will be reasonably distant and appear quite separate and part of the background landscape. As such, the development of the WWF will not impact upon the resource management outcomes sought by Objective 9 and Policies 9(a), 9(b) and 9(c) of the District Plan.

5.2.9.10 Heritage Values

Objective 10 of the District Plan seeks to recognise and protect the heritage values of buildings, objects, areas and historic sites located in the South Taranaki District. The applicable policies seek to enable flexibility in the use of heritage buildings, objects and areas provided the heritage values are not adversely affected.

As noted in section 5.2.4.10 above, a comprehensive assessment of the heritage and archaeological values of the project site is provided in Heritage Solutions (2016). This assessment sought to identify all previously recorded archaeological site, as well as those areas where potentially unrecorded sites may exist. In light of this assessment, all potentially sensitive areas within the project site have been incorporated into the EBZ. The alignment of the transmission line route has also been configured to avoid recorded archaeological sites.

Overall, the likelihood of finding intact archaeological sites within the project envelope is considered to be low given the former iron sand mining operations that occurred across the site.

5.2.9.11 Significant Natural Areas

Objective 12 and Policy 12(a) seek to protect significant areas of indigenous vegetation and significant habitats of indigenous fauna.

Related to these management intentions, the Waipipi Dunes are identified in the District Plan as a significant natural areas. The Waipipi Dunes are partly located within the project site (but outside the project envelope). The District Plan does not contain any information on the ecological values of these areas.

In terms of considering the WWF against Objective 12 and Policy 12(a), all areas considered to be ecologically sensitive within the project site (including the Waipipi Dunes) have been avoided from the project envelope via their incorporation into the EBZ. As such, any areas of significant indigenous vegetation will be protected.

Section 5.2.1.2 of this AEE provides an analysis of potential effects on indigenous fauna, particularly avifauna values. This analysis is considered to equally apply to Objective 12 and Policy 12(a) of the District Plan.

5.2.9.12 Roading, Access and Parking

Objectives 2.08.1(a) and 2.08.1(b) and Policies 2.08.2(a), 2.08.2(e) and 2.08.2(f) aim to achieve the sustainable management of a roading system with safe, efficient and convenient vehicle access, manoeuvring and parking. In addition, recognition is given to the need to appropriately manage heavy traffic movements and providing for the functioning of SH3.

As discussed in section 4.9 of this AEE, TDG (2016) have assessed the potential traffic effects of the WWF and concluded that particular upgrading works to existing roads will be required to facilitate the proposed traffic movements. Upgrade works are required at the SH3 / Peat Road intersection, along Peat Road, and at the site entrance. These upgrade works will be implemented before construction of the WWF commences.

A CTMP will also be prepared, and adhered to, in order to avoid or mitigate potential traffic effects on other road users (particularly users of Peat Road).

Finally, an internal access road network will be designed to ensure safe vehicular access and manoeuvring within the project envelope during construction (noting that the proposed internal access road network will not considered a road as defined in the District Plan).

5.2.9.13 Rural Character

Objective 2.03.01(b) and Policy 2.03.2(b) seek to manage activities in the rural areas of the South Taranaki District to ensure that rural character is protected and any adverse effects on the surrounding environment are avoided, remedied or mitigated.

All potential effects on the rural character of the environment surrounding the project site are addressed in section 4 of this AEE, including construction and operational effects on rural character. The key assessments relate to visual amenity and noise in sections 4.3 and 4.10 of the AEE. In particular, it is noted that the project site is a 'working' landscape characterised by productive rural activities. These existing activities will continue on the site, helping to maintain the underlying rural character.

5.2.9.14 Summary

The District Plan seeks to enable development within the rural and coastal environment of the South Taranaki District, and recognises that some infrastructure may have an operational need to locate in potentially sensitive areas. However, the District Plan also establishes a clear framework that seeks to maintain or protect amenity, natural character, rural character, and cultural values through the avoidance, remediation or mitigation of potential adverse effects.

The District Plan also recognises the importance of managing activities in the coastal protection area given that it represents the extent of the coastal environment and may be susceptible to damage from the adverse effects of activities. However, the extent of the coastal protection area at the project site has been questioned by Isthmus (2016) given it effectively extends to SH3.

In light of the measures that are being undertaken by Trustpower in order to avoid or mitigate the potential effects of the WWF, and the fact that the various objectives and policies do not suggest that the project site is inappropriate for development, it is considered that the WWF can be established in a manner that is broadly consistent with the overall intent of the District Plan.

5.2.10 Proposed South Taranaki District Plan

The Proposed Plan also contains a suite of objectives and policies that relate to the Rural Zone and the coastal protection area overlay which are potentially relevant to the WWF and transmission line.

The objectives and policies of relevance are discussed in Section 5.2.10.1 to 5.2.10.9 below. However, it is noted that the objectives and policies of the Proposed Plan were only notified in late-2015 and have not yet been considered by way of hearing process. Indeed, it is noted that a number of submitters are seeking either the deletion or redrafting of various provisions within the Proposed Plan.

As such, it is considered that limited weight should be placed on the outcomes and direction provided by way of the objectives and policies of the Proposed Plan for the purpose of section 104(1)(b) of the RMA.

5.2.10.1 Rural Zone

Objective 2.1.3 seeks to ensure subdivision, land use and development in the rural environment is of a nature, scale, intensity and location that maintains and enhances rural character and amenity values. The policies that follow this objective provide for the establishment and operation of new non-farming activities which are compatible and / or associated with farming activities in the rural environment, provided they meet minimum environmental standards to avoid, remedy and mitigate adverse effects. This is illustrated by Policies 2.1.8 and 2.1.10 of the District Plan.

These provisions effectively recognise that some non-rural activities, such as infrastructure, may need to locate in the rural environment, but that adverse effects on rural character and amenity values must be managed.

The compatibility of the WWF and the transmission line with the landscape character and amenity values of the surrounding environment are primarily addressed in Isthmus (2016) and Hegley (2016). They are also addressed in sections 5.2.9.5 and 5.2.9.13 with respect to the District Plan. The assessment in these sections is considered to apply equally to the Proposed Plan.

5.2.10.2 Transportation

Objective 2.7.7 seeks to avoid adverse effects on the current and future efficiency, operation, safety and development of state highway and railway infrastructure. In addition, the policies seek to avoid, remedy or mitigate the adverse effects of increased traffic or changed traffic type, and new or changed access and intersections, through the use of standards and controls.

As discussed in section 4.9 of this AEE, TDG (2016) have assessed the potential traffic effects of the WWF and concluded that some upgrade works to existing roads will be required to facilitate the proposed traffic movements. In particular, upgrade works are required at the SH3 / Peat Road intersection, along Peat Road, and at the site entrance. These upgrade works will be implemented before construction of the WWF commences.

A CTMP will also be prepared, and adhered to, in order to avoid or mitigate potential traffic effects on other road users.

Overall, it is considered that the state highway network and local road network will be able to accommodate the loads and number of vehicle movements required to enable the construction of the WWF. In addition, appropriate measures will be employed during the construction of the transmission line in order to ensure that the roading and rail network is not adversely affected (e.g. safety nets).

5.2.10.3 Energy

The key objectives concerning energy largely reflect the direction provided by the NPSREG. In this regard, they seek to recognise the significant benefits from the use and development of renewable energy resources by providing for the investigation, development, operation, maintenance and upgrading of renewable energy activities, and

that the adverse effects of renewable energy activities are avoided, remedied or mitigated - particularly adverse amenity, landscape and traffic effects.

These matters are covered in detail in relation to the analysis of the NPSREG in section 5.2.3 above. However, it is also noted that there is a potential conflict within the underlying policies with respect to renewable electricity generation activities in the coastal protection area. In this regard, Policy 2.9.11 directs that the development of energy resources within the coastal protection area should be 'restricted'. In contrast, Policy 2.9.14 recognises the potential of the available wind resource along the coast in South Taranaki to provide for renewable electricity generation activities – which would presumably include areas within the coastal environment.

Policy 2.9.14 is also considered to be supported by Policy 2.9.17 – which recognises the locational, operational and technical constraints associated with developing large-scale renewable electricity generation activities.

Given the quality of the wind resource close to the coast, it is somewhat unclear what management outcomes the Proposed Plan seeks with respect to the development of renewable electricity generation activities in the coastal environment. In this regard, an approach that seeks to restrict renewable electricity generation activities in the coastal environment may, upon being tested via the hearings process, be considered contrary to the policy direction provided in the NZCPS and NPSREG and section 5 of the RMA.

5.2.10.4 Network Utilities

The objectives and policies regarding network utilities seek to provide for the development of utilities, while ensuring adverse effects on the environment are minimised (or avoided, remedied or mitigated). This is reflected in Objective 2.10.2 and Policies 2.10.4 and 2.10.5 of the Proposed Plan.

The potential effects of the transmission line are considered throughout section 4 of this AEE. Overall, it is considered that any potential effects have been largely avoided by the route selection process undertaken by Trustpower. Any residual visual or construction related effects will be generally acceptable.

5.2.10.5 Historic Heritage

Objective 2.11.2 and 2.11.3 seek the protection of significant historic heritage that reflects the culture and history of the South Taranaki District from inappropriate subdivision, use and development. This includes via the protection of known archaeological sites identified on the planning maps and their historic values from damage, modification and destruction.

The protection of historic heritage is addressed in Heritage Solutions (2016) and in relation to the RPS (section 5.2.4.10). Overall, Heritage Solutions (2016) concludes that the probability of archaeological or heritage sites being disturbed during the construction of the WWF is low. Trustpower is, however, proposing that an archaeologist monitor the construction of key phases of the WWF and that appropriate protocols be established in the event of the accidental discovery of archaeological, heritage or cultural sites. All known archaeological sites have been excluded from the project envelope.

In light of these matters, it is concluded that appropriate provision has been made to provide for the protection of historic heritage in accordance with the relevant provisions in the District Plan.

5.2.10.6 Tangata Whenua

The relevant objectives regarding tangata whenua values in the Proposed Plan seek:

- To recognise and provide for the relationship of tangata whenua and their culture and traditions (including mauri) with land, water, sites and areas of cultural and spiritual significance, wahi tapu and other taonga;

- To protect sites and areas of cultural and spiritual significance to tangata whenua from the adverse effects of inappropriate development; and

- Give effect to the concept of kaitiakitanga as defined by Tangata Whenua of the District in respect of the management of natural and physical resources.

These matters largely reflect the outcomes sought in the District Plan with respect to tangata whenua values. As such, it is considered that the analysis in section 5.2.9.3 above applies equally to the Proposed Plan.

5.2.10.7 Coastal Environment

The key objectives in relation to the coastal environment seek to:

- Preserve the natural character, open space, historical and cultural values of the coastal environment and protect natural features and landscape values from inappropriate subdivision, use and development (Objective 2.15.3);

- Avoid adverse effects on areas within the coastal environment recognised as having outstanding natural character from inappropriate subdivision, use and development (Objective 2.15.4); and

- Maintain and enhance public open space, landscape and amenity values, and recreation opportunities of the coastal environment (Objective 2.15.5).

With respect to the underlying policies, it is noted that Policy 2.15.7 seeks to identify a coastal protection area generally based on the criteria in Policy 1 of the NZCPS. However, the explanatory text states that the coastal protection area is an area of land that essentially covers the length of the South Taranaki coastline and is considered to represent the extent of the coastal environment with high natural character. This explanation is questionable given that the criteria in Policy 2.15.7 are based on the values that define the coastal environment and do not assign a degree of significance. In addition, it is highly unlikely that entire coastline of the South Taranaki District actually exhibits high natural character values.

The remaining policies concerning the coastal environment largely repeat the direction set out in Policy 13 of the NZCPS (i.e. avoiding adverse effects on areas with outstanding natural character). This matter, along with the classification of the coastline of the project site as an area of outstanding natural character, is considered in detail in section 5.2.1.3 above.

5.2.10.8 Indigenous Biodiversity

Objective 2.17.3 and 2.17.4 of the Proposed Plan seek to protect areas of significant indigenous vegetation and significant habitats of indigenous fauna from inappropriate

development, and no net loss of indigenous biodiversity through protection, enhancement and restoration measures.

The underlying policies make no further mention of achieving no net loss of indigenous biodiversity. That is, there is no suggestion in the policies that offsets should be utilised and in what circumstances. Rather, the policies focus on the avoidance, remediation or mitigation of any significant adverse effects of development that would result in a loss of indigenous biodiversity values (although the focus in the coastal protection area is on avoiding significant adverse effects).

The approach being adopted to the management of indigenous biodiversity and the protection of significant ecological areas is addressed in section 5.2.1.2 in relation to the NZCPS. This analysis is considered to equally apply to the NZCPS.

5.2.10.9 Natural Hazards

Objective 2.19.2 seeks that the risks and adverse effects from natural hazards on people, property and the environment are avoided or mitigated. Policy 2.19.9 also proposes to manage the effects of natural hazards caused by long-term shifts in climate and changes in sea-level. In particular, it seeks that climate change predictions are factored into avoidance or mitigation measures.

Potential coastal hazard effects are considered in section 4.17 of this AEE. Overall, it is considered that long-term shifts in climate have been appropriately considered and that coastal hazards associated with sea-level rise will not impact on the WWF throughout its expected life span.

5.2.10.10 Summary

As noted previously, the objectives and policies of the Proposed Plan have not yet been considered by way of hearing process. As such, it is considered that little weight should be placed on the outcomes and direction provided by way of the objectives and policies of the Proposed Plan for the purpose of section 104(1)(b) of the RMA.

It is also noted that the Proposed Plan identifies the coastline adjacent to, and part of, the project site as an area of outstanding natural character. It is considered that this classification should be given limited weight based on the detailed assessments and reviews provided in Isthmus (2016) and Brown (2015). These assessments consider the dunes fail to display the physical cohesion and visual integrity that would be expected for an area of outstanding natural character. As such, the applicability of the provisions concerning the management of outstanding natural character areas to the WWF will be dependent on the final decisions on submissions to the Proposed Plan.

With respect to the remaining objectives and policies of the Proposed Plan, these enable resource use and regionally / nationally significant infrastructure and also focus on the avoidance, remediation or mitigation of adverse effects – with particular focus given to those ecological areas with high values. In light of the approach adopted by Trustpower to the management of environmental effects, including the utilisation of the EBZ and the proffered resource consent conditions (**Appendix Fourteen**), it is considered that the WWF and the transmission line will be developed in a manner that is broadly consistent with the overall intent of the Proposed Plan.

5.3 Conclusion

The construction, operation and maintenance of the WWF and the transmission line require land use consents for discretionary activities from the STDC (as well as under the NES). In addition, a variety of land use consents, water and discharge permits are required from the TRC. The activity status of these resource consent applications ranges from controlled to discretionary.

With respect to the statutory planning framework that applies to the WWF and the transmission line, it is concluded that the development of the project in the manner proposed by Trustpower will not be contrary to the overall management intentions specified in the objectives and policies of the relevant national, regional and district planning documents.

It is also considered that particular attention has been given to designing the WWF and the transmission line route in a manner that appropriately avoids, remedies or mitigates potential adverse effects on the range of natural and physical resource values identified in the relevant statutory planning documents.

Furthermore, it is noted that a number of the objectives and policies in the relevant national, regional and district planning documents recognise the need to develop renewable electricity generation infrastructure and the need for such infrastructure to be located where the resource exists, including within the coastal environment. In this regard, there is clear policy recognition in the statutory planning documents that the development of renewable electricity generation activities is subject to technical, functional and locational constraints that should be considered in determining the appropriateness of a site for development.

6. RESOURCE MANAGEMENT ACT 1991

Section 104 of the RMA outlines the matters that a consent authority must have particular regard to when considering any resource consent application as follows:

> *(a) any actual and potential effects on the environment of allowing the activity; and*
> *(b) any relevant provisions of –*
> *(i) a national policy statement;*
> *(ii) a New Zealand coastal policy statement;*
> *(iii) a regional policy statement or proposed regional policy statement; and*
> *(iv) a plan or proposed plan; and*
> *(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.*

The consideration of the matters listed above is subject to Part 2 of the RMA. As such, sections 6.1 to 6.5 below provide an assessment of the WWF against the relevant matters in Part 2 of the RMA.

Furthermore, sections 6.6 and 6.7 below consider the discharge permit applications required for the WWF against sections 105 and 107 of the RMA.

6.1 Section 5 – Purpose of the RMA

Section 5 of the RMA states that the purpose of the Act is to promote the sustainable management of natural and physical resources. Section 5(2) goes on to state that sustainable management means managing the use, development and protection of natural and physical resources in a manner which enables people and communities to provide for their social, economic and cultural wellbeing, and their health and safety, while:

> *(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
> *(b) Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and*
> *(c) Avoiding, remedying or mitigating any adverse effects of activities on the environment.*

Applying section 5 of the RMA, and the other relevant matters under Part 2 of the Act, can involve the assessment of conflicting considerations - including the positive and adverse effects of a proposed development. In addition, the consideration of the matters in sections 5(2)(a) – (c) can often be informed by the direction provided in the objectives and policies in the relevant statutory planning documents, which have been considered in detail in section 5.2 of this AEE.

The various considerations of section 5 of the RMA are detailed below.

6.1.1 Enabling Communities

The WWF will enable the wind resources available across the project site to be utilised in a manner that will provide for the social and economic wellbeing of people and communities, both within the South Taranaki District and New Zealand as a whole. In this regard, the WWF will contribute towards securing New Zealand's electricity supply by adding additional electricity generation capacity and contributing to the diversity of supply options. The WWF also represents a positive move towards achieving the Government's strategic target of 90% of electricity generated in New Zealand being derived from renewable sources by 2025 (in an average hydrological year).[45]

The location of WWF between Auckland and Wellington will also have a positive effect on the electricity system, as it will be able to despatch electricity to large urban loads to the north and the south - displacing the need to transmit electricity from locations further afield with higher transmission losses.

The construction and commissioning of the WWF will require $325 million of capital expenditure over a 24 month period. This will inject $82 million of expenditure into the Taranaki economy, which will contribute a net $40 million in value-added. The establishment of the WWF will also require a construction workforce of between 80 and 100 people over a period of 24 months.

With respect to the social and economic wellbeing of people and communities adjacent to the WWF and the transmission line, Trustpower has sought to design the WWF and the route of the transmission line such that potential construction and operational effects on the community are minimised as far as practicable. This has included the use of the EBZ to limit the proximity of turbines to existing / consented dwellings, ensuring the WWF is consistent with relevant national and international standards in relation to noise and shadow flicker, and the development of proposed resource consent conditions for the management of effect on local amenity values.

6.1.2 Needs of Future Generations

Section 5(2)(a) of the RMA requires that the use, development and protection of natural and physical resources be managed in a way, or at a rate, which sustains the potential or resources to meet the reasonably foreseeable needs of future generations.

The WWF will primarily sustain natural resources of potential value to the community via the approach to the design of the development that has been adopted. In this respect, Trustpower has identified and avoided those natural and physical resource values within the project site that have important social, cultural or environmental value to the community. This has culminated in the development of the EBZ.

In addition, the utilisation of the project site for the development of a wind farm will not preclude the continued or future use of the underlying land for farming / agricultural purposes. In this regard, the operational footprint of the WWF will be relatively small and will not impact on existing farming practices or soil resources.

Finally, the WWF will sustain natural resources in order to meet the needs of future generations through the utilisation of a renewable resource. The use of the wind resource to generate electricity will potentially avoid the depletion and use of non-renewable resources associated with other electricity generation facilities. In particular, the WWF will potentially avoid 337,412 tonnes of CO_2 per year if this electricity were to

[45] New Zealand Energy Strategy 2011 - 2021.

otherwise be generated from a coal-fired plant (or 196,824 tonnes per year if generated from a gas-fired plant).

6.1.3 Safeguarding Life-Supporting Capacity

Section 5(2)(b) of the RMA relates to the life-supporting capacity of water, soil and ecosystems being safeguarded. This involves an assessment of the life-supporting capacity of natural and physical resources as a whole. It is not a matter that requires there be no change in environmental quality.

The life-supporting capacity of water, soil and ecosystem resources around the project site will be primarily safeguarded as a result of the design approach adopted by Trustpower. In particular, the EBZ will ensure that all important environmental areas within the project site are protected. The WWF will not impact on the long term sustainability of the national populations of New Zealand pied oystercatcher and pied stilt. Trustpower will assist in sustaining the life-supporting capacity of resident bird populations (e.g. black shag, little black shag and little shag) by the removal of three farm ponds within the project envelope which attract waterfowl, and via mitigation for the displacement of populations.

The implementation of the various environmental management plans that are proposed by Trustpower will also ensure that any potential adverse effects from construction activities on water resources and ecosystems are minimised. In this respect, management plans such as the ECMP will manage and control the potential discharge of stormwater and sediment to waterbodies and land within the project site.

Furthermore, Trustpower is proposing to undertake extensive riparian planting within the Waipipi Stream, implement stock fencing along stream margins, wetlands and sand dunes within the project site, and remove culverts which are barrier to fish passage in order to safeguard and enhance ecosystems values within the project site.

6.1.4 Requirement to Avoid, Remedy or Mitigate

Section 5(2)(c) of the RMA requires that the adverse effects on the environment be avoided, remedied or mitigated.

The avoidance, remediation or mitigation of adverse effects does not require that there be no residual effects on the environment. Instead, section 5(2)(c) of the RMA contemplates adverse effects, the acceptability of which depends on the circumstances of the particular case and is a question of fact and degree.

With respect to the resource consent applications for the WWF, section 3.3 of this AEE has already discussed the design approach adopted by Trustpower in developing the WWF. This approach has included identifying areas within the project site where the establishment of turbines, ancillary buildings, roads or earthworks should be avoided. These areas have been encapsulated within the EBZ. As such, significant effort has gone into avoiding potential adverse effects in the environment that will encompass the WWF.

Furthermore, section 4 of this AEE provides details on the measures proposed by Trustpower to avoid, remedy or mitigate the potential environmental effects of the WWF and the transmission line. While the WWF will have some adverse effects, the resource consent conditions proffered by Trustpower have been designed to manage the actual and potential environmental effects associated with the construction, operation and

maintenance of the WWF. The proposed consent conditions also include a requirement to monitor and review the potential environmental effects of the WWF.

6.2 Section 6 - Matters of National Importance

Section 6 of the RMA identifies matters deemed to be of national importance. In exercising their functions and powers under the RMA, consent authorities must recognise and provide for the matters listed. With respect to the WWF and the transmission line, the matters of relevance are:

> *(a) The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins and the protection of them from inappropriate subdivision, use and development:*
> *(b) The protection of outstanding natural features and landscapes from inappropriate subdivision, use and development:*
> *(c) The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*
> *(d) The maintenance and enhancement of public access to and along the coastal marine area, lakes and rivers:*
> *(e) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, wahi tapu, and other taonga:*
> *(f) The protection of historic heritage from inappropriate subdivision, use, and development:*

Section 6(g) of the RMA is not considered relevant to this assessment as there are no recognised customary activities identified in the area around the WWF.[46]

6.2.1 Section 6(a)

The preservation of the natural character of the coastal environment, and the wetlands and streams within the project site, and their protection from inappropriate subdivision, use and development is a matter of national importance in accordance with section 6(a) of the RMA. The importance of the natural character of the coastal environment is also recognised in the NZCPS.

The definition of what constitutes natural character has evolved over the period since the enactment of the RMA. Early assessments of natural character tended to rely almost entirely on visual perception. As practice has evolved, it has become generally accepted that natural character derives from the presence of natural elements, biophysical features and perceptual aspects. Isthmus (2016) provides an assessment of the various aspects that are encompassed in the natural character of the project site. These include the matters listed in the NZCPS and RPS, which include natural landforms, wild and scenic areas, ecological, geological and geomorphological aspects.

Isthmus (2016) has concluded that the WWF will have no direct effects on the biophysical aspects of natural character of any significance. In this regard, the construction of the wind farm will avoid those areas that have been identified in the RPS and District Plan as having high value for ecological / scientific and cultural / historical

46 It is acknowledged that the Whenuakura River is a statutory acknowledgement area in the District Plan. However, this does not constitute a recognised customary activity in accordance with section 6(g) of the RMA.

reasons. The rehabilitation of the Waipipi Stream will also have some positive effects on biophysical aspects of natural character.

Isthmus (2016) also identifies that the WWF will have some effects on experiential aspects of natural character because the turbines will be a prominent backdrop to views inland from the coast and dunes. Such effects will be mitigated by the setback of the turbines inland of the dunes. Locating the bases of the turbines behind the dunes will also increase the perspective depth in views from this area and help increase the perception of separation between the coast and the WWF. Isthmus (2016) notes that the setback of the turbines from the coast was determined by actual features / values - rather than by establishing an arbitrary setback distance.

Taking the matters above into account, Isthmus (2016) considers that the adverse effects of the WWF on the overall natural character of the coastal character will not be significant.

Trustpower is also proposing to avoid all wetland values within the coastal environment and will undertake riparian planting and fencing along the Waipipi Stream, which will enhance natural character values.

It is also important to have regard to the concept of 'protection from inappropriate development' within section 6(a) of the RMA. Protection means keeping safe from injury or harm, rather than absolute protection, prevention or prohibition.

An assessment of 'appropriateness' must be made on a case by case basis in terms of the values that contribute to the natural character of a site. It is important to note that while the Proposed Plan has identified the coastal margins of the project site as being an area of outstanding natural character, the detailed site investigation of Isthmus (2016) and Brown (2015) conclude that it is difficult to see how the coastline around, and south-east of, the Whenuakura River might be regarded as even 'close to pristine' and qualify as an area of outstanding natural character. In this regard, much of the coastal sector around the project site is highly modified and continues to be the subject of on-going physical degradation – both physically and perceptually. It also fails to display the physical cohesion and visual integrity that would be expected for an area of outstanding natural character. The site also lacks the overall sense of naturalness that pervades areas of outstanding natural character at other locations.

In light of the measures incorporated into the design of the WWF to protect or minimise potential effects on natural character values, the fact that the natural character values around the project site are highly modified and subject to on-going physical degradation, and that various ecological rehabilitation measures are proposed by Trustpower, it is considered that the project does not constitute inappropriate development for the purpose of section 6(a) of the RMA.

6.2.2 Section 6(b)

Section 6(b) of the RMA is only considered to have limited relevance to the WWF. In this respect, the project site is not identified as an outstanding natural feature or landscape in any of the relevant statutory planning documents. Isthmus (2016) has also concluded that the project site is not an outstanding natural feature or landscape.

The only potential outstanding natural feature within the vicinity of the project site is the cliffs at Waverley Beach (which are identified as an outstanding natural feature / landscape in the Proposed Plan). While the WWF will be a visible feature and landmark

from Waverley Beach, it will not affect the landscape values of the cliffs. From places in the vicinity of the cliffs with line of sight to the WWF, it will be reasonably distant and appear quite separate and part of the background landscape.

In light of the above, it is considered that the development of the WWF will not adversely affect the protection of outstanding natural features and landscapes within the surrounding environment from inappropriate development.

6.2.3 Section 6(c)

Section 6(c) of the RMA seeks to protect areas of significant indigenous vegetation and significant habitats of indigenous fauna. The relevant statutory planning documents and Ryder (2016) identify areas around the project site as containing sites of significant indigenous vegetation and habitat of indigenous fauna.

As previously discussed in this AEE, all areas considered to be ecologically sensitive within the project site (e.g. the Waipipi Dunes) have been excluded from the project envelope via their incorporation into the EBZ. As such, areas of significant indigenous vegetation will be protected in accordance with Section 6(c) of the RMA.

Trustpower is also proposing to protect the population of fennel-leaved pondweed, blunt pondweed and horse's mane weed within three ponds in the project site by transferring the weeds to other ponds within the site before the ponds are infilled, with the aim of establishing new populations of these species.

As noted in section 4.5 of this AEE, Boffa (2016) estimates that some bird collision may occur as a result of the operation of the WWF. However, Boffa (2016) concludes that the WWF will not cause bird mortality that will impact on the long term sustainability of the national populations of New Zealand pied oystercatcher and pied stilt. The life-supporting capacity of resident bird populations (e.g. black shag, little black shag and little shag) will be sustained via the removal of three farm ponds within the project envelope which attract waterfowl, and via mitigation for the displacement of populations.

Post construction monitoring and review is proposed by Trustpower to ensure that bird species passing through the project site are actually suitably protected in accordance with section 6(c) of the RMA.

6.2.4 Section 6(d)

Section 6(d) relates to the maintenance and enhancement of public access to, and along, the CMA, lakes and rivers. As detailed in section 2.10 of this AEE, there is no formal public access across the project site to the CMA. That said, one of the landowners does provide informal public access to locals along their property boundary. Trustpower has no involvement in these access arrangements.

During the construction of the WWF (approximately 24 months) it will be necessary to restrict public access across the project site for health, safety and security reasons. However, these restrictions will only affect a small number of people. Following the completion of construction of the WWF the landowners will again be able to provide public access across their property at their discretion.

As such, beyond a moderate and defined period of exclusion for construction purposes, the existing public access arrangements to the CMA adjacent to the project site will be able to be maintained.

6.2.5 Section 6(e)

Section 6(e) of the RMA refers to the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, wahi tapu, and other taonga. Trustpower acknowledges that the Whenuakura River is identified as a statutory acknowledgement area in the relevant statutory planning documents in recognition of Ngaa Rauru and Ngati Ruanui's cultural, spiritual, historical and traditional associations with the river.

As noted in section 4.13 of this AEE, Trustpower has been engaging with Ngaa Rauru regarding the WWF since late 2010. An updated CIA is currently being prepared by Ngaa Rauru and Trustpower will continue to consult with Ngaa Rauru through the consenting process for the WWF and the transmission line.

Trustpower also intends to facilitate greater access opportunities for Ngaa Rauru across the project site to the coast (in consultation with the relevant landowners). This will provide Ngaa Rauru with the opportunity for better access to mahinga kai and other sites previously identified in the CIA for the wind farm proposed by Allco. In addition, Trustpower will undertake extensive ecological rehabilitation measures in order to improve environmental outcomes within the project site and surrounds; including the fencing of Waipipi Stream and wetlands, riparian planting, dune planting, improvements to fish passage through the project site, and the removal of drainage channels to wetlands.

Potential effects on archaeological sites will also be avoided in the first instance by virtue of the process that has been employed to design the extent of the project site and EBZ, and by the utilisation of accidental discovery protocols in the event that unrecorded archaeological sites are discovered during construction of the WWF.

Trustpower consider that the above measures, along with the other controls specified in the proposed consent conditions in **Appendix Fourteen**, should contribute to avoiding and mitigating any potential adverse effects on Ngaa Rauru.

6.2.6 Section 6(f)

Section 6(f) of the RMA seeks to protect historic heritage (including archaeological, cultural and historic resources) from inappropriate subdivision, use and development.

An assessment of the potential effects of the WWF and the transmission line is provided in section 4.12 of this AEE. Overall, Heritage Solutions (2016) concludes that the probability of archaeological or heritage sites being disturbed during the construction of the WWF is low due to the previous iron sand mining operations that occurred on site. Furthermore, the configuration of the project envelope has been designed to avoid the unmodified dunes along the coastal and river edges.

Trustpower is, however, proposing that an archaeologist monitor the construction of key phases of the WWF and that appropriate protocols be established in the event of the accidental discovery of archaeological, heritage or cultural sites.

In light of these matters, it is concluded that appropriate provision has been made to provide for the protection of historic heritage in accordance with section 6(f) of the RMA.

6.3 Section 7 - Other Matters

Section 7 of the RMA identifies additional matters that consent authorities shall have particular regard to when exercising their functions and powers under the Act. With respect to the WWF, the following matters in section 7 of the RMA are considered to be relevant:

(a)	*Kaitiakitanga:*
(aa)	*The ethic of stewardship:*
(b)	*The efficient use and development of natural and physical resources:*
(ba)	*….*
(c)	*The maintenance and enhancement of amenity values:*
(d)	*Intrinsic values of ecosystems:*
(e)	*[Repealed]*
(f)	*Maintenance and enhancement of the quality of the environment;*
(g)	*Any finite characteristics of natural and physical resources:*
(h)	*….*
(i)	*The effects of climate change:*
(j)	*The benefits to be derived from the use and development of renewable energy*.

Section 7(ba) of the RMA is not considered to be relevant to this assessment as the WWF is only related to the generation of energy and not the efficiency of its end use. Likewise, section 7(h) of the RMA is not considered relevant given that the Waipipi Stream and the drainage channels within the project site do not provide habitat for trout and salmon.

6.3.1 Sections 7(a) and (aa)

Sections 7(a) and (aa) of the RMA require particular regard to given to kaitiakitanga and the ethic of stewardship.

As already noted in relation to section 6(a) of the RMA, Trustpower is proposing to undertake extensive riparian planting within Waipipi Stream and implement stock fencing along the stream margin, wetlands and sand dunes within the project site in order to safeguard and enhance ecosystems values within the site. These measures will contribute to the stewardship and guardianship of the project site and the surrounding environment.

Further, extensive monitoring of the potential environmental effects of the WWF is proposed so that it can be ensured that the values of the site are protected.

Trustpower is also continuing to consult with Ngaa Rauru, and there may be other opportunities available that contribute to the iwi's role as kaitiaki of the environment (e.g. involvement in rehabilitation works or site monitoring).

6.3.2 Section 7(b)

Section 7(b) of the RMA is concerned with whether a proposal involves the efficient use and development of natural and physical resources. The WWF is considered to be an efficient use of natural and physical resources as it will enable the generation of

approximately 490 GWh of electricity per annum from the wind resources that exist on the project site.

As previously discussed in section 4.1 of this AEE, the WWF will also contribute to the displacement of the use of CO_2 producing energy sources.

Furthermore, the small footprint of the WWF (post construction) will enable the existing agriculture activities that occur on the project site to continue. As such, it is considered that the WWF also represents an efficient use of land resources.

6.3.3 Section 7(c)

The construction, operation and maintenance of the WWF and the transmission line may have some impacts on amenity values related to the visual effects, construction and operational noise effects, the enjoyment and utilisation of recreational areas, construction traffic on local roads, and other potential construction related activities (i.e. dust emissions).

All of these matters have been thoroughly assessed in section 4 of this AEE and the various technical assessments to this AEE. Whilst considerable effort has gone into designing the WWF and transmission line route to avoid the potential for disturbance to the amenity enjoyed by individuals and the local community, there will be some change in amenity for some individuals. Some amenity effects will be temporary (i.e. during the construction of the WWF), whilst others will exist for the duration of the project (i.e. visual effects).

That said, Trustpower is seeking to mitigate or minimise potential amenity effects on individual and the local communities through the establishment of appropriate setbacks from existing / consented dwelling, the establishment of riparian planting and stream fencing, the control of shadow flicker, compliance with appropriate New Zealand standards related to noise (including monitoring), and a range of other resource consent conditions – as set out in **Appendix Fourteen**.

It is, therefore, considered that particular regard has been given to Section 7(c) of the RMA.

6.3.4 Sections 7(d), (f) and (g)

Sections 7(d), (f) and (g) of the RMA relate to the intrinsic values of ecosystems, the quality of the environment, and the finite characteristics of natural and physical resources. Based on the conclusions outlined in section 4 of this AEE, it is considered that particular regard has been given to the intrinsic values of ecosystems and to the maintenance of the quality of the environment. In particular, the WWF has been designed to ensure that the ecosystem values of the project site will be retained by the identification and mapping of potentially sensitive areas within the EBZ.

Matters related to the quality of the environment enjoyed by adjacent landowners are also addressed in section 6.3.3 above in relation to amenity values.

6.3.5 Section 7(i)

Section 7(i) relates to the effects of climate change.

Section 4.17 of this AEE has considered the potential climate change effects associated with the use of coastal site for the development of the WWF. In particular, this section notes that coastal retreat will not impact on the site out to at least 2115 and that coastal flooding is not considered a hazard to the WWF. As such, it is considered that particular regard has been given to section 7(i) of the RMA.

6.3.6 Section 7(j)

Section 7(j) of the RMA is concerned with the benefits to be derived from the use and development of renewable energy. The NPSREG has clarified that the potential benefits associated with renewable energy may include (i) maintaining or increasing electricity generation capacity, (ii) maintaining or increasing security of supply at local, regional or national levels, (iii) the use of renewable resources over finite resources, and (iv) avoiding reliance on imported fuels for the generation of electricity.

As already noted in Section 4.1 of this AEE, the WWF will contribute a number of benefits to the local, regional and national community through the addition of 130 MW of installed generation capacity and approximately 490 GWh of electricity per annum. The development of additional renewable electricity generation capacity is also recognised as being important in order to meet the Government's strategic target of 90% of electricity generated in New Zealand being derived from renewable sources by 2025.

In light of the above, the WWF will be consistent with Section 7(j) of the RMA.

6.4 Section 8 - Treaty of Waitangi

Section 8 sets out that all persons exercising functions and power under the RMA, in relation to managing the use, development and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

Trustpower is not a *"person exercising functions and powers under the RMA"* for the purpose of this application to establish the WWF. In this regard, the STDC and TRC have the *"functions and powers under the RMA"* with respect to the resource consent applications being sought by Trustpower.

That said, Trustpower is undertaking consultation with Ngaa Rauru in good faith and in a manner that reflects the scale and significance of the proposal. This has included in the commissioning of an updated CIA by Ngaa Rauru and the continued investigation of measures to provide for cultural values as part of the development of the WWF.

6.5 Overall Conclusion Regarding Part 2

There are two general elements of sustainable management in the context of section 5 of the RMA that must be considered when assessing a resource consent application. They are whether a proposal will enable people and communities to provide for their social, economic and cultural wellbeing, and (at the same time) whether the environment will be safeguarded through the avoidance, remediation or mitigation of adverse effects.

The development of the WWF and the transmission line will have significant and demonstrable positive effects in terms of sustaining the social and economic wellbeing of the local, regional and national community. In particular, the WWF will contribute to

New Zealand's security of supply and strategic targets for renewable electricity generation.

In addition, extensive consideration has been to the natural and physical resource values of the project site in developing and designing the WWF and the route of the transmission line. As such, a number of potential environmental effects have been able to be avoided by designating key areas as part of the EBZ. Whilst the WWF will have some effects on the environment, these effects will be avoided, remedied or mitigated as far as practicable through the imposition of the robust resource consent conditions proposed by Trustpower (including the requirement for a series of environmental management plans). It is, therefore, considered that the project will safeguard the life-supporting capacity of air, water, soil and ecosystems.

Overall, and based on the technical assessments that have been prepared, it is considered that the project site is an appropriate location for a wind farm and that the construction, operation and maintenance of the WWF will promote the sustainable management of natural and physical resources in accordance with Part 2 of the RMA.

6.6 Section 105 - Matters Relevant to Discharge Applications

In addition to the matters which a consent authority must have regard to under section 104 of the RMA, section 105 sets out additional matters which must be considered when considering discharge applications. In particular, section 105 states:

> *(1) If an application is for a discharge permit or coastal permit to do something that would contravene section 15 or section 15B, the consent authority must, in addition to the matters in section 104(1), have regard to—*
>
> *(a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
> *(b) the applicant's reasons for the proposed choice; and*
> *(c) any possible alternative methods of discharge, including discharge into any other receiving environment.*

All of the matters set out in section 105(1) of the RMA are addressed in detail in either sections 2, 3 or 4 of this AEE. However, it is also concluded that the proposed discharge option is the best practicable option for managing the potential effects associated with the construction of the WWF.

6.7 Section 107 - Restriction to Grant Discharge Permits

Section 107 describes certain circumstances in which a consent authority shall not grant a discharge permit. In particular, a consent authority cannot grant a permit seeking to discharge a contaminant or water into water if, after reasonable mixing, the contaminant or water discharged is likely to give rise to all, or any, of the following effects in the receiving waters:

> *(c) The production of any conspicuous oil or grease films, scums or foams,*
> *or floatable or suspended materials;*

(d) Any conspicuous change in colour or visual clarity;
(e) Any emission of objectionable odour;
(f) The rendering of fresh water unsuitable for consumption by farm animals;
(g) Any significant adverse effects on aquatic life.

As outlined in sections 3 and 4 of this AEE, the discharge of stormwater and sediment to the waterbodies within the project site will not give rise to any of the effects listed above after reasonable mixing.

7. CONSULTATION

7.1 Introduction

Section 36A of the RMA confirms that an applicant has no duty to consult any person on their resource consent application. However, clause 6(1)(f) of the Fourth Schedule to the RMA also states that an AEE should identify those persons affected by the proposed activity, detail the consultation undertaken with those persons, and outline any response to the views of those persons consulted.

In light of the above, this section provide an overview of the consultation that has been undertaken by Trustpower with key stakeholders, adjacent landowners, and the wider community since it secured land access to the project site and commenced its investigations into securing resource consents for the WWF and associated transmission line.

Copies of the written approvals for the WWF and transmission line that have been obtained by Trustpower are attached as **Appendix Twenty One** to this AEE.

7.2 Preliminary Consultation

Trustpower began meeting key stakeholders and adjacent landowners regarding the possible development of the WWF in 2010. These preliminary meetings included discussions with some of the landowners immediately adjacent to the project site, along with Ngaa Rauru, Ngati Ruanui, Department of Conservation, NZTA, STDC and the TRC.

The primary purpose of these preliminary discussions was to update key stakeholders on the status of the WWF and Trustpower's general intentions for the development - particularly given that Allco had previously lodged, but not secured, resource consents for a wind farm on part of the site. In addition, Trustpower was interested in obtaining a better understanding of stakeholders' views on the key issues relating to the project site.

The preliminary consultation process also included Trustpower meeting with staff from the STDC and the TRC to discuss proposed changes to the configuration of the WWF, expectations for the resource consent process, and the scope of the new technical assessments to be commissioned by Trustpower.

More recently, consultation has been undertaken by Trustpower and the technical consultants it has commissioned to inform the various environmental assessments and the design of the project envelope / EBZ. This consultation has included further discussions with Ngaa Rauru, the Department of Conservation, NZTA, STDC and the TRC in relation to the traffic, avifauna, landscape, terrestrial ecology and archaeology / heritage assessments (amongst other things). These discussions have assisted in refining the EBZ and the project envelope.

With respect to the proposed transmission line route, Trustpower began consulting with landowners whose properties could be traversed by the transmission line in 2011. A key focus of the preliminary consultation meetings with landowners related to whether they would possibly grant Trustpower an easement for a transmission line corridor across their property and potential corridor routes in order to avoid or mitigate adverse effects on the utilisation of productive land, dwellings and other environmental values.

7.3 Public Open Days

Following the completion of draft technical assessments, Trustpower hosted three public open days for key stakeholders and the public and a site open day in November 2012. These public open days were held at the Waverley A & P Show, Waverley Community Centre, and the Patea Old Folks Association Hall respectively. Invitations to attend the public open days were sent to a number of key stakeholders and landowners adjacent to the project site.

In addition, public notices were placed in the local newspapers advertising the public open days and inviting interested parties to attended (or contact Trustpower for further information).

The public open days were intended to be informal events at which interested members of the community could meet with Trustpower and the authors of the technical assessments to gain a better understanding of the WWF and the potential environmental effects associated with its construction and operation. That said, the public open days did include presentations by Trustpower staff on the WWF and the proposed approach to development (e.g. the project envelope and the EBZ). A number of the authors of the technical assessments also made presentations outlining the key conclusions of their reports and the mitigation measures they were recommending. The public open days also provided an opportunity for Trustpower and the technical authors to receive feedback from attendees.

A total of approximately 40 people attended the open days.

The key questions / comments raised by stakeholders and members of the public during the public open days related to:

- Possible operational noise effects from the turbines at nearby dwellings;
- Possible construction noise effects at nearby dwellings;
- The potential visibility of the WWF from key locations and residential dwellings;
- The potential visual effects of the transmission line and its impact on the use of productive land;
- The timeframes for construction (including when construction would occur); and
- Traffic levels on the roads leading to, and from, the project site.

7.4 Subsequent Consultation

Following the public open days in 2012, the project was put on hold by Trustpower until June 2015. Since then Trustpower staff have continued to re-engage individually with key stakeholders and adjacent landowners to the project site and the transmission line. The primary focus of this continued consultation effort has been to provide further detail and information on the status of the project, further identify the key concerns of stakeholders and adjacent landowners, and to fine tune the technical assessments or develop mitigation solutions to address concerns.

Trustpower has also provided copies of all of its technical assessments to any stakeholders and adjacent landowners who have requested information. In particular, Trustpower has been engaging with the Department of Conservation regarding the terrestrial ecology and avifauna assessments by Ryder Consulting Limited and Boffa Miskell Limited.

Trustpower have sought to continue engagement with Ngaa Rauru in relation to understanding the potential effects of the WWF and transmission line on cultural matters, including the expression of kaitiakitanga.

Trustpower will continue to engage with stakeholders and landowners throughout the consenting process for the project in order to ensure that the potential adverse effects of the WWF and the associated transmission line are suitably avoided, remedied or mitigated, and to ensure the project is undertaken in a manner that contributes to the social and economic wellbeing of the community.

7.5 Project Consultation / Communication

As is set out in the proffered resource consent conditions in **Appendix Fourteen** to this AEE, Trustpower is proposing to establish a community consultation group to assist with the management of potential adverse effects and to assist with stakeholder enquiries during the construction of the WWF. This follows the successful establishment of similar community consultation groups for other projects initiated by Trustpower (e.g. the Mahinerangi Wind Farm in the Clutha District).

The purpose of the Waverley Wind Farm Project Consultation Group ('WWFPCG') will be:

- To ensure stakeholder input is considered in the preparation of the environmental management plans required for the construction of the WWF and associated transmission line;
- To ensure stakeholders are kept up to date with project implementation; and
- To provide a mechanism for stakeholders to express any matters of concern identified during the construction of the WWF, and for those concerns to be addressed.

Trustpower has no pre-determined views as to which stakeholders should be on the WWFPCG. Indeed, the indicative resource consent conditions in **Appendix Fourteen** to this AEE have not made any specific assumptions as to which stakeholders should be a part of the WWFPCG. The conditions simply note that, as a minimum, the following parties shall be invited to participate in the WWFPCG:

- A representative of property owners and occupiers on local roads identified for use by construction traffic;
- An elected representative of the STDC;
- A delegate from the Department of Conservation;
- A representative each from Ngaa Rauru and Ngati Ruanui; and

- Local residents.

8. CONCLUDING STATEMENT

Trustpower is proposing to construct, operate and maintain the WWF and a transmission line near Waverley in the South Taranaki District. The WWF will have significant and demonstrable positive effects in terms of sustaining the social and economic wellbeing of local / regional communities and New Zealand. In particular, the WWF will contribute to New Zealand's security of supply and the Government's strategic targets for renewable electricity generation.

Land use consent is being sought from the STDC for the construction, operation and maintenance of the WWF and the transmission line within the Rural Zone of the South Taranaki District. Land use consents, water permits and discharge permits are also being sought from the TRC for activities primarily related to the construction of the WWF and the transmission line.

Assessments of the potential effects of the WWF on landscape, natural character, terrestrial ecology, aquatic ecology, avifauna, noise, traffic, social, tourism / recreation activities, cultural values, archaeology / heritage values, radio communication interference, shadow flicker and coastal hazards are provided in the technical assessments commissioned by Trustpower and in section 4 of this AEE. Overall, these assessments conclude that whilst the WWF will have some effects on the environment, the project site is an appropriate location for a wind farm.

Trustpower is also proposing a number of measures in order to appropriately avoid, remedy or mitigate the potential effects of the WWF and the transmission line. These measures are detailed in the resource consent conditions and draft environmental management plans appended to this AEE.

With respect to the statutory planning framework that applies to the WWF and the transmission line, it is concluded that the development of the project in the manner proposed by Trustpower will not be contrary to the overall management intentions specified in the objectives and policies of the relevant national, regional and district planning documents. While there are competing management objectives in the various statutory planning documents, there is also recognition of the need for infrastructure to locate where the resource it relies on is also located. However, this recognition is subject to ensuring that the adverse effects of infrastructure development are appropriately avoided, remedied or mitigated.

Furthermore, the analysis in section 6 of this AEE has illustrated how the WWF responds to the various matters set out under Part 2 of the RMA. As such, and based on the technical assessments that have been prepared, it is concluded that the construction, operation and maintenance of the WWF will safeguard the life-supporting capacity of air, water, soil and ecosystems, and will promote the sustainable management of natural and physical resources.

Finally, it is noted that Trustpower has consulted widely with interested / potentially affected parties and the wider community with respect to the WWF over a period of time. This consultation has informed the various environmental assessments and shaped the design of the WWF and transmission corridor. This consultation process will continue throughout the resource consent process and during the subsequent construction of the WWF.

Appendix One

Landscape and Visual Assessment (Isthmus (2016))

Appendix Two

Certificates of Tile (Wind Farm)

Appendix Three

Certificates of Title
(Transmission Line Route)

Appendix Four

Geotechnical Assessment
(Riley – Geotechnical (2016))

Appendix Five

Coastal Processes Assessment (Shore Processes (2016))

Appendix Six

Natural Character Assessment (Brown (2015))

Appendix Seven

Terrestrial and Freshwater Ecology Assessment (Ryder (2016))

Appendix Eight

Avifauna Assessment (Boffa (2016))

Appendix Nine

Transportation Assessment (TDG (2016))

Appendix Ten

Noise Assessment (Hegley (2016))

Appendix Eleven

Social, Recreation and Tourism Assessment (TRC Tourism (2016))

Appendix Twelve

Heritage Assessment (Heritage Solutions (2016))

Appendix Thirteen

Radio Effects Assessment (Rodgers (2016))

Appendix Fourteen

Proposed Resource Consent Conditions

Appendix Fifteen

Civil Assessment (Riley – Civil (2016))

Appendix Sixteen

Taranaki Regional Council Resource Consents

Appendix Seventeen

Economic Assessment (NZIER (2016))

Appendix Eighteen

Shadow Flicker Assessment (Garrad Hassan (2016))

Appendix Nineteen

Draft Erosion and Construction Management Plan

Appendix Twenty

Draft Construction Noise Management Plan

Appendix Twenty One

Written Approvals