NZ TRANSPORT AGENCY
WAKA KOTAHI

Roads of national significance

1 Wellington Northern corridor

Ōtaki to North of Levin section

State Highway 1 Waitarere Beach Road Curves Project

Alteration to a Designation

Horowhenua District Council
December 2015

BF: 55576971

QUALITY STATEMENT

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REVISION SCHEDULE

Rev No	Date	Description	Signature or Typed Name (documentation on file).			
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Volume I: Notice of Requirement to Alter a Designation

NZ Transport Agency

Waitarere Beach Road Curves Project

Alteration to a Designation

CONTENTS

LIST OF TABLES

LIST OF FIGURES

VOLUME II TECHNICAL REPORTS

VOLUME III PLAN SETS

Form 18
Resource Management Act

Notice of requirement for an alteration of a designation in accordance with Sections 168 (2) and 181 of the Resource Management Act 1991

To:

Horowhenua District Council
126-148 Oxford Street
Levin 5510

The New Zealand Transport Agency (The Transport Agency) gives notice of a requirement for an alteration to Designation D2 in the Horowhenua District Plan for a project and works to undertake improvements to State Highway 1 (SH 1) between the Poroutawhao School and 410 m south of Clay Road, some 7 km north of Levin.

The purpose of the works (referred to as the Project) and the associated alteration to the designation is to contribute to the achievement of the overall objectives for the Wellington Northern Corridor Road of National Significance (RoNS), with a particular focus on reducing the risk of future fatal and serious crashes in the Project area in a manner which is consistent with the highway's position within the Wellington Northern Corridor RoNS.

The Project and works are described in more detail in section 2 of Volume I of this document.

Plans of the proposed designation boundary and the plans showing the proposed works are included in Volume III, Plan Sets B to F and I, of this document.

The land to which the requirement applies is:

Listed by address and legal description at the end of this Form, and shown on the plans in Volume III, Plan Set C.

The nature of the proposed project or work is:

The nature of the Project and work is to improve the safety and efficiency of SH1 from the Poroutawhao School, approximately 1.7km (1,656m) north of the Waitarere Beach Road intersection with SH1 to 410 m south of the Clay Road intersection with SH1, approximately 7 km north of Levin. The proposed package of improvements (the Project) involves re-alignment of SH1 (straightening curves), the installation of a wire rope median barrier, modifications to intersections with local roads and associated local roads and accesses, ancillary safety features and upgraded highway stormwater management infrastructure. A dedicated right turning bay, improved lighting and new signage is proposed for the Poroutawhao School area.

The nature of the proposed conditions that would apply are:

There are no conditions on the existing designation. However, to ensure that the effects of construction of the Project are mitigated, appropriate conditions on that part of the designation which is subject to the alteration are included to manage effects during the construction phase. Suggested conditions are provided in section 7 of Volume I of this document.

The effects that the project will have on the environment, and the ways in which any adverse effects will be mitigated, are:

The effects on the environment are significantly positive in terms of safety for road users. There are also positive effects in terms of transport efficiency, economic benefits to the district during the construction phase, and the improved management of stormwater and fish habitat associated with the Project.

Potential adverse effects on the environment have largely been avoided through the choice of alignment and the design of the project, although actual and potential adverse effects on ecology, archaeology, landscape and visual aspects have been identified and there are some adverse implications for local road users. The adverse effects are primarily associated with the construction phase and will be managed and mitigated through a range of measures, including through the proposed conditions. The nature and extent of adverse effects is described in more detail in section 5 of Volume I of this document, and proposed conditions are set out in section 7.

Alternative sites, routes, and methods have been considered to the following extent:

A number of alternative routes and alignments have been considered. In addition, the process of development of the preliminary design has encompassed numerous options and alternative methods. The consideration of alternatives is described in section 4 of Volume I and Appendix J of Volume II of this document.

The work and designation alteration is reasonably necessary for achieving the objectives of the Transport Agency for this project because:

The work which compromises the Project is reasonably necessary to achieve the Transport Agency's objectives for the North of Levin section of the Ōtaki to North of Levin Road of National Significance. The designation is reasonably necessary to provide consistency with the existing designation, protect the route, provide for the work and enable land acquisition.

The Project objectives are to:

- enhance inter-regional and national economic growth and productivity;
- improve journey times on the state highway network;
- enhance safety of travel on the state highway network;
- appropriately balance the needs of both inter-regional traffic and local road users; and
- achieve all the above objectives in a cost effective manner.

A more detailed explanation of the reasonable necessity is provided in section 4.4 of Volume I of this document.

The following resource consents are needed for the project from Manawatu-Wanganui Regional Council (Horizons) and have not been applied for:

- Land Use Consent, pursuant to s9 RMA for earthworks and vegetation removal
- Land Use Consent, pursuant to s13 RMA for a culverts within watercourses
- Water Permit pursuant to s14 RMA for the diversion of watercourses
- Discharge Permit pursuant to s15 RMA to discharge stormwater from earthworks to waterbodies.

The following consultation has been undertaken with parties that are likely to be affected:

Consultation has been undertaken with landowners, Iwi and the wider community who may be affected by the Project and with key stakeholders. The consultation undertaken to date in relation to the Project is described in section 6 of Volume I of this document.

The Transport Agency attaches the following information required to be included in this notice by the district plan, regional plan, or any regulations made under the Resource Management Act 1991:

- An assessment of effects on the environment (Volume I);
- Technical reports supporting the assessment of effects on the environment (Volume II); and
- Plans, sections and mapped information relating to the alteration to the existing designation (Volume III).

The Transport Agency seeks a waiver of outline plan for this project.

.....

Neil Walker, Highway Manager, Wellington.

New Zealand Transport Agency

.....

Date

Land to which the Notice of Requirement Applies:

Ref #[1]	Address[2]	Area Required(m²)	Legal Description
1 & 4	708 SH1	4667	Lot 2 DP 427692
2	-	497	Lot 1 DP 427692
3, 5, 6, 8 & 16	709, 717 SH1 & 18 Waitarere Beach Rd	1081	Lot 1 DP 68002
		837	Lot 2 DP 68002
		1789	Lot 4 DP 68002
		1404	Lot 2 DP 61632
		773	
7, 10, 10B, 11, 11B, 14 & 15	648 & 682 SH1	49924	Lot 2 DP 304414, Lot 2 DP 88263, Lot 5 DP 61399 & Lot 1 DP 73873
9	670 SH1	2058	Lot 1 DP 304414
12, 12B & 13	648 SH1	923	Lot 1 DP 88263
17	-	2574	Sec 3 SO 28705
18	-	6190	Sec 4 SO 28705
19	-	125	Lot 7 DP 88867
22	607 SH1	5501	Lot 6 DP 88867
23	12 Paeroa Rd	1634	Lot 1 DP 40353
24	9 Paeroa Rd	10174	9172
25	577 SH1	7036	7036
26	563 SH1	2239	Lot 3 DP 431661
27	559 SH1	986	7D2D36A Manawatu-Kukutauaki (ML 5450)
28	-	315	7D2D36B Manawatu-Kukutauaki (ML 5450)
29 & 30	-	17615	Lot 2 DP 73873 & Lot 4 DP 61399
31	516 SH1	211	Lot 1 DP 16204

Ref #[1]	Address[2]	Area Required(m²)	Legal Description
32	514 SH1	85	7D2D57D2A Manawatu-Kukutauaki (ML 4567)
33	519 SH1	262	7D2D56A2 Manawatu-Kukutauaki (ML 3426)
34	511 SH1 (including Ngāti Huia Marae accessway)	3915	7D2D56A1 Manawatu-Kukutauaki (ML 3426)
35	507 SH1	13078	Pt 7D2D56B Manawatu-Kukutauaki (ML 1893)
36	463 SH1	14404	7D2D60C Manawatu-Kukutauaki (ML 1893)
37	827 SH1	198	Pt 7D1,2 Manawatu-Kukutauaki (ML 1308)
38	769-791 SH1	127	Pt 7D1,3 Manawatu-Kukutauaki (ML 1355)
39	Paeroa Road (Māori Roadway)	1283	Pt 7D2D Manawatu Kukutauaki
40	Paeroa Road	-	-
50	State Highway 1	-	-
51	Waitarere Beach Road	-	-
52	Clay Road	-	-

Notes:

The Property Reference numbers correspond with those shown in Volume III, Plan Set C (drawings C611-C614). Note that numbering is not always consecutive, due to design change over time.

Some properties do not have 'property addresses'

Executive Summary

The NZ Transport Agency (Transport Agency) is the Crown entity responsible for managing New Zealand's State Highway network. The Transport Agency's objective is to undertake its functions in a way that contributes to an effective, efficient and safe land transport system in the public interest.

Through this Notice of Requirement (NoR), the Transport Agency, seeks to alter the SH1 designation (D2) within the Horowhenua District Plan (HDP) to authorise improvements to the Waitarere Beach Road curves section of SH1, approximately 7 km north of Levin (referred to as the Project).

The main purpose of the Project is to reduce future death and serious injury crashes on this section of SH1 and to achieve efficiency benefits. Between 2009 and 2013 there were four high-severity crashes within the Project Area, resulting in 8 deaths and serious injuries. As a result of the Project this is predicted to drop to one death or serious injury over a five year period. The improvements will result in the KiwiRAP Star Rating[1] for the Project area shifting from a 2-Star road to a 4-Star road. The Project will also enable potential future passing lanes north and south.

The Project will include realigning substandard curves, widening the existing alignment, installing a wire rope median barrier, improving intersections with local roads and other ancillary safety improvements. Management of highway stormwater runoff will also be improved. The Project also includes a right-turning bay at Poroutawhao School.

The Project is part of the wider Ōtaki to North of Levin (O2L) section of the Wellington Northern Corridor Roads of National Significance (RoNS) Programme; one of seven priority projects identified by the government in 2009 to reduce congestion, increase transport efficiency, improve safety, and support economic growth. The O2L RoNS involves a series of works including targeted improvements to address immediate safety and efficiency issues, but also includes longer-term improvements which will be provided on a staged basis to meet the objectives for this section of the Wellington Corridor RoNS.

The Project area is within a historically and culturally rich locality with a strong Māori presence. The area is part of a strong farming district and contains two marae, housing, a school and Māori church and several businesses. The landscape is complex and highly modified due to the development of pastoral farming, with natural watercourses largely being incorporated into the network of farm drains.

The Project's benefits include:

- safety improvements;
- improved provision for agricultural vehicles, cyclists, pedestrians, equestrians and slower moving local traffic and improved separation from regional and national traffic, by providing wider shoulders;
- improved route security and resilience in the event of road crashes, or other disruptions through provision of a wider road corridor;
- journey time savings and improved journey time reliability for regional and national traffic, including freight;
- alignment with the Ōtaki to North of Levin section of the Wellington Northern Corridor RoNs and the Wellington Northern Corridor RoNs as a whole;
- enabling future roading upgrades (i.e. passing lanes) as planned for the North of Levin section of SH1;
- economic benefits to the district and region during the construction phase; and
- improving the existing water quality of storm water discharges from SH1 into local waterways and replacing existing culverts to better enable fish passage.

[1] KiwiRAP is New Zealand's joint agency Road Assessment Programme. The Ministry of Transport, the Transport Agency, Police, ACC and AA developed the programme to assess the risk of New Zealand roads and targeted it at decision makers and the wider public. It classifies roads from 1-Star (very high risk) to 5-Star (very low risk).

The Project's assessment of actual and potential effects (taking into account mitigation) has identified a range of effects associated with the Project ranging from negligible to potentially significant. The key significant effect is positive; specifically, the reduced risk of death and significant injury from the improved alignment and road design. These safety benefits will particularly benefit local people, as approximately 40% of the traffic on this part of SH1 has an origin or destination within Horowhenua. The local Levin economy will also benefit from expenditure relating to the Project's capital expenditure of $14.2m over the construction period. A range of potential adverse effects are associated with the construction phase of the Project. Draft conditions have been suggested to address the potential adverse effects and ensure they are avoided, remedied or mitigated as far as practicable.

The Transport Agency considered a range of alternatives before selecting the form of the Project and its components. The Project and the alteration to the designation are reasonably necessary to achieve the objectives for the North of Levin section of the Ōtaki to North of Levin RoNS; relating to enhancing the safety of travel, improving journey time on the network, contributing to inter-regional and national economic growth and productivity, balancing the needs of inter-regional and local road users, and achieving the above objectives in a cost-effective manner. The Project contributes to the achievement of all the objectives. The Project will also help achieve the objectives of, and be consistent with, the policies of the HDP and other relevant policy instruments.

The Project's development has involved extensive consultation with iwi, local landowners and the community and feedback from the consultation has helped inform the Project's design.

Matters considered in the assessment of effects demonstrate the consideration and evaluation of the purpose and principles of the RMA. These matters include landscape and natural character values, ecological habitat, and heritage and cultural values, as well as amenity values (including effects on local landscape character and visual effects, noise and vibration) and social and economic impacts. Where RMA section 6 matters of national significance are relevant, such as effects on natural character, water and natural habitats, the potential effects have been managed.

With regard to RMA section 7 matters, economic efficiency has been demonstrated and other matters including amenity and environmental quality have been satisfactorily addressed. Based on the findings of the assessment of effects on the environment it is concluded that the Project would promote the purpose of the RMA (the sustainable management of natural and physical resources).

The Project is in accordance with section 5 of the RMA as it contributes to the health, safety and wellbeing of the local, regional and national community. At the same time, effects have been avoided or mitigated through the Project's design, and through conditions to be applied during the construction stage. Overall, the Project will contribute to the sustainable management of the district's natural and physical resources.

1 Introduction

1.1 The New Zealand Transport Agency

The Transport Agency is a Crown entity with its objective, functions, powers and responsibilities set out in the Land Transport Management Act 2003 and the Government Roading Powers Act 1989.

The Transport Agency is a requiring authority under section 167(3) of the RMA and Order in Council for:

- All existing roads that are State highways; and
- The maintenance and improvement of the safe and efficient operation of the existing State highways in New Zealand.

The Transport Agency takes an integrated approach to transport planning, funding and delivery of projects. This includes investment in public transport, walking and cycling local roads and the construction and operation of State Highways. The Transport Agency must exhibit a sense of social and environmental responsibility when undertaking this work.

1.2 The Proposed Works – An Overview

The Transport Agency seeks to alter the existing Designation 'D2' for 'State Highway Purposes' in the HDP. There are no conditions on designation 'D2'.

The alteration is required to enable the improvements to State Highway 1 shown on the plans in Volume III of this document (the Project), which comprises a sub-project of the Ōtaki to North of Levin section of the Wellington Northern Corridor RoNS programme. The existing designation is insufficient in width and is on an alignment that does not encompass the extent of works necessary for the Project.

The Project area is some 4.3km long and extends from the Poroutawhao School approximately 1,660m north of the Waitarere Beach Road intersection with SH1 to 410 m south of the Clay Road intersection with SH1, as described later in section 2.1.

The purpose of the Project and the associated NoR for an alteration to the existing designation is to contribute to the achievement of the overall objectives for the Wellington Northern Corridor RoNS, with a particular focus on reducing the risk of future fatal and serious crashes in the Project area in a manner which is consistent with the highway's position within the Wellington Northern Corridor RoNS.

The Project will achieve this by:

- Realigning a section of SH1 to reduce the number and severity of 'loss of control' crashes associated with the geometric deficiencies of the current alignment;
- Upgrading the local road intersections with SH1 to address the substandard intersection layouts;
- Installing a central wire rope median barrier to prevent vehicles crossing the highway centreline and colliding with oncoming vehicles;
- Installing edge wire rope barriers to prevent vehicles that have lost control running off the highway and into obstacles on the side of the highway;
- Consolidating private property accessways onto SH1 and closing the Paeroa Road intersection with SH1;
- Providing a new intersection at Hinaupiopio[2], with a connecting service road to Paeroa Road and access to properties and Huia Marae to the south;
- Constructing a wider cross section of sealed surface to provide recovery time if drivers make a mistake and more space for slower agricultural vehicles and cyclists;

[2] See location indicated as "8" on the Overview Plan in Plan Set A, Volume III.

- Improving the intersections of Waitarere Beach Road and Clay Road with SH1 by ensuring they have dedicated turning facilities and good visibility;
- Installing a dedicated right turning bay, improved lighting and new signage at the Poroutawhao School; and
- Providing turning facilities for local traffic at Waitarere Beach Road.

The Project is proposed to commence in the construction season of 2019, subject to funding approval. If funding becomes available sooner then the Project will be constructed earlier.

1.3 Project Context

In 2009 the Government identified seven State highway projects linked to New Zealand's economic prosperity and identified these as RoNS. The Wellington Northern Corridor (Levin to Wellington Airport) is one of the seven RoNS. The Wellington Northern Corridor has eight project sections as follows:

- Airport to Mount Victoria Tunnel
- Transport Improvements around the Basin Reserve
- Terrace Tunnel Duplication
- Ngauranga to Aotea Quay
- Linden to Mackays (Transmission Gully)
- Mackays to Peka Peka
- Peka Peka to Ōtaki
- Ōtaki to North of Levin.

The Project area is located close to the northern extent of the Ōtaki to North of Levin section. The RoNS projects that make up the Wellington Northern Corridor are shown on Figure 1-1.

The Ōtaki to North of Levin section involves a number of proposed improvement projects (for the short and medium term). These projects are shown on Figure 1-2.

For the section North of Levin, the Transport Agency has undertaken a Programme Business Case to determine the form and timing of projects and activities that are needed along the stretch of SH1 from Levin to the Manawatu River to achieve the Ōtaki to north of Levin objectives.

The Project's safety improvements are a vital element to enable that programme. It will be complemented in the programme over time by passing lanes, roadside safety improvements, intersection improvements and other projects.

1.4 Reason for the Improvements at Waitarere Beach Road Curves

The section of SH1 subject to this NoR has a number of safety and efficiency problems. The safety problems on the Waitarere Beach Road Curves section of SH1 which comprises the Project area, are described and discussed in this section. The safety problems arise from a combination of the highway form issues described in section 1.4.2 below, traffic volumes, vehicle speeds and driver error (e.g. loss of control). In addition, the highway does not function as efficiently as it could due to the highway form issues.

Background information relating to the highway, and the current problems associated with its performance in the Project area is provided in Appendix B, Volume II.

Figure1-1: Wellington Northern Corridor Programme Projects

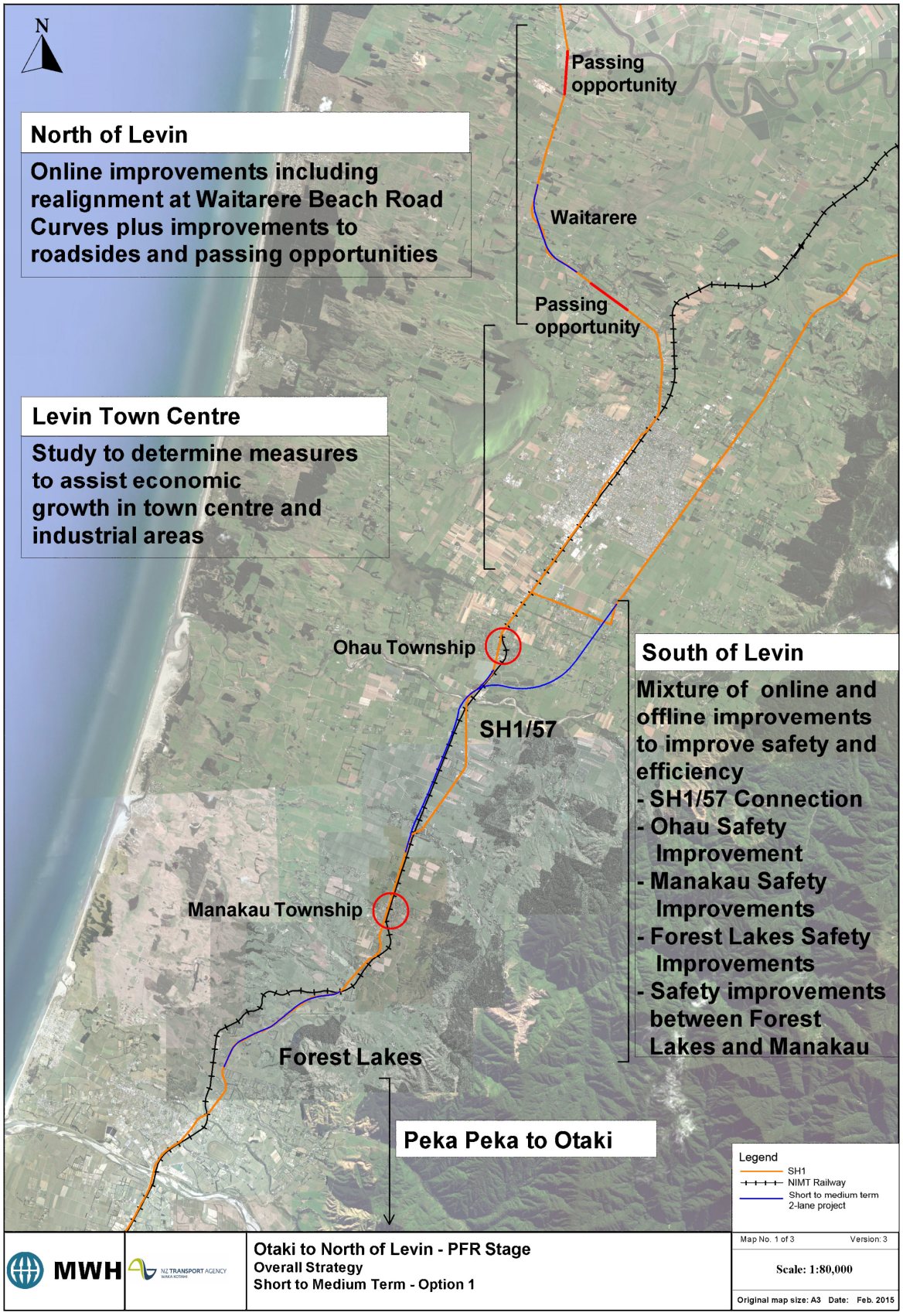

Figure 1-2: Ōtaki to North of Levin - short and medium term improvements

1.4.1 Death and Serious Injury Crashes

The Waitarere Beach Road Curves section of SH1 has been the site of four high severity crashes, resulting in 8 deaths and serious injuries (DSi), over the five year period from 2009 to 2013.

Of these, there were four reported crashes within 50 m of the Waitarere Beach Road intersection, including one serious crossing turning crash (1 DSi) and three non-injury crashes.

In the same period, there were also 11 reported crashes along the Project midblock section (excluding the crashes within 50 m of the Waitarere Beach Road intersection). These crashes included two fatal crashes (6 DSi), one serious crash (1 DSi), two minor injury crashes and six non-injury crashes.

The two fatal crashes were head on crashes. Two of the three injury run-off road crashes crossed the centreline, but fortunately did not encounter an opposing vehicle.

At low traffic volumes, single vehicle crashes and casualties predominate because opposing traffic is infrequent. As roads get busier and traffic volumes increase, as on this stretch of SH1, head-on crashes and casualties increase in direct proportion to the amount of traffic. Most head-on crashes result from loss of control where a vehicle loses control and crosses the centreline. The outcome will only be a head-on crash if an opposing vehicle is present at the wrong time[3].

1.4.2 Highway Form Issues

There are a number of issues with the current highway form, intersections and accessways within the Project area which contribute to the poor safety record. The problems with the geometry and form of the existing section of SH1 include:

- The curves between Clay Road and Waitarere Beach Road are below the standard[4] required for a 100 km/h highway and are out of context with the nature of the highway in this area;
- The lack of protection against vehicles crossing the highway centre line and colliding with oncoming vehicles in the opposite lane;
- The presence of obstacles, hazards and objects adjacent to the highway (such as poles and ditches), which present a safety hazard if vehicles run off the carriageway;
- The presence of a large number of accesses, including minor roads and private property accessways onto SH1 with resultant "side friction" issues;
- A highly trafficked Waitarere Beach Road intersection within the deficient curve section;
- Substandard combinations of vertical and horizontal curves, which results in poor visibility between vehicles;
- A narrow sealed shoulder providing inadequate space for cyclists, slow moving agricultural traffic or vehicles turning into and out of accessways; and
- Safety concerns at the intersections of Paeroa Road and Clay Road in that the visibility at these intersections is limited and there are no dedicated right turning lanes.

The above highway form issues result in this stretch of road being only a 2-Star Road under the KiwiRAP Star Rating system.

1.4.3 Opportunities for Improvements in Efficiency and Productivity

The highway form issues identified above, in addition to the safety problems outlined, also result in lower travel speeds and therefore reduce efficiency.

Narrow shoulders, low standard curves and frequent accessways and intersections mean that speeds are reduced. In addition, crashes can result in large delays for traffic from time to time.

[3] NZTA, High Risk Rural Roads Guide, Section 3.3: Key Crash Types.
[4] All four curves have curve radii less that that recommended in the Roads of National Significance Design Standards and Guidelines of 1100m, and three of them are less than the minimum radius of 720m.

This is a national strategic highway and a high priority freight route and therefore improvements along this stretch of SH1 will have benefits for economic productivity.

1.5 Project Purpose and Objectives

The Waitarere Beach Road Curves section of SH1 has a record of fatal and serious crashes which is nearly double the national average for similar State highways. Loss of control and head on crashes are the predominant crash types and these have resulted in seven of the eight deaths and serious injuries within the five year reporting period (2009-2013). Head on crashes occur here at a rate nearly twice the national average.

The purpose of the Project is to reduce the number of fatal and serious crashes occurring within the Project area, whilst contributing to the broader RoNS objectives of improving access to Wellington and its port and airport. The particular objectives that apply to the whole Wellington Northern Corridor RoNS are:

- To enhance inter regional and national economic growth and productivity;
- To improve access to Wellington's CBD, key industrial and employment centres, port, airport and hospital;
- To provide relief from severe congestion on the state highway and local road networks;
- To improve the journey time reliability of travel on the section of SH1 between Levin and the Wellington airport; and
- To improve the safety of travel on State highways.

As the Project is part of the Ōtaki to North of Levin RoNS, it has been developed in cognisance of the Ōtaki to North of Levin RoNS project objectives. These are to:

- enhance inter-regional and national economic growth and productivity;
- improve journey times on the state highway network;
- enhance safety of travel on the state highway network; and
- achieve the above objectives through a staged approach that realises the longer term transport needs in a cost effective manner.

The Project contributes to the achievement of the above objectives as part of the staged improvements within the Wellington Northern Corridor, and in particular within the Ōtaki to North of Levin section of the RoNS. It contributes to economic growth and productivity, helps improve journey times and enhances safety.

The specific objectives which apply to the North of Levin section of the Ōtaki to North of Levin RoNS (which applies to this Notice of Requirement) are to:

- enhance inter-regional and national economic growth and productivity;
- improve journey times on the state highway network;
- enhance safety of travel on the state highway network;
- appropriately balance the needs of both inter-regional traffic and local road users; and
- achieve all the above objectives in a cost effective manner.

The Project has been developed to contribute to all the above objectives as described in the Transport Impact Assessment report in Appendix B, Volume II. In particular, the safety benefits are clear, and journey times will be reduced as a result of the improved alignment. Both interregional and local traffic is provided for, including improvements for cyclists and larger, slower-moving vehicles, due to the wider

cross-section and safer shoulders. The Project is cost-effective, as demonstrated by its Benefit Cost Ratio (BCR[5]).

1.6 Project Benefits

1.6.1 Safety

The key safety improvements relate to:

- road geometry, e.g. curves will be eased significantly to improve safety and visibility (from current radius of approximately 300 m to proposed radius of 800 m);
- widening of road cross section generally from about 10.6 m to 17 m, particularly to accommodate wider shoulders and a central median;
- installation of a wire rope barrier between the opposing lanes and on the roadsides throughout much of the project length; and
- a reduction in the number of intersections and accesses onto the highway and their re-configuration to provide safer access.

These safety upgrades are expected to result in a significant drop in the number of deaths and serious injuries within the Project area (projected to reduce from 8 to 1 over a five year period). The safety improvements will be reflected in an increase in the KiwiRAP rating from 2-Star to 4-Star.

The need for an upgrade involving multiple safety solutions is reflected in several factors. Firstly, it is predicted that upgrades to geometry alone (i.e. no median barrier) would result in a drop in deaths and serious injuries from 8 to 4 in 5 year period (rather than 8 to 1 predicted for the preferred option). Secondly, an option involving only the installation of a median barrier without realignment of the carriageway is not practical as the barrier would limit forward visibility in many places. Thirdly, the wider shoulders are necessary to provide space for vehicles to recover if they lose control. They also provide additional width for agricultural vehicles, pedestrians, cyclists, equestrians to utilise the highway more safely, and improve safety for drivers turning left into and left out of driveways.

The Project will also involve upgrades in the vicinity of Poroutawhao School. Works here will include a right hand turn bay when turning from the south, double yellow lines to prohibit passing, and lighting and signage improvements aimed at enhancing safety around the School.

1.6.2 Efficiency

The three tiers of objectives relevant to the Project all emphasise the importance of network efficiency. The following Project objectives are relevant for efficiency (to match with objectives above):

- enhance inter-regional and national economic growth and productivity;
- improve journey times on the state highway network; and
- appropriately balance the needs of both interregional traffic and local road users.

SH1 is the primary transport route for New Zealand. Efficiency savings on this route benefit economic productivity, especially for freight transport. The existing highway form deficiencies within the Project area result in the following losses of efficiency through increased travel time, reduced travel time reliability, and reduced route resilience through:

- poor horizontal curves (below the standard required for a 100km highway);
- narrow road carriage way;
- frequent access ways and intersections; and

[5] For details on how BCRs are calculated see the NZ Transport Agency's Economic Evaluation Manual (https://www.nzta.govt.nz/resources/economic-evaluation-manual)

- poor separation of local road users from regional and national road users.

In addition to these limitations on travel efficiency, crashes can lead to significant delays, particularly when the crash leads to a full road closure. Detour routes add 10 to 15 minutes to travel time per vehicle.

The Project is estimated to improve travel speeds (from the current average of 87km/h to an average of up to 100km/h) and journey time reliability thereby reducing current inefficiencies by:

- improving road geometry;
- widening the carriageway; and
- re-configuring the intersections and accessways along the State highway.

The Project will also enable other planned works to proceed along the State Highway north of Levin, as described below.

1.6.3 Other benefits

The Project is a component of a much larger and nationally significant series of upgrades and improvements to SH1 north of Wellington. This overall project is expected to:

- support the region's growing population
- support increased freight volumes in the region: there will be a 50% increase between 2007 and 2017, with the vast majority of movements by truck
- improve access to Wellington's port, CBD, airport and hospital
- reduce severe congestion on state highways and local roads
- make travel safer
- make journey times more reliable
- make the highway more resilient to crashes or natural disasters by providing viable alternative routes and constructing roads that can recover quicker from natural events.

The safety and efficiency benefits of the Project described above will contribute to these wider beneficial outcomes. In addition to these benefits, there will also be:

- economic benefits to the district and region during the construction phase through creating local employment, and engaging local firms to provide goods and services;
- improvements in the management of storm water discharges from SH1, which will contribute to improved water quality in nearby waterways as well as managing local flooding risks; and
- enhancements to local aquatic ecology, due to replacement of existing culverts as well as improved water quality.

As a further benefit, the Project will also enable future roading upgrades as planned for the North of Levin section of SH1. These works include intersection upgrades, passing lanes and roadside safety upgrades. These works, in particular the passing lanes, will result in an increase in efficiency, improvements in journey time and a reduction in driver frustration. Due to the existing safety issues in the Project area these works cannot proceed without the Project being completed first.

2 Description of the Project

2.1 Project Location

The Project area extends from the Poroutawhao School north of the Waitarere Beach Road intersection with SH1 to 410 m south of the Clay Road intersection with SH1 and is shown on Figure 2-1. The Project area is some 4.3km in length.

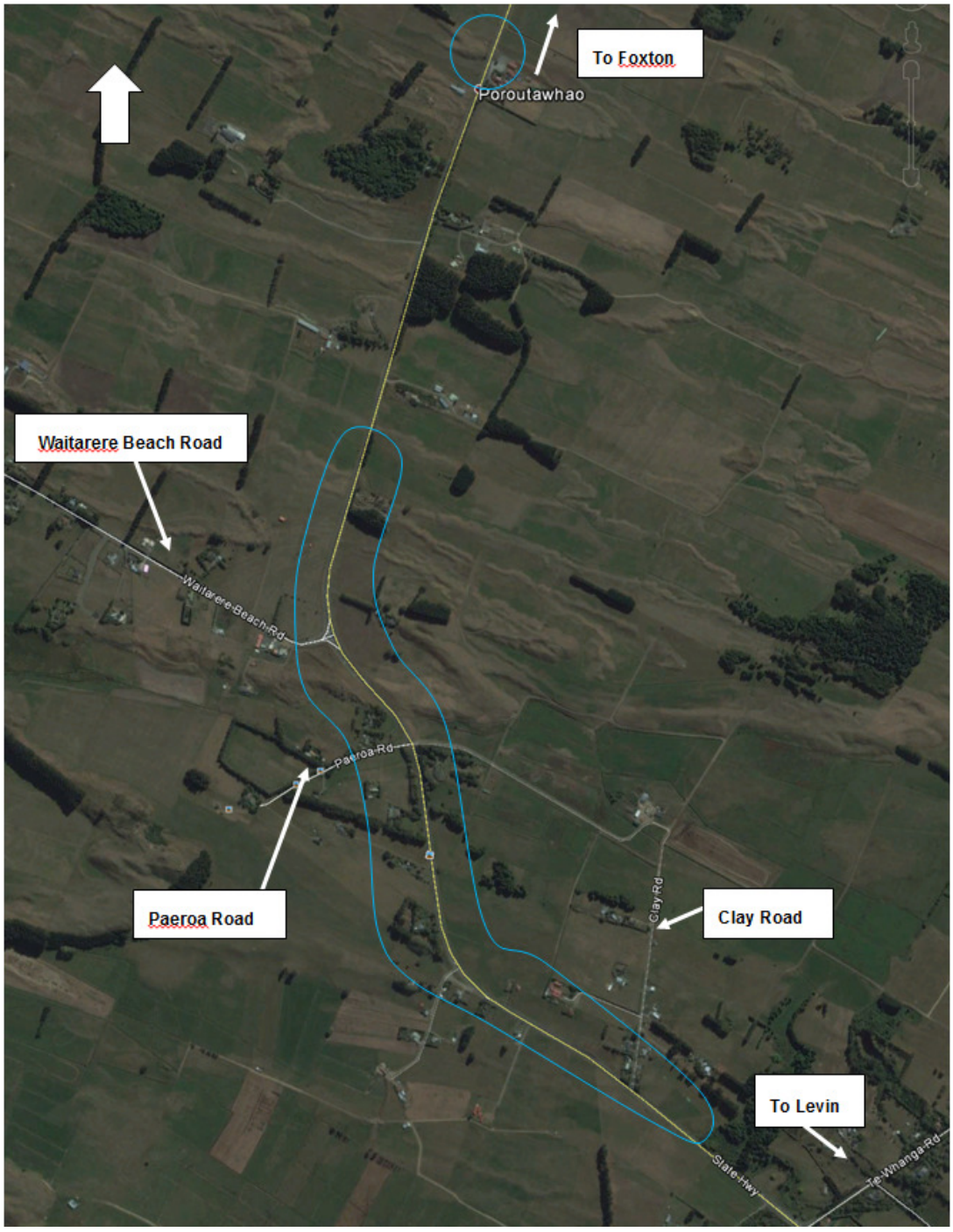

Figure 2-1: Generalised Project Area

2.2 Project Improvements

The improvements proposed through the Project are designed to address the problems with the existing section of SH1 road described in section 1.2 of this document and to achieve appropriate efficiency benefits in accordance with the objectives for the North of Levin section of the Ōtaki to North of Levin RoNS. These improvements were briefly set out in section 1.2 but are explained more fully here. Plans and cross sections in Volume III provide more detail. The proposed works are:

- Replacing the three existing curves with two curves of a greater radii (i.e. straightening the curves) to improve the alignment of the highway. These are to be 800 m radii curves with a 110 km/h design speed and higher design standards;
- Widening the highway cross section to provide a median strip and wider shoulders (tapering in to connect to the sections of highway outside the Project area). This provides an increased area for drivers to recover control of their vehicle if they were to lose control and more space for agricultural vehicles and cyclists to travel on the highway without being a hazard to other users/ themselves;
- Providing a wire rope median barrier within the median strip. Austroads and Transport Agency guidance indicates that a median barrier should be provided when there is a high percentage, or high average daily number, of heavy vehicles or severe consequences for vehicles crossing the centreline. These situations apply within the Project area;
- Providing wire rope barriers on the outer edge of the hard shoulder (but not across private accessways). These will help to further reduce the likelihood of the fatal or serious crashes where vehicles have lost control or strayed outside of their lane, running off the road;
- Improving the Waitarere Beach Road/SH1 intersection by relocating it onto the new alignment, which enables better visibility of oncoming traffic and improved turning lanes. A slip lane for northbound traffic to veer off the highway onto Waitarere Beach Road will also be provided which will form part of a turn around facility for northbound traffic to turn back south;
- Improving the Clay Road/SH1 intersection by relocating it onto the new alignment which enables better visibility of oncoming traffic, the introduction of a right turn bay on SH1 for traffic turning into Clay Road, and providing a left hand slip lane from the north to enable traffic to turn north at this intersection;
- Closing the Paeroa Road intersection with SH1, and providing a new connection to a new intersection at Hinaupiopio further south. This removes the conflict of having the two intersections close together on SH1, and provides adequate connection and turning opportunities for local residents; and
- Installing a dedicated right turning bay, improved lighting and new signage at Poroutawhao School to alleviate safety concerns raised by the community at this location.

The cross section of the existing highway will be increased. This will result in 3.5 m wide lanes, a 4m median strip (where the median barrier will be located) and sealed shoulders of 3.0m up to the front of the edge barrier. The total width of the highway cross section would be increased from approximately 10.6 m to 17 m. The proposed cross section is shown in the Plan Sets J and K in Volume III of this document.

2.3 Earthworks

The topography through the Project area contains a number of sand dune ridges and undulations which will require cut and fill to enable the realigned highway to be constructed. Earthworks will also be required to enable the development of the proposed drainage (discussed in section 2.4 of this document).

A general profile of 3H:1V (18.4%) will be used for both cut and fill batter slopes, and drainage swale grades, except in some areas where more gentle slopes of 5.6H:1V (10%) are likely to be necessary. These grades have been selected on the basis of available geological information for this area that indicates the presence of Aeolian sands, beach deposits and alluvial gravels (see Volume II, Appendix I of this document).

The bulk earthworks will cover a total area of approximately 7.1 ha (or 71 000 m^2). The more significant earthworks are proposed to be undertaken at the following locations:

- RP[6] 5540-5520: 3-4 m high cut batter;
- RP 6020-6080: 5-10 m high cut batter (ridge line[7]);
- RP 6700-6940: 3-4 m high fill batter; and
- RP 7200-7280: 3-4 m high cut batter.

The general locations of the earthworks are shown in Plan Sets D to F and K in Volume III of this document.

In particular the earthworks at RP 6020-6080 are to accommodate the realignment of SH1 and improvements to the Waitarere Beach Road intersection with SH1, including a left-turn slip lane. The work here continues to widen the opening in the dune ridge line that was created for the original construction of SH1.

The bulk earthworks within the Project area will involve moving approximately 122,000 m^3 of material. The material to be moved is estimated[8] as follows:

- Topsoil stripping (cut): 17,000 m^3;
- Cut to fill: 23,000 m^3;
- Cut to waste: 77,000 m^3; and
- Imported material: 5,000 m^3.

These volumnes are indicative only and will be further refined at the design stage.

2.4 Drainage and Stormwater Management

The existing watercourses and drainage patterns in the area are described in section 3 of this document. The existing management of stormwater from road runoff is passive. The straight sections of the existing highway are simply crowned in the centre with runoff shedding to the shoulder-berm area, roadside drains or to and adjacent land. The untreated runoff contains contaminants from the road and vehicles which at present contribute to reduced water quality in the wider environment.

The realigned highway will include more proactive measures to manage stormwater runoff from the highway which will assist in treatment of roading contaminants and improve water quality in the area overall[9]. A formalised channelisation and treatment process for stormwater runoff will be part of the upgrade works.

The stormwater runoff from the highway will be managed through a combination of grassed road-side engineered swales that collect, channel and direct runoff into retention ponds and/or direct discharge to watercourses.[10] The swales and ponds allow time for stormwater runoff from the highway carriageway to settle and the water to infiltrate into the ground and not directly discharge to a watercourse. The use of swales and ponds will assist in improving water quality, and better manage the volume of storm water runoff in this section of SH1 and the surrounding environment.

6 'RP' refers to 'Route Position' and relates to a particular distance along the route based on the state highway network referencing system. These can be seen on the plans in Volume III of this document.
7 Referred to as Tauheke Ridge.
8 The estimate is based on a 3D computer design model and current knowledge of the ground conditions without specific geotechnical investigations.
9 In accordance with the Transport Agency's design requirements, which seek to remedy existing road-related reduced water quality, as well as providing for the effects of the new works.
10 These engineered swales are sometimes referred to as "environmental swales".

There will be three permanent highway stormwater management retention ponds (refer to Plan Set H in Volume III of this document). They will have side slopes of 4H:1V and together will be approximately 1,000 m^2 in area.

The design of the drainage has been based on the requirements of the Transport Agency's Environment and Social Responsibility Standard Z19: Stormwater Treatment Standards for State Highway Infrastructure[11]. Stormwater swales will be provided on either side of the upgraded highway.

While the stormwater design for the northern and middle sections generally has the highway runoff directed towards retention ponds, the middle and southern sections of the Project area involves highway runoff directed through swales to existing watercourses. From the high point at about RP 7060 the highway runoff will be channelled north and south through swales (with some associated treatment) to discharge to ponds in the north and watercourses at about RP 7820 and 6240 in the south. The drainage plan and a description of the long-term management of stormwater for the Project area is provided in Appendix C in Volume II of this document.

The drainage swales that will be constructed along the majority of the alignment will have front and back slopes at 3H:1V, and a 0.5 m flat bottom, resulting in a swale width of generally 3.5 m to 4 m.

2.5 Construction Methodology

An outline of the construction methodology is provided below. This section should be read as indicative only. However, the information is provided in sufficient detail for the effects of the construction phase to be understood and has taken a conservative approach (actual construction methods and approaches may be undertaken in ways which have lesser effects). The description which follows has formed the basis for the investigations described in the various technical reports in Volume II and for the assessment of effects on the environment. The final detailed construction methodology will be confirmed in consultation with the contractor appointed for the Project.

2.5.1 Construction Programming and Activities

New sections of road, away from the existing alignment, account for the majority of the Project length, other than at the tie-backs to the existing highway at either end of the works, and two crossings of the existing highway. Keeping the traffic flowing along the highway during the construction phase will be required to limit disruption to the existing highway traffic. Temporary speed reductions and temporary traffic management measures will be necessary.

The construction activities will include:

- The establishment of the construction site (i.e. site compound and offices);
- Installing environmental controls (e.g. erosion and sediment control);
- Site clearance;
- Locating and realigning existing services;
- Undertaking earthworks and establishing the drainage;
- Pavement and surfacing construction (e.g. basecourse and chip seal); and
- Installing traffic services: barriers, markings, signage, landscaping.

It is expected the physical works can be completed (practical completion) within approximately 12 months of commencement. However, this is dependent upon the contractor's methodology, levels of resourcing and suitable weather conditions.

[11] https://www.google.co.nz/?gws_rd=ssl#q=z19+stormwater+treatment+standard+for+state+highway+infrastructure

2.5.2 Undertaking the Earthworks

The earthworks will be undertaken using a combination of on- and off-road equipment. Suitable cut material will be hauled to locations on the site which require fill. Cut to waste material will be disposed of preferably on-site, or otherwise offsite.

The largest cut will run through the existing sand dune ridge just south of the realigned Waitarere Road intersection (between RPs 6000-6100). The cut is required to accommodate the realignment of SH1. This work is likely to be completed early in the earthworks phase, with seeding and landscaping established to avoid erosion from the dune sand material. The excavations into this dune ridge will be undertaken in accordance with the Transport Agency's Specification for Earthworks Construction F/1:1997. While the final construction method would be determined by the appointed contractor the excavation of this dune ridge will probably be performed in a "top-down" manner for ease of construction, to minimise safety concerns and to achieve the cut slope angle required and to manage the risks of potential dune deformation. A top down manner also provides a platform (benches) for further slope reinforcement works if they are required, such as retaining walls.

Where fill material is required, the contractor is likely to use material cut from the site or use borrowed fill from other locations within the Project area. This may be determined by volumes and quality of the material required.

The stormwater drainage, swale drains, infiltration trenches and detention ponds will be formed during the earthworks phase. Stripped topsoil is likely to be spread in swales and other suitable locations, prior to hydroseeding or landscaping.

2.5.3 Erosion and Dust Suppression

The erosion and sediment control measures proposed for the Project are based on the Greater Wellington Regional Council (GWRC) document entitled 'Erosion and Sediment Control Guidelines for the Wellington Region (2002)' (the Guidelines).[12] The proposed approaches and designs are provided in Appendix D in Volume II. The proposed control measures will consist of runoff diversion channels, silt fences, and sediment retention ponds. The proposed measures are dictated by the area and topography of the disturbed area. The disturbed area of land (including bulk earthworks) within the work site is approximately 12.2 hectares[13].

The purpose of erosion and sediment control measures will be to:

- prevent clean water flows entering the site of the works; and
- transport and treat sediment laden flows before discharge into the surrounding environment.

The runoff from the earthworks will be channelled through treatment devices and discharged to watercourses that run through farm drains and ultimately discharge into the Manawatu River. There will not be any discharges to watercourses that drain to Lake Horowhenua.

All erosion and sediment control measures will be subject to on-going maintenance throughout the construction period and will be monitored and inspected during and after significant rainfall events.

For work undertaken in dune fields and in dry windy conditions (the Waitarere area experiences high and persistent winds) there is a risk of windblown sand. In order to mitigate the effects, exposed areas will be dampened down with water or covered with mulch when required.

2.5.4 Traffic Management During Construction

The management of traffic during construction will be undertaken in accordance with the Transport Agency's Code of practice for Temporary Traffic Management (COPTTM). As much of the Project involves construction outside the present SH1 area, most of the construction will be undertaken without interruption to traffic flows.

[12] Horizons uses these guidelines for erosion and sediment control through the requirements of the One Plan (regional plan).

[13] Note that this is greater than the indicative area of bulk earthworks (refer to section 2.3 of this document) because it includes estimates for accesses, tracking and 'tying in' of bulk earthworks areas to existing contours.

It anticipated that the appointed contractor's strategy for undertaking the works at the Project extents, where the new highway is tied into the existing one, will involve reducing the width of traffic lanes temporarily to allow part of the width of the works to be constructed whilst still allowing for traffic on the other half of the road. The traffic will be switched over to the other lane when the new part of the lane width is completed and allow the remaining part to be completed. This approach may include the construction of temporary road alignments within the designation, as required, to move vehicles safely around construction zones.

Managing traffic at the local road intersections (Waitarere Beach Road, Paeroa Road and Clay Road) is an important consideration. The majority of the construction of the new intersection can be undertaken 'offline' with the existing intersections continuing to function, albeit with speed reduction and temporary traffic management measures in place. This will keep any potential delays and disruption to road users at a minimum as far as this is practicable. The switch over from the existing highway to the new alignment should be straightforward to undertake without necessitating a significant amount of temporary works.

The specific details of temporary traffic management during construction will be subject to the development of a Traffic Management Plan (TMP) once a contractor is appointed. This TMP will follow guidelines in the COPTTM and will be approved by the Transport Agency.

3 Existing Environment and Site Description

The existing environment of the highway in the Project area is described below. More detailed descriptions are provided in each of the relevant technical reports in Volume II of this document.

3.1 State Highway 1, Local Roads and Māori Roadways

SH1 is the primary highway connecting New Zealand from the north to the south. SH1 within the Project area is an undivided carriageway which currently carries over 8,000 vehicles per day (vpd)[14]. The speed limit is 100 km/h. It has three intersecting roads - Waitarere Beach Road and two Māori roadways - Paeroa Road[15] and Clay Road. The highway and local roads are shown on Figure 2-1.

The existing alignment of the highway in the Project area has three horizontal curves forming an 'S' shape. The radii of these curves is, from north to south, 300m, 360m and 340m. At the southern end there is a more gentle curve with a radius of 1000m. The typical cross section is generally two 3.5 m traffic lanes with narrow sealed shoulders, with no median separation. There are no pedestrian facilities or dedicated cycle facilities on SH1 through the Project area. There is only a minimal sealed shoulder currently available for cycling that varies in width between 0.5 m-1.0 m. A typical cross section of the existing SH1 in this location is shown in section 5 of the Transport Impact Report, Appendix B in Volume II of this document.

As explained earlier, SH1 within the Project area has been the site of a high number of fatal and serious crashes. Of particular concern are the run-off-road and cross-centreline crashes, due to the severe nature of such crashes.

The section of SH1 in the vicinity of Waitarere Beach Road intersection has had curve easing at least twice in the last century to improve the safety of the area.

Waitarere Beach Road is the main intersection within the Project area. It currently carries approximately 3,000 vpd. The intersection provides the only access to the Waitarere Beach community which includes residential properties as well as commercial and leisure facilities. The intersection design is a priority T intersection. There is no recorded crash problem at the Waitarere Beach Road intersection and the intersection operates safely in its current form.

Paeroa and Clay Roads are Māori Roadways, which are likely to have been formed under the Native Lands Act 1909 to provide access to Māori land blocks in the locality.

Paeroa Road, originally known as Mill Road, provides access to the Paeroa Urupā and a small number of blocks of land. Its intersection with SH1 is currently a priority controlled T-intersection with all movements permitted. It is formed over the first 320m from the highway and after that is an unformed access. Although Horowhenua District Council[16] has advised that the first 300m is classified as public road, Paeroa Road is shown as Pt 7D2D Manawatu-Kukutauaki so it can be considered to be Māori roadway. There are also two small slivers of land in separate title that appear to have provided for some straightening and widening of the roadway near SH1. Part of one of these is within the area to be designated. It is understood that this has been the basis for Horowhenua District Council maintaining the roadway. There is a very low traffic flow on Paeroa Road (estimated in 2012 at 70vpd).

Clay Road provides access to individual houses, Matau Marae and farmland. Its intersection with SH1 is a priority-T intersection with all movements permitted. There is no known traffic data available for Clay Road[17]. In the absence of traffic data, it is estimated that the volumes would be similar or slightly more than Paeroa Road based on the types of land use[18] and number of properties served. Traffic volumes are expected to be less than 200 vpd.

[14] Average Annual Daily Traffic (AADT). Both directions. Refer to section 1 for more detail.
[15] Also part public road.
[16] Letter from the Horowhenua County Engineer, dated 20 November 1987.
[17] Data source: Horowhenua District Council and The Transport Agency's RAMM database.
[18] Refer to The Transport Agency's Planning Policy Manual (https://www.nzta.govt.nz/resources/planning-policy-manual/)

3.2 Historical and Cultural Setting

Historically, this area has been desirable to both Māori and Europeans, for farming and a source of food due to its good climate and fertile soil. It has been extensively occupied during the 19th and 20th centuries.

The early Māori occupation of this area was by Muaūpoko who were replaced by Ngāti Raukawa during the 1830s. The Māori occupation resulted in some land clearance for housing, fortifications and cultivation fields. The tangata whenua for the Project area are Ngāti Huia who whakapapa to Ngāti Raukawa. Europeans first arrived in the early part of the 19th century. However, the majority of the European settlement and development of the land took place in the mid to late 19th century. It was this latter occupation which significantly changed the landscape through wide scale land clearance for pastoral farming and the development of the railway and roads through the area.

There are numerous culturally and historically important sites in the general vicinity of the Project area. These sites include:

- Māori Pa (Nga Haere);
- Urupā (Māori cemetery) (Paeroa Urupā and 7D2D15[19] urupā);
- Two marae (Ngāti Huia and Ngāti Matau);
- Two churches;
- Former Māori dwellings and kainga (groups of housing), waka construction and cultivation areas;
- The site of a former Māori flour mill and water race system; and
- Māori roadways (Paeroa and Clay Roads).

The approximate location of known culturally and historically important sites is shown on Figure 3-1 (map source: Google maps).

The site of the Māori flour mill (Poroutawhao Mill) is located near Paeroa Road. The Nga Haere Pa (S25/60) and Paeroa Urupā are identified in the NZ Archaeological Association's database. The Horowhenua District Plan does not identify any of the above sites as heritage items.

There were also several small collections of housing, kainga, waka construction, and cultivation areas within the Project area. These residences and Kainga include Huia (7D2D17), Hohaia te Pahau (7D2D56), Kapa te Karaha (7D2D57D), Hohaia te Pahau (7D2D57B), and Paiaka and Kireona Paratawa (7D2D57B) residences. The kainga include Te Paiaka no te Waiariki pā and un-named kāinga (7D2D16) and Waitarere Sec. 7A[20], 8 and Ngawhakahiamoe settlement. However, there remains a significant and active Māori landholding and presence in the locality as evidenced by the two existing marae and many homes in the area.

Of the two churches in the locality only one remains. The former St Michael's Catholic Church has been gone for many decades and it is likely that its site has also been completely destroyed. The Whare Rongopai remains alongside the highway, and its frontage is encroached upon by the Project.

There is anecdotal evidence that koiwi have been discovered in the area near the Nga Haere Pa and Waitarere Beach Road. Together with the settlement history of the area, there is a reasonable potential for unexpected discoveries of koiwi and archaeological artefacts beyond the identified archaeological and historic sites.

[19] Historic land parcel description.
[20] Historic land parcel description.

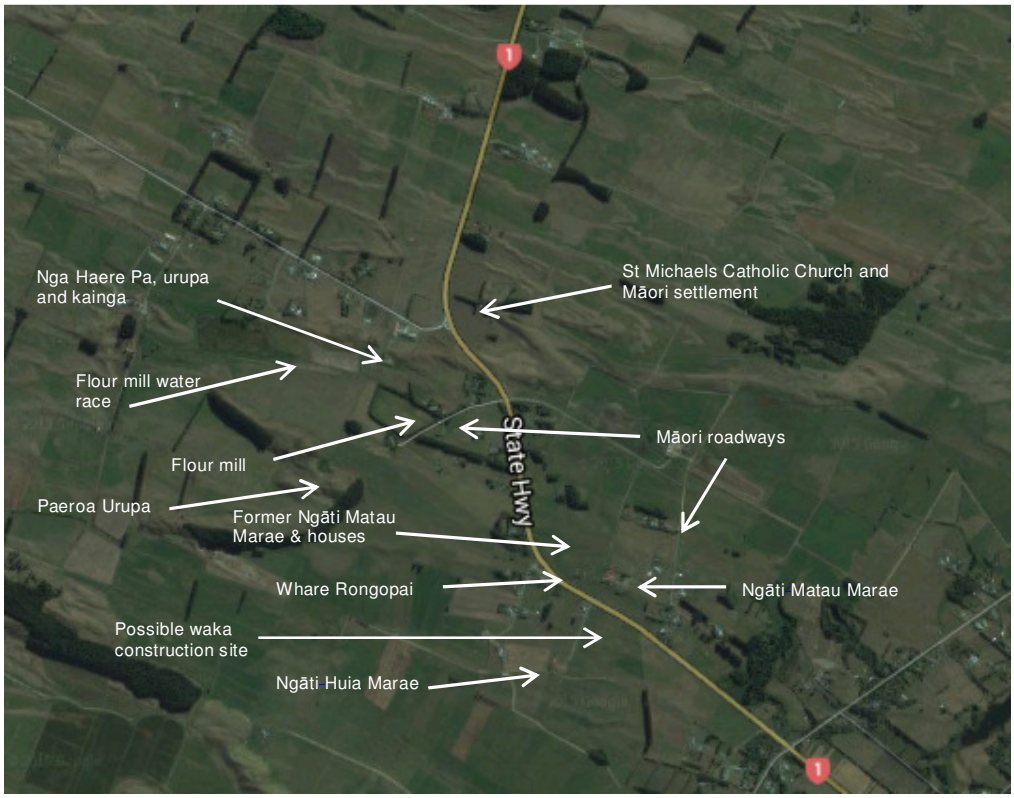

Figure 3-1: Culturally and Historically Important Sites

Both Marae use the Paeroa Urupā which lies to the south of the Project area. A tangi can generate a concentrated cross highway use for accessing/exiting the Paeroa Urupā at Paeroa Road. When a tangi occurs at the Matau Marae, vehicles need to cross SH1 travelling northwards towards the Paeroa Urupā and traffic management is often arranged with the Police.

More detailed information about the cultural and historic importance of the area is in the Archaeological and Heritage Assessment, Appendix E in Volume II of this document.

3.3 Social and Economic Setting

SH1 north of Levin is an important economic life-line for the North Island, forming the main link between Levin and regions to the north. The highway contributes to the social and economic fabric of the Horowhenua District through the transport of people, goods and services to, from, within and through the district.

The land within the vicinity of the Project area is mostly farm land with dairy farming and horticulture being the major land uses. Waitarere Beach Road provides access to a number of farms and some rural commercial businesses, residential property and the Waitarere Beach township. Waitarere Beach includes a permanent, as well as a holiday, population. Recent subdivisions have provided for considerable expansion of this settlement. All of these properties and land uses access to SH1 either directly or indirectly.

In addition to farming, there are a number of small businesses in the locality including a bed and breakfast and a furniture moving operation.

The Poroutawhao School is located at the northern end of the Project area and pupils travel to and from to school either by bus or private car. Pupils are actively discouraged from cycling or walking to school due to safety concerns.

3.4 Geology, Landscape and Hydrology

The majority of the Project area is underlain by beach deposits on Ōtaki Sandstone. Published geological mapping of the Project area indicates the northern portion comprises aeolian (wind-blown) sand deposits, the central section alluvium, and the southern section raised beach deposits. The geological map of the area is shown in the Preliminary Geotechnical Assessment of Effects, Appendix F in Volume II of this document.

The longitudinal shaped undulating topography of the Project area, particularly evident in the northern section, indicates the presence of sand dunes although alluvial deposits are also found in the area. The northern and central section of the Project area contains silty sand and sandy silt and the southern section contains alluvial deposits of silt with some gravel and trace sand.

The windblown loess that has formed the dunes usually has relatively low values of dry unit weight and moisture content. In their dry state, such soils can support moderate loads and undergo relatively small settlement. However, upon wetting, the cohesion is lost and large settlement can occur even if the loading remains constant. This results in the need for particular care in design of finished slopes in the Project area.

The Project area wider landscape is essentially rural in nature. It includes a mix of productive land uses, most notably dairying and cropping. Land use is dominated by pastoral farming and small clusters of rural housing based around and between the two local Marae and the local road intersections with SH1. Vegetation consists of pasture, exotic shelter belts and occasional lowland forest remnants, and some gardens associated with the dwellings in the area. There is a discernible 'patch-matrix' vegetation pattern in the landscape formed by shelterbelts overlaying the indigenous lowland forest remnants.

The Project area falls within two landscape area classifications in the HDP: the Coastal Lakes Domain and the Levin-Koputaroa Domain. The landscape of the Project area reflects parts of the landscape within both these Domains. The Project area is not considered to be within the coastal environment[21].

The natural hydrology is complex and dynamic. The landform has been shaped by wind and flooding processes, as well as extensive human modification with the locality's conversion into pastoral farming. The drainage and watercourses in the area are dominated by the grid pattern of farm drains. The low lying peat areas are affected by rises in the water table which results in surface ponding at various times[22].

The drainage within the wider Project area is characterised by two main catchments and this is reflected in Horizon's One Plan Surface Water Management Zones and Sub-zones[23]. The drains and streams in the Project area eventually flow either through a network of farm drains and modified streams to the Manawatu River or through farm drains and modified streams to Lake Horowhenua. The catchments and general directions of modified watercourses or streams that are within the Project area are shown on Figure 3-2. This shows, amongst other things, that the catchment boundary between the two catchments lies along SH1 in various places at the southern end of the Project area. Stormwater management systems for the Project will direct all stormwater from the road surface into systems that drain to the Manawatu River. No stormwater from the Project will flow into the Lake Horowhenua catchment.

[21] See ""Natural Character Assessment of the Horowhenua Coastal Environment"," Boffa Miskell Ltd for Horowhenua District Council, September 2012.
[22] Horowhenua District Plan. Section 2.
[23] Appendix AA of Horizon's 'One Plan'.

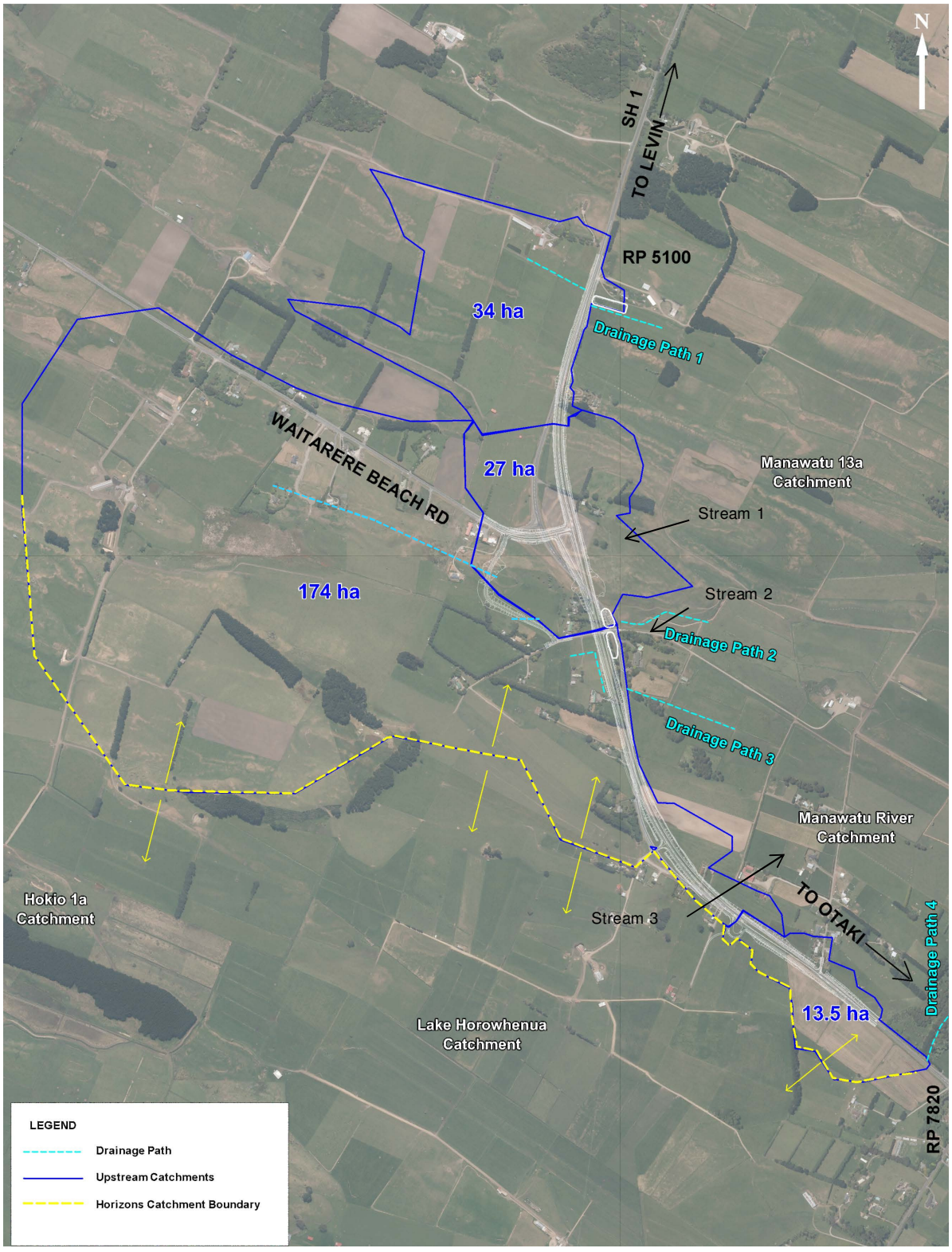

Figure 3-2: Streams and Drainage Catchments of the Project Area

There are three modified 'natural streams' within the Project area, in addition to a number of artificial drains (refer to Table 3-1 and Figure 3-2). Two natural streams[24] are located near Paeroa Road (Streams 1 and 2). Stream 2 originates upstream of SH1 on a lifestyle block where artificial drains have been dug. This was part of a water race that took water from a former lagoon (Te Konganui Lagoon) to power the flour mill that operated in the 1880s[25]. Whilst this stream has been modified upstream, it is considered to be a natural stream downstream of SH1. Stream 3 may be the former outlet channel from the former lagoon that historically appears to be part of a larger wetland network (Waimakuira Swamp) that has all but disappeared with the development of the network of drains to allow the land to be farmed. Stream 2 has been channelized and partially piped, but has the characteristics of a modified natural stream. Stream 3 is a modified natural stream that was modified by draining a kahikatea swamp forest. All other streams are artificial channels dug for drainage.

Table 3-1: Summary of Streams and Drains

#	RP	Stream Type	Description
	5240	Dry	Dug drain. Small swale upstream (west) of SH1 widening to a 1-1.5m wide drain east of SH1. No evidence of natural stream morphology. Dry.
1	6160	Ephemeral	Modified natural stream east of SH1 north-east of Paeroa Road. The stream commences at two perched pipes, one pipe below SH1 and one that is fed from a grate next to SH1. No natural stream is present upstream of SH1, only dug, artificial drains.
2	6240	Perennial	Modified natural stream with straightened and piped sections south of Paeroa Rd. Some shaded and open sections. There are two perched culvert pipes downstream of SH1 on private land which are significant impassable barriers to fish passage.
	7350-7800	Wetland	Modified wetland located at 463 SH1. Includes mature kahikatea swamp forest and Carex geminata wetland with some crack willow. Part of the wetland is grazed by stock.
3	7800	Perennial	Modified natural stream created by digging within the kahikatea swamp forest wetland (above) at 463 SH1. Well shaded by native vegetation. Two perched pipes beneath SH1 are also barriers to fish passage.

More detailed information about the existing geology, landscape and hydrology is included in the following reports in Volume II of this document: Preliminary Geotechnical Assessment of Effects (Appendix F), Landscape and Visual Assessment (Appendix H) and Stormwater Design (Appendix C).

3.5 Ecology

The ecological environment within the Project area includes terrestrial ecology and instream ecology. For further detail on the existing ecology refer to the Ecological Assessment Report in Volume II of this document (Appendix G).

3.5.1 Terrestrial Ecology

The terrestrial ecology includes vegetation, avifauna and herpetofauna.

3.5.1.1 Vegetation

The Project area is located on the boundary between the Foxton Ecological District (ED) and Manawatu Plains ED in the Manawatu Ecological Region. These areas include extensive sand dunes, several estuaries, wetlands, lagoons and some coastal swamp forest remnants and consist of flat-surfaced flood

[24] More detail of the streams can be seen in Appendix 2 of the Ecological Assessment Report, Appendix G in Volume II of this document.
[25] Kete Horowhenua http://horowhenua.kete.net.nz/en/site/topics/2811-vintage-flour-mill-at-poroutawhao-levin

plains and terraces. Vegetation has been modified by planting of pine forests, introduction of marram grass, pasture and the spread of weeds.

The majority of the Project footprint has been highly modified by rural development and the existing highway. Very little native vegetation cover remains. Alongside SH1, vegetation consists of improved pasture which is heavily grazed, with shelterbelts and small copses of exotic trees. Trees are mainly pines, with coastal banksia, some poplars and willows. Small plantings of exotic and native trees and shrubs also occur alongside residential dwellings.

3.5.1.2 Avifauna

The birds in the vicinity of the Project area comprise common native and exotic birds of open sites and modified vegetation. Overall, avifauna diversity was found to be low in areas of pasture, with greater diversity found near planted or natural vegetation. The vegetation present on site is likely to provide low quality nesting habitat for native and introduced birds. Silvereyes appear to be the most common native species present.

3.5.1.3 Herpetofauna

There are native and exotic herpetofauna species that have been recorded within about 10 km of the Project area. These include two exotic species of frog and ornate skink.

The majority of the Project area is unsuitable for native herpetofauna. Grazed pasture and heavily mown or sprayed roadsides provide no habitat for skinks or geckos. Discrete areas of low quality but potential habitat for terrestrial skinks were identified within the Project area, including in the un-mown berms at a number of properties.

There is no suitable habitat for arboreal geckos, apart from the mature kahikatea swamp located outside the Project footprint. The value of this habitat is reduced given the absence of regenerating native vegetation such as kanuka and manuka scrubland and/or connections to older growth native forest.

3.5.2 Aquatic Ecology

The ecological habitat in the watercourses within the Project area streams is poor, both in terms of in-stream and riparian conditions. A macroinvertebrate survey[26] was undertaken which indicated poor water quality and habitat conditions in all three streams in the Project area. They had a large proportion of Molluscs (high number of freshwater snails). This is expected with the high levels of macrophytes that are associated with nutrient enrichment from farming.

Surveys on the adjacent Koputaroa Stream show a total of seven native fish species within that stream and its and tributaries. These include three at risk species: longfin eel, inanga and brown mudfish. Brown mudfish have been recorded at five of the eight sites that have been surveyed within the sub-catchment, four of these being wetlands adjacent to the stream and one being in an upstream tributary. The Koputaroa Stream has similar land use and topography to the Project area, and being within the same catchment, is likely to have similar fish species present.

Habitat conditions within the three streams within the Project area are suitable for shortfin and longfin eels. A survey[27] found brown mudfish were in stream 1 which may also contain short fin eels (evidenced by the presence of eel slime). Suitable habit for mudfish appears to exist in stream 3, and they may be present there. No Brown mudfish were found in stream 2. However, Brown mudfish and/or banded kokopu may also be present in the more favourable conditions in the kahikatea swamp forest to the south of the Project area. Inanga are less likely to be present given the location in the catchment and presence of barriers to fish passage. Habitat is considered less suitable for bullies but these may be present in low numbers.

[26] Undertaken for this AEE (refer to the Ecological Survey in Appendix F in Volume II of this document).
[27] Undertaken for this AEE (refer to the Ecological Survey in Appendix F in Volume II of this document).

3.6 Noise

The existing noise environment has been assessed through both modelling and measurement. Measurements of typical levels of existing traffic noise were undertaken in the vicinity of three dwellings within the Project area. These dwellings were located in the northern, middle and southern sections of the Project area.

The readings are used to establish the existing $L_{Aeq(24\ hr)}$ levels of traffic noise at known locations adjacent to the existing highway and which will be affected by the proposed realignment. These results were used to model the noise environment in the future (with and without the Project).

Dwellings and other noise sensitive receivers (e.g. schools, marae and churches) are called Protected Premises and Facilities (PPFs) in NZS6806:2010 *Acoustics - Traffic Noise - Noise From New & Altered Roads*. This standard forms the basis of assessing traffic noise. There are 31 PPFs within 200 m of SH1.

The noise environment for the existing and future SH1 (without the Project) is shown in Table 3-2.

Table 3-2: Existing and Future Noise Environment

Measurement location	Measured Noise $L_{Aeq(24h)}$	Predicted Noise 2028 $L_{Aeq(24h)}$	Comments
North (648 SH1)	52.7	54	The 2028 noise level is based on the AADT for 2028 with no upgrades to SH1 ("Do Minimum")
Central (511 SH1)	57.9	55	As above
South (533 SH1)	63	69	As above

The survey of ambient sound levels revealed the existing environment is dominated by sounds from traffic passing through the area on the existing SH1. The existing environment also includes occasional sounds from equipment, animals and people associated with residences and facilities such as two marae located in the area. In addition, bird song was a noticeable feature of the ambient sound environment at some locations.

The existing noise environment is described in more detail in the Acoustic Assessment Report Appendix I in Volume II of this document.

4 Statutory Framework

This section describes the statutory context and the main objectives and policies of the relevant statutory documents.

4.1 Resource Management Act 1991 Context

The sections of the RMA relevant to the consideration of this NoR are set out in this section.

4.1.1 Section 181 – alteration of designation

The NoR for an Alteration of Designation (Designation D2) by the Transport Agency to the Horowhenua District Council is made in accordance with section 181 of the RMA. Section 181(2) states that:

(1) A requiring authority that is responsible for a designation may at any time give notice to the territorial authority of its requirement to alter the designation.

(2) Subject to subsection (3), sections 168 to 179 shall, with all necessary modifications, apply to a requirement referred to in subsection (1) as if it were a requirement for a new designation.

The Transport Agency is a Requiring Authority in accordance with section 167 of the Act. The NoR is given in the prescribed form under section 168(2), being Form 18 included in Volume I of this document.

Section 181(3) outlines circumstances by which a requiring authority may alter a designation without the formal procedure for consideration of a NoR. As set out in Table 4-1, these circumstances do not apply to the current NoR, therefore, the normal process under sections 168 to 179 of the RMA will be followed. Given the extent of consultation, and that the more than minor environmental effects are generally limited to adjacent properties, it is however available to the Council to proceed on a limited notification basis.

Table 4-1: Assessment in terms of S181(3) of the Act

S181(3) Requirements	Assessment
(3) A territorial authority may at any time alter a designation without notice if:	
(a) the alteration - *(i) involves no more than a minor change to the effects on the environment associated with the use or proposed use of land; or* *(ii) involves only minor changes or adjustments to the boundaries of the designation; and*	The proposed works are consistent with the purpose of designation D2 which is for a 'State Highway'. Works are proposed within the existing designation boundary and the designation boundaries need to be altered for other parts of the works. The works that are subject to this alteration will result in a change to the effects on the environment that will be more than minor. The environmental effects (both positive and adverse) are described in section 5 of this document. The extent of the proposed designation boundary change is shown in the Designation Plan in Plan Set A, Volume III of this document. The extent of the alteration shown is considered to be more than a minor change or adjustment to the existing designation boundary.
(b)written notice of the proposed alteration has been given to every owner or occupier of the land directly affected and those owners agree with the alteration; and	While the landowners that are directly affected by the alteration have been consulted, formal written notice has not been given to them and they have not "agreed" to the NoR.

(c) both the territorial authority and the requiring authority agree with the alteration— and sections 168 to 179 shall not apply to any such alteration.	There is no formal agreement between the Transport Agency and Horowhenua District Council on this alteration and therefore RMA sections 168 to 179 apply.

4.1.2 Section 171 – recommendation by territorial authority

Section 171 outlines the matters to be considered by a relevant territorial authority when considering a NoR made in accordance with Section 168.

Section 171(1) states the following:

(1) When considering a requirement and any submission received, a territorial authority must, subject to Part 2, consider the effects on the environment of allowing the requirement, having particular regard to:

(a) any relevant provisions of

a. a national policy statement;

b. a New Zealand coastal policy statement;

c. a regional policy statement or proposed regional policy statement;

d. a plan or proposed plan; and

(b) whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work if:

(i) the requiring authority does not have an interest in the land sufficient for undertaking the work; or

(ii) it is likely that the work will have a significant adverse effect on the environment; and

whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought; and

any other matter the territorial authority considers reasonably necessary in order to make a decision on the requirement.

The assessment of the Project against the above requirements is set out as follows:

- s171(1)(a) - the relevant provisions of plans and policy statements to the Project are described and discussed in section 4.6 of this document;
- S171(1)(b) - the consideration of alternatives undertaken for the Project is outlined in section 4.5 of this document and described more fully in Appendix J in Volume II;
- S171(1)(c) - the reasonable necessity of the work and designation for addressing the Project objectives is discussed in section 4.4 of this document.
- It is not considered that there are any other matters of relevance to the territorial authority in making a recommendation on the NoR.

4.1.3 Part 2 – Purpose and Principles

In Part 2, section 5, the purpose of the RMA is set out as:

(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.

(2) In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for 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.

Part 2 provisions of the RMA that may be relevant to the Project are:

- Section 6: Matters of national importance

  In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

  (a) the preservation of the natural character of ……. rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

  (c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:

  (e) the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:

  (f) the protection of historic heritage from inappropriate subdivision, use, and development:

- Section 7: Other matters

  In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to:

  (a) kaitiakitanga:

  (aa) the ethic of stewardship

  (b) the efficient use and development of natural and physical resources

  (c) the maintenance and enhancement of amenity values

  (d) intrinsic values of ecosystems

  (f) maintenance and enhancement of the quality of the environment

  (g) any finite characteristics of natural and physical resources.

- Section 8: Treaty of Waitangi

  In achieving the purpose of this Act, all persons exercising functions and powers under it, 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).

The assessment of these section 6, 7 and 8 matters forms part of the assessment of effects in section 5 of this AEE and they are also discussed under the consultation heading in section 6 of this document.

4.2 Reason for the Alteration to the Designation

The Transport Agency is seeking to change to the physical boundaries of the existing Designation D2 in the HDC to accommodate the Project. The proposed change to the designation is shown in the Designation Plan, Plan Set B, in Volume III of this document[28].

The reason for the alteration to the designation is to provide for the Project and works described in this NoR, and for the ongoing operation, maintenance and upgrading of SH1 within the boundaries of the D2 designation. The area of the alteration will merge in many places with the existing D2 designated area.

The extent of the designation is the reasonable area necessary to construct the Project's works and to construct and operate the improved State highway and associated infrastructure on an ongoing basis. This includes the area for the road itself, connections to local roads, areas for construction processes including earthworks and construction erosion and sediment controls, and ongoing management components including stormwater management and drainage systems.

It is not anticipated that all the land within the designated footprint would be acquired by the Transport Agency - indeed the designation includes some areas of local road and Māori roadway which the Transport Agency would not seek to acquire. Parts of the land within the area sought to be designated will remain in the current ownership, possibly with some legal instrument providing for partial Transport Agency use if this is necessary in the long term. Other areas may be used for construction purposes and then reinstated for normal rural use. Such property acquisition and compensation matters are addressed under the Public Works Act 1981 and are not part of the consideration of a NoR.

The conditions proposed in section 6 apply to the construction stage. Following the completion of the Project works, the Transport Agency will consider relinquishing parts of the designation which are surplus to the ongoing operation and maintenance of the State highway. This process is a straight-forward process provided for in section 182 of the RMA. In addition, the Transport Agency will consider in association with Horowhenua District Council whether the conditions should also be removed so that the designation alteration will be fully merged with the existing designation 'D2'.

4.3 Section 176A Outline Plan

An Outline Plan of the public work, project, or work to be constructed on land within a designation must be submitted by the requiring authority to the territorial authority to allow the territorial authority to request changes before construction is commenced unless a waiver is granted.

This document, including the Plans contained in Volume III, provides the information that would otherwise be required for an outline plan for the Project within the existing Designation D2 and the land subject to the alteration through the NoR (once it has been confirmed).

Table 4-2 below outlines the relevant requirements (Section 176A (3)) of the RMA and includes an assessment of the Project against those requirements. The NoR includes the information that is generally sought by the submission of an Outline Plan. Therefore it is considered that the territorial authority can waive the requirement for an outline plan.

Table 4-2: Requirements of Section 176A of the Act

S176A Requirements	Assessment
(3) An outline plan must show: *(a) the height, shape, and bulk of the public work, project, or work;*	A description of the works is contained in section 2 of this document and plans in Volume III of this document (Plan Sets D to H and K) show the dimensions and bulk of the public work.

[28] Note that the boundaries of the existing designation in the District Plan do not exactly align with the relevant property boundaries or the current SH1 alignment in some places. This is considered to be a result of the earlier digitisation mapping process and minor corrections to the existing boundaries have been made on the designation plans in Volume III, Plan Set B.

S176A Requirements	Assessment
(b) the location on the site;	The location of the site is shown in Figure 2.1 and in Plan Set D, Volume III of this document.
(c) the likely finished contour of the site;	Changes to contours of the site are shown in the cross and long sections in Plan Sets E and K in Volume III of this document.
(d) vehicular access, circulation, and the provision for parking;	Vehicular access and circulation is discussed in sections 1.2 and 2.2 of this document. Car parking is not being provided as part of the Project except during the construction phase.
e) landscaping; and	A Landscape Context Plan and proposed mitigation is provided in the Landscape and Visual Assessment Report in Appendix H in Volume II of this document, and in Plan Set I in Volume III of this document.
(f) any other matters to avoid, remedy, or mitigate any adverse effects on the environment.	Effects on the environment of the Project and the proposed mitigation are outlined in detail in section 5 of this document.

4.4 Reasonable Necessity

Under Section 171(1)(c) of the RMA, when considering a requirement and any submissions received, a territorial authority must consider whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought. The reasonable necessity of the designation and works are discussed below.

4.4.1 Reasonable Necessity of Works

One of the key outcomes of the Project will be a reduction in the instances of fatal and serious crashes within the Project area. Other beneficial outcomes include a contribution to the efficiency of this part of the network through journey time savings and improved journey time reliability for regional and national traffic, in particular freight, and improved conditions for cyclists and agricultural vehicles. Slower moving local traffic and improved separation of it from regional and national traffic will be achieved by providing wider shoulders. A wider road corridor will also improve route security and resilience in the event of road crashes, or other disruptions through providing, and enable future roading upgrades (i.e. passing lanes) as planned for the North of Levin section of the Ōtaki to North of Levin RoNS.

Further benefits will be achieved by enabling the alignment with the Ōtaki to North of Levin section of the Wellington Northern Corridor RoNs and the Wellington Northern Corridor RoNs as a whole. Economic benefits will also flow to the district and region during the construction phase. From an environmental perspective the improvements will also lead to improvements to the existing water quality of storm water discharges from SH1 into local waterways. As described in sections 1.2 and 1.6 of this document and Appendix B in Volume II, the proposed improvements will reduce the occurrence and severity of the crash types typical at this section of SH1 thus enabling the Transport Agency to help meet the objectives that apply. The Project improvements specifically address the crash types typical at this location of SH1 which are 'head on', 'loss of control' and 'over-taking' crashes.

The Project aims to reduce the occurrence and severity of all of these crash types.

To demonstrate that the Project is reasonably necessary to achieve the objectives of the requiring authority, an assessment of the Project against the Transport Agency's stated objectives for the North of Levin section of the Ōtaki to North of Levin RoNS is set out in Table 4-3.

Table 4-3: Assessment of the Project Against its Objectives

Project Objectives	Assessment
Enhance safety of travel on the state highway network	• The realignment of SH1 to address the deficient horizontal curves will reduce the majority of crashes

Project Objectives	Assessment
	within the Project area. It will also improve sight distances for safer access to and from private property and intersections. • The proposed median barrier will prevent vehicles crossing the centreline through loss of control and attempting to overtake other vehicles, thereby reducing the risk of crashes causing serious injuries and deaths. • The roadside or edge barriers will prevent vehicles which lose control and 'run-off' the road and hit road side obstacles or ditches. • The improved intersection layouts improve safety for turning vehicles through central turning facilities and better sightlines. • Improvements at Waitarere Beach Road and Clay Road, the consolidated points of access including the closure of Paeroa Road, and new intersection at Hinaupiopio will reduce the risks of crashes due to vehicles entering and exiting the highway. Refer to sections 1.2, 1.4, 1.6 and Appendix B in Volume II for more detail.
Improve journey times on the state highway network	• The improved alignment provides for safer travel at higher speeds and a shorter distance resulting in travel time savings. Refer to sections 1.4 and 1.6, and Appendix B in Volume II for more detail.
Enhance inter-regional and national economic growth and productivity	• Improved safety and travel times and VOC savings contribute to regional and national economic growth and productivity. This is a high productivity freight route and therefore improvements in journey times provides benefits to freight movement. Refer to sections 1.4 and 1.6, and Appendices B and K in Volume II for more detail.
Appropriately balance the needs of both interregional traffic and local road users	• While the median barrier would cause some inconvenience to adjacent landowners (longer local trip distances and travel times in some cases) access to intersections is improved and the improved safety of this section of SH1 (including in particular improved safety of access onto and off the SH at local intersections) provides an appropriate balance between interregional and local traffic. Local users of agricultural machinery on roads and cyclists will be better provided for. Local road users will also benefit in terms of safety from the safety improvements within the Project area. Refer to sections 1.2, 1.6 and 2.2 for more detail.
Achieve the above objectives in a cost effective manner	• The Project is cost effective in achieving the safety and other benefits in terms of the Transport Agency's BCR for the Project.

4.4.2 Reasonable Necessity for Designation

State highway infrastructure provides an essential element for the effective and efficient functioning of a district and contributes positive benefits to local communities, the wider sub-region and the nation.

Designations are considered a suitable mechanism under the RMA for approving infrastructure and utility works such as state highways.

SH1 is presently designated for State Highway purposes in the HDP. For consistency, the proposed alteration to the designation is therefore the appropriate method to achieve the project objectives. The designation alteration is reasonably necessary because it will:

- Authorise the Project to be constructed under the RMA;
- Provide long-term land protection and continuity;
- Identify the land in the district plan that is required for the work;
- Allow Horowhenua District Council to incorporate the outcomes of the Project in its land use planning for the district;
- Protect designated land from incompatible uses;
- Provide a basis for the subsequent acquisition of land needed for the works (including, if necessary, compulsory acquisition); and
- Promote the efficient ongoing operation, maintenance and upgrade of SH1 within the Project area in accordance with the purpose of the designation.

4.5 Consideration of Alternatives

As part of the Project development process, consideration has been given to alternatives. This section outlines the consideration of alternative sites, routes and methods for the Project in accordance with Section 171(1)(b) of the RMA.

Section 171(1)(b) of the RMA requires that when considering a requirement and any submissions received, a territorial authority must, subject to Part 2, consider the effects on the environment of allowing the requirement, having particular regard to:

> *whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work if—*
>
> *(i) the requiring authority does not have an interest in the land sufficient for undertaking the work; or*
>
> *(ii) it is likely that the work will have a significant adverse effect on the environment;*

The Transport Agency does not have a sufficient interest in the land to undertake the work and there is the potential for some significant effects on the environment. Therefore, the Transport Agency must demonstrate that it has given adequate consideration to alternatives.

The process undertaken to assess alternative alignments and designs for improving safety at the Waitarere Beach Road Curves is briefly described here. A more detailed description is provided in Appendix J in Volume II. Appendix B in Volume II also refers to relevant considerations and decisions.

The Transport Agency's development of potential options and alternatives for the Ōtaki to North of Levin RoNS in this area began with investigations for a four lane expressway corridor in mid-2011. This commenced with the collection and analyses of various data relating to both transport needs and existing issues, and constraints which would limit the presence of a new expressway in various parts of the wider RoNS area.

By 2013 this work concluded that the construction of a full four lane expressway was not economically viable at this point in time[29]. The Ōtaki to North of Levin RoNS investigations then focused on addressing problem areas on the existing SH1 route and a number of specific sub-projects were identified for investigation.

[29] NZ Transport Agency Board Decision, 12th June 2012.

The Waitarere Beach Road Curves area was one such area identified in the Ōtaki to North of Levin RoNS area for further investigation[30]. The reasons for prioritising this area are set out in section 1.4 of this report.

4.5.1 Consideration of Possible Routes

While earlier investigations of the Project area had been undertaken and a range of constraints identified, the refocusing of the RoNS work in the area meant that a more localised consideration of possible route improvements was required. A range of possible routes which would either bypass the problem area, or remedy the problems by minor alterations to the existing alignment were identified and evaluated.

The alternative alignments that were identified and considered are shown in Figure 4-1[31]. These alternatives were initially assessed through a multi criteria analysis (MCA) exercise on the basis of associated land severance, earthworks quantities required, effects on archaeology and cultural values, Project length, effects on dwellings and road connections.

[30] Other areas identified for early upgrades were in the vicinity of Manakau, through Ohau and Levin Town Centre. The Waitarere Beach Road Curves Project is part of a larger business case investigation of other improvements that can be made to SH1 north of Levin.

[31] An option to continue the maintenance and operation of the existing highway (do the 'bare minimum') was also considered. However, it was found that this option did not meet the Project objectives (refer to section 0 of this document).

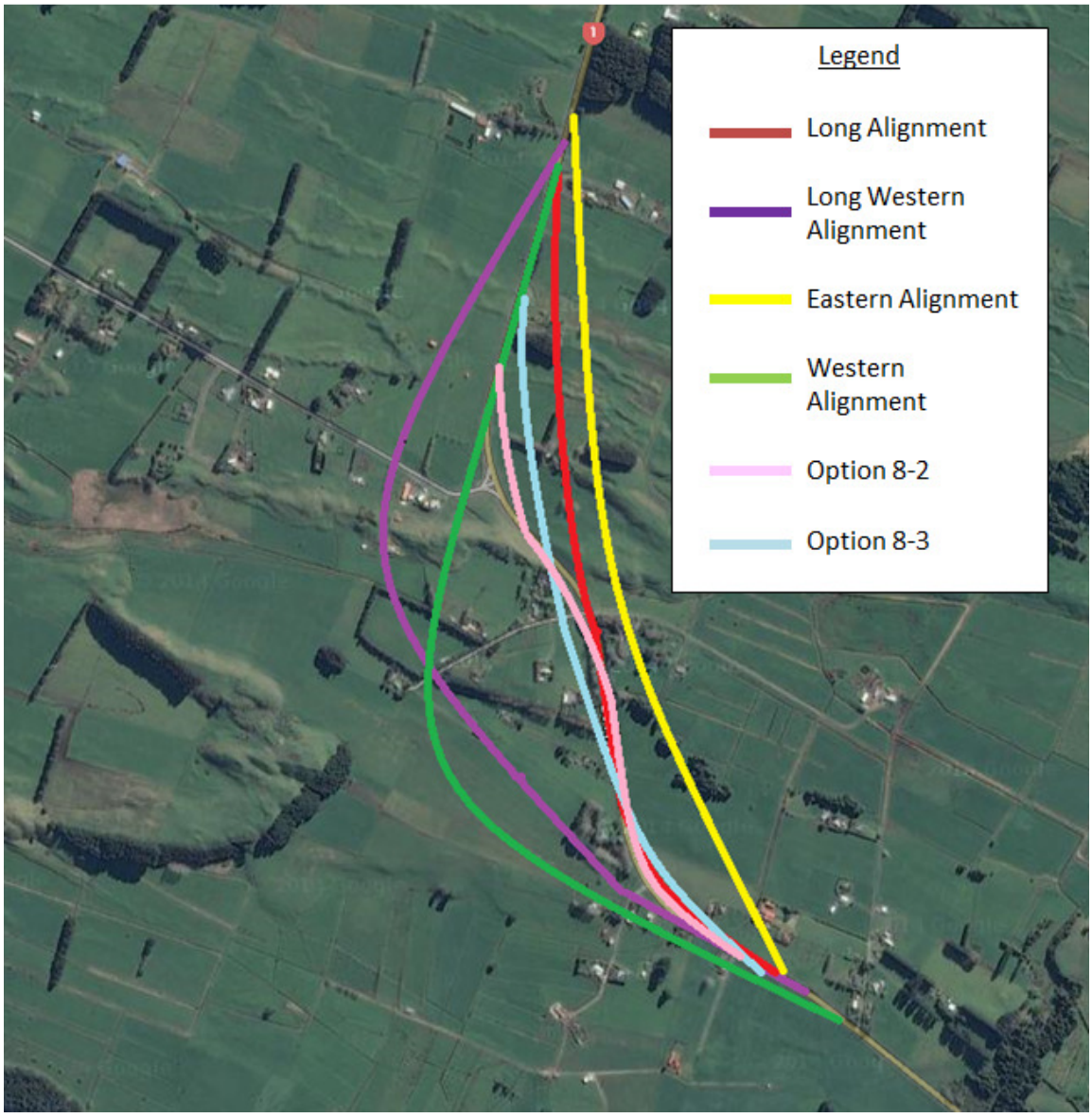

Figure 4-1: High Level Route Options Considered for the Waitarere Beach Road Curves

A brief description of each alignment analysed, and the key outcomes of the analysis, is given in Table 4.4 on the following page.

Table 4-4: Assessment of Alternative Route Options

Option Considered	Description of Option
Western Alignment Option	A western alignment was considered to move the road away from the majority of the dwellings that front the highway through this section. The option involved extending the straight from Clay Road further west before making the right hand bend and joining back to the existing SH1 just north of Waitarere Beach Road. This option was longer than the existing highway, would involve land severance and considerable sterilisation of property, and would encroach on areas of considerable cultural value and was not a preferred option.
Eastern Alignment Option	An eastern alignment was considered as it would provide the shortest route through the area being investigated, thereby providing the best outcome in terms of travel time efficiency. This option involved deviating east from the highway to the north of Clay Road, traversing through the sand hills and connecting back to SH1 approximately 900m north of Waitarere Beach Road. This option would affect valued cultural areas and involve very significant earthworks. It also had direct effects on some dwellings, would affect the usability of some farms and extends the connection to Waitarere Beach Road further through farmland. It was not a preferred option.
Long Alignment Option	This option improved the southern curve north of Clay Road then continued straight ahead, bypassing the curves at Paeroa Road and Waitarere Beach Road to connect back into the highway approximately 800m north of Waitarere Beach Road. The problems with this option were similar to the Eastern alignment, but more dwellings would be affected. It was not a preferred option.
Long Western Alignment	A longer western alignment was also considered, similar to the western alignment, but even further west. This option was developed in an attempt to avoid identified adverse effects associated with the western alignment. Upon examination, the effects were found to be equally adverse, and the alignment was even longer with associated dis-benefits in terms of efficiency and safety. It was not a preferred option.
Option 8-2	A shorter alignment option was considered, which closely tracked the existing highway, but provided some geometric improvement to the curve radii, as well as improved consistency through the curves. Impact on land would be reduced due to using a considerable length of the existing highway instead of greenfield construction, although there would be impacts on the least number of dwellings and existing accesses. It was considered that this option should be further investigated.
Option 8-3	A new alignment in close proximity to the existing highway was considered, which resulted in two larger radii curves and a long section of straight. This option provided a balance between a full realignment without deviating too far from the existing highway. This option also offered the potential for reduced project length. Again, there would be effects on some dwellings and accesses and some effects on cultural values. It was considered that this option should be investigated further.

4.5.2 Refinement of Alignments

The analysis of options indicated that option 8-2 and 8-3 were the preferred options to consider further. The Project then moved into a more detailed stage where further information was collected in order to determine the feasibility of the two options.

This stage included an economic assessment, social and environmental assessment, consideration of geotechnical matters and land requirements, and on-going maintenance issues. This evaluation concluded that Option 8-3 would deliver a higher standard geometric configuration than Option 8-2. Option 8-3 would also generate more transport benefits but would cost more than Option 8-2. Option 8-2 would have lower land requirement than 8-3 but would also have a lower benefit to cost ratio.

The NZ Transport Agency decided that option 8-3 was preferred on balance, because of its better geometry and thus safety performance subject to the outcome of public consultation exercises. During the public consultation there was no objection to the preferred option and so accordingly that option was progressed forward and developed. The general alignment of the preferred route option can be seen on Figure 4-1.

4.5.3 Preferred Option Design Refinements

The Project design as outlined in section 2.2 and shown in the Plans contained in Volume III of this document is fundamentally based upon Option 8-3. However, it has been subject to ongoing evaluation, refinements and decisions as a result of consultation and further information as described in Appendix J in Volume II. Once the preferred option had been identified, the Project then moved into a more detailed stage where further information was collected, more detailed consultation with potentially affected people and local iwi was undertaken, and a wide range of potentially appropriate detailed alignments and associated arrangements such as access provisions, were tested in terms of their impacts on known areas of value, on dwellings and on the natural environment (such as drainage systems and dunes) and the growing body of information identified from consultation. The considerable constraints in the area in terms of the values associated with its past history, particularly the history of Māori settlement and use of the area, were particularly emphasised. Through this iterative process, the Project design has been improved by adjustments to elements of the alignment to avoid or minimise adverse effects on important local values and enhance safe access to SH1 (such as the various arrangements relating to Paeroa Road).

The inputs of the specialist advisors in cultural, landscape, ecology, archaeology and hydrology fields have also led to refinements in the Project design. For example, the outcomes of a mitigation workshop resulted in a change in Project design including a reduction in potential impacts on the wetland to the south east of the Project area, as well as the inclusion of measures to reduce noise to affected parties, and landscaping proposals. Further modifications in the area to be designated resulted from decisions to further mitigate potential noise effects and discussions on access arrangements with individual landowners.

During the design refinement process, it became clear that some local residents had particular concerns about the proposed median safety barrier element of the Project design. In response, a safety review of the design was undertaken, including the respective cost benefit ratios of the Project, with and without the median barrier. This demonstrated that the incremental BCR[32] for including a median barrier was 13; i.e. this part of the project provides excellent value for money due to the very high crash reduction potential.

At a late stage in the design development process, some local residents suggested an alternative "internal road" connection to some properties and a new full intersection at Hinaupiopio. Initially this was promoted as part of an option with no median barrier. However, ongoing discussions led to the development of the option on which the NoR is based, which both provides for this intersection and retains the median barrier throughout most of the Project area.

A number of consequential further refinements were then necessary, such as the left hand slip road connection into Clay Road[33].

[32] Incremental BCR is a way of determining the economic efficiency of proceeding with a higher cost option over a lower cost option. It is calculated as being the increase in benefits divided by the increase in cost. For a scheme like this with a BCR between 1 and 2, an incremental BCR of greater than 1 means that the additional aspect should be progressed.

[33] However, other features of the previous design, including the link road connection from Paeroa Road north to Waitarere Road and a P-turn feature for traffic wishing to turn to travel north, have been able to be dispensed with.

Also as a result of consultation, the improvements at Poroutawhao School were added to the Project at this stage. Because of their relatively small scale, these have been subject to a separate design development process, including considerable consultation.

4.6 Relevant Resource Management Planning Documents

This section briefly identifies and assesses the provisions of the following statutory documents which are potentially relevant to this proposal:

- the New Zealand Coastal Policy Statement;
- the National Policy Statement for Freshwater Management;
- the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health;
- the Regional Policy Statement and Regional Plan (as a part of the Horizons One Plan); and
- the Horowhenua District Plan

4.6.1 New Zealand Coastal Policy Statement

The purpose of the New Zealand Coastal Policy Statement (NZCPS) is to state policies in order to achieve the purpose of the RMA in relation to the coastal environment.

An analysis of the NZCPS and the provisions of other relevant statutory documents was undertaken to determine whether the Project area is considered to be within the coastal environment.

Policy 1(2) of the NZCPS provides the basis for the identification of the coastal environment and recognises that the coastal environment includes a number of specific areas and features.

Based on the Ecological Assessment contained in Appendix G in Volume II of this document, none of coastal ecological matters identified under Policy 1(2) apply to the Project area. Policy 1(2)(f) of the NZCPS states that the coastal environment includes:

> *"elements and features that contribute to the natural character, landscape, visual qualities or amenity values".*

An analysis of the other components of Policy 1(2) would suggest that these values must relate specifically to circumstances where such values have clear coastal elements. That does not occur in the vicinity of the Project area.

The Natural Character Assessment of the Horowhenua Coastal Environment 2012 prepared for Horowhenua District Council shows the coastal environment to extend only to areas close to the Coastal Marine Area. This is supported in the landscape analysis in Appendix H in Volume II.

Based on Figure 5-1 of Chapter 5 of the HDP and Policy (2)(f) of the NZCPS, the Project area is considered to be a part of the 'coastal context' and a 'coastal landscape' but not the 'coastal environment'.

Consequently the following assessment does not address the provisions of the NZCPS or the provisions of the documents listed above in relation to the 'coastal environment'. An assessment of provisions related to 'coastal context' and 'coastal landscape' are however included in the following sections where relevant.

4.6.2 National Policy Statement for Freshwater Management 2014

The National Policy for Freshwater Management 2014 (NPSFM) sets out the objectives and policies that direct local government to establish objectives and set limits for freshwater in regional plans.

Objectives 12 - 13 of the NPSFM relate to freshwater and generally seek that the quantity and quality of freshwater meets a range of uses and values for which water is required, safeguard the life supporting capacity of water bodies, meet the reasonably foreseeable needs of future generations; and that the region's rivers, lakes and wetlands support healthy functioning ecosystems.

As outlined in section 5.10 of this document, the Project will result in improved stormwater management through swales, and therefore will contribute to improved water quality outcomes.

4.6.3 National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health

The *National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NESCS) requires that land affected by contaminants in soil is appropriately identified and assessed before it is developed and if necessary the land is remediated or the contaminants are contained to make the land safe for human use.

The NES (Regulation 5) applies to the assessment and management of the actual or potential adverse effects of contaminants in soil on human health from five activities: subdivision, land-use change, soil disturbance, soil sampling, and the removal of fuel storage systems.

The NES applies to any "piece of land" on which an activity or industry described in the current edition of the Hazardous Activities and Industries List (HAIL) is being undertaken, has been undertaken or is more likely than not to have been undertaken (Regulation 5(7)).

Regulation 6 sets out the two methods to be used to establish whether the piece of land has had hazardous activities or industries conducted on it. The two methods are: by reviewing information about the land that is held and is accessible by the relevant territorial or unitary authority; and by conducting a preliminary site investigation.

The areas proposed for earthworks are currently used for pasture and the area has a history of pastoral grazing. In general, contaminated land on pastoral farms is usually found in association with sheep dips, stock yards and around farm buildings.

The result of a search of the formerly operative HDP 1999 and the Horizons One Plan concludes that there are no contaminated sites within the Project area[34]. The site visits undertaken have not revealed any specific areas or installations which may be associated with a risk of site contamination. It is not anticipated that there will be any actual or potential adverse effects on human health from the use of soil as a result of the Project.

4.6.4 Horizons One Plan

The Horizons One Plan combines the Regional Policy Statement, the Regional Coastal Plan and the Regional Plans for the Manawatu Wanganui Region. It became operative on 19 December 2014.

The **Regional Policy Statement** component of the One Plan, which is the relevant part of the Plan for the NoR, contains a number of relevant policies as set out below.

Te Ao Māori*:* Objective 2-1 seeks to have regard to the mauri of natural and physical resources to enable hapu and iwi to provide for their well-being (social, economic and cultural). Policy 2-2 identifies regional issues of significance for hapu and iwi which includes the disturbance of culturally sensitive sites by inappropriate activities. Policy 2-3 provides for the recognition of the mauri of water.

Consultation with tangata whenua in relation to this proposal has been ongoing and is detailed in section 6.1 of this document. The approach during the development of the Project has been to minimise adverse effects on cultural values and the improve water quality as far as practicable.

Infrastructure*:* Objectives 3-1, 3-5 and Policies 3-1 and 3-3 are to have regard to the benefits of infrastructure of national and regional importance and to provide for their upgrading once established whilst avoiding, remedying or mitigating adverse effects from the establishment of new infrastructure.

The Project contributes to improvement of the state highway network north of Levin, and to its safety and efficient functioning for the benefits of the region and the nation. The Project has been developed and designated in a way that is intended to avoid adverse effects as far as practicable and to mitigate

[34] Horowhenua District Council and Horizons Regional Council maintain a data base that records confirmed contaminated land as well as land that is potentially contaminated due to its association with a hazardous activity or industry as defined by the HAIL (Hazardous Activities and Industries List).

the remaining effects through conditions set out in section 7. The Project is in accordance with this policy framework.

***Land**:* Objective 4-2 seeks that land is used in a way that ensures accelerated erosion and increased sedimentation of waterways caused by land disturbance are avoided as far as reasonably practicable, or otherwise remedied or mitigated.

Watercourses in the Project area are highly modified and the effects from potential sediment run off will be negligible as outlined in section 5.5 of this document. Regional consents will be required for the Project's earthworks and discharges, which will be subject to conditions. In the meantime "bridging" conditions requiring management of sediment discharges during construction are included in section 7.

***Indigenous Biodiversity, Landscape and Historic Heritage**:* The relevant objectives and policies are Objectives 6-1, 6-3 and Policy 6-9. They generally seek to protect areas of significant indigenous vegetation, outstanding natural landscapes and features, and historic heritage and to manage use and development of land. The area does not include any of these features identified at regional level. The policy directs that historic heritage and notable trees and other significant vegetation are to be identified in district plans.

The Project area does not contain any areas of historic heritage or listed vegetation identified in the HDP.

Water: Objective 5-1 seeks that water bodies and their beds are managed in a manner which safeguards their life-supporting capacity and recognizes and provides for their Values in Schedule B of the RPS.

The Project area does not contain any waterbodies that are identified in Schedule B of the RPS. The Project will result in improved water quality outcomes as discussed in section 5.9 of this document.

Air: Objective 7-1 seeks that the standard of ambient air quality is maintained. Policy 7-2 sets out the regional standards for ambient air quality and seeks that discharges must not cause any noxious, offensive or objectionable dust beyond the property boundary.

With the mitigation measures proposed during the construction phase, effects from potential dust emissions will be managed in accordance with this policy.

Overall, the Project is in accordance with the policy framework of the Horizons One Plan. It has been developed in a way that is intended to avoid adverse effects as far as practicable and to mitigate the remaining effects through conditions.

4.6.5 Horowhenua District Plan

The HDP was made operative on 1 July 2015. The following objectives and policies are considered to be relevant for the Project.

***Tangata Whenua**:* The relevant objectives and policies are Objectives 1.1.1, 1.2.1 and Policies 1.3.1, 1.3.3 and 1.3.5. These generally seek to provide tangata whenua with opportunities to actively participate in resource management processes. The relationship between tangata whenua, and their culture and traditions are to be recognized and provided for and sites of cultural significance protected from adverse effects from the use and development of resources.

Consultation with tangata whenua in relation to the Project has been ongoing and is detailed in section 6.3 of this document.

***Rural Land**:* Objectives 2.1.1, 2.2.1, 2.2.7, 2.2.9 and Policy 2.1.9 provide for the development of rural land in a way that avoids, remedies or mitigates effects on features of the landscape including biodiversity, historic heritage or cultural value. Policies CL.1, CL.2, CL.3, CL.4, CL.7 and LK.1 seek to protect features of Coastal Lakes Domain and Levin-Koputaroa Domain.

The Project will retain the same overall landscape character such that it achieves the policies above. An assessment of the likely effects of the Project on landscape including natural features is provided in section 5.6. It confirms that the changes to the landscape as a result of the Project are consistent with the existing local landscape.

***Land Transport**:* Objective 10.1.1 and Policies 10.1.5, 10.1.6, 10.1.7 and 10.1.4 are relevant to the Project and generally seek that the land transport network including the State Highway network is safe and efficient. Objective 10.2.1 and Policies 10.2.2 and 10.2.3 generally seek that the land transport network including upgrades to infrastructure, avoids, remedies or mitigates adverse effects on people and the environment. Policy 10.1.14 is particularly relevant to the Project. It is: "*To ensure that State Highways are a safe and efficient network".*

As discussed in section 1.4, a key purpose of the Project is to reduce the incidence of serious and fatal crashes within the Project area whilst improving efficiency. Appendix B in Volume II gives the detailed background to this. A full assessment of the actual and potential environmental effects is included in section 5 of this document.

***Historic Heritage**:* Objective 13.2.1 and Policies 13.2.5 and 13.2.6 generally seek to protect historic heritage from inappropriate use and development and to avoid or appropriately mitigate any adverse effects of activities that could destroy or diminish the heritage values associated with buildings and sites included in the Historic Heritage Schedule and Group 1 Sites.

There are no listed sites of significant historic heritage values[35] within the Project area. However there are known historical sites of local significance in the wider area. The Project has been adjusted in consultation with local iwi and the local community and this has resulted in an alignment that better avoids known sites and reduces risk in relation to potential archaeological sites. However there remains the potential to disturb archaeological sites. Archaeological effects and how these effects will be mitigated are outlined in greater detail in section 5.3.

***Natural Hazards**:* Objectives 8.1.1 and Policies 8.1.4, 8.1.5, 8.1.6 and 8.1.7 generally seek to ensure the adverse effects of flood events are avoided, remedied or mitigated in relation to the location and design of land use and structures. Objective 8.2.1 and Policy 8.2.2 generally seek to ensure activities do not increase the risk of natural hazards or reduce the effectiveness of existing protection.

The Project area is adjacent to an area of land identified on Planning Map 4 of the HDP as a flood hazard. The proposed drainage has been designed to manage run-off up to a 1% AEP event and is expected to improve drainage in the Project area. Further details on the effects of the Project on flood hazard are detailed in section 5.11 of this document.

***Natural Features and Values**:* Objective 3.1.1 and Policies 3.1.3 generally seek to ensure natural features and landscapes are protected and use and development affecting landscape domains is controlled. Policy 3.1.7 seeks to have regard to the ability of landscapes to absorb use and development including existing land uses. Policy 3.1.9 seeks to ensure adverse effects on significant dune landforms are avoided, remedied or mitigated.

The receiving landscape is not an outstanding natural feature or landscape, although it is a dune landscape. The Project will retain the same overall landscape character in the same location through its design including earthworks. A full assessment of the anticipated effects on landscape including on natural features is contained in section 5.6. It is demonstrated that the intent of the relevant policies is met.

Policy 3.3.6 is to promote and encourage the development or maintenance of riparian planting along water body margins. Such planting is included within the Project area in relation to the existing modified streams.

***Contaminated Land**:* Objective 9.2.1 and Policy 9.2.2 seek that adverse effects from the use of contaminated land on human health are avoided, remedied or mitigated and sites that may be subject to potential contamination are identified. As noted above, no contaminated sites have been identified in the area.

Overall, the Project is in accordance with the objectives and policies of the HDP and has been developed in a way that is intended to avoid adverse effects as far as practicable and to mitigate the remaining effects through conditions.

[35] Registered in the HDP and/ or by Heritage New Zealand for protection.

4.7 Other Relevant Matters

Other matters may be taken into account by local authorities in making a recommendation to a requiring authority. These can include matters outside the RMA, including non-statutory processes. It is considered that there are a number of other matters incorporated within statute or strategic documents that are relevant to the Project, taking into account:

- the subject of the NoR;
- the public processes involved; and
- the availabilility and importance of the strategy documents involved.

Key components of non-RMA documents are summarised below.

4.7.1 Land Transport Management Act 1989

The Transport Agency has a mandate under the LTMA, the Government Roading Powers Act 1989 and the Government Policy Statement on Land Transport Funding to carry out its functions in a way that delivers the transport outcomes set by the Government. These outcomes are:

- Transport that is effective in moving people and freight where they need to go in a timely manner;
- Transport that is efficient, delivering the right infrastructure and services to the right level at the best cost;
- A transport system that is safe and responsible , reducing the harms from transport; and
- A transport system that is resilient, able to meet future needs and endure shocks.

4.7.2 Government Policy Statement on Land Transport

The Government Policy Statement on Land Transport (GPS) sets out the government's priorities for expenditure from the National Land Transport Fund over the next 10 years. The GPS is the Government's main lever for setting priorities and funding levels for land transport investment.

The three key priorities in the GPS 2015 are:

- Economic growth and productivity;
- Road safety; and
- Value-for-money.

The GPS also contains six national land transport objectives for a land transport system that:

- addresses current and future demand;
- provides appropriate transport choices;
- is reliable and resilient;
- is a safe system, increasingly free of death and serious injury;
- mitigates the effects of land transport on the environment; and
- delivers the right infrastructure and services to the right level at the best cost.

The GPS recognises the Roads of National Significance (RoNS) as national road development priorities and essential routes that require significant investment to reduce congestion, improve safety and support economic growth. The GPS identifies the Wellington Northern Corridor RoNS as a priority for funding and delivery by the government. The Project is a section of this RoNS and forms a significant contribution to achieving the impacts sought by the government through the GPS.

4.7.3 National Land Transport Programme 2015 – 2018

The National Land Transport Programme for 2015–18 (NLTP) contains all the land transport activities, including public transport, road maintenance and improvement, and walking and cycling activities, that the Transport Agency anticipates funding over the next three years.

The NLTP focuses on four themes, underpinned by the continued emphasis on value for money:

- encouraging economic growth and productivity;
- making journeys safer;
- shaping smart transport choices; and
- effective and resilient networks.

The NLTP's three year programme supports the development of the transportation system across New Zealand's regions and the linkages between major cities.

5 Assessment of Environmental Effects

5.1 Overview

The AEE has been prepared in accordance with clauses 6 and 7 of the Fourth Schedule and Form 18 of the RMA.

The effects that are assessed in this document are:

- Safety and efficiency effects;
- Archaeological effects;
- Cultural effects;
- Social and economic effects;
- Landscape and visual effects;
- Ecological effects
- Acoustic effects;
- Property effects;
- Construction effects;
- Water quality effects;
- Effects on natural hazards; and
- Construction effects.

Additional detail on a number of these actual and potential effects can be found in the various specialist reports included in Volume II of this document.

5.2 Safety and Efficiency Effects

A key purpose of the Project is to address current significant road safety adverse effects associated with the Project area. These effects include deaths and serious injuries in the area which are significantly higher than expected for an equivalent section of State highway elsewhere. Section 1.4 provides on outline of the situation and section 1.6 and the Transport Impact Assessment in Appendix B of Volume II sets out the details. The changes to SH1 associated with the NoR have been designed to:

- Significantly reduce crashes, both fatal and serious, due to the improved road alignment and design described earlier and shown on the plans in Volume III.
- Improve the safety of vehicles and reduce the risk of crashes for vehicles entering and leaving private property entrances and local road intersections through improved design (for example improved sightlines and turning bays).
- Allow safer movement (passing vehicles) for large farm contractors' vehicles and equipment using SH1 in a high speed environment, due to the wider highway cross section.

These safety effects are significantly beneficial for all road users.

Travel time and vehicle operating cost savings through this section of SH1 will cumulatively improve travel time in conjunction with the other Wellington North Corridor RoNS projects for travel to and from Wellington and north of Levin. Benefits from this Project arise from the straighter and shortened section of SH1, reduced side friction, improved road geometry and therefore slightly higher speeds. Some local residents will however experience additional journey distance and time.

Overall, the Project benefits are in the order of $15 M in economic terms (net present value).

5.3 Effects on Archaeological and Heritage Values

Historically, this area has been desirable to both Māori and Europeans, for farming and a source of food due to its good climate and fertile soil. As a consequence of this long history of settlement and use of the land there are numerous culturally and historically important sites in close proximity to the highway. A description of the area's history and an archaeological assessment is provided in the Archaeological and Heritage Assessment Report (Appendix E) in Volume II of this document.

Archaeological authorities will need to be obtained for the works associated with the Project (including for geotechnical investigations and any other minor preliminary works) from Heritage New Zealand as there is the potential to disturb areas occupied prior to 1900.

The Authorities will involve detailed conditions for the management of effects on archaeological sites. Mitigation in terms of the RMA will rely on these authorities being obtained. Archaeological authorities will be obtained prior to works commencing. For any area of the Project construction for which an archaeological authority is not in place, protocols are proposed to provide a stay of work should any archaeological material be found (see section 7).

5.3.1 Overview

Table 5-1 identifies and summarises the potential archaeological sites within the Project area and the potential effects the Project may have on them.

It is noted that only the Nga Haere Pa site has been recorded by the New Zealand Archaeological Association. None of the sites in Table 5-1 are listed in the HDP Schedule of Historic Heritage Sites.

The area is rich in heritage associations and the archaeological values for the sites in Table 5-1 will vary depending on factors such as state of preservation and whether they have been disturbed, for example by agricultural activities or road works in the past. Although the assessed potential effects range from negligible to significant, most potential effects are minor or less. There is a level of uncertainty over the precise location and extent of most of the sites, but sufficient information is known to be able to determine the likely extent of effects.

Table 5-1: Archaeological Features and Extent of Potential Effects

Archaeological Item or Feature	Potential Effect	Mitigated Effect
Former Matau Marae	Negligible	Negligible
Nga Haere *pā* (S25/60)	Negligible	Negligible
MK7D2D Sec. 15 *urupā*	Negligible	Negligible
Huia's residence (MK7D2D Sec. 17)	Potentially significant	Minor
Te Paiaka no te Waiariki *pā* and un-named *kāinga* (MK7D2D Sec. 16)	Minor	Negligible
Waitarere Sec. 7A, 8 and Ngawhakahiamoe settlement	Moderate	Moderate
St Michael's Catholic Church	Negligible	Negligible
Poroutawhao Mill	Negligible	Negligible
Waka construction site (MK7D2D Sec. 60)	Low	Negligible
Hohaia te Pahau's residence (7D2D56)	Negligible	Negligible
Kapa te Karaha's residence (7D2D57D)	Minor	Negligible
Hohaia te Pahau's residence (MK7D2D Sec. 57B)	Negligible	Negligible
Paiaka and Kireona Paratawa's residence (7D2D57B)	Negligible	Negligible

The following sections explain the basis for the information and the assessment of effects in Table 5-1.

5.3.2 The Māori Residences

There are a number of former Māori residences within the Project area, in the general area between Clay Road and Paeroa Road, that were known to have been occupied prior to 1900. However, it is unclear what types of houses were present at these locations. There are likely to have been a number of other features associated with these residences such as: pits for rubbish and food storage, raised storage structures, cooking shelters and earth ovens, small midden, and wells, among others. At the present time the locations and ages of these residences cannot be accurately pinpointed.

Hohaia te Pahau, Kapa te Karaha, and Paiaka and Kireona Paratawa former residences are unlikely to be directly affected by the earthworks. However, archaeological materials associated with residential occupation may be uncovered.

The remaining residences (excluding Huia's which is discussed in the next section) are assessed as being negligibly affected in the absence of more certain information about their location. However, the limited extent of the proposed earthworks within the associated historic sections, relative to the size of the sections themselves, suggests there is a low risk of encountering these sites.

5.3.3 Nga Haere pā, section 15 urupā, Huia Residence and Te Paiaka no te Waiariki pā and kāinga

These locations are all in the vicinity of the duneland to the north of Paeroa Road, east of the Nga Haere pā but in the vicinity of the Tauheke Ridge. Some, including Huia's residence, may already have been disturbed by housing north of Paeroa Road.

The Nga Haere pā is a recorded archaeological site (S25/60). The main terrace of the pā is located outside the designation and more than 100 m beyond the extent of the proposed earthworks, which will not encroach into the former palisades of the pā. However, there is the potential for effects on as yet unknown related features external to the main pā, due to the proposed earthworks south of and near to Waitarere Beach Road.

The 7D2D Sec. 15 urupā cannot be located with the same accuracy as Nga Haere pā. While the exact location remains unknown, Māori Land Court (MLC) records place the urupā in the centre of the 7D2D16. The potential effects on this site due to the proposed earthworks within this block are considered negligible, as it is likely to be entirely or largely outside the affected area.

Huia's residence on the former 7D2D17, cannot be located to a high degree of accuracy. However, the proposed design requires earthworks over parts of the former 7D2D17 block, making it likely that this site may be affected by the proposed earthworks in this block. The two settlements identified on the 7D2D Sec. 16, Te Paiaka no te Waiariki pā and an unnamed kāinga, are high value archaeological sites due to the relative rarity of Māori settlement sites and their cultural significance as the location of first settlement for the Ngāti Tuwhakahewa *hapū* of Ngāti Raukawa. Details of the exact location and extent of these settlements in Sec. 16 are unknown at present as the historic record gives few details. Recent design changes have greatly reduced the risk that Te Paiaka no te Waiariki and the unnamed *kāinga* could be affected by the earthworks in this area. If sites are found, effects would be mitigated through the procedures described later in this section. The current extent of earthworks in this area means that mitigated effects are likely to be minor and it is possible effects will be avoided depending on whether sites are found.

5.3.4 Waitarere Sec. 7A, 8 and Ngawhakahiamoe settlement

There would be extensive earthworks in the vicinity of this site which lies near to the north end of the Project area, particularly in the former Waitarere Sec. 8 block, and there is a high risk of damage or destruction to former house sites. Alternatively, if house sites are not encountered there is the potential for damage to the extensive horticultural development associated with these residences. From an archaeological perspective this area will be complex and complicated by the continuous settlement from the 19th century through to the early 20th century.

Potential effects have been assessed as moderate, but they will be somewhat mitigated by the actions described later in this section. Adopting a process of careful observation, investigation and recording will appropriately minimise effects on this area which includes potentially complex sites.

5.3.5 Former St Michael's Catholic Church and Poroutawhao Mill

These features have mixed Māori-European associations. The former St Michael's Catholic Church was built in 1888 and was in place until at least 1911. It was associated with a former settlement in the vicinity of Waitarere Beach Road and its junction with SH1, and was built by local Māori. The former St Michael's Catholic Church site is probably located within the Project area with the most likely candidate site now under the existing SH1 alignment where the dune has been substantially cut away. Any traces of the church at this location are likely to have already been destroyed. The potential for adverse effects are therefore negligible.

Similarly, the site of the former Poroutawhao Mill is not known with any certainty, but the potential sites are both outside the proposed designation area.

Potential effects on these sites are negligible.

5.3.6 Waka Construction Site

There is a former waka construction site in the southern part of the Project area. The environmental conditions that would be conducive to the survival of organic materials are not present on the waka construction site and it is uncertain whether any materials may have survived. Any material uncovered is likely to be of minor archaeological value. The exact location of this site is unknown, though the extent of earthworks in this section suggests there is a reasonable probability of encountering this site.

Potential effects are low and the mitigated effects are assessed as negligible.

5.3.7 Potential Cultivation Grounds

Cultivation of land took place in this area, particularly in the vicinity of the Kouranui Stream, that is likely to have left behind material traces. These are likely to be sites of low archaeological value, such as midden, small fires and earth ovens. However, it is possible there could be the recovery of archaeologically rare waterlogged wooden artefacts from the margins of the Kouranui where environmental conditions have been conducive to the preservation of organic materials.

There are known to be cultivation grounds along the banks of the Waitarere Stream for taro. While cultivation grounds are likely to have been the most common site type during the historic period, in both number and extent, they are under-represented in records of archaeological sites. For this reason, they are sites of high archaeological value for investigation at the present time. The earthworks for this Project are assessed as having only a low effect. The presence of numerous and extensive cultivation grounds are known throughout the Horowhenua[36]. Any damage from earthworks will only be to a very small portion of the total area cultivated during the historic period within the Project area.

5.3.8 Koiwi

The archaeological studies set out in Appendix E in Volume II indicate that there is a risk of uncovering koiwi (human remains) in some areas, particularly in the vicinity of the Tauheke Ridge. More information will be available prior to the commencement of construction for the geophysical investigations described in the next section. It is likely that any such occurrences would be within the area covered by an archaeological authority. There are particular procedures which are necessary should such a find be made, which include the involvement of local iwi and the Police.

5.3.9 Mitigation

There is a risk of archaeological discoveries associated with the Project. The area has been settled for a long period and human habitation and use leaves archaeological traces in the landscape. The choice of the alignment for the Project has as far as possible avoided known sites (such as the main part of the Tauheke Ridge), but as the precise location of many sites is unknown due to sparse historic records, a risk remains. Recent changes to the Project design have reduced the risk, particularly in the area north of Paeroa Road.

[36] These cultivation grounds are not listed on Table 5-1 as it is not possible to identify specific cultivation grounds within areas. Land court records indicate this was a general land use in the 19th century and it is highly likely that cultivation grounds will be encountered at some stage in the works.

Further mitigation could involve either minor Project design changes which may be able to be undertaken once the results of the geophysical investigations, which will help scope the need for archaeological authorities for Heritage New Zealand, are available. Where practicable, identified sites will be avoided by design changes within the scope of the designation. Where this is not possible, archaeological investigations, recovery of material and recording of sites will be undertaken. Such investigations will be undertaken within the context of an archaeological authority issued by Heritage New Zealand under the Heritage New Zealand Pouhere Taonga Act, which will involve the development of an archaeological management plan for the specific area, supervision by a qualified and experienced archaeologist and cultural supervision at key stages.

These procedures will minimise effects by protecting sites during construction and if this is not possible, recording them prior to or during the earthworks. The salvage and recording of material will contribute to an understanding of the historic and cultural attributes of this area, and given the general lack of archaeological investigation in the Horowhenua District, will help contribute to the district-wide record and understanding of past settlement patterns and how people lived their lives.

The draft conditions in section 7 include procedures which will apply in areas which may not be covered by and archaeological authority (if geophysical or other investigations reveal there is little risk of archaeological traces in some areas). They also include requirements for training procedures for contractors, and a programme of public education and information about the investigations and any findings. A further condition includes a requirement for interpretive material to be located in the area.

5.3.10 Conclusion on Archaeological Effects

The Project involves the risk of disturbing archaeological sites. This includes a range of types of sites at different locations. Recent design changes have reduced the risk of disturbing archaeological sites. The areas of greater risk include Huia's dwelling (one of several in the area associated with Huia), kainga or outer parts of Te Paiaka no te Waiariki pā site south of Waitarere Beach Road, and Ngawhakahiamoe settlement.

Potential effects are negligible throughout most of the Project area. Even where risks of disturbance are high or moderate, effects can be reduced through careful observation, investigation and recording.

The extent of risk will be reduced prior to construction by appropriate investigations and obtaining necessary archaeological authorities. The purpose of the investigations is to better define risk. Mitigation could include minor design changes to avoid or reduce direct effects where practicable, and where this is not possible, investigations and salvage. These procedures should reduce the extent of effects to all sites.

The Project will have the beneficial effect of facilitating research into any archaeological sites which are unable to be avoided. This provides an opportunity to investigate little documented site types that will have beneficial effects for future research in other parts of the Horowhenua. In addition, a small portion of the extensive garden systems known to have been located in the wider Horowhenua are likely to be disturbed and their details recorded contributing to a better understanding of past horticultural practices. Mitigation of potential adverse archaeological effects is addressed through the recovery of archaeological materials and recording of information as will be required by any archaeological authorities obtained from Heritage New Zealand.

5.4 Cultural Effects

This area has long been desirable to Māori as a source of food due to its natural resources, good climate and fertile soil which yielded food and helped meet other needs (e.g. eels from the wetlands and cultivation). The land has been extensively occupied and settled for centuries as described in the archaeological context in Appendix E in Volume II. The early Māori occupation of this area was by Muaūpoko who were replaced by Ngāti Raukawa during the 1830s. The Māori occupation resulted in some land clearance for housing, fortifications and cultivation fields. The tangata whenua in the Project area are Ngāti Huia based at Huia and Matua Marae, who whakapapa to Ngāti Raukawa. Early Europeans arrived in the early part of the 19th century and also left their mark on the landscape. As a consequence there are a number of existing and historically important sites and a significant amount of Māori land within the Project area as discussed in section 3.3 and Appendix J Volume II of this document.

The Transport Agency has undertaken extensive consultation with Ngāti Huia, Ngāti Matau and the Muaūpoko Tribal Authority on this Project. This consultation is outlined in section 6 of this document. The issues and values identified during the consultation are:

- Ongoing opportunities for consultation and an ability to influence the Project;
- Potential for loss of traditional Māori land;
- Effects on whanau living close to the highway (e.g. noise and construction);
- Effects on access to marae and urupa along with the tikanga and kawa in relation to tangi;
- Effects on Mauri of the land and waterways along with the indigenous flora and fauna associated with waterways;
- Effects (damage) on historic and culturally important sites and potential discovery of artefacts and other Māori cultural material; and
- Safety and the ability of whanau and visitors to use the road and access marae and urupa, and properties safely.

These matters are addressed in turn below.

5.4.1 Consultation with Iwi

The extensive consultation with Ngāti Huia of Huia Marae and Matau Marae, and with individual owners of Māori land has greatly assisted in shaping the Project through understanding the issues and the potential location of sites and areas of importance. The consultation has contributed to:

- Confirming the preferred alignment through assisting with an understanding of cultural values in the area;
- Understanding the access to the marae and urupa, and the inter-relationship between them in relation to tangi;
- Avoiding land parcels and minimising land encroachment where possible; and
- Developing mitigation.

Ongoing consultation will continue to inform the detailed design of the Project.

Endeavours to engage an appropriate author through Matau Marae and Huia Marae to prepare a cultural impact report commenced in September/October 2014. Whilst an author was quickly agreed upon, the work was unfortunately not achieved due to a range of factors beyond the ability of the Transport Agency to address. A similar situation applied in relation to Muaūpoko who were involved in discussions relating to the preparation of a cultural impact report in May and June 2015. A cultural impact report on behalf of Muaūpoko has now been received and is provided as part of the NoR documentation as Appendix M in Volume II. Detailed consultation with both local Iwi and with Muaūpoko was also undertaken in researching the archaeological environment of the area, and this has contributed to the description of the area and its values in the archaeological and heritage assessment in Appendix E of Volume II.

5.4.2 Loss of Māori land

The land is important to Ngāti Huia and Ngāti Matau due to their history of arrival, occupation and use; it provides the whanau who own the land a connection to the area (turangawaewae) and is an economic asset.

The Project alignment was developed with the aim of avoiding, where possible, and otherwise minimising encroachment into Māori land[37]. The Māori land the Project alignment has avoided includes

[37] For the purposes of the Project such land includes land classified under the Te Ture Whenua Māori Act, Māori Reserve or general land owned by Māori with associations with the area (referred to as traditional land). The area also includes Māori roadways which will be affected by the Project.

a Māori Reserve adjoining the Matau Marae. However, complete avoidance of Māori land has not been possible given its proximity to the highway and its overall extent in the area[38]. Culturally important land affected by the Project includes the access to Huia Marae, and the Māori roadway at Paeroa Road.

The recent redesign of the Project north of Paeroa Road has reduced the need to acquire Māori land for the Project by removing the need for a parallel road connection to join with Waitarere Beach Road. The total amount of land held in terms of the Te Ture Whenua Māori Act required for the Project is approximately 1.54 hectares. This is over two blocks. Further areas of land thought to be Māori land but in general ownership is also required. The need for this land is unavoidable and effects on Māori land have been reduced through Project design as far as possible. Paeroa Road, a Māori roadway, will also be affected. Further details including the parcels and ownerships are given in Plan Set C in Volume III and Table 5-4 of this document.

The loss of this extent of land is a moderate to significant effect, depending on the property affected. The consultation has raised the issue of potential land swaps to replace land required for the Project. However, this can only be addressed through the land acquisition process, and is outside the purview of the RMA.

Individual effects on property will be considered as part of the property acquisition process administered through the Public Works Act and, in respect of Te Ture Whenua Māori Act lands, through the Māori Land Court. These processes will consider effects on property and allow for appropriate compensatory measures to be developed. The approach to compensation can be different for each parcel of land, depending on the circumstances of the subject land and also the personal circumstances of individual land owners.

5.4.3 Existing Māori Owned and Occupied Residences

There are a number of Māori owned and occupied houses in close proximity to the existing highway. A number of these are affected by the land requirement and the owners have been consulted as part of the Project's development.

Issues such as land loss, access and noise were raised and have been discussed with landowners. Acoustic effects are assessed in section 5.7 of this report and it is expected that up to three dwellings, at least one of which is in Māori ownership, will be purchased to address potential noise effects. The safety of access to the highway for dwellings will be improved.

5.4.4 Access to Marae, Paeroa Urupā and Tikanga and Kawa

The existing access to the Huia Marae will be changed due to the Project. It is proposed to provide access via an extended accessway from the new intersection at Hinaupiopio. The proposed upgrade of the Clay Road intersection will improve its safety and therefore the safety of access to the Matau Marae.

The consultation with Ngāti Huia identified the kawa in relation to tangi between the two marae. This is due to the relative locations of the two marae. It was explained that a tangi procession to the Paeroa Urupā from a Marae should not 'go back on itself' (i.e. travel south before turning north onto the highway or pass north beyond Paeroa Road before accessing the urupa). Previous designs had presented difficulty with this aspect of kawa. The current design of the Project provides appropriate access at Hinaupiopio, with connections to Huia Marae and the urupa. Left in access to Huia Marae will remain for pre-determined occasions (e.g. tangi) and could be controlled by Huia Marae.

There are two Māori roadways in the Project area - Clay Road and Paeroa Road. The Clay Road SH1 intersection is to be improved with improved sightlines through vegetation management and improved road markings within the existing intersection area, giving safer access to Matua Marae. It will also be connected with a slip road from SH1 for vehicles turning left. This provides for safety and for additional improved turning movements at this point.

The eastern end of Paeroa Road is within the designated area and will be truncated by the realignment. Access onto SH1 will be closed at this point. Instead, a parallel service road is to be constructed to a new intersection at Hinaupiopio. There have been early discussions with Iwi as to whether a new road can be declared Māori roadway as replacement for the section of Paeroa Road that will be lost. The

[38] See constraints map in Volume II, Appendix J.

future ownership of the road is a matter of detail that commences once RMA approvals have been obtained to allow for the road to be constructed. It is acknowledged that creation of a Māori roadway and/or selecting a road name that responds to and respects the cultural significance of the area would assist in mitigating cultural effects of the loss of this roadway land.

5.4.5 Mauri of the Land and Waterways

Discharging contaminants to, and disturbing, ecosystems can affect the mauri (life force) of the land and water. At present stormwater from the highway runs off onto land and enters the local drainage system untreated. Proposed stormwater management for the Project includes treatment processes (swales and ponds) that will improve the quality of the highway stormwater runoff to watercourses in the area. The Project has been designed to avoid any stormwater discharge from the realigned highway into the catchment of Lake Horowhenua.

The Project has avoided disturbing the wetland at the southern end of the Project area, and the stormwater system design ensures that stormwater from the road in the future entering the wetland will be treated through swales on the western side of the highway before passing under the road and into the wetland area.

It is considered that there will be some cultural benefit from improvements in water quality due to the management of stormwater through swales. Where there is mitigation planting this will also contribute to the ecological health of the nearby area.

5.4.6 Historically and Culturally Important Sites

The alignment of the Project has largely avoided known historically and culturally important sites, both existing (such as Marae) and archaeological.

The existing sites that are affected are the Huia Marae entrance (discussed above) and the Whare Rongopai. The Whare Rongopai is an established church which will lose some land at the front of its site. The Transport Agency has been working with the owners to ensure satisfactory access layout and adequate parking for the church, both of which can still be achieved (14 on-site parks will remain). A cross section of the access area is shown in Figure 5-2.

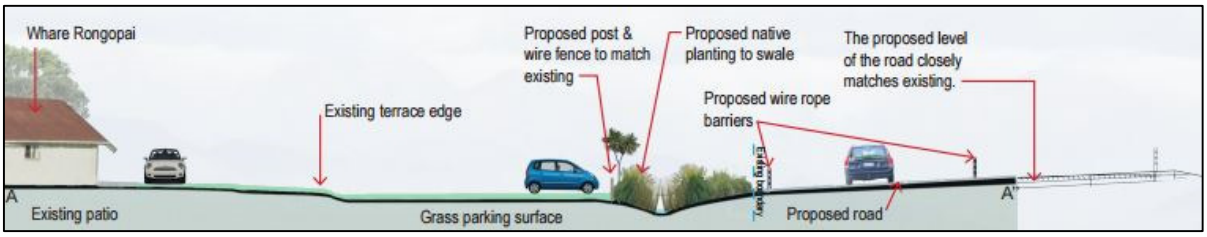

Figure 5-1: Cross Section of Whare Rongopai Entrance

The risk of disturbing archaeological sites is discussed in section 5.3 of this document. These risks are addressed through avoidance and mitigation measures and archaeological authorities will be obtained from Heritage New Zealand Pouhere Taonga, prior to undertaking any land disturbance. The authorities will set out requirements for ongoing involvement of tangata whenua in investigations, and undertaking archaeological work under specified conditions including through a heritage management plan. While there are risks of potentially disturbing a site of significant value and an area of moderate value (see section 5.3 of this report), the effects will be mitigated through the involvement of tangata whenua observers as appropriate and agreed protocols in case of any finds. A draft condition has been included in section 7 of this document which would cover the protocol in case of any finds outside the area covered by an archaeological authority.

5.4.7 Improved Junction and Access Safety

Safety will be improved at the junction of Clay Road with the refined intersection layout. Similarly safety will be improved through the reorganisation of Paeroa Road and its connection to the new intersection at Hinaupiopio. Access to Huia Marae will be safer than at the current informal junction with SH1. People who frequently use these accesses will benefit from these improvements.

5.4.8 Conclusion

Section 6 (Matters of national importance) of the RMA identifies that:

> *"all persons exercising functions and powers under it…shall recognise and provide for… the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga".*

Section 7 (Other matters) of the RMA identifies that:

> *"all persons exercising functions and powers under it…shall have particular regard to ……..kaitiakitanga".*

Section 8 (Treaty of Waitangi) of the RMA identifies that:

> *"all persons exercising functions and powers under it…shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi)".*

The principles[39] of the Treaty that apply to persons exercising functions and powers under the RMA include consultation, good faith, partnership and active Crown protection of Māori interests.

RMA section 6, 7 and 8 matters and principles have been applied to the Project through comprehensive and ongoing consultation, through the choice of an alignment which has as far as practicable minimised effects on Māori land and as far as possible avoided valued cultural sites[40]. A revision of the Project design late in the Project development stages was in part an endeavour to address issues raised through consultation. Further mitigation to address cultural effects includes involvement in archaeological investigations and interpretation. There are other opportunities to address cultural concerns which lie outside the RMA, including land compensation arrangements, road vestment and road naming. The draft conditions in section 7 include the involvement of tangata whenua in processes when any archaeological finds are made outside areas covered by archaeological authorities[41] and in post-construction activities relating to any finds.

5.5 Social and Economic Effects

As described in section 3.4, the existing SH1 has contributed to the growth and development of New Zealand as well as of the region and Horowhenua District. Over the years, the highway has brought the positive social benefits of ready access to Levin and Foxton nearby, but also some negative social impacts and the disadvantages of the environmental effects associated with traffic. Information on likely social impacts has been drawn from a range of sources, including consultation processes.

Social effects encompass broad considerations, ranging from changes in movement patterns and the environments within which people interact to changes in aspects of an area that people particularly value, including opportunities to experience particular attributes. These values can include cultural and spiritual values.

5.5.1 Affected Communities

There are four distinct communities which will be affected in various ways by the Project. To a certain extent these communities overlap. The main aspect that they have in common is their use of SH1.

The communities can be described as follows:

- The immediate community: residents and landowners who live adjacent or near to the Project area.

[39] For more information on the Principles of the Treaty of Waitangi refer to Te Puni Kokiri website http://www.tpk.govt.nz/en/a-matou-mohiotanga/search?q=treaty+principles

[40] See Appendix J, Volume II, where avoidance of effects on Māori land and cultural sites were amongst the considerations leading to the preferred alignment.

[41] The conditions of any authority will address these requirements for the areas they relate to.

- Tangata whenua: Māori who have mana whenua ties to the area, particularly Ngāti Huia[42]. This area is tūrangawaewae for many because of the history of its settlement, its two marae and shared urupa, and the significant Māori land ownership adjacent and near to SH1.
- The Waitarere Beach Road Community: residents of Waitarere and Waitarere Beach who live on property accessed from Waitarere Beach Road. The usually-resident population in this area is around 600 people and the non-resident property owners (owners of holiday homes) would cater for double this number at some times of the year.
- The Poroutawhao School Community: the community connected with Poroutawhao School located at the north-end of the Project area. The school has a roll of around 110 pupils with most children drawn from the local rural community and small settlements, including Waitarere Beach.

There is also a nation-wide community of road users who derive social benefit from the existence of SH1. The diverse and cumulative social effects on this wide community will be beneficial and are largely accounted for in the BCR.

5.5.2 Types and Extent of Social Effects

This section describes the potential for social impacts from the Project.

5.5.2.1 The Immediate Community

For the immediate community while in the past the existence of SH1 may have been seen primarily as a cohesive component of local infrastructure, enabling local contact, including through access from one side of the road to another, increasingly it has come to sever the immediate community. There are now high levels of severance within the local environment from the existing SH1 traffic. This social effect is unlikely to change for the immediate community as a result of the Project and it may slightly worsen as the road will be wider, with physical barriers. However, given the existing level of severance, any additional effect will be minor.

Other effects on the local community will include, in some circumstances, temporary or permanent loss of land. Associated economic effects are addressed through individual property negotiations or directly under the Public Works Act. It is possible that a small number of residents may be displaced by the Project as the effects of noise and proximity to the highway may mean that acquisition and removal of a few dwellings is necessary. At present, it is intended that three dwellings will be purchased by the Transport Agency but one or two may remain in place following construction and be reoccupied. As the community is quite scattered, the loss of a small number of dwellings is unlikely to have a social effect on people other than those directly affected. Other effects with a social component include increased noise (addressed in section 5.8), and the direct effects of loss of land and changes in access (described in section 5.9).

While some of the immediate community will no longer have direct access from the highway to their properties from the both the north and south, and may have increased journey distance with associated fuel cost and time loss, these are considered to be minor adverse effects at the community scale. The immediate community will benefit from the enhanced safety arising from the Project.

The community will also benefit from the proposed parallel access road between Hinaupiopio and Paeroa Road, as it provides a much safer route for local movement. Local residents have indicated that this will be of benefit to families and the community generally, and will enable amongst other things a suitable route from Hui Marae to the Urupa. The turn around area at Hinaupiopoi is also a potential location for school bus drop off/ pick up.

5.5.2.2 Tangata Whenua

The local tangata whenua community will experience social effects as for the other groups, depending on individual circumstances[43].

[42] Mauapoko people also have close ties to the area.
[43] Section 5.4 has addressed cultural effects separately.

Those who live in the area and take children to Poroutawhao School, or who commute through the area on SH1 will experience increased safety on this part of the road. Changes at the Clay Road and Waitarere Beach Road intersections will increase safety at both locations with no reduction in turning ability, while redirection of movement to and from Paeroa Road to a new intersection at Hinaupiopio may slightly reduce some convenience but enhance safety. The change in access to Huia Marae will also enhance safety.

A small number of Māori landowners in the area will lose some property. Such individual effects are likely to be perceived as negative, and will be addressed as described above for other directly affected people in the immediate community.

Decisions on route options which have led to the Project in its current form have endeavoured to minimise effects on known and likely sites of value to tangata whenua. Inevitably not all such effects have been able to be completely avoided. Such potential effects have a social component but more properly fall into cultural considerations. These are addressed in section 5.4. There is potential for the Project to disturb archaeological material associated with past tangata whenua occupation in some places. This is described in section 5.3.

An additional social benefit, identified from consultation and particularly articulated by the Māori community, will be derived from a reduction in road deaths in the vicinity. Such deaths place a burden on the local community both practically in terms of disruption but sometimes also in terms of investigative processes and provision of evidence, but also in terms of aspects of "sense of place". Local road deaths can contribute to peoples' perception of the safety and security of a place and can adversely affect such perceptions.

5.5.2.3 The Waitarere Beach Road Community

This community depends entirely on SH1 for access to and from most social facilities (workplaces, all but convenience shopping, education, health services and entertainment). At times of the year the local population swells, and the beach area has always attracted day visitors. It is notable that Waitarere Beach Road vehicle movements contribute a large portion of SH1 traffic in this area.

For this community, located beyond any direct effects of highway traffic, the social effects are expected to be entirely beneficial because of a safer intersection with SH1.

5.5.2.4 The Poroutawhao School Community

Pupils arrive at school by school bus or private vehicle because SH1 is not considered a safe environment for young children on foot or cycle. The Project will not significantly change this. However, pupils who attend the school from the Project area or further south, and those from Waitarere Beach Road will benefit from the enhanced safety the Project will bring. There are also specific safety concerns, which amount to a social effect, associated with school bus and private car movements because of lack of a "safe haven" such as a dedicated right turning lane for school traffic approaching from the south. The Project will remedy this current concern.

5.5.3 Effects on Local Facilities

Additional adverse social effects could arise if the Project were to directly affect, or affect access to, valued local community facilities. In the immediate vicinity of the Project area there are a number of such facilities. These include the two marae and the urupa, the Whare Rongopai (a church), Poroutawhao School and the gun club nearby.

Of these facilities, the only one directly affected is the Whare Rongopai, which will lose a small area of land at its front gate. In addition, its access will become left-in, left-out. A turning opportunity is now provided at Clay Road. This church has a small congregation and the social effects of the change are expected to be negligible.

A sliver of land is also required from the property currently used by the gun club. This will have a negligible effect on the club.

Huia Marae, currently accessed off a driveway at the future P-turn location, will have a modified access. Detailed plans for this access and aspects such as signage are currently under discussion with the Transport Agency as has been described in section 5.4.

Access to the urupa will be somewhat modified by the closure of Paeroa Road, although the service road connection from Hinaupiopio will replace this. The effects of this change are considered primarily as a cultural effect (see section 5.4).

To the extent that Waitarere Beach and the nearby Waitarere Forest recreation area are community facilities, the Project will have beneficial social effects through enhanced safety at the Waitarere Beach Road intersection.

5.5.4 Economic Effects

Appendix K in Volume II provides an assessment of the economic effects of the Project.

As with the social effects, the economic effects will be experienced at different levels (nationally, regionally and locally). The basis of the Transport Agency's economic analysis is a national basis, and is established through the conventional BCR analysis undertaken for the Project. This compares Project benefits (including vehicle operating cost savings, time cost savings, accident cost savings, and travel time reliability improvements) with Project costs (including capital costs and changes in operation and maintenance costs). The background and methods for the BCR calculation are briefly described in Appendix K.

The Project has a BCR of 1.4, which means that it is a Project which justifies national funding, regardless of its RoNS status[44].

As pointed out in Appendix K, the Wellington (and Manawatu-Wanganui) regions' businesses and residents will accrue a disproportionate share of the benefits of the Project, as they use the road more than the national average road user. As the Project is paid for out of a national budget, this positively skewed economic situation is a significant benefit of the Project for the nearby regions.

The safety benefits are noted in Appendix K as particularly benefiting local people, as approximately 40% of the traffic on this part of SH1 has an origin or destination within Horowhenua itself.

The local Levin economy will also benefit considerably from expenditure relating to the Project's capital expenditure of $14.2m[45] during the 12-month construction period from 2019 (or possibly sooner if finance becomes available). This is due to the additional expenditure, employment and incomes that will be generated, and the indirect expenditure (or multiplier) as a consequence of provision of goods and services to the Project (such as aggregate and daily project resource needs) and by those local people employed on it, who themselves will be spending on goods and services.

Appendix K also identifies and describes a number of other economic wellbeing beneficial effects which arise from the increased level of economic activity which the Project may bring, which can be experienced in the local and regional communities. These are:

- increased economics of scale;
- increased competition and associated efficiencies;
- reduced unemployment and underemployment of resources (including labour); and
- increased quality of central government services.

The extent to which these wellbeing benefits will be achieved locally or regionally will depend on the circumstances at the time the construction of the Project is undertaken.

The economic effects of the Project are assessed as being significantly beneficial at national, regional and local levels.

[44] Refer NZ Transport Agency's Investment Framework. http://www.nzta.govt.nz/planning-and-investment/2015-18-national-land-transport-programme/the-investment-framework/

[45] This sum is based on future, not present, values (which would be lower).

5.5.5 Conclusion on Social and Economic Effects

There are both positive and negative actual and potential social impacts associated with the Project in terms of the local community. The positive effects relate primarily to significant safety benefits and will be experienced by both the local and wider community. There are actual and potential adverse social effects from loss of land and potentially up to three dwellings, a small increase in severance due to the Project's design, and slight inconvenience for those who have to travel further due to access changes.

There are also temporary economic benefits associated with the construction phase which are discussed above and long-term more significant economic benefits from efficiency gains due to improved travel times (as part of the North of Wellington RoNS) which have been addressed earlier in section 1.6 of this report.

The adverse effects under this heading are minor or less than minor and are largely outweighed by the important safety benefits and economic benefits to both the local and the wider community.

5.6 Landscape and Visual Effects

The main potential landscape and visual issues associated with the Project are as follows:

- Effects on rural landscape character as a result of the greater highway footprint and encroachment into adjacent rural land.
- Effects on natural features as a result of cut slopes into the existing sand dune landforms, and removal of vegetation, as well as the realignment of the existing stream (Stream 2) south of Paeroa Road (as part of the drainage works).
- Effects on community places (Marae, the school and Whare Rongopai).
- Landscape and visual effects on individual properties.
- Temporary effects during construction.

These effects are discussed in the following sections. Further detail on the landscape and visual effects and mitigation measures is provided in the Landscape and Visual Assessment in Appendix H in Volume II of this document.

5.6.1 Effects on Landscape Character

Generally, the character will remain similar in kind to that existing now - a highway curving through a productive rural landscape.

The upgraded highway will have a wider footprint and more formalised character than the current rural highway. It will still have two lanes, but it will now have wider shoulders, a wide central median, wire rope barriers on both sides and the median, a separate parallel service road and some long parallel accessways, more expansive intersections at Waitarere Beach Road and Clay Road (including slip roads), street lighting and a right turning bay at Poroutawhao School. It will therefore be more visually apparent.

The increased width (generally from about 10.6 m to 17 m) will encroach further into adjacent productive land, and will increase visual and physical severance between the land on either side of the highway.

The effect of the works, with the inbuilt mitigation of their design in accordance with the local topography and the finishing of the works with landscaping, reversion to pasture, and specific areas of improvement including riparian margins, planted swales and areas of focused landscape planting, will be minor or less than minor in terms of landscape character.

5.6.2 Effects on Natural Character and Natural Features

The existing highway has modified the natural landscape and the natural dune features in the immediate vicinity of the Project area. Land drainage has also modified, over the years, the other natural feature of the area - its wetlands and local lakes. The Project has been designed so that it will not adversely affect the remaining wetland in the vicinity, to the south of Clay Road. As part of the drainage from the

highway passes through the wetland, water quality improvements from the swale drainage system will somewhat benefit this natural feature.

Where the highway alignment passes through the sand dunes this will require cut faces. The main cut faces will be to both the east and west sides of the realigned highway between Paeroa Road and Waitarere Beach Road. The cuts will be graded as practicable so as to fit with the existing character and tie in to the surrounding dunes. The proposed designation width allows for this blending of earthworks into the surrounding landscape. If any retaining walls are found to be required (to be confirmed at detailed design stage), it is expected that they will be low, over a short extent, and able to be easily screened by planting.

There will be a small diversion of the stream to the south of Paeroa Road. The stream has already been modified as part of the farming landscape. Effects of the diversion will be offset by proposed riparian planting alongside this and other streams within the designated area. In addition, a number of mature planted totara trees in the area will be removed. They are to be replaced through planting of more trees of the same species at suitable locations within the designated area.

The effect of the Project on natural features and natural character in the Project area, with the above mitigation, will be minor or less than minor.

5.6.3 Overall Landscape and Visual Effects

The potential landscape and visual effects will result from alterations to the local rural landscape due to earthworks, some removal and replacement of vegetation and the introduction of largely horizontal road infrastructure to upgrade the existing highway.

The receiving landscape is not an outstanding natural feature or landscape, although it is a dune landscape as identified in the HDP. This is based on its inclusion in part within the area identified as the Coastal Lakes Domain in landscape character values. The specific features which identify this landscape as one of higher landscape amenity are not, however, found in the Project area other than the dunes themselves. The Project will replace the existing highway with an upgraded, slightly straighter highway. It will effectively retain the same overall character in the same location. The landscape has a high visual absorption capacity and low landscape values. A landscape context plan in Plan Set I, in Volume III of this document, shows the proposed landscaping which will mitigate any residual landscape and visual effects.

Mitigation measures include:

- Replanting that is in accordance with the contribution of local vegetation patterns in the landscape;
- Planting to integrate the new highway into the landscape and over time, enhance the landscape and natural character values in the area.
- Added planting which will, over time, enhance the landscape and natural character values in the area.
- Reinstating entranceways and gardens that need to be modified as a result of the Project, in accordance with the local landscape character;
- Swales and stormwater management facilities that will contribute positively to the local landscape through their planting and maintenance;
- Planting of stream margins within the designation.
- Merging batter slopes with the existing landforms.

Overall, any adverse landscape and visual effects of the Project will be minor or less than minor.

5.6.4 Visual Effects on Individual Properties and Community Places

The visual and landscape effects of the Project on individual properties in its vicinity have been investigated and assessed. The realignment of the road, the changes in road design and the removal of some areas of established vegetation results in varying effects on dwellings. Some dwellings will benefit

from increased distance from the highway (with positive effects resulting over time) whereas others will be closer and may experience some degree of adverse visual effect.

The assessment shows that potential adverse effects on three existing dwellings will be significant. All three are within the proposed designated area and are expected to be purchased by the Transport Agency.

There will be moderate adverse visual effects on six properties. In all cases, effects are able to be mitigated by landscape design. For the remaining 30 dwellings in the vicinity, adverse effects are minor or less (five assessed as minor, five as less than minor and 18 negligible or potentially positive).

Of the four community places evaluated, visual effects at Matau and Huia Marae and at Poroutawhao School have been assessed as negligible. Whare Rongopai will be visually affected to a moderate degree, due to being closer to the highway with some encroachment of its curtilage. It will however benefit from being more visible from the sweep of the highway. Adverse effects can be mitigated by landscaping, as described and shown in Appendix H in Volume II of this document, and at individual property level by agreed planting or other landscaping.

5.6.5 Visual Effects During Construction

There will be some adverse visual effects during the construction stage due to vegetation clearance, raw earthworks, and construction storage areas and equipment. These effects will be temporary and within the context where such effects would be expected from time to time.

5.7 Ecological Effects

An outline of the potential ecological effects of the Project (terrestrial and aquatic ecology) is provided below. For a detailed description of these effects, refer to the Ecological Assessment report in Appendix G in Volume II of this document.

The Project is to be constructed in a highly modified environment with overall low ecological values. The presence of the existing road and adjacent farmland means that habitat for native flora and fauna is sparse and degraded. However, there are discrete areas of ecological value within or near the Project area.

5.7.1 Vegetation

The extent of native vegetation removal is summarised in Table 5.2, which sets out the area of trees and shrubs within the construction footprint, excluding areas of pasture and isolated ornamental shrubs. This is a potential maximum area which could be cleared, but existing vegetation will be retained wherever practicable.

Table 5-2: Vegetation to be cleared[46]

Vegetation Type	Area Within Designation (ha)	Percentage of Designation (%)
Designation (total)	22.92	100
Total area of vegetation clearance within the Designation	1.585	6.98
• Exotic vegetation	1.307	5.72
• Mixed native/exotic vegetation (mainly exotic with some planted natives)	0.245	1.09
• Native vegetation	0.026	0.13
• Kahikitea swamp forest (partial canopy of one tree)	0.007	0.04

[46] There are minor discrepancies in area between the Ecological Report and the most recent Project plans due to the addition of some areas after the Ecological Report was completed.

Out of a total of 1.6 hectares trees and shrubs within the designation, 1.3 hectares or 82% is exotic species. A further 0.25 hectares (16%) consists of mixed plantings of little ecological significance, including occasional planted and regenerating native shrubs.

Very little native vegetation will be impacted by the Project. Approximately 0.3 hectares or 2% of the area to be designated consists of native vegetation, almost all of which has been planted. The only nonplanted native vegetation consists of one kahikatea on the edge of the Designation at 576-598 State Highway 1 (part of kahikatea swamp forest); kanuka, cabbage tree and bracken on a the roadside cutting at 805 State Highway 1; a group of five cabbage trees at 9 Paeroa Road on the opposite side of the highway; and occasional shrubs and groundcovers colonising planted and non-grazed areas.

Alterations to the initial engineering design have successfully avoided the need to remove the kahikatea tree or to directly affect the kahikatea swamp forest wetland located to the south of the Project.

The loss of 0.3 hectares of predominantly planted native vegetation is considered to a minor adverse effect. The mature totara trees near to the Paeroa Road, SH1 junction will be retained if possible. However, this is unlikely to be achieved. Instead, a condition requiring the planting of a specified number of ecologically locally-sourced totara trees is included in section 7. All plantings will require a minimum three year maintenance period during establishment.

Overall, with the proposed mitigation, there will be no net loss of native vegetation biodiversity and any adverse effects are considered to be minor.

5.7.2 Avifauna

Avifauna values within the Project footprint are low, with values mainly associated with mature native and exotic trees. To avoid adverse effects on native and exotic avifauna, woody vegetation clearance will be undertaken, as far as practicable, outside the main nesting period of spring and early summer (01 September to 31 December inclusive). A condition to this effect is included in section 7. If this is undertaken then the adverse effects on native avifauna will be negligible.

5.7.3 Herpetofauna

The majority of the site is unsuitable for native herpetofauna. However, there are records of three native species in close proximity to the Project area, including one 'at risk' species, the ornate skink.

Due to the potential risk of protected and threatened species of native lizards being present, mitigation for herpetofauna is proposed through the proposed conditions in section 7 of this report. A lizard salvage operation will be undertaken prior to clearance of any vegetation that may be potential lizard habitat. A lizard discovery protocol will be implemented during construction.

If the above is implemented, the adverse effects of the Project on herpetofauna will be negligible.

5.7.4 Aquatic Ecology

Three modified natural streams are present within the Project footprint. These streams take runoff from SH1 and the surrounding farmland.

The physical habitat of these streams is poor, and reflects historic drainage and channelization, vegetation clearance, and the presence of barriers to fish passage. Macroinvertebrate indices indicate poor water quality and habitat conditions. Fish surveys have confirmed the presence of 'at risk' brown mudfish in Stream 1. This species may also be present in Stream 3.

The streams within the designated area will be modified by the Project due to a small length of stream diversion and culverting. This is summarised as follows:

- Stream 1: Small increase in catchment area and runoff from State Highway 1.
- Stream 2: 30m of stream to be piped, 118m of stream diversion, 24m of stream daylighting and 60m of flowpath to remain downstream of Pond 2b, resulting in a linear increase in stream length of 32 metres.
- Stream 3: Small increase in catchment area and runoff from State Highway 1.

To mitigate the impacts of stream piping and diversions, all diversions and daylighted sections will be designed to maximise in-stream and riparian habitat. Two existing perched culverts are proposed to be remediated, and all new culverts will be designed to allow for fish passage. This will benefit aquatic ecology and will be a positive effect of the Project. In addition, all stream banks within the designated area will be planted with native vegetation and maintained for a minimum period of three years.

To mitigate the potential effects on brown mudfish, specific mitigation measures will be developed as set out in the proposed conditions. This will include assessing changes to in-stream hydrology, riparian fencing and planting downstream of the motorway, monitoring and reporting. Mudfish recovery and temporary relocation may be required.

Water quality will be maintained by the implementation of an Erosion and Sediment Control Plan during construction and through the design and operation of the vegetated environmental swales which form part of the Project improvements.

All the above mitigation measures are proposed to be implemented through draft conditions included in section 7. The conditions which apply to matters which also require regional consents from the Manawatu-Wanganui Regional Council (Horizons) are interim until such consents are obtained. On this basis, any adverse effects on aquatic habitat are considered to be minor or less. The improvements to habitat outlined above will be a positive effect in the environment post-construction.

5.8 Noise Effects

There are potential adverse noise effects associated with the realignment of SH1 in the Project area. This has been investigated through a technical investigation including the modelling of future noise levels, and the results are described in the acoustic assessment report - Appendix I in Volume II. New Zealand Standard NZS6806 provides a standard method of investigating and determining the extent of such effects. The investigations for the Project have been through several stages, and additional properties containing the most affected dwellings (including those at 607 SH1 and 577 SH1) have been included in the designated area to mitigate the effects of the Project.

NZS6808 requires that assessments of noise are undertaken in comparison to the noise levels that would occur at a future design year if the Project did not proceed. For the Project, the future year has been set at 2028. The noise level assessment compares the noise levels that would be experienced in the area if SH1 remained on its present alignment, with the projected traffic growth included, compared to the proposed Project alignment.

To meet the NZS6806 requirements, the assessment is taken in relation to Protected Premises and Facilities (PPFs) which include dwellings and public buildings such as the churches and Marae in the area. The investigation, in accordance with the requirements of the model used - the NZ-modified version of the Calculation of Road Traffic Model - took into account all PPFs within 200m of the alignment and assessed the present situation, the situation as it would be at 2028 with no change in the alignment but with expected traffic volume increase (the "do-nothing" noise level), and the situation with the altered alignment in place and the increased traffic volumes, but no mitigation in place (the "do-minimum" noise level).

Without any change other than the predicted traffic volume increase, there will be a gradual increase in noise levels in the area over the modelled period to 2028. This is contributed to in part by an increase in the proportion of heavy vehicles, as well as overall increases in traffic volumes (of approximately 1000 vehicles per day). This would lead to an increase in exposure to noise in the general area of 1 - 2dB (L_{Aeq} (24hr)), which is an imperceptible change. With the change in alignment, some PPFs will experience increases above the average while others will experience reductions. Only if a PPF is exposed under the "do-minimum" scenario to a L_{Aeq} (24hr) noise level which reaches 64dB and is 3dB greater than the exposure would be without the Project having been developed (i.e., when compared with the "do-nothing" scenario) is mitigation considered necessary under NZS6806. As can be seen in Table 5-3 none of the PPFs have been modelled to reach the 64dB level on the "do-minimum" scenario.

Table 5-3 sets out the significance of the changes in noise levels if the Project is constructed. The right-hand column and the colour green (as compared to larger increases which would show as orange or red) indicate that there is no need for corrective action through mitigation in accordance with NZS6806.

Table 5-3: Predicted Noise Levels for PPFs in the vicinity of the Project (2028) $L_{Aeq(24\ hrs)}$ (by Street **Address)**

Address	Existing (2014) Noise Levels	"Do-nothing" (2028 - without the Project)	"Do-minimum" (2028 - with the Project)
719 State Highway 1	56.9	57.7	57.7
717 State Highway 1	55.8	56.6	56.6
708 State Highway 1	58.9	59.8	59.8
670 State Highway 1	58.1	58.9	59.4
648 State Highway 1	52.9	56.2	62.6
15 Waitarere Beach Road	55.4	56.9	54.6
12 Paeroa Road	56.2	57.7	62
9 Paeroa R (Upper level)	56.9	57.8	61.2
9 Paeroa R (Lower level)	56.9	57.8	61.0
563 State Highway 1	52.5	53.4	54.1
594 State Highway 1	64.7	65.6	61.0
559 State Highway 1	58.9	59.7	61.6
549 State Highway 1	61.6	62.4	63.2
533 State Highway 1	57.9	60.5	57.4
535 State Highway 1	64.0	64.9	60.5
537 State Highway 1	56.2	57.1	55.9
541 State Highway 1	57.9	58.8	56.7
537A State Highway 1	52.9	53.8	52.7
527 State Highway 1	54.0	54.9	53.6
519 State Highway 1	65.8	66.7	62.1
516 State Highway 1	60.6	61.5	63.8
514 State Highway 1	58.7	59.6	61.7
19 Clay Road	58.0	58.9	58.7
13 Clay Road	59.9	60.7	59.9
7 Clay RD (Upper level)	64.3	65.2	60.8
7 Clay RD (Lower level)	63.9	64.8	60.4
6 Clay Road	65.3	66.2	61.9
9 Clay Road	59.6	60.4	59.5
10 Clay Road	59.5	60.3	59.6
16 Clay Road	56.1	57.0	56.5
22 Clay Road	54.4	55.3	54.9

On this basis, operational noise effects associated with the proposed realignment up to year 2028 are considered minor, and no additional noise mitigation is required. This is because the noise assessment found:

- Forecast levels of future traffic noise are well below the trigger values of NZS6806:2010 for every relevant assessment location;
- The closest affected dwellings have been incorporated into the designation, effectively removing them from the assessment; and

- For over half of the PPFs assessed the proposed realignment of the curved highway manages to avoid coming close to dwellings, such that a reduction or nil increase in traffic noise is expected.

5.9 Property Effects

A number of private properties are directly affected by the Project. Table 5-4 sets out the property address and details the effects on those properties. The proposed realignment will encroach into these properties which will require partial or complete land acquisition within the designated area, and in some cases will also require reconstructed or replacement access or vehicle crossings.

The properties are set out from north to south. The reference number and their addresses and ownerships are shown mapped in Plan Set C in Volume III. It is noted that where parts of property is needed to be acquired (or access gained) (other than that shown as Paeroa Road and in Horowhenua District Council's ownership) then that property will have access to the compensation process set out in the Public Works Act 1981. This process provides opportunities for individual agreements to be reached that will address the range of property-related aspects that are outside the scope of RMA considerations.

It is also noted that some land that is currently within the designation and part of SH1 may become surplus and in due course may be disposed of by the Transport Agency.

Table 5-4: Property Effects

Ref #[1]	Address[2]	Area Required (m^2)	LD[3]	Owner	Property effects
1 & 4	708 SH1	4667	Lot 2 DP 427692	Speirs Terence Roydon Heron-Speirs Heather Adele Speirs Ofelia Guevara	The property covered by ref # 1 and # 4 is a single 102 ha property. Property ref # 2 is a smaller 0.7 h property. The realignment encroaches into the western extent of these properties, which are farm land. This encroachment is to accommodate the drainage swales, the carriageway and stormwater detention pond.
2	-	497	Lot 1 DP 427692	Heron-Speirs Heather Adele	Formed and licensed accessways to these properties will be retained and access onto SH1 will allow all turning movements.
3, 5, 6, 8 & 16	709, 717 SH1 & 18 Waitarere Beach Rd	1081	Lot 1 DP 68002	Fluker John Alexander Pescini Dorothy Jayne Pescini Mark James	The realignment encroaches into the eastern portion of these properties. The encroachment is necessary to accommodate the drainage swales and the carriageway. Formed and licensed accessways to these properties will be retained.
		837	Lot 2 DP 68002		
		1789	Lot 4 DP 68002		
		1404	Lot 2 DP 61632		
		773			
7, 10, 10B, 11, 11B, 14 & 15	648 & 682 SH1	49924	Lot 2 DP 304414 Lot 2 DP 88263 Lot 5 DP 61399 & Lot 1 DP	Poroutawhao Land Company Ltd	The Project encroaches into these properties to accommodate the drainage swales, stormwater detention pond, the carriageway and improvement to the Waitarere Beach Road intersection. Access will be left in-left out only.

Ref #[1]	Address[2]	Area Required (m²)	LD[3]	Owner	Property effects
			73873		
9	670 SH1	2058	Lot 1 DP 304414	Rose Scott Maurice Joseph Enoka Hine Ruth	The realignment encroaches into the western extent of this property. The encroachment is necessary to accommodate the drainage swales and the carriageway. Approximately half of the area currently used for a motocross track is required for the Project. The access to the property will need to be reconstructed. The access will be left in-left out only.
12, 12B & 13	648 SH1	923	Lot 1 DP 88263	Stewart Donald Charles Stewart Margaret Ann Thompson John Stuart	The realignment affects the full length of the accessway to this property and a small portion of the southwestern corner of the main portion of the property. The accessway is lined by an avenue of trees. While some of the trees will be removed those remaining will provide some shelter and screening. The encroachment is to accommodate the drainage swales and the carriageway. Access to the property will be from the existing accessway and will be a "left in left out" access.
17	-	2574	Sec 3 SO 28705	Grace Clarence William Frederick + 13 more	The Waitarere Beach Road extension and slip road from the highway to Waitarere Beach Road requires all of parcels 17 and 18 to be taken.
18	-	6190	Sec 4 SO 28705	Horowhenua District (042)	
19	-	125	Lot 7 DP 88867	Paterson Rosemary Ann	The Project requires all land within property ref # 19 and # 22. This may result in the removal of the house on the property ref # 22. This land is required to accommodate the new carriageway and slip road to Waitarere Beach Road and Waitarere Beach Road intersection improvements.
22	607 SH1	5501	Lot 6 DP 88867		
23	12 Paeroa Rd	1634	Lot 1 DP 40353	Reihana Tracy Reihana Miranda	The acquisition of part of this property is proposed. In particular it is needed to accommodate the drainage swale and the carriageway.
24	9 Paeroa Rd	10174	Lot 3 DP 58154	Christie Gillian Maxine Christie John	The Project will encroach into this residential and farm property by just over a hectare. This encroachment is to accommodate the drainage

Ref #[1]	Address[2]	Area Required (m²)	LD[3]	Owner	Property effects
				Grahame	swales and the carriageway of the highway, as well as the parallel service road. These works are likely to require the removal of the planted Totara trees on the SH1 frontage. The effects of the tree removal will be mitigated as described in section 5.7 of this AEE. The access to the property will be retained onto Paeroa Road and via the proposed service road to Hinaupiopio with full access to SH1.
25	577 SH1	7036	Lot 4 DP 58154	Archer Alan Archer Linda	The acquisition of the entirety of this property is proposed. This may result in the removal of the house on the property. In particular the land is needed to accommodate the drainage swales and the carriageway. The access to the property will be via the parallel service road, accessing the highway at the new intersection at Hinaupiopio with full access to SH1.
26	563 SH1	2239	Lot 3 DP 431661	Hirini Nan Hemaima Hirini Richard Winitana	The Project will encroach into this property to accommodate the drainage swales and carriageway of the highway, as well as the parallel service road. The access to the property will be via the parallel service road, accessing the highway at the new intersection at Hinaupiopio with full access to SH1.
27	559 SH1	986	7D2D36A Manawatu - Kukutauaki (ML 5450)	Matenga David Charles	The Project will encroach into this property to accommodate the drainage swales and carriageway of the highway, as well as the parallel service road. The frontage area lost contains a small personal chipping and putting green. The access to the property will need to be reconstructed and will be via the parallel service road, accessing the highway at the new intersection at Hinaupiopio with full access to SH1.
28	-	315	7D2D36B Manawatu - Kukutauaki (ML 5450)	Schmidt Lindsay Michael Schmidt Wendy Marie	The Project will encroach into this property to accommodate the new service road for properties to the north and south.
29 & 30	-	17615	Lot 2 DP 73873 &	Poroutawhao Land	The Project will encroach into these properties to accommodate the

Ref #[1]	Address[2]	Area Required (m²)	LD[3]	Owner	Property effects
			Lot 4 DP 61399	Company Ltd	carriageway, drainage swales and sediment retention pond (during construction activity). No access is currently proposed to SH1. If access is required it could be proposed from the accessway at RP 6200 to the north, or directly from SH1; both options operating as left-in, left-out only.
31	516 SH1	211	Lot 1 DP 16204	The Stewards Trust of NZ Inc.	The southern curve realignment will encroach into the Whare Rongopai to accommodate the drainage swales and carriageway. The vehicle accessway will be reconstructed. The access will be left in-left out only. Turnaround facilities will be provided at Clay Road and Hinaupiopio to replace the right turn in and out movements that will no longer be possible.
32	514 SH1	85	7D2D57D2A Manawatu - Kukutauaki (ML 4567)	Hill Te Rahi Elizabeth	The southern curve realignment will encroach into the property to accommodate the drainage swales and carriageway. The vehicle crossing will need to be reconstructed. The access will be left in-left out. Turnaround facilities will be provided at Clay Road and Hinaupiopio to replace the right turn in and out movements that will no longer be possible.
33	519 SH1	262	7D2D56A2 Manawatu - Kukutauaki (ML 3426)	Albert Donna Albert Peter Albert Tiaho Donna	The southern curve realignment encroaches into the property to accommodate the drainage swales and carriageway, and the new service road. The vehicle crossing will need to be reconstructed. The access will be via a shared accessway that runs parallel to SH1, accessing the highway from the intersection at Hinaupiopio.
34	511 SH1 (incl. Ngāti Huia Marae accessway)	3915	7D2D56A1 Manawatu - Kukutauaki (ML 3426)	Tatana Nepia Tatana Helen Anne	The southern curve realignment encroaches into this property and the accessway to Ngāti Huia Marae. The dwelling on this property will need to be removed. The access to the property and the Marae will be from the shared accessway that runs parallel to SH1 to the new intersection at Hinaupiopio. The access from Hinaupiopio will accommodate all movements. A left

Ref #[1]	Address[2]	Area Required (m²)	LD[3]	Owner	Property effects
					turn 'in' will also provided from SH1, but may only be used in for motorcades from Matau Marae.
35	507 SH1	13078	Pt 7D2D56B Manawatu - Kukutauaki (ML 1893)	Cockrell Paul Douglas Spicer Gregory Paul Cockrell Alan James	The southern curve realignment encroaches into this property to accommodate the carriageway, drainage and slip lane into Clay Road. Formed and legal accessways will be retained for the paddock directly from the highway.
36	463 SH1	14404	7D2D60C Manawatu - Kukutauaki (ML 1893)	Māori Trustee	The southern extent of the alignment encroaches into the property to accommodate carriageway and drainage swales. Formed and legal accessways will be retained with no overall change to access.
37	827 SH1	198	Pt 7D1,2 Manawatu - Kukutauaki (ML 1308)	Whiripo Land Company Limited	North of the main Project, a right turn bay is to be provided for Poroutawhao School. This will require a small part of this property to enable access to cut back and grade the existing dune. Physical works will only marginally encroach over the property boundary.
38	769-791 SH1	127	Pt 7D1,3 Manawatu - Kukutauaki (ML 1355)	Fluker John Alexander Mclennan Dorothy Christine	North of the main Project, a right turn bay is to be provided for Poroutawhao School. While physical works within the property are unlikely - a small section of land is required for access purposes to undertake the cut/ grading of the dune.
39	Paeroa Road (Māori Roadway)	1283	Pt 7D2D Manawatu Kukutauaki	-	The closure of part of Paeroa Road and the provision of connection to Waitarere Beach Road means that a portion of the Paeroa Road (Māori Roadway) is required for the Project. This will remove the intersection of Paeroa Road and SH1. Access from Paeroa Road to SH1 will be via the new service road to a full intersection at Hinaupiopio. An additional length of Paeroa Road (Māori Roadway) is also required to connect onto the new service road. The land is required for carriageway and drainage swales.

Ref #[1]	Address[2]	Area Required (m²)	LD[3]	Owner	Property effects
40	Paeroa Road	-	-	Horowhenua District Council	The extent of Paeroa Road that is public road, within the designation at the intersection with SH1 is to be closed through Local Government Act procedures.
50	State Highway 1	-	-	Her Majesty the Queen	Existing SH1.
51	Waitarere Beach Road	-	-	Horowhenua District Council	A portion of Waitarere Beach Road is required for realignment and connection with the new SH1.
52	Clay Road (part Māori Roadway)	-	-	Horowhenua District Council	Clay Road is to be extended for connection to the new SH1 alignment, requiring a portion of the existing road.

Notes:

1. The Property Reference numbers correspond with those shown in Volume III, Plan Set C (drawings C611-C614). Note that numbering is not always consecutive, due to design changes over time.
2. Some properties do not have 'property addresses'
3. Legal Description

5.10 Water Quality Effects

The proposed stormwater design for the Project is described in Appendix C in Volume II.

The stormwater management system proposed for the realigned section of SH1 within the Project area includes retention ponds and vegetated swales[47]. This system will be a significant improvement to the existing passive system and will provide treatment for the runoff from the highway pavement.

Once the construction stage is completed the permanent facilities for the Project will include approximately 2,000 m length of drain channel, 2,200 m length of engineered swale, seven culverts and three detention ponds. This design meets the requirements of the Transport Agency's Stormwater Treatment for State Highway Infrastructure and will assist in:

- Mitigating contaminant loads from the whole of the section of SH1 which comprises the Project;
- Retaining stormwater so that contaminants are treated near to source, and downstream flood potential is also mitigated; and
- Mitigating flows off the new section of SH1 to avoid erosion in downstream channels.

The stormwater runoff from the new highway alignment entering any watercourse is expected to be of a higher quality than the stormwater runoff currently discharged from the existing highway pavement. The detention ponds will moderate the downstream flows to reduce risk of erosion downstream. In addition, the reorganisation of the stormwater system in the south western part of the Project area which is at the extremity of the Lake Horowhenua catchment will ensure that all SH1 runoff in this area is discharged into the Manawatu River catchment area.

Together these design aspects contribute to positive environmental effects in terms of the quality and hydrology of stormwater management for the area.

[47] These will take over from the temporary systems to be installed for management of stormwater, sediments and erosion control during construction (see Appendix D in Volume II on erosion and sediment control).

5.11 Natural Hazards Effects

5.11.1 Slope Stability

The majority of the slopes in the vicinity are sand dunes. These dunes have virtually no cohesion other than that developed as part of soil aging, and their uniform fine grained nature provides low friction angles and therefore gentle slopes. Table 5-5 below is a summary of the general slope stability status in the Project area.[48]

Table 5-5: Sand dune slope stability summary

Slope angles	Stability summary
10 - 15º	Generally stable with only surficial stability issues
17 - 18º	Unstable and show signs of sliding, slope creep, soil creep, erosion and riling.
20º +	Unstable, ground deformation prevalent, erosion, sliding, rotation and slope creep

During construction, modification of the sand dunes through over steepening or disturbance of the toe in order to meet design geometry and property boundary requirements has the potential to result in dune destabilisation. Removal of topsoil cover will expose the slopes to surface stability issues during rain events such as rilling.

Areas of soft clay, silt and organic materials may be present in the lower areas between sand dunes, and soft alluvial swamp deposits will be subject to settlement if load is placed on them such as pavement, embankments and gravity retaining walls. Although settlement is not a direct environmental risk, it has the potential to cause issues - for example with overland drainage performance resulting in unintended water run off to sensitive areas. These risks are not unusual and are able to be managed using standard design and construction techniques.

Existing cut slopes in similar sandy materials indicate that the slopes become unstable if cut too steeply. Ten degree slope angles are generally proposed at this stage of the design for the larger cut and fill faces. Where this cut angle is not possible, options for surface protection in the form of biodegradable or cellular plastic geotextiles and topsoil replacement will be used to ensure stability and allow grass strike as early as possible.

The cut slope at Poroutawhao School will not need to be profiled at the same angle as the sand dunes around Waitarere Beach Road. This slope currently stands at approximately 45 degrees and the Project aims to move this cut face 3.5m to the west but retain same angle. This slope face may need surface protection with erosion control matting and hydroseeding following the reprofiling.

The erosion and sediment control measures proposed for the Project will effectively manage and mitigate the effects of surface water flow and drainage control during construction by placing impermeable plastic lining over exposed slope faces until work is complete. This will be subject to regional consent requirements. In the meantime draft consent conditions in section 7 provide "bridging" conditions which will mitigate the risk of slope erosion or loss of stability.

Further geotechnical investigations will be undertaken as part of the detailed design of the Project to confirm, or where possible, increase the cut and fill slope angles proposed so that earthworks may be able to be reduced.

Overall, the effects on slope stability are considered to be low given the extensive existing roading works and the design of the proposed slopes and other mitigation methods.

5.11.2 Flood Hazard

The Project area is adjacent to the area identified on Planning Map 4 of the HDP as a Flood Hazard risk area. Anecdotal information from local residents suggests that there is a localised flooding nuisance

[48] For further detail on the assessment of slope stability refer to Appendix F, the Preliminary Geotechnical Assessment Report in Volume II of this document.

when the culverts in the area block up. Otherwise, there are no known flood risks related to this section of SH1.

The proposed stormwater management system for the Project, which is briefly described in section 2.4 of this document and set out in full in Appendix C in Volume II, is designed to manage highway runoff up to 1%AEP event. This recognises the increased impervious area from a wider sealed highway cross section. The stormwater management will be achieved through new and larger culverts, roadside swales and retention ponds (with overland flow paths to watercourses when a more significant rainfall event would occur).

Therefore, the Project will manage and reduce the flood risk in relation to highway stormwater runoff. This aspect will also be subject to regional consent requirements. In the meantime draft consent conditions in section 7 provide "bridging" conditions which will provide for the proposed stormwater design until the regional consents are in place.

5.12 Construction Effects

Construction of the Project is currently expected to commence in 2019 and take one year to complete. Over this period, adverse construction effects will be experienced. The construction stage will however also include management of construction noise and vibration, and undertaking a range of activities necessary to avoid, remedy or mitigate actual and potential adverse Project construction effects. This includes landscaping (development of batter slopes and planting), addressing potential archaeological effects (supervision and management of the processes provided for under archaeological authorities, including investigations, recording and recovery) and management of ecological effects (such as vegetation clearance and any specified fauna).

Construction effects are to be managed within the framework of a construction management plan (CMP). This section describes the actual and potential effects associated with the construction stage.

The key construction effects for this Project relate to:

- Construction noise and vibration;
- Potential dust emissions;
- Potential sediment runoff into waterways: and
- Temporary traffic disruption and inconvenience.

All the potential construction effects described below will be mitigated through the construction phase through specific provisions to be incorporated in the CMP (see draft conditions in section 7) so that they will be no more than minor. Any residual effects will be temporary and most will be localised.

5.12.1 Construction Noise and Vibration

The Project will involve bulk earthworks, transporting fill, grading and levelling, and compaction as described earlier in section 2.3. Preparing the basecourse and surface will involve the spreading of fill, distributing the chips/asphalt and compaction. In addition to the road, kerbing, safety barriers and roadside furniture will be installed, and line marking conducted. Construction has the potential to generate significant levels of noise and some vibration effects at nearby dwellings. Most of the work will be undertaken during the day, but there may be some work at night, particularly during the limited periods when the newly constructed parts of the highway are being "tied in" to the existing SH1.

An assessment has been undertaken and is provided in Appendix I in Volume II as part of the overall acoustic investigations for the Project. The applicable noise standard for construction activities is NZS6803:1999 and a Transport Agency guideline has been developed from this which sets criteria for noise exposure from construction activities which identifies situations in which mitigation would be required. This is based on exposure over 15 minute periods, and on instantaneous maximum noise

events, at different times of the day (with higher standards for the weekend days). The assessment for the Project has been based on noise levels expected for typical construction activities.[49]

The investigation indicates that, given the intention to acquire two properties which would otherwise have been at risk of receiving unacceptable construction noise (at 511 and 607 SH1), construction activities will be able to comply at all times with the daytime LAeq and LAFmax limits for "long term" projects.

Regardless of this, and in accordance with good practice and the need to keep noise in the environment at reasonable levels under the RMA, a Construction Noise and Vibration Management Plan (CNVP) is to be developed for the construction stage of the Project. An appropriately-worded condition, including specification of standards to be achieved, is incorporated in the draft conditions in section 7. This will include communication with local residents.

Construction vibration from compaction will be the main source of construction vibration, with the potential for adverse effects. The assessment undertaken in Appendix I in Volume II indicates that compliance with international standards will be achieved in relation to vibration exposure. The management of vibration effects from the Project's construction stage will also be included within the CNVP, as set out in the draft conditions in section 7.

5.12.2 Potential Dust Emissions

Dust effects during construction have the potential to cause annoyance to nearby residents, land users and drivers on nearby roads. Methods of management of construction processes to mitigate dust emissions include management of stockpiles of excavated material (including surface stabilisation as appropriate) and the use of water carts for dust suppression on working surfaces.

The proposed erosion and sediment control measures described in general terms in section 2.5.3, along with more specific provisions which will be part of the construction management plan (included in the draft conditions in section 7), will effectively manage the risk of dust emissions.

5.12.3 Potential Sediment Runoff into Waterways

As discussed in section 3.4, the local watercourses are highly modified and largely act as farm drains with a limited ecological habitat. When it rains there is a risk that water in these watercourses could become sediment laden and ecological values further reduced during the construction stage, unless specific provision for water treatment is made during the construction phase.

The proposed erosion and sediment control measures are described briefly in section 2.5.3 and in more detail in Appendix D in Volume II. They include specific provisions for management of all earthworks, and construction stormwater runoff being diverted through sediment ponds. Discharges during the construction stage will be subject to resource consents from the Manawatu-Wanganui Regional Council (Horizons). A "bridging condition" that requires the development and application of an erosion and sediment control management plan (which will be developed from the draft in Appendix D of Volume II) is included in the draft conditions in section 7.

The temporary sediment control ponds and structures will be removed following the construction stage, when the permanent stormwater management system of swales and ponds takes over.

5.12.4 Temporary Traffic Disruption and Inconvenience

There will be temporary disruption from the construction of the Project to highway and local road users for the period over which the construction will be undertaken. As described in section 2.5.4, traffic management will be undertaken in accordance with the Transport Agency's Code of Practice for Temporary Traffic Management (COPTTM). There will be some temporary disruption to property accesses, which will be managed in consultation with affected landowners, and some temporary traffic inconvenience particularly when the new area of highway is "tied in" to the existing SH1. As much of the Project involves construction outside the present SH1 area, much of the construction will be undertaken without interruption to traffic flows.

[49] Using the construction sound calculator on the Transport Agency Transport Noise website (www.acoustics.nzta.govt.nz)

5.13 Overall Summary of Effects

The Project will have a number of actual and potential beneficial and adverse effects. This section provides a summary of these effects, indicates their extent (assessed taking into account any specific mitigation noted in the right-hand column) and outlines the mitigation which is either part of the design of the Project or is provided for in the draft conditions set out in section 7 (which will apply during the construction phase).

Table 5-6: Summary of Effects on the Environment

Type of Effect	Nature and Extent of Effect	Mitigation
Effect on Safety and Efficiency	Significantly beneficial effect because of reduced risk of death and serious injuries due to improved alignment and safety features, and associated efficiency gains.	N/A
Archaeological Effects	Potential adverse effects from disturbance of archaeological sites - ranges from negligible to potentially significantly adverse in relation to one site and potentially moderate in relation to another.	Most potential effects avoided or mitigated through changes to the design during Project development Remaining effects addressed through obtaining appropriate archaeological authorities from Heritage New Zealand and complying with conditions in the authorities. A discovery protocol condition is also proposed; to address residual cultural and archaeological effects during land disturbance. Post-construction information and memorialisation relating to any archaeological discoveries is also proposed. There may be the ability to modify and reduce earthworks in specific areas if further investigations indicate specific risk areas.
	Potential minor beneficial effect, should sites be discovered, as information of the area's history and culture will be obtained.	N/A
Cultural Effects	Minor adverse cultural effect due to realignment of Paeroa Road.	Mitigation possible through ownership and naming of new roadway.
	Minor to negligible adverse effects associated with changes to access to some individual properties and Te Whare Rongopai (one dwelling to be acquired).	Mitigation will be through compensation under the Public Works Act procedures and associated agreements. Mitigated through Project design and provision of alternative access including suitable access to Whare Rongopai.
	Balanced (neutral) effect on Mauri of land and waterways - minor adverse effect during construction and positive effects in the long-term.	Mitigated through project design, including management of runoff during construction. Use of swales and ponds in the long-term will improve environmental quality, manage flood and erosion potential and therefore help restore Mauri.

Type of Effect	Nature and Extent of Effect	Mitigation
	Minor positive effect from rationalisation of runoff adjacent to southern and of Project, and diversion of stormwater away from Lake Horowhenua Catchment.	Mitigation within Project design.
Social and Economic Effects	Adverse effects on directly affected people property acquisition.	Mitigated through compensation under the Public Works Act procedures.
	Minor adverse effects on individuals due to property access modifications and additional travel distance. This effect will be offset by improved safety.	N/A
	Moderate to significant benefit to Waitarere Community due to improved intersection and safety improvements.	N/A
	Minor to moderate benefit to Poroutawhao School community due to improved turning provision and associated safety improvements.	N/A
	Significant beneficial effect on safety to the wider community (already noted above).	N/A
	Moderate economic benefit due to improved efficiency and safety, for national and regional economy.	N/A
	Minor negative effects on directly affected people due to loss of land and in some cases property acquisition. Moderate to significant economic benefit at regional and local level due to national expenditure accruing at regional/local levels.	Mitigated through compensation under the Public Works Act. N/A
	Potentially significant local benefit due to expenditure (and flow-on effects) in the local Levin area.	N/A
Landscape and Visual Effects	Minor or less effects on landscape character and natural features in the local area due to wider road and landscape modification.	Mitigated through design and planting as proposed in the Landscape Context Plan (Volume III, Plan Set I), to be developed as a Landscape Plan prior to construction.
	Moderate to negligible effects on individual dwellings.	Mitigation through planting within the designation and specific design (to be developed in discussion with property owners) for the six properties assessed as having moderate visual adverse effects.
Ecological Effects	Minor or less effects on local native vegetation due to potential loss of a small number of mature native trees and other vegetation loss.	Removal of mature trees to be avoided if practicable, and requirement to provide for specified number of totara trees in landscaping. Mitigation of loss of other vegetation by replacement

Type of Effect	Nature and Extent of Effect	Mitigation
		planting within the Project area, including riparian planting.
	Negligible effects on avifauna to vegetation removal.	Mitigated through undertaking vegetation removal outside nesting times as far as practicable.
	Negligible effects on herpetofauna.	Mitigated through investigation and recovery protocol during construction.
	Minor adverse effects on aquatic ecology balanced by minor positive effects including improved culvert design and riparian planting.	Mitigated through riparian planting and improved culverts. Implementation of mudfish management requirements.
Noise Effects	Potential minor effects of noise and vibration during construction period.	Mitigation includes inclusion of dwellings most exposed to future noise within the designated area.
Construction Effects	Noise and vibration include temporary adverse effects which are expected to be no more than minor.	Mitigate through preparation of a Construction Management Plan, including a Construction Noise and Vibration Management Plan which provide for community information and liaison and specific measures if monitoring reveals any exceedances of specified standards.
	Minor or less than minor temporary effects on property access	Managed through a Traffic Management Plan in accordance with the COPTTM.
	Less than minor temporary effects on road transport.	As above
	Minor to negligible effects associated with dust and sediment runoff.	Mitigation through measures set out in an Erosion and Sediment Control Management Plan (ESCMP), to be incorporated within the Construction Management Plan. Standard techniques are proposed.
Property Effects	Property effects range from negligible to significant, depending on the individual property.	Mitigation of adverse effects on property is subject to processes in terms of the Public Works Act. Mitigation may range from outright purchase including compensation for injurious affection, to a wide range of other negotiated settlements, agreements or compensatory packages.
Water Quality Effects	Positive effects due to design installation and operation of swales and ponds (including flood hazard mitigation).	N/A
	Minor adverse effect due to sedimentation during construction stage.	See mitigation under Construction Effects.
Natural Hazards	Negligible potential adverse effects on slopes and potential minor positive	Mitigated through indicative Project design, including draft Erosion and

Type of Effect	Nature and Extent of Effect	Mitigation
	effects on flood hazard.	Sediment Control Management Plan.

6 Consultation

6.1 Overview

The consultation for the Project commenced as part of the wider Ōtaki to North of Levin RoNS project in 2011, and remains ongoing. This has included public Open Days (most recently in November/ December 2013) at which it was noted that the Waitarere Beach Road Curves was one of the priority areas for improvements. During this period, a range of stakeholders were also consulted (refer to the consultation documents identified in Appendix L of Volume II).

Detailed consultation on the Project began in April 2014 once a concept design was available. Two 'cottage' meetings were held in April and May 2014 and were attended by a number of landowners in the area. Following this, one-on-one meetings with landowners commenced in July 2014. Formal consultation with local iwi commenced in October 2014 and has been ongoing since.

The consultation process has included numerous meetings with affected landowners and iwi to refine the Project alignment and to discuss and address potential effects on them and the environment. More detail on this process is set out below.

The changes to the Project design that have occurred have been summarised earlier in section 4.6 of this report.

Comprehensive consultation reports covering the consultation on the wider Project to date have been prepared - see references in Appendix L (Consultation Reports 1 to 4).

6.2 Affected Landowners

The two cottage meetings (held on the 22nd April 2014 and the 26th May 2014) that were requested and hosted by affected landowners were well attended. They were requested by local landowners in response to the Project team arranging one-on-one meetings. The meetings provided an opportunity for the Project team to present Project information, answer questions and gain feedback from local residents.

A further multiple-party meeting was held at the request of 4 landowners (Geoff Lewis, Neil Hirini - Principal of Poroutawhao School, Graeme Bagrie and Heather Heron-Speirs) on the 14th April 2015 to discuss their particular concerns with the scope and rationale of the Project. It was hosted by HDC at its offices and attended by members of the Project team, the affected landowners and HDC representatives.

To date there have been over 50 one-on-one meetings with directly affected landowners, as well as numerous phone calls and email exchanges to discuss the Project, its potential effects and mitigation options, and future project stages.

Some landowners and local residents who have been invited to meet with Project representatives have at times chosen not to do so but nevertheless have been kept informed in with the process by letter or emails.

Affected landowners have raised a number of issues, including:

- Loss of land (including Māori land);
- Impact on farm operations, including access for farm and contracting vehicles if a median barrier is present;
- Concern the median barrier will inconvenience access to neighbours and Levin for day to day needs;
- Noise from the road being closer to houses (operational and construction);
- Loss of pedestrian and cycling access across state highway due to the median barrier;
- Construction impacts; and

- Concern that preventing overtaking on the realigned curves will cause more overtaking manoeuvres near to Poroutawhao School which is locally considered to be unsafe.

The comments and information received have been taken into account within the Project and its development over time wherever possible (see section 4.6).

The concern around the median barrier and the associated reduction in access for local residents and farm operations is difficult to avoid or mitigate given the median barrier is integral to the Project. However, the Transport Agency will continue to work with stakeholders to address outstanding matters where at all possible as the project progresses.

6.3 Tangata Whenua and other Māori Interests

As part of the larger Ōtaki to North of Levin RoNS, consultation with Iwi commenced in 2011. Meetings included representatives of some of the Iwi noted below.

The Project team has specifically consulted with the following Iwi groups on the Project as it has developed:

- Ngāti Huia;
- Ngāti Huia ki Matau;
- Muaūpoko (The Muaūpoko Tribal Authority)

To date fourteen hui have been held. Concerns that were raised during the huis were considered during the design process. These hui are summarised in Table 10-1 below with further detail provided in the text that follows.

Table 6-1: Meetings/Hui

	Date	Marae/Iwi	Present
1	8 July 2011	Muaūpoko Tribal Authority	The Transport Agency, MWH and members of the Muaūpoko Tribal Authority.
2	4 July 2012	Muaūpoko Tribal Authority	The Transport Agency, MWH and members of the Muaūpoko Tribal Authority.
3	23 April 2013	Muaūpoko Tribal Authority	The Transport Agency, MWH and members of the Muaūpoko Tribal Authority.
4	13 October 2014	Ngāti Matau	The Transport Agency, MWH and the Matau Marae Committee
5	9 November 2014	Ngāti Huia	The Transport Agency, MWH and Ngāti Huia Marae Committee
6	21 November 2014	Ngāti Huia Ngāti Matau (Walkover of Project area)	The Transport Agency, MWH and members of the Ngāti Huia whanau (from both Marae)
7	25 February 2015	Ngāti Huia Ngāti Matau	The Transport Agency, MWH and members of the Ngāti Huia whanau (from both Marae)
8	20 April 2015	Ngāti Huia Ngāti Matau	The Transport Agency, MWH and members of the Ngāti Huia whanau (from both Marae)

	Date	Marae/Iwi	Present
9	20 April 2015	Muaūpoko Tribal Authority	The Transport Agency, MWH and members of the Muaūpoko Tribal Authority.
10	27 May 2015	Muaūpoko Tribal Authority	The Transport Agency, MWH and members of the Muaūpoko Tribal Authority.
11	5 July 2015	Ngāti Huia	The Transport Agency, MWH and members of the Ngāti Huia whanau.
12	16 July 2015	Ngāti Huia	The Transport Agency, MWH, Te Tumu Paeroa and members of the Ngāti Huia whanau.
13	20 July 2015	Ngāti Huia	The Transport Agency, MWH, the Muaūpoko Tribal Authority, and members of the Ngāti Huia whanau.
14	22 October 2015	Ngāti Huia and Ngāti Matau	The Transport Agency, MWH and members of Ngāti Huia and Ngāti Matau whanau

Details of the hui and the issues raised are outlined in the following paragraphs.

1 and 2: Hui were held with the Muaūpoko Tribal Authority in July of both 2011 and 2012. The purpose of the 2011 hui was to the introduce the Project and to establish a relationship between Muaūpoko and the Project team. The 2012 hui was held to update Muaūpoko on progress.

3: A hui was held with the Muaūpoko Tribal Authority in April 2013 to outline the Waitarere Curves sub Project. The main points of discussion were affected land owned by Muaūpoko whanau and culturally important sites in the area.

4: The hui with the Ngāti Matau Marae Committee was held in October 2014 at the Ngāti Matau Marae to discuss the Project. The main points or concerns raised by the committee were:

- Property acquisition (and compensation) process.
- Environmental effects assessment and consenting processes.
- Need for a cultural impact assessment for the consent applications.
- Ongoing communication with the marae and landowners.
- An archaeological walkover to be held in the area.

5: The hui with the Ngāti Huia Marae Committee was held in November 2014 at the Ngāti Huia Marae. Feedback from Ngāti Huia centred on the features and effects of the Project:

- The location of a turnaround area at the north end of the Project.
- Location of median barriers and the inconvenience it causes for travel to Levin.
- Entrance to the marae.
- Layout of Waitarere Beach Road intersection.
- Effect on local properties in the area and on whanau.
- Potential for the Project to impact on the urupa.

6: In November 2014 a site walkover was held with committee members of both Ngāti Huia and Ngāti Matau Marae. The purpose of the walkover was to identify and better understand issues that might be

associated with the Project, in particular, the potential impacts on sites of significance to Ngāti Huia and Ngāti Matau. At this hui NZTA confirmed that it had contacted the author identified by Ngāti Huia and Ngāti Matau to prepare a Cultural Impact Assessment and noted that it was urgent that this work was done so as to inform design decisions, where on current programme RMA applications were programmed to be lodged by June 2015.

7: The hui hosted at the Ngāti Huia Marae in February 2015 was attended by both Huia and Matau Marae whanau, and was held at NZTA's request. This was to address some design issues where guidance from local tangata whenua was sought.

The main points of discussion from this hui were:

- The location of urupa near Nga Haere Pa.
- Access options for Paeroa Road much of which is Māori Roadway.
- Access options for a Māori road line connecting the rear of Huia marae to SH1.
- Options for mitigation of effects on Whare Rongopai.

At this hui, the Transport Agency noted its concern that the commissioned cultural impact assessment had not yet commenced. Both Ngāti Huia and Ngāti Matau confirmed that the original, preferred author was still the approporate person to undertake this work.

8: Another hui was held on the 20th April 2015 with Ngāti Huia and Ngāti Matau whanau at Ngāti Huia Marae to discuss and resolve issues around design variations, including:

- Variations around access to SH1 at Paeroa Road.
- Geotechnical Investigations planned for the area.
- Variations for the southern section of the Project around Whare Rongopai and entrance to Huia Marae and surrounding property.

The Transport Agency also repeated concerns that the Cultural Impact Assessment had not commenced. Both Ngāti Huia and Ngāti Matau reiterated that the original, preferred author was still the approporate person to complete this work. At a subsequent hui, concerns around the need to progress the Cultural Impact Assessment were re-expressed by the Transport Agency.

9 and 10: Hui were held with Muaūpoko Tribal Authority on 20th April 2015 and 27 May 2015 to discuss the Project (as part of the wider North of Ōtaki to Levin RoNS Project and sub-Projects). Discussions included measures that could be undertaken to assess the Muaūpoko tribal interest within the area and would allow the Muaūpoko Tribal Authority to input into effects mitigation. The Transport Agency invited the Tribal Authority to prepare a cultural impact assessment and confirmed that they would assist with this matter as appropriate.

The following detailed matters were discussed:

- Update on the Project.
- Muaūpoko to have an involvement/ongoing relationship with the Project team.
- Input into the mitigation of effects on the environment by the Project.
- Historical significance of area/potential for archaeological finds.

11: A follow up hui was held on 5 July 2015 with Ngāti Huia to discuss Project progress.

12: A hui was held 16th July 2015 with members of Ngāti Huia and Trustees (owners) of the 7D2D60C Manawatu-Kukutauaki block to discuss the effect of the Project on this block of land. Attendees walked over the block for an appreciation of the land encroachment shown on design drawings.

13: A community workshop was held on the 20th July 2015 at the Poroutawhao Hall which was attended by representatives of the Muaūpoko Tribal Authority, and members of the Ngāti Huia and Ngāti Matau whanau. More detail on the workshop is given in section 6.45.

14: A hui was held on 22 October 2015 with Ngāti Huia and Ngāti Matau to update them on the most recent changes to the proposal.

In addition to the above, members of Ngāti Huia and Ngāti Matau have also been present at meetings with the community representatives in August, September and October 2015.

A meeting was held with members of the Whare Rongopai Trust Board on 24th May 2015. This discussed alignment options, land requirements, access arrangements and parking. There has been some further communication including emails, phone calls, meetings and provision of draft layouts for comments since the initial meeting.

6.4 Other Stakeholders

Consultation with other stakeholders including the Horowhenua District Council, the Department of Conservation, Heritage New Zealand (formerly the Historic Places Trust), the Automobile Association and the Road Haulage Association has been on-going since investigations for the wider Ōtaki to north of Levin RoNS Project began in early 2011.

The Transport Agency first met with a range of other stakeholders for information collection, and then for discussion of high level options for the Ōtaki to north of Levin RoNS during the early studies undertaken between May 2011 and September 2011. Collaboration meetings involving the Councils, stakeholders, representatives of community groups and Iwi were held on several occasions to discuss the wider RoNS proposals.

Between June 2012 and August 2012, once the RoNS Project had been modified and various sub-project areas identified, a series of meetings were held with stakeholders as the details for each area of the overall Project were refined.

Once the two preferred options for the Waitarere Curves project had been identified, further consultation was undertaken to seek feedback on these (between April 2013 - July 2013). Stakeholders were generally supportive of the two high-level options proposed,which included the proposal to re-align the road.

Since the design phase for the Waitarere Beach Road Curves Project began in 2014, consultation has been ongoing with elected council representatives and staff. This has largely centred on the design of intersections at local roads and the interests of residents and affected landowners.

A meeting with all relevant emergency services was held 18th October 2015. All were supportive of the Project. Details of the Project have also been forwarded to the New Zealand Automobile Association (AA) and Fonterra along with a request to provide feedback. While the AA did not have any feedback at this stage, Fonterra provided information on tanker routes and indicated that they were looking forward to the completion of the safety improvements.

6.5 General Public

As progress on the Project has been made, information for the general public and opportunities for public input have been provided via Project updates, Open Days and a community workshop.

6.5.1 Newsletters

The following newsletter updates were released containing information on the safety upgrades proposed as part of the Project:

- **Project Update 4:** The Project Update, Issue 04 - March 2013 contained general information on the area where investigations were focused. It also indicated that safety and alignment issues in the Waitarere Curves area were being considered and that consultation would be carried out in due course.
- **Project Update 5:** The Project Update, Issue 05 - May 2013 provided details of the intended improvements for the Waitarere Beach Road Curves locality, including a description of the preferred approach to straighten and realign the road rather than simply upgrading the road on its existing alignment. It contained the details and an illustration of the design proposed. The expected issues

likely to emerge were indicated as property impacts, property access, intersection changes and potential effects on community facilities including the Whare Rongopai. People were asked for their views and to identify any other information the Project teams needed to know.

- The community was encouraged to provide feedback prior to the Project progressing to the next stage of the design process. An invitation to the Open Day held on the 4th of May 2013 at the Levin Memorial Hall was also included. Feedback from this session was considered in the subsequent design stage.
- **Project Update 6:** The Project Update, Issue 6 - August 2013 provided feedback to the community on the open days. There was generally good support to the safety initiatives in the proposed improvements at Waitarere Curves.
- **Project Update 7:** The Project Update, Issue 07 - November 2013 noted that work was progressing on the Waitarere Beach Road Curves area and other focus areas, and that feedback was being considered.
- **Project Update 9:** The Project Update, Issue 09 - March 2015 gave an overview of changes to this section of highway and outlined the preferred option of realigning the road to remove three tight curves in the road and included a section of wire rope median barrier. Access arrangements to local roads and properties were illustrated in an accompanying sketch and people were invited to provide comments on the proposals.

6.5.2 Open days

Five Project open days have been held at various venues that were considered readily accessible to the various interested communities. Open Days provided information on proposals and also the opportunity for the general public to engage with the Project team and make submissions. The following Open Days were held in Levin and drew a number of people from north of Levin:

- Saturday 4th May 2013, 2pm to 9pm, in the Levin Memorial Hall, attended by 286 people.
- Saturday 30th November 2013, 10am to 4pm at the Levin Library (Te Takere), Levin, attended by 170 people.

A series of information boards were on display at the Open Days. These set out the context of proposals for key locations of the wider Ōtaki to Levin Project including the Waitarere Beach Road Curves as well as description of problems, objectives and proposed improvements. More detailed plans showing the route options overlain on aerial photographs were also available for discussion. Feedback from public recorded at the Open Days indicated that people were generally supportive of proposed improvements at the Waitarere Beach Road Curves because of the safety benefits.

6.5.3 Community Workshop

A workshop was held on the 20th July 2015 at the Poroutawhao Hall for both landowners affected by the Project and the wider community to attend. This was held as a result of concerns about the Project and the process as expressed to Horowhenua District Council and the Transport Agency. The workshop explored community opinions on the objectives for the North of Levin RoNS section. Attendees were first given an update on the Project before splitting into groups to rate the Project objectives and to record concerns and issues. The community was then asked to give their perspective on the relevance and weighting of the different objectives.

This workshop gave people the chance to raise particular issues as they saw them and to discuss the Project one-on-one with Project team members. Overall feedback from this meeting was that the community considered safety and local access as the two most important considerations. They also demonstrated considerable concern about the median barrier. Feedback from the group exercises was shared at the end of the workshop and the frequency of each concern recorded. Information from this workshop was taken into account during the design stage of the Project.

6.6 Meetings with Community Representatives

A number of further meetings between the Project team and a key group of some community members were held in August and October 2015. At these meetings the contined involvement of these particular community members was agreed, as part of the Transport Agency's processes, to give a local perspective about the Projects that form the overall programme.

A range of issues were raised during these meetings, including adequacy of consultation, the importance of the median barrier for the Project, and a range of matters relating to the detailed Project design and road operation. As a result of this series of meetings, there has been agreement on the following:

- Right turn at Poroutawhao School and associated street furniture; changes to be considered within the turnaround facility on Poroutawhao School property.
- A speed reduction relative to the Poroutawhao School that is timed to coincide with school arrival and departure times will be investigated as part of the NZ Transport Agency's national programme. If that investigation concluded that such a measure is supported then it could be provided as part of the overall package of work.
- Intersections at Clay Road and Waitarere Beach Road are to be lit, although this level of design detail has not been included in the NoR and will be addressed in the next phase of design.
- The proposed realignment would include a wide road side shoulder that could be used by slow moving farm vehicles so as to allow faster traffic to pass safely.
- The Transport Agency also agreed that space for buses to drop-off and pick-up could be provided at Waitarere Beach Road intersection utilising the old SH1 alignment at this location. How this was done would be investigated during the next phase of design.
- It was noted that the Transport Agency would not promote a scheme that does not include a central median barrier, as it considered that the safety benefits outweighed the local disbenefits.

As a result of the ongoing meetings and discussions, the Project design was recently amended to include a new intersection at the curve approximately 1200m north of the access to Huia Marae with a gap in the median barrier. The area is referred to as Hinaupiopio – indicated as "8" on the Overview Plan in Plan Set A, Volume III. This is now an integral part of the Project. As a consequence, a connecting road between Paeroa Road and Waitarere Beach Road is no longer included in the Project.

7 Suggested Conditions

The following draft conditions are proposed to address the actual and potential adverse effects of the construction phase of the Project within the area to which the NoR alteration applies (see Plan Set B, Volume III). The draft conditions address the construction phase of the Project and once they have been fully complied with, the Transport Agency may seek that they be removed from the designation.

DRAFT CONDITIONS

General Accordance

1. Except as modified by the conditions below, and subject to final design, the Project shall be undertaken in general accordance with the information provided by the Requiring Authority in the Notice of Requirement dated [ ] the AEE and the technical reports.

Construction Management

2. The Requiring Authority shall submit a Construction Management Plan (CMP) to the [Manager] for information at least 20 working days prior to commencement of Work. The CMP shall include, as appendices, the plans/protocols required under conditions [8, 10, 14 and 19]. The purpose of the CMP is to ensure that all construction activities are managed in a way that is in general accordance with the NoR and associated documentation referred to in condition 1.
3. The CMP and the management plans included under condition [2] shall include details of:
   a) Staff and contractors' responsibilities;
   b) Training requirements for employees, sub-contractors and visitors;
   c) Environmental incident and emergency management;
   d) Environmental complaints management;
   e) Compliance monitoring;
   f) Corrective actions, if necessary in specified circumstances;
   g) Review procedures;
   h) Stakeholder and communication management;
   i) The final construction methodologies; and
   j) Shall contain sufficient information to ensure that the CMP achieves its purpose set out in condition [2].
4. Prior to submission of the CMP to the [Manager], the Requiring Authority shall organise a workshop with representatives from the Council to enable comments on the draft CMP to be provided. When submitting the CMP under condition 2 the Requiring Authority shall give reasons for not including any comments on the draft CMP provided by the Council.
   a) The workshop shall focus on:
      i. ensuring that the purpose of the CMP in condition 2 is fulfilled; and
      ii. reporting procedures, timing and other interactions with the Council during the construction of the Project.
   b) The Requiring Authority shall invite the Council to the workshop, at least 10 working days prior to the date of the workshop.
   c) A copy of the draft CMP shall be provided to the Council at least 5 working days prior to the date of the workshop.
5. The CMP shall be implemented and maintained throughout the entire construction period and following construction as required by condition [8], and shall be updated as necessary by the Requiring Authority to reflect any design changes.

6. A copy of the CMP shall be held on the construction site at all times and shall be available for inspection by the Council.

7. The Requiring Authority may amend the CMP or subsidiary management plans at any time. Any changes to the management plans shall remain consistent with the overall intent of the CMP. The Requiring Authority shall provide a copy of any amendments to the CMP or other management plans to the [Manager] for information, at least 3 working days prior to giving effect to the amendment.

Ecology, Landscape and Visual

8. Construction shall not commence until a Landscape Plan (LP) has been prepared and is incorporated in the CMP under condition [2]. The LP shall incorporate provisions for the detailed design, siting, implementation and maintenance of landscape planting and restorative work (including the protection of any existing vegetation). The LP shall give effect to the Landscape Context Plan, Plan Set I in Volume III of the Notice of Requirement documentation and shall include:

   a) Measures to ensure the integration of the Project's permanent works (including earthworked areas and structures) into the surrounding landscape and topography;

   b) Wherever practicable, the retention of areas of indigenous vegetation, and the retention of significant existing trees;

   c) The appropriate integration of landscape work with ecological restoration, including those required for stream diversion and permanent stormwater control ponds;

   d) The rehabilitation of all areas used for temporary work and construction yards;

   e) Specific mitigation for dwellings where visual effects have been assessed as moderate (see Appendix H in Volume II of the Notice of Requirement documentation);

   f) Provisions for maintenance of all plantings, including replacement of any dead, dying or damaged plants, for a period of up to three years from planting;

   g) The LP shall be prepared in consultation with:

      i. Ngāti Huia Marae and Ngāti Matau Marae committees; and

      ii. Horowhenua District Council; and

   h) The LP shall be prepared by suitably qualified and experienced landscape architect (with input as required by other suitably qualified experts, including ecologists).

9. As far as practicable, woody vegetation shall be cleared outside the period of 1st September to 31st December.

10. Prior to clearing any vegetation which may be suitable lizard habitat, a lizard investigation and, where necessary, salvage operation shall be undertaken by a suitably qualified herpetologist. A lizard discovery protocol shall be appended to the CMP so that any lizards found during construction are recovered, handled and released appropriately.

11. The LP will include at least 12 totara trees within the planted landscaping area, utilising locally eco-sourced stock from the Manawatu Ecological Region.

Cultural or archaeological finds

12. The Requiring Authority, in consultation with, Ngāti Huia, Ngāti Matau, the Muaūpoko Tribal Authority and Heritage New Zealand shall prepare a schedule of "On Call Procedures" to be implemented in the event of the discovery of cultural or archaeological artefacts or features during the construction of the Project in any area not covered by archaeological authorities obtained under Part 3 of the Heritage New Zealand Pouhere Taonga Act 2014. This schedule shall be submitted to the [Manager] at least 15 working days prior to any construction commencing. The "On Call Procedures" shall include, but need not be limited to:

   a) Training procedures for all contractors regarding the possible presence of cultural or archaeological sites or material, what these sites or material may look like, and the relevant provisions of the Heritage New Zealand Pouhere Taonga Act 2014 if any sites or material are discovered;

b) Parties to be notified in the event of an accidental discovery shall include, but need not be limited to Ngāti Huia, Ngāti Huia ki Matau, the Muaūpoko Tribal Authority, Heritage New Zealand, Horizons Regional Council, Horowhenua District Council and, if koiwi are discovered, the New Zealand Police;

c) Procedures to be undertaken in the event of a discovery (these shall include immediate ceasing of all physical works in the vicinity of the discovery); and

d) Procedures to be undertaken before work under this designation may recommence in the vicinity of the discovery. These shall include allowance for appropriate tikanga (protocols), recording of sites and material, recovery of any artefacts, and consulting with to Ngāti Huia, Ngāti Huia ki Matau, the Muaūpoko Tribal Authority and Heritage New Zealand prior to recommencing works in the vicinity of the discovery.

Advice Note: *The Requiring Authority is responsible for obtaining archaeological authorities from Heritage New Zealand under section 44 of the Heritage New Zealand Pouhere Taonga Act 2014, prior to the commencement of construction. The authorities are likely to include requirements for management of detailed investigations and monitoring. Condition [12] is complementary to requirements under the archaeological authorities.*

13. Following completion of construction works the Requiring Authority shall, in consultation with Ngāti Huia, Ngāti Huia ki Matau, the Muaūpoko Tribal Authority, the Horowhenua District Council and Heritage New Zealand and where any investigations have been undertaken in accordance with any archaeological authorities granted under Part 3 of the Heritage New Zealand *Pouhere Taonga* Act 2014 based on the information obtained as part of those investigations, provide for appropriate public information and educational purposes:

a) Fixed interpretive signs, placed at culturally and/or archaeologically significant or strategic locations to which the Requiring Authority has access; and

b) Copies of any documents produced as a condition of fulfilling an archaeological authority under the Heritage New Zealand Pouhere *Taonga* Act 2014 to Ngāti Huia, Ngāti Huia ki Matau, the Muaūpoko Tribal Authority, the Horowhenua Historical Society and the Levin Library.

Construction Noise and Vibration

14. A Construction Noise and Vibration Management Plan (CNVMP) shall be included within the CMP. The purpose of the CNVMP shall be to provide a framework to manage construction noise/ vibration appropriately for the variety of circumstances within the Project area by outlining the measures, procedures and standards for mitigating the effects of noise and vibration during construction of the Project to meet:

a) The noise criteria set out in condition [16], where practicable. Where it is not practicable to achieve those criteria, alternative strategies should be described to address the effects of noise on neighbours; and

b) The Category A vibration criteria set out in condition [17], where practicable. Where it is not practicable to achieve those criteria, a suitably qualified expert shall be engaged to assess and manage construction vibration during the activity that exceed the Category A criteria. If predicted construction vibration exceeds the Category B criteria, then construction activity should, where practicable, only proceed if approved by the [Manager] and if there is appropriate monitoring of vibration levels and effects on those buildings identified as being at risk of exceeding the Category B criteria, by suitably qualified experts.

15. Except where the CMP contains relevant provisions, the CNVMP shall, as a minimum, address the following:

a) Description of the Work, anticipated equipment/processes and their scheduled durations;

b) Hours of operation, including times and days when construction activities causing noise and/or vibration would occur;

c) The construction noise and vibration criteria for the Project;

d) Identification of affected houses and other sensitive locations where noise and vibration criteria apply;

e) Methods to mitigate and manage noise and vibration during construction works:

f) Methods and frequency for monitoring and reporting on construction noise and vibration;

g) Stakeholder communications;

h) Complaints processes; and

i) Operator training procedures.

16. Construction noise shall be measured and assessed in accordance with NZS 6803:1999 'Acoustics - Construction Noise'. The construction noise criteria are:

Period	Time	L_{Aeq} dB	L_{AFMax} dB
Weekdays	0630-0730	65	75
	0730-1800	80	95
	1800-2000	75	90
	2000-0630	45	75
Saturdays	0630-0730	45	75
	0730-1800	80	95
	1800-2000	45	75
	2000-0630	45	75
Sundays and Public Holidays	0630-0730	45	75
	0730-1800	55	75
	1800-2000	45	75
	2000-0630	45	75

17. Construction vibration shall be measured in accordance with ISO 4866:2010 'Mechanical vibration and shock - Vibration of fixed structures - Guidelines for the measurement of vibrations and evaluation of their effects on structures'. The construction vibration criteria are:

Receiver	Details	Category A	Category B
Occupied Dwellings	Night time 2000h-0630h	0.3 mm/s PPV	1 mm/s PPV
	Daytime 0630h-2000h	1 mm/s PPV	5 mm/s PPV
Other occupied buildings*	Daytime 0630h-2000h	2 mm/s PPV	5 mm/s PPV
All other buildings	Vibration - transient	5 mm/s PPV	BS5228-2:2009* Table B.2
	Vibration - continuous	5 mm/s PPV	50% of BS5228-2:2009* Table B.2

*BS5228-2:2009 '*Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2: Vibration*'

Erosion and Sediment Control and Mudfish Management

18. Conditions [18] to [23] apply only until all necessary consents relating to the matters covered in the conditions below, including any alternative condition applying to the management of mudfish within the designated area, have been granted by Manawatu Wanganui Regional Council (Horizons).

    Advice Note: *This clarifies that Horizons has the primary responsibility for discharges of contaminants to watercourses and ecological values within those watercourses.*

19. During the construction stage the Requiring Authority shall take all practicable measures to minimise erosion and prevent the discharge of sediment beyond the boundaries of the designated area.

20. The Requiring Authority shall prepare, in consultation with the contractor undertaking the works, an Erosion and Sediment Control Plan (ESCP). The ESCP shall be prepared in accordance with the 'Erosion and Sediment Control Guidelines for the Wellington Region' (September 2002).

21. The Requiring Authority shall install, operate and maintain all erosion and sediment control measures in accordance with the completed ESCP.

22. All erosion and sediment control measures shall remain the responsibility of the Requiring Authority and no erosion or sediment control device shall be removed until the area serving the device is stabilised (as defined in the Greater Wellington Regional Council (GWRC) document entitled 'Erosion and Sediment Control Guidelines for the Wellington Region' (Septemeber 2002)).

23. Prior to undertaking any works in Streams 1 and 3, measures for the management and protection of mudfish within the construction area from the effects of construction activities over the period of construction shall be developed. This may provide for the temporary relocation of mudfish. The measures will be incorporated within the CMP.

Advice Note: *The conditions above apply only within the area of the alteration to Designation D2 within the area shown in Plan Set B, Volume III in the Notice of Requirement documentation. Once the construction is complete and the conditions complied with (including the time specified for maintenance of planting), the NZ Transport Agency may seek to remove them from the designation.*

Volume II: Technical Reports

Volume III: Plan Sets

Plan Set A Index, Overview, General Arrangement
Plan Set B Designation Plan
Plan Set C Land Requirement Plan
Plan Set D Layout Plan
Plan Set E General Arrangement Plan
Plan Set F Poroutawhao School Works Plan
Plan Set G Sediment Control
Plan Set H Drainage Layout Plan
Plan Set I Landscape Context Plan
Plan Set J Typical Cross Section
Plan Set K Cross Sections