

Transmission Gully Project - Urban & Landscape Design Framework

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This document was prepared by



with inputs from

Opus, Holmes Consulting, SKM, Boffa & URS

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Action	Name	Signed	Date
Prepared by	Lucie Desrosiers and Paul Roper-Gee (Beca) Gavin Lister and Wade Robertson (Isthmus)		29/7/2011
Reviewed by	Lynne Hancock		
Approved by	Andrea Rickard		
on behalf of	Beca Infrastructure Ltd (Beca)		

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Figure 1.1: Wider Context: The Wellington Northern Corridor Road of National Significance

1 Introduction

1.1 Wellington Northern Corridor

1.1.1 Roads of National Significance (RoNS)

The Government has identified a suite of 'roads of national significance' and set priority for investment in these as New Zealand's most important transport routes. The RoNS are critical to ensuring that users have access to significant markets and areas of employment and economic growth.

The Wellington Northern Corridor i.e. State Highway 1 between Wellington Airport and Levin is identified as a RoNS and comprises eight projects:

- Airport to Mt Victoria Tunnel
- Transport improvements around the Basin Reserve
- Terrace Tunnel duplication
- Ngauranga to Aotea Quay
- Transmission Gully
- MacKays to Peka Peka Expressway
- Peka Peka to Otaki Expressway
- Otaki to Levin

The Transmission Gully Project is one of the eight segments forming the Wellington Northern Corridor (Figure 1.1). Once completed, it will consist of 27km of new highway linking MacKays Crossing and Linden.

The projects which together form the Wellington RoNS need to be designed in a coordinated manner to provide their users a seamless, coherent and legible road corridor.

1.1.2 Wellington RoNS character sectors

The Wellington RoNS corridor passes through four distinct environments:

- Kapiti Coast (the 'Coastal' sector)
- Rough hill-country of the Akatarawa Ranges (the 'Steep Country' sector)
- Urban motorway on approach to Wellington City (the 'City Gateway' sector)
- Wellington City streets (the 'Inner City' sector)

The design of the Wellington RoNS corridor shall:

- Reinforce the travel sequence of the Coast, Steep Country, City Gateway and Inner City as per the four corridor sectors;
- Generally seek to achieve consistency of design within each character sector; and
- Introduce variations within sectors where these help orientation or respond to specific local conditions.

1.1.3 Corridor-wide urban design principles

The NZTA's Urban Design Policy is the foundation for a set of corridor-wide principles that guide the urban and landscape design aspects of the Wellington RoNS projects. These principles are:

Design in context:

- Minimise the adverse effects of the project on the surrounding communities and environments.
- Design the highway including its horizontal and vertical alignments, cross sections, structures and interchanges to respond to the specific natural and built environments it traverses.
- Design the highway including the location and design of interchanges to respond to the strategic policy context within which it sits.
- Design the highway with consideration to the needs and amenity of the local community including maintaining or enhancing the usability and amenity of public open spaces.

Respect for heritage:

- Design the highway so as to a) maintain where practicable natural, cultural and built heritage features, b) ensure the relevance of heritage features through access and/or interpretation, and c) promote historical and cultural narratives through the detailed design.

Identity and distinctiveness:

- Design the highway to respond and contribute to the identity of the area.
- Design the highway to create legible entry and exit points to and from urban areas with consideration of driver experience across the whole Wellington RoNS corridor.
- Design highway structures to contribute positively to the environment, integrate functionality with elegant design and help orientation.

Connectivity:

- Design the highway to maintain or enhance the connectivity, usability and amenity for pedestrian, cycle, public transport and local road links which adjoin or cross the road corridor.
- Design the highway to reconnect public open spaces and recreational corridors severed by the Project.
- Design the highway to maintain or enhance access to waterways, the coast, open spaces and recreational activities.

Respect for the natural environment:

- Design the highway to retain where practicable key landscape and ecology features.
- Prioritise low impact design and environmentally responsive solutions.
- Design the highway to contribute to ecological sustainability and biodiversity

Quality Design:

- Design and build structures and surrounding spaces to a high standard.

Safety and security:

- Design the highway to assist safe driver behaviour with designed-in speed management and safety measures.
- Consider CPTED (Crime Prevention Through Environmental Design), road safety, noise exposure and accessibility for the mobility impaired in the selection and development of design solutions.

Development opportunities:

- Design the highway to maintain where practicable the development potential of the adjacent land.
- Where appropriate, design the new highway with consideration of the role of the old highway corridor in contributing to local accessibility for public transport, cycle and walking networks.
- Design the highway to avoid the creation of isolated pockets of land and not preclude use or development of sites in the future.

Value for money:

- Consider 'whole of life' and use cost effective design solutions.
- Consider resource efficiency and sustainability opportunities and innovations in the design, construction, operation and/or maintenance phases of the highway.

Users' experience:

- Design the highway to provide road users with a coherent, interesting and pleasant experience.
- Design the highway to preserve distinctive local and distant views to aid orientation and enhance sense of place.

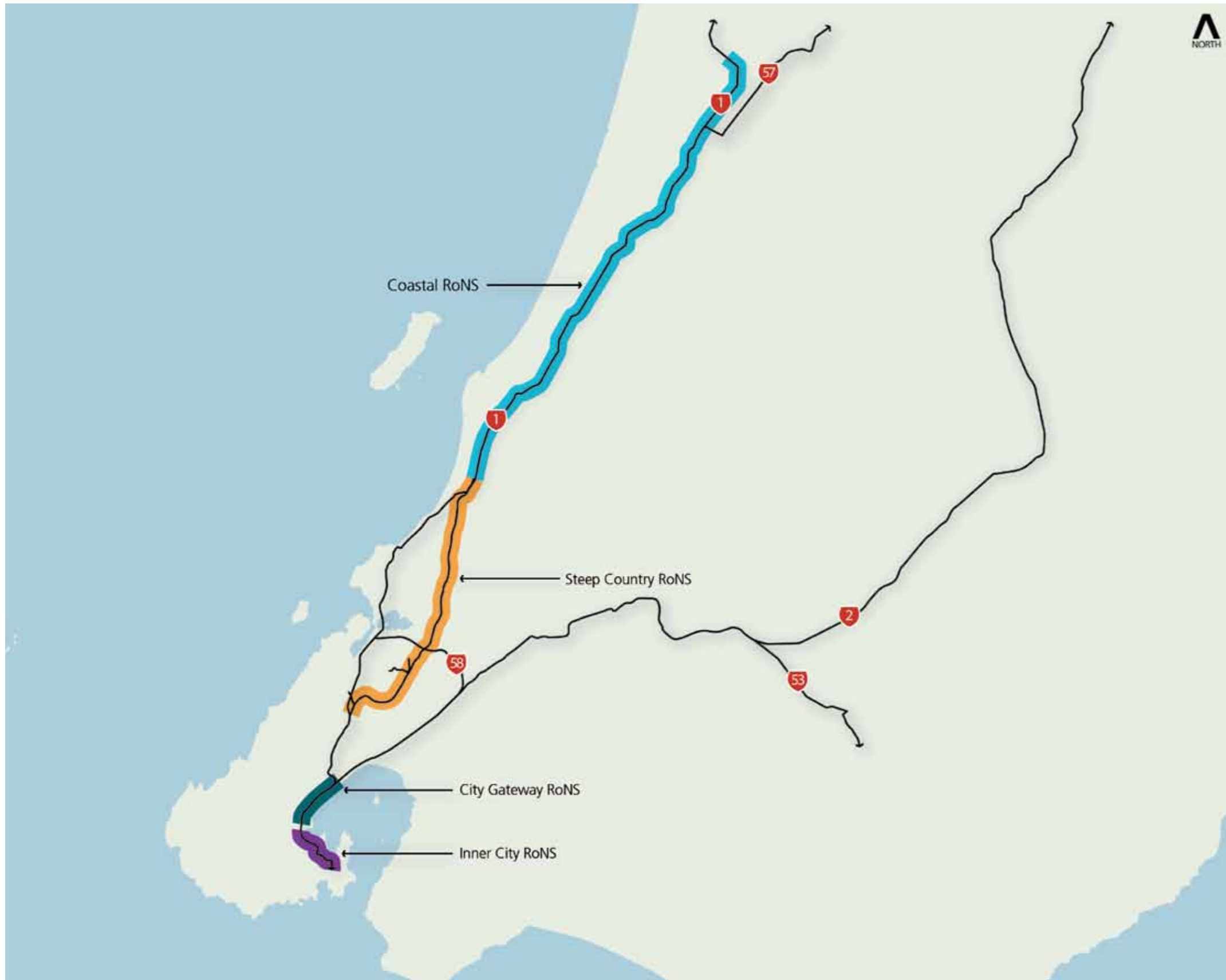


Figure 1.2: Wider Context: The Wellington RoNS Character Sectors

1.2 NZTA Policy Requirements

The key documents and policies of relevance to urban design in NZTA projects are:

- Land Transport Management Act 2003
- Transit Environmental Policy 2004
- New Zealand Urban Design Protocol (MfE, 2005)
- Transit Urban Design Policy 2007
- Transit Environmental Plan 2008
- Urban and Landscape Design Frameworks - Highways and Network Operations guideline 2009

1.2.1 Land Transport Management Act 2003

The Land Transport Management Act 2003 (LTMA) requires NZTA to “exhibit a sense of social and environmental responsibility” in meeting the statutory objective of operating a state highway network that contributes to an integrated, safe, responsive and sustainable land transport system.

1.2.2 Transit Environmental Policy (2004)

This policy is a commitment by the NZTA to improve the contribution of state highways to the environmental and social well being of New Zealanders by:

- Protecting and enhancing the natural and physical environment including the quality of life in urban areas.
- Avoiding adverse effects of state highways construction and operation on communities and the environment.
- Using and managing resources efficiently and helping reduce New Zealand’s greenhouse gas emissions.
- Considering environmental issues early in network planning, design and maintenance.
- Contributing to sustainable outcomes by working with central government, local government, communities, Maori and transport providers.
- Continually improving environmental performance including environmental sustainability and public health.

1.2.3 New Zealand Urban Design Protocol (MfE, 2005)

The New Zealand Urban Design Protocol aims to ensure New Zealand's towns and cities are successful places for people. The Protocol is a voluntary commitment by central and local government, property developers and investors, design professionals, educational institutes and other groups to undertake specific urban design initiatives. The NZTA (then Transit) was one of the first organisations to become a signatory of the Protocol in 2005.

1.2.4 Transit Urban Design Policy (2007)

As a signatory of the Urban Design Protocol, NZTA is committed to quality urban design outcomes. This commitment is implemented through the Urban Design Policy which aims to:

- ensure state highways contribute to vibrant, attractive and safe urban and rural areas; and
- achieve integration between state highways, local roads, public transport, cycling and walking networks and the land uses they serve.

More specifically, this is a commitment by the NZTA to ensure that:

- Roads fit in sensitively with the landform and the built, natural and community environments through which they pass;
- All systems of movement along and across the corridor are integrated into the design of projects with good connections and access to communities; and,
- The design contributes to the quality of public space and the road user's experience.

1.2.5 Transit Environmental Plan (2008)

The Environmental Plan specifies how the Agency's staff and suppliers who plan, design, build, maintain and operate the state highway network are expected to address key social and environmental effects including social responsibility; culture and heritage; and visual quality.

The relevant objectives are as follows:

Effect	Objective(s)
Social responsibility	<ul style="list-style-type: none"> ■ To enhance and contribute to community cohesion.
Culture and heritage	<ul style="list-style-type: none"> ■ To proactively limit the disturbance of significant cultural and heritage features along state highways. ■ To show respect for historic buildings we own to maintain their integrity.
Visual quality	<ul style="list-style-type: none"> ■ To incorporate multi-purpose landscaping as an integral part of all new state highway construction projects. ■ To improve the visual quality of the existing state highway network.

1.2.6 Urban and Landscape Design Frameworks - Highways and Network Operations Guideline (2009)

The Guideline outlines the requirement for, purpose and content of Urban and Landscape Design Frameworks (ULDF) and Urban and Landscape Design Master Plans (ULDMP).

The purpose of an ULDF is to ensure that the urban and landscape design concepts of the project are appropriately defined, developed and implemented. The ULDF describes and explains the various design elements of a project and ensures that the design proposals from various disciplines within the project are integrated.

1.3 Purpose of the Urban and Landscape Design Framework

The purpose of the Urban and Landscape Design Framework (ULDF) is to demonstrate how the design of the Transmission Gully Project satisfies NZTA's Urban Design Policy Requirements. In order to do so, the ULDF includes:

- An appreciation of the policy and physical contexts to the route;
- The identification of urban design issues and opportunities within the Project or in the Project's immediate surroundings; and
- Design objectives and principles to guide the development of specific aspects of the road alignment and road components.

The process of preparing the framework has ensured that ULDF design drivers have been integrated across the many work streams.

1.4 Relationship of ULDF to Consent Application Documentation

The framework describes the design concepts of the Transmission Gully Project, complementing Technical Report 1: Road Design Philosophy. The framework provides a vision for the road in the form a series of design principles (see section 4). Subsequent sections of the report identify detailed design issues and explain how these might be resolved in accordance with the design principles.

In order to implement the vision, the Urban Design and Landscape Framework will be used to inform the preparation of detailed landscape and urban design masterplans for the corridor and Site Specific Environmental Management Plans.

1.5 Methodology

The ULDF is an umbrella document which contains recommendations from a number of disciplines. The methodology for the preparation of the ULDF is based on a multi-disciplinary approach to the refinement of the horizontal and vertical alignment and design of highway elements.

In summary, the methodology included:

- **Site visits:** These included visits to the proposed highway corridor, surrounding landscape and adjoining urban areas.
- **Document review:** Relevant background, historical and policy documents were reviewed.
- **Identification of design issues:** This was undertaken through a series of area specific workshops attended by representatives of the urban design, landscape and visual assessment, roading design, bridge design, ecology, planning (social and community impacts), hydrology and noise assessment teams. In addition, meetings with representatives of Greater Wellington Regional Council, Wellington City Council, Porirua City Council and Kapiti Coast District Council were held to identify and address specific issues (pedestrian and cycle movement, and link roads junction design).
- **Refinement of highway alignment:** The Scheme Assessment Report preferred highway alignment was refined through workshops involving primarily the landscape and visual assessment, roading design, ecology, geotechnical engineering and urban design teams.

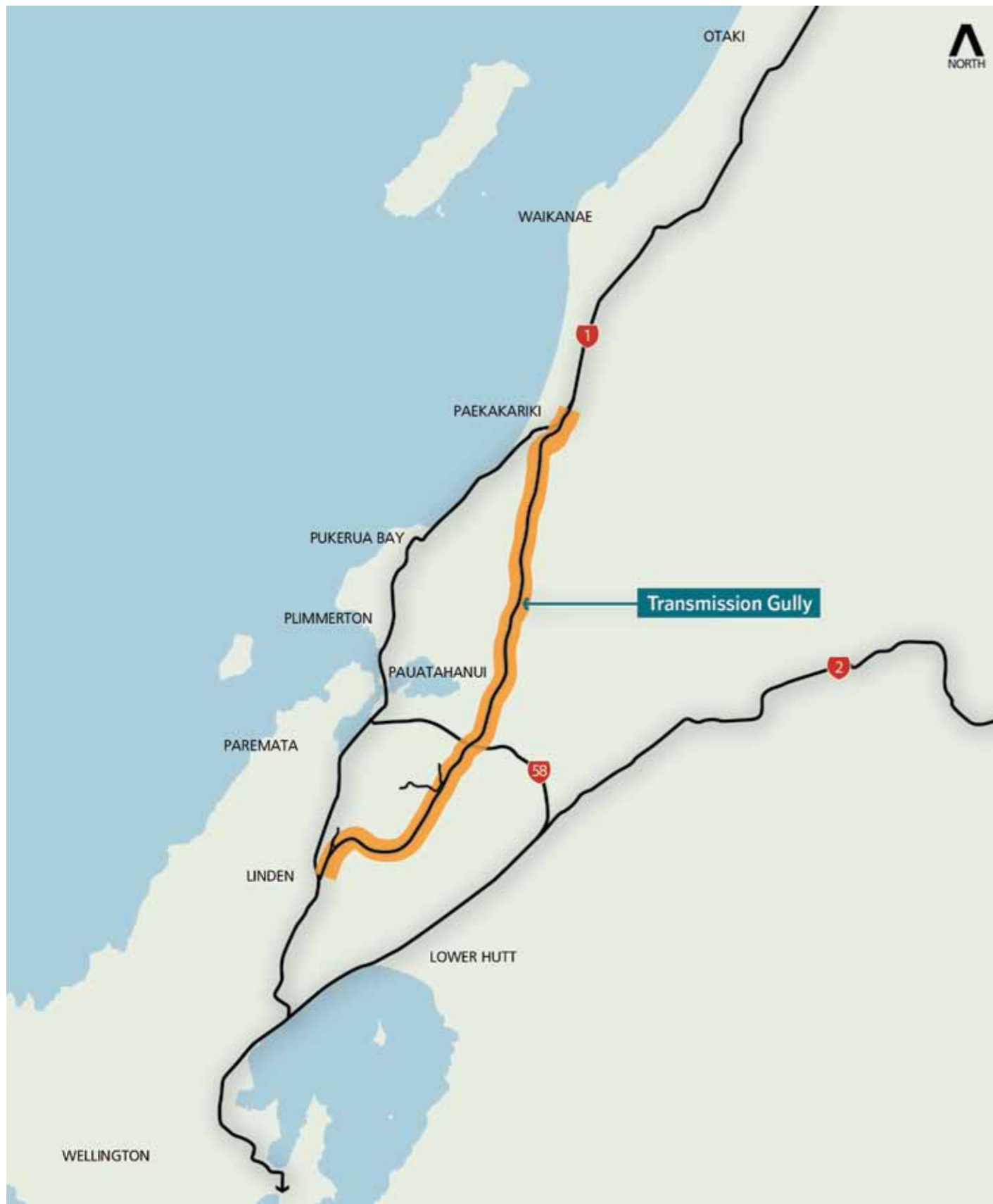


Figure 1.3: Project context

- **Development of project-wide principles:** The urban design and landscape and visual assessment teams worked together and in consultation with other disciplines to develop design principles for the whole project.
- **Design of road elements:** The urban design and landscape and visual assessment teams worked with the relevant specialists to develop design principles on earthworks, structures, pedestrian and cycle links, stormwater treatment devices, planting, highway furniture, and noise barriers.
- **Noise mitigation:** The noise mitigation options were subject to a multi-disciplinary assessment (assessment matrices and workshop).
- **Bridge design:** Initial guidance on bridge form and aesthetics was provided to the bridge designers by the urban design team at the start of the Project. This was followed by reviews of preliminary and final designs.

1.7 Project objectives

The Transmission Gully Project objectives are:

- To provide an alternative strategic link for Wellington that improves regional network security;
- To assist in remedying the safety concerns and projected capacity problems on the existing State Highway 1 by providing a safe, reliable and more responsive route between Linden and MacKays Crossing in an environmentally sustainable manner;
- To assist in enabling wider economic development by providing a cost-optimised route that better provides for the through movement of freight and people; and
- To assist in the integration of the land transport system by enabling the existing State Highway 1 to be developed into safe and multi-functional alternative to the proposed new strategic link.

1.6 Structure of the Urban and Landscape Design Framework

The ULDF is structured as follows:

Chapter 2 Policy Context: summarises key transport and land use policies which have been taken into consideration in the design of the Transmission Gully Project.

Chapter 3 Corridor Context: provides a summary of the main features of the Project area.

Chapter 4 Corridor Design: sets out corridor-wide design concepts and principles.

Chapter 5 Sections Design: provides a summary of the key features of each section of the corridor followed by the identification of design issues and associated objectives and proposals.

Chapter 6 Conclusion

1.8 Project description

The Transmission Gully Project (the Project) consists of three components:

- The Transmission Gully Project Main Alignment (the Main Alignment) involves the construction and operation of a State highway formed to expressway standard from Linden to MacKays Crossing. The NZ Transport Agency (NZTA) is responsible for the Main Alignment.
- The Kenepuru Link Road involves the construction and operation of a road connecting the Main Alignment to existing western Porirua road network. The NZTA is responsible for the Kenepuru Link Road.
- The Porirua Link Roads involves the construction and operation of two local roads connecting the Main Alignment to the existing eastern Porirua road network. Porirua City Council (PCC) is responsible for the Porirua Link Roads.

Transmission Gully Project Main Alignment

The Main Alignment is a proposed 27km inland State highway between Wellington (Linden) and the Kapiti Coast (MacKays Crossing). Once completed, the Main Alignment will become part of State Highway 1 (SH1). The existing section of SH1 between Linden and MacKays Crossing will likely become a local road. The Main Alignment is part of the Wellington Northern Corridor (Wellington to Levin) road of national significance (RoNS).

The key design features of the Main Alignment are:

- Four lanes (two lanes in each direction with continuous median barrier separation);
- Rigid access control;
- Grade separated interchanges;
- Minimum horizontal and vertical design speeds of 100 km/h and 110km/hr respectively; and
- Maximum gradient of 8%;
- Crawler lanes in some steep gradient sections to account for the significant speed differences between heavy and light vehicles.

The Main Alignment consists of nine sections (Figure 1.3) numbered from north to south as follows:

Section 1: MacKays Crossing

This section is approximately 3.5km long, and extends from the tie-in at the existing MacKays Crossing Interchange on SH1 to the lower part of the Te Puka Stream valley. The Main Alignment will connect to the existing SH1 at approximately 00700m. The first 700m is the existing State Highway 1 alignment which is a grade separated interchange providing access across the North Island Main Trunk rail line (NIMT). Any alteration to the MacKays Crossing Interchange will be minimal.

This section of the Main Alignment will provide for three lanes in the northbound carriageway from 00700m and from 02100m in the southbound carriageway. Southbound traffic will be able to exit the Main Alignment at approximately 01250m. This exit will pass under the Main Alignment at approximately 01800m and will connect to the existing SH1 heading south towards Paekakariki. Traffic heading northbound from Paekakariki will be able to join the Main Alignment from a connection at approximately 01200m.

A subway at 01990m will provide vehicular access across the state highway to three properties. This subway will also provide access across the Main Alignment for pedestrians, cyclists and stock. For the rest of this section heading south, the carriageway will be three lanes in both directions and rises up the Te Puka Stream valley. At approximately 02900m there will be an arrestor bed adjacent to the northbound carriageway for any out of control vehicles heading downhill. The section finishes at 03500m.

Section 2: Wainui Saddle

Section 2 starts at approximately 03500m and will continue climbing for about 2km to the top of the Wainui Saddle at approximately 262m above sea level (at about 05500m). This will be the highest point of the Main Alignment. Just south of the Wainui Saddle peak at about 05600m there will be a brake check area for both northbound and southbound carriageways. Slightly further south, at approximately 06000m, three lanes in each direction will be reduced to two lanes in each direction. Section 2 finishes at 06500m.

Section 3: Horokiri Stream

This section is approximately 3km long and extends from the southern end of the Wainui Saddle to the northern end of Battle Hill Farm Forest Park. For the entire length of this section, the Main Alignment will run generally parallel to the Horokiri Stream. From 06500m to approximately 08550m the Main Alignment will be to the west of the Horokiri Stream, while from 08550m to 09500m it will be to the east of the stream. As the Main Alignment runs parallel to the stream it will cross a number its minor tributaries which generally run perpendicular to the Horokiri Stream and the Main Alignment.

Over this section, the Main Alignment will cross the Horokiri Stream once with a bridge at 08540m. The section finishes towards to northern boundary of the Battle Hill Farm Forest Park (BHFFP) at approximately 09500m.

Section 4: Battle Hill

This section is approximately 3km long and extends from the northern boundary of the BHFFP to the Pauatahanui Golf Course. Shortly after the Main Alignment enters the BHFFP from the north it crosses over the Horokiri Stream with a bridge at approximately 09720m. Over the remainder of this section heading south the Main Alignment will follow the Horokiri Valley floor which widens from north to south through the BHFFP.

Access across the Main Alignment for park users will be provided by a subway located at approximately 10500m. This will provide a connection between the eastern and western part of the park for pedestrians, cyclists and stock. The Main Alignment will continue south from the BHFFP boundary towards the Pauatahanui Golf Course. At about 11750m it will cross an unnamed stream with a bridge. Access across the Main Alignment will be available underneath this bridge. The section finishes at 12500m where there will be a subway providing pedestrian and stock access across the Main Alignment.

Section 5: Golf Course

This section is approximately 3km long, and extends from north to south through rural land adjacent to the Pauatahanui Golf Course and Flighty's Road. The Main Alignment will cross a number of small tributaries along this section but there will be no major stream crossings requiring bridges.

Section 6: State Highway 58

This section is approximately 3km long and starts at 15500m. The SH58 / Pauatahanui Interchange will be located at approximately 17500m. At this interchange the Main Alignment will be elevated above a roundabout which will provide access to and from the Main Alignment for traffic travelling in both directions on existing SH58. Immediately south of this interchange, at approximately 17660m, there will be a bridge across the Pauatahanui Stream.

At approximately 18250m the Main Alignment will widen to provide three lanes in each direction. This section finishes at approximately 18500m.

Section 7: James Cook

This section starts just south of the State Highway 58/ Pauatahanui Interchange, at approximately 18500m. Three lanes will be provided for both the northbound and southbound carriageways. The James Cook Interchange will be located at approximately 19500m. This will be a dumbbell interchange with the Main Alignment being elevated above the local road connections. These roads will provide access to the Main Alignment in both directions to and from the Porirua Link Roads. In the vicinity of this interchange, the number of lanes in each direction will be reduced from three to two. This will occur at approximately 18900m in the northbound carriageway and at 19500m in the southbound carriageway. From the James Cook Interchange, the Main Alignment will continue southwards for a further 2km. This section finishes at approximately 21500m.



Figure 1.4: Transmission Gully Project Sections

Section 8: Cannons Creek

This section begins at 21500m and is approximately 3.4 km long. Throughout this section the Main Alignment will run along the eastern side of Duck Creek valley, and across an undulating, weathered greywacke plateau between Duck and Cannons Creeks.

There will be four bridges in this section:

- A 140m long bridge starting at 21555m, crossing a tributary of Duck Creek;
- A 150m long bridge starting at 21845m, crossing a tributary of Duck Creek;
- A 160m long bridge starting at 22780m, crossing a tributary of Duck Creek;
- A 260m long bridge starting at 23550m, crossing Cannons Creek.

These bridges will follow the horizontal alignment of the Main Alignment. This section finishes at 24900m.

Section 9: Linden

This southernmost section is approximately 2.8km long. From the start of the section at approximately 24900m, a third lane will be provided in the northbound carriageway heading uphill.

There will be two bridges:

- A 50m long bridge starting at 25790m, crossing an unnamed stream that flows into the Onepotu arm of the Porirua Harbour;
- A 90m long bridge starting at 26010m, crossing an unnamed stream that flows into the Onepotu arm of the Porirua Harbour.

The Kenepuru Interchange will be located at approximately 26700m. This interchange will involve the Main Alignment being elevated above a roundabout which will connect to the Kenepuru Link Road.

South of the Kenepuru Interchange, the Main Alignment will continue downhill to where it will tie into the existing SH1 along the Tawa straight. For traffic joining the Main Alignment in a northbound direction, the carriageway will be elevated and will pass over the existing southbound SH1 carriageway. Traffic continuing to Porirua will be able to do so by taking the left lane exit from the existing SH1.

Note: For the purpose of this Framework, the link roads will be addressed together with the Main Alignment Section they connect to.

Kenepuru Link Road

The Kenepuru Link Road will provide a connection from the Main Alignment to western Porirua. This link road will provide a connection from the Kenepuru Interchange to the existing Kenepuru Drive and will be approximately 600m long. There will be a roundabout at the intersection with Kenepuru Drive. The Kenepuru Link Road will be a State highway designed to the following standards:

- Two lanes (one in each direction);
- Design speeds of 50 km/h;
- Maximum gradient of 10%; and
- Limited access only.

The Kenepuru Link Road will run under existing SH1 and will be bridged over the NIMT.

Porirua Link Roads

The Porirua Link Roads will connect the Main Alignment to the eastern Porirua suburbs of Whitby and Waitangirua. The Porirua Link Roads will be local roads designed to the following standards:

- Two lanes (one in each direction);
- Design speeds of 50 km/h;
- Maximum gradient of 10%; and
- Some side access will be permitted.

The Waitangirua Link Road will be approximately 2.5km long will run from the James Cook Interchange to the existing intersection of Niagara Street and Warspite Avenue. This will be a signalised intersection. The Waitangirua Link Road will cross five waterways. The most significant of these will be a crossing of Duck Creek requiring a culvert. The Waitangirua Link Road will link into the western side of the James Cook Interchange.

The Whitby Link Road will be 0.9km long and will run from the existing roundabout at the intersection of James Cook Drive and Navigation Drive to the Waitangirua Link Road. The new intersection of the proposed Waitangirua and Whitby link roads will be an unsignalised T-intersection with traffic from the Whitby Link Road giving way to Waitangirua Link Road traffic.

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