

Appendix B Urban Design Framework

NGAURNAGA TRIANGLE STRATEGIC STUDY - TECHNICAL REPORT

URBAN DESIGN FRAMEWORK

FOR NEW ZEALAND TRANSPORT AGENCY

AUGUST 2009

PREPARED BY

URBANISMPPLUS LTD



NGAURANGA TRIANGLE TRANSPORTATION STUDY URBAN DESIGN FRAMEWORK

FOR NEW ZEALAND TRANSPORT AGENCY

This report summarises urban design related aspects of the Ngauranga Triangle Transport Study. The assessment of the potential route detailed within this report is preliminary only, and is to be subject to further detailed analysis during future Project Feasibility Reports and other studies through the Investigation and Reporting phase outside of the scope of this project.

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introduction

PART 1

INTRODUCTION

1.1 Summary of urban design involvement

URBAN DESIGN INPUT

Urbanismplus Ltd has provided specialist urban design input into all phases of the strategy study process to ensure the assessment of route options and progression to a potential alignment has appropriately responded to best practice urban design principles. Urbanismplus has acted as a sub-consultant to Sinclair Knight Merz Pty Ltd, and was requested to facilitate the final workshop phase, namely the development of the potential route from the short list options.

NGAURANGA TRIANGLE WORKSHOP PROCESS

The Ngauranga Triangle workshop process was held during December 2008 - May 2009 based around three key inquiry-by-design workshops interspersed by focussed design-led production and reporting. Refer to Figure 1-1.

The workshops allowed for a high degree of active participation and debate amongst NZTA, stakeholders, and a multi disciplinary consultant team. This concentrated IBD approach encouraged an efficient and inclusive process which led to informed and collaborative design activity and resolution.

The IBD workshop approach offered the following benefits to the Ngauranga Triangle strategic study project:

- Produced well coordinated, quality outcomes with broad support and ownership;
- The range of workshop participants enabled local technical understanding of issues to be filtered into the broader project knowledge. This helped with understanding of the many complex issues facing the corridor route options;
- Provided urban design, landscape and environmental, and land use planning representation and opinion in addition to transport which led to greater interrogation of issues from a diverse range of perspectives;
- Competing demands between different interests were able to be identified and negotiated over a shorter period;
- The core deliverable of a potential package of routes was achieved within a relatively short timeframe as issues were explored and resolved in a sequential manner.

The three workshops were held at NZTA offices on the following dates:

- Workshop 1, 10 December 2008 - Constraints Workshop;
- Workshop 2, 7 April 2009 - Long List Options Workshop;
- Workshop 3, 15 May 2009 - Short List Options Workshop.

Major steps in the workshop process

WORKSHOP 1 - Constraints workshop

- Confirm study objectives and study area
- Technical briefing & feedback on constraints and opportunities from contextual groups
- Group 1: planning, urban design, geotechnical, hydrological, parks and reserves
- Group 2: noise / air quality, contaminated land, landscape, community, historical / archaeological, infrastructure / services
- Assess using a severity / opportunity rating

Development of long list of options

WORKSHOP 2 - Long List Options

- Assessment of all long list options
- Agree on short list options to take forward
- Further development of an additional 'one way pair' option

Short list of options + report

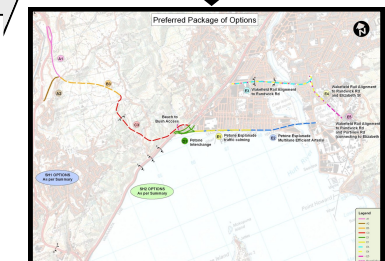
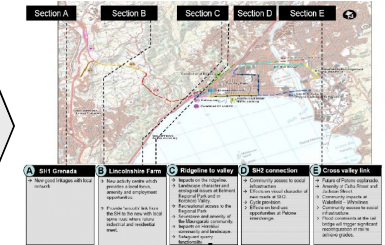
WORKSHOP 3 - Short list options

- Assessment of all short list options
- Provisional costing of SH2 to Gracefield options to determine relative costs to benefits
- Prioritisation of Petone interchange designs
- Prioritisation of Gracefield route options
- Agree on potential route and Petone interchange design

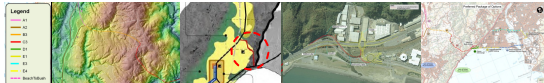
Potential route options + technical report

Major project outputs

Constraints report + mapping



ABOVE FIG. 1-1: Ngauranga Triangle Strategy Study workshop process and outputs summary



urban design framework + objectives

2.1 Ngauranga Triangle Urban Design Framework

The urban design framework sets out the key assumptions, priorities, and goals of development for the Ngauranga Triangle Strategy Study. Its purpose is to provide a rationale and focus for what the corridor should achieve. The use of the framework ensures that a comprehensive view of the Ngauranga Triangle options potential is taken.

The framework is based on the following considerations:

AN INTEGRATED APPROACH

- Ensuring that planning is undertaken in a holistic manner to avoid the risks associated with ‘tunnel vision’ or artificial separation of intrinsically inter-related elements. Refer to Figure 2-1. This applies to both:
 - The core qualities of the environment (the ‘quadruple bottom line’); and
 - The technical disciplines and specialisations used to apply knowledge. The key technical assessment areas relevant to Ngauranga Triangle Strategy Study relate to: Movement Networks; Open Space Networks; Community Networks (including residential); and Employment Networks.

The framework is also a response to various policy, strategies and documents including:

2.1.1 Urban design values

- The essential qualities that should guide development of the built environment (*New Zealand Urban Design Protocol*);
- The design principles that help create optimal physical settings to facilitate social and economic exchange (*Ministry for Environment’s People + Places + Spaces*).

2.1.2 Transport specific urban design values

- The urban design principles associated with transport networks revolving around context sensitive roads and connected networks (*Transit New Zealand Urban Design Policy, Planning Policy Manual*).

2.1.3 Wellington regional strategic planning and transport policy

- The key issues within strategic plans, policy and strategy identified by Greater Wellington Regional Council, Wellington City Council, Hutt City Council and other stakeholders that relate to the Ngauranga Triangle project.

2.1.4 Localised planning and transport policy

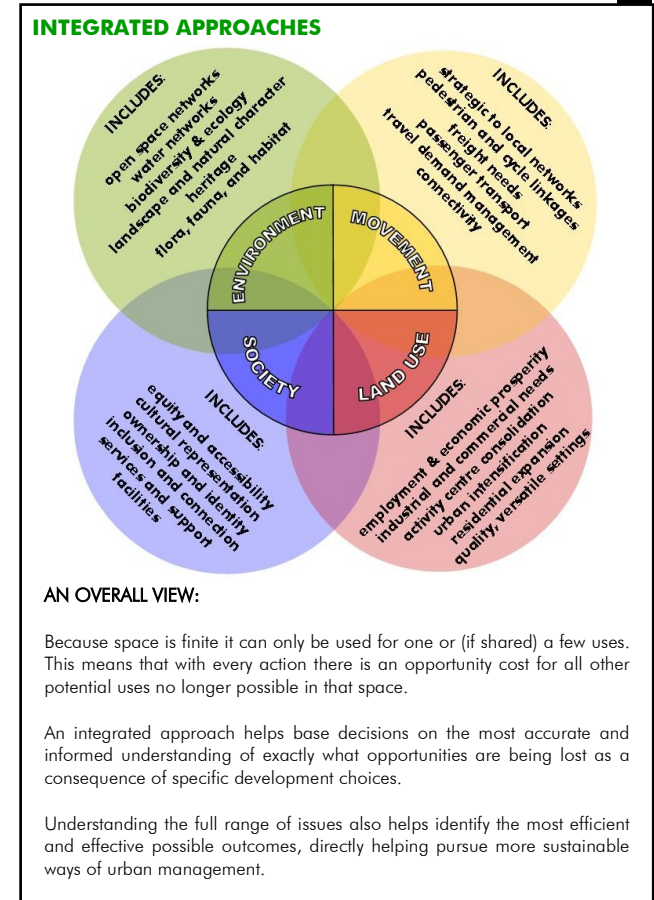
- The project specific issues identified by key stakeholders that relate to what the most beneficial solutions will entail in the study area.

Ngauranga Triangle functional goals

- The specific functional goals that Ngauranga Triangle should achieve, as set out by the stakeholders and used within all evaluation frameworks. These are based around the five core objectives within the New Zealand Transport Strategy.

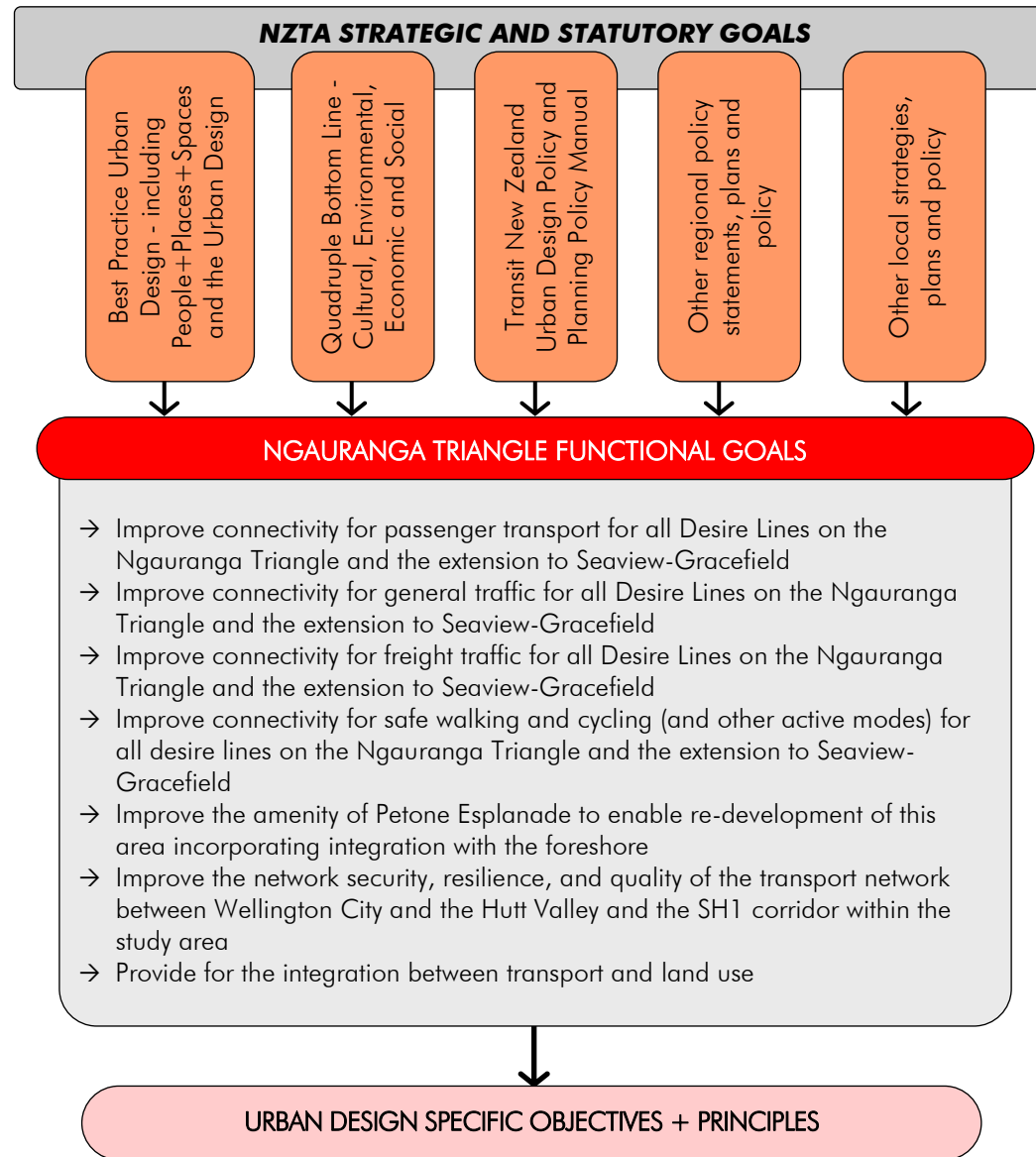
This framework will ensure that a comprehensive and overall view is taken. No individual interest will dominate (for instance a biased focus towards through movement, or passenger transport, or local amenity). Instead, an issues-based approach will be used to help determine what the most beneficial solution will entail in each corridor section. Refer to Figure 2-2 for a conceptual summary of the urban design framework.

The following pages provide a summary framework for each urban design related strategic policy influence. It is noted that study specific goals have already been comprehensively considered against the vision and objectives of national, regional and local transport policy. Please refer to the section 3 of the Detailed Technical Report.



ABOVE: Figure 2-1: An integrated approach seeks to give balanced representation to all interests, rather than just those traditionally associated with particular elements of the built environment.

ABOVE: Figure 2-2: Urban design framework.

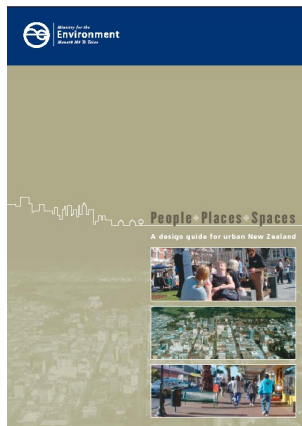


2.1.1 URBAN DESIGN PRINCIPLES

MFE PEOPLE + PLACES + SPACES

A ‘principles’ approach has been used to drive the process, based on key urban design concepts that can best embed and deliver sustainability into a constructed outcome. This allowed a spatially robust, defensible ‘bottom line’ to be established against which the potential of the Ngauranga Triangle options was able to be explored.

The urban design principles that underpin the urban design framework, in line with the Ministry for the Environment’s People Places Spaces, are illustrated on this page.



Principle	Features	Implications for Ngauranga Triangle Strategy Study
Consolidation and Dispersal	DEVELOPMENT PATTERNS AND INTENSITY	<i>To promote higher intensity development around existing nodes and lower density around the periphery. This allows local communities, businesses and public transport to be strengthened, and resource efficiencies to be achieved, whilst reducing environmental impacts on peripheral areas. For <u>Ngauranga Triangle</u> this means ensuring that the strategic transport outcome does not serve sprawl. The corridor should seek to maximise the potential of the existing Petone town centre (and other nodes in the wider area including Johnsonville and Lincolnshire Farm). Their long term prosperity will relate to how they can provide logical,</i>
Integration and Connectivity	MOVEMENT NETWORKS; BUILDING INTERFACES	<i>To promote development that is integrated and connected with its surrounding environment and other existing or future communities. This facilitates ease of access, economy of movement, and improved social interaction. For <u>Ngauranga Triangle</u> this means minimising the severance of communities. This includes supporting local and strategic networks and pedestrian/cycle links that enable better connectivity to the destination points found in the area: town centres; Belmont Regional Park; Percy Scenic Reserve; residential areas; Seaview/Gracefield; and between other important locations that offer employment, growth, recreational or other opportunities. It also means supporting places where location, form, use and interfaces are designed to stimulate interest and pride in the local environment such as the esplanade and existing</i>
Diversity and Adaptability	RANGE OF DENSITIES; MIX OF USES; FLEXIBILITY OF BUILDINGS	<i>To promote choice through the provision of a diverse mix of compatible activities and uses. These built environments can better adapt over time. This facilitates the ability to respond efficiently to social needs, provides a range of market demands, and allows for changes in lifestyle. For <u>Ngauranga Triangle</u> this means multi modal, multi purpose trips, where the equity of the corridor is shared to more than just the transport function. This includes understanding the many different users already within the environment and how these may best accommodate natural changes over time. As an example, this may include how the Petone Esplanade develops over time from lower density uses into higher value mixed use premises if amenity is</i>
Legibility and Identity	TOWN FORM; VISUAL CHARACTER; SPECIAL PLACES	<i>To promote environments that are easily understood by their users, display a strong local identity, and create appropriate visual character. This facilitates an enhanced usage, enjoyment, and pride in local place. For <u>Ngauranga Triangle</u> this means orientation and detail of the corridor should reinforce place, and enhance the existing visual and physical connections along the corridor e.g. to Belmont Regional Park and other natural / built landscapes.</i>
Environmental Responsiveness	ECO SYSTEMS; GREEN NETWORK; URBAN WATER; WASTE; ENERGY	<i>To promote urban environments that are responsive to natural features, eco systems, water quality issues, reduced energy usage and waste production, and balance the spatial needs to achieve this with that required for urbanisation. This facilitates improved ecological outcomes. For <u>Ngauranga Triangle</u> this relates to reconnecting biodiversity and minimising the ecological footprint of the corridor. The potential route option should enhance the existing open space network and associated waterways (Hutt River and other tributaries), and ecologically significant areas such as the Korokoro Valley and entrance to Belmont Regional Park. Additionally it is about creating safe and attractive environments that encourage walking, cycling and</i>

WHAT THIS MEANS FOR THE PROJECT:

The movement network has the most profound effect on the urban environment of all built elements. Good urban design becomes paramount to ensure that any new road contributes to better economic, social, cultural and environmental outcomes. Considering the proximity of the Ngauranga Triangle corridor to existing built fabric and proposed development areas, actively ensuring that this new network maximises positives is critical if it is to successfully enhance Grenada through to Gracefield areas.

NEW ZEALAND URBAN DESIGN PROTOCOL

The New Zealand Urban Design Protocol is a coordinated attempt to improve the processes used as well as the outcomes achieved using urban design-led approaches. The Protocol focuses around seven essential qualities, referred to as the 'Seven C's'.

NZTA is a signatory to the protocol, committing to advancing the standards of the built environment through best practice urban design approaches.

The sustainable urban design process principles that underpin the Development Framework, in line with the New Zealand Urban Design Protocol, are illustrated on this page.



Quality	Features	Implications for Ngauranga Triangle Strategy Study
Context	SPATIAL AND SOCIAL RELATIONSHIPS	To realise a dynamic and responsive approach that can evolve and change over time in response to changes in economic, social, cultural, or ecological setting. It requires implementation mechanisms and ultimately physical environments that are robust, flexible, and adaptable, responding to their environment. <u>For Ngauranga Triangle this means</u> protecting the local condition and reconciling local integration with through function.
Character	DISTINCTIVENESS, IDENTITY, RESPONSIVENESS	To realise development outcomes that reinforce 'place' at the local, corridor, and sub-regional levels. At the same time change and variety must be recognised as important factors contributing to richness, diversity, and ultimately also character. This has key relevance to the way in which future development is enabled and community identity is protected and managed. <u>For Ngauranga Triangle this is about</u> more than design aesthetics. It relates to recognising and protecting the sense of place and identity for local communities and important amenity areas.
Choice	DEMOCRACY IN SPACE, USES, MOVEMENT	To realise diverse living, working, playing, learning, and resting environments that cater to the widest possible range of interest groups and users. <u>For Ngauranga Triangle this means</u> providing for multi modal users, facilitating choice in network routes (local and strategic) and satisfying the needs of different communities.
Connections	LINKAGES, ACCESSIBILITY, EQUITY	<u>Ngauranga Triangle</u> must place equal emphasis on facilitating physical, environmental and social connections and not simply providing for freight and HCV through movement. This has implications for land use integration with the public realm including the movement network, legibility, and permeability across a range of movement modes.
Creativity	ORIGINALITY; PROBLEM-SOLVING; ARTISTIC	<u>For Ngauranga Triangle</u> the location of a high intensity movement corridor within sensitive environmental, town centre and residential areas requires an equally unique approach to transport and land use management including custom-designed mitigation techniques to minimise adverse environmental impacts. Creativity in relation to this project is also about a multi disciplinary design team interacting, assessing and finding solutions in an integrated way.
Custodianship	RESPONSIBLE; INTER-GENERATIONAL EQUITY	The <u>Ngauranga Triangle</u> strategy and its various benefits and costs need to be equitably shared across stakeholders today and also those who will benefit from sound planning tomorrow. It also demands that a sensitive approach be made to the recognition and maintenance of ecosystems, biodiversity and other non-renewable resources.
Collaboration	CO-ORDINATION; GOOD-WILL; OPEN MINDEDNESS	Real integration occurs through providing a setting to allow professional consensus achieved through rigorous debate and testing. This is embedded into the <u>Ngauranga Triangle</u> Strategy study process through the way in which the stakeholder organisations have come together and been involved in the process. This partnership will need to be maintained during the ongoing planning, design and implementation of the strategy.

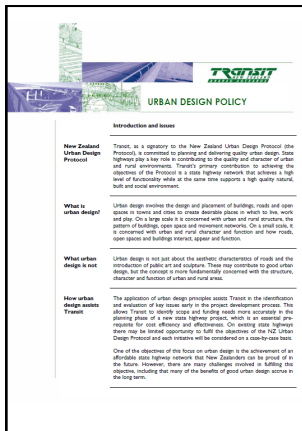
WHAT THIS MEANS FOR THE PROJECT:
 To deliver a quality built environment within the context of the Ngauranga Triangle corridor, the potential option must ensure that the existing urban fabric remains economically prosperous, socially inclusive and user friendly to people as well as environmentally responsive. Future generations as the custodians of the project should be advantaged. The character and identity of communities and assets should be protected and enhanced, choices need to be given for movement connectivity and land use activity, and complexities associated within competing demands creatively resolved. This should occur in an integrated, transparent and collaborative manner to ensure a deliverable outcome is found.

2.1.2 NZTA (TRANSIT NZ) URBAN DESIGN POLICY

To further NZTA's commitment as a signatory of the Protocol, urban design related policy has been developed within the Transit Planning Policy Manual. This manual is one of many documents which informs the National State Highway Strategy and Strategic Plan.

The urban design policy forms a broad statement of intent for integrated land use and planning. It is not a list of transport specific urban design principles. Each project is required to be evaluated on a case-by-case basis.

Transit's urban design policy and sustainable transportation principles, in line with the New Zealand Urban Design Protocol, are illustrated on this page.



Features

Urban design policy

Transit will implement the Integrated Planning Policy by giving effect to this supporting policy, which relates to the contribution made by state highways to urban and rural form and amenity. Transit's policy on seeking to influence land use planning as part of an urban design approach is set out in Chapter 4.

As a signatory to the New Zealand Urban Design Protocol Transit plans and design state highways in a way that supports good urban design and value for money. In particular, Transit 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.

UDIP

Transit will apply its Urban Design Implementation Principles (UDIP) to all state highway activities:

1. Appropriate urban design needs to be determined on a case-by-case basis for state highway improvement activities. Each activity is different and should not be assumed to be a precedent for the next.
2. Urban design elements need to be incorporated into the activity at the outset. This will help ensure the project design addresses urban design in an efficient and cost effective manner.
3. Urban design will not represent an extravagant use of public funds. Urban design initiatives should not attempt to 'disguise' a road, rather they should enhance its integration with the surrounding environment.
4. Early collaboration with local stakeholders will occur to promote alignment between urban design initiatives of Transit and the views of affected communities.
5. Co-funding of urban design initiatives with local stakeholders will always be considered. Where a local community desires a higher level of urban design than Transit provides, Transit will seek the cost of the higher level outcomes from local stakeholders.
6. Urban design will be consistent with the operational requirements of state highways, while recognising the needs of motorists, pedestrians, cyclists and surrounding communities. State highway categorisation has a key role to play.
7. All components of urban design will be considered when incorporating urban design into state highway activities. Urban design can contribute to:
 - assisting economic development;
 - improving safety and personal security for all state highway users;
 - improving access and mobility for motorists, pedestrians, cyclists and passenger transport;
 - protecting and promoting public health through the state highway being appropriately integrated with an interconnected road network; and
 - ensuring environmental sustainability through appropriate use of materials and influencing surrounding land use development.

Implications for Ngauranga Triangle Strategy Study

The policy provides direction on adherence to a strategic triple bottom line mandate in the development of new road connections including Ngauranga Triangle. Urban design-led sustainable transport is recognised to be far more than simply aesthetic enhancements. Consideration needs to be given to:

Assisting with economic development: e.g. for Ngauranga Triangle this includes ensuring freight, goods and services can move efficiently, protecting local connection and access, ensuring the viability of land uses in the face of reverse sensitivities, reliable journey times, enabling land redevelopment/of Seaview / Gracefield, new growth such as Lincolnshire Farm, allowing people to access employment areas.

Improving safety and personal security: e.g. reducing the volume of heavy vehicles on the Petone Esplanade.

Access and mobility for all transport users e.g. increasing public transport mode share and walking and cycling trips, improving peak period journey times, reducing inefficient travel patterns.

Public health e.g. reducing the volume of HCVs on the esplanade, promoting sustainable travel modes like walking and cycling.

Environmental sustainability e.g. the way in which a road connects or severs communities of interest, the way in which people identify and respond to the uniqueness of place, protecting cultural and heritage features, habitat and vegetation, reducing erosion and controlling sediment deposition, responding to climate change and reducing greenhouse gas emissions, reducing VKT.

WHAT THIS MEANS FOR THE PROJECT:

Urban design led transport planning will be used to strategically unlock the best possible built outcomes along and around the Ngauranga Triangle corridor and for the design and planning of the movement network.

The policy also recognises that different places are best supported by different urban design approaches. Seeking a context-sensitive approach which finds an informed balance between many different interest areas (whether complementary or competing) is a key goal of the project.

2.1.3 REGIONAL LAND USE AND TRANSPORTATION POLICY

A number of regional planning documents and strategies provide a direction for the sustainable location of, and transportation between, activities within the region.

The most relevant regional policy frameworks that underpin the urban design framework are illustrated on this page.

WHAT THIS MEANS FOR THE PROJECT:

Taking account of all regional strategic directions for growth and future transportation development, a common theme prevails. These strategies emphasise through movement for economic development advantage. The WRS also looks towards land use intensification as part of a sustainable future for the region.

This means that this project should enable better connectivity for freight and business traffic rather than simply more general commuter capacity to provide for a prosperous regional economy.

Regional policies also demand that the corridor be designed and planned in the best possible way from an urban design perspective. Its importance as a strategic connection should not override an integrated outcome being sought.

Plan/ Strategy	Features	Implications for Ngauranga Triangle (from an urban design perspective)
National State Highway Strategy	STATE HIGHWAY; MANAGEMENT; LEADERSHIP AND COLLABORATION; QUADRUPLE BOTTOM LINE BENEFITS; TRANSPORT - LAND USE INTEGRATION	<i>The National State Highway Strategy recognises state highways are at the top of the strategic roading hierarchy but contribute to an integrated multi-modal transport network. Their planning and management is also strongly interconnected with local movement and land use integration. Both the function of State Highways and the environment through which they pass are classified into categories within the NSHS. Strong emphasis is placed on context sensitivity and responsibility towards making sure the route contributes to local, regional and national economic development, social and environmental wellbeing. <u>For this project, this means</u> that while it is a nationally significant transport project the outcome must also contribute amenity to the local condition. This will be primarily in terms of maintaining local access and minimising severance or disconnections; maintaining local amenity through route location and detail design; and contributing to local development through ensuring investment is not discouraged as a consequence of the impact of the outcome.</i>
Wellington Regional Strategy	REGIONAL URBAN DESIGN; REGIONAL OPEN SPACES; INDUSTRIAL LAND; RURAL RESIDENTIAL DEVELOPMENT; CENTRES; INTENSIFICATION	<i>The Wellington Regional Strategy aims to guide development of a coordinated and internationally competitive region. It favours sustainable regional form through intensification of centres and identified change areas. Grenada to Gracefield is identified as a regionally significant change area and improved east-west transport connections to provide traffic congestion relief in the Ngauranga Gorge and development of the Petone foreshore is encouraged. This seeks to provide regional economic benefits through improved port / airport access between major industrial areas, and local economic development through growth and land use change. <u>For this project it means</u> that the outcome must enhance these strategic business connections.</i>
Proposed Regional Policy Statement	SUSTAINABLE RESOURCE MANAGEMENT / REGIONAL URBAN DESIGN	<i>Regional form, design and function is a core theme in the Proposed RPS. The PRPS seeks to provide a regional requirement for quality of urban design, co-ordinated development and integrated land use and transportation. Included within the sustainable planning approach proposed is improving east-west transport linkages (Objective 21(i)). Implementation of urban design related components is to overseen by the Wellington Regional Strategy, District Plans and local/regional authorities. Developing planning frameworks around Regional Focus Areas and regional design principles are two methods identified. <u>For this project it means</u> that the outcome must enhance the viability/vibrancy of regionally significant centres (Johnsonville, Petone, Lower Hutt), promote higher land use intensity and mixed use development, protect industrial employment areas and discourage sprawl.</i>
Wellington Regional Land Transport Strategy + Ngauranga to Airport Corridor Plan Hutt Corridor Plan Regional Cycle Plan Regional Freight Plan Regional Pedestrian Plan Regional Travel Demand Management Plan	INTEGRATED LAND TRANSPORT; OUTCOMES AND STRETCH TARGETS; PRIORITY PROGRAMME; INVESTMENT AND FUNDING	<i>All five objectives of Transit's Transport Strategy are also RLTS objectives in addition to ensuring that the Regional Transport Plan is affordable to the regional community. The RLTS sets targets to increase passenger transport patronage, pedestrian and cycle patronage across the region thus supporting multi-modal movement and a shift towards more sustainable travel modes. The strategy seeks to improve regional freight efficiency and reduce general congestion to grow the economy. It seeks to improve environmental sustainability by reducing CO2 emissions, reduce crashes, and improve transport and land use integration by aligning to sustainable urban growth outcomes within the WRS. <u>For this project, this means</u> that the outcome must focus on two key characteristics. Firstly, it must provide for better and more efficient freight and business movement, but also contribute to a reduction in CO2 by not creating excess attraction to general commuter vehicle use. Secondly, it must not undermine local attractiveness or amenity to ensure growth aspirations are supported.</i>
Regional Passenger Transport Plan 2007-2016	REGIONAL PASSENGER TRANSPORT SERVICES; INCREASING PATRONAGE	<i>This strategic policy aims to increase the use of passenger transport (passenger rail, bus and ferry) across the region over the next 10 years and gives effect to the Regional Land Transport Strategy. This fits within a sustainable transport goal of ensuring local access and mobility, reducing congestion through minimising private vehicle commuter trips and supporting a healthy environment through reducing emissions. Related to this is making sure the passenger transport network is equitable, reliable, affordable, convenient and of a high quality. <u>For this project</u> there is a direct link in the way in which better freight and business vehicle use may help remove those vehicles from routes and locations more desirable for pedestrian and passenger transport activity. Indirectly, the project should not result in a situation where private vehicle use is generally made more attractive or easy to the point that it then counteracts attempts to transition commuters to more sustainable modes.</i>

2.1.4 LOCAL LAND USE AND TRANSPORTATION CONSIDERATIONS

A number of local and corridor specific planning documents and strategies provide a direction for the growth and development of the wider Ngauranga Triangle area.

The most relevant local policy frameworks underpinning the urban design framework are illustrated on this page.

WHAT THIS MEANS FOR THE PROJECT:

The new transport link is supported by Wellington City and Hutt City local authorities as a connection which can enable localised economic growth and land use redevelopment. This link can also ease peak congestion through the Ngauranga Gorge on the State Highway and local roads for residents.

This means that the corridor in addition to its through movement function for freight, needs to carefully protect the local condition and amenity of the 'place' through which it passes. The corridor and its on/off ramp connections should provide opportunities for high quality redevelopment and residential intensification as well as viable business settings.

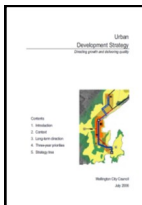
An ecological corridor intersects with the future transport corridor. The project should deliver a stronger ecological network across the local area and recognise landscape areas of high visual amenity.

Policy / Plan or Strategy

Features

Implications for Ngauranga Triangle Strategy Study (from an urban design perspective)

Wellington City Urban Development Strategy



WELLINGTON CITY GROWTH; ROADING INVESTMENT; BUS PRIORITY; WALKING AND CYCLING; CONNECTION TO AIRPORT

A city-wide strategy to manage and guide physical growth and change over next 30-50 years. Directs population and employment growth to where the benefits are greatest (in the central area and along a spine between the airport to Johnsonville). The strategy has a critical link with transport planning and seeks to improve road (strategic and local), public transport and walking and cycling opportunities. The UDS Sets priority actions which include improving the quality of urban design through making the city more liveable, compact, connected, prosperous, safer, sustainable, and a stronger sense of place. For this project this means that the outcome must clearly contribute to bettering local amenity rather than undermining its attraction to investment, new residents, and new business.

District Plans (Wellington City + Hutt City)

SUSTAINABLE MANAGEMENT; LOCAL CONNECTION, MOVEMENT AND ACCESS; ENVIRONMENTAL / AMENITY PROTECTION

The corridor sits within residential, rural and open space zoned areas of the Wellington City District Plan. Of importance is the recognition of Lincolnshire Farm as an appropriate area for future urban growth and subsequent approved Plan Change / Structure Plan. Within the Hutt City District Plan, the Petone Foreshore is a special recreational area and Seaview/Gracefield is a special business area. Both areas are subject to specific planning controls to manage the use and development of land. Both District Plans place emphasis on avoiding community severance by enabling local movement and access to continue along transport routes.

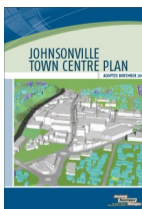
Lincolnshire Farm



URBAN DEVELOPMENT AREA; NORTHERN GROWTH MANAGEMENT; EMPLOYMENT VIABILITY

The Lincolnshire Farm Structure Plan (north of Newlands and south of Grenada North) formed part of Council's Plan Change 45 for the rezoning of rural land to an Urban Development Area zoning. This approved Plan Change seeks to implement the Northern Growth Management Framework. In its current form the Structure Plan provides for approximately 2000 jobs within a business park and neighbourhood centre, a mix of housing intensities are proposed in addition to open space areas and community facilities. The viability of employment areas within the structure plan is closely related to the connection with the Grenada - Hutt link road.

Johnsonville Town Centre Plan



WRS SUB REGIONAL CENTRE; TOWN CENTRE PLAN; FUTURE CONCEPTUAL VISION

As an identified sub-regional centre for commercial and residential development, the Johnsonville Centre Plan is a founding local planning document (adopted November 2008) which establishes the character, context and growth expectations / responses for the centre. The Plan establishes a broad approach and set of actions for community facilities, transport, public spaces, suburban centre zoning, housing and mixed use activities within an overarching development framework. For this project this means that transport interventions in the proximity of this centre must clearly contribute to improving the amenity and function of the Johnsonville Road main street through reducing congestion, enhanced local connection and access to strategic links as well as local employment and residential development.

Belmont Regional Park



REGIONAL RECREATIONAL DESTINATION; ECOLOGICALLY SENSITIVE; SURROUNDING LANDSCAPE; NATURAL ENVIRONMENT

Belmont Regional Park is located between Porirua and the Hutt Valley. It is a well used active and passive recreational open space area within the sub-region and has important local landscape and ecology values. Korokoro Stream and regenerating native forest are located near to the SH2 Petone interchange. Maintaining local recreational connections to the Regional Park and protecting the natural environment are key objectives for the Ngauranga Triangle project.

2.2 Ngauranga Triangle urban design objectives and principles

To provide specific urban design input into the assessment of the potential route options and in response to identified guidance, five urban design objectives and various principles under these have been developed:

Objective	THE FACILITATION OF ECONOMIC DEVELOPMENT	URBAN REGENERATION + INTENSIFICATION OPPORTUNITIES	ENABLING LOCAL MOVEMENT AND ACCESS	THE ENHANCEMENT OF PLACE AND PARTICIPATION	REDUCING ENVIRONMENTAL CONSEQUENCES
Principles	<p>The project must enhance strategic regional links for the movement of freight and business traffic. This will help the development of existing and new business areas as well as improve the efficiency of vehicle trips associated with these.</p>	<p>A new link within the strategic network may facilitate urban sprawl through the 'opening up' of cheaper land on the periphery that can exploit the improved accessibility to employment and service destinations.</p> <p>The improved connection should serve to enable intensification of existing urban areas and the local environment as an attractive place to invest. The public transport investment should be seen as a lever towards helping initiate market-led development around it.</p>	<p>Pedestrian and cycle amenity in the local environment should be improved in consequence of this project.</p> <p>The new link, if overemphasising through movement and access restriction, could lead to inefficient local vehicle movement / use patterns.</p>	<p>The new link, could either facilitate integration between communities or cause severance.</p> <p>The link could also either undermine the distinctiveness and attractiveness of the local area as a distinct place and destination of its own local relevance, or conversely help establish it as a viable, attractive place to live, work, rest, and play. The generic nature of strategic transport infrastructure design (signage, materials, markings) poses an additional challenge in this respect.</p>	<p>The project will undoubtedly result in more total vehicular carriageway than before. To offset this, the project outcome must ensure meaningful ecological balance is maintained in the form of rehabilitation, adherence to the lowest-impact design approaches, and contribution to local non vehicle trips.</p>

NGAURANGA TRIANGLE INDICATORS OF URBAN DESIGN SUCCESS

A range of indicators could be used to value the effects of the Ngauranga Triangle project on transport specific urban design attributes that have been identified within the urban design framework. These measurements also align with the broader evaluation criteria used within the Long and Short List Options report. There are many types of indicators that could be used to measure and quantify change (positive, neutral or negative) following the completion of the project from the baseline of the existing environment (pre-works). Indicators and measurements listed below are a selection which demonstrate a correlation between urban design, transport, and perceptions of value.

Objective	THE FACILITATION OF ECONOMIC DEVELOPMENT	URBAN REGENERATION + INTENSIFICATION OPPORTUNITIES	ENABLING LOCAL MOVEMENT AND ACCESS	THE ENHANCEMENT OF PLACE AND PARTICIPATION	REDUCING ENVIRONMENTAL CONSEQUENCES
Measurements	<p>Could be measured by:</p> <ul style="list-style-type: none"> → Improved movement efficiency of freight through reduction in travel times, and a corresponding reduction in commuter vehicle kilometres travelled. → Increase in the number of jobs provided near to the corridor. → Competitiveness of business areas better connected by the project outcome. → Directness of connection established and ease of access / use by identified user groups. → Increase in the volume of business activity undertaken, and/or increase in the establishment of new businesses in consequence of the project outcome. 	<p>Could be measured by:</p> <ul style="list-style-type: none"> → The number of building consent applications for residential development, and their locations, relative to the corridor. → Average VKT per capita increasing or decreasing within 5 years of the connection being completed. → The number of new businesses / retail spend / property and construction investment undertaken in the local area within 5 years of the connection being completed. 	<p>Could be measured by:</p> <ul style="list-style-type: none"> → The number of pedestrians and / or cyclists making trips in the local area. → The proportion of local daily trips being undertaken by private vehicle should decrease over time. → Whether local vehicle trips are made less direct or less convenient as a consequence of the project. → Whether local pedestrian and / or cycle trips are made less direct or less convenient as a consequence of the project. → Whether the local economy improves or declines within 5 years of the connection being completed. 	<p>Could be measured by:</p> <ul style="list-style-type: none"> → Whether the local community has a stronger sense of identity within 5 years of project completion. → Specific local features directly reflected in the design of the outcome. → Legibility of the local identity to users of the connection, measured by survey. → Whether the local area develops a stronger or weaker sense of community and place within 5 years of completion of the project. → Whether investment in the local area for quality developments improves over time. → Whether the average socio-economic and demographic profile for the area improves or declines over time. 	<p>Could be measured by:</p> <ul style="list-style-type: none"> → The sensitivity of the route to ecological constraints. → The number of general commuter vehicles using the connection once completed. → Whether the improvements to local capacity resulting from this connection result in more commuter vehicle use on those roads to consume that capacity. → The carbon footprint of the project including embedded energy and carbon emissions. → Whether the impervious footprint of the connection is as minimal as possible. → Whether local air quality - especially on routes expected to benefit with less congestion as a result of this project - improves.



urban design assessment

3.1 Urban design evaluation of potential routes

Following review at the Long and Short List Options Workshop, collective agreement on potential routes for Ngauranga / Tawa, Ngauranga / Dowse, Grenada - SH2 and Cross Valley Link has been reached.

NGAURANGA TO TAWA

- Tawa Interchange Improvements
- Consideration of Helston Road ramps with Grenada - SH2

NGAURANGA TO DOWSE

- Existing Cycle Track completion with possibility of the Great Harbour Ways project
- Bush to Beach project (pink line)
- Petone Interchange upgrade as part of the Link Road project (D1)
- Ramp metering at Ngauranga and Petone on ramps

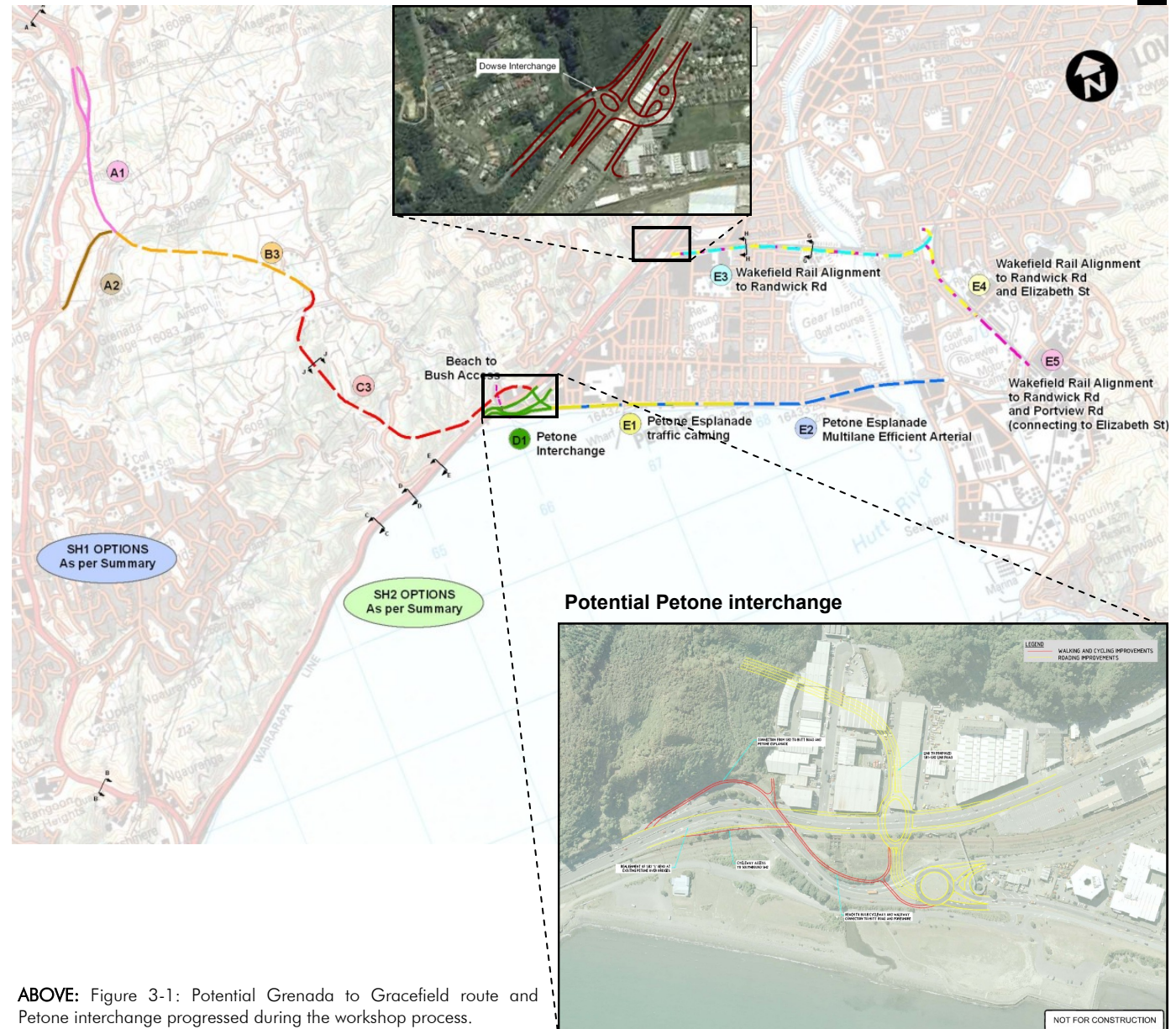
GRENADA TO SH2

- Basic option Grenada to SH2 (A1/2 / B3 / C3)
- Possible connection to Johnsonville / Helston
- Connection to Petone Esplanade and SH2 (via new Petone Interchange) to connect to the Cross Valley Link (D1)
- Bus services from Wellington North to Hutt Valley

CROSS VALLEY LINK (CVL)

- Wakefield to railway corridor CVL (E3)
- Randwick Road Extension (E4)
- Extension via Railway to Elizabeth Street (E4)
- Extension via Railway to Parkside Road (E5)
- Petone Esplanade and Jackson Street west traffic calming (30km/hr) (E1)
- Petone Esplanade multilane efficient arterial with high traverse and pedestrian accessibility (E2)

These projects - where they have particular relevance to urban design - are assessed against the urban design objectives and principles.



ABOVE: Figure 3-1: Potential Grenada to Gracefield route and Petone interchange progressed during the workshop process.

3.1.1 The facilitation of economic development

GENERAL

The impact of the potential route package on local economic development is detailed in section 3.1.2 of the report under the objective of urban regeneration.

All options assessed within the strategy study assume that the economically vital movement of freight, goods and services across the region - between Wellington North, Gracefield, the port, airport, along the State Highways and across Districts is provided for and travel times reduced.

NGAURANGA TO TAWA

Tawa Interchange Improvements

A design speed increase to 110km/hr and alignment changes may provide for some improved movement benefits to freight and business traffic.

Given the technical nature of this project, further assessment is considered outside the area of urban design expertise. Reference should be made to transport and roading assessments.

Consideration of Helston Road ramps with Grenada - SH2

An additional motorway interchange at Helston Road will improve the strategic connection to Johnsonville, and facilitate economic and employment growth in Johnsonville / Wellington North. The work will align with Wellington City's Johnsonville Town Centre Plan and will therefore be constructive in achieving the objectives.

NGAURANGA TO DOWSE

Petone Interchange upgrade as part of the Link Road project

The interchange will allow a direction connection to SH2 from the Link Road and two options to access Hutt Road and the Cross Valley Link. This should facilitate efficiency of access to employment areas and corresponding business and industrial development.

Ramp metering at Ngauranga and Petone on ramps

Ramp metering is usually employed to improve through movement flows and to make the use of a highway less attractive for local movements. This is not the case here as the key destinations are in Wellington City (not local). Ramp metering will therefore favour outlying areas over closer destinations. The ease of access from these outer areas will promote less sustainable remote development which requires more travel, and penalises the more efficiently located Petone. It is noted however that degree to which long distance travel is favoured over shorter distance travel will depend on the signalling delay employed.

Ramp signalling will however help to support a reduction in traffic on Petone Esplanade which will have associated amenity benefits.

GRENADA-SH2

Lincolnshire Farm area

The Link Road is a limited access road with local interchanges in this location. This will allow for efficiency in the through movement function between Grenada to Gracefield. The proposed layout (refer to the Structure Plan) will provide ease of access and connection to the employment areas in Lincolnshire Farm. The viability of business and industrial activity in the planned development area is protected as a consequence of this proximity and access to the movement economy. The route opens up new employment areas and opportunities at Lincolnshire Farm.

Petone interchange

Full access is provided for at the interchange, allowing for strategic connection to State Highway 2, to SH1 via the Link Road, the Petone rail station and to Gracefield via the Cross Valley Link.

CROSS VALLEY LINK

The potential route whilst reducing movement efficiency across the valley, has the least local social and environment damage to Petone. The movement efficiency of freight is enhanced in the Wakefield to rail corridor alignment which in the main, avoids passing through urban areas which potentially slows movement. The Wakefield Street to rail corridor route is however more circuitous into Gracefield from the Petone interchange when compared to the option which provided for all movements along The Esplanade and an associated increase in design speeds to 70km/hr.

Seaview/Gracefield

The rail corridor extension (Randwick Road - Elizabeth Street - Parkside Road) is the potential route which will provide the greatest efficiency of access, and directness of connection into the Gracefield industrial area for freight movements. This is compared to other options assessed previously that interrogated routes through the suburb of Moera. These other options may also have resulted in increased delays from greater local traffic movements.

3.1.2 Urban regeneration and intensification opportunities

NGAURANGA TO TAWA

Tawa Interchange Improvements

Refer to local development assessment in Section 5.1.3, pgs. 14-15 of the Short Options Report.

Consideration of Helston Road ramps with Grenada - SH2

The provision of motorway on and off ramps has pro's and con's from an urban design perspective. The provisional ramp sketches show the need for property acquisition either side of SH1.

Road designation widening to the extent which requires the acquisition of properties backing onto the corridor may result in the loss of employment uses to the west and residential properties to the east. This land take is unlikely to give any substantial urban regeneration opportunities, although if redevelopment were to occur on employment land, the existing properties with lower rental value may be replaced with higher value properties.

From a positive standpoint, the ramps may future stimulate land use investment in retail and residential intensification elsewhere in Johnsonville. Removal of some traffic intensity from Johnsonville Road may encourage economic redevelopment within the retail core and more mixed use typologies.

NGAURANGA TO DOWSE

Existing Cycle Track completion with possibility of the Great Harbour Ways project

Refer to local development assessment in Section 6.2.1, pg. 36 of the Short Options Report.

Bush to Beach project

Refer to local development assessment in Section 6.4.2, pg. 44 of the Short Options Report.

Petone Interchange upgrade as part of the Link Road project

Refer below.

Ramp metering at Ngauranga and Petone on ramps

N/A

GRENADA-SH2

Tawa /Grenada interchange connection to Lincolnshire Farm

Dependent on the design and proximity to planned development, the interchange may support local economic activity at Tawa and Grenada through increasing the potential retail catchment capture.

Lincolnshire Farm area

There are two main employment areas planned within the Lincolnshire Farm structure plan area in addition to a neighbourhood centre. They are located proximate to the Link Road and two major intersections with an internal principal 'spine' road through the area. The connection follows the Link Road route and supports new local employment growth by providing good commercial access and visibility close to interchanges.

The route can help connect Newlands residents with employment opportunities in the wider area.

Other options canvassed, locate the Link Road north or south of the potential route alignment through planned residential or reserve areas. These alignments may create unfavourable economic outcomes for the settlement and sever the node. This is a consequence of the potential reduction in the on-going viability of retail in the centre and employment areas as the potential movement economy (ability to capture passing trade), is redirected away. The noise, vibration and air pollution effects are likely to discourage intensification away from the high frequency route, or lead to poor urban frontage conditions.

Petone interchange

Capitalising on the gateway potential and connections to strategic routes, specific sites in this location may be subject to future employment related regeneration opportunities.

Consideration also needs to be given to the impact of the interchange on the current Petone Gateway concept for a research and technology campus north of the railway currently under development by a private developer with the support of Hutt City Council. There is however no certainty that the concept will be delivered in its current form.

The potential interchange has little conflict with the gateway concept. Refer to an overlay of the scheme on two interchange designs in Appendix 2. The interchange retains the development opportunity of this gateway scheme, given its location further south of the proposed building footprints and pedestrian overbridge.

CROSS VALLEY LINK

Wakefield Street to Rail corridor

As detailed in the Short Options Report (Section 9.4.2, pg.101) the potential route along with the other options investigated using Udy Street, Manchester Street and golf course / Halford Street, provide an alternative route to The Esplanade. This may encourage local development along the Esplanade through associated amenity improvements. Along Wakefield Street there may be adverse land use effects from the intense movement function of passing traffic, as well as some impacts on surrounding properties. Access and land use management is required to mitigate effects.

Petone Esplanade

The potential route (by providing an alternative) seeks to deter freight and heavy commercial vehicle traffic along the Esplanade through a speed managed environment that aims to manage the intensity of traffic west of Cuba Street. This may assist with the creation of a higher amenity local setting along the foreshore and connecting through to Jackson Street. Consequently this may stimulate future redevelopment of mixed use activities (both residential and commercial).

The amenity of Petone's main street (west of Cuba Street) along Jackson Street is also protected. The route maintains favourable conditions to support local retail viability and pedestrian use.

East of Cuba Street, Petone Esplanade

Access difficulties and amenity reductions may negatively impact on future economic development opportunities east of Cuba Street on Petone Esplanade and along Cuba Street.

The multi-lane efficient arterial project will provide for more through traffic capacity (mostly HCV) and higher speeds. This will have associated adverse air quality, vibration and noise effects and is likely to discourage sensitive activities such as residential and retail from locating close to the route. Its proximity to the Seaview area and freight movements may however support some urban regeneration to flexible light industrial or commercial servicing activities.

It is noted some property acquisition may be required under the multi-lane arterial project which could consequently result in the loss of existing employment uses and future urban regeneration opportunities.

Seaview/Gracefield

A direct route into Gracefield (Railway extension to Parkside Road) will reduce the travel costs and increase the efficiency of production. This may in turn allow for reinvestment and increased economic activity and development of remaining vacant sites in this area.

3.1.3 Enabling local movement and access

NGAURANGA TO TAWA

**Tawa Interchange Improvements
Consideration of Helston Road ramps
with Grenada - SH2**

NGAURANGA TO DOWSE

**Existing Cycle Track completion with
possibility of the Great Harbour Ways
project**

Bush to Beach project

**Petone Interchange upgrade as part of
the Link Road project**

**Ramp metering at Ngauranga and
Petone on ramps**

The strategy should help to reduce peak traffic congestion in the Ngauranga Gorge to better enable efficient local and strategic movement in Johnsonville, Grenada and Petone.

The above options for Ngauranga to Tawa and Ngauranga to Dowse should facilitate the ease of local movement, improved safety and connection between communities in north Wellington to Wellington city centre and Lower Hutt via more sustainable travel modes. The options will provide a higher level of PT service for commuters who for various reasons do not meet their needs locally, as an alternative to general vehicle use.

Passenger transport improvements and cycleway strategies will help to reduce the number of local daily trips being undertaken by private vehicle which in turn results in environmental and health benefits.

Local recreational pedestrian and cycle linkages along the coastal edge (cycleway) and between Petone and Belmont Regional Park (bush to beach connection) are maintained within the potential route option.

GRENADA-SH2

Tawa / Grenada interchange connection to Lincolnshire Farm

Dependent on the design, the interchange may support local access at Tawa and Grenada. It is unknown whether local vehicle trips will be made more, or less, direct and convenient in this location.

Possible connection to Johnsonville / Helston Road

As detailed within the Johnsonville Town Centre Plan, a motorway interchange at Helston Road to connect the town centre core of Johnsonville with SH1 may reduce through traffic congestion on Johnsonville Road and provide additional capacity to cope with future traffic associated with proposed redevelopment of the mall.

The work will align with Wellington City's Johnsonville Town Centre Plan and will therefore be constructive in achieving the objectives.

Lincolnshire Farm area

It is assumed that the link will provide local connectivity and access to the effective main street (Principal Road) from major intersections through the area. These interchanges are detailed in the Lincolnshire Farm Structure Plan.

Petone interchange

The interchange provides for full local access between the Link Road, State Highway 2 and Petone (feeding to The Esplanade and Hutt Road). The existing connection between the access road and Priests Avenue north of SH2 to the Petone railway station and Koro Crescent connecting to Hutt Road is retained.

The potential interchange is likely to be located close to the proposed pedestrian overpass between the campus and foreshore as detailed in the Petone Gateway concept. This alignment may require adjustment. Local pedestrian connections will however be provided for within the Bush to Beach project.

CROSS VALLEY LINK

General

The potential cross valley route does not disconnect any part of the movement network in Petone and in some areas may improve vehicle congestion and capacity locally. Local movement is better provided for along the railway corridor opposed to other options considered which located the route along local streets.

Local connection and access may however be disadvantaged where the freight route is located along local streets e.g. along Wakefield Street, Cuba Street, The Esplanade (east of Cuba Street) and Hutt Road. Impacts may include:

- reduced ability of pedestrians to cross at mid block and intersection conditions (relating to the frequency and speed of vehicles and the width of the road);
- reduced access to land uses (relating to possible removal of parking, and a lack of access management, restriction of property ingress/egress); and
- discouraging of pedestrian activity (walking next to multiple high intensity traffic lanes can expose people to vehicle noise, exhaust fumes, intimidation by the sheer intensity of movement occurring, and physical wind shear associated with the close passage of rapidly moving large vehicles. Safety may also be adversely effected).

Petone Esplanade

Traffic calming works support more active movement modes (pedestrian and cycle) at both the local and regional scales through the management of traffic intensity along the Esplanade and local connections to the cycleway adjacent to SH2 and Belmont Regional Park. A low speed environment will enable greater casual crossing opportunities to the beach and to the main street and enable higher standards of safety.

Seaview/Gracefield

Moving the freight route from Randwick Road north to the rail corridor alignment will help to protect local movement and access in Moera.

3.1.4 The enhancement of place and participation

NGAURANGA TO TAWA

Tawa Interchange Improvements

Refer to community cohesion and noise/vibration assessment paragraphs in Section 5.1.3, pg. 14, Short Options Report.

Consideration of Helston Road ramps with Grenada - SH2

By reducing the pressure on the main shopping street of Johnsonville Road this may enable amenity improvements to occur, and stimulate land use change towards a finer grained mixed use streetscape character with stronger sense of place. The work will align with Wellington City's Johnsonville Town Centre Plan and will therefore be constructive in achieving the objectives.

The ramps may also create negative amenity effects (noise, vibration, air pollution) to properties located either side of SH1. There are likely to be reduced separation distance between land use activities and the corridor.

NGAURANGA TO DOWSE

Existing Cycle Track completion with possibility of the Great Harbour Ways project

Refer to community cohesion and noise/vibration assessment paragraphs in Section 6.2.1, pg. 35, Short Options report.

Bush to Beach project

Refer to community cohesion and noise/vibration assessment paragraphs in Section 6.4.2, pg. 43, Short Options Report.

Petone Interchange upgrade as part of the Link Road project

Refer to assessment in next segment.

Ramp metering at Ngauranga and Petone on ramps

N/A

GRENADA-SH2

General

Unlike other options which pass through or within close proximity to existing local communities or approved subdivisions, the potential route seeks to avoid high levels of severance and adverse amenity effects to the Grenada, Horokiwi and Korokoro Valley communities. From Lincolnshire Farm, the route circumnavigates Horokiwi Road to the south to connect directly to the urban area at the Petone interchange. The route may negatively impact on some rural residential land uses where it crosses Horokiwi Road.

Tawa /Grenada interchange connection to Lincolnshire Farm

Dependent on the design and proximity to planned development, the interchange may support the integration of communities (existing and future) at Tawa and Grenada.

Lincolnshire Farm area

800-900 new households are planned for at Lincolnshire Farm in addition to community uses within the neighbourhood centre. The Link Road follows the alignment found within the Lincolnshire Farm Structure Plan and avoids disconnecting residential areas and the local centre. Safety, amenity and access can be maintained within sensitive development areas. Refer also to community cohesion and noise/vibration assessment paragraphs in Section 7.3, pg. 58.

Petone interchange

The interchange is located in an industrial / commercial area, with residential uses unlikely to develop in the future. If carefully designed, the interchange and pockets of land use redevelopment potential can function as a visual gateway to Petone, helping to strengthen community identity.

The interchange is located at the 'front door' of Lower Hutt and will serve as an important gateway statement. If carefully designed, this piece of infrastructure can, in itself, provide a gateway function / statement, and serve to enhance the sense of place and identity of Hutt City. Alternatively, the interchange should aim to provide for creative built form 'gateway' outcomes through protecting key pieces of land. The potential interchange design avoids impact to the current Petone Gateway concept.

CROSS VALLEY LINK

Wakefield Street to Rail bridge

In comparison to route options using the local street network to access Gracefield (passing residential, local employment areas and through the middle of the Shandon golf course), the potential route minimises impacts on the Petone community by avoiding the built fabric and following the rail alignment from Wakefield Street. Refer to the community cohesion and noise/vibration paragraphs Section 9.4.2, pg. 100 Short Options Report.

Petone Esplanade

The street environment west of Cuba Street is a speed managed area through deliberate street design and speed limits. Lowered traffic volumes (particularly HCV) and speeds are likely to improve safety, amenity and access to land uses thereby enhancing the attractiveness of the coastal foreshore area as a destination of local and sub-regional importance. Jackson Street and the Esplanade have strong intangible sense of place values which require protection. This was not achieved under the 70km/hr Esplanade option previously assessed. It is noted that noise emission can be exacerbated when speed control measures are installed which encourage heavier braking and acceleration.

East of Cuba Street, Petone Esplanade

The community east of Cuba Street and along Cuba Street may be adversely impacted on by the multi-lane arterial route. Although most heavy vehicles are likely to exit from Gracefield in the north along the rail alignment, some vehicles will use the Petone Esplanade route turning onto Cuba Street to avoid the Esplanade traffic calming works. Loss of amenity and some reverse sensitivity effects will arise for adjacent land uses. Refer also to the community cohesion and noise/vibration paragraph section 9.1.2, pgs. 88-89 in the Short Options Report.

Seaview/Gracefield

The potential route which follows the rail line as an alternative to the Randwick Road option is preferable from a community severance perspective as it avoids the through movement of freight and heavy vehicles past residential uses within the Moera community. Further isolation of Moera (already an social-economic disadvantaged area) is likely to manifest in less social and business interaction and a poorer sense of community / social capital. By locating the route adjacent to the rail line adjacent to a predominance of industrial uses, the air quality, noise and vibration effects can be more contained.

3.1.5 Reducing environmental consequences

NGAURANGA TO TAWA

Tawa Interchange Improvements
N/A

Consideration of Helston Road ramps with Grenada - SH2
N/A

NGAURANGA TO DOWSE

Existing Cycle Track completion with possibility of the Great Harbour Ways project
Bush to Beach project
Petone Interchange upgrade as part of the Link Road project
Ramp metering at Ngauranga and Petone on ramps

These options give greater movement provision and safety to cyclists through a dedicated cycle Track along SH2. This in turn will help to reduce commuter trips made by private vehicles (which in turn reduces congestion and carbon emissions), and will importantly contribute to achieving healthier lifestyles. This is also relevant to the Bush to Beach crossing of SH2.

Preference is given to retaining the existing number of traffic lanes along SH2 i.e. keeping within the motorway designation to avoid unnecessary destruction of embankment and vegetation.

GRENADA-SH2

Lincolnshire Farm area

The Link Road follows the alignment proposed within the Structure Plan, and avoids passing through Areas of Protection and planned open space reserves which have higher landscape, ecological or recreational values.

Lincolnshire Farm to Petone interchange

In contrast to the other options canvassed, the potential route avoids the most sensitive ecological areas e.g. Belmont Regional Park, Percy Scenic Reserve and habitats between SH1 and SH2. The most significant environmental impacts of the proposed route are likely to be:

- on Belmont Stream by Lincolnshire Farm;
- around Cottles Landfill where the route is located on contaminated land;
- areas of steep gradient (requiring more earthworks and potential for erosion and sedimentation into environments);
- areas where natural drainage channels are impacted; and
- areas requiring the removal of natural vegetation.

The potential route does however avoid the need for previously assessed option D4 which located the Link between the Petone and Dowse Interchanges adjacent to SH2 cutting into the western embankment.

Petone interchange

The staged removal of the structures associated with the current Petone interchange and construction of a new interchange at the southern end of the Link may provide a real opportunity to restore the Horokiwi Stream to a natural opposed to culverted condition.

CROSS VALLEY LINK

General

The cross valley link section through the urban environment of Petone will have potential adverse environmental consequences in the following key areas:

- the Hutt River as the potential route will require a redeveloped bridge connection with associated structure and pilings at the rail bridge adjacent to Wakefield Street. The Hutt River is subject to strict flood management requirements, and the upgraded bridge may reduce its storage capacity during storm events (dependant on the clearance between the structure and river);
- reduction of local air quality in areas proximate to the heavy traffic route as a result of the intensity of HCV and general traffic and associated emissions. Reductions in the number of general commuter vehicles may help to offset this; and
- likely increases in the road reservation along Petone Esplanade (east of Cuba Street) and impervious surfaces discharging into receiving environments

Petone Esplanade

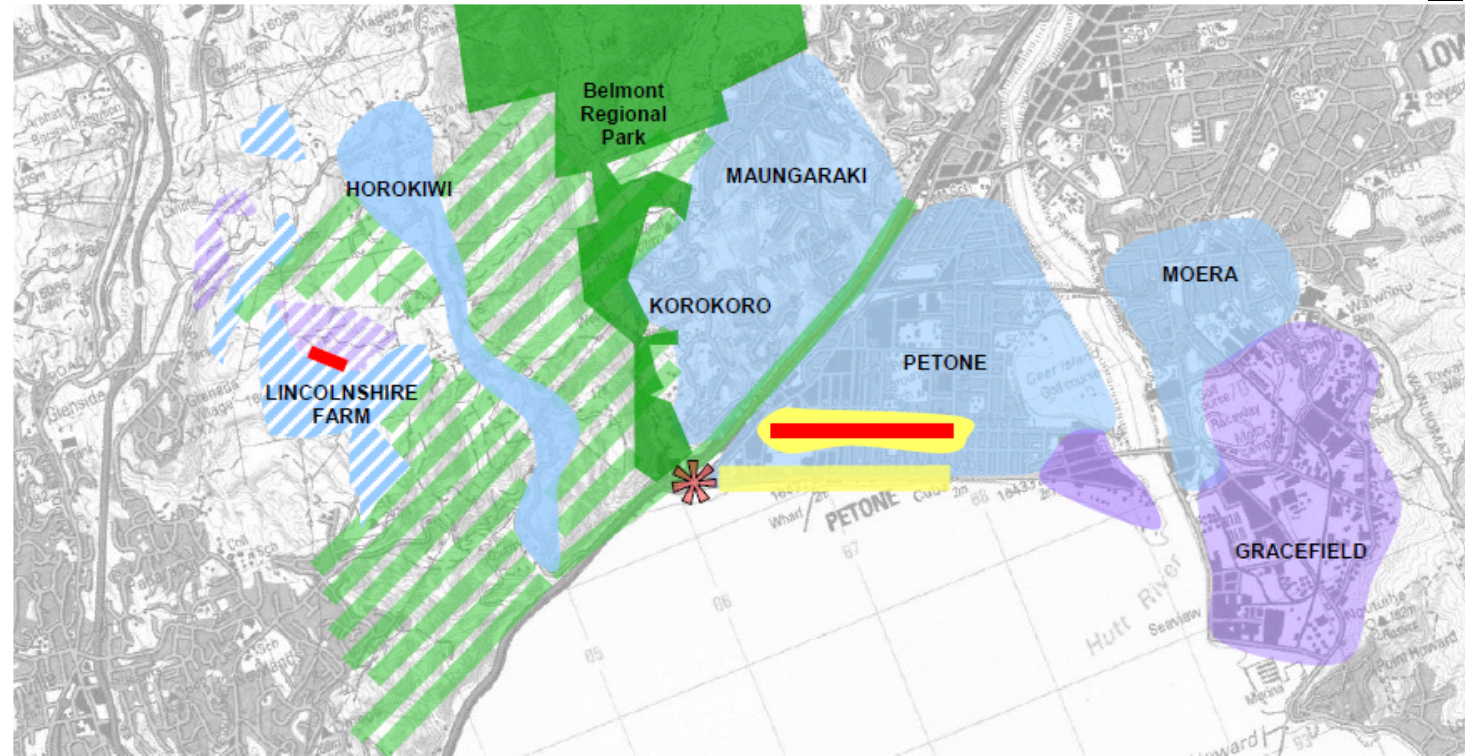
Reductions in traffic intensity from the Esplanade may present opportunities to plant street trees in the road reserve. Trees absorb CO2 released from vehicle emissions and on a city wide scale may be considered to contribute to a carbon sink.

3.2 Urban design assessment summary

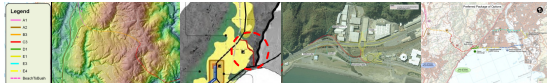
Overall Urbanismplus has provided urban design input into the Short List Options, Long List Options and completed an assessment of the potential routes under an urban design framework found within this report.

We find the potential Ngauranga Triangle route to adhere to best practice urban design, and overall is the most appropriate solution when looking at the full range of constraints and opportunities.

Key land use considerations for the potential Ngauranga Triangle route are summarised in Figure 3-2.

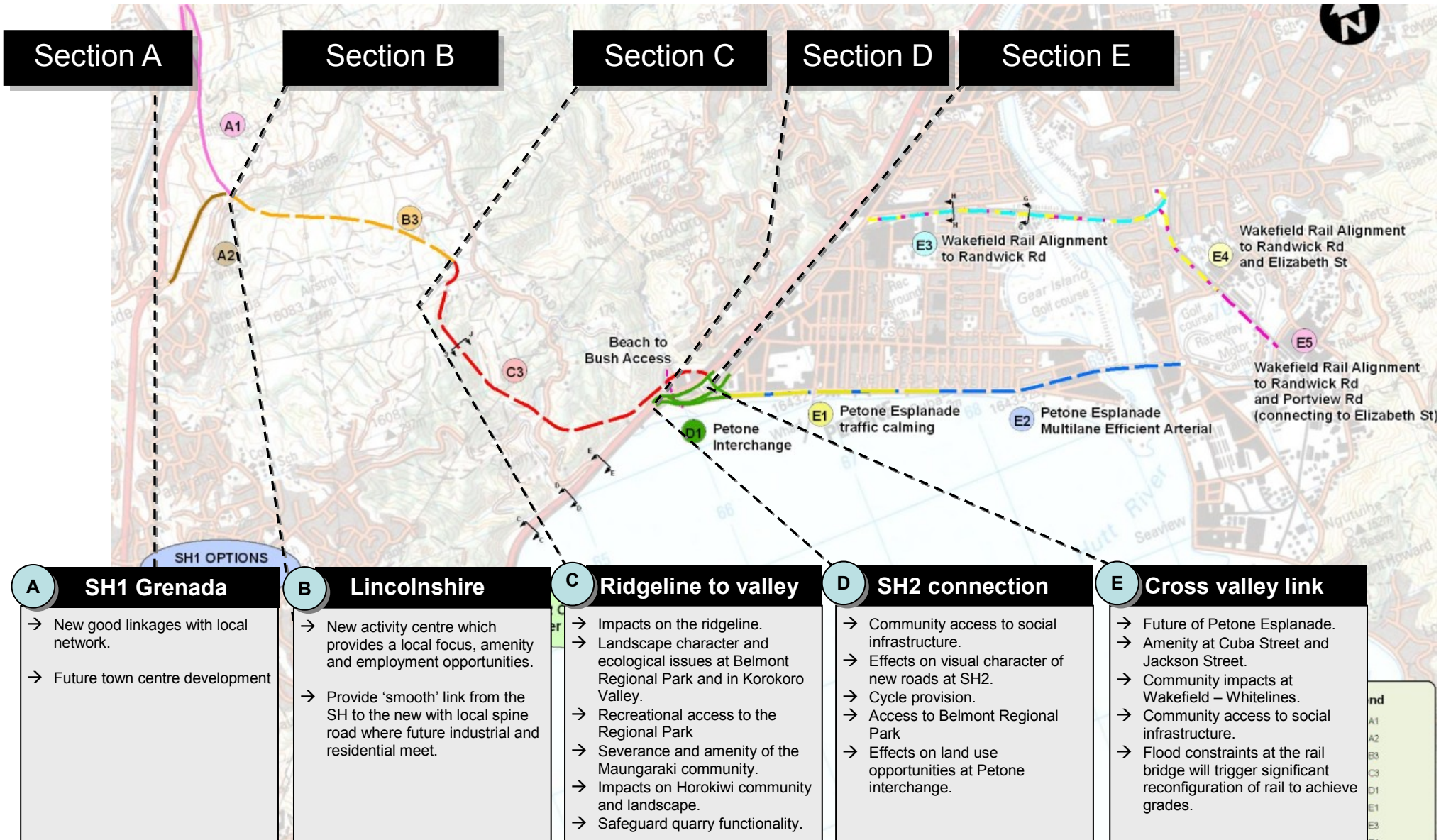


ABOVE: Figure 3-2: Summary of critical Ngauranga Triangle land use considerations.



APPENDIX

1. Urban design contextual analysis



2. Overlay of potential Petone interchange with the Gateway Concept scheme

