16 Urban form and function

Overview

This Chapter outlines the potential effects of the proposed Expressway on urban form and function within the Kāpiti Coast District and wider context. The effects assessment has been grouped under the headings of:

- Urban growth;
- Connectivity; and
- Amenity values.

A separate document Urban and Landscape Design Framework describes the Kāpiti urban environment in the project area in detail and sets out key design considerations for the proposed Expressway, the way in which the design has responded to those matters, and how the detailed design for the proposed Expressway needs to occur to secure an appropriate urban form and function outcome.

The process of assessing effects on urban form and function was carried out throughout the development of the Project and decisions on its design. The assessment was informed by the feedback from Kāpiti residents on urban planning and design issues during consultation. The residual potential adverse effects that were unable to be fully addressed during the design process and NZTA's proposed mitigation measures have been described.

16.1 Introduction

This Chapter summarises the findings of the assessment of the proposed Expressway on urban form and function, drawing on the assessment of Urban Planning and Design Effects (UPDE) in Technical Report 6, Volume 3.

The assessment of UPDE forms the basis of the analysis supporting the information in this Chapter. An Urban and Landscape Design Framework (ULDF) (Technical Report 5, Volume 5) has also been prepared for the Project; this sets out a framework for assessment of urban design matters and is a companion document to Technical Report 6. The ULDF is a technical document rather than an assessment of effects. The NZTA requires that urban and landscape design considerations for its projects are addressed within a project-specific ULDF.

This assessment does not specifically address noise & vibration, visual & landscape, transport, cultural, economic or social effects, all of which are addressed by other assessments. However, it does consider the collective influence of these effects on the urban form and function of the Kāpiti Coast, particularly on those areas immediately adjacent to the proposed Expressway. This assessment therefore draws on the findings of those assessments (noise and vibration – Technical Reports 15, 16, 17 & 18, Volume 3; landscape and visual – Technical Report 7, Volume 3; cultural – Technical Report 11 & 12, Volume 3;

economic – Part G, Chapter 29, Volume 2; and social – Technical Report 20, Volume 3). The Chapter on traffic and transport effects (Part G, Chapter 12, Volume 2) discusses the amenity generated by the proposed Expressway providing access to local centres and the provision of pedestrian and cycleway facilities.

16.2 Investigation and assessment methodology

The process of determining the urban planning and design effects followed several process steps:

1. A set of objectives was established at the outset of the Project (refer to ULDF); these objectives guided the assessment throughout the entire Project scoping and design process and are common to the other Wellington Corridor RoNs;

2. An investigation to establish the character of the existing environment of the proposed Expressway route was undertaken to establish an evidential base and the design options promulgated with the team were developed with reference to this environment;

3. Consultation was undertaken on options and feedback on urban planning and design issues identified to inform the assessment (further information on consultation methods is provided in Technical Report 5, Volume 5); and

4. An assessment of the potential effects of the preferred proposed Expressway design on the existing urban environment was undertaken with specific regard to the urban conditions that will result from its construction.

Those matters specifically addressed in the assessment of urban planning and design effects (Technical Report 6, Volume 3) relate to:

- Urban Form;
- Connectivity; and
- Amenity and Quality of the Environment.

The process of assessing the effects of the proposed Expressway did not wait until the final design was produced. The assessment was on-going throughout the design process to ensure that the Project incorporated urban planning and design considerations.

This process is significant as it has enabled many effects to be avoided or mitigated through the alignment and design of the Expressway as it is now proposed. It also allowed the identification of potential ways to mitigate effects if the design could not fully avoid those effects.

There have been different techniques employed to address urban effects in the design option decision-making process these include multi-criteria analysis, local area movement surveys, on site counters, school accessibility plans and pneumatic counters. A full description of these techniques is set out in sections 4.2 to 4.3 of Technical Report 6, Volume 3. A detailed assessment of amenity has also been undertaken as discussed in Chapter 17 Landscape and Visual and Effects of this AEE.

16.3 Existing environment – urban form and function patterns

A description of the existing urban environment has been developed as a point of reference for the assessment of effects in section 16.4 below. A full description of the existing environment is contained within Part C, Chapter 6 Description of the environment of this AEE; and in Technical Report 6 Urban Planning and Design Effects and within the Urban and Landscape Design Framework in Technical Report 5.

16.3.1 Land use and built environment

The area of the Kāpiti District through which the proposed Expressway passes has a range of land uses and lower densities of use typical of a New Zealand urban area. Building heights are typically low (no more than two storeys, including in the town centres) with a few exceptions such as at Paraparaumu Beach.

The Kāpiti area consists of a series of beach communities. Lateral east-west connections from the existing SH1 leading to the beach are now an important part of the movement network and have provided a street structure on which urban development has been based. The number of north-south arterial and connector roads is limited, reducing the amount of connectivity in that direction. During the 1950s, the Kāpiti Coast grew rapidly and developed a more suburban character. The original designation for the Sandhills Motorway (along which the proposed Expressway broadly follows) occurred at this time, resulting in urban development growing up to the edge of this proposed roading corridor.

Consequentially, much of the former dune landscape has been subsumed by development. Typically, the more recent development has filled in between the beach settlements and spread back to and out from the main centres at Waikanae and Paraparaumu, and up into the hills. The area between Paraparaumu and the Waikanae River has remained as open space which is now generally occupied by rural-residential land uses. The Waikanae River itself and its corridor have served to maintain this open space gap, and the retention of the river corridor as open space is an objective of KCDC's Development Management Strategy.

The identity and naming conventions of the District's urban areas continue to follow the pattern established historically - a string of 'beach' communities (Raumati Beach, Paraparaumu Beach, Waikanae Beach, and Peka Peka Beach), and the associated inland communities (Raumati, Paraparaumu, and Waikanae). Most of these communities have some local amenities in the form of shops and schools. The two colleges are located at Paraparaumu.

Notable in the District is the relatively large amount of senior living residential land use. There are many 'retirement villages', as well as people of an older age living independently in the District. The same lifestyle has attracted people of working age.

The town centres at Waikanae and Paraparaumu are less than 40 years old. Paraparaumu is the largest and functions as the District centre, based around Coastlands shopping mall with adjacent civic facilities including the Council buildings and library. Plans for a town centre with a higher level of public amenity have been in train for some time.

KCDC has also investigated with the community options for improvements at the Waikanae town centre in recent times.

16.4 Assessment of effects on urban form and function patterns

The following assessment addresses potential adverse effects that the proposed Expressway may have on the urban environment, and how the proposed Expressway design and proposed mitigation measures intend to avoid or mitigate these adverse effects.

The assessment of effects on urban form and function has been divided into three subheadings:

- **Urban form and land use** – how the proposed Expressway may affect the existing and future urban form of the Kāpiti Coast, including town centres, residential communities, the Kāpiti Coast airport, and Waikanae North future urban growth area;
- **Connectivity** – how the proposed Expressway may affect local road connections and other forms of connectivity, and how such effects will be avoided or mitigated; and
- **Amenity and Quality of Environment** – how the proposed Expressway may affect the amenity values in those areas where people will experience the proposed Expressway, including people's direct experience with under-bridges, abutment forms, and bridges, as well as the degree of safety and perception of recreational amenity. The assessment considers how the Project design aims to maintain the amenity and quality of environment.

16.4.1 Urban form and function

16.4.1.1 Kāpiti Coast Airport

The Kāpiti Coast Airport ('the Airport') is a key transport node within the Kāpiti District. The Airport was recently rezoned to allow for a large area of commercial development whilst maintaining its function as a regional airport. The growth of the Airport has a number of implications for the proposed Expressway, for two key reasons:

- the Airport development includes a new east/west link road to be constructed, known as the Ihakara Street extension. The connection would reduce traffic volumes on Kāpiti Road and the need for its upgrade to address current and likely future capacity problems; and
- the proposed Expressway design includes an interchange on Kāpiti Road to provide ready access to the Airport (and town centre) by proposed Expressway users, including trucks.

The proposed interchange on Kāpiti Road will complement the existing operation of the Kāpiti Coast Airport and will provide greater efficiencies in access. The planned form and function of the Airport will be maintained and any effects resulting from the proposed Expressway and Kāpiti Road interchange are considered to be positive.

Although not part of the Project, the future extension of Ihakara Street will also provide greater connectivity for local traffic accessing the airport in an east-west direction.

16.4.1.2 Paraparaumu town centre

The town centre in Paraparaumu is the main service centre on the Kāpiti Coast. The most recent urban planning for the town centre includes:

- a town centre zoning since 1999 and more recently the introduction of a residential development overlay to provide for mixed use development ;
- a concept plan formulated in 2004 (see Figure 16.1), which assumed a WLR on about the same alignment as the proposed Expressway but smaller in scale; and
- a District Plan change to give effect to part of this concept plan which was promulgated but has been delayed in implementation due to disputes over KCDC's ownership of a large area of the subject land and appeals.

An interchange on Kāpiti Road will feed traffic on and off the proposed Expressway from the west side of the town centre via Kāpiti Road and/or a new local road network in the town centre zone (the area which is currently vacant land). The Kāpiti interchange structure will be large and could potentially adversely affect the future urban amenity of the Paraparaumu Town Centre. The aesthetic appearance of the interchange has therefore been designed with respect to its relationship with the town centre.

The Expressway proposal is not considered to be inconsistent with the Council's latest Concept plan. There is sufficient space within the concept plan land area to enable the mitigation of effects of the Project on the visual amenity of the Town Centre.

Detailed design will address the visual integration of the Kāpiti Interchange into its context, including shaping and planting of the landforms associated with the Kāpiti Road interchange and it's on and off ramps. A significant element to be worked through includes the detail of the interchange as it meets Kāpiti Road to ensure walking and cycling connectivity on the local road. Provision in the design has already been made for traffic signals and on and off ramp configurations that will assist this connectivity. The proposed Expressway and Kāpiti Road interchange will provide new opportunities for the development of the Paraparaumu Town Centre without the constraints of the existing SH1 to the east (discussed below). The overall effects on urban form and function will be positive with the appropriate level of attention to detailed design.

16.4.1.3 Waikanae town centre

The proposed Expressway will substantially reduce traffic volume on existing SH1 and provide greater scope for development of the future urban form and function of the Waikanae Town Centre. KCDC has conducted design studies to examine how the town centre layout can better provide for local needs. This work can progress with more certainty with a decision on the proposed Expressway location. The design studies on the future urban form of the Waikanae Town Centre provide an opportunity to enhance the amenity and character of the area.

The Te Moana Road interchange will be the main connection from the proposed Expressway to/from the Waikanae town centre (3km to the west of the Waikanae town centre). The distance of the interchange from the town centre could potentially affect the potential for commercial and retail growth in this town centre. Some of the existing shops rely on passing motorists for trade, with the most affected activities

likely to be the two motel complexes, a supermarket (with fuel retail), a fast food outlet, two service stations and 11 restaurants, cafes and takeaway outlets, (although, the assessment is that not all of their trade is reliant on passing motorists). Counter to this potential adverse effect is that the removal of traffic from the current State highway route will allow a higher level of amenity within the town centre and this can enable new improvements in public space and connectivity to public transport and eastern areas of the town centre - that will generate new commercial opportunities.

Planned growth areas in Waikanae are located close to the Te Moana interchange (especially the proposed multiple neighbourhood residential development at Ngarara). Future increases in traffic volume from these growth areas will be able to conveniently access the proposed Expressway via a connection near the Te Moana interchange avoiding the need to travel along Te Moana Road up to the existing SH1. This planned growth area will utilise the Waikanae town centre as a main service centre. Local movements are also provided for with the Smithfield Road proposed Expressway overbridge. In addition to giving access to existing properties and other users (such as horse riders), this bridge will allow movements from any future development at Ngarara to move east and west across the proposed Expressway. An extension of this bridge connection is a planned link road through the Waikanae North area to north of the Waikanae town centre. The timing of construction of this link road will be dependent on the Ngarara development and progress of the nearby Waikanae North development.

In terms of effects on Te Moana Road, the proposed Expressway is expected to alter the preferred access of heavier service and delivery vehicles such as trucks servicing the Waikanae town centre. These trucks are expected to access the Waikanae town centre from either the north or the south along the existing SH1, or from the proposed Expressway depending on whether the trips are linked with other local movements. If the Waikanae bound town centre trucks also service Paraparaumu they will likely use the existing SH1. Similarly it can be expected that trucks bound for Waikanae town centre coming from the areas to the north will turn off the proposed Expressway at the Peka Peka connection. However, if only servicing Waikanae and coming from areas south they may be more likely to arrive via Te Moana Road. The number and frequency of truck movements arriving via Te Moana Road is likely to be relatively low compared to the other scenarios. Overall, most trucks passing through the District and not servicing Waikanae or Paraparaumu are likely to use the proposed Expressway (rather than existing SH1) with a significant decrease in heavy vehicle movements through Waikanae town centre.

In summary, the Waikanae Town Centre will experience a general reduction in traffic volume once the proposed Expressway is operational. This reduction in volume will allow greater scope to plan the future urban form of the Waikanae Town Centre. There is potential to lower the traffic speed on existing SH1 and reconfigure the layout of the town centre which would enhance existing amenity values in the town centre to provide for planned development areas. However, it is acknowledged that the reduction in traffic volume will adversely affect existing retailers who rely on through traffic for trade. It is expected that these retailers may relocate and that over time there will likely be a redistribution of business within the town centre. The overall effects on urban form are considered to be positive.

16.4.1.4 Relationship of existing SH1 with Paraparaumu and Waikanae town centres

There will be a number of positive effects on the town centres that will result from reductions in traffic on and the removal of through traffic from the existing SH1.

These positive effects include potential for:

- a lower traffic speed environment that will enable:
  - opportunities for new uses with a relationship to the road frontage;
  - a safe environment for pedestrians and cyclists at grade; and
  - improved pedestrian links between the town centre and rail station at Paraparaumu;
  - reduced width of traffic lanes providing space for planting and visual amenity improvements, as well as a better layout and function of the bus interchanges; and
- a reduction in the number of heavy vehicles through the town centres.

The potential for such measures to be introduced once the proposed Expressway becomes operational is likely to feed into future town development studies for Paraparaumu and Waikanane.

16.4.1.5 Waikanae north growth area

The Waikanae North Area is the descriptor for the planned urban growth in the area north of Waikanae. This comprises two large areas – Ngarara Zone (see Figure 16.1) and Waikanae North Development Zone, as well as other smaller areas such as Ferndale.

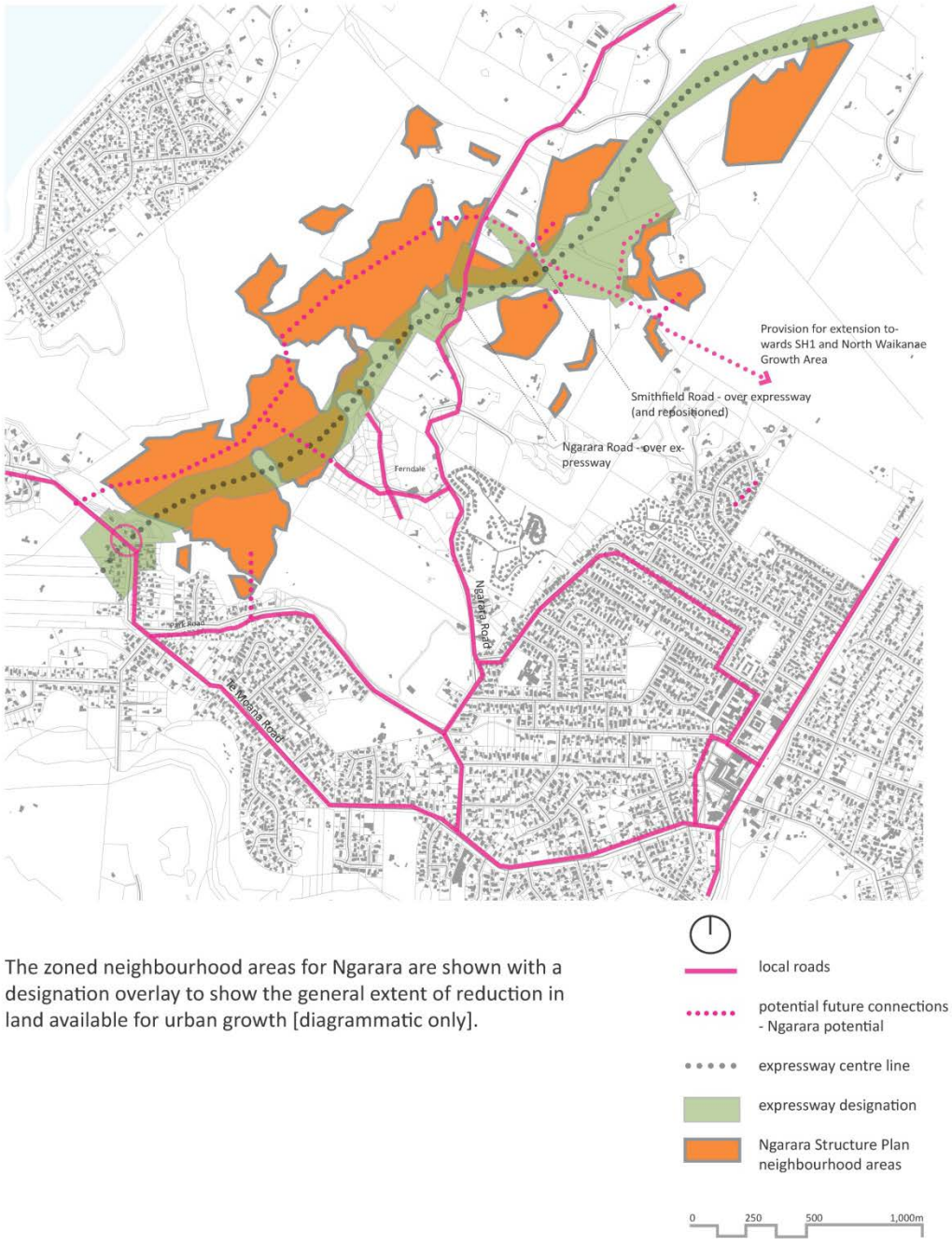

Figure 16.1: Ngarara Development Zone

The urban planning policies that define the form, quality and character of the future urban environment sought from the development of the Waikanae North area were promulgated following an extensive process. The subject area has a designation for a road (the existing WLR designation) within it. The proposed Expressway largely follows this alignment, although it would avoid the significant wetlands within Ngarara that are currently crossed by the existing WLR designation.

The effects of the proposed Expressway on the development of the Waikanae North area of most significance are those created by the reduced areas available for development, particularly in the Ngarara Zone. The construction footprint of the designation for the proposed Expressway reduces the total neighbourhood areas of approximately 128 hectares by approximately 23 hectares (a reduction of approximately 17%).

Accordingly, there would be a reduction in the capacity of this area to provide for the District's urban growth. The structure plan for this area would need to change to reflect the proposed Expressway and some increased densities could also be considered to compensate for lost potential. It is reasonable to expect that, during the proposed Expressway construction (2013-2017), development uptake for residential activities may be slower to progress given the construction effects.

The proposed Expressway will result in a number of potential adverse effects on the Ngarara development area, in terms of visual and noise effects. There is some ability to reconfigure future residential neighbourhoods to utilise the natural land forms that may assist to provide acoustic and visual barriers to the proposed Expressway.

The alignment of the proposed Expressway has been chosen to avoid the wetlands within Ngarara. The wetland areas offer opportunities to provide open spaces within a future urban spatial structure in this area.

In terms of future connections, there would be several opportunities to provide for new road connections into Ngarara from Te Moana Road. In addition, Ngarara Road itself would cross over the proposed Expressway, providing an immediate connection between the eastern part of Waikanae and the Ngarara development to the west. It is also planned to provide a new bridge link over the proposed Expressway to replace the Smithfield Road connection currently to Ngarara Road. This will also be positioned to allow a link back into the Waikanae North Development Area, providing a continuous Waikanae east-west link from Ngarara to the existing SH1.

In summary, the principal effect on the Ngarara Zone of the proposed Expressway would be a reduction of the area's development potential. The actual extent of this loss cannot be understood without re-planning the area, but it could be in the order of 20% of the development previously planned. There are also opportunities to consider areas currently adjacent to existing SH1 for future residential growth, which may offset this lost development potential.

The development of North Waikanae Development Zone on the east side would be unfettered by the proposed Expressway, and the ability to link this development with Ngarara would be maintained via the proposed Smithfield Road Expressway overbridge.

16.4.1.6 Managing unplanned development pressure

The design of the proposed Expressway has taken into account the potential for pressure for urban development that is not consistent with the District's urban growth strategy by excluding or limiting direct connectivity in those areas where urban growth is not proposed. Otherwise, it is anticipated that the Kāpiti Coast District Plan will continue to be the principal method for managing unplanned development pressures.

a. Kāpiti Road Interchange

Land fronting Kāpiti Road in the vicinity of the proposed interchange would likely come under further pressure for commercial development as a result of the Project. Most of this land is currently zoned for commercial use, and thus this is not considered to be a significant issue or to be in conflict with the Council's urban planning policies. Residentially zoned land to the southeast of the proposed interchange that is currently a mix of residential and services (medical practitioners) is likely to come under pressure for commercial uses as a result of the Project. It is considered that the District Plan will sufficiently address any development not in accordance with the zone provisions.

b. Te Moana Road Interchange

The Waikanae interchange on Te Moana Road is within a relatively wide area of open land and may be more at risk of land uses (such as service stations) wanting to locate adjacent to the proposed Expressway. It is noted that much of the flat land around the interchange at Te Moana Road is within an overland flow path from the Waikanae River towards the Waimeha Stream. The Crown will retain ownership of large areas of this land in order to allow for this over land flow path to operate in extreme flood events. Other land in this vicinity will be managed under the provisions of the Kāpiti Coast District Plan. Overall, it is considered that potential adverse effects of unplanned land use around the Te Moana interchange are able to be suitably avoided.

c. Poplar Avenue partial interchange

The area around the proposed Poplar Avenue interchange is zoned rural and residential, and accordingly there is currently limited scope for commercial development to occur under the provisions of the District Plan. The existence of Queen Elizabeth Park and the close proximity of the railway line and the existing SH1 to the proposed Expressway overbridge would limit opportunities for unplanned land development. Therefore, the potential for unmanaged development around the Poplar Avenue interchange is considered to be limited, and any significant changes in land use would be managed under the policies and rules of the District Plan.

d. Peka Peka Road partial interchange

The area around the proposed Peka Peka partial interchange is relatively open rural land, with some rural lifestyle blocks. The current nursery and associated café are well used, and although the proposed Expressway will change access arrangements to Peka Peka, it will still be connected to the current SH1 and local people are expected to continue to frequent it. However, it is reasonable to expect that general sales for these retailers will be lower with the partial interchange as opposed to a full interchange. The risk of new commercial type development at this intersection is likely to be limited by the inability to get off the proposed Expressway for travellers heading north or for people coming off local roads to travel south on the proposed Expressway. There is also a relatively small local area catchment to support any substantial commercial development seeking to take advantage of traffic turning off at Peka Peka Road from the proposed Expressway. Overall, it is considered that the potential for adverse effects on urban form at Peka Peka will be avoided.

16.4.2 Connectivity

For the purposes of this assessment, "connectivity" is defined as *"the functionality and quality of the physical connections between the multiple places people need to access for their use and enjoyment of the area"*. Connectivity is a key component which dictates urban form and function. The connectivity of the proposed Expressway with local roads crossing the alignment in an east-west direction has been an important objective of design development, as were a number of other connectivity opportunities. In this respect, the proposed Expressway will bring about a number of positive effects resulting from improvements in connectivity.

16.4.2.1 North- south connections

The principal enhancement in connection that the proposed Expressway would provide is between Paraparaumu and Waikanae. The main constraint currently restricting vehicle connectivity between these communities is the single bridge over the Waikanae River. The additional bridge over the Waikanae River provided by the proposed Expressway, with full interchanges on both sides of the River, will significantly enhance connectivity between these two communities.

Once the proposed Expressway is operational, the existing SH1 will have a much lower traffic volume (with traffic passing through the District generally using the proposed Expressway). This will provide a new slower traffic environment option for those in the community that may prefer these conditions.

16.4.2.2 East- west connections

Provision for maintaining east-west connections have been one of the Guiding Objectives of the Project. With this in mind, all east-west local road connections have been maintained. Two additional pedestrian bridges are also proposed. In the block between Kāpiti Road and Mazengarb Road the bridge will provide cycle and pedestrian connectivity in an area where there is a strong existing pattern of cross-corridor walking and cycling movement in the absence of a local road. The other bridge is proposed at the Leinster Avenue end of the route where the current connection of the end of Leinster Avenue to the existing SH1 will be severed. The Leinster Avenue connection to Poplar Avenue would be retained, but for those people wanting to move from the north-east area of Leinster Avenue towards Paraparaumu town centre along the existing highway this movement would become more circuitous. The proposed bridge would enable walking and cycling movements and would also provide connectivity for any future urban development of the area.

16.4.2.3 Walkway & cycleway connections

Cycling and walking connectivity is being significantly enhanced through the provision of a shared path the length of the proposed Expressway from Paekākāriki in the south to Peka Peka in the north. The shared path will connect to local roads along its route and to the two well used paths at Wharemauku Stream and Waikanae River as well as the bridges described above.

Connections to other walking networks are also being provided, and the grades on embankments will be designed to enable the best practicable slopes for walking and cycling. At the Waikanae River crossing, provision for horse traffic to share the walking/cycle bridge will be made. The catchments for the local

primary schools have been assessed and the cycle and walking path is expected to add to the options for people moving to and from these schools.

16.4.2.4 Connectivity across Kāpiti Road at the interchange

There are challenges at the two interchanges for local area movements and connectivity across the local roads. At Kāpiti Road, which will be a busy interchange, traffic light signals will enable clear periods for crossing by pedestrians and cyclists and other active modes. The design has eliminated free turns onto and off the proposed Expressway, making the crossing of the on- and off-ramps controlled by the traffic lights and therefore more predictable. This arrangement significantly improves the safety and quality of the crossings for pedestrians and cyclists.

16.4.2.5 Connectivity across Te Moana Road at the interchange

At the Te Moana Road interchange, it is currently proposed to use roundabouts to manage traffic flows to and from the proposed Expressway to the local road. These will be difficult crossings to make for pedestrians and cyclists and will inhibit the connectivity along and across Te Moana Road. Te Moana Road is an important east-west road link as it is the only direct link between the Waikanae Beach area and the main body of Waikanae. It is well used by school children as there is no school at Waikanae Beach. It is also used by recreational and other users moving between the beach and lower river area and Waikanae township including horse riders. It has been agreed with KCDC to review this arrangement to determine whether traffic lights should be used, which would improve the ease of walking and cycling movements and so connectivity in this area.

16.4.2.6 Urban growth areas

In addition to existing east-west links, the potential of the proposed Expressway to affect future additional connections across the proposed Expressway has been assessed, particularly in relation to the future potential urban growth in the Waikanae North area. It is considered that with the proposed Ngarara Road and Smithfield Road bridges that provides east-west connections are sufficient.

16.4.3 Amenity values

Amenity values are defined in the RMA as *"Those natural and physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes"*.

In regard to amenity values, the urban planning and design assessment (Technical Report 6) focused on the following:

- The appreciation of pleasantness in regard to local road and other east-west links (like
- Waikanae River and Wharemauku Stream) which the proposed Expressway would cross, as well as
- at town centres where people come together for social and cultural reasons, for the various services offered from there;

- The aesthetic coherence of all proposed Expressway structures and the way in which these are
- designed in relation to the landscape, recognising that the landscape design itself is
- addressed by the Assessment of Landscape and Visual Effects in Technical Report 7, Volume 3;
- The recreational attributes in regard to horse riding, cycling and walking and how provision can be made for these activities; and
- The proposed Expressway user experience in terms of its appreciation of its pleasantness, aesthetic coherence and cultural and recreational attributes.

In addition, the effects of the Project on the amenity values of those parts of the District within the immediate vicinity of the proposed Expressway are considered in respect of the combined effect of the noise and vibration, natural and artificial light, appearance and change in character that the proposed Expressway will have on the natural and physical qualities and characteristics of these areas. This assessment draws on the findings of the relevant technical assessments in Volume 3, including light (Technical Report 8), noise and vibration (Technical Reports 15, 16, 17 & 18), landscape and visual (Technical Report 7), and terrestrial ecology (Technical Report 27).

16.4.3.1 Local road crossings

The primary point at which local people will have a direct experience of the proposed Expressway is at those points where the proposed Expressway crosses over a local road or other path: typically, these are east-west roads and paths. There is a lesser level of immediate interaction for the two locations where the local roads will go over the proposed Expressway.

There are eight connections across the proposed Expressway via underbridges (not including Ngarara and Smithfield Roads which go over the proposed Expressway and the two pedestrian bridges):

- Poplar Avenue;
- Raumati Road;
- Ihakara Extension/Wharemauku Stream;
- Kāpiti Road;
- Mazengarb Road;
- Otaihanga Road;
- Waikanae River; and
- Te Moana Road.

Furthermore, while local road users will primarily be people in vehicles, the most important consideration in urban planning terms is for people walking, cycling or otherwise moving east/west under the proposed Expressway.

Poor quality underbridges may encourage people not to walk or cycle, or may direct them to use less direct alternative routes. In many instances people may choose to use a car instead or if without access to a car (like children, older people or those on low incomes) not make the trip with consequent loss of

benefit. As part of the proposed Expressway Project, it is proposed to provide two pedestrian overbridges. Apart from these there are no alternatives to moving under the proposed Expressway in the more urban areas. This reinforces the importance of the design of these underbridge spaces for users.

16.4.3.2 Local roads at grade

Experience with underbridge locations is that these can be uncomfortable places that people will avoid if poorly designed.

One of the premises of the design process was a preference to have local road crossings that cross the proposed Expressway at the existing level of the local road, as on balance this was a better option than using bridges over the proposed Expressway. The slopes of any bridges would discourage walkers and cyclists, inhibit mobility impaired people and people of an older age. Bridges over the proposed Expressway would also obstruct a number of property accesses fronting the local road in the vicinity of the ramps leading to the bridges; the longer the bridge ramps (to lower the gradient for vehicles and people to climb), the more properties that are affected by bridge ramps.

16.4.3.3 Light

Where people walk and cycle on local road crossings in large numbers, the north and south bound lanes of the proposed Expressway will cross over on separate bridges. This is to allow natural light beneath the bridge to provide a lighter experience enhancing the amenity of this underbridge space.

The proposed Expressway design also includes lighting for the walkway/cycleway along the most populated path lengths. Under the current design, the illuminated walkway/cycle way section starts from Raumati Road, carries on across Kāpiti Road and through to Mazengarb Road. Urban design workshops identified that there would be benefits from lighting on walkway/cycleway routes, particularly where there is potential for early evening use in the darker winter months by school children and commuters. A potential adverse effect from lighting however, is that this would attract people to the route at night which if there is limited use may make it unsafe given the lack of mutual surveillance.

The other effect may be light spill to adjacent properties. These lighting effects are addressed in Technical Report 8, Volume 3 and in Chapter 18 of the AEE.

16.4.3.4 Abutment forms

Abutment forms will generally be angled back on the underside of bridges over local roads and paths frequented by people. Vertical walls on the underside of bridges, combined with the normal width of footpath (1.5m), can create an over-bearing scale that is uncomfortable for pedestrians. The proposed angling back of bridge abutments (termed spill-through abutments) seeks to achieve a more light and open space. The abutment surfaces will have texture, colour and utilize local materials to provide visual relief and interest to pedestrians, which will be important given the scale of the proposed Expressway structures. The abutments forms and the architecture of the bridges are consistent and have been designed in a coordinated process. The aim is to ensure that the lead in to the underbridges on either side encourages pedestrian and cycle movement under. There will be consistency within the ‘family’ of bridges given their number and frequency.

16.4.3.5 Bridge forms

The design process considered a number of options for bridge forms, with the preferred design being one that seeks to integrate the main bridge components (barrier, deck, cross heads, piers) so that they visually 'read' as one shape and thus provide more fluid and sculptural forms that are aesthetically pleasing.

There is provision also to uplight these forms to highlight their sculptural shapes and to similarly add to the experience for people moving under the bridges after dark. A consideration of bridge forms in context with the surrounding landscape is considered in the visual and landscape assessment in Chapter 17 of the AEE.

16.4.3.6 Safety

The safety of the spaces beneath bridges has been carefully considered. A safe environment will be created by:

- providing clear lines of sight for people walking or cycling beneath;
- having sufficient path space that cyclists and walkers are not pushed close to moving vehicles and so at risk from being hit;
- providing good light levels to provide clear visibility;
- ensuring there are no spaces where people can conceal themselves and confront or attack unsuspecting users;
- maintaining direct visual contact between vehicles passing and walkers or cyclists (passive surveillance); and
- encouraging by the quality of the space, high levels of use by walkers, cyclists.

16.4.3.7 Other structures

The other key structures that have been carefully considered in urban design terms are the proposed noise barriers. It is noted that, where practicable, noise 'bunds' (shaped raised ground) will be used as physical barriers between the proposed Expressway and the noise receiving environment.

16.4.3.8 Expressway user experience

The primary focus of the urban design assessment has been from the point of view of the local area and residents. However, the amenity values that users of the proposed Expressway will experience also need to be considered: such users will be local residents, visitors to the District and people passing through the District.

People's experience and perceptions of the proposed Expressway and its aesthetic coherence will relate to the sections of the highway network that extend beyond the project area. To this end, coordination has occurred between the designers of the other RoNS projects.

In particular, it has been determined that the sections of the network from north of Transmission Gully will all have a similar context (a coastal plain) and that there is some logic to coordinating the designs of these three sections. This includes:

- highway furniture used (lights, barriers, signs etc);
- median width which will range between 4 and 6 metres and shoulder widths of 2.5 metre;
- design speeds (generally 110kmh) and geometry; and
- landscape treatment.

In addition, consideration has also been given to consistency of bridge design. The proposed Expressway will generally pass over local roads until the north end where the land uses are more rural and the arrangement reverses so local roads bridge over the proposed Expressway.

16.4.3.9 Rural & open space area amenity values

The proposed Expressway passes through areas that are zoned rural and open space in the District Plan as well as urban areas. These rural and open space areas are generally quiet, characterised by low density (or no) housing and local roads with relatively low traffic volumes. Agricultural uses include pastoral grazing.

The maintenance of amenity in rural and open space areas primarily relies on the avoidance and mitigation of adverse visual and noise effects.

One of the guiding principles for the Project team was to design the proposed Expressway so that it sits as low into the landscape as practicable. In areas of duneland, the existing topography assists in achieving this outcome. However, the need for bridging will result in the proposed Expressway being visible in many places. In addition, some sections of the alignment, such as the northern-most end, have few natural landforms that will assist in screening the road.

The proposed Expressway design includes substantial earthworks. Consideration has been given to how the edges of the proposed Expressway can be contoured to provide some visual screening where practicable. Noise walls/fences and retention of existing vegetation will also be utilised with the aim of so far as practicable having the proposed Expressway blend into the rural and open space environments. For further detail on mitigation measures, refer to the full assessment of effects on visual amenity included in Chapter 17 Landscape and Visual of this AEE and in the ULDF (Technical Report 5, Volume 5)

Notwithstanding the proposed mitigation, the proposed Expressway will alter the amenity values of the rural and open space, although this effect will be reduced by distance from the proposed Expressway. In some locations, particularly in locations that currently have little current traffic and are close proximity to the proposed Expressway, the effect on existing amenity values will be significant; in other areas, the presence of existing natural landforms and vegetation will assist in mitigating such effects. To a degree, such a change is an anticipated outcome of realigning the State highway, and it would be unreasonable and impracticable to seek to fully avoid or mitigate all potential effects on amenity values, particularly in a rural environment in which a State highway is not out of context or inappropriate.

The low density of housing in the rural sections of the proposed designation, and the selection of the proposed Expressway alignment, has resulted in few houses being within close proximity to the proposed Expressway. Along most of the rural sections of the route, the width of the proposed Expressway designation provides a sufficient corridor in which an appropriate level of mitigation can be provided in regard to visual and acoustic attenuation. However, the visual and noise environment will undergo a significant change, albeit that it can be mitigated to some extent as to its severity.

16.4.3.10 Urban amenity values

The proposed Expressway will pass through a number of urban environments (Raumati, Waikanae and Paraparaumu) that are characterised by relatively moderate to low ambient noise levels (depending on local traffic characteristics), low to medium density residential use, and well-established vegetation. The long history of roading designations has prevented development within the designation corridor, which is approximately 100m wide, along most of the proposed designation. Where the proposed Expressway deviates from previous designations, the wide corridor is proposed to be continued, partly to provide a buffer distance, and also to allow for appropriate mitigation to be provided.

In the development of the proposed Expressway, a key component of the decision-making process on its alignment and design was to ensure the best practicable level of amenity value within urban areas. A focus was also made on the needs of the most vulnerable and those people most affected by adjacency such as at schools. To achieve the best practicable amenity visual and acoustic effects were considered in an integrated design process. The main decisions made were to:

- align the proposed Expressway to maximise the separation distance from neighbouring residential areas where practicable;
- set the proposed Expressway as low as practicable into the landscape, making use of natural landforms where practicable;
- using earth bunds integrated within the natural landforms (as a first preference to a noise wall) that have the dual purpose of noise attenuation and visual screening; and
- using landscape treatment and planting to provide visual screening to the proposed Expressway as well as for noise wall structures.

Based on the proposed alignment and design of the proposed Expressway, including the extent and form of noise and visual mitigation, it is considered that a reasonable standard of amenity will be achieved (the assessment of visual and noise effects are outlined in Chapters 17 Landscape and Visual Effects and Chapter 19 Noise and Vibration of this AEE). There is no doubt that the appearance of the area will change (as it would have with other roads or urban developments such as at Ngarara), but the available corridor width (generally 100m) and the attention to the design of the landscape and architecture of structures that occurs within it is aimed at making the change as attractive as practicable.

In regard to the proposed Expressway structures, a principle of the ULDF was to recognise the importance of interchange and bridge structures in terms of creating a quality environment at local roads and adjacent communities. The Kāpiti Interchange will become a key link to the Paraparaumu town centre and is surrounded by a mixture of relatively low visual amenity commercial, industrial, health-

care and residential uses. There are long term plans for the general town centre area to be significantly redeveloped. Given this context, the design, bulk and scale of the interchange (including the proposed landscape treatment) will not detract from the existing visual amenity and can be integrated with the redevelopment of the town centre area over time.

At the proposed Te Moana interchange, which is flat and more open, the proposed Expressway is elevated and so the effects on visual amenity from private properties and Te Moana Road will be high. The effects on landscape character of the quiet suburban/ rural area as a result of the landform modification, interchange structures and the activity on the proposed Expressway will also be very high.

Consultation has identified that some local residents have concerns that the Te Moana interchange will increase traffic flows along Te Moana Road to the existing SH1. However, traffic modelling shows that there will be a reduction of traffic volume on Te Moana Road once the proposed Expressway is operational. This is because those vehicles travelling from Waikanae Beach and the western areas of Waikanae intending to go south (towards Paraparaumu) will be likely to use the Te Moana interchange. These vehicles will thus no longer need to travel all the way up Te Moana Road to the current highway. This reduction in traffic volumes will result in an improvement in amenity values for residents between the interchange and existing SH1 (especially walkers and cyclists, including children commuting to school).

The proposed partial interchanges at Poplar Avenue and Peka Peka are located in areas where they would be visible to a limited number of residences, and the proposed landscape treatment would assist in attenuating the visual impact on the amenity values of these vicinities.

The design and positioning of the other bridge structures have been fully addressed in the development of the proposed Expressway design to reduce their visual presence: for example, the lowering of a section of Mazengarb Road to reduce the elevation of the proposed Expressway as it crosses this road.

The potential shading effects of the proposed Expressway structures and associated embankments were considered during the design development process, including the shading effects of noise attenuation structures. The potential for shading effects to occur is limited to several areas of housing in relatively close proximity to the proposed Expressway, where early morning or late afternoon shading may occur at times of the year. However, any such shading that may occur would be consistent with District Plan requirements.

For a number of residential properties, the presence of open space within the existing designation makes a significant contribution to their amenity values. This undeveloped space has enhanced amenity values by creating higher levels of privacy, lower levels of noise and a sense of openness. As much as practicable, the alignment and design of the proposed Expressway, including the proposed use of earth bunds and planting, seeks to mitigate the effects of the Project on these values to an acceptable level, notwithstanding the corridor has long been identified for major roading purposes.

An assessment of air quality effects from traffic was undertaken (Chapter 20 Air Quality of the AEE), which found that people living within 200 metres of the proposed Expressway will have a slightly increased exposure to vehicle related contaminants as a result of the Project, compared to existing ambient levels. However, this increase would have a low level of effects and would meet accepted air quality standards. In addition, the maximum ground level concentrations of all vehicle-related

pollutants are predicted to decrease between 2016 and 2026, largely as a consequence of predicted improvements in the vehicle fleet. Accordingly, it is considered that any effects on amenity values from changes in air quality would be minor.

In summary, the proposed Expressway will introduce a large piece of infrastructure into a currently vacant corridor, which has been set aside for the past 50 years to construct a major road. There will inevitably be adverse effects on existing amenity values of residents adjoining the proposed Expressway, due to the existing quiet and open environment. The Project intends to mitigate these adverse effects on amenity values to a level suitable for adjoining urban land uses: the types of mitigation are described below in section 16.5.

16.4.3.11 Recreational amenity values

It is considered that there will be, in overall terms, positive effects for walking, cycling and horse riding recreational users from the construction of the proposed Expressway given that current formal networks are not only being retained but also significantly added to and connected by the development of the proposed shared walking and cycle path along the proposed Expressway route, parts of which can also accommodate horse riders.

In regard to the Waikanae River corridor, the construction of the bridge will create significant adverse visual effects. It will not be possible to mitigate all adverse effects generated by the bridge. A detailed assessment of visual and landscape effects are included in Chapter 17 of the AEE.

16.5 Measures to avoid, remedy or mitigate actual or potential adverse effects on urban form and function

Many of the potential adverse effects on urban form and function have been addressed through the design process. Set out below are the elements of the Project where proposed conditions will address effects that have not been fully avoided, remedied or mitigated.

- Challenging elements in the proposed Expressway design that have yet to be fully resolved - in these situations, enough design work has been done to satisfy the Project team that there is an ability to resolve design issues in further stage of detailed design; and
- Where there will be adverse effects that cannot be avoided or remedied by further design changes and will need some other form of mitigation.

The suite of conditions proposed by NZTA is set out in Chapter 33 of this AEE.

16.5.1 Summary

The potential adverse environmental effects on the form and function of areas the proposed Expressway will pass through will be suitably avoided and / or mitigated. This will be achieved through the elements detailed in the Plan Set at Volume 5, and conditions on the designation .