

17 Landscape and visual

Overview

The proposed Expressway will be a large roading infrastructure element that will result in changes to the landscape. The scale of the necessary earthworks in conjunction with the scale and elevation of the various associated structures (i.e. bridges, retaining walls and noise fences) will have landscape and visual effects and, in places, these effects will be adverse. Conversely, the proposed planting will strengthen the framework of vegetation throughout the District, and the recreational values for locals and visitors will be enhanced with the proposed cycleway/walkway along the route.

In some areas, there will be some significant adverse landscape and visual effects, arising from both the construction and operation of the Project. A best practice approach has been taken to avoid effects as far as practicable.

The landscape and visual team, as part of the Expressway Project team, have provided advice and input throughout the design process to avoid or reduce adverse landscape and visual effects as far as practicable through good design. For example, this input included working with a multidisciplinary team to determine the Best Practicable Option for noise attenuation along the proposed Expressway.

Where avoidance of all adverse effects has not been practicable, various mitigation measures have been proposed and included in the design of the proposed Expressway. These measures have been informed by the urban and landscape design principles developed for the Project and documented in the Urban Landscape and Design Framework (ULDF) (Technical Report 5, Volume 5). In relation to landscape and visual effects, earth bunding and associated planting are the primary mitigation measures proposed.

The complete assessment of landscape and visual effects is contained in the Assessment of Landscape and Visual Effects Report (Technical Report 7, Volume 3).

17.1 Introduction

This Chapter presents an assessment of the landscape and visual effects of the proposed Expressway Project, including the proposed earthworks and new structures.

The assessment extends over a range of different landscapes along the 16km proposed Expressway alignment and describes the mitigation measures NZTA is proposing to undertake that are tailored to these individual areas.

Full details of the assessment of landscape and visual effects undertaken are contained in Technical Report 7, Volume 3. All landscape and visual drawings (illustrating effects and proposed mitigation) associated with this assessment can be found within Volume 5.

The ULDF (Technical Report 5, Volume 5) defines the existing environment and the design rationale that has informed this assessment.

The assessment of landscape and visual effects has, in part, drawn on information contained in other Technical Reports in Volume 3, particularly:

- Ecological Impact Assessment (Technical Report 26)
- Assessment of Hydrology and Stormwater Effects (Technical Report 22)
- Assessment of Traffic Noise Effects (Technical Report 15)
- Assessment of Construction Noise Effects (Technical Report 16)
- Construction Methodology Report (Technical Report 4).

Some environmental effects that would often be included as part of a landscape and visual assessment, such as urban design matters and effects on cultural landscape values, have been addressed by other Technical Reports, particularly:

- Urban and Landscape Design Framework (Technical Report 5, Volume 5)
- Assessment of Urban Planning and Design Effects (Technical Report 6, Volume 3)
- The Takamore Trust Cultural Impact Assessment (Technical Report 11, Volume 3)
- Te Rūnanga o Āti Awa ki Whakarongotai Inc Cultural Impact Assessment (Technical Report 12, Volume 3).

17.2 Existing environment: landscape and visual

To assess the landscape and visual effects of the Project, an understanding of the existing landscape and visual environment is required. The following subsections provide a short description of the existing landscape context and visual amenity of the environment.

17.2.1 Landscape context

17.2.1.1 The regional landscape

When considered at a regional level, the topography of the Project area is relatively flat, located on the relatively narrow coastal plain between the Tararua Ranges and the Tasman Sea.

The Kāpiti coastal plain is located at the southern end of an extensive coastal sand country land system, which extends from Paekākāriki to Hawera. With the exception of the alluvial deposits on the Waikanae River floodplain, the entire proposed Expressway is situated on sand country; a complex of old sand dunes, interdunal hollows, sand plains, peatlands and drained swamplands.

The sand country land system has been significantly modified through drainage and vegetation clearance, originally for farming but subsequently for residential, rural lifestyle, and horticultural development.

The Tararua Ranges, coastal escarpments and Kāpiti Island are distinctive and defining landforms, which are well recognised and visible from many locations throughout the Kāpiti district.

17.2.1.2 The local landscape

At a local scale, the remaining dunelands and waterbodies are significant features of the local landscape.

The proposed Expressway passes through a variety of smaller landscapes – residential areas, open farmland, vegetated dunelands, and rural lifestyle areas, each with a different and distinctive landscape character.

17.2.1.3 Western Link Road designation

The proposed Expressway generally follows the existing WLR designation, but in places the alignment departs from this.

The long history of roading designations in this corridor has resulted in a corridor of open space, providing a separation and buffer between residential areas in some places. Many of the dunes within the existing WLR designation remain today only because of the ‘protection’ that that designation and previous designations have provided over the previous decades (since the 1950s). This is particularly evident between Kāpiti and Mazengarb Roads, where land beyond the existing WLR designation has been flattened to facilitate residential and industrial development, while the dunes within the designation have remained relatively intact.

In places along the proposed Expressway route, residential subdivision has been developed right up to the existing WLR designation, whereas in other places, especially in the northern section, large tracts of farmland remain, together with relatively recently developed pockets of rural lifestyle holdings.

17.2.2 Existing amenity

This assessment specifically considers the visual aspect of amenity. Visual amenity is a component of the overall amenity values of a place. Amenity includes a combination of many factors, such as, visual amenity, ambient noise, air quality, and recreational and cultural attributes.

The existing environment along the proposed Expressway route can be categorised into four amenity types - rural/open space amenity, urban/industrial amenity, suburban amenity, and highway/road amenity - described in Table 17.1 below:

Table 17.1: Amenity types

Rural /Open space amenity	Suburban amenity	Urban /Industrial amenity	Highway/Road amenity
<ul style="list-style-type: none"> ■ Sense of spaciousness ■ Productive farmland and associated elements and patterns, fences, shelterbelts grazed pasture. ■ Privacy, relative quietness and minor traffic and bustle, rural noises such as machinery and stock may be present. ■ Environment relatively uncluttered by structures, buildings and artificial features. ■ Natural landforms, waterbodies, trees and vegetation are dominant. 	<ul style="list-style-type: none"> ■ Relatively small spaces enclosed by buildings, fences and vegetation. ■ Background neighbourhood sounds and smells, activity on streets, in parks and within residential sections, differing levels of noise and activity occur at various times (weekends, week days, evenings, night time). ■ Visually dominated with buildings, structures and domestic vegetation. ■ Hard surfaces dominant in street environment, natural landforms/waterbodies less prominent. 	<ul style="list-style-type: none"> ■ Buildings and structures are dominant, with relatively large bulk and often with tall and broad facades close to the street boundary. ■ Exterior spaces enclosed by buildings and fences. ■ Relatively high traffic activity, and busy road environment. ■ Hard surfaces dominate, natural features and vegetation a minor element. 	<ul style="list-style-type: none"> ■ Linear space, often enclosed by residential/industrial development/vegetation. ■ Traffic activity and noise are dominant features, also dust and exhaust fumes on busy roads. ■ Linearity of road provides strong directional axis of view, can be visually cluttered in built up areas, including signage, lighting, parked and moving vehicles. ■ Hard/artificial surfaces dominate. ■ Physical personal safety a perceived and actual issue.

17.3 Actual and potential landscape and visual effects

17.3.1 Assessment methodology

The proposed Expressway route passes through a range of landscape types, including, rural, rural lifestyle, suburban, industrial, open space and river environments. Twelve landscape character areas are identified in Table 17.2.

Table 17.2: Landscape Character Areas

	Sector 1	Sector 2	Sector 3	Sector 4
Landscape Character Areas	Queen Elizabeth Park	Raumati Road	Otaihanga South	Ngarara
	Raumati South	Wharemauku Basin	Otaihanga North	Peka Peka South
		Kāpiti-Mazengarb	Waikanae River	Peka Peka
			Te Moana	

The landscape and visual effects of the Project in relation to each of the landscape character areas were assessed and consideration given to the following three interrelated components:

- Biophysical - This considers the extent and significance of modifications to landforms, waterbodies and vegetation.

- Visual amenity - Visual amenity is a component of the overall amenity and therefore contributes to peoples' appreciation of the pleasantness and aesthetic coherence of a place. The magnitude of effects on visual amenity is dependent on several factors, including the size of the viewing audience, the sensitivity of that audience, and the degree of the visual change.
- Landscape character - The effects on landscape character relate to changes in land use, (new or different activities), changes to existing patterns and elements in the landscape, such as vegetation, waterbodies, landform, and settlement patterns.

A detailed assessment of effects can be found within Technical Report 7, Volume 3, with a summary of these effects provided within Table 7.3 of this Chapter.

The magnitude of the biophysical, visual amenity and landscape character effects have been based on a seven point scale ranging from extreme to negligible (refer to Technical Report 7, Volume 3).

Consideration of landscape and visual issues early in the design process has meant that there is a significant degree of mitigation already 'built-in' to the design. This assessment therefore, includes the mitigation planting as part of the proposal, rather than as an aspect to be considered separately.

The full assessment methodology is provided within section 5 of Technical Report 7, Volume 3. The main actual and potential landscape and visual effects have been assessed using Part 2 of the RMA as a framework.

17.3.2 Temporary effects

The construction effects are relatively short term (approximately 3 to 4 years) in relation to the life of the Project and therefore are regarded as temporary effects¹²⁵. However, given that construction of the proposed Expressway will not start at one end and progress to the other, many of these temporary effects will occur at different times along different parts of the route during the overall construction period (refer to Chapter 8 of this report for details on the likely construction sequencing).

There will be different construction activities that have the potential to affect the landscape and visual outlook. These construction activities fall into the broad categories of earthworks, structures, temporary fencing and temporary buildings and yards.

17.3.2.1 Earthworks

Given that the proposed Expressway passes through large areas of peatland at various places along the route, specific ground improvement measures will be required.

¹²⁵ Temporary effects are regarded in this assessment as those effects created by the construction process; over and above the effects of the earthworks and changes to the landform and vegetation considered in the remainder of the Chapter.

For some properties (especially those in relatively close proximity to the proposed Expressway), the earthworks will be visible for the duration of the ground improvement period. However, this will change when construction has been completed. The ground improvement works will generally be located in predominantly rural or low density residential areas. The residential areas immediately adjacent to the proposed sections of the proposed Expressway where ground improvement works will be required, and potentially the most affected, are the Leinster Avenue, Raumati Road/Rata Road and Midlands subdivision communities.

The total number of residents to whom these ground improvement works will be visible and therefore which will be directly affected will be relatively small.

17.3.2.2 Structures

There will be a lot of activity around the places where the bridges, retaining walls and other structures are being built, especially at the location of interchanges. Many of the bridging and other structural components will be precast off site and transported to the various sites, which will reduce the amount of time and activity at the actual locations where these structures are being built.

Contractors working on construction bridges will need to use floodlights, either portable or temporary, but these will be mounted and directed at the activity areas so that they do not cause glare towards any residential properties or towards roads.

17.3.2.3 Temporary fencing

At the outset of the construction, the area where earthworks and other construction activities will occur will be securely fenced. The sites selected for the establishment of the construction yards are relatively discrete and separated from residential properties. While the fencing around the yards will be visible from public roads and residential areas, it is unlikely to be intrusive or result in any adverse landscape or visual effects.

17.3.2.4 Temporary buildings and yards

Due to the lineal nature of the proposed Expressway, eleven areas along the route will be established to accommodate and service the works at various stages during the construction programme. All yards will be located within the Designation with layouts and access to seek to avoid adverse effects on residents and local road users. The extent of yards will vary according to their purpose (i.e. whether they are a Project Yard, Bridge Yard or Interchange Yard).

Site establishment for the yards will include site clearance, ground preparation, and establishment of erosion control measures prior to any construction activities occurring. Intersection Yards and the Project Yard will be lit at night. While Bridge Yards will probably not be lit at night, bridge construction operations will be (refer to Technical Report 8, Volume 3).

Upon completion of the works, the construction yards will be disestablished and the areas reinstated.

17.3.3 Summary of temporary effects

While earthworks will occur along the entire route, the erection of structures such as bridges and retaining walls, and the location of temporary buildings and yards will occur at specific locations. Consequently the potential landscape and visual effects of these will be limited to site specific areas.

The construction process will have landscape and visual effects for nearby residents and others in the vicinity of the proposed Expressway corridor. In particular, the removal of vegetation and earthworks will be the most significant, and will affect the visual amenity of the locality. During and post construction, the bare earth or hydroseeded surfaces, especially on the elevated embankments, will be most visible and, from some locations, visually prominent. Until the proposed planting is established, the visible earthworks will have a 'bare' or 'new' appearance, contrasting strongly with the established view which it has replaced.

In locations where ground improvement works are required, unvegetated earthworks approximately 2m to 4m higher than the finished road height may be visible for periods of 6 to 24 months. Consequently, the visual effects of ground improvement earthworks are likely to be greater than the final effects of the established proposed Expressway, as the finished proposed Expressway road level will be lower and the embankments planted.

Overall, there is the potential for temporary adverse landscape and visual effects during the construction period.

17.3.4 Biophysical effects

The proposed Expressway traverses 16 km of an undulating dune and peatland landscape. The scale of the proposed Expressway means that substantial changes to landforms, vegetation and waterbodies are not practicably avoidable in places.

The alignment and design has, wherever practicable, avoided areas of intact dunes, indigenous vegetation and wetland areas. In particular, the alignment of the proposed Expressway through the Raumati South character area, which has deviated from the existing WLR designation, has avoided a series of large intact dunes with stands of semi-mature manuka, as well as a natural wetland.

Physical change to the dune landforms, floodplain areas and wetlands cause the greatest level of adverse biophysical effects, as these are permanent changes to natural landforms. Due to the large scale of the physical changes proposed, little effective mitigation is possible, beyond integrating the earthworks into the natural landforms as far as practicable.

In places, intact dunes within the proposed Expressway footprint will be totally removed and in other places they will be modified by cuts or the addition of fill to form bunds. As discussed, many of the dunes remain only because of the 'protection' that previous designations have imposed on the use and development of much of the proposed Expressway corridor.

The construction of elevated ramps at interchanges and bridges also requires significant change to the existing landforms, especially where ramps are required in flat or low lying areas such as the Poplar Avenue, Wharemauku Basin, Te Moana Road, Smithfield Road and the Peka Peka interchange overbridge.

Conversely, in places, the existing height of the dunes is utilised to ramp the proposed Expressway or local road over the intersecting road, such as at the Raumati, Mazengarb, Otaihanga, Ngarara Road crossings. While in these situations the dunes may largely remain intact, the integrity of their natural form would still be significantly modified.

Loss and fragmentation of indigenous vegetation and habitats, while undesirable, can to some extent be effectively mitigated, through replanting, rehabilitation and offset mitigation measures. However, the benefits of such measures will be effective only if they are properly managed and maintained.

The proposed Expressway alignment has avoided all but four wetland areas, three of which lie within the Otaihanga South character area, and which will be fragmented and reduced in size. An area of new wetland proposed in the same character area will go some way to remedy this loss. The large crescent-shaped dune with advanced regenerating indigenous vegetation near Puriri Street, north of the Takamore urupā, will be substantially altered by large cuts and the loss of an area of advanced secondary native vegetation. However, this alignment avoids the need to remove more dwellings in the Te Moana character area.

The proposed riparian mitigation planting on the sections of streams affected by the proposed Expressway will in time improve the indigenous biodiversity and habitat of those parts of the streams.

17.3.5 Visual amenity effects

The proposed Expressway will be an unavoidably visible component in the landscape. Its large scale and the number of elevated structures make it impracticable to fully screen from view. The dynamic aspect of traffic movement visible on the proposed Expressway will accentuate the visual impact. However, for large sections of the proposed Expressway, the remaining dunes, proposed earth bunds, noise walls and planting will screen views of the moving traffic and the proposed Expressway itself.

The effects on visual amenity are rated as very high in three landscape character areas and high in another four. The greatest visual effects are where the proposed Expressway footprint is large and where there are large structural and elevated components (ramps bridges, embankments and noise walls). The magnitude of these effects increases where they are visible to both resident and transient viewing audiences, and when the visual change detracts from existing views and outlooks.

The effects on the visual amenity of the Waikanae River corridor will be extreme in the close vicinity of the proposed bridge, very high at greater distances. The River corridor's high natural and recreational values and its status as an Outstanding Natural Landscape make this area sensitive to change. While the visual effects would be severe within close proximity of the bridge (i.e. within approximately 200m), they diminish with distance and with intervening vegetation.

Similarly, the bridge and embankments crossing Wharemauku Stream introduce large elevated features into a relatively flat and undeveloped landscape, reducing the openness of the area and restricting views to Kāpiti Island from some locations. The proposed interchanges at Kāpiti Road and Te Moana Road include large elevated structures, crossing busy local roads and in residential areas, therefore impacting on a large viewing audience.

In places, the changes the proposed Expressway will produce in relation to altered landforms or mitigation planting will not necessarily adversely affect visual amenity but will simply be different (e.g. along Makarini Street). For a large section of the proposed Expressway between Kāpiti and Mazengarb Roads, the residents on the eastern side currently have views of the remnant dunes in the existing WLR designation. Some of these dunes will be reduced in height and in places earth bunds will be constructed so traffic on the proposed Expressway will not be visible. Planting proposed on these new landforms will, in time, replace the scrub with a backdrop of trees and other vegetation.

At some locations, the effects on visual amenity for residents immediately adjacent to the proposed Expressway will be adverse, particularly for residents who lose views of open space and for whom traffic becomes a prominent element of the foreground view (e.g. Chilton Drive).

The magnitude of effects on visual amenity range across six of the seven point spectrum (from extreme to low) depending on the location of the viewpoint (refer to Table 17.3).

17.3.6 Landscape character effects

The landscape character varies along the proposed 16km route; there are areas with distinct rural, rural lifestyle, residential, urban, industrial, and highway characters. As a large section of roading infrastructure, the proposed Expressway will introduce a new type of activity and character into these areas.

The proposed Expressway will bisect the landscape, interrupting the natural topography and waterbodies, as well as man-made patterns such as settlements, plantations, shelterbelts, roads and accessways.

The degree of change to the existing landscape character relates to the scale of the proposed Expressway footprint and the size of the various structures. The change to landscape character will generally be the greatest in the immediate vicinity of the footprint; however, with increasing distance from the proposed Expressway these effects will lessen.

The least effect on the existing landscape character occurs where the proposed Expressway is close to the existing SH1 and NIMT rail corridor, which is already a busy transport environment. While the proposed Expressway will contribute to this character in these areas, in other areas it will be an unfamiliar element, notwithstanding that much of the route lies in a corridor that has long been identified for a major road.

For most of the route, the changes to landscape character are rated high. In three character areas, the changes will be very high – Wharemauku Basin, Waikanae River and Te Moana. In these locations, the scale of the proposed Expressway structures and the activity that the proposed Expressway will introduce will significantly change the existing landscape character.

17.3.7 Summary of effects

The biophysical, visual amenity and landscape character effects of the Project within each of the twelve landscape character areas are summarised in Table 17.3. These effects have been assessed with the inclusion of the mitigation measures that have been an integral part of the design from the outset. That is, earth bunds, noise attenuation structures and planting.

Table 17.3: Summary of landscape and visual effects by character area

Character Area	Biophysical	Visual Amenity	Landscape Character
QE Park	low	low	low
Raumati South	moderate	high	high
Raumati Road	high	high	high
Wharemauku Basin	high	very high	high*
			very high**
Kāpiti Mazengarb	high	high	high
Otaihanga South	very high	low	high
Otaihanga North	high	moderate	high
Waikanae River	moderate	extreme***	very high
		very high****	
Te Moana	high	very high	very high
Ngarara	high	moderate	high
Peka Peka South	moderate	moderate	high
Peka Peka North	moderate	high	high

* Considered in the context of a future built environment with the development of the town centre, the effects on landscape character would be high

** Considered in relation to the existing open space environment, the effects on landscape character would be very high

*** In close proximity to the bridge

**** At greater distances where the bridge is visible

17.3.8 Natural character

The proposed Expressway crosses eleven watercourses, most of which currently have a low level of natural character, due to being channelised, with poor riparian vegetation and low in-stream ecological value. However, the Waikanae River has a high level of natural character.

The imposition of the large scale of the proposed Expressway where it crosses these streams will have an adverse effect on the natural character in terms of perceived naturalness. It will also affect the natural character in a biophysical sense because of the loss of habitat in the long culverts.

However, the proposed riparian restoration/enhancement of sections of the streams will improve the ecological value and natural character of these particular stream sections.

Small parts of some of the larger wetlands will be lost, which will adversely affect their natural character. In addition, three small and high value but modified wetlands in the Otaihanga character area will be either lost or seriously compromised by construction of the proposed Expressway, which will have serious or very high adverse effects on their respective natural characters. However, the new off-set wetland proposed in this character area, once established, will go some way to compensate for the decreased natural character of the existing wetlands.

The loss of natural character in the immediate vicinity of the proposed Waikanae River bridge would be very high because of the realignment of the Muaupoko Stream in this vicinity, the confinement of the main river channel by riprap and by having the bridge overhead. However, in the context of the River over its entire length, the effect on its natural character would be low.

17.3.9 Outstanding natural features and outstanding natural landscapes

Short sections of the proposed Expressway are in close proximity to the former coastal escarpment, (at Raumati and Peka Peka), and where the proposed Expressway crosses the Waikanae River corridor – these landscapes have been scheduled in the Kāpiti Coast District Plan as Outstanding Natural Landscapes (ONL).

The proposed Expressway would not have any effects on the two escarpment ONLs. However, in relation to the Waikanae River ONL, the effects of the proposed Expressway bridge crossing would be moderate when considered in terms of the ONL overall but, in the immediate vicinity of the river crossing, the effects on the natural and landscape values would be extreme.

17.3.10 The effects on natural components (biophysical aspects) of the landscape

The physical changes to the dunes and other landforms, features and waterbodies will adversely affect the quality of the environment along the proposed Expressway route. However, the large areas of the proposed Expressway corridor to be planted with predominantly locally eco-sourced indigenous vegetation will improve the biophysical aspects of the environments along the route.

17.4 Summary of landscape and visual effects

The proposed Expressway is a large piece of infrastructure that will result in changes to the landscape. The scale of the footprint, the earthworks, size and elevation of the various associated structures such as bridges, retaining walls and noise structures that comprise the proposed Expressway, will have adverse landscape and visual effects which are unavoidable, even with the substantial mitigation that is proposed as part of the design.

Due to the relatively populated area, through which the proposed Expressway would pass, there is a large potential resident and transient viewing audience. For the majority of those residents that would be able to see the proposed Expressway, the visual effects would relate to a change of view, not necessarily adverse, but different. Mostly, the proposed Expressway would be experienced as planted

bunds, beyond which traffic is not visible. However, some nearby residents will be adversely affected through loss of views or inability to practicably screen views of traffic.

The large transient viewing audience will experience the proposed Expressway for short periods of time at local road crossings and at interchanges.

The Waikanae River is highly valued by the community for its recreational, natural, and 'wild' values and is recognised in the District Plan as an outstanding natural landscape. The proposed Expressway bridge over the Waikanae River, with associated buttresses, rip rap, re-alignment of Mauapoko Stream will significantly change the immediate river corridor environment. Once established, tall vegetation proposed adjacent to the walkways will generally screen views of the structures from more distant locations up and down river. However, the effects on natural character, visual amenity, the 'wild' and natural values and the tranquillity in close proximity to the bridge will be unavoidably permanent and significant.

Largely, the adverse effects relate to (or correlate with), the relatively short time frames associated with construction and the subsequent five to ten years when the proposed Expressway will be a 'new', unfamiliar feature in the landscape. For many years, the works and mitigation planting will have a raw and immature appearance, which will contrast to the long established and undisturbed adjoining landscape. In the longer term however, over the successive decades, the landscape change (earthworks, vegetation, interchanges) will mature and become part of the landscape fabric of the district.

While the landscape and visual effects of the proposed Expressway have been considered in the context of the existing environment, this will also continue to change over time. The Paraparaumu and Waikanae areas are predicted to continue growing, as reflected in the District Plan provisions that provide for expansion of urban and residential areas such as the development of Kāpiti Airport, the town centres, and various plan changes such as the Waikanae North Development Zone, Waikanae North Urban Edge, and Ngarara. The form of these developments, in part, will be influenced by the presence of the proposed Expressway and over the long term the proposed Expressway will become integral element of a popular, fast-growing and increasingly developed area.

17.5 Measures to avoid, remedy or mitigate actual or potential adverse effects on landscape and amenity

17.5.1 Mitigation through design

As part of the proposed Expressway Project, the landscape and visual team have provided advice and input throughout the design process to avoid or reduce adverse landscape and visual effects as far as practicable through good design, rather than simply relying on landscape mitigation.

The key principles that guided the landscape input to the proposed Expressway design process included:

- To avoid, where practicable, disturbance of intact natural landforms, water bodies and areas of indigenous vegetation. Where avoidance is not practicable, to minimise the extent of modification;

- To recognise the diverse local character of the landscape along the route and reflect that character through landscape design and plant species selection;
- To seek to achieve a design where the proposed Expressway integrates into the landscape as far as is practicable;
- To recognise the importance of retaining existing vegetation (exotic and indigenous), to provide a basis on which to develop a vegetation framework;
- To seek to include environmental benefits where practicable - for example, biodiversity;
- To recognise that the visual and amenity effects on the receiving communities have precedence over proposed Expressway user visual and amenity experience;
- To seek to ensure proposed plantings are sustainable in the long term through use of appropriate planting medium, appropriate species, locally eco-sourced species and effective maintenance regimes;

Importantly, the proposed mitigation measures have been considered as part of the overall proposed Expressway design, rather than 'add-on' mitigation measures. As an example of this, the inclusion of planting along the proposed Expressway corridor, and its design, was an integral part of the Project design process from the outset.

17.5.2 Mitigation of temporary effects

As previously described, the actual and potential adverse landscape and visual effects arising during the construction process will be temporary.

While the overall construction period spans three to four years, the likely construction programme would be undertaken in a sequence of construction zones. These start from separate locations and work over different sections at a time, so that activities such as vegetation clearance and bulk earthworks will be limited to a much shorter period from any one viewpoint.

An Ecological Management Plan and a Landscape Management Plan¹²⁶ have been prepared for the Project (refer to Appendices M and T of the CEMP, Volume 4). These documents outline methods and monitoring necessary for managing the adverse landscape and visual effects of construction. Some of the key elements to these Management Plans include:

- *Retaining existing vegetation:* Through recognised protection techniques, particularly at the 'site establishment' phase of construction, groups of trees, stand-alone mature trees, and residual amenity plantings on residential properties that are affected by construction can be retained and protected. The areas of vegetation to be retained are identified in the Vegetation Map, Volume 5.

¹²⁶ It is anticipated that these documents will be a 'live' document and will be updated and revised as the construction methodology and practices for managing ecological and landscape effects change over time.

- *Re-vegetation*: Exposed, recently earthworked areas will be visible but this will change as the hydroseeded grasses germinate and become established. The visibility of earthworks will change once the final planting is completed and as the plants grow the landscape and visual effects will progressively lessen. Timely revegetation (for soil stabilisation) is included in proposed consent conditions addressing erosion and sediment control.
- *Buffer zones to limit light spill*: A 10.0m buffer zone between any equipment requiring light and a residential boundary and lighting layout and design for the construction yards will be reviewed and approved by an accredited illumination engineer to seek to avoid adverse environmental effects from lighting prior to it being installed. Details on temporary and construction lighting are addressed in the Assessment of Lighting Effects report (Technical Report 8, Volume 3).
- *Reinstating construction yards*: Upon completion of the works, the construction yards will be disestablished and the areas reinstated.

17.5.3 Mitigation of long- term effects

Mitigation measures involving shaping of earthworks to integrate them with the surrounding topography, in conjunction with planting, are fundamental aspects of the Expressway proposal.

The landscape mitigation measures proposed seek to address two aspects in particular:

- *Effects on biophysical factors*: by retaining existing trees and vegetation where desirable and practicable, earth bunding and contouring of earthworks, and planting to seek to integrate the proposed Expressway into the fabric of the surrounding landscape.
- *Effects on the visual amenity from beyond the corridor*: by including measures that can as far as practicable, screen views of the proposed Expressway, associated structures, and traffic movement, particularly for nearby residents. The measures include earth bunding and planting.

As discussed, there is a crossover between landscape mitigation measures and those carried out for other reasons, particularly those to be carried out for noise, stormwater management and ecological purposes.

17.5.3.1 Contouring of earthworks

While the land along much of the route is flat, sand dunes of various heights and inter-dunal hollows are landforms that significantly contribute to landscape character. They also provide considerable scope to assist with integrating the proposed Expressway into the landscape. Construction of the proposed Expressway will significantly modify the landscape and, in places, totally alter and transform the dunes, which in some areas are restricted to narrow, isolated bands.

Given the level of disturbance that will occur to the dunes, it will be important to ensure that the cut faces and batter slopes are 'tied in', both physically and visually, with the adjoining, undisturbed dunes. Sometimes, this will entail re-shaping a much larger area than that simply required to construct the road itself in order that all the 'faces' of a modified landform are effectively integrated (refer to Technical Report 5, Volume 5).

At the detailed design stage, minor adjustments to the final contour plans may be needed to ensure the earthworks fully integrate with the existing landforms at a site specific level.

17.5.3.2 Noise bunds

The shape of bunds is important in that bunds need to relate to their context and, ideally, have a 'natural' appearance. The way these bunds tie in with existing and new landforms will require careful attention at the detailed design stage. While drawings can illustrate the forms of bunds in a general sense, their successful integration will rely on the interpretation by the contractors and monitoring the execution of the earthworks.

17.5.3.3 Noise walls and fences

Noise walls have been designed in relation to their context. Generally, there will be planting along the 'Expressway side' of the timber noise fences, as part of overall landscape mitigation. It is intended that earth will be mounded some way up the external faces of the concrete noise walls to partly 'bury' them on one side. The earth ramps will also be planted, further integrating them into the landscape and seeking to screen them from view from beyond the proposed Expressway corridor.

17.5.3.4 Retention of existing vegetation

There are patches of existing vegetation that are proposed to be retained, while in some places there are just individual trees. Retention of existing vegetation is a key mitigation measure, which can assist with integrating the proposed Expressway into the landscape.

In several areas where the retention of existing vegetation is proposed, the planting of adjoining areas is based on the presence of the particular type of existing vegetation. If, for some reason, the existing vegetation were to be removed then this could affect habitat, landscape character, and the success in establishing the proposed new planting. Given that screening of the proposed Expressway and associated structures is part of the mitigation strategy, retaining existing vegetation is an important consideration.

17.5.3.5 Planting

In landscape terms, planting will:

- Enhance local landscape character;
- Integrate earthworks with adjoining topography / vegetation;
- Enhance local biodiversity;
- Reinforce or complement existing vegetation to be retained;
- Screen views of the proposed Expressway, associated structures and traffic on the proposed Expressway;
- Screen views of noise fences;
- Seek to maintain visual amenity for residents; and

- Enhance cycleway/walkway amenity.

Nine planting types are proposed for the Project area (with the location of proposed planting illustrated within Technical Report Appendices, Report 7, Volume 5):

- Mass Planting - *Trees and/or shrubs (which are typically native species) with either a simple palette e.g. 1 species- kanuka or, revegetation style mixture of species;*
- Mass planting with tree enrichment - *As above with additional planting of tree species;*
- Specimen trees underplanted with groundcover species: *Mixed shrubs/groundcover species (native or exotic) including specimen trees;*
- Trees with grass - *Mown or grazed grass with large exotic or indigenous trees;*
- Riparian planting - *Planting along streams and wetlands margins;*
- Wetland planting - *Mixed wetland species for ecological and stormwater wetlands;*
- Stormwater treatment wetlands - *As above;*
- Flood storage areas - *Excavated areas of damp or soggy ground for flood storage; and*
- Mown Grass.

17.5.3.6 Terrestrial planting

Terrestrial planting (planting on land) will involve the following:

- All areas disturbed by earthworks will be hydroseeded on completion to provide stability and to control silt runoff. For the areas being returned to grazing, pasture grasses will be used as this will be the final vegetation cover.
- Areas to be planted in woody vegetation will be either blanket sprayed or spot sprayed, depending on the type of planting being carried out. All areas planted in woody vegetation will be mulched. Depending on the particular situation, mulch will be mechanically applied, blown on to areas or applied by hand. Various areas of woody vegetation along the route will be cleared and mulched (except those species that may become future pest plants) and used around new planting.
- All plants will be 'hardened off', either in a nursery where they are propagated or in a suitable local nursery holding area for at least two months prior to being planted.
- Controlling pest plants and animals will be a key to plant survival and establishment. Where pest plants or animals are likely to be a threat then a removal/control programme will be initiated in advance of planting.
- A two year maintenance period is proposed for planting on embankments, batter slopes, bunds, wet and dry swales and for riparian planting. A four year maintenance period is proposed for the ecological and stormwater treatment wetlands.

17.5.3.7 Wetland planting

Wetland planting involving establishing and maintaining planting in the existing and new wetlands will pose several challenges, notably pest plants and the level and period of maintenance required. A good example of what can be achieved in terms of wetland planting is the Pharazyn Reserve, KCDC's former sewerage ponds between Waikanae Beach and Peka Peka Beach. The edge of these man-made rectangular-shaped ponds has been reconfigured and extensively planted with local native species.

17.5.3.8 Lizard habitat

The Herpetofauna Report (Technical Report 28, Volume 3) recommends that suitable lizard habitat be included in the planting. Lizard habitat can be provided along the edge of the cycleway and wetland areas (with the inclusion of the species listed in Technical Report 28). This measure will be incorporated at the detailed planting plan stage.

17.5.3.9 Pest plants

Given that material used in the construction of the proposed Expressway will be transported to and from different parts of the route, as well as being brought in from places from further afield, there is considerable risk of pest plants (in particular, blackberry and convolvulus) being spread to areas where they are currently not present or where they have only a minor presence.

Removing and controlling pest plants requires vigilance and a sustained effort both at the outset of construction and during the maintenance period.

17.5.3.10 Eco-sourcing

Although very little original indigenous vegetation remains on the Kāpiti coastal sand plain, the development of the landscape and ecological mitigation planting along the proposed Expressway provides an opportunity to use a range of native plant species that occur in the Foxton Ecological District, which extends from Paekākāriki to Whanganui.

Use of eco-sourced plants has been factored into the planting along the proposed Expressway; however, there are exceptions. Given the time frames for construction of the proposed Expressway, obtaining the quantities of certain species of large grade specimen trees for planting in areas such as the Kāpiti Road and Te Moana Road interchanges is unlikely. However, the planting proposed for these areas is more for amenity purposes rather than one of trying to approximate natural plant assemblages.

Eco-sourcing plants generally do not increase costs but adds significant environmental benefits. While using eco-sourced plants is widely adopted, it does come with challenges, such as insufficient seed of the range of species required, poor germination, die-back, and unthrifty plants.

The location of proposed mitigation measures are illustrated within the Landscape Plans (Volume 5).