



**New Zealand Transport Agency
Waikato Expressway Cambridge Section**

**Landscape, Visual and Urban Design
Assessment**



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Landscape, Visual and Urban Design Assessment
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Prepared By

Adrian Morton
Principal Landscape Architect

Opus International Consultants Limited

Environmental
Opus House
Princes Street, Hamilton 3240
Private Bag 3057, Waikato Mail Centre
New Zealand

Reviewed By

David McKenzie
Principal, Landscape Architecture

Telephone: +64 7 838 9344

Facsimile: +64 7 838 9324

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1 Executive Summary

The objective of this report is to assess the landscape and visual effects of the Cambridge section of the Waikato Expressway (the Project). The urban design component and context of the Project is also considered within this report.

The Expressway is located within the Cambridge area, a generally flat landform containing the incised gully of the Karapiro Stream. The area is defined by the numerous stands and individual specimens of mature, exotic deciduous trees scattered throughout the plains, with shelterbelts and hedges, roads and buildings, including individual farmhouses, sheds and residential properties of Cambridge. The area is of moderate landscape quality, with a high visual absorption capability due to the screening effects afforded by trees and hedgerows.

The Expressway travels through two relatively distinct areas, being rural farmland and the peri-urban areas of Cambridge. Overall, the Expressway may have a noticeable landscape and visual effect on both areas. However, the effects on the broader environment are likely to be minimal due to the surrounding vegetation screening the Expressway, with moderate effects likely to be sensed from properties immediately adjacent to the Expressway.

The Project's landscape effects and the notable changes to the urban design context that will result from implementing the Project are related to the changes in landform, landcover, land use, loss of farmland, and severance of local roads. The visual changes are associated with the new road feature with the landscape, cut and fill formations for the Expressway, loss of existing mature vegetation and the removal of buildings. Visual effects related to the Expressway development include the removal of vegetation and buildings, earthwork cut and fill formations, the development of the carriageway and implementation of associated structures. The structures that will form new elements in the landscape and will have a visual effect include the Karapiro Stream Gully bridge, the under and overpasses, retaining walls, noise mitigation barriers, plus road lighting and signage.

The Project will provide landscape and urban design opportunities to integrate the Expressway into the landscape and to contribute to the Cambridge environment. The location of the Expressway creates a positive urban edge to Cambridge, with the three interchanges designed to create 'gateway' entrances, with landscape planting to reflect the 'treed' character of Cambridge. The Expressway will improve accessibility and reduce congestion within Cambridge by removing through traffic, while providing cycle and pedestrian opportunities as alternatives to vehicle transport. Urban design interventions in regards to the Project's structures will ensure that these elements contribute to the character and identity of the area, while integrating into the local landscape.

A number of mitigation measures are recommended as part of the overall environmental, urban design and landscape development of the Project, to minimise effects of changes to the landscape and to help screen and integrate the proposed Expressway and structures into the area. The mitigation measures have regard to the potential future development to the northern aspects of Cambridge, Waipa's District Growth Strategies, and NZTA's Guidelines for Highway Landscaping and Urban Design policies.

It is noted that as the northern Cambridge area develops in line with the Waipa 2050 Growth Strategy and the Project's mitigation measures establish and mature, the overall landscape and visual effect of the Expressway will reduce as the area becomes more developed. Ultimately, the Expressway will become the defining outer urban edge to Cambridge Township.

Overall, however, it is considered that any actual or potential adverse effects on landscape amenity from the Expressway can be mitigated by the landscape, visual and urban design mitigation measures proposed in this report.

2 Introduction

The primary objective of this report is to assess the landscape and visual effects of the proposed Cambridge section of the Waikato Expressway and associated works (the Project) by the New Zealand Transport Agency (NZTA). The Project involves a major realignment of State Highway 1 (SH1) and was previously known as the “Proposed Cambridge Bypass”. The urban design component and context of the Project is also addressed in this report.

In regard to landscape, visual and amenity planning matters, the assessment component of this report is in accordance with relevant provisions of Part 2 and the Fourth Schedule of the Resource Management Act 1991 (RMA).

Relative to urban design, this report considers the NZTA’s Urban Design Policy 2007 and describes the urban design principles and elements that have been previously stated in the Urban Design Preliminary Design Philosophy Statement¹ for the Project (attached as **Appendix 1**).

The Project is situated approximately 10km south of Hamilton. The Expressway corridor runs east from Cambridge Road (SH1) just south of Hautapu Road, truncates Forrest Road, underpasses Peake Road, truncates Hannon Road, overpasses Victoria Road (SH1B), underpasses Swayne Road, truncates Watkins Road, underpasses Thornton Road, bridges Karapiro Stream to rejoin SH1 at Golf Course Hill to the south of Cambridge. The Project is approximately 11.4km long.

This assessment is based on the Project scheme plans² developed by Opus.

3 Reference Documents

This assessment considered a number of reference documents, including the Waikato Regional Landscape Assessment (Regional Assessment), relevant provisions of the Waipa District Plan and the Waikato District Proposed Plan. Consideration has also been given to the NZTA’s Guidelines for Highway Landscaping and Urban Design Policy.

3.0 Waikato Regional Landscape Assessment

Waikato Regional Council (also known as Environment Waikato) has recently undertaken a landscape assessment of the Waikato Region³. The following summarises Environment Waikato’s assessment objectives:

¹ “*Cambridge Bypass – Urban Design Preliminary Design Philosophy Statement*”, prepared for Transit New Zealand by Brewer Davidson, Auckland, July 2007.

² “SH1 Region 3 RS 557 Hautapu Road – Golf Hill South, RP 557/8.53 – 574/3.45 Cambridge Section of Waikato Expressway, Preliminary Design Drawings, VAC Report Issue prepared by Opus International Consultants Ltd, Hamilton, dated March 2010.

³ “*Waikato Regional Landscape Assessment*” prepared for Environment Waikato by Mary Buckland – Landscape Architect, O’Connor Planning Consultants Limited, Chow: Hill and GHD; February 2010.

The overall objective of the Waikato Regional Landscape Assessment was to provide the information and policy guidance required to develop a robust framework to bring about consistent and integrated management of landscapes and landscape values within the region while also providing an understanding of regional landscapes and identifying key elements of special landscapes so they are able to be appropriately managed and protected.⁴

The Regional Assessment defines Outstanding Natural Features and Landscapes, High Value Amenity Natural Features and Landscapes, Significant Natural Landscape Features and Significant Indigenous Forest Areas within the Waikato Region. The landscape traversed by the Project is not considered to be in any of these higher quality landscape categories as it does not fall within these definitions.

3.1 Waipa District Plan

The following sections outline the relevant Waipa District Plan⁵ (WDP) provisions that relate to the Project. The majority of the Expressway is located within the Waipa District and therefore the objectives and policies of the WDP provide a framework for the landscape and visual aspects of the Project. The WDP identifies a number of objectives and policies that aim to manage the use, development and/or protection of the District's resources.

Rural activities

Rural Policy 2.3.1: Landscape Character Areas

Policy RU1: To identify the different landscape character areas within the District and create controls and performance standards appropriate to the special circumstances of each area and design guidelines as may be required.

The Expressway is situated within the identified 'Alluvial Flats' landscape character area and the 'Hamilton-Cambridge State Highway Corridor'. This landscape and visual assessment identifies appropriate mitigation measures for the Project to safeguard the local landscape character.

Policy RU37: To protect areas of significant indigenous vegetation and significant habitats of indigenous fauna.

The Project does not have an effect on any areas of significance.

Transportation

Policy TR7: To design new road networks to visually compliment [sic] or improve the locality concerned and to incorporate landscape planting where appropriate.

The Project will enhance the environment and complement the existing vegetation and landscape character through planting.

⁴ Executive Summary, page 5 of the *Waikato Regional Landscape Assessment*
<http://www.ew.govt.nz/Publications/Technical-Reports/TR-201012/>.

⁵ Waipa District Council as updated on 1st December 2009.

Policy TR8: To encourage the use of public transport, bicycles and walking as alternatives to private cars.

The Project will improve the cycling and walking environment within Cambridge by removing SH1 traffic from the town centre and will create a more reliable and efficient transport system that provides the opportunity for improved public transport operation. The Project will provide shoulders along the Expressway for cycling. Shoulders will also be provided for cycling on the local roads and on ramps that pass over or under the Expressway. A footpath will be provided on the local road bridges over the Expressway.

3.2 Preliminary Landscape Assessment for Waipa District

In the early 1990s a district-wide landscape study⁶ defined seven main landscape types within Waipa District: volcanic cones, steep hill country, rolling farmland, river valleys, alluvial flats, peat lakes and domed peat swamp. The study also defined scenic corridors that follow the sections of the two main State highways (SH1 and SH3) within the district.

The landscape type traversed by the majority of the Project is 'Alluvial Flats', which is described in the Council's 1991 Landscape Assessment as:

"There are patches of alluvial flats right through the Waipa District. They have been built up by pumice and sand deposited by the Waikato and Waipa Rivers. The soil is rich and fertile in many places. The main area of the plains follows the Waikato River and runs between Te Awamutu and Cambridge.

The landscape quality of these areas varies between medium to fairly high. It comprises mixed landuses of all types from market gardening, fruit growing, to cattle and dairy herds, stud farms and racing stables. The area is dotted with groups of both native and exotic trees particularly around farmhouses. Hedgerows are a feature. There are occasional small knolls where farmhouses are built surrounded by trees. There are distinctive clumps of kahikatea in parts.

Other than these knolls the landform is mostly flat. The soil is extremely good and therefore site recoverability is likely to be good, though some parts of the plains have had to be drained in order to get them into pasture.

The visual absorption capability of these landscapes is medium. Because of the lack of screening landforms, new developments would stand out, though the numbers of trees and other vegetation would assist in screening. Some parts of the plains are heavily vegetated, others sparsely."

The description for 'Alluvial Flats' in the 1991 Landscape Assessment includes a specific description of what the study defines as the 'Hamilton to Cambridge Corridor':

"Part of this landscape type is the Hamilton to Cambridge corridor. There are a greater range of landuses along this corridor than elsewhere in the landscape area,

⁶ Preliminary Landscape Assessment for Waipa District, prepared for Waipa District Council by LA4 Landscape Architects and Gabites Porter Ltd, April 1991.

with some rural residential development, as well as the farms, stud farms and market gardening. All uses are intensified along this corridor. The land is flat here also with knolls, very large trees and tall hedgerows. There is very good screening in this corridor. The soil is excellent, indicating that site recoverability will be good.

The landscape quality of this area is medium, and the visual adsorption capability is quite high because of the screening afforded by trees and hedgerows and the good soils.”

The description of the general features of the alluvial flats and the associated scenic corridor corresponds with much of the flat land that the Project traverses. There are rich soils and a diversity of landuses. There are some areas that have quite dense plantings of exotic trees and shelterbelts and hedges. There are other areas that are quite open.

The other landscape type noted in the 1991 study that the Project traverses is ‘River Valleys’, which is described as follows:

“The river valleys are a very characteristic feature of this area. Over the years the rivers in the Waipa District have eroded away the alluvial soils. A series of river terraces have been formed in some places. All of the river valleys have very steep sides, sometimes with flat land at the water level or part way up the steep slopes.

The most unusual aspect of the river valleys is how difficult it is to get views down into them from the surrounding land. They are the hidden landscape feature of the Waipa district.

Their landscape quality is high.”

The 1991 Landscape Assessment contains a ‘landscape analysis’ map that shows that the majority of the ‘River Valley’ landscape type is within the incised flood channel of the Waikato River, of which the lower reaches of the Karapiro Stream Gully area are a very small part. Much of the description provided applies to the gully; its valley walls are steep, it is difficult to obtain a view of the gully, and its landscape quality is relatively high, due to the diversity of vegetation it contains and the visual contrast of the gully with the surrounding alluvial flats.

3.3 Waikato District Council – Proposed District Plan

A small section of the western end of the Project is located within the southern edge of the Waikato District. The following provides a summary of the key policies in the Proposed Waikato District Plan that are relevant to the landscape and visual aspects of the Project in respect of the area within the Waikato District.

Policy 3.4.2(e): Avoiding, remedying or mitigating as soon as practicable, the adverse visual effects of earthworks and vegetation clearance by: retaining vegetation, restoring natural contours and replanting with appropriate species, limiting the area of soil exposed by earthworks and the length of time it is exposed, and locating and constructing roads, tracks and vehicle accesses to minimise their visual impacts.

The Project will achieve this policy by minimising the visual effects during construction, through such methods as retention of vegetation and planting of appropriate species, as part of the landscape mitigation.

Policy 8.2.3(d): The integrated, safe, responsive and sustainable operation of the land transport network should be promoted through: provision for pedestrians, cyclists and the disabled, including off road routes and connections including pedestrian malls.

The Project will achieve this policy through the integration and provision of cycle and pedestrian facilities within the designation. These facilities will link with those included within that part of the Expressway that runs through the Waipa District to provide a connected system.

Policy 8.4.2: Road and rail maintenance, construction and operation should minimise adverse effects on people, communities and the environment by managing:

(a) discharge of storm water.

The Expressway will meet these requirements with the integration of sustainable drainage systems and swales, which also provides opportunities for the inclusion of indigenous vegetation.

Policy 8.4.2: Road and rail maintenance, construction and operation should minimise adverse effects on people, communities and the environment by managing:

(c) disturbance to natural landforms, soil resources, indigenous vegetation and habitats, and cultural and heritage sites.

Although no significant vegetation occurs within the Waikato District section of the Expressway, where possible, existing vegetation will be retained, protected and enhanced to minimise effects.

Policy 8.4.2: Road and rail maintenance, construction and operation should minimise adverse effects on people, communities and the environment by managing:

(f) connections between communities.

The Project will achieve this policy by maintaining road, cycle and pedestrian links and connections from the Expressway to Cambridge and from the surrounding areas.

Anticipated Environmental Results

8.10.1 Operation of the land transport network

(i) Amenity not duly impacted by roads, including street lights.

The amenity values of the area will be considered to ensure appropriate mitigation measures will be integrated into the Project to minimise the effects on the area's amenity.

3.4 Waipa District Growth Strategy – Waipa 2050

Waipa District Council has developed and adopted the Waipa District Growth Strategy 2050⁷, which provides a framework, vision statements and strategy development plans for towns across the region. The strategy document provides an overview of projected growth in Waipa District and the anticipated character of the District to 2050. It describes the general rural environment while providing a specific description for Cambridge and identifying growth areas for residential, commercial and industrial uses in and around the town. The Project's designated route is identified in the strategy and forms the northern boundary to Cambridge residential areas.

3.5 NZTA Guidelines for Highway Landscaping

The NZTA's Environmental Policy Manual aims to protect and enhance the environment, where appropriate, and to avoid adverse effects where reasonably possible.

These aims are also expressed in the NZTA Guidelines for Highway Landscaping⁸ which has been considered as part of this assessment. Section 2 of those Guidelines identifies the NZTA's expectations for good highway landscaping as:

- Maintaining and improving safety;
- Promoting biodiversity;
- Improving visual quality;
- Managing storm water runoff;
- Managing pests;
- Improving local air quality; and
- Improving the NZTA's business practices.

3.6 NZTA Urban Design Policy

The NZTA has developed an Urban Design Policy⁹, that promotes an integrated design approach for NZTA's highway projects that encompasses the traffic and civil engineering, urban design, landscape, ecological, storm water and heritage aspects of highway projects. The NZTA acknowledges in its urban design policy that all these factors need to be integrated to ensure an overall positive environmental solution for its highway projects.

To this end, mitigation measures have been developed as part of the overall environmental, urban design and landscape development of this Project. The Project's response to the expectations of the amenity-related objectives and policies in the District Plans will also act to meet the NZTA's urban design expectations.

⁷ Waipa District Council – Waipa District Growth Strategy, adopted 30 June 2009.

⁸ Guidelines for Highway Landscaping, Version 2, Transit New Zealand, December 2006.

⁹ <http://www.nzta.govt.nz/resources/urban-design/policy/>

4 Methodology

The landscape, visual and urban assessment has included the collection of baseline information through desktop studies collating background planning information and existing studies, and a field survey to collate the necessary baseline information. The study area has extended beyond the designation boundary and covered the surrounding area from which the Expressway will be visible. The baseline information has been utilised to appraise and describe the study area, classify the landscape character and evaluate the visual resource (i.e. attach a value).

The baseline information examines the landscape patterns, landform, land use and land cover and considers potential visual receptors (viewers). Receptor groups include single residential properties along the Expressway corridor, groups of viewers (i.e. groups of dwellings and commercial properties) and travellers through the area (i.e. drivers, cyclists and pedestrians).

The assessment also considers the urban design aspects of the Project, and references the NZTA's Urban Design Policy, the Waipa District Growth Strategy 2050, and the 2007 Urban Design Preliminary Design Philosophy Statement (Refer to **Appendix 1**). The urban design process has assessed the background information and reports, and assimilated the information to provide appropriate responses and mitigation measures within the Project.

Information presented within the assessment appendices includes:

- Urban Design Preliminary Design Philosophy Statement;
- Site plan and maps locating the Expressway on an aerial map;
- Location plan of site photographs and site photographs;
- Landscape mitigation plans;
- Cross sections; and
- Scheme montages.

The scheme montages have been prepared utilising three dimensional digital models of the Project that enable 'snap shot' views to be generated. These images are then enhanced with planting to reflect the preliminary landscape plans. The montages produced are not photorealistic, but aim at being a fair representation of the appearance of the Project within a 5 to 10 year period.

5 Landscape Context

5.0 Landscape north of Cambridge

The broad landscape context in which the Project is located is that of the alluvial plains of the Waikato River Basin, which is bisected by the Waikato River. Rising above the low level plain and dividing it into the basin's three major former swamp areas (now mostly highly productive agricultural land) are low rolling hills and ridgelines. The main ridgeline runs

north/south from Hamilton to Te Awamutu and separates Rukuhia and Moanatuatua Swamps.

Between Hamilton and Cambridge, the land is flat with the very occasional small, rounded hill. The other noticeable features are various gullies formed by tributary streams that flow towards the Waikato River, such as those at Tamahere and immediately south of Cambridge. The remaining features of this landscape are the numerous stands and individual specimens of mature, exotic deciduous trees such as plane and oak broadly scattered throughout the plain, shelterbelts and hedges, roads and buildings (from towns though to individual farmhouses and sheds).

The views within this landscape are potentially expansive, but often contained to varying degrees by trees and hedges. The ranges and volcanic cones at the margin of the Waikato River basin form the distant skyline to the west, with the more immediate rounded forms of the Pakaroa Range, Maungakawa and Maungatautari forming the skyline from the northeast through to the south.

A more detailed description of the local landscape that the Project traverses is provided in sections 5.21 to 5.4, with the Expressway designation corridor broken down into sections running from the west.

5.0.1 Landform

The 1991 Waipa Landscape Assessment (Section 3.3) provides a broad overview of the landform that the Project traverses. In its simplest terms, it is a flat landform that in its southern extent, contains a distinct, incised gully at Karapiro Stream. There are some minor features within the local flats, such as a small knoll in the Stanfield Oaks property between Hautapu Road and Discombe Road, some subtle alluvial undulations between Swayne Road and Thornton Road and the occasional artificial, open drain.

5.0.2 Landcover

As outlined in the Project's Ecological Assessment¹⁰, the vegetation in the area of the designation corridor, other than grazed pasture, is predominantly exotic. The landscape is dominated by grazing paddocks, defined by hedgerows and shelter belts with large exotic trees scattered throughout the landscape. There are few examples of any native vegetation along or close to the designation.

Vegetation along the northern side of Karapiro Gully is regenerating native bush with infestation of weeds. The southern side of the gully consists of pasture and areas of pine plantations. At the base of the gully, native vegetation is sparse with pasture and weed communities being dominant.

Close to the designation corridor in the Forest Road area there is a small area of native vegetation of note. This is a re-vegetated area of drain which forms the upper section of Mangaomapu Stream, with native vegetation being approximately 8m in height.

¹⁰ "Waikato Expressway Cambridge Section Ecological Assessment" prepared by Opus International Consultants Ltd, Hamilton June 2010.

5.0.3 Landuse

The most common landuse along the Project length is farming, mainly the grazing of beef and dairy cattle, horses and some sheep in paddocks of ryegrass pasture. Additional landuses along the designation corridor include, a contractor's yard, a berry orchard, an early childhood education centre, a plant propagating nursery and an area of partially grazed scrubland (the Karapiro Stream gully).

Other uses near to the Expressway include, horse racing on the Cambridge Race Course at Hannon Road, semi-industrial uses along the west side of Victoria Road, suburban residential development from Watkins Road through to Thornton Road, a council reserve and woodlot forestry, and scrubland at Karapiro Stream.

5.1 Hautapu Road to Peake Road

South from Hautapu Road (**Appendix 3**, Photo 01), SH1 is relatively enclosed by hedges and various stands of large trees through to the intersection with Discombe Road. On the north side of SH1 and also contained by Hautapu Road and Discombe Road, is a single farm – Stanfield Oaks. The majority of this property's highway frontage has a continuous, trimmed thorn hedge that is approximately 4m high. There is an opening in the hedge at the Hautapu Road corner where there is a "triangle" of planting within the property. This planting is 10 - 12 years old and contains pittosporum and other native species, along with silver birch trees that are approximately 12m high. There are further trees that have been planted along the total length of the "back" of the hedge and these are now evident above the hedge. There is also a further "triangle" of planting at the property's Discombe Road corner.

At the midpoint of the property's highway frontage is what used to be the main gateway entrance to Stanfield Oaks; the main dwelling on this property is now accessed from Discombe Road. On either side of the gateway in a lawn setting, there are two mature totara, both of which are approximately 25m high. On the south side there is a group of 3 oak trees, which are up to 30m high and have an underplanting of pittosporum. On the north side of the gateway there are 4 oaks, two of which are over 30m high and a group of 3 totaras, with further underplanting of pittosporum.

South from Hautapu Road on the southwest side of SH1, the adjoining properties have relatively open frontages, with the residences set back from the highway, except for the property at chainage 200¹¹, which has a dense frontage planting of trees and shrubs, part of a larger residential garden/plant collection. Many of the plants on this property are rare species; the seeds for which have been collected overseas and are subsequently being used by the owner as the source for further plant propagation.

South of the chainage 200 property along the southern highway boundary fence line, are shrub and flax plantings along with a single large conifer tree, a totara and an oak tree. From there, the highway is open to the paddocks beyond. The farmhouse and outbuildings in the adjoining property are set a short distance back from the highway. From the point

¹¹ Chainage numbers are shown on the drawings, commencing from the west of the Expressway increasing in distance to the east.

opposite Discombe Road, there is a high thorn hedge along the southern highway margin that runs to Hooker Road.

From SH1, Discombe Road (**Appendix 3**, Photo 02), runs directly east for approximately 400m, then a right angle bend takes the road directly north to Hautapu Road. The Stanfield Oaks frontage of both ‘legs’ of Discombe Road is comprised of dense hedgerow planting, which includes various deciduous trees that overhang the road edge.

On the east side of the northern ‘leg’ of Discombe Road, there are several dwellings and their associated garden and shelter plantings. Between the house yard plantings, the road is open to the adjoining farmland, which extends as open, flat paddocks to a low trimmed hedge approximately 350m to the east. Beyond the hedge, and before Forest Road, there is an area of further flat paddock that contains a grid pattern of shade trees, a further higher thorn hedgerow, three sets of high voltage transmission lines and their associated pylons.

East to the corner of Discombe Road there are a pair of low trimmed thorn hedges that run parallel to the designation corridor to the first ‘cross’ hedge, and then further hedging continues along the southern edge of the designation to Forrest Road. There are also several poplar shelterbelts that run south perpendicular to the designation. Close to Forrest Road there is an open drain that crosses the designation and flows past a stand of mature macrocarpa trees, through an area of planted native trees and shrubs behind a house, and on to the Mangaomapu Stream to the south.

From Forrest Road (**Appendix 3**, Photo 03) to Peake Road (**Appendix 3**, Photo 04), there is a continuation of open farmland, with various sections of trimmed hedge, higher untrimmed hedgerow and scattered mature, individual shade trees. Thorn hedging continues along much of the south edge of the designation and several high thorn hedgerows run south perpendicular to the designation corridor. Towards Peake Road, there are a number of horse racing studs and training tracks, such as on the property H9¹², on the northern side of the designation corridor.

5.2 Peake Road to Swayne Road

From Peake Road through to Hannon Road (**Appendix 3**, Photo 05), the flat expanse of farmland continues, with more horse racing studs and then broad, open paddocks north of the designation. To the south is the developing rural-residential subdivision of Nagar Lane and various concentric race tracks of the Cambridge Racecourse, which are situated immediately to the south of the Project.

In the relatively short distance between Hannon Road and Victoria Road (**Appendix 3**, Photo 06), there are some subtle undulations in the landform and a denser subdivision pattern that is reinforced by mature tree plantings along various boundary lines. On the north side of the designation there are various buildings and yards associated with the rural service industry, such as tractor sales and servicing and an earthmoving contractor’s yard. Most of these service businesses front onto Victoria Road. The Hautapu Cemetery and Fonterra’s Hautapu Dairy Factory are a short distance further to the north. On the south

¹² H9 – 215 Peake Road. Note: Property numbering follows the numbering utilised within the Noise Report for consistency.

side of the designation, many of the small holdings are associated with horse racing and contain numerous shade trees.

Beyond the road and rail corridor of Victoria Road, there is a broad, open expanse of dairy farm that extends across much of the 1.1km between Victoria and Swayne Roads (**Appendix 3**, Photos 07 and 08). Towards Swayne Road on the north side of the designation corridor, house H37¹³ is sheltered by numerous mature trees in its farmyard. Between this yard and Swayne Road is an orchard that is enclosed on all sides by a mixture of poplar, willow and conifer shelterbelts.

5.3 Swayne Road to Thornton Road

East of Swayne Road through to Watkins Road (**Appendix 3**, Photo 09), the designation corridor has the expanding northern margin of Cambridge to the southwest and a continuation of relatively open farmland to the north and east. The treed aspect of the local landscape intensifies east of Swayne Road and south of Appleby Road as a reflection of the greater number of established smallholdings in the area, which is now steadily being transformed into suburban housing. Within this area, at the intersection of Swayne and Appleby Road, is an early childhood educational facility, Little Einsteins (building H42). On the immediate northern edge of the designation, just prior to Watkins Road, is the Waipa District Council's potable water reservoir.

East to south east of Watkins Road through to St Kilda Road (**Appendix 3**, Photo 11) and Thornton Road (**Appendix 3**, Photo 10), there is further open farmland and then established rural-residential development bounding on to eastern local roads. On the immediate east side of the intersection of St Kilda and Thornton Roads is a plant propagation nursery. There are various stands of mature trees and shelterbelts within the farmland that shelter the houses along St Kilda Road.

On the southwest aspect of the designation from Watkins Road through to Thornton Road are two areas of recent suburban development – the Watkins Road and Oaklands Drive parts of Cambridge North (**Appendix 3**, Photos 14 and 15). These areas are separated by the northeast corner of Cambridge's Town Belt Reserve. This Reserve connects to a 30m wide linear reserve that parallels the western edge of the designation corridor between Watkins Road and Thornton Road. The northern portion of this linear reserve adjoins the houses that are accessed off Saffron Street and has been developed with a 30m buffer, containing a walkway and cycleway, plus landscape planting. It appears that the Oaklands Drive portion of the linear reserve is yet to be developed.

5.4 Thornton Road to Golf Hill South

Opposite the intersection of St Kilda Road and Thornton Street, the designation corridor is aligned to the southeast and traverses several small paddocks that contain a number of large, deciduous trees. On the south side of the paddocks are pine and poplar trees that define the northern edge of the Karapiro Stream gully. There is a pa site and a suspected urupa in the southern portion of these paddocks overlooking the gully.

¹³ H37 – 137 Swayne Road.

West of the designation are various residences on the Athlone Drive cul de sac. East of the designation is a cluster of residences that have a rural aspect and are accessed off the south side of Thornton Road. All of these residences are located within relatively large sections with well developed gardens.

The incised alluvial cut of Karapiro Stream gully (**Appendix 3**, Photo 12) is a dramatic contrast with the flat land and the farming, rural-residential and suburban landuses to the north of the gully and the flat to rolling farmland to the south. The diverse range of vegetation, both exotic and native, is a strong contrast to the highly modified and cultivated landcover to the north and south. The gully also contains the only notable water course within the length of the designation corridor, but due to the incised landform, the vegetation within the gully and the setback of the gully from local roads, the stream is an invisible element of this landscape.

On the south bank of the gully, there is open farmland along the designation corridor until it connects to the existing SH1. From the site of the proposed Southern Interchange (**Appendix 3**, Photo 13), SH1 continues southeast past Lake Karapiro and on to Tirau. Just west of the proposed Interchange, a small localised gully falls away from the south side of the designation.

6 Urban Design Context

6.0 Review of Urban Design Preliminary Design Philosophy Statement

In 2007, a Urban Design Preliminary Design Philosophy Statement (Urban Design Statement), (refer to **Appendix 1**) was prepared that focussed on the Peake Road to Thornton Road section of the Project. The reason for this particular focus was that this central section of the Project has existing and future urban-related landuse issues, whereas the remaining sections of the Project to the west and east have a more rural context.

A précis of what is covered in the urban design preliminary design philosophy statement is presented in its introduction and summary.

The introduction of the Urban Design Statement states:

“Transit New Zealand (Transit) is wishing to confirm the extent of the designation required for the Cambridge Bypass section of the Waikato Expressway. Since previous reports have been completed the northern residential section of Cambridge has grown out to the southern edge of the designation, and Waipa District Council are proposing an industrial zone at Hautapu along the northern edge of the designation. Therefore, the context issues for the Cambridge Bypass Project (the Project) have shifted from largely rural landscape effects to a mix of rural and urban effects.

*The **Contextual Analysis** firstly looks at the larger scale relationship between Cambridge and the Project to establish themes for the whole corridor length.*

*The corridor is split into two sections defined by industrial and residential landuse along the route. The **Hautapu Section** looks at context issues for the Cambridge Jockey Club and the proposed industrial zone. The **Cambridge North Section** looks at context issues for residential landuse stretching from Victoria Road to Thornton Road. The **Victoria Road Interchange** is examined separately given its future significance as the major entry to Cambridge from the North.*

Although some design solutions are suggested these are only for the purpose of testing the required extent of designation. The report is more an Urban Design Framework for subsequent design phases to utilise.”

The summary notes the following 8 points:

- 1. The Cambridge Bypass is conceived as a Second Town Belt to create a positive urban edge for the town.*
- 2. Landscape design could extend Cambridge’s streetscape tree planting along Victoria Road and the Cambridge Bypass to reinforce the ‘Town of Trees’ image as a consistent corridor theme. Victoria Road will become the main northern entrance to Cambridge.*

3. *An asymmetric planting design responds to an urban edge on the southern side of the corridor, and rural/industrial edges on the northern side.*
4. *Denser native (evergreen) planting could be considered to screen the less attractive Hautapu industrial zone.*
5. *Mounds are preferable to noise walls for acoustic mitigation. Locating the mounds outside the existing swale/footpath buffer area appears possible in the Cambridge North Section. This buffer and footpaths should extend along the future urban area between Hannon and Victoria Roads.*
6. *Walking/cycling paths beside the Hautapu Industrial zone will have surveillance problems if denser planting is preferred. These could be relocated to internal roads if the visual screening is considered more important.*
7. *A diamond interchange is preferred from an urban design perspective but it causes problems with the rail designation along Victoria Road.*
8. *Karapiro Stream Gully and project areas outside the sections in this report are rural in character so are covered in the Landscape Architect's assessment."*

The Urban Design Statement notes the branding of Cambridge as 'Town of Trees' and the significance of SH1B/Victoria Road as an 'entranceway' and the link between the Project and the town¹⁴. An argument is made for developing this treed character and connection as follows:

"Landscaping will form part of the mitigation features along the Cambridge Bypass Project's edges. Native planting is appropriately favoured in current Transit projects to create distinctly New Zealand environments, but Cambridge's character is largely established through ordered planting of exotic oak and plane trees. A regular rhythm of trees along the Bypass corridor will establish a town edge that is consistent with Cambridge's character.

*Cambridge Bypass should be considered as a **Second Town Belt** to establish a new urban edge now that Cambridge North has jumped across the existing Town Belt. Although kerbside paths and trees are not possible with a State Highway, regular tree planting and walking/cycling paths located safely within the corridor will create a positive edge to Cambridge. This can reinforce the image of Cambridge, attract visitors and enhance the road users' experience."*

The above statements provide a number of points, which are still valid for the current Project. The Expressway will act as a second town belt, where appropriate planting will be used to reflect the treed character of the area, with an urban feel to the south and a more open environment to reflect the rural nature to the north. Furthermore, the Victoria Road Interchange will utilise planting to emphasis the main north entrance to Cambridge, although the Northern and Southern Interchanges also provide important entranceways into

¹⁴ Cambridge Bypass, Urban Design Preliminary Design Philosophy Statement, Brewer Davidson, July 2007, Page 6, Contextual Analysis.

Cambridge. Additionally, noise mitigation will utilise earth mounds where possible. Walking and cycling have been integrated into the scheme, and provide a safe facility. The Project reinforces the 'treed' image of Cambridge and enhances the road user's experience, by encompassing the above objectives and a number of other initiatives in relation to the structures, integrated drainage systems, landscape and ecological enhancements.

6.1 Cambridge Town Concept Plan

Waipa District Council has prepared a Town Concepts Plan¹⁵ for Cambridge that has a variety of objectives, as outlined within Section 4 of the document as follows:

- *Build on and enhance Cambridge's distinctive heritage character and image as a vibrant community located on the Waikato River;*
- *Provide for appropriate land uses that enhance the economic wellbeing of Cambridge and contribute to the town's cultural and social wellbeing;*
- *Provide built form that incorporates sensitive, high quality, integrated urban, landscape and architectural design;*
- *Enhance and extend connectivity throughout Cambridge by providing improved opportunities for pedestrians and cyclists to move safely and comfortably within and around town;*
- *Continue to enhance pedestrian, cycle and other sustainable movement modes to minimise vehicle movement and parking requirements;*
- *Maintain and enhance public spaces, streets and reserves, including the qualities that reinforce Cambridge's tree lined streetscape character and high amenity, safe, secure open spaces;*
- *Protect and enhance vistas and street views that celebrate significant buildings and features, and reinforce visual connections to wider rural and natural landscape features;*

These objectives are relevant to the Project and have been articulated within the final form of the Expressway.

In the Town Concept Plan there are a number of character areas on the northern aspect of Cambridge that bound the designation corridor for which there are specific urban design-related considerations. These include:

Cambridge North (Character Area 5) – this area extends from Hannon Road through to the existing SH1 at Golf Hill south and is bordered to the north by the designation corridor. In terms of a link to the Expressway, it is noted that *"the future design treatment of Victoria Road will have a lasting effect on the image of Cambridge, both as a first impression for visitors to the town and as a much used movement route for locals. Accordingly, its design*

¹⁵ *Cambridge Town Concept Plan: Draft Report*, prepared by Beca Carter Hollings & Ferner Ltd for Waipa District Council, October 2009.

*will need to be considered carefully to ensure that it adds positively to the amenity values and character of the town.*¹⁶

St Kilda Waterways (Character Area 7) – this area is located northeast of the designation corridor from Watkins Road to Thornton Road and is an approved large lot/rural residential zone, currently in the planning phase.

Hautapu Industrial Lands (Character Area 12) – this area is seen as potentially playing an important role in Cambridge's economy and has the potential to be developed in line with the surrounding land and *"will be developed in the future as industrial; uses, compatible with the existing dairy factory"*.¹⁷

7 Description of the Project

As shown in **Appendix 2** and noted previously, the Project is a new 11.4km alignment of SH1 that runs east from Cambridge Road (SH1) just south of Hautapu Road. The Expressway then truncates Forrest Road, underpasses Peake Road, truncates Hannon Road, overpasses Victoria Road (SH1B), underpasses Swayne Road, truncates Watkins Road, underpasses Thornton Road, and bridges Karapiro Stream to rejoin SH1 at Golf Course Hill to the south of Cambridge. A full description of the Project is given in the AEE.

Other than at its immediate northern and southern points, where the Project connects with the existing SH1, the widened designation corridor will follow a 'greenfields' route. The designation is widened predominantly on the north side of the existing corridor.

The main visible components of the Expressway are dual two-lane carriageways that will be separated by a central median. The median will be 9m wide, but will reduce to 6m east of Watkins Road (**Appendix 4**, Sheet 10). The median includes two 1.0m wide sealed shoulders and a centrally located steel cable safety fence, with the remainder of the median being grassed. Associated built features will be:

- The Northern Interchange that will connect local traffic to Cambridge Road (existing SH1). South-bound local traffic using the off-ramp will overpass the Expressway on a single lane bridge that will have a skewed alignment, 3 sets of single supporting piers, a vertical MSE (Mechanically Stabilised Earth) wall at the north abutment, a sloping 'spill-thru' southern abutment and approach embankments (**Appendix 4**, Sheets 5 and 201, **Appendix 6**, Figure 6.1).
- The Peake Road Underpass where the Expressway passes under a two lane bridge that carries local traffic. This bridge will have a straight alignment, 3 sets of twin piers, spill-thru abutments and approach embankments (**Appendix 4**, Sheets 7 and 203, **Appendix 5**, Figure 5.5, **Appendix 6**, Figure 6.6).
- The SH1B Victoria Road Interchange, which will be a full diamond, grade-separated interchange with the Expressway over-passing local traffic and a designated railway

¹⁶ Cambridge Town Concept Plan, Section 3.5, Cambridge North, page 9.

¹⁷ Cambridge Town Concept Plan, Section 3.12, Hautapu Industrial Lands, page 10.

corridor¹⁸. The pair of Expressway bridges will have straight alignments, 3 sets of twin piers, spill-thru abutments and combined approach embankments (**Appendix 4**, Sheets 8, 9 and 205, **Appendix 6**, Figures 6.2 and 6.3).

- The Swayne Road Underpass where the Expressway passes under a two lane bridge that carries local traffic. This bridge will have a straight alignment, 3 sets of twin piers, spill-thru abutments and approach embankments (**Appendix 4**, Sheet 9 and 205). From the north end of the northern approach, there will be a new link road that will realign Appleby Road and connect to the proposed St Kilda Waterways subdivision to the north of the expressway (**Appendix 4**, Sheets 9, 10, 205 and 206, **Appendix 6**, Figure 6.7).
- The Thornton Road Underpass where the expressway is in an excavated cut and passes under the local road (**Appendix 4**, Sheets 11 and 207). The local traffic will be on a two lane bridge that will be at grade to the surrounding land. The bridge will have a straight alignment, sets of twin piers, and its abutments will be part of the retaining wall within the Expressway cut formation. From the eastern side of the underpass off Thornton Road, there will be a new link road that will realign the southern end of St Kilda Road (**Appendix 4**, Sheets 11 and 207).
- The Karapiro Stream Gully Bridge, which will carry the Expressway traffic on a pair of viaduct-type bridges. The vertical sag occurs to the north of both bridges, with the bridges inclining slightly to the south and a horizontal alignment that has a subtle sweep to the south-east (**Appendix 4**, Sheets 11, 12 and 207, **Appendix 6**, Figure 6.5). Each bridge will have four sets of single piers that will avoid the invert of the Karapiro Stream.
- An access road will be constructed on the southern side of the Karapiro Stream gully for bridge construction and maintenance purposes (**Appendix 4**, Sheets 11, 12 and 207).
- The Southern Interchange, which will have only a south-east-facing on-ramp and a north-west-facing off-ramp. The Expressway will pass over a local access road and the on-ramp, which will both be located in an excavated cut (**Appendix 4**, Sheet 12 and 208). The alignment of the local access road and the on-ramp is skewed with respect to the Expressway alignment. The Expressway will be carried on twin bridges that will be constructed at grade to the surrounding land. The bridges will have sets of twin piers, and sloping cut batters at the abutments. The north-west-bound off-ramp will be excavated in cut. The local road that will provide access to and from properties on the northern side of the alignment will curve to intersect with the existing SH1 alignment (Tirau Road) at a right angle. A local road will also be constructed to provide access to and from properties on the southern side of the expressway alignment. It will be constructed alongside the off-ramp but at a different level over much of its length. It will curve to intersect with the existing SH1

¹⁸ The latter is used to link rail traffic from the close-by Hautapu dairy factory to Cambridge township. The railway is still operational from the dairy factory back through Matangi and Newstead to Frankton in central Hamilton.

alignment and form a staggered tee intersection, with the local access road servicing properties on the northern side of the Expressway.

- Stormwater treatment wetlands, which will be excavated at two locations to treat the stormwater runoff from the completed Expressway: in the vicinity of the current intersection of St Kilda and Thornton Roads (**Appendix 4**, Sheets 11 and 207) and on the southern side of the Karapiro Stream gully (**Appendix 4**, Sheets 12 and 208).

The roading component of the Project will be seen for the most part, as two parallel “ribbons” of seal that will be on fill for approximately 8km; being the western 70% of the total length. Between the Northern Interchange and Swayne Road, the Expressway will have a 9m grassed median, with the grassed median tapering to 6m at Watkins Road, which continues to the Southern Interchange. The fill will be in the order of approximately 1.m above grade in the Northern Interchange area, rising to about 3m between Forrest Road and Peake Road, then to approximately 9m at the crest of the SH1B Victoria Road Underpass and back to approximately 2.5 - 3m above grade between Swayne Road and Watkins Road.

Between Watkins Road and Thornton Road, the Expressway will pass into a cut formation that will be approximately 6m deep at the Thornton Road Underpass and up to approximately 6m deep between the underpass and the Karapiro Stream Gully. The deck height of the Karapiro Gully bridges will be approximately 40m above the Karapiro Stream. The depth of cut at the eastern lip of the gully will be approximately 3m deep.

The Expressway will only cross one watercourse of note – Karapiro Stream (**Appendix 4**, Sheet 11). High stormwater volumes from storm events will be drained to retention basins located adjacent to the Thornton Road Underpass (**Appendix 4**, Sheets 11 and 207), above the southeast abutment of the Karapiro Stream Gully Bridge (**Appendix 4**, Sheets 12 and 208), and at the end of the off ramps at the Southern Interchange.

Waipa District Council has also provided in its Cambridge North Structure Plan for a 30m wide reserve that will run parallel to the southern edge of the designation from SH1B/Victoria Road south to Thornton Road. This reserve will have a 2m earth bunds (**Appendix 5**, Figure 5.2, **Appendix 6**, Figure 6.8) to screen the residential properties from the Expressway, while also providing an amenity function to the adjacent residential areas.

Noise mitigation measures will include the construction of 2 to 3.5m high earth bunds and the installation of a single noise wall that will be up to 3m high. The noise wall will be 250m in length situated on the northern side of the Expressway adjacent to properties H6 and H7, between chainage 1300 to 1550 (**Appendix 4**, Sheets 5, 6, 201 and 202). To the northern side of the Expressway adjacent to property H9, chainage 3500 to 3900, an earth bund up to approximately 3m in height will be installed and will tie into the embankment of the Peake Road underpass.

Along the south side of the designation from Watkins Road south along the edge of the Saffron Street/Madison Street buffer reserve (chainage 7550 to 8350) (**Appendix 4**, Sheets 10 and 206), noise mitigation measures will incorporate 2m earth bunds.

At the Southern Interchange, a 2.5m screening fence will be installed between the off ramps and local access roads between chainage 11450 to 11600. This fence will have a dual purpose of screening light glare between off ramps and access roads, and providing noise mitigation.

Urban design inputs will act to ensure pedestrian and cycle connectivity is maintained for the local community across the Expressway on the local road overbridges (**Appendix 6**, Figures 6.2, 6.6 and 6.7). Each bridge will have roadway shoulders that are at least 1.5m wide and the Peake Road, Swayne Road and Thornton Road overbridges will each have a 2m wide footpath on one side only. 2.5m wide shoulders will be provided on the Expressway for cyclists' use. The urban design input will also aim to achieve an appropriate and consistent design style utilised for all of the bridge structures.

8 Assessment of the Landscape, Visual and Urban Design Effects

8.0 Landscape Effects

In their simplest form landscape effects arise from changes to the landform, landcover and landuse components of the local landscape. These physical changes to the landscape from the construction and operation of an expressway typically occur due to:

- the removal of existing structures and vegetation;
- the excavation of cut batters;
- the placement of fill formations;
- the construction/placement of the expressway surface, bridges, lighting and other structures;
- implementation of stormwater, noise and visual mitigation measures; and
- traffic on the completed expressway.

The above effects are examined in relation to landform, landcover, landuse and visual effects along the duration of the Expressway.

8.0.1 Landform

The potential change to landform will arise from the Project's cut and fill earthworks and the placement of bridge approaches.

The cut formation is confined to the southern end of the Project with the excavation of the approaches to the Karapiro Stream Gully Bridge through to Watkins Road with a cut formation that will be approximately 6m deep at the Thornton Road Underpass. The depth of cut at the eastern lip of the gully will be approximately 2.5m deep. The combined length of the two sections of cut will be approximately 2.3km or 20% of the overall length of the Project.

The northern section of cut tapers from approximately 38m wide (chainage 7900) at its upper edge through to 66m wide (chainage 9300) at the Thornton Road underpass. South of the underpass, an opposing pair of 3m high retaining walls that are approximately 400m long, will be installed to narrow the cut width and thereby limit the potential effect on iwi-related sites at the gully edge. Between the underpass and the Karapiro Stream Gully Bridge the cut will taper from approximately 53m wide (chainage 9400) to 40m (chainage 9700) at the upper edge of the cut. On the south side of the gully bridge, the cut will taper from approximately 50m wide (chainage 10100) at its widest down to 44m (chainage 10500) where the Expressway formation returns to grade.

At this end of the Project, the incised nature of the Karapiro Stream gully is a distinct contrast with the surrounding flat landscape. Whilst the two cuts could be considered to reflect, in part, natural incised tributaries to the gully, the linear alignment of the cuts reinforces their artificial nature. Though the cuts will be an obvious contrast of landform; in

a flat landscape with various intervening structures and areas of vegetation, the extent of this effect will be quite localised. Having a section of the Expressway in cut will also be advantageous in terms of limiting visual and noise effects and as a source of material for some of the required fill formation.

As previously noted, the Expressway will be on fill for approximately 8km; being the western 70% of the total length. The fill formation varies in width from approximately 40m wide (chainage 1400) at Discombe Road, to 47m (chainage 2900) east of Forrest Road to 42m (chainage 7200) east of Swayne Road.

A broad strip of fill running through a flat landscape that is accentuated at various locations by bridge approach embankments and grade separated interchanges will create a very obvious landform change. By comparison, the fill height of approximately 3m is slightly higher than the eaves of a single storey house, and 9m is one metre higher than the ridge of the roof on a two storey house.

Conclusion

In summary, the effects on landform will be the result of the elevated sections of carriageway from the Northern Interchange through to Watkins Road, and the changes in landform as a result of fill formations and construction of structures above-grade at the Interchanges and Underbridges. From the south of Watkins Road, towards and including the Karapiro Stream Gully Bridge, the Expressway will be in a large incised cutting through the flat topography. Therefore, the changes will have a moderate localised effect on the landform, due to the changes to the existing flat landform. The inclusion of earth bunds will contribute to changes in landform, however, as the bunds will be contoured to integrate into the surrounding landscape, their effect on landform will be minor. Extensive landscape planting will be utilised where landform changes have occurred, which will assist integrating the Project into the existing landform to minimise the effects.

8.0.2 Landcover

The general vegetation cover between Hautapu Road and Golf Hill South is described in the Project's Ecological Assessment¹⁹. This report concludes that *"the study corridor encompasses a highly modified, intensively farmed landscape which for the most part supports no indigenous vegetation and little indigenous fauna."*

A further concluding comment is that *"the Karapiro Gully is the only feature that retains significant ecological values that will be impacted by the road."* Most of the ecological values of the gully are vegetation-related and therefore the ecological focus is on the native vegetation in the gully.

In terms of the landscape values of the vegetation cover, the majority of the landscape that the Project traverses is modified. Notable vegetation in the landscape is mature, exotic trees, along with shelterbelts, hedgerows and hedges. The removal of trees, in particular along the designation corridor, will result in obvious, but localised landscape effects. Trees are to be removed in the following areas:

¹⁹ Refer to footnote 11.

- The SH1 'entrance' (chainage 600) and Discombe Road corner (chainage 1300) of 3 Stanfield Oaks;
- The line of shade trees (chainage 1800 to 2400) at the south end of the paddock midway between Discombe Road and Forrest Road;
- Various trees within the footprint of the western half of the Victoria Road Interchange, between Hannon Road and Victoria Road (chainage 5200 to 5600);
- Various trees immediately southeast of the Swayne Road/Appleby Road intersection (chainage 6800 to 7100);
- Several trees immediately south of the St Kilda Road/Thornton Road intersection (chainage 9300 to 9400); and
- A small group of trees at the Southern Interchange (chainage 10900).

The removal of a swath of vegetation, including pine, willow and tree fern through the Karapiro Stream Gully, will also be an obvious landscape change within the context of the gully.

8.0.3 Landuse

As previously stated, the most common landuse along the designation corridor is pastoral farming. Although farmland is the most common and expansive land use within the area, there are also numerous roads and several sections of State Highway within the area. Within the broader context of the landscape, the change of landuse from farm land to Expressway will have a minor effect. However, with the creation of a broad strip of new road and its margins, the closure of several local roads and the removal of various dwellings and other buildings, the change in landuse will have a noticeable effect. The effect will be contained to the immediate landscape.

Two specific local roading-related landuse changes will be the realignment of the western portion of Appleby Road to connect to the northern approach ramp to the Swayne Road Underpass to service the proposed St Kilda Waterways subdivision. The second change will be the realignment of the southern end of St Kilda Road relative to the Thornton Road Underpass.

A particular landuse effect relates to the berry orchard on Swayne Road. Planting shelter has been established on the orchard relative to the previous '2 lane' designation corridor. The proposed widening to the '4 lane' configuration will result in both sets of southerly shelters being removed and the majority of the orchard will be exposed to the Expressway and the southerly wind.

Additional changes to the landuse will be the introduction of three stormwater detention basins/ponds at the Northern Interchange/Connection, St Kilda Road and south side of Karapiro Stream Gully Bridge. The retention ponds will be between approximately 2000m² to 5000m² in total area and will result in a change in land use from farming to ponds.

Conclusion

In summary, the change in landuse is primarily associated with the loss of farm land to accommodate the Expressway. The effect of the change will be moderate as the farm land will be permanently lost and non-productive, although this will be confined to the designation area and will not have an effect in the broader sense. To minimise the loss of pastoral land, once construction has been completed, suitable areas of land will be returned to pasture. Additional landuse effects will be the closure of several local roads and removal of various dwellings and other buildings within the Expressway designation. No mitigation measures are available in regards to the removal of houses, however where roads are severed, alternate routes will be available for local road users to maintain connection with Cambridge.

8.1 Visual Effects

The visual effects of the Expressway will result from changes to the local landscape and their degree of visibility. The extent of these effects and their acceptability or otherwise will depend on the degree of change to the local landscape character, in relation to the amount of change that is currently happening in the area.

The actual changes to the landscape resulting from the construction of the Expressway typically include the removal of existing structures and vegetation, excavation of cut batters, placement of fill formations, construction of bridges and structure, and the placement of the roading surface. Further visual effects will result from the implementation of stormwater, noise and landscape mitigation measures.

The Project's visual catchment will vary relative to its linear extent. The limits to its visibility are the effect of distance when looking across a flat plain and the localised screening effect of hedges and taller vegetation. The viewing audience will be local residences who can see parts of the Project from their dwellings and properties, motorists using the local roads and motorists using the Expressway and its link roads.

The 'Hamilton to Cambridge Corridor' area is noted in the Preliminary Waipa Landscape Assessment²⁰ to have the following attributes:

"The landscape quality of this area is medium, and the visual absorption capability is quite high because of the screening afforded by trees and hedgerows and the good soils."

This implies that the Project may be within what could be considered the "limits of acceptable change". This assumption is based on the fact that the Project does not directly conflict with, or obscure, the existing landscape forms and patterns in the long term. This is correct relative to the majority of the Project being a "line" expression within a flat or plains-type landscape that has many existing "lines" – roads, fences, hedges, shelterbelts and power lines. However, this is challenged by 70% of the proposed Expressway being above

²⁰ Preliminary Landscape Assessment for Waipa District, prepared for Waipa District Council by LA4 Landscape Architects and Gabites Porter Ltd, April 1991.

grade with its surrounding landscape, where the immediate receptors will perceive a noticeable new element within the landscape, which will result in a moderate effect.

There are definitely specific, localised areas where the level of change may be greater than what could be considered acceptable, such as where larger earthworks or bridge structures are proposed and where larger groups of mature trees are to be removed. At these points, specific design and mitigation solutions will be required to mitigate the effect of the change.

The following sections describe the source of change and the likely visual effects within the specific sections of the Project:

8.1.1 Hautapu Road to Peake Road

Likely visual effects include:

- (a) The removal of vegetation, including the ‘Stanfield Oak’ trees, farm trees, sections of shelterbelt and hedges along the Expressway corridor from Discombe Road to Peake Road, will have a moderate localised effect. The vegetation currently contributes to the visual amenity and character, and its removal will change the local character within the immediate vicinity.

In the broader landscape context, the loss of these trees will not have a significant effect on the character, as mature trees, hedgerows and stands of trees surround and contain the area. The extensive landscape planting along the Expressway and interchange, will help mitigate the loss of existing vegetation, enhance the character and provide a beneficial visual effect over time.

- (b) The removal of house H1²¹ and associated buildings adjacent to the existing SH1 and Discombe Road intersection, and house H13 at Peake Road,²² will have no effect on the visual quality or character of the area. The buildings are currently partially screened by existing vegetation, and have a limited contribution to the area’s character. The removal of the buildings will not have an effect on the broader landscape character.
- (c) The placement of the Northern Interchange approach embankments and construction of the Underpass Bridge will be a new visual element within the landscape that will have a moderate effect on properties H2, H5a, H6 and H7²³. The effect on the surrounding properties is the result of the Underpass Bridge and embankments being above grade, making them an obvious and visible element to receptors in the immediate vicinity.

For the travelling public utilising the Expressway, the embankments and the Underpass Bridge will be a new and obvious visual element within the landscape. Therefore, these elements will have a minor effect on the travelling public. However, these effects will be minimised through the bridge design and use of spill-thru abutments to maintain

²¹ H1 - 508 Hautapu Road.

²² H13 – 221 Peake Road.

²³ H2- SH1 1328B Cambridge Road.

views beneath the structure, therefore reducing the visual impact of the Underpass Bridge.

Installation of extensive areas of landscape mitigation will include, native shrub, hedge and exotic tree planting, which will provide a moderate visual benefit in the long term.

- (d) The Expressway will be elevated in the order of 1.25m above grade at the Northern Interchange rising up to 3m between Peake Road on fill formation (**Appendix 5**, Figure 5.1). This section passes through rural farmland, which contains hedgerows and trees that will provide a degree of screening. Properties H8, H9, H10, H11²⁴ and H15 are located within 150m of the Expressway, and will be moderately affected, as the elevated section of the Expressway will be visible to these properties. Landscape planting to the southern and northern sides of the Expressway, adjacent to properties H9, H10, H11 and H15²⁵ will help to mitigate visual effects on these properties.
- (e) The excavation of a storm detention basin on the south side of the Northern Interchange, will have a minor visual effect on the immediate area. As this new element will be seen in the context of the Interchange structures and will be planted with native species, it will have a limited visual effect.
- (f) A 3m high noise wall, which will extend 250m along the northern edge of the Expressway adjacent to Discombe Road and properties H6 and H7²⁶, will be installed to mitigate traffic noise. The effect on properties H6 and H7, and the travelling public will be moderate, as this new visual element will be a noticeable new feature within the rural landscape. The height and length of the wall will be out of keeping with the character of the area. However, in the broader landscape context, the noise wall will have no effect, as the existing vegetation within the surrounding area will screen views of the wall.

For the travelling public, the noise wall will have a moderate adverse effect, as the wall will be an obvious and visible element that is incongruous with the open rural landscape character of the area. Extensive landscape measures, include the planting to both sides of the wall, will help to soften and reduce the visual impact of the wall over time.

- (g) Sections of the southern side of the Expressway will have native hedgerow planting, which ties into the existing hedgerows within the immediate vicinity. The planting will provide a degree of screening and softening of the Expressway and will have a beneficial visual effect over time.

²⁴ H8 - 109 Forest Road, H9 - 215 Peake Road, H10 - 207 Peake Road, H11 - 191 Peake Road and H15 - 197 Peake Road.

²⁵ H9 - 215 Peake Road, H10 - 207 Peake Road, H11 - 191 Peake Road and H15 - 197 Peake Road.

²⁶ H6 - 251 Discombe Road, H7 - 245A Discombe Road.

8.1.2 Peake Road to Swayne Road

A combination of earth bunds, native planting and/or hedgerow planting have been incorporated into the Project from Peake Road through to Swayne Road to ‘future proof’ the Expressway, as identified within the Waipa District Growth Strategy.

Likely visual effects include:

- (a) The removal of farm shade trees, various stands of mature specimen trees (between Hannon Road and SH1B/Victoria Road), sections of shelterbelt, including the southern shelterbelts of the berry orchard on Swayne Road, and hedges along the Expressway corridor from Peake Road to Swayne Road will have an obvious, but localised visual effect.

In the broader landscape context, the loss of vegetation will have no effect on the landscape character. However, extensive landscape planting, which will include exotic and native plants along the Expressway, will help mitigate the loss of vegetation and reinforce the character of the area.

- (b) The removal of house H18²⁷ adjoining Peake Road, houses H19 and H20²⁸ adjoining Hannon Road and houses C29, H30, H31 and H35²⁹ adjoining Victoria Road and all associated outbuildings, will have an obvious, but localised effect. The effect will be minor, as these buildings make a limited contribution to the character of the area.
- (c) The placement of the Peake Road Underpass Bridge (**Appendix 5**, Figure 5.5 and 5.6, **Appendix 6**, Figure 6.6) and associated approach embankments, will be a new and obvious structure within the landscape. The surrounding landscape is predominantly flat and the bridge structure will rise approximately 9.4m above existing ground level. The Underpass Bridge will be visible from houses H9, H10, H11, H12, H14, H15, H16 and H17³⁰(which are located within close proximity to the structure), and will have a moderate visual effect.

For houses further from the structure, the effect will be less, although it is likely that the structure will be visible due to the height above existing ground level. In the broader landscape context, the structure will not have an effect, as existing vegetation will provide effective screening of the structure.

The effect on the travelling public using the Expressway will be moderate, as the Underpass Bridge will briefly dominate the view. For travelling public utilising the bridge, the structure will be less obvious, but views to the surrounding area will be enhanced, providing a moderate positive effect. Extensive planting to the embankments and along the Expressway approaches to the Underpass Bridge will

²⁷ H18 - 222 Peake Road.

²⁸ H19 - 151 Hannon Road and H20 - 150 Hannon Road.

²⁹ C29 151 Victoria Road, H30 - 129 Victoria Road, H31 - 141 Victoria Road and H35 - 140 Victoria Road.

³⁰ H9 - 215 Peake Road, H10 - 207 Peake Road, H11 - 191 Peake Road, H12 - 257 Peake Road, H14 - 249 Peake Road, H15 - 197 Peake Road, H16 - 234 Peake Road and H17 - 198 Peake Road.

assist in softening and reducing the effect of the structure and contribute to the area's character.

- (d) The Victoria Road Interchange (**Appendix 6**, Figures 6.2 and 6.3), approach embankments and bridge structures will be new and obvious features within the landscape, due to the height and scale of the Interchange. The crest of the Victoria Road Interchange overpass bridge will be approximately 9m above grade, and will be a noticeable feature within the predominantly flat landscape. Residential houses within the immediate vicinity (houses H21, H32, H33 and H34³¹), will see the Interchange and be moderately affected. The commercial properties C22, C27 and C28³², will have a noticeable change in view, although these properties are considered less sensitive than residential properties, and therefore, the effect will be minor.

The effect on the travelling public using the Expressway will be minor, as the overpass bridges will be less obvious. However, the rise in elevation will provide the opportunity to obtain views across the area, which will provide a moderate positive effect for the road user. For travelling public using Victoria Road, the bridge structures will dominate the immediate view and obscure the surrounding landscape (refer to **Appendix 6**, Figures 6.3 and 6.8). As the Victoria Road Interchange will form the gateway into Cambridge, extensive planting to the embankments and the approach roads will assist in 'anchoring' the structure into the landscape, improve the visual amenity and reduce the effect of the Interchange on the surrounding area.

- (e) Construction of earth bunding up to 3m in height will be incorporated along the northern boundary of the Expressway adjacent to Peake Road and property H9 to provide noise mitigation. This will be a new element within the landscape and will be seen in context with the Peake Road underpass bridge embankments and structure. The bund will be an obvious new element within the landscape and will have a minor visual effect on property H9. However, extensive landscape planting along the bund will soften and improve the character of the bund in relation to the property.
- (f) The racetrack to the southern side of the Expressway and adjacent to Hannon Road, will be moderately affected by the elevated carriageway, which will be a new and obvious feature within the landscape. The visual effects of the elevated carriageway on the racetrack will be mitigated through the use of native hedgerow and exotic tree planting along the southern side of the Expressway.

8.1.3 Swayne Road to Thornton Road

Likely visual effects include:

- (a) The removal of mature specimen trees on the immediate north and east of the children's care centre Little Einsteins, H42 adjoining Appleby Road, farm shade trees and hedges along the Expressway from Swayne Road to Thornton Road, will have an obvious, but localised moderate visual effect. In the broader landscape context, the loss of vegetation will have no effect on the landscape character. However, extensive

³¹ H21 - 142 Hannon Road, H32 - 115 Victoria Road, H33 - 111 Victoria Road and H34 - 99 Victoria Road.

³² C22 - 162 Hannon Road, C27 - 169 Victoria Road and C28 - 151 Victoria Road.

landscape planting, which will include exotic and native plants along the Expressway, will help mitigate the loss of vegetation and reinforce the character of the area.

- (b) Removal of house H43³³ to the north of Watkins Road, house H124³⁴ adjoining Thornton Road and house H134³⁵ and shed unit C127³⁶ adjoining the existing St Kilda Road/Thornton Road intersection and associated outbuildings, will have a minor visual effect. These buildings are typically one storey bungalows set within large lots and surrounded by mature garden vegetation. The loss of the residential buildings will not affect the character of the area. However, the removal of the industrial type buildings will improve the character of the residential area bringing a minor positive effect.
- (c) The Swayne Road Underpass Bridge and approach embankments will be an obvious new feature within the landscape, and will be approximately 7m above grade (**Appendix 6**, Figure 6.7). As the Underpass Bridge will be elevated, the structure will be seen from nearby residential properties, and therefore, will have a moderate visual effect. The Underpass Bridge structure will be visible from houses H37, H38, H39, H42, H40, H41 and H42³⁷. The residential development further west, is likely to have limited views of the Underpass Bridge, due to their proximity from the structure and the existing vegetation that will obscure views of the structure.

The effect on the travelling public using the Expressway will be moderate, as the Underpass Bridge will briefly dominate the view. For travelling public utilising the bridge via Swayne Road, the bridge structure will be less obvious. However, views across the surrounding area will be enhanced, providing a moderate positive effect.

Extensive planting to the embankments and along the Expressway approaches towards the Underpass Bridge will assist in softening and reducing the effect of the structure, and contribute to the area's character.

- (d) The Thornton Road Underpass bridge, will be at grade, and therefore, will have no visual effect on the adjacent residential properties. There will be an effect on the travelling public using the Expressway, as the Underpass Bridge will briefly dominate the view. However, the Underpass Bridge will be seen in context of the retaining walls along the Expressway cutting, with the walls tying into the vertical abutments of the bridge, which will assist in 'anchoring' the structure into the landscape and minimising the effects on the road user.
- (e) The excavation and formation of a stormwater detention basin adjacent to the north of Thornton Road, will have only a minor effect on the immediately adjacent properties, H119, H120, H131 and H135³⁸. The pond will be set below grade and will be partially

³³ H43 - 42 Appleby Road.

³⁴ H124 - 219 Thornton Road.

³⁵ H134 - 241 Thornton Road.

³⁶ C127 - 239 Thornton Road.

³⁷ H37 - 137 Swayne Road, H38 - 170 Swayne Road, H39 - 120 Swayne Road, H42 - 116 Swayne Road, H40 - 100 Swayne Road, H41 - 102 Swayne Road and H42 - 16 Swayne Road.

³⁸ H119 - 213/1 Thornton Road, H120 - 1/213 Thornton Road, H131 - 222 Thornton Road and H135 - 1 Athlone Drive.

visible to the neighbouring properties. Extensive landscaping will be undertaken on and around the pond edges to provide a quality visual environment that will contribute to the visual amenity and character of the area.

- (f) The Expressway between Swayne Road through to just south of Watkins Road will be above grade at between 2.5m to 3m. This section of the Expressway will be visible from the immediate surrounding area, and will have a moderate effect on the short views of properties located to the south of the Expressway. However, existing vegetation located in the paddocks to the south of the Expressway will assist in screening the elevated section of Expressway. Landscape planting along the margins will help to integrate the Expressway into the landscape and screen the elevated section of the carriageway, and therefore help mitigate the effects.

For travelling public utilising the Expressway, the elevated section will provide views across the immediate area and will afford some longer views to distant hills, therefore providing a moderate positive effect for the road user.

- (g) The section of Expressway south of Watkins Road through to Thornton Road Underpass will be in cut formation. The Expressway at Watkins Road is at grade and slopes away to approximately 6m at the Thornton Road underpass, which effectively removes the Expressway from the sight of the residential properties located to the southwest of the Expressway. Although, the cutting will be a new feature in the landscape, the residential properties will have no direct views of the carriageway, and therefore will have only a minor effect.
- (h) The placement of earth bunds for noise mitigation will be placed on the southern side of the Expressway between Watkins Road to Thornton Road. The bunds will be approximately 2m in height and located adjacent to the 30m buffer zone. The bunds will be new elements within the landscape, and will have a minor effect (**Appendix 6**, Figure 6.9). The effect will be minimised, as the bunds will be formed with flowing contours and will be planted with native shrubs and trees that will soften their appearance (refer to **Appendix 5**, Figure 5.2). Long views of the residential properties will not be affected, as the properties will maintain views across the buffer zone and bunds towards the foothill range to the east.
- (i) To the northern side of the Expressway, adjacent to the St Kilda development, bund and planting treatments will be implemented to mitigate the visual effects of the Expressway, therefore 'safeguarding' the visual amenity of future development. The visual effect on the St Kilda development will be minor, as the Expressway will be screened by the proposed earth bunds and planting.

8.1.4 Thornton Road to Golf Hill South

Likely visual effects include:

- (a) The removal of mature specimen trees on the south side of Thornton Road, farm shade trees and trees on the highway margin south of Karapiro Stream gully, plus the removal of mixed native and exotic vegetation through the Karapiro Stream Gully will have an obvious, but localised moderate visual effect. However, extensive landscape planting,

which will utilise native plants along the Expressway and within the Karapiro gully, will help mitigate the loss of vegetation and reinforce the character of the area.

- (b) The installation of a construction access track down into the Karapiro Stream gully will create an obvious new feature within the landscape, relative to the gully environment. It may be possible for the properties H145 and H154³⁹ to view the access track, although existing vegetation should obscure the majority of their view. Therefore, the effects of the access road will be minor, as the road will be contained within the gully system and there are no properties with direct views of the access road within the gully.

In relation to the gully itself there will be a localised moderate visual effect. The access road will change the visual appearance and character of the gully within that location, as it will be a new feature and will result in the loss of vegetation.

- (c) The excavation of the Expressway cut formation from Thornton Road Underpass through to the north edge of the Karapiro Stream Gully, and the construction of associated retaining walls will create a new feature within the landscape. The visual effects on properties located to the west of the Expressway (along Athlone Drive), will be minor, due to the change of the land form, although, the Expressway which is located within the cutting will not be visible. Additionally, the properties are located within lots which are well vegetated with mature garden plants, which will provide a good degree of screening of the cutting and retaining walls.

The cutting bisects part of the historic Pa site and this will have a significant effect on the historic site. Landscape planting will be utilised to mitigate the effects of the cutting and will be used to soften the retaining walls. Native plant species will be used within this location and the creation of a reserve will assist in mitigating the effects on the Pa site, with native planting providing a visual link across the Expressway cutting.

- (d) The construction of a pair of Karapiro Stream Gully Bridges, and the approach cuttings to the north and south of the bridges, will be a significant new feature within the landscape (refer to **Appendix 6**, Figure 6.5). Only a small group of houses, H145, H154 and H152⁴⁰, are likely to have a view of the bridges. However, as the existing vegetation along the eastern boundary of property H154⁴¹ will obscure views of the bridges, visual effects will be minor. The effects will be limited to the above properties, as there are no other viewing points or properties within the vicinity that will be effected.

The effect on the travelling public using the Expressway will be moderately beneficial, as the bridges will provide a brief view of the Karapiro Gully. The travelling public, will be mostly unaware of the bridge structures, and therefore the structures will result in only a minor effect.

In relation to the gully itself, the localised visual effect of the bridges will be significant. The effect is the result of the bridges changing the visual appearance and character of the gully within that location.

³⁹ H145 - 281 Athlone Drive and H154 - 370 Athlone Drive.

⁴⁰ H145 - 281 Athlone Drive, H154 - 370 Athlone Drive and H152 - 330 Athlone Drive.

⁴¹ H154 - 370 Athlone Drive.

- (e) The excavation and creation of a stormwater detention basin on the south side of the Karapiro Stream Gully will have no effect on the views or character within the vicinity. The stormwater pond will have no effect on the travelling public utilising the Expressway, as the pond is set off the carriageway and mitigation planting will be utilised to assimilate the pond into the landscape.
- (f) The construction of the Southern Interchange will introduce new structures into the landscape, with a pair of overbridges at grade level, the excavation of the Southern Interchange approaches, including access roads for adjacent properties (refer to **Appendix 6**, Figure 6.4). The Expressway will tie into the existing SH1/Tirau Road, which currently passes close to properties H155, H158, H159, H160, H161 and H162⁴². As the new overbridges will be at grade and the Interchange approaches will be in cuttings, the visual extent of the Expressway will be reduced. However, the increased carriageway widths, Interchange approaches and local access roads, will require a greater land use area than the current SH1 arrangement, which will result in a moderate localised effect.

The effect on the travelling public using the Expressway will be minor, as the overpass bridges will be less obvious, although the extent of the Southern Interchange will be an obvious feature within the landscape. Travelling public utilising the approach roads, will have a moderate effect as the road moves through the cutting, with the overbridge briefly being the dominate feature within the view for Tirau bound traffic. However, extensive planting to the Expressway embankment approaches, the overbridges and access roads will assist in assimilating the Interchange into the landscape and will reduce the effect of the Southern Interchange area on surrounding properties.

- (g) At the Southern Interchange, a 2m high fence will be installed between the offramps and the local access roads to provide a physical barrier between the carriageways to prevent headlight daze. This safety fence will result in a minor localised effect on the adjacent properties and the travelling public. Extensive planting to the embankments and adjacent to the fences will assist in softening, mitigating and reducing the effect of the fences.
- (h) The excavation and formation of two stormwater detention basins adjacent at the Cambridge end Interchange approach roads, will have only a minor localised effect. Although the ponds will be new features within the landscape, property H158 will incur a minor effect as the ponds are set below grade and the existing vegetation surrounding the property will provide a degree of screening. Extensive landscaping will be undertaken around the pond to enhance the visual environment and mitigate the effects.

8.1.5 Visual Effects - Conclusion

The visual effects of the Project relate to the loss of existing buildings and vegetation, construction of the Expressway, the changes to topography in relation to the cut and fill formations, the placement of bridges and structures, noise barriers and retaining walls and

⁴² H155 - 370 Athlone Drive, H158 - 190 SH1, Tirau Road, H159 - 246 SH1, Tirau Road, H160 - 259 SH1, Tirau Road, H161 - 276 SH1, Tirau Road and H162 – SH1 280 SH,1 Tirau Road.

the erection of lighting and signage. The degree of visual effects of the Project will vary along the route and will depend on the location and proximity of the visual receptor and the degree of change in relation to the outlook from the receptor.

The removal of mature trees, shelterbelts, hedgerows and hedges will have an obvious, but localised visual and land cover effect. The removal of predominantly weed species, exotic trees and some re-growth native vegetation from the Karapiro Stream Gully will have a minor visual effect on the broader landscape, as the Gully topography contains the effects.

The commercial and residential buildings situated along the Expressway make a limited contribution to the character and visual amenity of the area. The removal of these buildings as a result of the Project will have a minor localised effect on the character of the surrounding area. The removal of poor quality commercial buildings will result in a minor positive effect.

The effects associated with underpass bridges at Peake Road and Swayne Road, the Interchanges, including the approach embankments, bridge structures and access roads will be obvious new elements within the landscape. The effects of the elements will result in a moderate, localised visual effect in regards to the immediately adjacent residential properties. Beyond the immediate area of the structures, the existing trees and hedgerows will effectively screen the view of more distant properties and therefore no effect will be present. For the travelling public utilising the Expressway, the underpass bridges will result in a moderate effect, as each underpass bridge will briefly dominate the view. Where local road users utilise the bridges, they will have a beneficial effect with views across the surrounding landscape.

The approach cutting on both sides of Karapiro Stream Gully and the placement of the pair of bridges will be significant new features within the landscape. However, the visual effects on local residential properties will be minor due to the proximity and surrounding vegetation that screens views into the Gully. For the travelling public, the Karapiro Stream Gully Bridge will provide a positive effect, as the Bridge will provide views into and across the surrounding landscape, and therefore, enhance the travelling experience.

Elevated sections of the Expressway from the Northern Interchange to Watkins Road will be an obvious new element within the landscape and will have a localised moderate effect on nearby residential properties including the racecourse off Hannon Road. For the travelling public utilising the Expressway, they will have selected views across open rural land and therefore, the elevated Expressway will provide a visual benefit to these users.

The Expressway from Watkins Road through to the Karapiro Stream Bridge will be located within a cutting, which will result in the Expressway being less visible from the surrounding area. Therefore, the Expressway will have a minor localised effect on the adjacent residential properties.

The integration of stormwater swales and excavations for ponds adjacent to the Northern Interchange, Thornton Road, south of the Karapiro Stream Gully Bridge and at the Southern Interchange, will be integrated into the Project and will have a minor visual effect.

Noise mitigation measures include the use of bunds and a 3m high noise wall. The bunds will have a minor localised effect on adjacent residential properties and will effectively screen the Expressway from view. Extensive landscape planting will be incorporated along each bund that will soften the appearance of the bunds. A single 3m high noise wall will be installed next to the Expressway, adjacent to Discombe Road, which will have a moderate effect on the two adjacent residential properties and the travelling public. The wall will be out of character with the rural setting, but extensive planting along both sides of the wall will minimise the effect on the viewing audience.

There will be moderate visual effects on the historic pa site due to the close proximity of the Expressway cutting. However, the use of indigenous planting will assist in mitigating the effects of the Project.

The extensive mitigation planting along the Expressway, utilising hedges, shrubs and trees will mitigate the visual effects resulting from the loss of vegetation, the introduction of bridges, underpasses and structures on views from adjacent properties situated along the Expressway.

8.2 Urban Design Effects

The Project responds to the 2007 Urban Design Preliminary Design Statement and encompasses the design philosophies and objectives to assist in mitigating effects, enhancing the urban environment. This is achieved by establishing a continuity of themes, including a consistent approach to integrated drainage design, and giving consideration to the design of appropriate structures and appropriate landscape treatments.

The urban design effects have been assessed on two levels; firstly on the broader context of the Cambridge area utilising urban design protocols, and secondly, focussing more specifically on the Project's structures and their effects on the urban environment.

In terms of the broader context, the Project will largely have a beneficial effect on the urban context of Cambridge. The Project provides a variety of opportunities to encompass the urban design protocols to improve connections, celebrate and enhance the area's character and context, incorporate creative solutions, and incorporate custodianship. A positive effect of the Expressway, will be the removal of traffic and congestion from Cambridge town centre, which will in turn provide easier access for local and visiting public.

In terms of character, the location of the Expressway will provide a positive urban edge to Cambridge. This will be emphasised by appropriate landscape planting, that reinforces the 'green edge' buffer zone and contributes to Cambridge's 'Town of Trees' character. At the interchanges, landscape planting will be used to create a strong local identity and define 'gateways' into Cambridge. The structures associated with the Expressway will also utilise a consistent design approach and 'family' of materials to ensure they integrate within the local landscape context. The bridge structures provide an opportunity to provide a positive visual effect through creative and elegant design and finishes to the structures.

Pedestrian and cyclist facilities have been incorporated into the Project, with separate pedestrian walkways across Underpass Bridges (Peake Road, Swayne Road and Thornton

Road), with on road shoulder areas for cycling. Victoria Road has pedestrian and cycling facilities to connect through to the industrial zone to the north of the Expressway.

The severance of Discombe, Forrest and Watkins Roads will have a moderate effect in regards to connectivity. The effect of the severance disconnects local communities and reduces the opportunities for pedestrian and cycle links into the town. Alternate routes and connections into Cambridge can be made by road users, although these alternate routes will require greater travel time to utilise local roads which have underpass bridge links. Where the realignment of sections of Appleby Road and St Kilda Road occur, there will be no connectivity effect, as the adjustments to the re-alignments, seamlessly fits into the urban fabric of the area and maintains the road connections.

8.2.1 Urban Design Aspects of Structures

Structures have a significant impact on the road user and will influence the viewing experience and visual amenity of the area. Therefore, design quality is a key factor to ensure structures have an appropriate form and scale, which responds to the environmental, social and cultural aspirations of the area.

The Project contains a variety of structures that need to be considered in regard to their design and aesthetics to ensure they integrate with the landscape context. These structures are a noise wall, bunds, two overpasses, four underpasses, the Karapiro Stream Gully Bridges and retaining walls between Thornton Underpass Bridge and the Karapiro Stream Gully Bridge.

The landscape setting of the area is defined as being a predominantly flat pastoral farmland environment, which is characterised by the horizontal forms of boundary fencing and hedgerows, interspersed with mature blocks of native planting and mature exotic trees. Roads within the area are predominantly straight linear elements that pass through the rural landscape and often have distant views across the flat farmland or framed views towards the surrounding hills. These aspects play an important role in terms of developing a context sensitive urban design for each of the structures.

The urban design opportunities for each of the main structural elements are outlined below and provide a design approach to ensure the structures are appropriate and integrate into the surrounding landscape. The following urban design principles should be incorporated into the subsequent design stages.

(a) Noise barriers

Noise mitigation measures include the use of a noise wall and several areas of earth bunds. Where noise mitigation measures are required, earth bunds are preferred over noise walls, because bunds are visually more sympathetic in the environment and will reduce the visual effect. As noise walls would be a new visual element within the landscape that is not characteristic of the area, the preference is to minimise their height and combine the structure with landscape planting to help integrate the structure into the surrounding environment.

The Project includes a single noise wall adjacent to houses H06 and H07 situated at the northern end of the Expressway, with a length of 250m and a height of 3.5m. The wall will be integrated into the landscape by utilising recessive colours as part of its design and limiting the height of the wall as much as possible, while utilising simple texturing or patterning to break up the extent of the wall panels. Additionally, planting will occur along the length of the noise wall to mitigate the visual effect.

Earth bunding is utilised adjacent to housing between chainage 3500 to 3900 at a height of 3m for a length of 400m and continues between chainage 7550 to 8350 at 3m in height for a length of 800m. Bunds will be gently contouring features with landscape planting to help soften and integrate the bunds into the landscape areas and to provide a visual amenity to neighbouring properties and Expressway users.

(b) Retaining walls

Within the Project, there is one location where retaining walls are proposed. The retaining walls are located on both sides of the Expressway from the Thornton Road Underpass to approximately 400m south towards the Karapiro Stream Gully Bridge. The retaining walls will reach a maximum height of 4m and then tie back into the gully slope.

The retaining walls form the abutments of the Thornton Road Underpass, and due to their height and length, will form a prominent new feature within the landscape and therefore have an obvious effect. They will also create a transition from the open rural southern end of the Expressway to the more urban environment of north Cambridge. Careful consideration will be given to the choice of materials, which could include split faced Hinuera limestone integrated with a textured concrete retaining wall system. The incorporation of landscape planting along the base and upper level of the retaining walls will also assist in visually ‘anchoring’ and softening the structure within the environment.

(c) Lighting and signage

Although highway light standards and directional and advisory signage are inherent elements associated within the Project, careful consideration will be given to their location and extent of use. Highway lighting should utilise the standard light column and lamp unit that have been utilised along other existing sections of the Expressway to ensure a consistency of materials. Light columns should be evenly spaced to ensure that a consistent light level and visual rhythm is achieved along the Expressway. On associated feeder roads, lighting should be consistent with that used on Waipa District’s local roading network.

Where signage needs to be integrated into the Project, it will follow the appropriate NZTA standards, sizes and types to ensure consistency in regards to the totality of the Waikato Expressway. Signage should only be located in key locations and avoid being located on bridge and retaining wall structures, which would make these structures prominent in the view from the Expressway and surrounding areas.

(d) Bridges

Integral to good urban design is ensuring bridge designs not only meet the functional requirements, but also establish suitable design objectives and principles to deliver an aesthetic solution, which positively contributes to the character, visual amenity and experience of the Expressway user. The design standards for all of the bridges will have a 'family' of treatments to ensure consistency throughout the Project.

The proposed bridge structures contain consistent elements, which comprise pairs of columns and, pier caps that support the superstructure beams, with rigid barriers either side of the deck. Bridge abutments have been designed where possible to be spill-thru type to maximise views beneath bridges.

The design approach to the bridge structures should ensure that they are simple and elegant to complement the flat and linear landscape character of the area. Design consideration should be given to the use of parapets, with proportions assessed to provide a strong simple linear form that overlaps the abutments. These forms should be complemented through the use of tapered columns to contribute to the elegance and simplicity of the bridge design. Where possible, well integrated artwork or patterning that reflects the local identity or character of the area should be incorporated into the parapet design. Ducting for electricity and other services will be incorporated into the superstructure of the bridge and will not be visible from the Expressway.

The underpass bridge structures should aim at maximising views of the landscape under the bridge by utilising spill through abutments. Bridge side barriers should be designed to minimise the impact on views. This is particularly the case for above-grade bridges and the Karapiro Stream Gully Bridge, which will form milestones along the Expressway and provide landmark viewing experiences of the surrounding landscape.

Where structures are formed above-grade (Northern underpass, Swayne Road underpass, and Victoria Road overbridge) and have a ramped approach, the embankments should utilise vegetation to visually enhance and anchor the bridge into the landscape and minimise the effects. The Victoria Road Overpass and the Karapiro Stream Gully Bridge side barriers should be designed to maintain views across, and into, the surrounding landscape/gully to enhance the Expressway users' visual experience.

8.2.2 Urban Design Effects - Conclusion

In regards to urban design, a number of features will integrate the Project into the surrounding landscape and urban environment, while providing good connectivity, set within the context of the area. Within the broader context, the Project will provide a positive urban edge to Cambridge, improve connections and accessibility while removing through-traffic congestion from the town centre. A number of local roads are retained with proposed bridges providing links to the broader area. These bridges and the Expressway will incorporate cycling and pedestrian facilities to provide a sustainable choice in transport modes. Three local roads will be severed which will have a moderately adverse effect in terms of connectivity to the outlying areas and communities. The Interchanges provide the opportunity to define entrance 'gateways' into Cambridge and to reinforce the treed character of Cambridge.

9 Mitigation Measures

The landscape character within the immediate area of the Expressway is well defined with generally flat to slightly rolling land form, with farm fields defined by hedgerows and large exotic tree planting across the landscape. These characteristics are incorporated into the mitigation measures.

The visual mitigation measures will minimise the adverse effects arising from changes to the landscape, removal of vegetation, and earthworks. Additional consideration to the bulk and appearance of structures and their integration into the environment will form part of the mitigation proposals.

The proposed landscape mitigation measures will mitigate the effects of changes to the landscape, and will help screen and integrate the Expressway into the landscape. The preliminary landscape drawings (refer to **Appendix 4**) have been prepared to indicate the extent and location of the proposed mitigation measures, which include:

- Development of an overall landscape theme that reflects the history of the area and responds to the area's character, while integrating indigenous species;
- Utilisation of exotic tree species along Victoria Road to create a 'gateway' and link into Cambridge's existing 'Town of Trees' character;
- Use of indigenous tree and shrub species for screening purposes where the Expressway is in close proximity to residential development and traverses areas of residential land use;
- Grouped tree and hedgerow planting at strategic locations along the Expressway, where the outlook from existing dwellings will undergo change. These plantings will screen more immediate views of the Expressway;
- Planting of exotic trees along the Expressway to visually 'soften' its extent and break up more distant views from the surrounding landscape. This would also act to integrate the Project with the local vegetation pattern of hedgerows and existing tree planting and tie into the theme of Cambridge as a "Town of Trees";
- Tree and shrub planting to denote key junction areas while integrating and soften structures and visually reducing the extent of roading surface. This planting will be located to ensure traffic visibility sight lines are retained;
- Re-vegetation of Karapiro Gully to re-establish indigenous landcover and habitat, and integrate and soften the appearance of the bridge structures and abutments within the existing gully environment;
- Native planting along the cut approach to Karapiro Gully/Bridge to soften and integrate the retaining wall structures;
- Gentle grading and rounding of the fill and cut batters to match and tie into the adjoining landform to integrate the Expressway with the surrounding terrain; and

- Retaining as much as possible of the highway margins to the northern side of the Expressway in pasture, particularly where the Project crosses farmland. This will assist the integration of the Expressway into the surrounding rural land use and landscape.

During the detailed design stage for the Project, a Landscape Management Plan will be prepared to ensure any landscape, visual or urban design effects of the Project are appropriately mitigated. That plan will:

- Enable the potential for panoramic views from elevated sections of the Expressway to be considered, where these can be achieved without impact on nearby properties;
- Provide for the framing and screening of views out over the landscape for the travelling public on the Project to enhance the outlook from the road;
- Ensure the selection of materials and surface finishes of overbridges, underpasses and noise walls during the detailed design phase to minimise the visual effect of these structures;
- Where noise barriers are required, ensure such barriers are integrated into the landscape by setting them as far back from the carriageway as possible and utilising planting to reduce their visual effect. The use of earth bunding is the most visually desirable measure for noise mitigation through areas of existing rural landscape, as it is in keeping with the surrounding topography and existing landscape patterns. However, such bunds should be kept low to a maximum of 3m, with gently undulating forms to ensure they visually tie into the surrounding landscape;
- Require the preparation of landscape plans that define the vegetation to be retained, areas of landscape and ecological mitigation planting, the type and density of planting to be undertaken and establishment maintenance requirements;
- Consideration will be given to the integration of stormwater channels and ponds to allow for native planting to ecologically enhance the Project. Where possible, ponds should be developed as reserve areas to contribute to the open space and provide a green buffer between the Expressway and surrounding residential properties;
- Where practicable, consideration will also be given to establishing the landscape and visual mitigation measures prior to construction works commencing, or as soon as areas become available for planting due to progress of the works; and
- Ensure consideration is given to mitigation measures to ‘future proof’ the proposed residential and industrial areas to the north of Cambridge as identified within the Waipa ‘Growth Strategy’. These measures could include earth bunds, shrub and tree planting to physically and visually separate the Expressway to ‘safeguard’ future development areas.

These mitigation measures take account of the existing landscape form and character, and will maintain the rural character, but also respond to the urban character of Cambridge. In time, the character of the area is likely to change, with increased residential development

occurring to the north and east of Cambridge, with the Expressway providing a boundary to the town expansion. The mitigation measures outlined will assist in integrating the Expressway, maintaining and strengthening the ‘treed’ character of the area, and in the long term provide a green edge to Cambridge.

10 Conclusion

The Expressway will be a noticeable new linear element within the landscape that will traverse rural farmland and also form a new urban boundary to Cambridge. The surrounding landscape has a high visual absorption capability due to the surrounding vegetation, which contains and screens views of the Expressway. Although the Cambridge landscape has a good ability to absorb change, any changes need to be managed sensitively to maintain the landscape quality of the area.

Overall, the Expressway will have noticeable landscape and visual effects, but the effects are typically localised and will not impact on the broader area. The landscape effects will result in changes to the landform, landcover and landuse through cut and fill formations, removal of vegetation and buildings, plus the loss of productive farmland, which will have a minor localised effect.

Visual changes associated with the Expressway relate to the placement and construction of Interchanges, raised and incised sections of carriageway, under and overpasses, Karapiro Stream Gully Bridge, retaining walls, noise mitigation structures, drainage and proposed landscaping measures. These elements will be new and obvious structures within the landscape and will typically have a localised visual effect, due to the visual absorption capability and screening afforded by the existing trees and hedgerows. However, a consistent design approach utilising a ‘family’ of materials, which integrates locally sourced materials, will enable these effects to be mitigated and add to the identity and character of the area.

The landscape and urban design opportunities provided by the Project will allow the strengthening of local character and identity. This will be achieved by creating a positive urban edge to Cambridge, and the Interchanges providing defined ‘gateway’ entrances with planting to reflect the ‘treed’ character of the town. The Expressway will also relieve congestion improve accessibility to the town, and contribute to the economic success of Cambridge, while improving pedestrian and cycling opportunities.

Landscape and urban design mitigation measures will assist in mitigating visual effects by assimilating the Project into the environment, while incorporating opportunities to enhance the ecology and biodiversity of the area. The planting proposals do not aim to screen the Project, but will soften and integrate the Expressway and structures into the landscape, while maintaining and enhancing the character of the area. The mitigation measures will utilise a combination of indigenous and exotic planting that reflects the existing vegetation types and patterns found within the area.

It is considered that through a sensitive landscape and urban design approach, the actual and potential landscape and visual effects of the Expressway will be successfully minimised and mitigated by the measures outlined in this report.

