Appendix H

Landscape Character and Visual Impact Assessment

MR512 - HEATHCOTE ROAD UPGRADE REVISED REF

INFANTRY PARADE, HAMMONDVILLE TO THE AVENUE, VOYAGER POINT HAMMONDVILLE, NSW

LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT REPORT

04 September 2019

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COVER PAGE: VIEW SOUTH WEST ON HEATHCOTE ROAD OVER HARRIS CREEK
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BARK OF EXISTING SPOTTED GUMS ON HEATHCOTE ROAD, HOLSWORTHY

1. Introduction and requirements

1.1 Background

This Landscape Character and Visual Impact Assessment (LCVIA) Summary Report has been prepared by Scape Design on behalf of Hills Environmental for submission to Roads and Maritime Services (Roads and Maritime) as part of an Addendum to the Review of Environmental Factors (REF). It assesses the proposed modifications to the Heathcote Road Upgrade, Infantry Parade to The Avenue, that came to light during the detailed design.

1.2 Description of proposed modifications

The proposed modifications have been designed by SMEC Australia for Roads and Maritime in order to improve key arterial roads in the southern Sydney metropolitan area.

Key features of the proposed modification would include:

- Changes to the project boundary to accommodate all elements of the detailed design and additional vegetation clearing
- Provision of a shared path connection and additional traffic lane to Holsworthy Railway Station
- Changes to horizontal and vertical road alignment and inclusion of emergency stopping bays
- Retention of the abutments and rolled steel joists of the Harris Creek Pedestrian Bridge
- Additional construction compounds
- Changes to the Harris Creek Bridge and channel widening
- Services adjustments
- Extensions of maintenance access tracks
- Increase in the height of the retaining wall at The Avenue and extension of an existing noise wall to address a gap outside the Child Care Centre at 3A Artillery Crescent
- Relocation/removal of roadside tributes.

1.3 Location

Hammondville is a suburb located within the City of Liverpool Council Local Government Area (LGA), situated 5 kilometres (km) south-east of Liverpool and 30 km South West of Sydney.

1.4 Reference documents

The following document is the overarching Urban Design Report for the proposal and should be read in conjunction with this summary report:

- MR512 - Heathcote Road Widening, Urban Design Report - Detailed Design 100%, Scape Design 2019 (in prep)

While the following supplementary reference documents are also relevant:

- Heathcote Road Upgrade Infantry Parade to The Avenue - Review of environmental factors (WSP and Roads and Maritime, 2016)
- Urban Design report by Clouston, dated 10/10/2016
- Heathcote Road Upgrade – Interpretation Themes, Devices and Locations by Extent Heritage, letter 13/03/2018
- Biodiversity Assessment Report, SMEC 2019
- Erosion and Sedimentation Management Report, SMEC, May 2019
- Operational Noise Assessment Report (Resonate, 2019)
- Heritage Interpretation Strategy (Extent, April 2019)
- Heritage Interpretation Plan (Extent, in prep)
- Contamination and acid sulphate soil assessment (Draft, SMEC 2018)
- Acid sulphate soil management plan (SMEC, April 2019)
- Operational Noise Assessment Report (SMEC, 2019).

1.5 Purpose of this report

The purpose of this report is to document and assess the modifications which were a result of the detailed design phase and undertake a critical review and evaluation.

Scape Design has undertaken an assessment of the existing environment, built form, previously identified landscape context and character impacts and proposed mitigation from the detailed design stage modifications, in order to gain an understanding of the urban design measures that are required during detailed design.

1.6 Proposal objectives

The key objectives of the Roads and Maritime proposal are to:

- Improve road safety
- Improve freight access and efficiency
- Reduce traffic congestion and improve travel times
- Increase road capacity catering for current and predicted traffic volumes
- Enhance network connectivity
- Improve travel time reliability and efficiency
- Improve pedestrian and cyclist access and connectivity to Holsworthy Train Station and surrounds.

1. Introduction and requirements

1.7 Urban design objectives

The over-arching aim of the urban design is to ensure that the proposal is physically and visually integrated with its surrounding environment and where possible, maximises road user engagement with local context to provide a more enjoyable and interesting driving experience.

Table 1-1 lists the urban design objectives and principles as outlined in the proposal's urban design report for detailed design.

Table 1-1: Review of urban design objectives and principles

Urban design objectives	
01	Link the more developed northern section of the road corridor with sensitive bushland to the south
02	Protect sensitive environments adjacent to the road corridor including endangered ecological communities, riparian crossings and local residences
03	Provide effective linkages to Holsworthy Train Station and Holsworthy Army Barracks with improved amenity for pedestrians and cyclists
04	Consider visual impacts and aim to reduce impacts for local residences and road users
05	Reference the rich military heritage of the area within the road corridor design.

2. Existing environment

2.1 Overview

The following section of the report provides a summary of existing landscape context and cultural influences on the study area. Information in this section of the report has predominately been drawn from the Heathcote Road Upgrade Infantry Parade to The Avenue - Review of Environmental Factors (WSP and Roads and Maritime, 2016).

This background information is specific to the scope of this report which deals only with the LCVIA for the proposed modifications to the Heathcote Road Upgrade that came to light during the detailed design and which are identified in Section 1.2.

2.2 Site context

The proposed upgrade of Heathcote Road is located between Infantry Parade, Hammondville and The Avenue, Voyager Point.

This section of Heathcote Road is a crucial link for commuters who drive, walk or cycle to Holsworthy Train Station and Holsworthy Army Barracks. Refer to Figure 2-1 imagery of the site and its immediate context.

2.3 Character of the study area

Heathcote Road is an urban arterial road that provides an east-west link from Liverpool to Heathcote and to the south coast via the Princes Highway. It is generally a two lane undivided road through the Project area except where it has been widened to four lanes on the approaches to the new signalised access to Holsworthy Army Barracks.

Southern sections of the road have a strongly vegetated character. This mature flora contributes a strong linear character to the road corridor, providing motorists with a sense of passing through undeveloped bushland apart from where suburban development abuts the road.

2.4 Biodiversity

Vegetation Communities

Supplementary field surveys have been undertaken by SMEC for areas impacted by the detailed design. These surveys have mapped a total of 11.75 ha of vegetation, comprising 5.49 ha of native vegetation and 6.26 ha of mixed native and exotic vegetation.

Four threatened ecological communities were recorded within the study area, these communities include:

- Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion
- Shale Gravel Transition Forest in the Sydney Basin Bioregion
- Castlereagh Swamp Woodland Community
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

Within the 5.49 ha of native vegetation there were three distinct areas of Castlereagh Scribbly Gum Woodland, three distinct areas of Shale Gravel Transition Forest, one distinct area of Castlereagh Swamp Woodland and one distinct area of Cumberland river-flat Forest. Botanically these areas vary due to fragmentation caused by development along the

Figure 2-1: Site context

2. Existing environment

Georges River and its tributaries.

Fauna Habitat

Although much of the vegetation of the study area has been previously cleared for roads, buildings and playing fields, substantial areas of vegetation do remain in the south of the site. These locations include Holsworthy Army Barracks adjacent to Heathcote Road, and the riparian zones of Harris and Williams Creek.

Past clearing has resulted in the loss of biodiversity values and habitat features and the majority of the existing terrestrial habitat is in poor condition, with limited habitat features such as hollow-bearing trees, ground cover (logs and fallen timber) and bush rock.

The riparian zones of Harris Creek and Williams Creek and areas south of the study area are in good condition with low weed invasion, moderate occurrences of hollow-bearing trees, fallen timber, bush rock and dense understorey.

Threatened Flora and Fauna

For a discussion on threatened flora, fauna and biodiversity offsets, related to changes during the detailed design, refer to SMEC's Biodiversity Assessment Report Section 1.4 of this report.

2.5 Topography and hydrology

The geography of the wider area is characterised by sandstone ridges and gullies which continue through a mix of bushland and urban landscapes east to the coast. The area is characterised by shale derived clay soils and Hawkesbury sandstone with a range of shallow and steep to very steep slopes with crests and ridges that can be convex and narrow.

The topography of the road corridor is gently undulating, generally descending to the Harris Creek riparian corridor before sloping up to Holsworthy Barracks. There is another slight drop in elevation across Williams Creek before a gentle increase in elevation near the entrance to Voyager Point.

2.6 Soils and Geology

Soils

The 1:100 000 soil landscape map for Penrith (Bannerman, 1990) indicates that the majority of the study area is underlain by fluvial soils of the Richmond group. These are broadly described as poorly structured orange to red clay loams and sands.

The project is identified as having a high risk of erosion and sedimentation. As a result, an Erosion and Sedimentation Management Report has been prepared during detailed design (SMEC, May 2019).

Geology

With reference to the 1:100 000 geological sheet for Penrith (Clark,1991), it is indicated that the majority of the study area is underlain by Hawkesbury Sandstone. This sandstone is described as medium to very coarse-grained quartz sandstone with minor laminated mudstone and siltstone lenses.

From the intersection of Heathcote Road and Infantry Parade, the alignment appears to be underlain by Ashfield shale. This shale is described as being dark-grey to black claystone-siltstone and fine sandstone-siltstone laminate.

Geotechnical investigations undertaken in this area did not reveal the presence of shale, however residual soil encountered in one borehole locations between these roads was classified as highly expansive indicating the possibility of underlying shale.

Acid Sulphate Soils

Two acid sulphate soil management areas have been identified for the project. Each area is located at the road bridge crossing at:

- Harris Creek, and
- Williams Creek.

Detailed soils sampling and testing for acid sulphate soils has occurred during detailed design. Further information is provided in:

- Contamination and acid sulphate soil assessment (Draft, SMEC 2018)
- Acid sulphate soil management plan (SMEC, April 2019).

2.7 Climate

Holsworthy has a temperate climate, with warm summers and cool to mild winters, with precipitation peaking in February.

Thunderstorms are common in the summer months, and according to Bureau of Meteorology data, Holsworthy has a total mean annual rainfall of 706.5 millimetres (mm), with the highest mean monthly rainfall in February (109.0 mm per month). Holsworthy receives up to 500mm less precipitation than coastal areas, 25 kilometres east.

Holsworthy has a mean average annual temperature of 23.5 degrees Celsius (C), with the warmest months being December to February (about 28° C) and the coldest months of June to August (about 18°C). Winters tend to be cool and sunny with frost a fairly common occurrence in winter.

2. Existing environment

2.8 Land use

Existing urban form

A review of existing and former land uses in the study area has provided an understanding of how settlement patterns have influenced cultural patterns on the landscape. European settlement of the area began in the 1798 when grants for farming were made in the area and with good soil in the area crops of corn, wheat and vegetables were soon being harvested.

Holsworthy is now most notable for a large Australian Army reserve, Holsworthy Barracks, where training exercises are frequently carried out.

Key stakeholder sites

The study area consists of several stakeholder sites where strategic urban design measures would be required in order to mitigate the impacts of the proposal. These impacts include functional issues such as access and parking, as well as visual amenity issues such as screening.

Understanding the location and nature of these key stakeholders is a key urban design consideration in order to ensure mitigation measures adequately address the needs of these stakeholders.

Government Agencies include:

- Sydney Trains
- Transport for NSW
- Office of Environment and Heritage (OEH)
- Environmental Protection Authority
- NSW Department of Planning and Environment
- Fisheries NSW
- Department of Defence – Holsworthy Army Barracks
- Sydney Water
- Bicycle NSW
- State Minister for Roads and Freight
- State Member for Holsworthy
- Federal Member for Hughes
- Liverpool City Council

Other stakeholders include:

- Gandangarra Local Aboriginal Land Council
- Tharawall Local Aboriginal Land Council
- Moorebank Heritage Group
- Holsworthy Early Education and Care Centre
- Local residents
- Public transport users
- Road users
- Community and Action groups
- Environmental groups
- Sporting groups
- Utility companies.

2.9 Transport network

Vehicular access

Heathcote Road is a major arterial road which joins Heathcote, Lucas Heights and the Sutherland Shire to Liverpool and its surrounding suburbs. It plays an important role in moving traffic between the Illawarra area and the western Sydney areas. The section of Heathcote Road passes through the southern end of Holsworthy, Mornington, Holsworthy Barracks and Voyager Point.

Heathcote Road provides the only access to Holsworthy Train Station via a roundabout intersection at Macarthur Drive. It is also the sole access road to Voyager Point residential area via a T-intersection at The Avenue. Heathcote Road also provides access to the Holsworthy Army Barracks. In mid 2014 a new signalised intersection was completed to provide a new access point to the Army Barracks.

Currently Heathcote Road is heavily congested during peak hours due to the dominant right turn movement into Macarthur Drive as well as right turn movements from army personnel.

Public transport

Train

Holsworthy Train Station provides access to the T8 Airport Railway Line, originating in the city and terminating at Macarthur Station. Transfers at Wolli Creek provide access to the T4 Eastern Suburbs and Illawarra Line, while transfers at Sydenham provide access to the T3 Bankstown Line. Redfern and City Circle stations provide access to the rest of the network.

East Hills Station lies outside the study area but is accessible to Voyager Point via a pedestrian connection.

Bus

The upgraded section of Heathcote Road is used by the following bus services:

- 901: Liverpool to Holsworthy, via Wattle Grove
- 902: Liverpool to Holsworthy, via Moorebank and Hammondville
- 902X: Sandy Point to Holsworthy, via Pleasure Point and Voyager Point

Pedestrian and Cycling Facilities

There is currently no formal pedestrian link and no continuous, safe cycling route along Heathcote Road from Macarthur Drive to The Avenue. Presently, the only active transport (pedestrian and cyclist) provisions along this section of Heathcote Road are on the western side of the road between Infantry Parade and Macarthur Drive.

2. Existing environment

2.10 Noise and vibration

The upgrade would involve vehicular traffic travelling closer to properties adjacent to Heathcote Road. As part of the detailed design process operational road traffic noise mitigation has been considered with the outcomes presented in the Heathcote Road Upgrade – Operational Road Traffic Noise Assessment Report (Resonate, 2019). As a result of this consideration the following is proposed:

- Extension of the existing 2.75 metre high (above existing ground surface) noise wall to address an approximate 37 metre gap outside the Child Care Centre at 3A Artillery Crescent in Noise Catchment Area (NCA) A (western side of Heathcote Road, north of Harris Creek).
- Consideration of at-property treatments at three residences and one childcare centre in NCA A (consistent with the REF) due to residual exceedances of noise criteria.
- Consideration of at-property treatments for non-project related exceedances at Holsworthy Public School and one residence in NCA A.
- Consideration of at-property treatments at 25 locations in NCA B (western side of Heathcote Road, east of Harris Creek).
- Consideration of at-property treatments for non-project related exceedances at nine residences in NCA B.
- Provision of a 3.5-3.6 metre high (above existing ground surface) noise wall at The Avenue (NCA D - The Avenue, Voyager Point), as opposed to the 4.5 metre high noise wall foreshadowed in Section 6.6.4 of the REF.
- Consideration of at-property treatments at 13 locations in NCA D.

2.11 Aboriginal heritage

The broader Holsworthy bushland retains many indigenous sites with many significant Tharawal sites in the area including campsites, tool making sites and rock art. The art is mostly engravings of hands, boomerangs, animals, birds and fish.

Investigations for the proposed modification (Kelleher Nightingale, 2019) noted that one previously recorded Aboriginal archaeological site (Holsworthy Isolated Find 4; AHIMS ID: 45-5-2344) was within the study area but is listed as destroyed and is no longer extant. No further Aboriginal archaeological sites, objects or potential archaeological deposits were identified.

A Heritage Interpretation Strategy (Extent, April 2019) and a Heritage Interpretation Plan (Extent, in prep) would be implemented for the project and include Aboriginal Art on proposed structures. A local Aboriginal artist would be engaged and the artwork would be selected in consultation with Gandangara Local Aboriginal Land Council and Liverpool City Council.

2.12 Non-Aboriginal heritage

The Liverpool Local Environmental Plan (LEP) includes provisions intended to conserve the environmental heritage of the LGA. Identified heritage items listed in Schedule 5 of the LEP within the area of proposed road upgrade include:

- Holsworthy Pedestrian Bridge (Former Harris Creek Railway Bridge) – Local significance - Item 31.
- Holsworthy Group (Including Holsworthy Pedestrian Bridge) – Local significance - Item 32.
- Cubbitch Barta National Estate Area – Local significance - Item 34.

The Holsworthy Pedestrian Bridge has been nominated for inclusion on the State Heritage Register, with the nomination currently being considered by the Office of Environment and Heritage.

As part of the detailed design it was identified that significant heritage fabric including the piers, abutments and Rolled Steel Joists (RSJs) of this item could be retained without causing unacceptable upstream flooding impacts (ie the flooding of private residential property). Retention of these elements is part of the proposed modification.

Heritage listed items

The Liverpool Local Environmental Plan (LEP) includes provisions intended to conserve the environmental heritage of the LGA. Identified heritage items listed in Schedule 5 of the LEP within the proposed road upgrade include:

- Holsworthy Pedestrian Bridge (Former Harris Creek Railway Bridge) – Local significance - Item 31

This bridge has been nominated for State Heritage Listing and is currently being assessed by OEH.

Considerable efforts were made during detailed design to minimise impacts on this bridge and design and flood studies identified that additional heritage elements of the pedestrian bridge can be retained, including the abutments and the RSJs.

- Holsworthy Group (Including Holsworthy Pedestrian Bridge) – Local significance - Item 32
- Cubbitch Barta National Estate Area – Local significance - Item 34
- The Bailey Bridge element would be the only item to be removed as retention is not possible due to potential flooding impacts. Further information is provided in the SoHI (Extent, February 2019) for detailed design.

3. The Proposal

3.1 The proposal modification

Roads and Maritime proposes to modify the Heathcote Road Upgrade, Infantry Parade to The Avenue, to address the requirements of the detailed design, improve functionality, reduce environmental impacts, manage impacts on utilities and assist construction.

Key features of the proposed modification would include:

- Changes to the project boundary to accommodate all elements of the detailed design and additional vegetation clearing
- Provision of a shared path connection and additional traffic lane to Holsworthy Railway Station
- Extension of eastbound dual right turn lane into Macarthur Drive
- Provision of a third lane on Heathcote Road between Macarthur Drive and the rail bridge
- Provision of an additional right-turn lane from Heathcote Road (eastbound) to Macarthur Drive
- Provision of an additional right-turn lane from Macarthur Drive to Heathcote Road (eastbound)
- Provision of an additional right-turn lane from The Avenue to Heathcote Road
- Retention of the abutments and rolled steel joists of the State Heritage Register nominated Harris Creek Pedestrian Bridge
- Inclusion of additional construction compounds
- Inclusion of an emergency stopping bay on the southern side of Heathcote Road, west of Harris Creek
- Changes to the Harris Creek Bridge and channel widening in Harris Creek to address upstream flooding
- Provision of a 3.5-3.6 metre high (above existing ground surface) noise wall at The Avenue, as opposed to the originally proposed 4.5 metre high noise wall.
- Extension of the existing 2.75 metre high (above existing ground surface) noise wall to address an approximate 37 metre gap outside the Child Care Centre at 3A Artillery Crescent on the western side of Heathcote Road, north of Harris Creek.
- Sewer, water, power and communications adjustments and connections
- Additional kerb, gutter and pathway works
- Provision/extension of maintenance access tracks
- Implementation of a detour for pedestrians and cyclists during construction
- Temporary relocation of bus stops during construction
- Speed zone adjustment near The Avenue intersection
- Relocation/removal of roadside tributes.

LOOKING EAST ALONG THE ARTC RAIL CORRIDOR FROM THE DISUSED ACCESS BRIDGE

4. Urban Design

4.1 Detailed Design Review

Overview

An Urban Design Report which included a LCVIA for the proposal was completed in October 2016 to support the review of environmental factors (REF) and assist with the development of the concept design.

Since then a detailed design of the proposal has been undertaken and more recently Roads and Maritime has proposed modifications to improve functionality, manage impacts on utilities, assist construction and where possible reduce environmental impacts. This section of the report considers the modifications that have resulted in the latest changes to the detailed design.

Urban Design Proposal

As stated in the project's Review of Environmental Factors:

'The proposal's urban design strategy is to reinforce the vegetated character of the road corridor through the use of appropriate native planting and restore areas outside the corridor disturbed by construction with appropriate native vegetation.'

The road therefore needs to be designed and landscaped to be functional in its future context and setting, by fitting in with its future landform. It also needs to provide an environment that people can easily navigate around and the Liverpool City Council can easily maintain.

Table 4-1 analyses the objectives provided in the concept design and expands them to include principles for the detailed design stage and beyond.

Approach to Detailed Design

The design approach taken is to provide a clear response to the needs of the community, and the varying landscape and the urban characteristics of the proposal.

The following section lists the urban design elements that have either been introduced or revised in order to address issues raised during detailed design.

Figure 3-1: Heathcote Road Upgrade Revised REF

4. Urban Design Proposal

Structures

Retaining walls

Key features of the proposed modification of the detailed design include:

- Increase in the height of the retaining wall at The Avenue from 2.5 metres to 4.5 metres

Revised Road Design response: These key features are seen as appropriate in terms of intent, with final selected finishes.

Furniture

Noise walls

Key features of the proposed modification of the detailed design include the following noise abatement walls:

- Extension of the existing 2.75 metre high (above existing ground surface) noise wall to address an approximate 37 metre gap outside the Child Care Centre at 3A Artillery Crescent comprised of two panels of concrete reaching a total height of 3m
- Provision of a 3.5 metre high (above existing ground surface) noise wall at The Avenue (includes concrete base panel with 0.5m clear top panel)
- Provision of 4.5 metre high noise wall, from the western side of Heathcote Road, east of Harris Creek to MacArthur Drive (includes concrete base panel with 1.5m clear top panel).

Revised Road Design response: These key features are seen as appropriate in terms of intent, with final selected finishes.

Lighting

Key features of the proposed modification of the detailed design now include:

- Street light located on the north west corner of the intersection of MacArthur Avenue and Morningside Parade.

Revised Road Design response: Selection of street lighting fixtures will aim improved amenity for pedestrians and cyclists and limit impacts to local residents. For further detail on lighting refer to Section 5 of this report.

4.2 Landscape design proposal

Landscape design elements

Batter treatments

Key features of the proposed modification of the detailed design now include the following non-conformance batters:

- 1.95H:1V steep batters have been provided for a short section (8m) on the eastbound carriageway (approximate MC00 CH 350)
- 1.75H:1V steep batters have been provided for a short section (5m) on the westbound carriageway (approximate MC10 CH 1375)
- 1.7H:1V steep batter have been provided at Williams Creek adjacent to the eastbound carriageway (MC00) due to a change in the project boundary at this location
- 4:1 batter slopes adopted in depressed median, locally only at two (2) drainage pits located on the departure side of the rail bridge

Revised Road Design response: Additional consideration of appropriate treatments and plant species selection would be required to deal with non-conformance batters to reduce impacts for local residences and road users.

Riparian treatments

Key features of the proposed modification of the detailed design at Harris Creek includes:

- widening of the channel to address upstream flooding
- additional bioswales
- fauna crossing.

Key features of the proposed modification of the detailed design at Williams Creek includes:

- additional bioswales
- fauna crossing.

Revised Road Design response: Plant species would be selected from the relevant endangered communities found within the existing riparian corridors as well as appropriate macrophyte and sedge planting to reduce visual impacts for local residences and road users.

4. Urban Design Proposal

Table 4-1: Review of urban design objectives and principles

Objective	Principle	Revised principles for project modifications
1.0 Link the more developed northern section of the road corridor with sensitive bushland to the south	– 1.1 Reinforce the vegetated character of the road corridor through the use of appropriate native planting	No change proposed – Establishing a well-vegetated road corridor is a desirable outcome
2.0 Protect sensitive environments adjacent to the road corridor including endangered ecological communities, riparian crossings and local residences	– 2.1 Restore areas outside the corridor disturbed by construction with appropriate native vegetation from local ecological communities – 2.2 Introduce appropriate riparian planting at the Harris Creek and Williams Creek crossings – 2.3 Select batter vegetation on either side of the road corridor to screen the built form and reduce the scale of infrastructure elements – 2.4 Minimise the removal of existing vegetation and maximise revegetation within the corridor	Supplementary principle: – Select vegetation and surface treatments in creek bioswales areas to maximise soil stabilisation and ensure vegetation establishes quickly and performs well in flood inundation periods – Minimise the disturbance as a result of access track extensions
3.0 Provide effective linkages to Holsworthy Train Station and Holsworthy Army Barracks with improved amenity for pedestrians and cyclists	– 3.1 Provide generous and safe shared paths along the road corridor and on bridges – 3.2 Contribute to the accessibility and connectivity of people within regions and local communities and maximise pedestrian and cyclist movements and connections within the area	– No change
4.0 Consider visual impacts and aim to reduce impacts for local residences and road users	– 4.1 Ensure a well-vegetated road corridor including tree planting, particularly next to built-up areas	Supplementary principle: – Ensure that the finishes of retaining walls and noise walls reduce impacts for local residences and enhance interpretation of heritage and assist with landmarking
5.0 Reference the rich military heritage of the area within the road corridor design.	– 5.1 Embellish the entry features to Holsworthy Barracks with feature/gateway planting – 5.2 Develop a Heritage Interpretation Strategy which reflects the history and important role of the Holsworthy Barracks in the local community. Ensure an integrated and iterative urban design response exhibited through a combination of elements including signage, noise walls and retaining walls – 5.3 Introduce culturally appropriate species in proximity to the army barracks.	Principle removed as it is not part of the proposed modifications: – Integrate Liverpool Council's proposed Holsworthy Army Barracks entry feature 'Anzac Memorial' into the road corridor design

LOOKING NORTH WEST OVER HARRIS CREEK ROAD AND PEDESTRIAN BRIDGE

5. Impact assessment

5.1 Methodology

This chapter aims to undertake a qualitative assessment of the potential impacts on landscape character and views of the proposal. The assessment has been undertaken in parallel with development of the concept design. Outcomes of the impact assessment have been incorporated directly into the concept design or where this has not been possible, stated as mitigation measures or potential design improvements to be developed in the Detailed Design.

Study Process

Key components of the LCVIA methodology include:

- desktop study and site analysis to identify the landscape character zones. The natural environment is identified and described as well as the human intervention and shaping of that environment, including settlements and the interaction between place and community
- identifying and assessing the impacts of the proposal on each zone to determine the landscape character impacts. These impacts are based on the sensitivity of the landscape character zone to change and the magnitude of the proposal within that landscape
- assessment of the visibility of the proposal which is based on desk top studies and site analysis, the extent of the proposal which is visible is captured in the Visual Envelope Map (VEM)
- visual inspection of subject site and study area and associated photography to identify and confirm key viewpoints and the sensitivity of potential visual receptors and confirm site character. The final list of receptors does not represent the entire number of receptors likely to be visually impacted by the proposal, but rather gives an indication of the typical range of views that receptors will have
- assessment of the unmitigated impact of the development on each representative viewpoint based on a composite of the sensitivity of the view and magnitude of the development in that view, before any mitigation strategy has been put in place
- development of mitigation strategy which includes principles and strategies to mitigate landscape character and visual impacts in the ongoing development of the design.

Urban Design Criteria

The methodology for the LCVIA has been developed in response to the brief and in accordance with Roads and Maritime guidelines set out in the ***EIA N04 Practice Note: Guidelines for landscape character and visual impact assessment V2.1*** (Roads and Maritime, 2018). The methodology also draws upon the key considerations and outcomes of the overarching ***Beyond the Pavement*** (Roads and Maritime, 2014) guidelines.

The relevance of the first document is that it considers the site within its landscape setting and considers views from a variety of user groups and from a range of locations. The second document is Roads and Maritime's overarching urban design policy, which outlines the urban objectives for road, road network and road furniture design, the design of structures and earthworks formations, which are of relevance to this proposal.

5.2 Impact ratings

The overall impact rating of the proposal on any given visual receptor or landscape character are based on themes of magnitude and sensitivity. The relevance of magnitude and sensitivity for each assessment type is described below.

5.3 Landscape Character

Roads and Maritime guidelines provides the following definition of landscape character -

Landscape character is the aggregate of built, natural and cultural aspects that make up an area and provide its unique sense of place. Landscape in this context is taken to include all aspects of a tract of land - the built, planted and natural topographical and ecological features.

In applying this definition to the specific conditions within the study area and the features of the proposal, the landscape character assessment also considers how the road upgrade would be used and how it would function as a part of the region. The assessment has considered both existing landscape character and desired future character.

		Magnitude			
		High	Moderate	Low	Negligible
Sensitivity	High	High Impact	High-Moderate	Moderate	Negligible
	Moderate	High-Moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Figure 5-1: RMS Visual Impact Assessment Matrix

5. Impact Assessment

To enable the assessment of impacts on landscape character, landscape character zones are determined for the site.

Landscape character zones have distinct, recognisable and consistent pattern of elements, be it natural (soil, vegetation, landform) and/or human built form, distinguishing one landscape different from another.

Two primary factors are used to determine Landscape Character Zone impacts:

- sensitivity of the character zone
- magnitude of the proposal in that zone.

Sensitivity

The degree to which a particular landscape type can absorb and accommodate change arising from a proposal. Sensitivity refers to how sensitive the character of the setting is to the proposed change. For example a pristine natural environment will be more sensitive to change than an industrial area.

It considers the perceived cultural, natural and heritage values of the visual environment and the elements within it.

Magnitude

The magnitude of the effects of the development within the landscape. Consideration is given to existing built form in the landscape and how closely the proposal matches this in bulk, scale and form. Magnitude is a study of the scale or degree of change to the landscape resource, the nature of the effect and its duration including whether it is permanent or temporary.

In the case where future development is already approved, this context is used in the assessment.

Refer to Figure 5-2 for landscape character zone identification.

5.4 Visual Impact

The potential visual impact of the proposal is assessed in relation to key viewpoints and/or group of viewpoints. Visual impact assesses the unmitigated impact of the proposal on each representative viewpoint. Impacts are based on a composite of the sensitivity of the view and magnitude of the proposal in that view, before any mitigation strategy has been put in place and helps to determine mitigation measures.

Sensitivity

Sensitivity is the measure of the visual importance of the view and the 'completeness' of the view and the perceived value of the existing landscape character. A judgment is made as to the quality of the landscape, its cultural and historical importance to the community, scenic value and overall composition of the place and its inhabitants. The following sensitivity parameters have been used as the basis for this assessment:

- The category of viewer such as resident, visitor or worker and the number and frequency of viewers or views
- The elements of the proposal that are visible
- Importance of the view. Places with high social, recreational, and historical significance to local residents have higher sensitivity, as do areas of unique scenic quality
- Generally, viewers with the highest sensitivity include:
  - Residents who have existing views that would be affected by the proposal and the context of this view i.e. kitchen window, balcony, bedroom, living room
  - Users of public open space where their attention is focused on the visual landscape, for example, lookouts or other scenic natural areas
  - Communities that place high cultural and historical significance on the visual landscape
- Viewers with the lowest sensitivity are most likely to be:
  - Employees working within an enclosed workplace and focused on their work (however interesting views should be provided for them within a short walk from their workplace)
  - Motorists (apart from tourists) whose attention is focused on driving – however it is important to provide a stimulating motorist experience, particularly for tourists.

Magnitude

The 'magnitude of visual change' to existing character and views refers to the nature and scale of the proposal, and the extent and proximity of the view to the work or the extent of change of landscape character. Magnitude represents the contrast in scale, form and type of work and to the location and context to which it is to be placed.

A high magnitude results if the proposal is of a major scale and considered out of scale or uncharacteristic of the existing visual character, or if there is considerable modification to the existing built fabric or landscape. A moderate magnitude would result if the proposal is prominent but not considered to be substantially uncharacteristic with the existing character. A low magnitude results if there is minimal alteration to the existing view and the proposal is of a scale and nature that is consistent with the existing character.

5. Impact Assessment

5.5 Landscape character

Character overview

The MR512 Heathcote Road Widening Infantry Parade, Hammondville To The Avenue, Voyager Point Urban Design Report by CLOUSTON Associates identified that the project area is an important gateway and the transition zone between the more developed northern sections of the Heathcote Road corridor (including the suburbs of Wattle Grove, Moorebank and Hammondville), and the mostly undeveloped bushland that the corridor winds through as it heads south towards Heathcote.

Six Landscape Character Zones (LCZ) were identified surrounding the project area (Refer Figure 5-2). The key aspects defining the project area were:

- Urban arterial road which is generally a two lane undivided road except where it has been widened to four lanes on the approaches to the new signalised access to Holsworthy Army Barracks
- Heavily vegetated open space areas, with paths and sportsfields
- Southern sections of the road have a strong vegetated character with a sense of undeveloped bushland
- The two riparian crossings are marked by subtle changes in the type and density of vegetation
- Some noise walls and vegetated verges either side of the road
- Generally enclosed with only limited views from motorway to surrounding area.

Landscape Character Zones

To enable the assessment of impacts on landscape character, landscape character zones have been identified for the site. Landscape character zones are defined as having a distinct, recognisable and consistent pattern of elements, be it natural (soil, vegetation, landform) and/or human built form, distinguishing one landscape different from another. Refer Figure 5-2 taken from CLOUSTON Associates Urban Design and LCVIA Report October 2016.

The boundaries of the LCZ were identified during desktop studies and confirmed during site visits where they were recorded and photographed.

The project is broken into several landscapes of differing landscape character from remnant bushland areas through to defence land. The project site and surrounds have been assessed and six landscape character zones have been defined. These include:

- Character Zone 1: Remnant Bushland
- Character Zone 2: Residential
- Character Zone 3: Sports Facilities
- Character Zone 4: Public open Space
- Character Zone 5: Defence Land
- Character Zone 6: Future Development Site

Each character zone is summarised in Table 5-1 in terms of the existing physical attributes as well as proposal elements which are likely to impact the LCZ and each is illustrated with photographs on the following pages.

5. Impact Assessment

Table 5-1: Landscape character impact rating analysis

Zone	Description of setting	Concept stage impact rating	Detailed design stage review	DD project modifications review
Zone 1 Remnant Bushland	This zone is primarily located along the northern side of the alignment and straddles the alignment at the southern end near The Avenue and Williams Creek.	– Impacts to character in this zone has been rated as High to Moderate based on a High sensitivity and Moderate magnitude rating due to removal of vegetation	– The loss of vegetation should be minimised however as bushland continues in similar density away from the road, removal of foreground vegetation strips would not alter character to this extent	– There would be additional linear strips of vegetation removed for compound areas and access tracks however this is unlikely to alter the landscape character
Zone 2 Residential	This zone comprises pockets of existing residential development along the southern side of the alignment, as well as the residential area known as Voyager Point on the north side of Heathcote Road at the southern end	– Impacts to character in this zone have been rated as Moderate based on Moderate sensitivity and Moderate magnitude	– Houses are generally well setback and would continued to be buffered by vegetated setbacks	– The extension of existing noise walls and addition of new ones as well as the widening of the road traffic lanes means that some of the vegetated buffers and setbacks would be reduced
Zone 3 Sports Facilities	This zone consists of sports fields and associated facilities at the Moorebank Sports Club at the northern end of Heathcote Road	– Impacts to character in this zone have been rated as Moderate to Low based on Moderate sensitivity, due to the open nature of the zone and a Low magnitude of work	– While its true the sports areas are open, currently the Heathcote Road edge here is not densely vegetated. Although the road is to be widened in some areas that may front the zone, planting and revegetation along the road would reduce character impacts	– The clearing boundary has been adjusted and no longer includes council land next to the sports club carpark consequently character impacts would be further reduced
Zone 4 - Public Open Space	This zone comprises of a reserve associated with Harris Creek next to the suburb of Holsworthy	– Impacts to this zone have been rated as Moderate based on High sensitivity, due to local community usage and a Low magnitude of work	– As Heathcote Road already forms an edge to the reserve and would not be substantially widened	– Additional hydraulic works to widen the Harris Creek channel and address upstream flooding might increase the impact of the proposal within the landscape character zone
Zone 5 Defence Land	This zone comprises the Holsworthy Army Barracks on the southern side of Heathcote Road, bounded by Harris Creek in the west, the T8 Airport Line and Heathcote Road in the north and Williams Creek to the east	– Impact to this zone has been identified as Negligible, based on a Low sensitivity and a Negligible magnitude of work	– As users of the barracks are well setback from the road and given the road has recently been upgraded we agree with the rating of Negligible	– The entry feature at the Barracks is no longer proposed by Department of Defence/ Council so it no longer part of the projectconsequently character impacts would be further reduced
Zone 6 Future Development Site	This zone is identified in two locations, one of which fronts Heathcote Road to the east of the railway bridge	– Impact to this zone has been identified as Low as future residents/users will inhabit the site once the upgrade has already been completed	– A retaining wall associated with the railway bridge would likely be visible and care should be taken to employ appropriate urban design of the structure.	– The provision of a third lane within the road corridor and the addition of a maintenance access track has meant that the verge between the future development site and the road has been reduced which will impact the landscape character

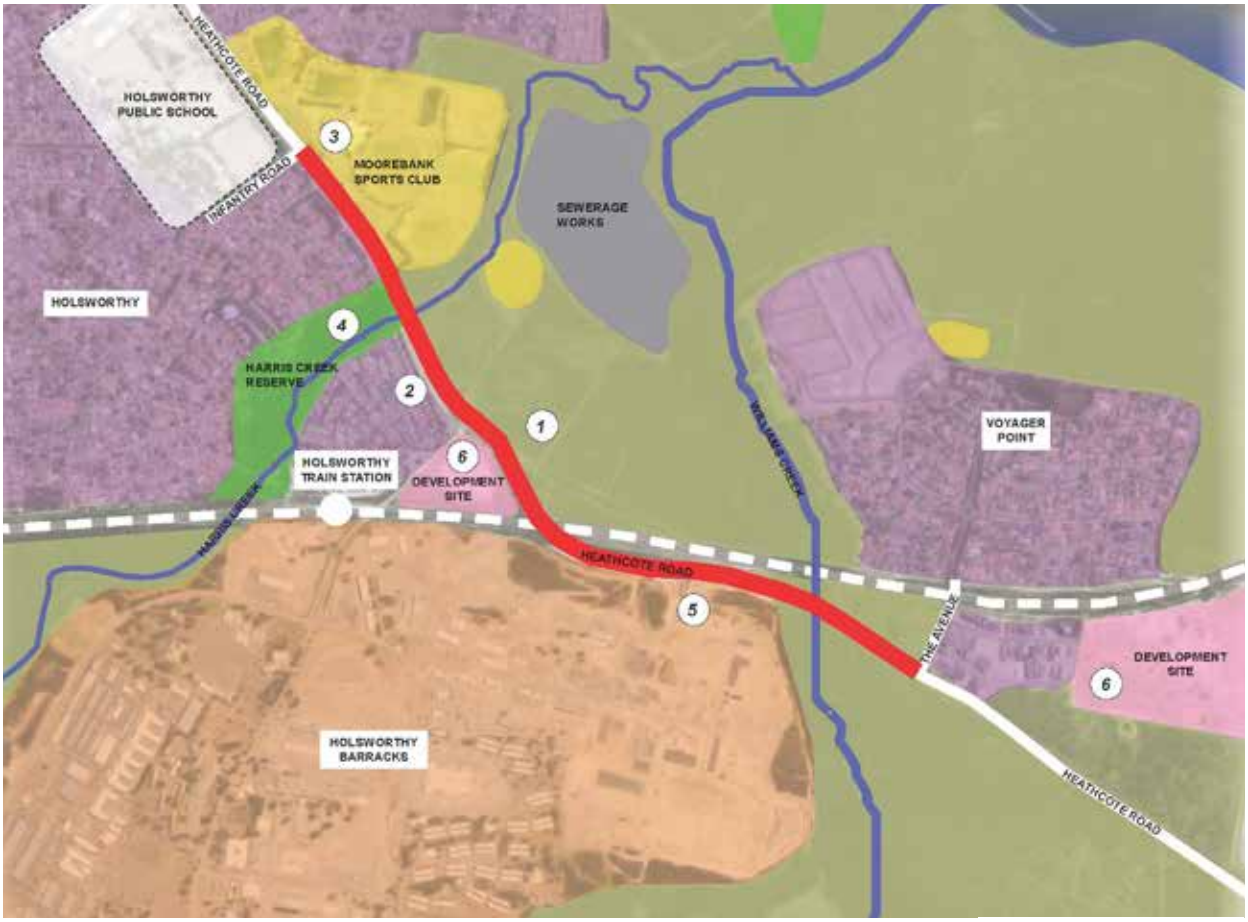

Figure 5-2: Landscape Character Zones (CLOUSTON Associates)

5. Impact Assessment

5. Impact Assessment

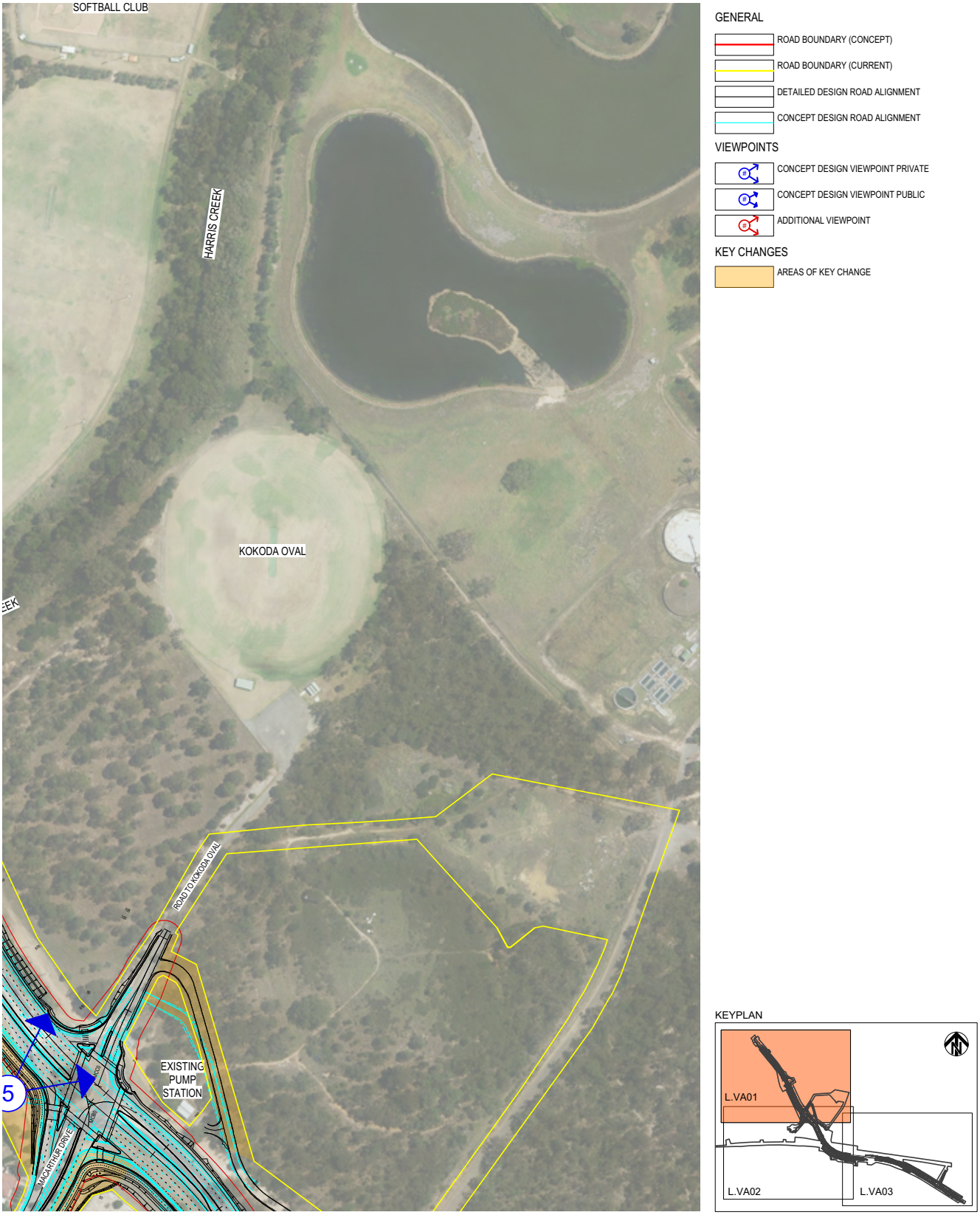

Figure 5-3: Visual Assessment L.VA.01

5. Impact Assessment

5. Impact Assessment

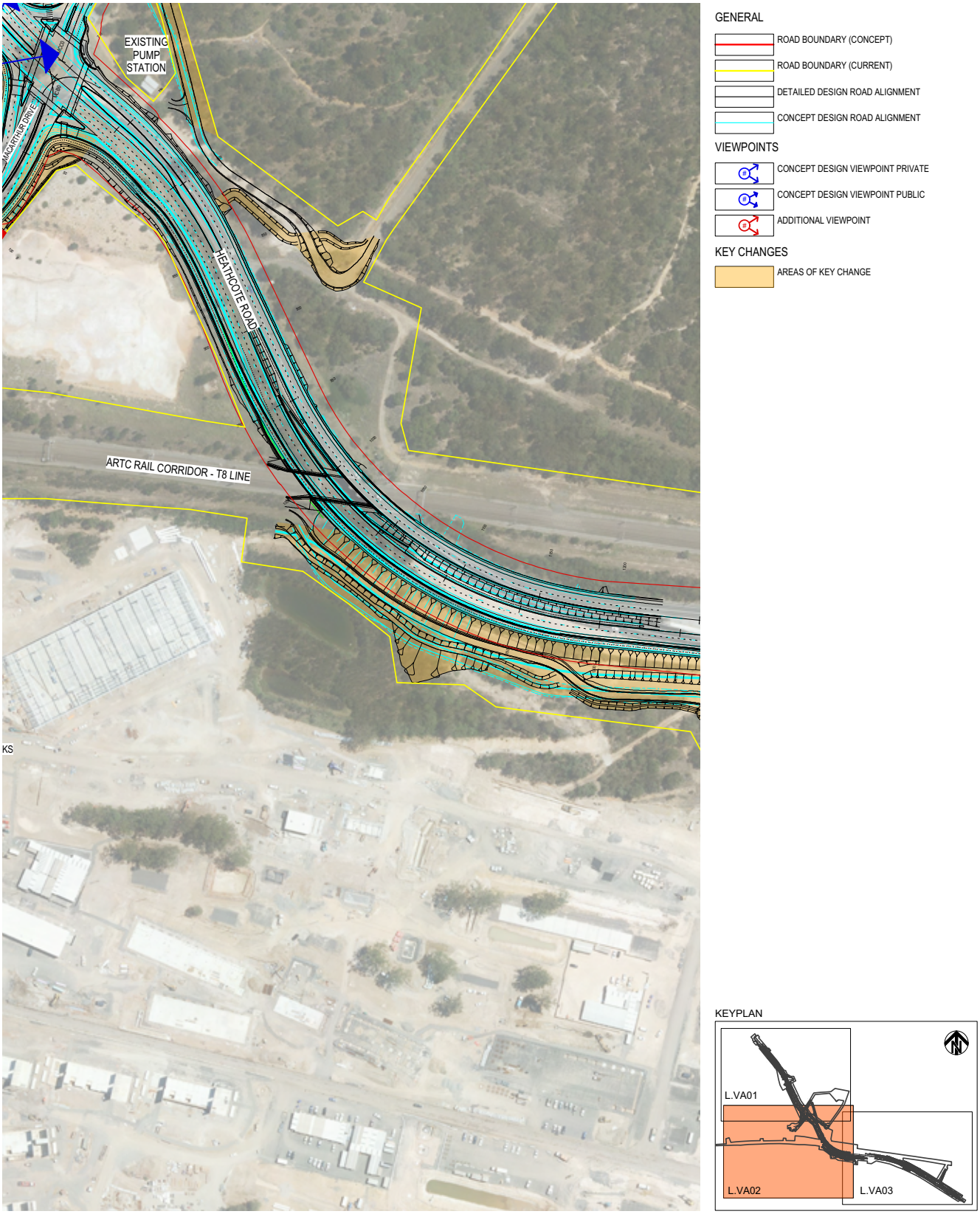

Figure 5-4: Visual Assessment L.VA.02

5. Impact Assessment

5. Impact Assessment

Figure 5-5: Visual Assessment L.VA.03

5. Impact Assessment

LCZ 01: Remnant Bushland

Existing landscape character assessment

This landscape character zone occurs along riparian corridors and fragmented sections across the study area, including the Harris Creek and Williams Creek corridors, to the north of Heathcote Road between the two creeks and immediately south of Heathcote Road, opposite the main entrance to Voyager Point. Vegetation is predominately native and occurs in dense stands with understorey and sometimes low native grasses at the road edge.

Refer to the Biodiversity Assessment Report, SMEC 2019, for a full description of flora and fauna across the project area.

While the direct Project area has been previously disturbed by the construction of the roads and the bridges along Heathcote Road, the vegetation is generally intact and dominated by native species within all strata, with weeds predominately restricted to disturbed road edges. Much of the vegetation beyond the road corridor is of a high quality with dense canopy cover and includes threatened ecological communities.

Refer to Plate 5-3 to Plate 5-5 for existing character images.

Visible elements of the project modifications:

- Changes to the Harris Creek Bridge and channel widening in Harris Creek to address upstream flooding
- Bioswales to Harris Creek channel
- Fauna crossing at Harris Creek Bridge
- Additional ancillary sites (Commonwealth Lease)
  - compound area running along the northern side of Heathcote Road between Harris Creek and Macarthur Drive
  - compound area at the Harris Creek Field
- Water main adjustment north east of Heathcote Road
- Northern access track to the existing pumping station
- Bioswale at the intersection of Williams Creek Bridge and Heathcote Road
- Fauna crossing at Williams Creek Bridge
- Compound area running along the northern side of Heathcote Road north west of Williams Creek Bridge
- Relocation of roadside tributes

Revised Landscape character assessment

Although the proposal area has been previously disturbed by the construction of the roads and the bridges, along Heathcote Road, the vegetation is generally intact and dominated by native species within all strata, with weeds predominately restricted to disturbed road edges. Much of the vegetation beyond the road corridor is of a high quality with dense canopy cover and includes threatened ecological communities.

To address the requirements of the detailed design the project boundary has expanded into some bushland areas previously not disturbed by construction. Typically these areas have been constrained to narrow, linear parcels next to existing infrastructure corridors in order to minimise the magnitude of change. As a result it is unlikely that the character of the whole zone would be significantly affected. Impacts would be reduced by the replanting in affected areas.

The impact on landscape character is summarised in Table 5-2.

Table 5-2: Landscape character zone 01 impact rating

Concept Design Phase		
Sensitivity	**Magnitude**	**Impact**
High As stated in *S15-0135 Heathcote Road Widening - Urban Design Report, Issue E*, an ecological survey of the site indicated the presence of two endangered ecological communities (EECs) while two threatened species were located at multiple locations within the project site. This zone has a low ability to accommodate change - removal of vegetation could alter its character substantially, leading to a high sensitivity rating	Moderate The road alignment has the potential to impact a limited section of EEC vegetation on both sides of the road corridor. This would be most substantial where the existing bridges over Harris Creek and Williams Creek are widened. Impacts would be reduced by the replanting of these vegetation communities in affected areas	Moderate/ High
Project modifications (Detailed Design Phase)		
High The project boundary has expanded and would require the clearing of a greater portion of vegetation within this character zone. As this zone has a low ability to accommodate change it maintains a high sensitivity rating	Moderate The project modifications would impact a greater portion of the EEC vegetation in this character zone but the magnitude of change is unlikely to significantly affect the character of the whole zone but rather only narrow, linear areas next to the road corridor	Moderate/ High
No change to the impact rating.		

5. Impact Assessment

Plate 5-3: LCZ01: Remnant bushland close to Harris Creek

Plate 5-4: LCZ01: Remnant bushland north of the East Hills rail line

Plate 5-5: LCZ01: View south east from Williams Creek Bridge

5. Impact Assessment

LCZ 02: Residential

Existing landscape character

Residential development is concentrated to the west of the road corridor within the suburbs of Holsworthy and Mornington, as well as Voyager Point to the east. These developments are characterised by modern low to medium density residential dwellings, including single and double storey detached and attached houses, town houses and some apartments up to three storeys in height.

The coherent building form of blockwork and tile buildings, set within densely planted streetscapes and gardens, contribute to a consistent urban character. The mature framework of native trees and urban density result in limited visibility of Heathcote Road from within the communities.

Some views along streets running parallel to Heathcote Road such as Margate Avenue (Mornington), Sabre Crescent (Holsworthy) and Willowie Way (Voyager Point) have views directed towards the road through breaks in screening vegetation.

The entry to Voyager Point is marked by a low sandstone wall and entry feature surrounded by dense tree planting.

Refer to Plate 5-5 to Plate 5-8 for existing character images.

Visible elements of the project modifications:

- Extension of the existing 2.75 metre high noise wall to address an approximate 37 metre gap outside the Child Care Centre at 3A Artillery Crescent
- Pavement and subworks on Heathcote Road
- Power connections on Heathcote Road
- Shared path along Heathcote Road, Holsworthy
- Inclusion of an emergency stopping bay on the southern side of Heathcote Road, west of Harris Creek, Holsworthy
- Provision of a 3.5-3.6 metre high (above existing ground surface) noise wall at The Avenue, as opposed to the originally proposed 4.5 metre high noise wall
- Provision of an additional right-turn lane from The Avenue to Heathcote Road
- Maintenance access track to southern boundary of Willowee Way properties

Revised Landscape character assessment

The project boundary has increased and many of the modifications made in the revised detailed design are of a similar scale and bulk to the existing infrastructure corridor however the introduction of new noise walls, retaining wall height adjustments and the reduction of vegetative screening would likely impact some of the residents of both Holsworthy and Voyager Point.

The proximity of a new noise wall to the rear boundary of properties on Margaret Avenue as well as the reduction of screening vegetation would have an impact in Holsworthy. At the entry to Voyager Point on The Avenue a 2 metres high increase in the height of the existing retaining wall as well as the introduction of a noise wall would have an impact. In both instances the close proximity to the works would likely mean a higher magnitude of change.

The impact on landscape character is summarised in Table 5-3.

Table 5-3: Landscape character zone 02 impact rating

Concept Design Phase		
Sensitivity	**Magnitude**	**Impact**
Moderate Residential development within the study area is set within an urban context including the presence of existing transport infrastructure. The zone can accommodate some change without impacting its character and is described as having a moderate sensitivity	Moderate The Project is similar in scale and bulk to other sections of Heathcote Road that are dual carriageway, and is in proximity to the M5 motorway, a road of substantially larger scale and bulk. Several properties in close proximity to the road corridor are likely to experience a moderate magnitude of change associated with the widened road infrastructure, with an increasing signage, lighting and traffic	Moderate
Project modifications (Detailed Design Phase)		
Moderate The urban context of this character zone which includes an existing transport corridor ensures that detailed design elements can be accommodated without impacting its character	High The revised road design would expand closer to residential properties and although many of the design elements are of a similar nature to other sections of Heathcote Road the scale and bulk of some elements increases with a closer proximity	High/ Moderate
The impact rating is likely to increase as a result of the project elements becoming more substantial and closer in proximity to residential dwellings		

5. Impact Assessment

Plate 5-6: LCZ02: Existing noise wall to edge of Holsworthy residences

Plate 5-7: LCZ02: View of Margaret Avenue residences from Heathcote Road

Plate 5-8: LCZ02: View of Willowie Way residences from Heathcote Road

5. Impact Assessment

LCZ 03: Sports Facilities

Existing landscape character

This character zone is found within the Moorebank Sports Club precinct, which is bounded by Harris Creek to the east, Heathcote Road to the south and west, and residential development within Hammondville to the north. Denser tree planting associated with Harris Creek forms a distinctive eastern edge to the character zone. This precinct consists of a number of sports fields that cater to a variety of local sport, such as soccer, cricket and netball.

Opened in 1970, this facility provides the wider community with a range of sporting and social activities. This zone is open in character with boundary tree planting surrounding the facility filtering views back towards the road corridor.

Refer to Plate 5-9 to Plate 5-11 for existing character images.

Visible elements of the project modifications

- The final project boundary has expanded along the perimeter of the sports facility to accommodate construction.

Revised Landscape character assessment

Changes in this character zone relate to the expansion of the boundary of the proposal area. It does not appear that any built works would happen at this location past the construction phase so it is unlikely to dramatically alter the character of this landscape zone.

The impact on landscape character is summarised in Table 5-4.

Table 5-4: Landscape character zone 03 impact rating

Concept Design Phase		
Sensitivity	**Magnitude**	**Impact**
Moderate As there is a limited amount of built form within this landscape zone, any new development has the potential to be discernible. The sports club is a functional space, however, and has the ability to absorb a certain level of change without impacting its character. The zone is rated as having a moderate sensitivity to change	Low The distance of the Project from the character zone, as well as the buffering effect of vegetation and carparks between these two spaces, would reduce the magnitude of the Project on this zone. A low magnitude rating has been recorded for this zone	Moderate/ Low
Project modifications (Detailed Design Phase)		
Moderate The project boundary has expanded for road widening. This zone has a moderate ability to accommodate change but as very limited change proposed it maintains a moderate sensitivity rating	Low No additional built form is proposed in this character zone with only an expansion of the proposal area likely during construction. A low magnitude rating is maintained	Moderate/ Low
No change to the impact rating		

5. Impact Assessment

Plate 5-9: LCZ03: Moorebank Sports Club main entry

Plate 5-10: LCZ03: Moorebank Sports Club carpark adjacent Heathcote Road

Plate 5-11: LCZ03: View of Hammondville Oval from Moorebank Sports Club carpark

5. Impact Assessment

LCZ 04: Public Open Space

Existing landscape character

To the north of the Mornington residential area, Harris Creek Reserve forms the most important area of public open space adjacent to the Project. This is a linear parkland following the creek. The parkland has shared pedestrian and cycle paths, linking the suburbs of Wattle Grove, Holsworthy and Mornington with Holsworthy Station.

Informal parking in the vicinity of the Station detracts from the character of the parkland in this area. The eastern end of the reserve has filtered views of Heathcote Road through the existing mature trees.

Refer to Plate 5-12 to Plate 5-14 for existing character images.

Visible elements of the project modifications

- Changes to the Harris Creek Bridge and channel widening in Harris Creek to address upstream flooding

Revised Landscape character assessment

Changes in this character zone relate to widening the Harris Creek channel in order to improve upstream flooding. This zone has a general absence of built form a presence of sensitive native vegetation in a linear parkland setting that is valued highly within the local community as an area for informal recreation. Consequently an increase to the creek channel embankments, the introductions of bioswales and fauna crossings as well as sewer and water infrastructure adjustments are likely to alter the character of this landscape zone.

The impact on landscape character is summarised in Table 5-5.

Table 5-5: Landscape character zone 04 impact rating

Concept Design Phase		
Sensitivity	**Magnitude**	**Impact**
High This zone has a general absence of built form, presence of sensitive native vegetation and is valued highly within the local community as an area for informal recreation. Any new built form has the potential to adversely impact this zone and it is described as having a high sensitivity to change.	Low The upgrading of Heathcote Road would have minor impacts to the edge of Harris Creek Reserve where it meets the widened road corridor, although this is unlikely to have an impact on the reserves functionality. The magnitude of the Project within this zone is rated as low.	Moderate
Project modifications (Detailed Design Phase)		
High The project boundary has expanded and would require the clearing of a greater portion of vegetation to accommodate changes in the vicinity of Harris Creek. As this zone has a low ability to accommodate change it maintains a high sensitivity rating	Moderate The revised road design further impacts the edge of Harris Creek Reserve where it meets the widened road corridor, and although this is unlikely to have an adverse impact on the reserves functionality the magnitude of the proposal within this zone is rated as moderate	Moderate/ High
The impact rating is likely to increase as a result of the proposal area and proposal elements becoming more substantial		

5. Impact Assessment

Plate 5-12: LCZ04: Harris Creek from heritage bridge

Plate 5-13: LCZ04: Harris Creek heritage bridge and pedestrian bridge

Plate 5-14: LCZ04: View of Harris Creek Reserve from Sabre Crescent

5. Impact Assessment

LCZ 05: Defence Land

Existing landscape character

Heathcote Road forms a boundary along the northern edge of Holsworthy Barracks. The main entry and Heathcote Road intersection have recently been upgraded, and so much of the associated landscaping and swale planting is new and still establishing, giving this area a relatively open character. Other sections of this zone are characterised by remnant bushland such as Castlereagh Scribbly Gum Woodland and Castlereagh Shale/gravel Transition Forest.

The Holsworthy Defence Base covers a very large area of land south of Holsworthy Station and west of Heathcote Road. This area has been a training area and artillery range for the Australian Army since the First World War.

To ensure privacy and security of Defence land, the buildings are set back from the edge of the road corridor with some screening vegetation. Filtered views are available from the barracks to Heathcote Road although access to the facility was not possible for this report.

Refer to Plate 5-15 to Plate 5-17 for existing character images

Visible elements of the project modifications

- Additional batters on the southern edge of Heathcote Road on approach to the rail bridge
- Access Road (MCD0), south of Heathcote Road from MC10 CH1010 – CH1300, to provide access for Sydney Trains to the rail bridge

Revised Landscape character assessment

There are some elements of the revised road design that could potentially impact this character zone but given the distance from the proposal and presence of similar infrastructure elements any changes would likely be seen as a continuation of recent road infrastructure work.

As well, to ensure privacy and security of Defence land, the buildings are set back from the edge of the road corridor with some screening vegetation. The impact on landscape character is summarised in Table 5-6.

Table 5-6: Landscape character zone 05 impact rating

Concept Design Phase		
Sensitivity	**Magnitude**	**Impact**
Low This zone is not publicly accessible and is utilised for defence purposes. The zone is described as having a low sensitivity to change	Negligible The interface between Heathcote Road and the Barracks has recently been upgraded, limiting the likely impact of any proposed works of a similar scale. The Project is anticipated to have a negligible affect on this zone	Negligible
Project modifications (Detailed Design Phase)		
Low This zone is not publicly accessible and is utilised for defence purposes. The zone is described as having a low sensitivity to change	Negligible Given the similar scale and bulk of the revised road design features with the existing infrastructure as well as screening vegetation The proposal continues to have a negligible affect on this zone	Negligible
No change to the impact rating.		

5. Impact Assessment

Plate 5-15: LCZ05: View looking south east to the Holsworthy Barracks entry

Plate 5-16: LCZ05: View across south-western corner of Holsworthy Barracks entry

Plate 5-17: LCZ05: View south west from the railway bridge across Holsworthy Barracks

5. Impact Assessment

LCZ 06: Future Development Sites

Existing landscape character

This landscape character zone is bounded by residential development to the west, Heathcote Road to the east and East Hills railway line and Holsworthy Barracks to the south. The site itself is predominantly exposed earth, surrounded by small groups of trees within grassland and weeds. The zone is mostly open with undulating landform, sloping up steeply to meet Heathcote Road at its eastern edge. There is a proposal for commercial development on this site in the future.

There are two future development sites located along the road corridor. The first is on the corner of Macarthur Drive and Heathcote Road. The second is adjacent to Voyager Point, but is screened from view by vegetation along Heathcote Road. While both of these sites currently contribute little aesthetic quality to the road corridor, the potential for development may change this in the future.

Refer to Plate 5-18 to Plate 5-20 for existing character images.

Visible elements of the project modifications

- Access Road (MCH0), next to proposed RSW (from MC10 CH 730 – CH 950 south of rail bridge), to provide Roads and Maritime access to retaining wall
- Provision of a third lane on Heathcote Road between Macarthur Drive and the rail bridge

Revised Landscape character assessment

Overall a low impact rating has been recorded on this landscape zone. The revised road design is unlikely to adversely impact the character of this zone, although it would be important to consider the road interface in this location to ensure that any such future development can be integrated successfully.

The impact on landscape character is summarised in Table 5-7.

Table 5-7: Landscape character zone 06 impact rating

Concept Design Phase		
Sensitivity	**Magnitude**	**Impact**
Low This area is fenced off and inaccessible to the public. The desired future character of the site is likely to be either residential or commercial development. Due to its positioning close to the existing road carriageway, the character zone has a relatively high ability to absorb change, leading to a low sensitivity rating	Low The Project is not expected to have any substantial impacts on this character zone and would be similar in terms of scale and bulk to the existing road infrastructure. A low magnitude of change is therefore expected for this landscape zone	Low
Project modifications (Detailed Design Phase)		
Low The project boundary has expanded and now accommodates drainage channels, access roads and a reduced verge however due to its positioning the character zone has a relatively high ability to absorb change, leading to a low sensitivity rating	Low Although is expected that there would be a slight increase in the scale, bulk and proximity of the existing road infrastructure the proposal is not expected to have any substantial impacts on this character zone. A low magnitude of change is considered in this landscape zone	Low
No change to the impact rating.		

5. Impact Assessment

Plate 5-18: LCZ06: View north west of development site from Heathcote Road

Plate 5-19: LCZ06: View west of development site from Heathcote Road

Plate 5-20: LCZ06: View south east from MacArthur Drive across future development

5. Impact Assessment

Landscape Character Assessment Summary

Roads and Maritime proposes to modify the Heathcote Road Upgrade, Infantry Parade to The Avenue, to address the requirements of the detailed design, improve functionality, reduce environmental impacts, manage impacts on utilities and assist construction.

For the purposes of this assessment the project has been identified as having six character zones and these have been ranked and the cumulative impact on sensitivity and magnitude has been assessed.

With regards to impact on LCZ the key features of the proposed modification are generally an expansion of the detailed design already assessed for Heathcote Road Upgrade. The landscape character assessment is summarised in Table 5-8 below.

The summary reveals that the greatest impact would be experienced in residential and public open space character zones where in both locations the sensitivity remains the same but the magnitude of change has increased.

Areas where an impact to character has been foreseen, generally relate to zones where screening or the ability to screen is relatively constrained and so the loss of vegetation potentially sees the reduced definition of the character zones boundary and increased exposure to the new road corridor and associated works.

Table 5-8: Landscape character impact rating summary

	Concept Design Phase				**Project Modifications (Detailed Design Phase)**		
	Zone	**Sensitivity**	**Magnitude**	**Impact**	**Sensitivity**	**Magnitude**	**Impact**
01	Remnant Bushland	High	Moderate	Moderate/High	No change		
02	Residential	Moderate	Moderate	Moderate	Moderate	High	High/Moderate
03	Sports Facilities	Moderate	Low	Moderate/Low	No change		
04	Public open Space	High	Low	Moderate	High	Moderate	High/Moderate
05	Defence Land	Low	Negligible	Negligible	No change		
06	Future Development Site	Low	Low	Low	No change		

5. Impact Assessment

5.6 Visual assessment

Key viewpoints from which potential visual impacts would be expected were identified and assessed on site with further desktop analysis undertaken using various desktop tools.

The use of a Google Earth KML files is just one set of data used to gain a comprehensive understanding of the extent of the proposal and in conjunction with plans and site photography, Google Earth oblique aerial views were generated and analysed to assess the anticipated impacts.

It is important that regardless of the methods used to investigate the proposal that the final analysis of the impacts is inferred using professional judgement of changes to landscape composition through changes to the dominance of form, lines, colours and textures and sensitivity to potential receptors.

Originally eight viewpoints that were identified as having potential visual impacts resulting from the REF works and each of these continues to experience some impact in the revised road design. Two additional viewpoints were identified requiring assessment as they are located close to new works not captured by the initial concept design. A summary of the viewpoints which were evaluated is summarised in Table 5-9 and the identified viewpoints are assessed on the following pages.

Table 5-9: Viewpoint summary

VP	Location	Viewpoint - Public or private	Distance to CD works	Distance to Project Modifications (DD phase)
01	Moorebank Sports Club	Public	90 metres	60 metres
02	Residential properties off Heathcote Road, Holsworthy	Private	15 metres	09 metres
03	Harris Creek Reserve	Public	50 metres	17 metres
04	Residential properties off Heathcote Road, Mornington	Private	25 metres	11 metres
05	Intersection of Macarthur Drive and Heathcote Road	Public	30 metres	0 metres
06	Entry to Holsworthy Barracks	Private	50 metres	25 metres
07	Heathcote Road near Williams Creek Bridge	Public	0 metres	0 metres
08	Residential properties within Voyager Point	Private	15 metres	5 metres
Not part of Concept Design assessment				
09	Macarthur Drive looking north-east towards the intersection at Heathcote Road	Public	-	0 metres
10	Turning left into The Avenue from Heathcote Road	Public	-	0 metres

5. Impact Assessment

Viewpoint 01

Location and description

Moorebank Sports Club entry, looking south towards Heathcote Road.

Refer Figure 5-3, Plate 5-21 and Plate 5-22.

Visible elements of the Concept Design Road Design

As shown in Plate 5-9, the sports club entry has views south towards the Heathcote Road corridor. The existing road is visible with established trees on either side of the corridor. These trees screen the majority of views from within the Sports Club and from the associated sports fields.

Visible elements of the project modifications

As shown in Plate 5-21, the project boundary has been expanded and the new works now tie in at the intersection of Infantry Parade and Heathcote Road. As well, the clearing area has increased to accommodate a widening of the exiting road corridor which would resulted in the loss of some additional established trees on the south-west side of the corridor. These trees screen residential and the Holsworthy Early Education and Care Centre property boundaries from within the Sports Club and from the associated sports fields.

Affected viewers:

- Users of Moorebank Sports Club
- Road users

Description of impacts

The widening of the road corridor on the south-western verge of the associated access roads, embankments and new planting areas would result in the removal of mature trees and thus reduce the visual and physical buffer between the existing residences and the road.

The visual impact on these viewpoints is summarised in Table 5-10. For mitigation measures relating to these views refer to Section 6 of this report.

Plate 5-21: Viewpoint 01 Looking south towards Heathcote Road

5. Impact Assessment

Plate 5-22: Oblique aerial view showing location of VP01

Table 5-10: Visual impact summary VP01

Concept Design Phase			
VP	**Sensitivity**	**Magnitude**	**Impact**
01	Moderate The view is experienced briefly by users of Moorebank Sports Club who are usually focused on activities within the Sports Club and associated sports fields	Low The Project would be visually accessible from some of the Moorebank Sports Club playing fields, with views partially filtered by vegetation surrounding the sports ground and along the road corridor itself. The widened road, embankments and associated infrastructure (such as signage and lighting) would be visible within the view frame	Moderate/ Low
Project modifications (Detailed Design Phase)			
01	Moderate This view is located in the Moorebank Sports Club adjacent Heathcote Road. Viewers are typically users of the Club who tend to be focused on activities within the grounds and associated sports fields.	Low Additional minor vegetation loss occurs on the far side of the existing road corridor however it is unlikely that the additional road widening and associated infrastructure would be more visible within Club. Views out from the playing fields remain intermittent and partially filtered by vegetation surrounding the sports ground and along the northern boundary of the road corridor.	Moderate/ Low
No change to the impact rating. Although discernible from some locations within the sports facility, the impact on visual amenity is not expected to increase			

5. Impact Assessment

Viewpoint 02

Location and description

Holsworthy, adjacent to Heathcote Road.

ReferFigure 5-3, Plate 5-23 and Plate 5-24.

Visible elements of the Concept Design road design

The Project is unlikely to be visible from the majority of these dwellings due to the presence of a high timber fence running the length of their eastern boundary with combined existing trees.

Visible elements of the project modifications

As shown in Plate 5-24, the revised project boundary has expanded and has shifted closer to the residents in Holsworthy especially four dwellings at the western end, three of which have access via the paved portion of Artillery Crescent.

The proposal area has increased to allow for the widening of the exiting road corridor, a new shared path, noise wall extension and power connections. This would result in limited tree clearing occurring where existing trees fall within the expansion area and conflict with construction or maintenance.

Affected viewers:

- Residents within Holsworthy whose properties that back onto Heathcote Road
- Pedestrians and cyclists using the shared path.

Description of impacts

The revised project and expanded clearing would result in the removal a section of an existing timber fence and several trees which are located in the verge area of Heathcote Road.

The visual impact on these viewpoints is summarised in Table 5-11. For mitigation measures relating to these views refer to Section 6 of this report.

Plate 5-23: Viewpoint 02 Looking southeast from pathway adjacent to Heathcote Road

5. Impact Assessment

Plate 5-24: Oblique aerial view showing VP02

Table 5-11: Visual impact summary VP02

Concept Design Phase			
VP	**Sensitivity**	**Magnitude**	**Impact**
02	High Residents of approximately 12 dwellings on Artillery Crescent and Sabre Crescent, within Holsworthy, whose properties back onto Heathcote Road are considered sensitive receptors	Low Visual impact is expected, limited to the eastern end of Sabre Crescent where there is less screening vegetation present and views would be available to the road corridor	Moderate
Project modifications (Detailed Design Phase)			
02	High Residences are in close proximity to the project and consequently are considered sensitive to any change.	Moderate Magnitude of change is dependant on the impact of the loss of screening vegetation and the proximity of the proposed noise wall extension. Partial loss of vegetative screening is due to the increased length of the proposed noise wall and consequently magnitude is likely to increase.	High/ Moderate
The impact rating is likely to increase as a result of the project clearing area moving closer to the sensitive receptors			

5. Impact Assessment

Viewpoint 03

Location and description

Harris Creek Reserve, looking east.

Refer Figure 5-4, Plate 5-25 and Plate 5-26.

Visible elements of the Concept Design Road Design

As shown in Plate 5-25, the existing view from this section of the reserve is orientated north-east towards the road corridor. Established trees and a small grassed area form the foreground of the view with Heathcote Road running across the view frame from north to south. Mature trees and shrub planting are visible behind the road corridor.

Visible elements of the project modifications

As shown in Plate 5-26, the revised project boundary has expanded into the Harris Creek Reserve.

The clearing area has also increased in order to allow for the widening of the exiting road corridor, an increase of bridge spans, a new fauna crossing, new footpath, bridge interpretation area, embankments and bioswales.

Affected viewers:

- Reserve users
- Residents travelling on Sabre Crescent
- Pedestrians and cyclists using the shared path.

Description of impacts

The revised project and expanded clearing area would impact some of the more established trees thinning the canopy and removing some additional tall shrub planting abutting the road corridor. The grassed area in the foreground would also be reduced, which would have a minor impact on the reserve.

The visual impact on these viewpoints is summarised in Table 5-12. For mitigation measures relating to these views refer to Section 6 of this report.

Plate 5-25: Viewpoint 03 Harris Creek Reserve looking north east towards Heathcote Road

5. Impact Assessment

Plate 5-26: Oblique aerial view showing VP03

Table 5-12: Visual impact summary VP03

Concept Design Phase			
VP	**Sensitivity**	**Magnitude**	**Impact**
03	High The open nature of the reserve in this location provides clear views to the road widening and associated vegetation removal adjacent to the creek	Low While the project would be discernible, the continuing presence of a vegetated backdrop to the road corridor would ensure the magnitude of change to the visual scene would not be substantial	Moderate
Project modifications (Detailed Design Phase)			
03	High Although reserve users are transitory viewers, they would have clear views of the road widening and associated vegetation removal abutting the creek.	Moderate The expanded footprint of the project would mean the works would be more discernible especially due bridge widening and creek clearing which would increase the magnitude of change.	High-Moderate
The impact rating is likely to increase as a result of the project clearing area moving closer to the sensitive receptors			

5. Impact Assessment

Viewpoint 04

Location and description

Looking southeast onto Heathcote Road.

Refer Figure 5-4, Plate 5-27 and Plate 5-28.

Visible elements of the Concept Design Road Design

As shown in Plate 5-27, the proposed road upgrade would only be visible to several of these properties, partially filtered by the existing row of tall shrubs and trees. The greatest visual impact would be on properties with a second storey, offering elevated views of the widened road, associated infrastructure and upgraded intersection at Macarthur Drive.

Visible elements of the project modifications

As shown in Plate 5-28, the revised project boundary has expanded and has shifted closer to the residents in Mornington especially 12 dwellings whose views of Heathcote Road are partially filtered by the existing row of tall shrubs and trees.

The clearing area has also increased in order to allow for the widening of the exiting road corridor, a section of SUP and new noise wall. As a result of this expansion vegetation would be removed from both verges of the existing road corridor.

Affected viewers:

- Residents of living in the Mornington dwellings
- Motorists
- Pedestrians

Description of impacts

The widening of the road corridor on the south-western verge could see a partial loss of tall shrubs and trees that currently screen the road from the Mornington properties. The closer proximity of associated road infrastructure elements would likely add to the scale of the project.

The visual impact on these viewpoints is summarised in Table 5-13. For mitigation measures relating to these views refer to Section 6 of this report.

Plate 5-27: Viewpoint 04 Looking southeast towards Heathcote Road

5. Impact Assessment

Plate 5-28: Oblique aerial view showing VP04

Table 5-13: Visual impact summary VP04

Concept Design Phase			
VP	**Sensitivity**	**Magnitude**	**Impact**
04	Moderate Residents of two storey dwellings (approximately 12) on Margate Avenue, Mornington, whose properties back onto Heathcote Road are considered moderate receptors	Moderate The partial removal of a row of existing tall shrubs and trees and potential verge impacts add to the scale of the proposed changes	Moderate
Project modifications (Detailed Design Phase)			
04	Moderate Vegetative cover provides separation to the project and reduces sensitivity.	High The scale of the road has increased and removal of screening vegetation would open up views in the short term potentially exposing more of the project. In time new vegetation may establish and provide a visual buffer reducing the impact.	High/ Moderate
The impact rating is likely to increase as a result of the project clearing area expanding and more vegetation being removed on both sides of the road corridor			

5. Impact Assessment

Viewpoint 05

Location and description

Looking north towards the intersection of Macarthur Drive and Heathcote Road.

Refer Figure 5-4, Plate 5-29 and Plate 5-30.

Visible elements of the Concept Design Road Design

As shown in Plate 5-29, the conversion of the existing roundabout to a signalised intersection would require the removal of all vegetation within the roundabout, marking a major change to the character of this view.

Visible elements of the project modifications

As shown in Plate 5-29, the revised project boundary has expanded to accommodate more road infrastructure features such as drainage channels, swales and small embankments.

The clearing area has also increased and now includes a portion of the access road to Kokoda Oval and a construction compound area.

Affected viewers:

- Users of Kokoda Oval
- Motorists
- Pedestrians

Description of impacts

The widening of the road corridor on the south-western verge of the associated access roads, embankments and new planting areas would result in the removal of mature trees and thus reduce the visual and physical buffer between the existing residences and the road.

The visual impact on these viewpoints is summarised in Table 5-14. For mitigation measures relating to these views refer to Section 6 of this report.

Plate 5-29: Viewpoint 05 Looking north towards the intersection of Macarthur and Heathcote Road Drive

5. Impact Assessment

Plate 5-30: Oblique aerial view showing VP05

Table 5-14: Visual impact summary VP05

Concept Design Phase			
VP	**Sensitivity**	**Magnitude**	**Impact**
05	Low The short duration of the view and the relatively low sensitivity of the receptors to visual change gives this a low sensitivity rating	High The intersection would be of a more urban nature compared to the existing road infrastructure, increasing the dominance of the road corridor within the view frame	Moderate
Project modifications (Detailed Design Phase)			
05	Low The receptors are transitory (i.e. motorists on Heathcote Road) and the proximity to the works remains similar so sensitivity is still considered to be low.	High The the scale of the area of new road pavement from the concept design phase is maintained however there is a slight increase in associated road infrastructure features and larger areas of vegetation removal.	Moderate
No change to rating			

5. Impact Assessment

Viewpoint 06

Location and description

Looking north to Heathcote Road from entry to Holsworthy Barracks.

Refer Figure 5-5, Plate 5-31 and Plate 5-32.

Visible elements of the Concept Design Road Design

As shown in Plate 5-31, this viewpoint looks north across a planted swale to the Heathcote Road corridor, with bushland forming the backdrop of the view frame. A substantial fill embankment would be required to the west of this viewpoint as the widened road crosses the rail line on a duplicated bridge.

Visible elements of the project modifications

As shown in Plate 5-32, the revised project boundary has expanded either side of Alec Campbell Drive and now ties into an exiting drainage culvert under the Drive.

The clearing area has also increased in order to allow for the widening of the exiting road corridor, a new footpath, drainage channels and associated embankments as well as well a rail maintenance service road which is an extension of the existing service road off Alec Campbell Drive.

Affected viewers:

- Users of Holsworthy Barracks
- Road users of Holsworthy Barracks

Description of impacts

While the channel embankments are likely to be a bulky structures, the large set back of the barracks from the project as well as the possibility of the establishment of screen planting in the expanded clearing area would likely reduce associated visual impacts.

The visual impact on these viewpoints is summarised in Table 5-15. For mitigation measures relating to these views refer to Section 6 of this report.

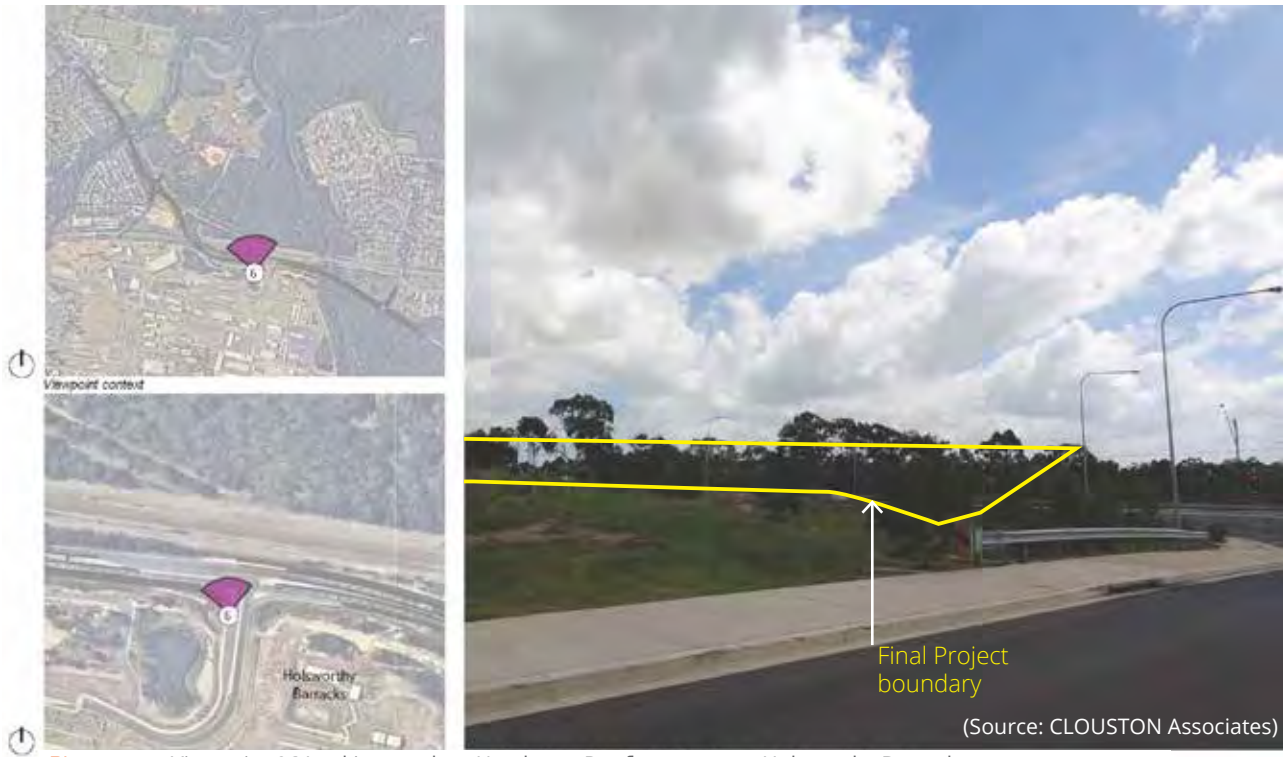

Plate 5-31: Viewpoint 06 Looking north to Heathcote Road from entry to Holsworthy Barracks

5. Impact Assessment

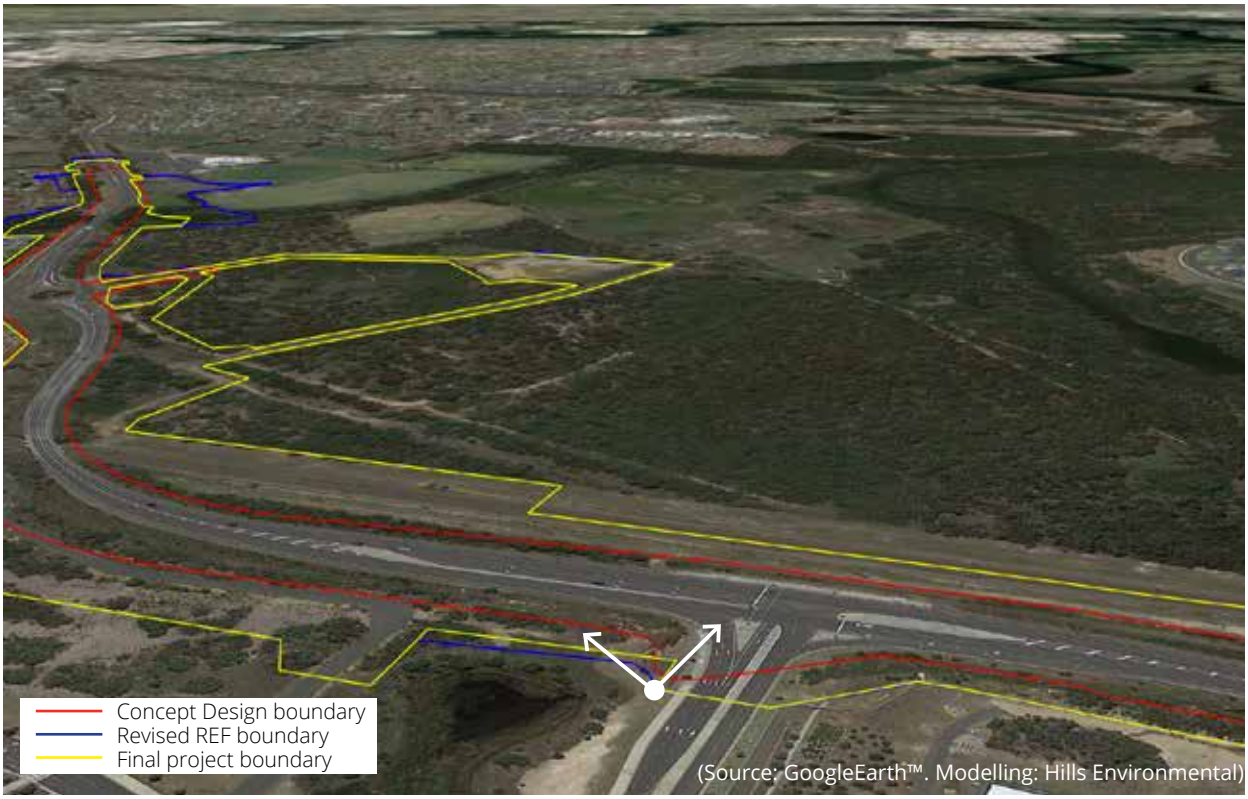

Plate 5-32: Oblique aerial view showing VP06

Table 5-15: Visual impact summary VP06

Concept Design Phase			
VP	**Sensitivity**	**Magnitude**	**Impact**
06	Moderate The Project would be visually accessible from some of the Moorebank Sports Club playing fields, with views partially filtered by vegetation surrounding the sports ground and along the road corridor itself. The widened road, embankments and associated infrastructure (such as signage and lighting) would be visible within the view frame	Low While the embankment would be a bulky structure, the large set back of the barracks to the road corridor and presence of screening vegetation would reduce associated visual impacts	Moderate/ Low
Project modifications (Detailed Design Phase)			
	Moderate The distance of receptors located in the barracks from the project and the possibility of vegetative screening mitigate their sensitivity while road users are transitory.	Low The barracks are currently partially exposed to the view of Heathcote Road. Although an increase in scale of the road and associated infrastructure as a result of these works it is expected that the establishment of vegetative screening would help limit the visibility of the project.	Moderate/ Low
No change to rating			

5. Impact Assessment

Viewpoint 07

Location and description

Looking west on Heathcote Road towards the proposed bridge over Williams Creek.

Refer Figure 5-5, Plate 5-33 and Plate 5-34.

Visible elements of the Concept Design Road Design

As shown in Plate 5-33, the road corridor is characterised by dense native vegetation on both sides. The bridge over Williams Creek is visible in the middle of the view frame. The widened road corridor would be a noticeable change in the visual scene for motorists travelling both west and east. There would be an increase in the scale of the road visible and a reduction in the vegetation either side of the road corridor.

Visible elements of the project modifications

As shown in Plate 5-34, the revised project boundary has only slightly expanded in this location and there is minimal change to the width of the road carriageway.

The groundworks and drainage infrastructure associated with the road and bridge over Williams Creek has meant that the clearing area has substantially increased although given the nature of the terrain, being a steep creek gully, it is unlikely that this infrastructure would be directly visible from the road.

Affected viewers:

- Road users

Description of impacts

The expanded clearing area would remove a larger expanse of vegetation at this location. The widened corridor would be a noticeable change in the visual scene for motorists travelling both west and east. There would be an increase in the scale of the road visible and a reduction in the vegetation either side of the road corridor, reducing the 'green edge' to the corridor.

The visual impact on these viewpoints is summarised in Table 5-16. For mitigation measures relating to these views refer to Section 6 of this report.

Plate 5-33: Viewpoint 07 Looking west on Heathcote Road towards the bridge over Williams Creek

5. Impact Assessment

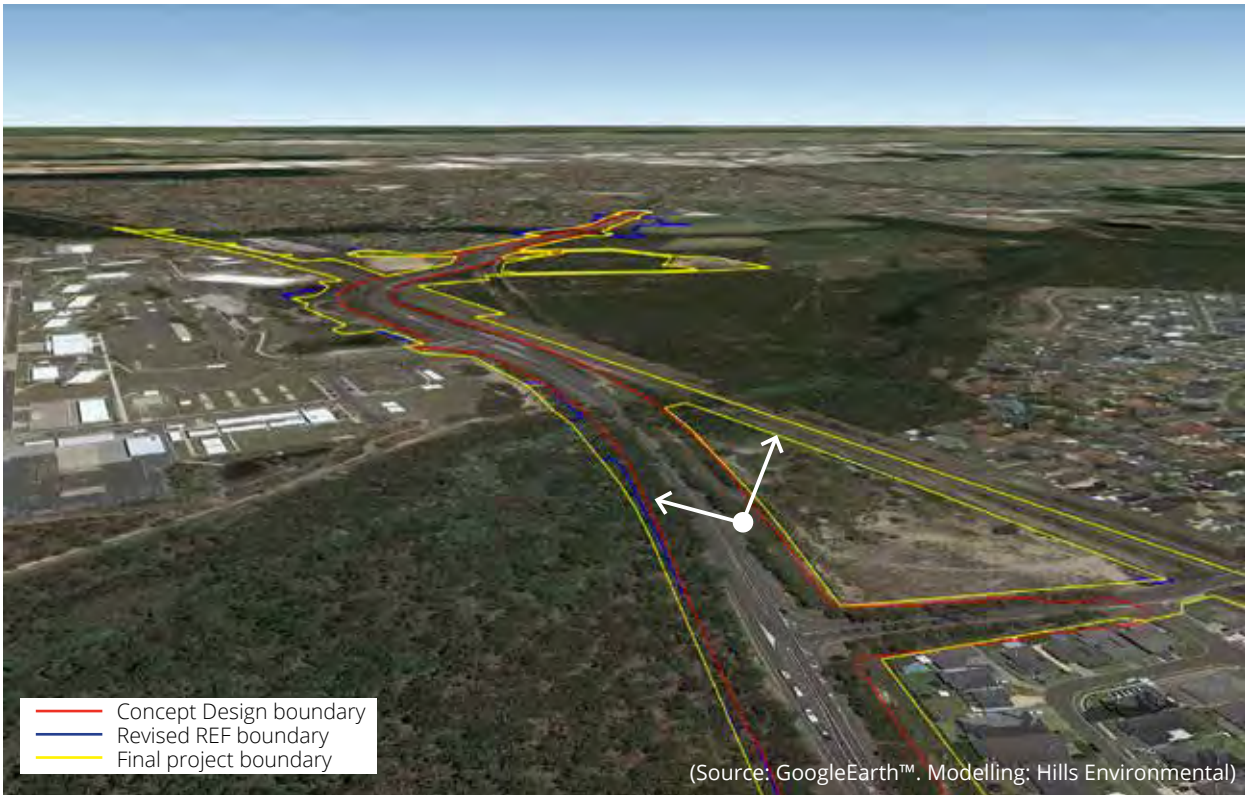

Plate 5-34: Oblique aerial view showing VP07

Table 5-16: Visual impact summary VP07

Concept Design Phase			
VP	**Sensitivity**	**Magnitude**	**Impact**
07	Moderate A short duration of view and a lower sensitivity of visual receptors but with a close proximity of change the sensitivity is assessed as moderate	Moderate There would be an increase in the scale of the road and a reduction in the vegetation either side of the road corridor, reducing the 'green edge' to the corridor	Moderate
Project modifications (Detailed Design Phase)			
07	Moderate Motorists are experiencing the road at a close proximity and are consequently considered more sensitive to change however they are transitory (i.e. motorists on Old Heathcote Road) which somewhat reduces their sensitivity to change.	Moderate Motorists are currently exposed to the road alignment. Additional loss of screening is assumed and so an increase in scale of the project would be observed.	Moderate
No change to rating			

5. Impact Assessment

Viewpoint 08

Location and description

Looking southeast from Voyager Point, adjacent to Heathcote Road.

Refer Figure 5-5, Plate 5-35 and Plate 5-36.

Visible elements of the Concept Design Road Design

As shown in Plate 5-35, the existing view to the Heathcote Road corridor is currently partially screened by vegetation along the road boundary. Filtered views exist from these dwellings to the road, especially from second storey windows. The proposed road upgrade would be visible to several of these properties, partially filtered by the existing row of shrub and tree planting. The greatest visual impact would be on properties with a second storey, offering views of the widened road, associated infrastructure and removed vegetation on the southern side of the road corridor.

Visible elements of the project modifications

As shown in Plate 5-36, the revised project boundary has only slightly expanded in this location and there is minimal change to the width of the road carriageway.

Drainage channels associated with a service road which now runs close the rear property boundaries of residents on Willowie Way would not be visible through the rear fences however vegetation loss in the clearing are would be visible.

Affected viewers:

- Residents of approximately 10 dwellings on Willowie Way which backs onto Heathcote Road.
- Road users

Description of impacts

An increase in the scale of the road corridor is likely as a result of service road and associated infrastructure being located close to the residential property boundaries and the expanded clearing area would see the removal of a larger expanse of screening vegetation at this location.

The visual impact on these viewpoints is summarised in Table 5-17. For mitigation measures relating to these views refer to Section 6 of this report.

Plate 5-35: Viewpoint 08 Looking southeast along the road corridor from Voyager Point

5. Impact Assessment

Plate 5-36: Oblique aerial view showing VP08

Table 5-17: Visual impact summary VP08

Concept Design Phase			
VP	**Sensitivity**	**Magnitude**	**Impact**
08	Moderate* The Project would be visible from several properties with the greatest visual impact on properties with a second storey where views would be partially filtered by the existing row of shrub and tree planting	Moderate The greatest visual impact would be on properties with a second storey, offering views of the widened road, associated infrastructure and removed vegetation on the southern side of the road corridor. This impact would reduce as compensatory screen planting matures	Moderate
Project modifications (Detailed Design Phase)			
08	Moderate Views of Heathcote Road from nearby properties are currently partially filtered by the existing vegetation. Some additional loss of screening vegetation is assumed as a result of these works but the scale of the project would remain the same.	Moderate The expanded footprint of the project would mean the works may be more discernible. Increased removal of screening vegetation would open up views in the short term potentially exposing more of the project. In time new vegetation would establish and provide a visual buffer reducing the impact.	Moderate
No change to rating			

*There was a minor discrepancy found in Table 04 of the Clouston Report, Issue E. We have used the appropriate rating found in the body of the report which we felt was more suitable and consistent with the other viewpoint ratings.

5. Impact Assessment

Viewpoint 09 (New viewpoint)

Location and description

Macarthur Drive looking north-east towards the intersection with Heathcote Road.

Refer Figure 5-5, Plate 5-37 and Plate 5-38.

Visible elements of the Concept Design Road Design

This viewpoint was not assessed in the concept design phase.

Visible elements of the project modifications

As shown in Plate 5-37, the project boundary has expanded with the new works now tying into the roundabout at Morningside Parade and Macarthur Drive. As well, the works clearing area has increased to accommodate a shared path around the southern verge of Macarthur Drive which ultimately connects to The Boulevard footpath.

Affected viewers:

- Road users

Description of impacts

The widening of the road corridor to include a shared path on the southern verge would likely result in the loss of some established boulevard trees which act as gateway feature to the Holsworthy Train Station Commuter Carpark as well as acting adding partial screening to the future development area beyond.

The visual impact on these viewpoints is summarised in Table 5-18. For mitigation measures relating to these views refer to Section 6 of this report.

Plate 5-37: Viewpoint 09 Looking northeast towards Heathcote Road from Macarthur Drive

5. Impact Assessment

Plate 5-38: Oblique aerial view showing VP09

Table 5-18: Visual impact summary VP09

Concept Design Phase			
VP	**Sensitivity**	**Magnitude**	**Impact**
09	Not assessed in this phase	Not assessed in this phase	-
Project modifications (Detailed Design Phase)			
	Moderate Three residences are located in close proximity to the changes but the limited extent of change reduces sensitivity.	Low The removal of planting in the road verge has some minor impact.	Moderate/ Low

5. Impact Assessment

Viewpoint 10 (New viewpoint)

Location and description

Turning left into The Avenue from Heathcote Road.

Refer Figure 5-4 and Plate 5-58.

Visible elements of the Concept Design Road Design

This viewpoint was not assessed in the concept design phase.

Visible elements of the project modifications

As shown in Plate 5-39, the project boundary and clearing area are similar alignments to the Concept Design phase and run along the north-western rear property boundary of residents on Willowie Way.

The introduction of traffic signals into this intersection would be a major change to the character of this view. The new works would accommodate a widening of the existing road corridor with additional travel and turning lanes, formalisation of gutters and kerbs, new shared paths, a retaining wall, service road and drainage channels.

Affected viewers:

- Road users
- Pedestrians

Description of impacts

The widening of the road corridor and signalisation of the intersection would likely result in a loss of some established trees on the south-eastern side of The Avenue and in the existing median. On the south-western verge a large stretch of retaining wall would be prominent and additional vegetation would required to be removed for a service road above this. Removal of established trees reduce the visual and physical buffer between the existing residences and the road and impact the nature of the intersection.

The visual impact on these viewpoints is summarised in Table 5-20. For mitigation measures relating to these views refer to Section 6 of this report.

Plate 5-39: Viewpoint 10 Turning left into The Avenue from Heathcote Road

5. Impact Assessment

Plate 5-40: Oblique aerial view showing VP10

Table 5-19: Visual impact summary VP10

Concept Design Phase			
VP	**Sensitivity**	**Magnitude**	**Impact**
10	Not assessed in this phase	Not assessed in this phase	-
Project modifications (Detailed Design Phase)			
	Moderate Residences adjacent to the intersection upgrade and the potential for vegetation screening to be removed as part of the project make this a moderately sensitive area.	High – The removal of verge and median planting and impacts to the verge closest the residents add to the scale and level of change proposed – The addition of retaining wall and noise wall – Removal of entry signage	High/ Moderate

5. Impact Assessment

Visual assessment summary

Visual impact analysis in this report determined that additional impacts will result from the proposed modifications of the Detailed Design phase.

The analysis of impacts to character zones reveals that the greatest impact would be experienced in residential and public open space character zones where in both locations the sensitivity remains the same but the magnitude of change has increased due to widening of the road and associated infrastructure.

Impacts would be experienced at each of the eight original viewpoint locations and also at an additional two viewpoint locations and range from High/Moderate to Moderate/Low, primarily due to the proximity of the viewer to the changes at these locations as the extent and nature of the changes is considered overall to be relatively minor along the length of the project.

Vegetation removal along with the need for retaining walls and/ or noise walls at close range to receptors contributes to the visual impacts however with suitable mitigation measures these impacts could be effectively reduced.

The visual impact of the proposal across the study area is summarised in Table 5-20.

For mitigation measures refer to Section 6 of this report.

Table 5-20: Viewpoint summary

Concept Design Phase					**Project modifications (Detailed Design Phase)**		
VP	**Location**	**Sensitivity**	**Magnitude**	**Impact**	**Sensitivity**	**Magnitude**	**Impact**
01	Moorebank Sports Club	Moderate	Low	Moderate/ Low	No change		
02	Residential properties off Heathcote Road, Holsworthy	High	Low	Moderate	High	Moderate	High/ Moderate
03	Harris Creek Reserve	High	Low	Moderate	High	Moderate	High/ Moderate
04	Residential properties off Heathcote Road, Mornington	Moderate	Moderate	Moderate	Moderate	High	High/ Moderate
05	Intersection of Macarthur Drive and Heathcote Road	Low	High	Moderate	No change		
06	Entry to Holsworthy Barracks	Moderate	Low	Moderate/ Low	No change		
07	Heathcote Road near Williams Creek Bridge	Moderate	Moderate	Moderate	No change		
08	Residential properties within Voyager Point	Moderate	Moderate	Moderate	No change		
Additional Viewpoints							
9	Macarthur Drive looking north-east towards the intersection with Heathcote Road	-	-	-	Moderate	Low	Moderate/ Low
10	Turning left into The Avenue from Heathcote Road	-	-	-	Moderate	High	High/ Moderate

6. Mitigation Measures

6.1 Overview

This section describes the mitigation measures that have been included as part of the Concept Design for the proposal and as a summary of further mitigation measures to be considered during the detailed design and construction phases of the project. The measures have been developed in order to address the impacts identified in the Visual Analysis section of the report.

6.2 Mitigation for project modifications during detailed design

Roads and Maritime proposes to modify the Heathcote Road Upgrade, Infantry Parade to The Avenue, to address the requirements of the detailed design, improve functionality, reduce environmental impacts, manage impacts on utilities and assist construction.

The Landscape and Visual Impact Assessment process brings to light a variety of mitigation measures that have the potential to reduce adverse impacts of these project modifications.

Some measures would help to better integrate the road with its surroundings while others would help to reduce its visual impact. These are provided in Table 6-1 below.

Table 6-1: Mitigation measures

LCZ#	VP#	Project modifications (Detailed Design Phase)	Reason
Road Design Elements			
LCZ 02 Residential	09	Provision of a shared path connection and additional traffic lane to Holsworthy Railway Station	The extension of the shared path will require the removal of existing trees however with new tree planting and shrubs this should reduce the visual impacts
Structures			
LCZ 04 & 01 Public open space	03	Changes to the Harris Creek Bridge and channel widening in Harris Creek to address upstream flooding	A larger area of existing riparian planting would be removed but with careful selection of appropriate riparian species mixes the impact of the channel widening on adjacent areas would be minimised
LCZ 02 Residential	10	Provision of a 3.5-3.6 metre high (above existing ground surface) noise wall at The Avenue, as opposed to the originally proposed 4.5 metre high noise wall	A visually recessive and muted finish would ensure that the noise wall is not visually obtrusive
LCZ 02 Residential	01	Extension of the existing 2.75 metre high (above existing ground surface) noise wall to address an approximate 37 metre gap outside the Child Care Centre at 3A Artillery Crescent on the western side of Heathcote Road, north of Harris Creek	A visually recessive and muted finish which mimics the existing noise wall structure would ensure that the noise wall is not visually obtrusive
Furniture			
LCZ 02 Residential	09	Minor changes to light poles and extension of barriers	The selection of high quality road furniture that matches the existing furniture will help integrate it with the surrounding environment
Landscape elements			
LCZ 01 Remnant bushland	04	Changes to the project boundary to accommodate all elements of the detailed design and additional vegetation clearing	A varied selection of plant species used to revegetate clearing areas next to the main road corridor will ensure that they will become visually integrated once plants have established

6. Mitigation Measures

LCZ#	VP#	Project modifications (Detailed Design Phase)	Reason
Non-conformance batter treatments			
LCZ 03 Sports fields	02	– 1.95H:1V steep batters have been provided for a short section (8m) on the eastbound carriageway (approximate MC00 CH 350)	Appropriate species mixes on non-conformance batters would maximise the efficiency of planting for ground stablisisation and help integrate the batters with adjacent areas as planting establishes
LCZ 01 Remnant bushland	06	– 1.75H:1V steep batters have been provided for a short section (5m) on the westbound carriageway (approximate MC10 CH 1375)	
LCZ 01 Remnant bushland	06	– 1.7H:1V steep batter have been provided at Williams Creek adjacent to the eastbound carriageway (MC00) due to a change in the project boundary at this location	
		– 4:1 batter slopes adopted in depressed median, locally only at two (2) drainage pits located on the departure side of the rail bridge	Variation in colour and texture of planting to the main road corridor would provide subtle wayfinding and add visual interest for road users
Feature treatments			
LCZ 04 Public open space	03	Riparian Treatments at Harris Creek	A larger area of existing riparian planting would be removed but with careful selection of appropriate riparian species mixes the impact of the channel widening on adjacent areas would be minimised
LCZ 01 Remnant bushland	07	Riparian Treatments at Williams Creek	Appropriate riparian species mixes would maximise the efficiency of bioswales and minimise the visual impact of the works on adjacent areas

7. Conclusion

Following an analysis of landscape context, the development of objectives, principles, strategies and mitigation measures, an assessment of landscape character and visual impact has been undertaken in accordance with Roads and Maritime guidelines. The results of this assessment would enable Roads and Maritime representatives to undertake a critical review and evaluation of the development of the detailed design.

The revised road design would result in some impacts on both landscape character and visually, as experienced by sensitive receptors. This would be particularly evident in residential and public open space areas how would experience the highest impacts.

The revised road design impacts on vegetation, character and views along the corridor and landscape quality of the area generally. The biggest visual impacts are a loss of street trees/ screening vegetation and the construction of a new retaining wall and noise walls. The mitigation measures aim to address this through replacement tree planting and revegetation, embankments and greening around the walls (to reduce extent and screen views) and through the use of robust materials of a quality suited to the urban setting.

Overall, the identified visual and character impacts can be managed and the improvements to the traffic flows can be achieved with a minimum effect on the quality of the area.

LOOKING NORTH EAST ACROSS THE MOOREBANK SPORTS CLUB

8. Appendices

The following appendices have been prepared with this report:

- L.VA.101-VISUAL ASSESSMENT 1, Rev02, 02.07.2019
- L.VA.102-VISUAL ASSESSMENT 2, Rev02, 02.07.2019
- L.VA.103-VISUAL ASSESSMENT 3, Rev02, 02.07.2019

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