Henry Lawson Drive Upgrade – Stage 1A

Urban Design Report Including Landscape Character and Visual Impact Assessment

Review of Environmental Factors (REF) and Environmental Impact Statement (EIS)

Prepared for Transport for NSW

Tract

Level 8, 80 Mount Street,
North Sydney, NSW 2060

(02) 9954 3733
www.tract.com.au

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Quality Assurance

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04

Prepared By

Mathew Nenadic

Reviewed By

Matthew Easton

Project Principal

Matthew Easton

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Revisions

Rev	Date	Details	Prepared By	Reviewed By	Project Principal
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02	14 May 2021	LCVIA	MN	ME	ME
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Background

The overall proposal forms the first stage of the progressive upgrade to 7.5 kilometres of Henry Lawson Drive between the intersections of Hume Highway, Villawood, and the M5 South Western Motorway, Milperra.

The upgrade would help ease existing traffic issues and increase traffic capacity at key intersections to help meet growing demand, with residential, commercial and industrial development in the surrounding area expected to increase in the coming years. The upgrade would be delivered in three stages.

Subject to approval, construction of the Stage 1A proposal may commence in early 2023 and would take about two years to complete. Other stages of upgrading Henry Lawson Drive would be developed and assessed separately in the future. The proposal is subject to assessment under two planning pathways, a review of environmental factors (REF) under Part 5, Division 5.1 of Environmental Planning and Assessment Act 1979 (EP&A Act) and an environmental impact statement (EIS) under Part 4 of the EP&A Act. The majority of the proposal is subject to approval under Division 5.1 of the EP&A Act and will assess the REF areas of the proposal. However, a small part of the proposal is within land mapped as "Coastal Wetlands" under State Environmental Planning Policy (Coastal Management) 2018 (CM SEPP). As such, that part of the proposal (known as the EIS proposal) is subject to approval under Part 4 of the EP&A Act and will be assessed within an EIS.

Purpose

This report has been prepared to support both the REF, the EIS and to assess the impacts of the proposal on urban design, landscape character and visual amenity as well as describe the urban design concept developed to support the proposal. Secretary Environment Assessment Requirements (SEARs) relevant to the EIS portion of the assessment (EIS area) include:

- Visual - including an impact assessment at private receptors and public vantage points
- Environmental monitoring and management – including a detailed description of what measures would be implemented to manage, mitigate or offset the potential impacts (including cumulative impacts) of the proposal (as identified above) during construction and operation as relevant, and where required.

In developing an integrated design response for the proposal, the development of the urban design objectives and principles has occurred which responds to the landscape character and visual context of the study area. The objectives have been developed to ensure relationship between the proposal and the surrounding precincts are adequately addressed through the design response.

The urban design, and the landscape concept have been developed to achieve an integrated outcome that helps fit the project as sensitively as possible into its context and to minimise the impacts of the project on the existing landscape character of the project area. Mitigation measures as discussed in detail in Chapter 8 would be implemented in the detailed design process to ensure these objectives are realised.

Six landscape character zones (LCZ) have been identified and assessed as part of the landscape character assessment and include:

- LCZ1 – River frontage
- LCZ2 – Swampland
- LCZ3 – Residential
- LCZ4 – Commercial
- LCZ5 – Road corridor

- LCZ6 – Open space

The landscape character assessment illustrates that the area surrounding the proposal and the precincts within the proposal area are largely established and vary along the proposal length.

For the REF proposal there will be a high impact on LCZ1 – River Frontage, moderate to high impacts on both LCZ 2 – Swampland and LCZ3 – Residential areas, moderate impacts to LCZ5 - Road Corridor and LCZ6 - Open space and a low impact on LCZ4 – Commercial. These results reflect the varying uses and the extent of impact. The impacts north of Tower Road should be reviewed as part of the detailed design for opportunities to reduce footprint and impact. Revegetation will be the key irrespective of changes to ensure the corridor remains a strong green connection.

For the EIS proposal areas, the impacts on EIS proposal area 1 within LCZ1 have been assessed as high based on the extent of vegetation that is impacted and it being identified as Coastal Wetlands north of Tower Road. The extent of vegetation loss in LCZ2 for the EIS proposal area 2 is less, compared to EIS proposal area 1, although both locations of protected vegetation are impacted by either permanent or temporary works and are considered to have a high impact. The impacts on EIS area 3 have been assessed as moderate based on the quantity of works proposed within the EIS area, with most of the proposals works occurring outside of the EIS area. In all instances impacts will be mitigated through revegetation using the appropriate community as part of the implementation of the landscape strategy, refer further to Section 7.A total of ten viewpoints have been assessed in relation to the permanent works associated with the proposal.

A range of viewpoints have been considered reflecting the nature of land-use and the likely interaction that will occur in relation to the proposal and existing development. The viewpoints selected provide a range of receptors including residents, road users, open space users which reflect a broader cross section of community who will experience changes as a result of the proposal.

For the REF area, high impacts are assessed in VP8 and VP10. A moderate to high impact is assessed in VP4 and VP5 with moderate impacts assessed in VP1, VP3 and VP6. Moderate to low impacts are assessed in VP7 and VP9. VP2 is assessed as having a low impact on the REF area. Mitigations to limit the impacts on viewpoints 8 and 9 need to consider how the overall footprint of the proposal can be retained to maintain the intimate scale of the setting and where impacted landscape treatments will seek to provide some of this character over time.

VP8 and VP10 relates to viewpoints within EIS proposal Area 1, both of these viewpoints are determined to have a high impact on the EIS as the expansion of the road corridor will directly impact this area resulting in removal of vegetation and widened pavement element.

VP1a relates to viewpoints within EIS proposal Area 2, impact on the EIS areas has been assessed as moderate to high as the proposal directly impacts the area result in removal of vegetation and replacement with road infrastructure.

VP5 relates to viewpoints within EIS proposal Area 3, impact on the EIS areas has been assessed as moderate as the area is not visually prominent but is sensitive due to the presence of Coastal Wetlands.

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Management measures

This report has proposed appropriate mitigation measures and an urban design strategy which responds to and addresses the identified impacts of the proposal. These will be further resolved as part of the detailed design consistent with the intent of this report and its findings.

Conclusion

The Stage 1A proposal has been assessed to generally have a moderate to low impact on Landscape Character and Moderate visual impact, with some high impacts. The environmental assessment for the EIS proposal for both landscape character and visual impact have assessed predominantly high impacts due to the small scale of the study areas and the immediate and direct impact to them.

The proposal as a whole is able to be delivered with impacts managed through appropriate design and revegetation strategies as outlined within the report, which would enhance the experience of all users.

Contents

Figures

1 Introduction

Transport for NSW (Transport) is proposing to upgrade Henry Lawson Drive Upgrade between Keys Parade, Milperra, to Tower Road, Bankstown Aerodrome (known as the Henry Lawson Drive Upgrade Stage 1A) (the overall proposal). The proposal consists of upgrading a 1.3-kilometre length of Henry Lawson Drive and an additional 480 metres along Milperra Road, including intersection upgrades.

This Landscape Character and Visual Impact Assessment (LCVIA) has been prepared to assess the potential landscape character and visual impacts of the proposal. It will support a Review of Environmental Factors (REF) being prepared by Transport under Division 5.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act) and an Environmental Impact Statement (EIS) being prepared under Division 4.1 of the EP&A Act.

1.1 Proposal Background

The overall proposal forms the first stage of the progressive upgrade to 7.5 kilometres of Henry Lawson Drive between the intersections of Hume Highway, Villawood, and the M5 South Western Motorway, Milperra.

The upgrade would help ease existing traffic issues and increase traffic capacity at key intersections to help meet growing demand, with residential, commercial and industrial development in the surrounding area expected to increase in the coming years. The upgrade would be delivered in three stages.

Subject to approval, construction of the Stage 1A proposal may commence in early 2023 and would take about two years to complete. Other stages of upgrading Henry Lawson Drive would be developed and assessed separately in the future.

1.2 Proposal Location and Setting

The overall proposal is located around 20 kilometres south west of the Sydney CBD in the City of Canterbury-Bankstown local government area. The proposal is mainly along Henry Lawson Drive and includes intersection upgrades at Tower Road, Newbridge/ Milperra Road and Auld Avenue. (Figure 1).

Henry Lawson Drive is a key connection for traffic moving between the Hume Highway, Milperra Road /Newbridge Road and the M5 Motorway. It is also used for local travel trips between residences and services. In terms of heavy vehicle access, Henry Lawson Drive is designated as a B-Double access route that connects surrounding large industrial areas of Milperra, Revesby, Chipping Norton and Moorebank.

The proposal is located to the east of the Georges River and surrounding recreational areas. There are a number of Coastal Wetlands within and surrounding the proposal associated with the Georges River.

Located to the south west of the proposal, is a residential area with detached housing and sporting fields and passive recreation areas. To the south east, is the Bankstown Golf Course and urban bushland areas. North of Milperra Road comprises retail and commercial development that backs onto the Bankstown Airport and land currently being redeveloped, all of which access Henry Lawson Drive via Tower Road. Located north of Tower Road is the Georges River Golf Course (Figure 2).

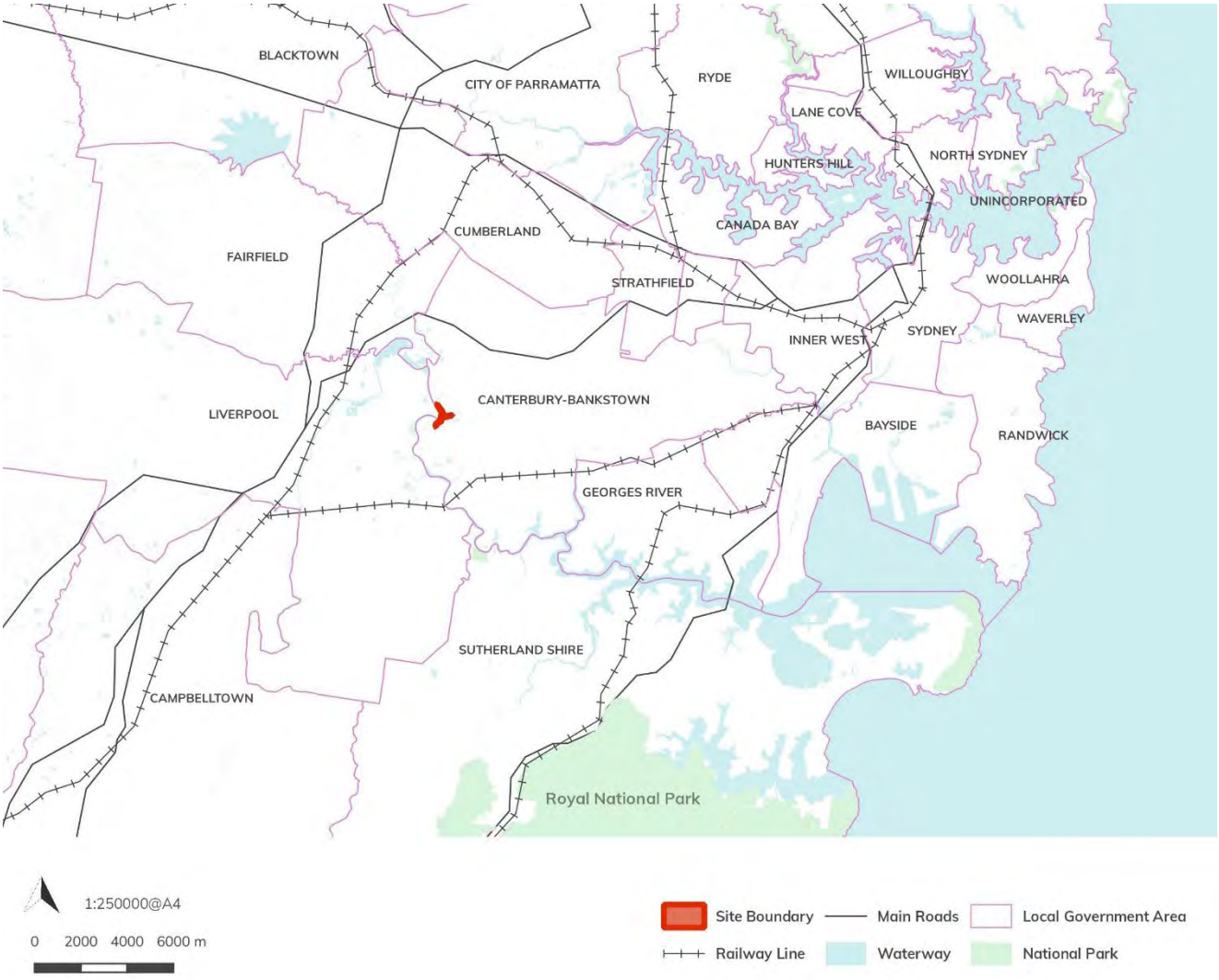


Figure 1 – Regional Context Plan

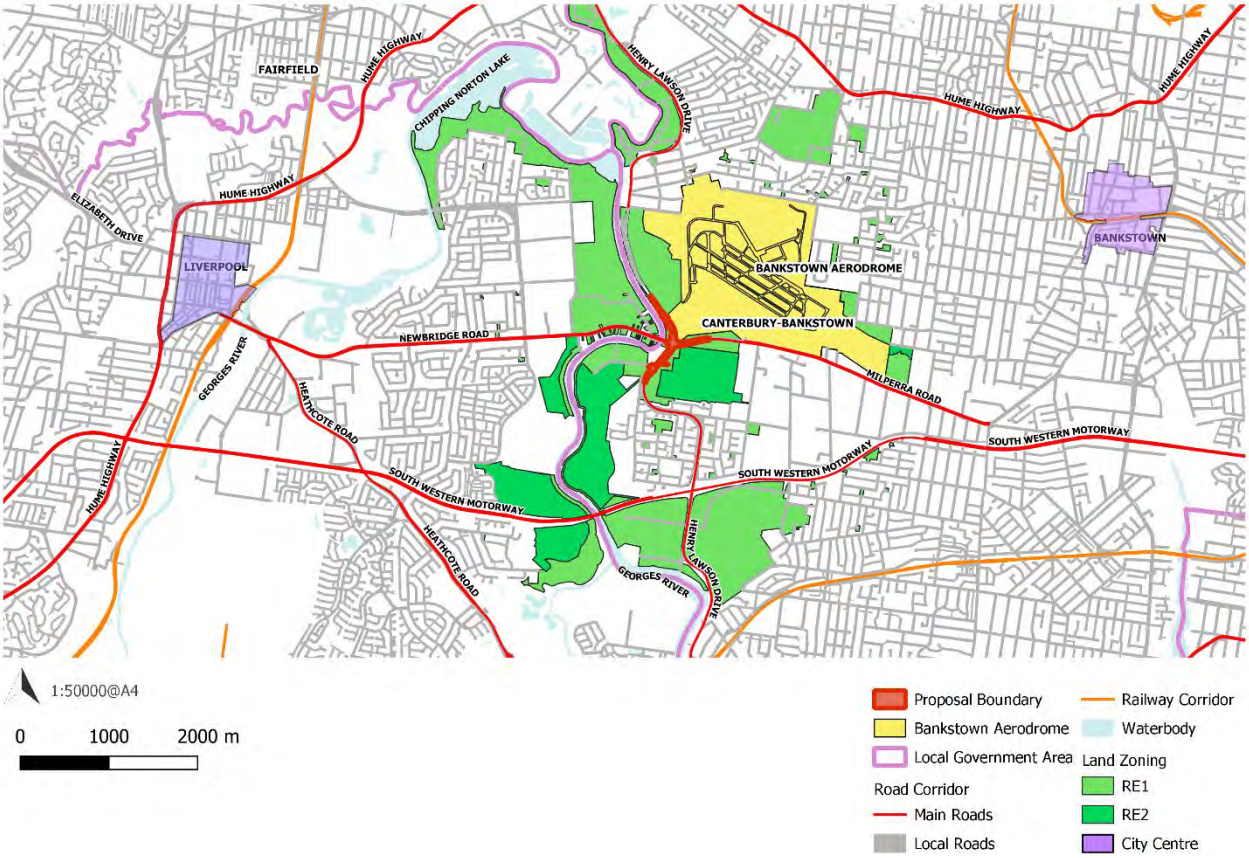


Figure 2 – Sub-regional Plan

1.3 Proposal overview

The proposal involves the upgrade of Henry Lawson Drive along a 1.3-kilometre section between Keys Parade and Tower Road. The proposal would include widening Henry Lawson Drive from two lanes to four lanes, increasing the number of lanes at the Tower Road and Newbridge / Milperra Road intersections and duplicating the Auld Avenue Bridge.

The REF proposal incorporates most of the overall proposal, however, excludes works which are located within the SEPP (Coastal Management) area. These areas have been assessed as part of the EIS that has been prepared in parallel with this REF (discussed further in Section 1.4).

Key features of the REF proposal include:

- widening Henry Lawson Drive from two to four lanes
- upgrading the signalised intersection of Henry Lawson Drive and Tower Road including:
  - an additional right turn lane from Tower Road onto Henry Lawson Drive;
  - a new channelised short left-turn lane from Henry Lawson Drive (southbound) onto Tower Road
  - an additional right turn lane from Henry Lawson Drive (northbound) onto Tower Road; and
  - retaining the pedestrian crossing across Henry Lawson Drive on the southern side of the intersection.
- upgrading the signalised intersection of Henry Lawson Drive and Milperra Road /Newbridge Road including:

    - an additional right turn lane on the Milperra Road and Newbridge Road approaches to Henry Lawson Drive
    - an additional through lane on the Henry Lawson Drive southbound approach
    - the removal of the bus only lane on Milperra Road to provide an additional right turn lane on the Henry Lawson Drive northbound approach.
- removing the dedicated left turn slip lane into the ALDI and fast-food area with access being retained via a standard property driveway
- retaining the existing bus stop on Milperra Road (eastbound) and moving the westbound bus stop 20 metres to the west
- altering access to Auld Avenue to a "left in/left out" only configuration
- installing a new Henry Lawson Drive road bridge over Milperra Drain to the south of Auld Avenue (referred to as the Auld Avenue bridge) to carry northbound traffic and retaining the existing bridge for southbound traffic
- constructing new footpaths on the eastern side of Henry Lawson Drive to connect Tower Road to the existing bus stop on the eastbound lanes of Milperra Road and a new footpath on the southern side between Henry Lawson Drive to the bus stop on the westbound lanes of Milperra Road
- widening the shared user pathway between Flower Power (Keys Parade) and Newbridge Road to three metres and reconstructing footpaths along the western side of Henry Lawson Drive, where required
- adjusting existing drainage, including lengthening culverts, installing new drainage infrastructure and water quality controls
- relocating utilities (including electrical, gas, water and telecommunications)
- final roadworks including pavement, kerb and gutters, signs, lighting and line marking
- ancillary work for the project including, but not limited to noise walls, road furniture, tie-in works, landscaping, earthworks and the like
- temporary ancillary compounds, stockpile sites and associated facilities.
- The proposal forms Stage 1A of the progressive upgrade of Henry Lawson Drive between the Hume Highway, Villawood, and the M5 South Western Motorway, Milperra.

1.3.1 The EIS Proposal

Key features of the proposal occurring within land mapped as coastal wetlands form the EIS proposal areas, deemed designated development as required by the State Environmental Planning Policy (Coastal Management) 2018. There are three EIS proposal areas within the study area, deemed designated development described below and are shown in Figure 3.

EIS proposal area 1 – Henry Lawson Drive opposite Tower Road

The key features of EIS proposal area 1 are:

- widening of Henry Lawson Drive northbound lanes
- installing of fill embankments along the edge of the new carriageway to meet existing ground levels
- extending existing stormwater culvert and installing outlet scour protection measures
- installing additional stormwater drainage infrastructure and water quality treatments
- installing a vegetated channel along the toe of the new fill embankment
- adjusting the existing shared path to suit the new re-alignment and to connect it back to the existing path
- installing road furniture, including road safety barriers

EIS proposal area 2 – Milperra Road opposite Bankstown Airport

The key features of the EIS proposal area 2 are:

- installing a new bus stop relocated from its existing position on Milperra Road
- installing a section of a new footpath to the bus stop (connecting to the remainder of the new path to Henry Lawson Drive – REF proposal)
- installing fill embankments along the edge of the new carriageway to meet existing ground levels
- extending existing stormwater culvert and installing outlet scour protection measures
- installing additional stormwater drainage infrastructure connecting to the outlet of the extended culvert
- installing road furniture, including road safety barriers

EIS proposal area 3 – Henry Lawson Drive opposite Auld Avenue

The key features of the EIS proposal area 3 are:

- removing of existing ancillary structures
- installing temporary fencing, flagging of exclusion boundaries & temporary erosion and sediment controls for use as an ancillary facility and construction area
- installing fill embankments along the edge of the new carriageway to meet existing ground levels
- stabilising the ground surface following the completion of construction to minimise erosion.

1.3.2 The REF Proposal

The REF proposal assesses all other aspects of the overall proposal included in Section 1.3 that are outside the footprint of the EIS proposal described in Section 1.3.1, refer to Figure 3.

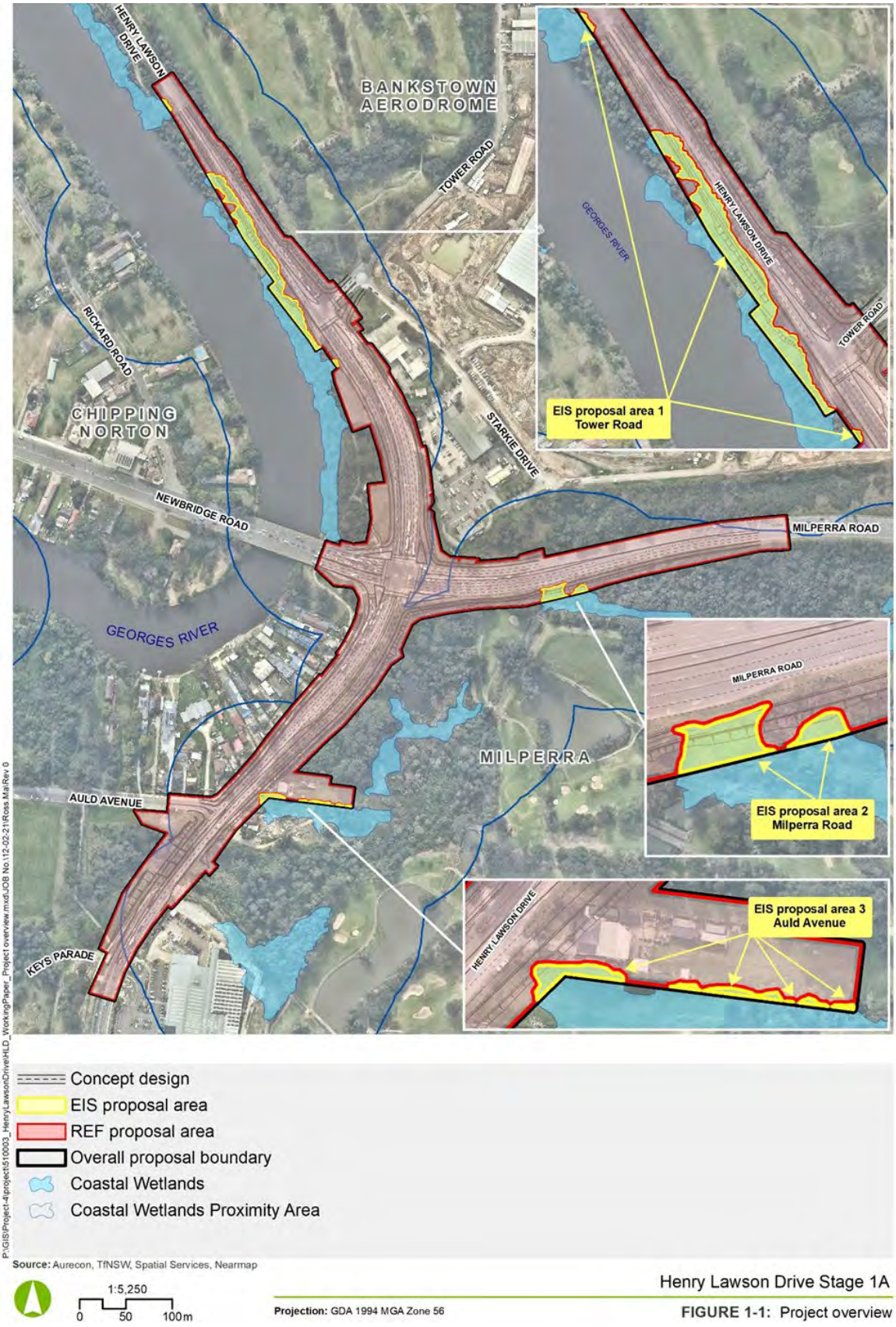


Figure 3 – Local Context Plan and REF / EIS Proposal Areas

1.4 Purpose of Report

This report has been prepared to support the REF and EIS for the proposal and to assess the impacts of the overall proposal on urban design, landscape character and visual amenity. The REF has been prepared for the majority of the proposal, where Transport can approve works under the State Environmental Planning Policy (Infrastructure) 2008 (referred to as the 'REF proposal'). However, as part of the proposal is located within areas mapped as coastal wetlands under the State Environmental Planning Policy (Coastal Management) 2018, this is subject to an EIS. The work within mapped coastal wetlands is, designated development, referred to as the 'EIS proposal', where Canterbury Bankstown City Council is the consent authority for the work. These areas are shown in Figure 3 and are described in Section 1.3.1.

Tract Consultants Pty Ltd has been commissioned by Transport to provide the Urban Design, Landscape Character and Visual Impact Assessment (LCVIA) report for the widening of Henry Lawson Drive. As part of this process a review of the concept design is to be undertaken and recommendations made as to its integration within the road corridor.

This assessment and recommendations will form part of the Review of Environmental Factors (REF) and EIS submission for the approval of the works.

The report:

- addresses the relevant SEARs listed in Table 1.1 for the EIS Proposal described in Section 1.3.1
- describes the existing environment with respect to urban design, landscape character and visual amenity
- assesses the impacts of constructing and operating the proposal on urban design, landscape character and visual amenity
- recommends measures to mitigate and manage the impacts identified.

Table 1.1- SEARs relevant to the assessment of impacts associated with the EIS proposal only (April 2020)

SEAR Heading	Requirements	Where addressed in this report
Visual	Visual - including: ▪ an impact assessment at private receptors and public vantage points	An assessment of the visual impacts of the proposal at private properties and from public vantage points is included in Section 6.
Environmental Monitoring and Management	Environmental Monitoring and Management - including: ▪ a detailed description of what measures would be implemented to manage, mitigate or offset the potential impacts (including cumulative impacts) of the proposal (as identified above) during construction and operation as relevant, and where required	Section 7 and 8 includes a detailed description of what measures would be implemented to manage, mitigate or offset the potential impacts. Section 5 and 6 includes an assessment of the cumulative impacts of construction and operation of this and other proposals in the area.

As part of this process a review of the design was undertaken and recommendations made as to its integration within the road corridor. The methodology for the assessment is described in Section 3.

1.5 Report Structure

This report is structured with the following sections:

- Section 1 – provides an introduction to the report
- Section 2 – describes the relevant planning and policies
- Section 3 – describes the methodology used to complete the assessment
- Section 4 – describes the existing environment
- Section 5 - provides the landscape character assessment
- Section 6 – provides the visual impact assessment
- Section 7 – provides the urban design strategy
- Section 8 - provides recommended mitigation measures
- Section 9 – provides the conclusions of the assessment

2 Policy and Planning Section

2.1 Planning Framework

2.1.1 Strategic Planning and Policy Framework

Several strategic planning and policy documents apply to the study area, including:

- State government plans and policies:
  - *NSW State Infrastructure Strategy 2018-2038* (Infrastructure NSW 2018)
  - *Future Transport Strategy 2056* (Transport for New South Wales, 2018)
  - *NSW Freight and Ports Plan 2018- 2023* (Transport for New South Wales, 2018)
  - *Draft Road Safety Plan 2021* (Transport for New South Wales, 2017)
  - Road Network Plan Summary Report – Henry Lawson Drive Woodville Road (Transport for New South Wales, 2018)
  - *Coastal Management Act 2016* (NSW Legislation, Updated 2020)
  - State Environmental Planning Policy (Coastal Management) 2018 (NSW Legislation, Updated 2020)
  - Greater Metropolitan Regional Environmental Plan No 2—Georges River Catchment. (NSW Legislation, Updated 2020)
- Local plans:
  - *Local Strategic Planning Statement (LSPS)- Connective City 2036* (Canterbury Bankstown City Council 2020)

Both the State Environmental Planning Policy (Coastal Management) and Greater Metropolitan Environmental Plan No.2 (GMREP No.2) provide detail guidance in relation to issues and factors which need to be considered in developing areas adjoining the Georges River and key elements are defined below.

State Environmental Planning Policy (Coastal Management) 2018 (SEPP)

The State Environmental Planning Policy (Coastal Management) 2018 (SEPP) is a policy which aims to promote an integrated and a co-ordinated approach to land use planning in coastal zones, consistent with the objectives laid out in the *Coastal Management Act 2016*. The *Coastal Management Act 2016* sets out policies which will inform the urban design objectives for the proposal including;

- Protecting and enhancing natural coastal processes and environments including natural character, scenic value, biological diversity and ecosystem integrity.
- Support social and cultural values of the coastal zone and maintain public access, amenity, use and safety.
- Acknowledge Aboriginal peoples spiritual, social customary and economic use of coastal zone.
- Mitigate future risks from coastal hazards, including future effects of climate change.
- Promote plans and strategies to improve coastal assets.

The LCVIA will detail the impacts on the existing character coastal wetlands and vegetation communities within the proposal area.

Greater Metropolitan Regional Environmental Plan No. 2 – Georges River Catchment (GMREP No.2)

The aims and objectives of this REP are generally involved with maintaining and improving the water quality and river flows of the Georges River and its tributaries and establishing a consistent and coordinated approach to planning and assessment within the catchment. The REP applies when a council is preparing a LEP, or when a consent authority is determining a development application. The following must be considered: **acid sulphate soils**, **bank disturbance, flooding**, industrial discharges, land degradation, on-site sewage management, river-related uses, sewer overflows, **urban/stormwater runoff**, urban development areas, **vegetated buffer areas**, **water quality** and **river flows**, and **wetlands.**

The bolded text delineates key areas of consideration for the proposal.

Further discussion of these documents is undertaken in detail in Chapter 2 of the REF and Chapter 4 of the EIS which also consider the consistency of the overall proposal with the respective strategic and policy directions outlined in the above documents.

2.2 Land Zoning

The land use zoning of an area has the potential to influence the overall character and feel of the place. Each land use zone is associated with several objectives that guide planning decisions including the assessment of development applications. An understanding of the zoning objectives is key to developing the proposal in a manner that optimises the fit of the proposal within the existing and desired future built, natural and community context. This is to ensure consistency of the proposal with the aim of protecting, managing, and restoring areas with special ecological, scientific, cultural, or aesthetic values where possible.

Land use in the study area is regulated by local environmental plans (LEPs). LEPs provide a statutory framework for the way that land is used (Figure 4) in this case it is covered by the:

- Bankstown Local Environmental Plan (LEP) 2015

There are three dominant land uses along the alignment, these are:

- RE1 Public Recreation
- R2 Low Density Residential
- SP2 Infrastructure

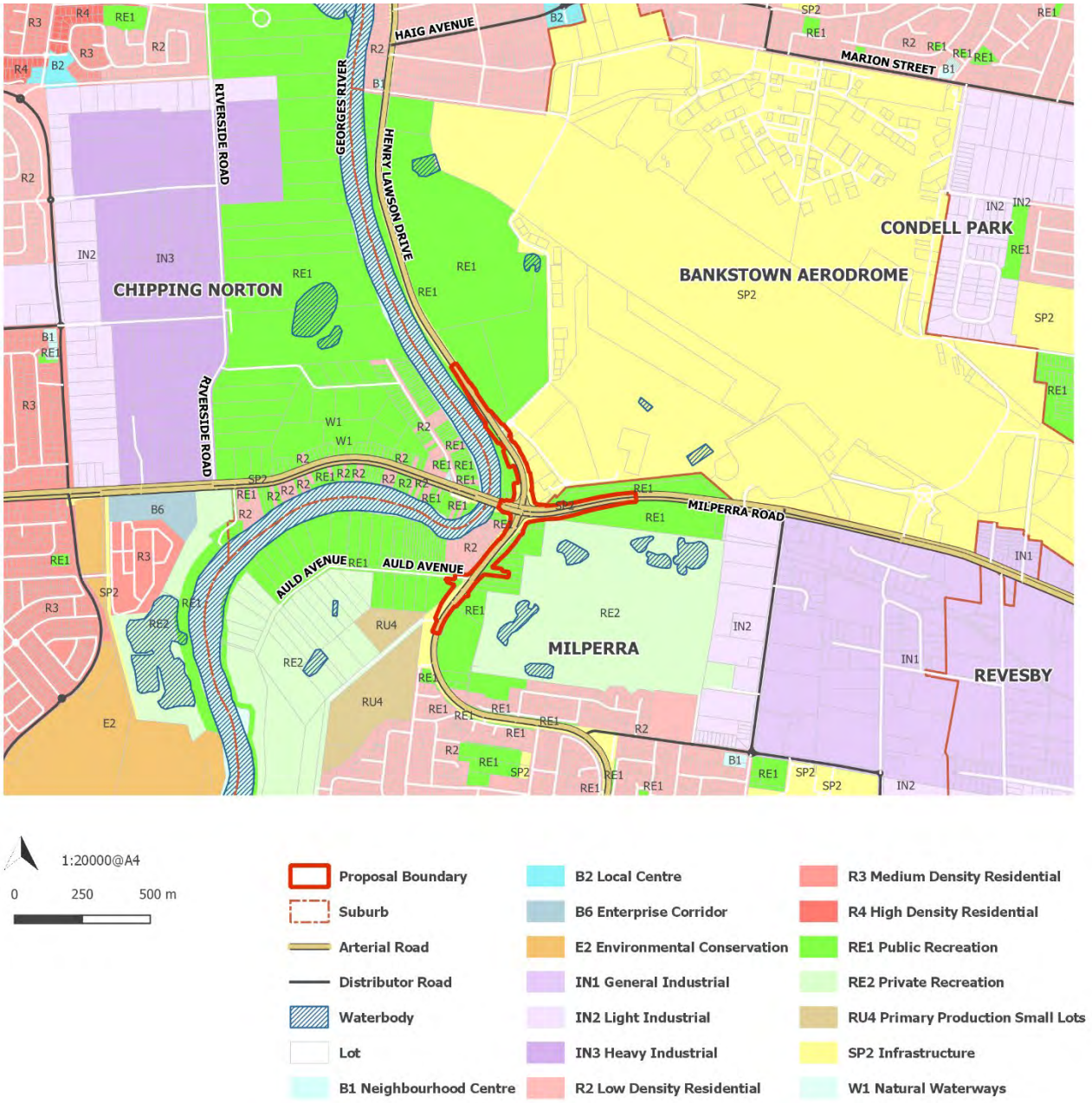


Figure 4 – Land Zoning Map

The uses that are currently zoned adjoining the corridor have the following characteristics.

2.2.1 RE1 Public Recreation

Objectives of zone

- To enable land to be used for public open space or recreational purposes.
- To provide a range of recreational settings and activities and compatible land uses.
- To protect and enhance the natural environment for recreational purposes.

This forms a key interface both along Henry Lawson Drive and connected to it via Auld Avenue. A new Flower Power Centre has been developed within this public land, at the southern end of the proposal and has been approved as an amendment to the permitted uses of Public Recreation lands. The site previously had been used for landfill.

2.2.2 R2 Low Density Residential

Objectives of zone

- To provide for the housing needs of the community within a low-density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To allow for certain non-residential development that is compatible with residential uses and does not adversely affect the living environment or amenity of the area.
- To allow for the development of low-density housing that has regard to local amenity.
- To require landscape as a key characteristic in the low-density residential environment.

The extent of housing is limited due to the flood liability of lands adjoining the road corridor. Residential properties which address the road have had their boundaries adjusted to reflect future road widening and most instances building, and boundary setbacks reflect this change.

2.2.3 SP2 Infrastructure

Objectives of zone

- To provide for infrastructure and related uses.
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.

Areas zoned as SP2 include both the alignment of Henry Lawson Drive and Milperra Road as well as the Bankstown Aerodrome and its supporting services and land holdings.

Bankstown Aerodrome

Bankstown Aerodrome is a key development that interfaces with this intersection. Its presence from the road however is not immediately obvious as a range of commercial industries are located within the lands of the facility.

Bankstown Airport Limited's (BAL's) vision is to continue to operate and develop Bankstown Airport to be:

".. a dynamic, integrated aviation and commercial centre for Sydney, including home for emergency services, general aviation, training, logistics and destination retail."

This vision sees a more diverse utilisation of the airport with an expansion of the commercial interface along Milperra Road edge as depicted in the following Figure 5. With this will come more engagement with the broader community and road network of which this intersection is a key component and constraint to expansion of usage.

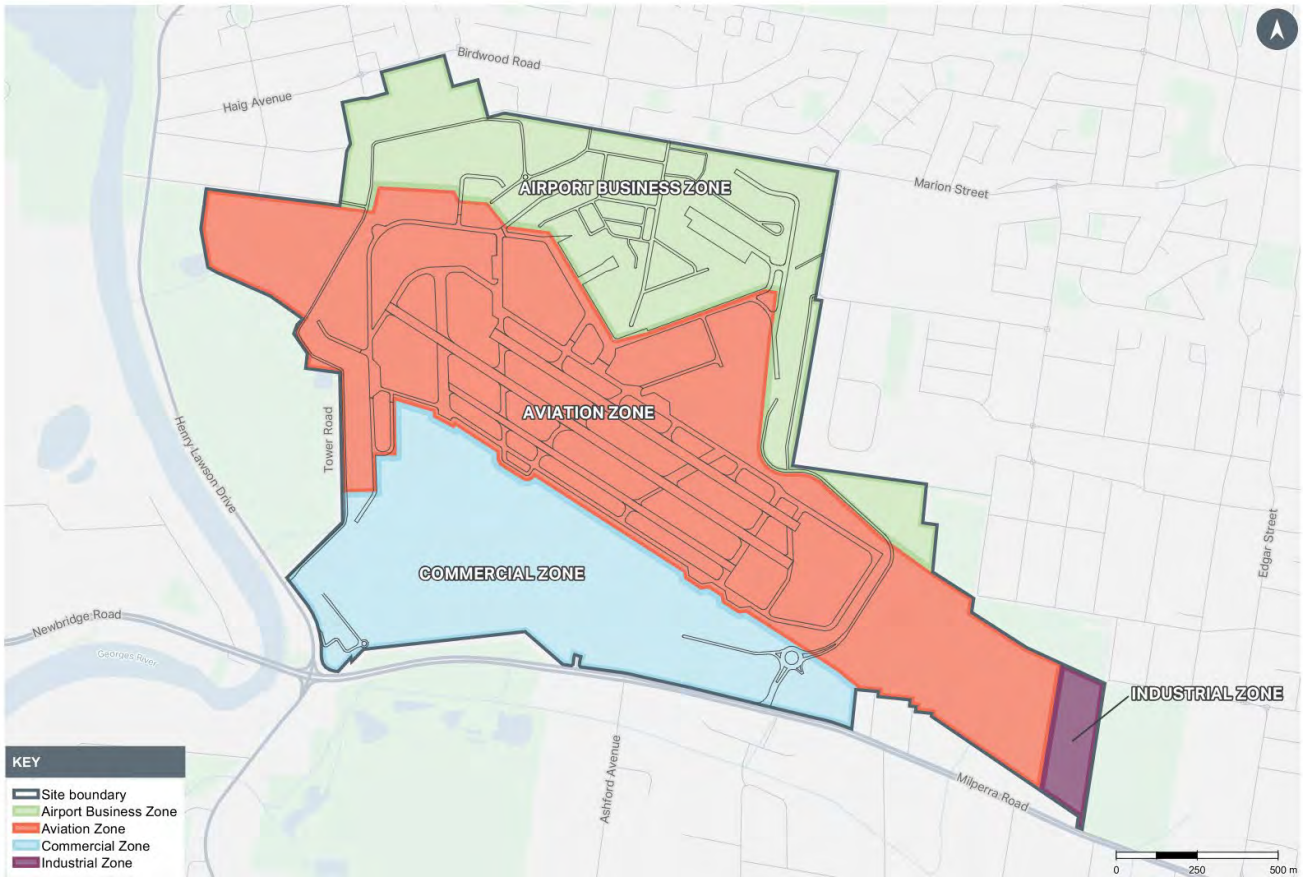


Figure 5 – Bankstown Airport Masterplan Zoning Plan (Source: Sydney Metro Airport Ltd 2019)

2.2.4 Other land uses

Other land use zones found beyond the immediate proposal area include:

RE2 – Private recreation comprising lands both east and west of the southern leg of Henry Lawson Drive – to the east this is characterised by the Bankstown Golf Club and to the west a portion of open space used for agistment of horses.

RU4 - Primary Production Small Lots - is located at the southern end of the site and appears to have been used for sporting activities and currently houses tennis courts and a gym

IN1 and 2 – General and Light Industry respectively occur along Milperra Road - east of the Georges River prior to reaching the intersection.

While not immediately impacted they provide a sense of overall character, arrival experience and feel of the place.

2.3 Development Controls

Bankstown Development Control Plan 2015–Part B11 March 2015 (Amended December 2019) addresses the management of trees within the LGA be it in the public or private domain. This document identifies councils' vision in relation to trees and their role in the community.

"Trees are a vital component of the urban environment of the City of Bankstown. They provide essential ecological, environmental, social, health, heritage and amenity values, all contributing to make the City of Bankstown a pleasant place to live and work. As well as these direct values to residents, urban trees also have equally important values in their own right in maintaining and enhancing biodiversity and natural ecosystems and processes."

This DCP enables tree works to be lawfully conducted in accordance with the Roads Act 1993. - Section 88 - Tree felling – which enables the following:

"A roads authority may, despite any other Act or law to the contrary, remove or lop any tree or other vegetation that is on or overhanging a public road if, in its opinion, it is necessary to do so for the purpose of carrying out road work or removing a traffic hazard."

The design of the proposal should seek to minimise impacts on vegetation in order to maximise retention and health of the existing vegetation.

2.4 Relevant Standards and Guidelines

This assessment has prepared in accordance with Transport's *Beyond the Pavement 2020 Urban Design Approach and procedures for road and maritime infrastructure planning, design and construction* (Beyond the Pavement) (Transport, 2020). In addition to the overarching principles established in Beyond the Pavement, Transport for NSW has a number of guidelines, dealing with specific issues and elements which have also formed the basis of the urban design principles for the overall proposal.

2.4.1 Beyond the Pavement Urban Design Policy Procedures and Design Principles

In Beyond the Pavement, Transport defines best practice for road infrastructure projects in NSW, outlining the goals, expectations, process, and responsibilities for urban design for Transport projects.

Beyond the Pavement describes nine urban design principles that should govern the planning and design of road infrastructure in order to deliver safe, efficient and high-quality infrastructure:

1. Contributing to urban structure and revitalisation
2. Fitting with built fabric
3. Connecting modes and communities
4. Fitting with the landform
5. Responding to natural patterns
6. Incorporating heritage and cultural contexts
7. Designing roads as an experience in movement
8. Creating self-explaining road environments
9. Achieving integrated and minimal maintenance design.

The urban design for the proposal has been developed based on the above principles. This is elaborated further in section 7 - Urban Design Strategy and Concept Design.

In addition to the overarching principles established in Beyond the Pavement, Transport for NSW has a number of guidelines, dealing with specific issues and elements which have also formed the basis of the urban design principles for the overall proposal. This is discussed further in Section 5 - Urban Design Strategy.

Other guidelines of particular relevance to this proposal are:

- NSW Sustainable Design Guidelines Version 3.0 (Sustainable Design Guidelines), (Transport, 2013)
- Crime Prevention through Environmental Design (Queensland Government 2007)
- Urban Green Cover in NSW. Technical Guidelines (Urban Tree Cover), (Office of Environment and Heritage 2015)

3 Methodology

3.1 Overview

This section of the report outlines the methodology adopted, which is consistent with *Environmental Impact Assessment Practice Note: Guideline for Landscape Character and Visual Impact Assessment - EIA-N04* (Transport, 2020). The assessment differentiates between landscape character assessment - the overall impact of a project on an area's character and sense of place, and visual impact assessment - the project's impacts on views.

The assessment involved:

- a review of relevant guidelines, planning and policies (Section 2)
- a desktop review of existing conditions to allow for the contextual analysis (Section 4)
- site inspections in January 2021, to ground-truth the study area, landscape character and views
- Consideration of the proposal's urban design strategy (Section 7). The urban design strategy was used to develop the urban design concept to fit into the surrounding area, support local connections and contributes to communities and their natural, built and community setting
- Identification of landscape character zones (Section 5) and assessment of construction and operation landscape character. Refer to Section 3 for further detail on the landscape character assessment methodology and Section 5 for the impact assessment
- assessment of visual impacts during construction and operation. Refer to Section 3 for further detail on the visual impact methodology and Section 6 for the visual impact assessment
- development of a mitigation strategy (Section 7 and 8).

As per EIA-N04, the landscape character and visual impact assessment has several purposes:

- to measure and report on how well the design fits into the built, natural and community landscape and how well it responds to what people see
- to inform the development of the concept design so the proposal can avoid and minimise impact up front
- to inform Transport, other agencies and the community about the potential landscape character and visual impacts of the overall proposal
- to identify the avoidance, management and mitigation strategies:
  - embedded in the design
  - to be implemented if the overall proposal was approved.

3.2 Landscape Character and Impact Assessment

To assess landscape character the local context of the site is divided into several unique units to assist in understanding the local context and the implications of the proposal. These include defining the landscape character zones (LCZ) which are zones of similar spatial or character properties, and the analysis of changes to these LCZ's as a result of the proposal.

The Guideline for landscape character and visual impact assessment defines landscape character:

"Landscape character relates to the built, natural, cultural and community aspects which make a place unique." (Transport, 2020).

The purpose of dividing the study area into LCZs is to make sure that the impacts assessed are representative for each zone based on its distinct characteristics. The LCZs identified for the study area are described in Section 5.

The proposal is assessed in terms of its impacts on these character zones and the impact ranked in terms of sensitivity to change. This assessment differs from a visual assessment in that it assesses the overall impact of a proposal on an area's character and sense of place.

3.3 Visual Impact Assessment

The visual impact assessment involves identifying an estimated visual catchment through desktop analysis and ground truthing to ascertain the theoretical area from where the proposal would be visible considering factors such landform, direction of travel or direction of the view, built structures and vegetation. Vegetation, while often obscuring potential views, is not considered a permanent obstruction as it can be relatively easily removed. This area is known as the visual catchment or visual envelope.

Distance is also an important factor when assessing visual impacts. With increased viewing distance, the proposal may appear smaller and less detail can be made out. For this reason, very large visual envelopes are often defined by zones or bands of proximity from the proposal.

Within the visual envelope a number of viewpoints were selected for assessment, located both within and outside the proposal's operational footprint Figure 3.

Viewpoints were chosen to represent a range of views including views from residential properties, public buildings and spaces, heritage items, businesses and the existing road corridor. The visual impact of the proposal was assessed (Section 6) by considering the sensitivity of the view and the magnitude of change to the view as a result of the proposal:

- Sensitivity refers to the quality of the view. It is measured by assessing the composition of the view, its capacity to absorb change by identifying sensitive or visually valuable elements in the view, and the length of exposure to the view
- Magnitude refers to the physical character, size and scale of the proposed works and their proximity relative to the viewer. For example, a development situated one kilometre from the viewpoint would have a much-reduced visual impact relative to one 100 metres away. Magnitude also considers overshadowing during the day and lighting at night

The combination of sensitivity and magnitude provides the rating of the visual impact. Visual impact is calculated using the landscape character and visual impact grading matrix provided in the practice note and defined below.

3.4 Landscape Character and Visual Assessment Matrix

Landscape character and visual assessment are equally important. The landscape character assessment helps determine the overall impact of a proposal on an area's character and sense of place including all built, natural, and cultural aspects, covering towns, countryside, and all shades between. The visual impact assessment helps define the day to day visual effects of a proposal on people's views.

To quantify these impacts, it is important to assess two qualities identified as sensitivity and magnitude in relation to a viewpoint. To enhance understanding a description is provided for both in order that the key issues are understood.

Sensitivity refers to the qualities of an area, the type number and type of receivers, and how sensitive the existing character of the setting is to the proposed change. For example, a pristine natural environment will be more sensitive to change than a built-up industrial area.

Magnitude refers to the nature of the proposal. For example, a large interchange would have a very different impact on landscape character than a localised road widening in the same area (Transport, 2020).

Table 3.1 summarises the ranking of the assessment of these two criteria and how they are combined to provide an overall impact assessment. This is supported by an accompanying description of the factors of both sensitivity and magnitude which have influenced the determination of the result.

Table 3.1- Landscape Character and Visual Impact Assessment Matrix

		Magnitude			
Sensitivity		*High*	*Moderate*	*Low*	*Negligible*
	High	High	High – moderate	Moderate	*Negligible*
	Moderate	High -Moderate	Moderate	Moderate - Low	*Negligible*
	Low	Moderate	Moderate - Low	Low Impact	*Negligible*
	Negligible	*Negligible*	*Negligible*	*Negligible*	*Negligible*

3.5 Mitigation Strategy

The mitigation strategy comprises, principles or treatments recommended to manage the identified landscape character and visual impacts of the proposal. This includes:

- measures embedded in the proposal design that have already mitigated potential landscape character and visual impacts. They include a strategy and design principles that continue to provide guidance during future design and construction stages in order to minimise landscape character and visual impacts
- environmental management measures for further investigation during future stages of the proposal in order to manage landscape character and visual impact including:
    - safeguards and management measures to be implemented during detail design
    - aspects and details of the concept design to be further investigated in detailed design to improve urban design outcomes.

The mitigation strategy for the overall proposal is described in Section 8.

4 Existing Environment

4.1 Introduction

The assessment and development of a response for the proposal to minimise impact and maximise its integration with place involves an understanding of the present context, how this may change as a result of other projects or the impacts of the proposal itself. To understand this a review of the physical and social context of the proposal is undertaken to understand the attributes of place.

4.2 Landform and Hydrology

The landform and hydrology are interconnected with the area comprising an alluvial plain of Georges River, refer Figure 6 for Topography and Drainage Plan.

4.2.1 Landform and Geology

The catchment of the Georges River is dominated by two main rock types, the Wianamatta Shale concentrated in the western portion, and the Hawkesbury sandstone in the southern, northern, and eastern sub catchments. Both geologies give way to different landforms. The Wianamatta Shale is typically flat to undulating with moderately incised creek lines, while the Hawkesbury sandstone is characterised by flat ridge tops and steep, deeply incised, rocky gullies (Tippler & Wright, 2012). It is the Wiannamatta landscape that dominates the study area.

The general elevation along the proposal's alignment ranges between 0 - 5 metres above sea level, reflecting its position on the floodplain of the Georges River. The floodplain lies between ridges to the east and west of the alignment that define the shallow river valley of the Georges River at this point. To the east beyond the airport, Georges Hall and Condell Park rise above the floodplain and are located on a ridge up to 30m above sea level. The western edge forms the broader section of the floodplain at this point, with land uses responding to the flooding which occurs within the precinct. The land rises further to the west where new residential and commercial projects are being constructed located just beyond the floodplain of the Georges River.

The proposal is defined by two distinct precincts divided by a small rise which passes through the intersection. This rise covers much of the airport lands and crosses the intersection and extends through into the residential precinct. To either side of this land, is land less than 5m above sea level. These lands are flood prone and so support largely open space activities both private and public.

The low-lying nature of this landscape means there is a high potential for acid sulphate soils which if disturbed may impact the quality of the river's waters.

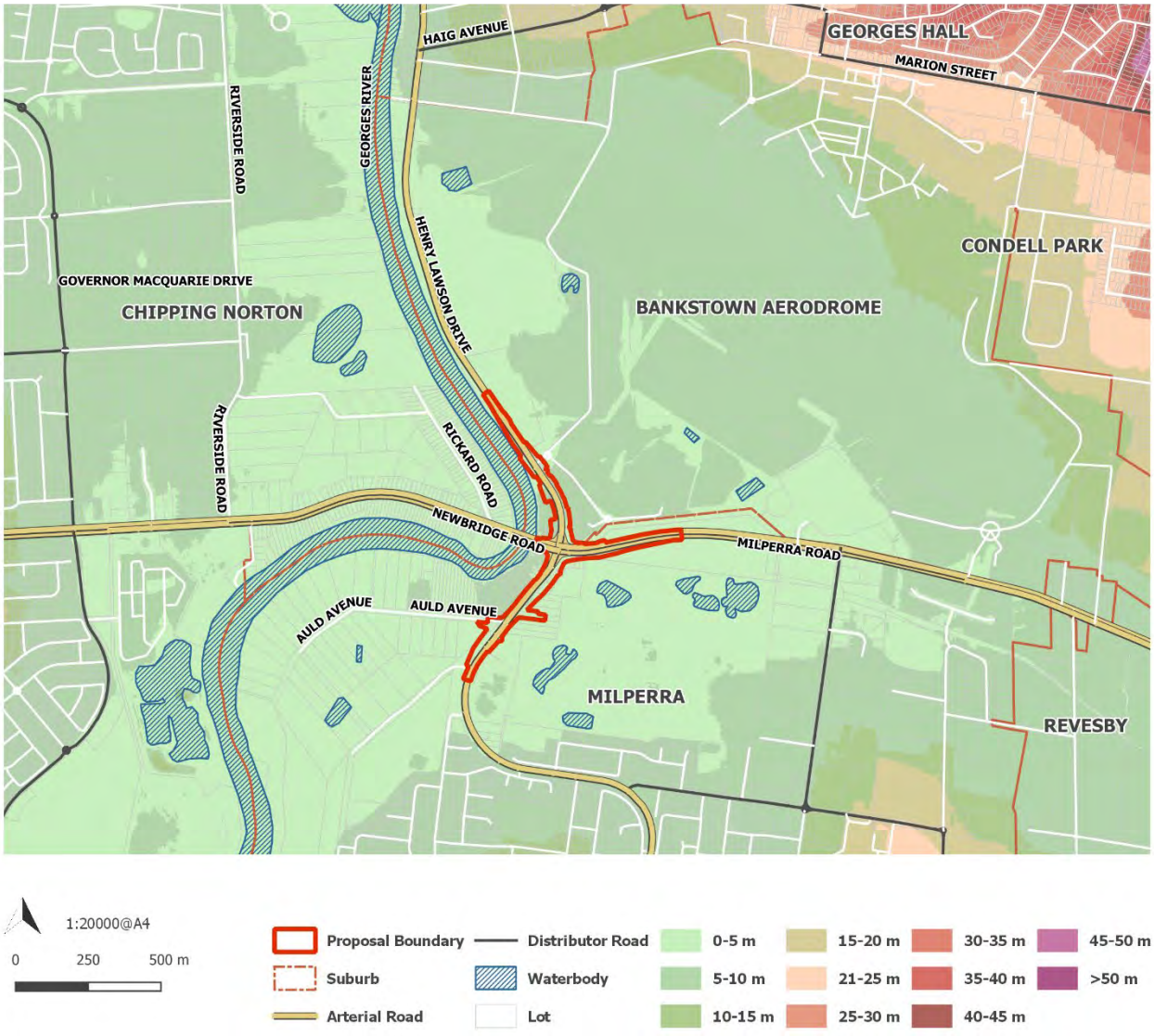


Figure 6 – Topography Map

4.2.2 Hydrology

The proposal is located along the banks of the Georges River which drains from South Western Sydney to Botany Bay. This is depicted in the catchment plan for the Georges River – Figure 7. In this location the floodplain is relatively broad with limited definition of the plain to the east or west with low lying lands extending a significant distance from the channel. The Georges River at this location is tidal and comprises brackish waters where fresh and saltwater mix. The tidal limits of the River extend as far as the Liverpool Weir. Mangroves, as a result, can be seen extending along the foreshore within the study area.

A number of small tributaries including Milperra Drain and other unnamed tributaries cross the alignment of Henry Lawson Drive as they direct water from the ridgeline to the east to the Georges River.

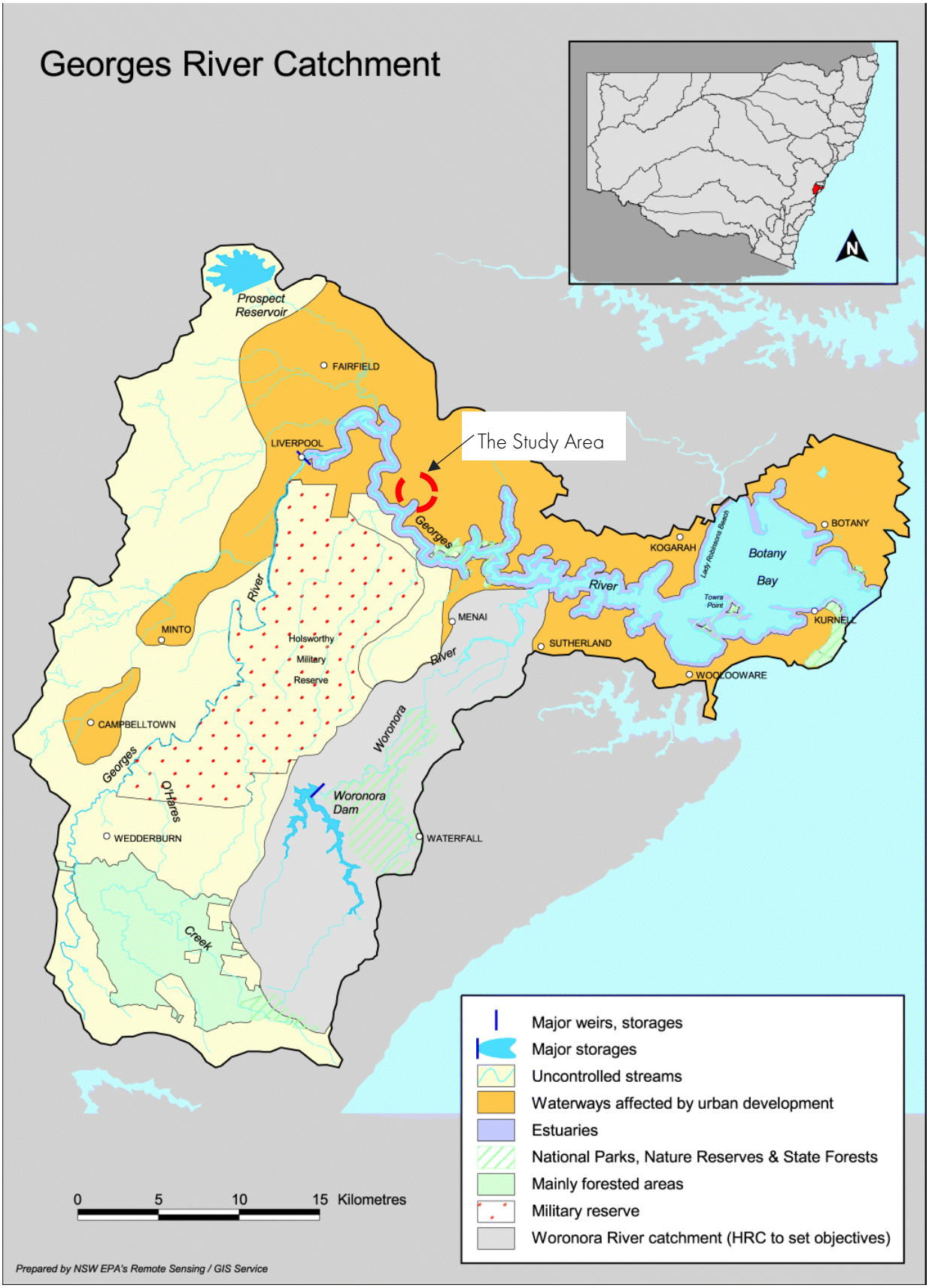


Figure 7 - Georges River Catchment (Source: NSW EPA Remote Sensing)

Flooding

The main floodplain of the Georges River occurs between Glenfield and East Hills, in Liverpool, Fairfield and Canterbury Bankstown Local Government Areas. In that area, the river flows through low-lying areas with soft shale geology, whereas in other areas the river flows through deeper sandstone valleys. Those valleys act as a bottleneck during floods, with water backed up into low lying areas.

Whilst flooding of the Georges River is not frequent, with the last flood events occurring in 2020, 1988 and 1986, it is ranked as one of the most flood prone valleys in NSW. The worst recorded flood in 1873 was a 1 in 100 year event in which waters rose 10.5m.

This low lying and flood prone landscape has informed both the land uses and vegetation that occurs within the precinct and is a key determinate of the overall character of the precinct. The historic image below (Figure 8) clearly illustrates the flood flow paths and former channel alignments of the River which cross the floodplain and the way the land uses have responded to it.

Flooding models depicted in Figure 9, demonstrate that the Bankstown and Georges River Golf Courses are at the greatest risk of flooding. As part of the planning for flood management, the flood mitigation plans of Liverpool City Council and the Canterbury Bankstown City Council developed in response to the Georges River Floodplain Risk Management Study and Plan 2004 have both established a Voluntary Purchase Schemes within the floodplain to assist in mitigating flood impacts and its management. Land purchased under these agreements is transferred to Public Open space.

Figure 8 - Aerial image of the Georges River and development 1943 (Source: Six Maps)

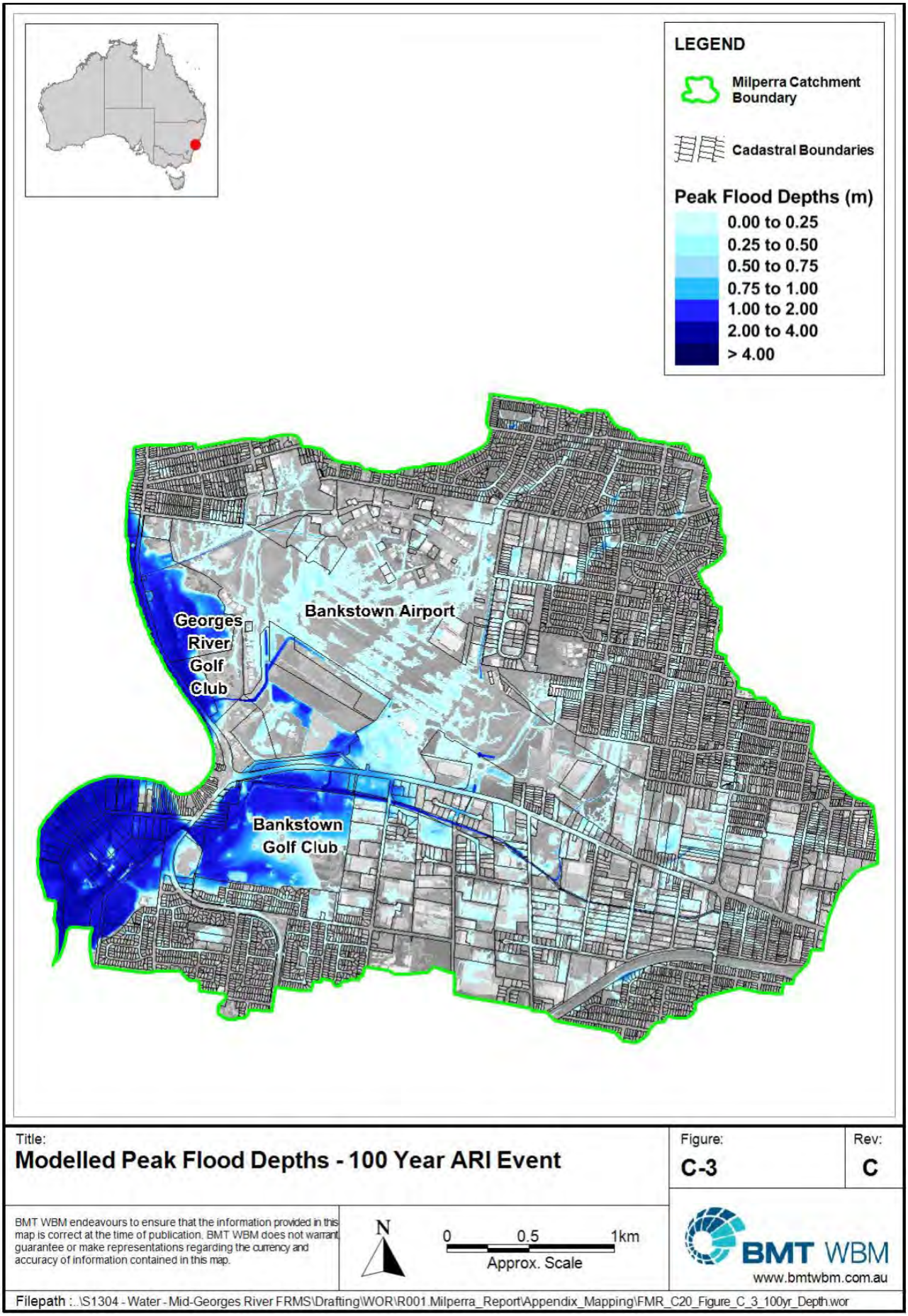


Figure 9 - Georges River Flooding (Source: Lyall And Associates)

4.3 Vegetation

As has been seen in the earlier chapters vegetation is an important element in the overall character and feel of Henry Lawson Drive Corridor as a whole and defines it as a special corridor within the Sydney Road network.

The proposal area is characterised by seven ecological communities:

- PCT 725 – Broad-leaved Ironbark – Melaleuca decora shrubby open forest on clay soils of the Cumberland Plain, Sydney Basin Bioregion – moderate condition
- PCT 781 - Coastal Freshwater Lagoons of the Sydney Basin and South East Corner
- PCT 835 - Forest Red Gum-Rough-barked Apple Grassy Woodland on Alluvial Flats of the Cumberland Plain, Sydney Basin
- PCT 920: Mangrove Forest in Estuaries of the Sydney Basin and South East Corner
- PCT 1236 - Swamp Paperbark – Swamp Oak tall shrubland on estuarine flats, Sydney Basin Bioregion and South East Corner Bioregion
- PCT 1234 - Swamp Oak Swamp Forest Fringing Estuaries, Sydney Basin and South East Corner
- PCT 1800: Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley.

In addition a number of non-native vegetation types are present including:

- Miscellaneous ecosystem – Urban exotic / native landscape plantings
- Miscellaneous ecosystem – Weeds / exotics – non- native vegetation
- Miscellaneous ecosystem – Waterbodies.

The makeup of these communities informs both the overall character of the place but also gives direction as to the landscape response which should be adopted in the developing the overall strategy. The following provides a summary of the key distinguishing elements. Additional detail can be found in the Biodiversity Assessment Report (BAR).

PCT 725 – Broad-leaved Ironbark – Melaleuca decora shrubby open forest, is the dominant community along either side of Milperra Road and presents a swampland character, with the strong presence of Melaleuca species including *Melaleuca decora* (White Feather Honeymyrtle), *Melaleuca nodosa* (Ball Honey Myrtle) and casuarina (*Casuarina glauca)*

Figure 10 – PCT 725 (Source: WSP - BAR)

Figure 11 – PCT 1236 (Source: WSP - BAR)

This community is also adjoined by PCT1236 Swamp Paperbark – Swamp Oak tall shrubland on estuarine flats. Like the adjoining Broad-leaved Ironbark - *Melaleuca decora* shrubbery open forest, Melaleuca make up an important element of this community including *Melaleuca ericifolia* (Swamp Paperbark), *Melaleuca linariifolia* (Snow-in Summer).

Along the Georges River the community changes to a distinct riverine character which supports PCT 835 Forest Red Gum-Rough-barked Apple Grassy Woodland and PCT 1234 Swamp Oak Swamp Forest Fringing Estuaries

PCT 835 Forest Red Gum-Rough-barked Apple Grassy Woodland comprises both a dominance of eucalyptus including *Eucalyptus amplifolia* subsp. *amplifolia* (Cabbage Gum), *Eucalyptus tereticornis* (Forest Red Gum), *Angophora floribunda* (Rough-barked Apple), within the canopy with the presence of *Eucalyptus baueriana* (Blue Box) becoming dominant to the north. This community also extends south of the Milperra Road intersection between Henry Lawson Drive and the Golf Course.

PCT 1234 Swamp Oak Swamp Forest Fringing Estuaries – the canopy is dominated by *Casuarina glauca* and occurs within the tidal flats adjoining the rivers edge. The shared path runs adjacent to and through this community. Refer Figure 12.

The edge margin of the Georges River supports a distinctly different responsive to the tidal influences of the River and the presence of water. This is PCT 920: Mangrove Forest in Estuaries of the Sydney Basin and South East Corner Bioregion. It is limited in its extent being concentrated along the immediate rivers edges largely beyond the limit of the proposal. Tree species is dominated by mangrove species which are influenced by the tidal nature of the river.

PCT 781 Coastal Freshwater Lagoons of the Sydney Basin and South East Corner – is a largely open treeless community dominated by wetland reeds and sedges associated with standing water. The dominant reed present was phragmities. These are located adjoining Milperra Road and within the Milperra Drain.

Figure 12 - View of PCT123: Swamp Oak Swamp Forest Fringing Estuaries vegetation along the Georges River

PCT 1800: Swamp Oak open forest on river flats of the Cumberland Plain and Hunter valley – this community is located predominantly along the Milperra Drain and Casuarina glauca is the dominant canopy species. The community is heavily impacted by weed.

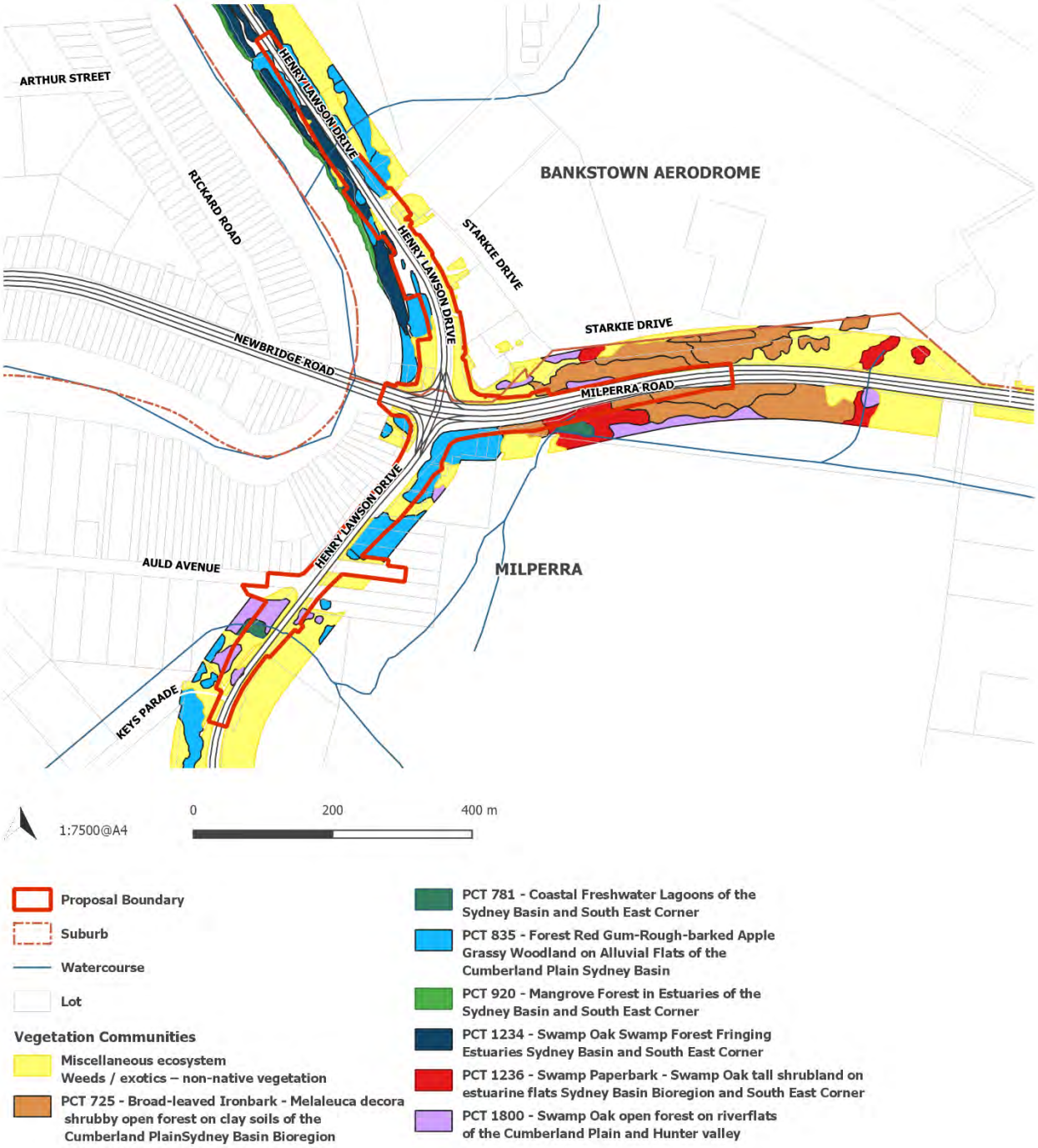


Figure 13 – Vegetation Map (Source: Data provided from WSP)

The EIS extents reviews those areas mapped as Coastal Wetlands under the State Environmental Planning Policy (Coastal Management) 2018) refer Figure 14.

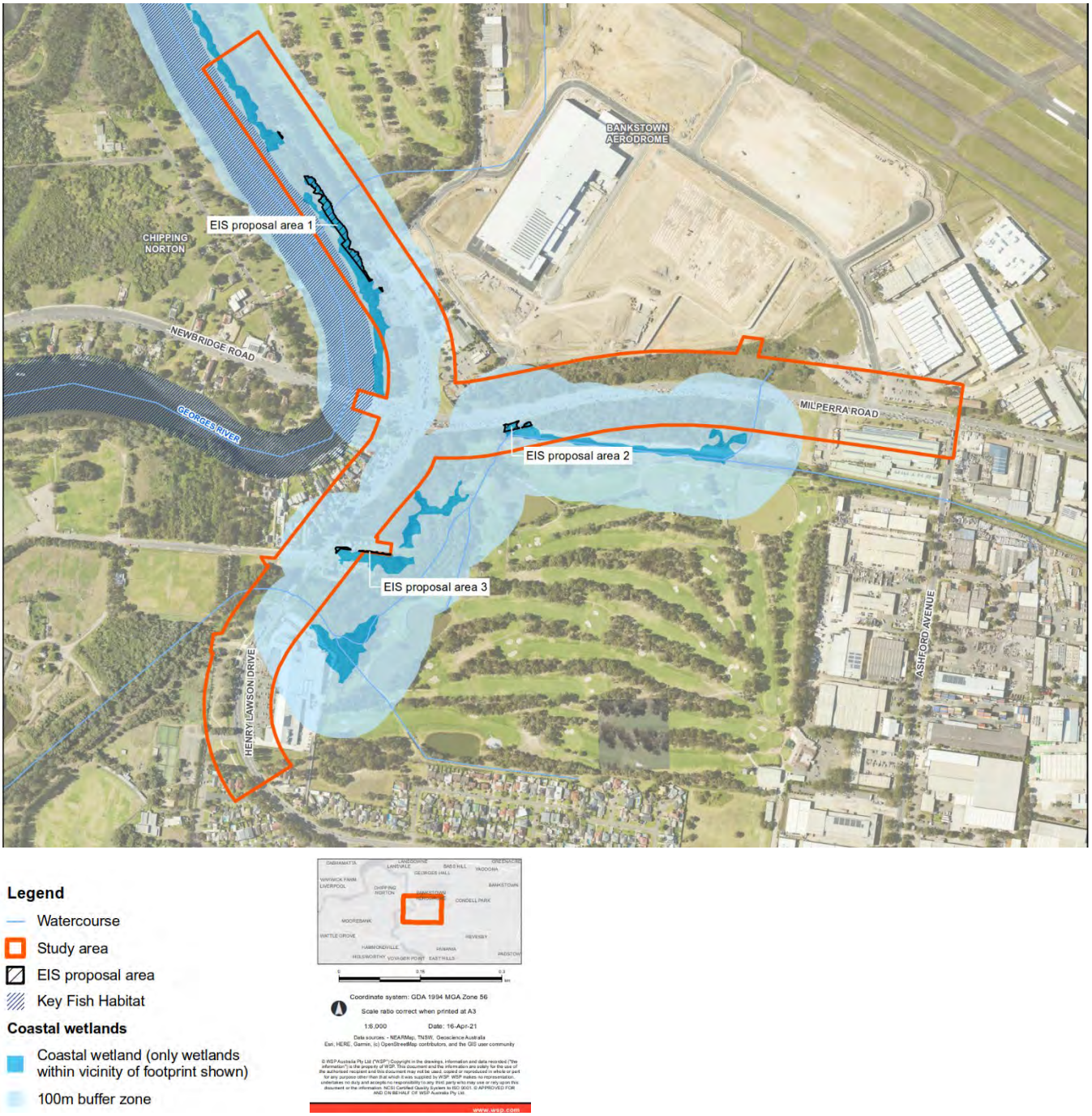


Figure 14 – Coastal wetlands mapping (Source: WSP)

4.4 Heritage

4.4.1 Aboriginal Heritage

Based on early British accounts the original inhabitants of the region were the *Gweagal* and the *Bidgigal*, both part of the *Dharug* people. *Gweagal* territory extends from the southern edge of Botany Bay towards Liverpool in the south-west. *Bidjigal* territory bound by Botany Bay, the Cooks River, the Georges River and Salt Pan Creek and in some sources documented them as reaching as far as Parramatta. A third group the *Gahbrogal* (Cah-bro-gal) who ate estuarine teredo worms they called cah-bro are associated with the present-day suburb of Cabramatta.

Historically the Georges River has provided a rich source of food, derived from both the vast marine and mammal life along the river, medicine and shelter, evidence of which remains through the presence of middens, campsites, and artworks along the river's length (Goodall & Cadzow, 2014).

A detailed Aboriginal heritage investigation and assessment has been undertaken, Henry Lawson Drive – Hume Highway to M5 Upgrade Aboriginal Cultural Heritage Assessment, 2020. 4 sites within or immediately adjacent to the study area were identified HLD Pad 5 and 6a, HLD Resource Zone 1 + Pad and HLD Site 5s. None of these locations were identified as having archaeological deposits as a result of soil disturbance both due to settlement and the alluvial nature of the floodplain.

There are no Aboriginal places or archaeological sites listed on the Bankstown Local Environmental Plan (LEP) 2015. Despite the absence of relics within the immediate study area remnant Indigenous sites have been found such as the axe grinding grooves in the rocks between River Road and Salt Pan Creek at Revesby and intact middens found at Padstow Heights reinforcing written observations of the aboriginal past of the region. From both these sources it is clear that the Georges River catchment has been a source of spiritual, social, cultural, and economic importance to the Dharug and Dhwrawal nations

The understanding of the Aboriginal heritage can add to the overall programming of the space and provide potential for interpretation and character to the place. The opportunity for this will be reviewed as part of the consultation process.

4.4.2 European Heritage

First discovered in 1789 by Governor John Hunter, Matthew Flinders and George Bass who were exploring Georges River and Prospect Creek at the time. The area was determined to comprise favourable land on the flat banks of the river, and with this, a pioneer colony was established and was called 'Banks Town'. The area was renamed Bankstown after Sir Joseph Banks, who travelled to Australia with Captain James Cook in 1770. The area of first European settlement along the river has been partially reserved as part of the Mirambeena Regional Park located to the north of the proposal along Henry Lawson Drive.

Twelve items of local heritage value are located within the LGA, of these items, none are within the visual proximity of the proposal. One item is of state heritage significance, 'The Homestead' located in Georges Hall adjacent to Henry Lawson Drive, approximately 1km from the proposal site, the heritage listed item is significant as a homestead built in the 1820s and exists in a reduced capacity today.

The history of Bankstown Aerodrome and its ongoing operation play an important role in the character and feel of the place. Bankstown Aerodrome is a locally listed item and has shaped the areas development since 1940. Its establishment was linked to the war effort providing both a base and resources including the manufacturing of aircraft over the period.

This connection is reflected in artwork along the river front as illustrated in the work 'Camoufleur' by Regina Walters depicted in Figure 15 which recollects the Sydney Camouflage Group, which comprised artist like Max Dupain and Frank Hinder, who worked at Bankstown Airport during WWII.

Figure 15 - The 'Camoufleur' created by artist Regina Walters

4.5 Built Environment

The built environment in the study area is comprised of roads, residential and industrial/commercial infrastructure. Major built environment features in the study area are described below.

4.5.1 Henry Lawson Drive / Milperra Road

Henry Lawson Drive and Milperra Road are the main roads which form the major intersection and location of the proposal within the study area. Henry Lawson Drive provides a link north to the Hume Highway, and residential and employment communities in and around Parramatta while providing a southern link to the M5 Motorway. Milperra Road forms a link to the eastern suburbs of Sydney and west to Liverpool while connecting communities and employment centres. Henry Lawson Drive is predominantly four lanes (two northbound lanes and two southbound lanes) whereas Milperra Road is predominately six lanes (three eastbound and three westbound lanes).

Henry Lawson Drive presents a unique road corridor as its corridor responds to the general alignment of one of Sydney's main river systems, the Georges River. This natural asset has influenced and shaped the character of the corridor. The character of Henry Lawson Drive varies as its relationship to the river varies, but generally has a strong landscape setting which is evident at the proposal site.

Between the M5 South west Motorway the corridor is set in from the Rivers edge and the landscape responds to a more urban context. Here the corridor is well vegetated, but the vegetation is structured and planted consisting of avenues of trees including *Eucalyptus micorcorysis* and *Eucalyptus tereticornis*, which flank the roads alignment and create a separation between the road corridor and residential development (Figure 16) that developed along the road including the suburb of Milperra.

Figure 16 - Henry Lawson Drive approaching the southern end of the proposal looking north

North of the Milperra Road (Figure 17) intersection the character changes as the road is closely aligned with the Georges River. Here a more naturalistic character is provided which creates a strong sense of enclosure and connection to the natural environment. This character is reinforced by the adjoining landuses which within the study area adjoin open space lands.

Figure 17 - Northern Leg of Henry Lawson Drive between Milperra Road and Rabaul Road looking south

Figure 18 - Northern Leg of Henry Lawson Drive between Milperra Road and Rabaul Road looking north

Like Henry Lawson Drive the connecting section of Milperra Road also presents with this landscape frontage. Prior to this point Milperra Road reads as a highly urbanised corridor characterised by industrial and commercial premises (Figure 19a) and services which create a harsh and unattractive streetscape. This moves abruptly into a naturalistic vegetated character (Figure 19b) which is the interface of this proposal. This character should be integral to the overall character developed for the intersection.

a)

b)

Figure 19 - Milperra Road built (a) and natural contexts (b)

The design of the proposal needs to be developed within the overall concept of Henry Lawson Drive whose character is connected to its natural setting. Any proposal needs to ensure that a celebration of the natural context is an integral element of the design. This should also be developed in relation to the planning of the green grid, ensuring that minimisation of the heat island effect, and connection to nature are part of the proposal's considerations.

4.5.2 Commercial/ Industrial Infrastructure

Two industrial/commercial precincts exist to the north and south of the intersection, both on the eastern side.

1. North of the intersection comprises a range of uses including petrol station, fast food outlets and ALDI Supermarket. All are dominated by parking to the front or side of the built form and have large scale signage structures. Built form is single storey and independent structures.

2. South of the intersection is a single development – Flower Power Nursery. This is developed on land zoned recreational on a former landfill site. It is elevated above Henry Lawson Drive and has multiple commercial outlets within the single structure large scale warehouse type development.

4.5.3 Residential

A localised section of residential development located west of Henry Lawson Drive and south of Milperra Road. Presents a varied composition of forms and materials. Dwellings are free standing of one or two storeys height. Setbacks are irregular and vegetation breaks up the frontage minimising the overall presence. Two isolated properties are located east of Henry Lawson Drive

4.5.4 Utility Services

A number of major utilities are located in the study area including:

- Electricity supply and street lighting: Ausgrid including 33kV transmission lines and 5, 11 & 22kV high voltage overhead lines
- Telecommunications: Telstra, Optus, NBN and Nextgen optic fibre and copper cables
- Gas: Jemena and AGL
- Water and sewer services and infrastructure.

4.5.5 Accessibility

As part of the urban environment of greater Sydney accessibility plays an important role. The upgrade proposal facilitates enhanced accessibility for vehicular transport both public and private. The corridor is serviced by bus routes which traverse Milperra and Newbridge Roads with the only stops located within Milperra Road east of Henry Lawson Drive. These stops fall within the proposal and their accessibility and safety should be considered.

The proposal needs to also consider and address the active transport network and the impacts it may have on this. A review of the Draft Active Transport Action Plan 2020-2030 provides guidance as to how the area is presently serviced by active transport but also future plans. These present the following:

Vision

"To provide a high quality, connected walking and cycling network that enables our residents to choose active transport to move about the City and beyond."

Draft Active Transport Action Plan 2020-2030

Currently Henry Lawson Drive is serviced by a section of shared path which runs from the M5 in the south through to Liverpool. This north south service is a key cycleway provision and provides a safe attractive route along the Georges River and associated parklands. This path alignment also forms part of a heritage trail, with art works and interpretive elements located along the corridor. The alignment however is not lit and meandering which suggests a more recreational focus than commute.

Pedestrian access apart from the provision of this shared path to the western side of Henry Lawson Road is limited in terms of path provision and can be enhanced by additional pathways to assist the functionality of all elements which address the corridor.

A key element of the Transplant Action Plan is the establishment of Route 9 as a cycleway route which runs Milperra to Earlwood. The route for this is not defined although significant lengths exist as part of other cycleway networks including M5 and Wolli Creek networks.

Figure 20 - Cycle Route Map (Source: Canterbury Bankstown City Council)

4.5.6 Green Grid

The Government Architect of NSW has developed a strategy to enhance and promote the greening of our cities. This has been developed in acknowledgment that green space is a key hallmark of liveability in urban areas. As part of this process the GANSW has identified a network of high-quality green space that connects town centres, public transport hubs, and major residential areas. While not specifically identified as one of these corridors the Milperra Road / Henry Lawson Drive, the setting of the proposal and its surroundings make this a meaningful element of the Green Corridors which exist within this precinct.

The GANSW identifies for a strategy for what it calls "The Georges River North SW1.1"

"The northern portion of the Georges River occupies some of the most urbanised land within the district. Chipping Norton Lakes and other surrounding parklands and golf courses are by-products of two decades of sand mining activity. There is significant opportunity to further enhance the Georges River as a key regional open space corridor. The large parklands available are of regional significance, offering the opportunity to contribute greatly to density increases in the surrounding suburbs. There are opportunities to enhance access to wetlands and improve regional facilities within the existing parklands."

The Georges River and Chipping Norton Lakes have the potential to be a major open space corridor that connects many centres near Liverpool, Bankstown and Hurstville. The corridor of the proposal is at the centre of this greenspace and should contribute to it

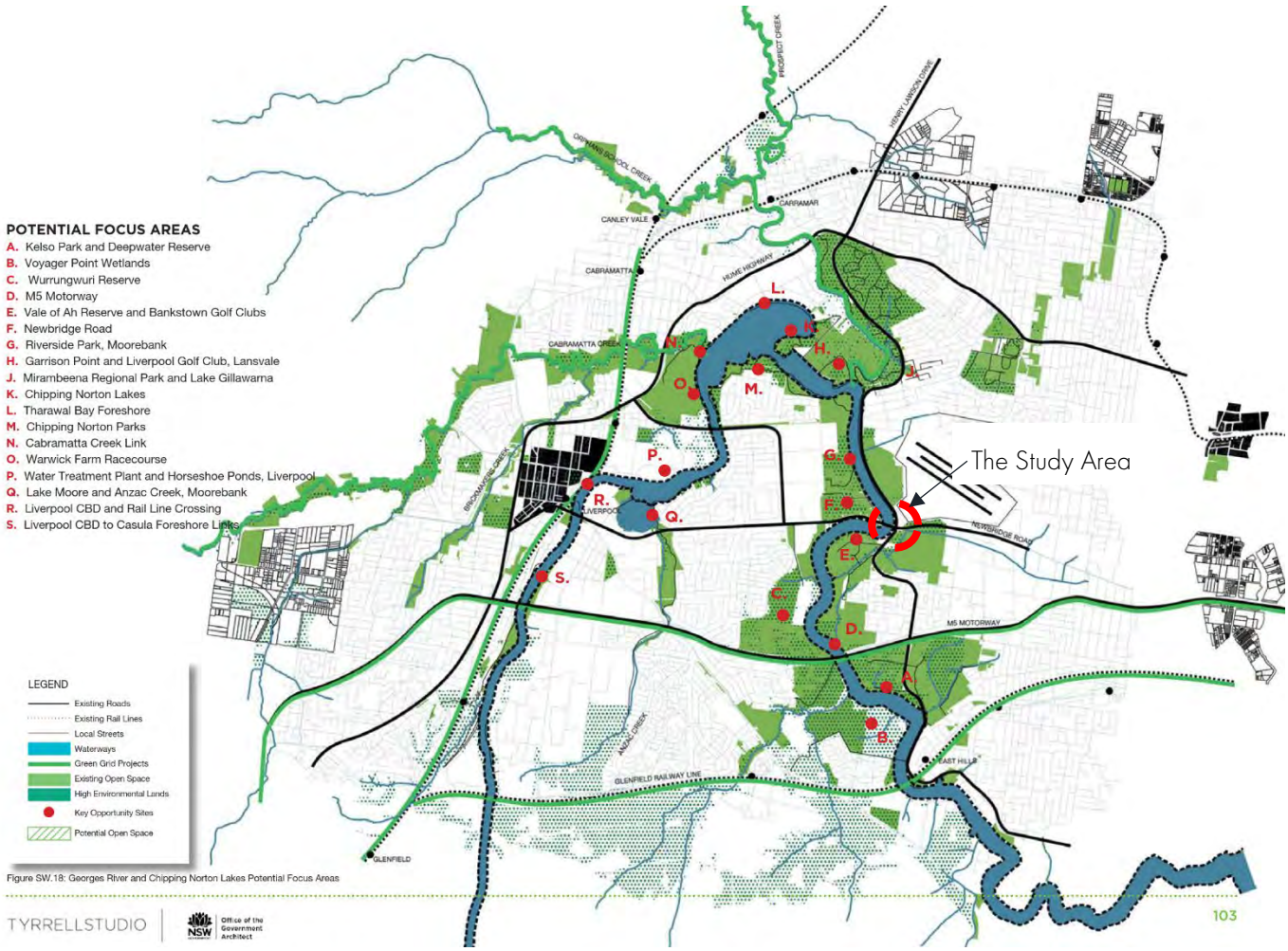


Figure 21 - Green Grid Map (Source: NSW Government Architect)

5 Landscape Character Assessment

5.1 Landscape Character Assessment

This section of the report reviews the physical attributes of the character zones and the proposal's potential impacts. As part of the character assessment, the assessment has reviewed the alignment and its context and classified it into a number of differing character zones.

LCZ1 – River frontage
LCZ2 – Swampland
LCZ3 – Residential
LCZ4 – Commercial
LCZ5 – Road corridor
LCZ6 – Open space

Figure 22 illustrates the distribution of these character zones and their relationship to the proposal. The assessment is based on the REF proposal. Where EIS areas are within the respective character zone a separate assessment is made in relation to these areas and a separate rating provided.

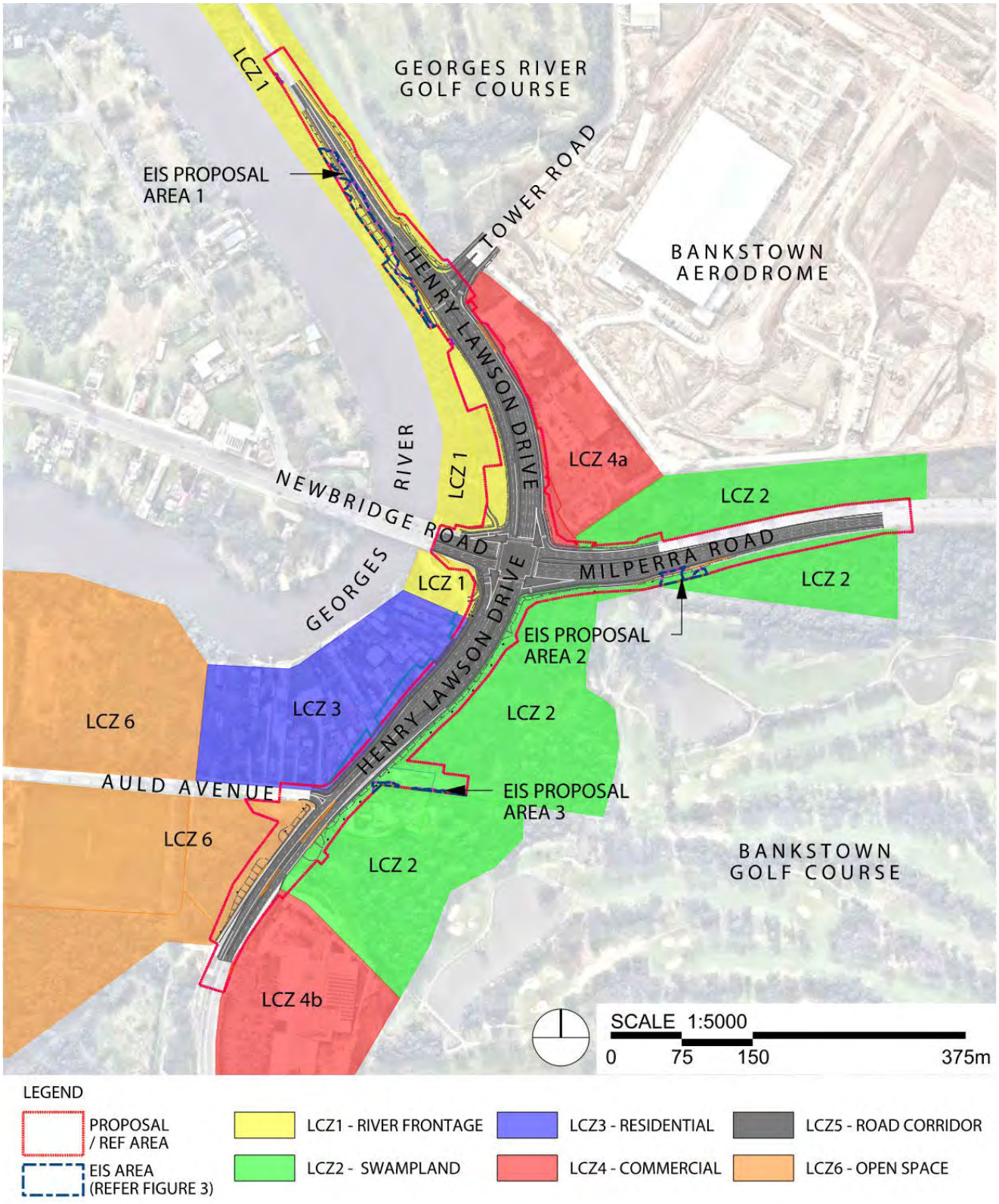


Figure 22 – Landscape Character Zones

5.2 Landscape Character Zone Definitions

5.2.1 LCZ1 – River frontage

Figure 23 – View of vegetation along the Georges River

LCZ1 is located just south of the northern leg of Henry Lawson Drive/Milperra Road intersection and extends to its end on approach to Georges Hall. Located predominantly west of Henry Lawson Drive it straddles the alignment north of Tower Road. This location is characterised by the well-established vegetation along the Georges River, screening the river from view of motorists but offering glimpses of the river for pedestrians and cyclists using the shared path. This section of the corridor has been identified as having protected coastal wetlands. These areas are addressed in the EIS assessment.

Sensitivity: High

The existing landscape is well vegetated along the river's edge, providing filtered views to the Georges River for users of the shared path and respite from the hustle and bustle of the adjoining major road and urban development. This natural landscape character contrasts with the urban typology adjacent. It is a scenic backdrop to the corridor which is highly sensitive to change.

EIS proposal area 1 occurs within this zone north of Tower Street. As a protected zone they are considered highly sensitive to change.

Magnitude: High

The proposal is anticipated to impact this character zone along the immediate edges of Henry Lawson Drive in this location. To the south of Tower Road existing vegetation is largely retained and provides a buffer zone between Henry Lawson Drive and Georges River, whereas to the north the road formation extends out from its existing footprint impacting existing vegetation. The extent of work and its impact on the overall character means the magnitude is considered high.

EIS proposal area 1 is impacted by expansion of the footprint. As a protected community it is considered highly sensitive to change and so magnitude of change is assessed as high.

Summary: High

The upgrade will affect the existing vegetation aligning Henry Lawson Drive, the expanded footprint will result in vegetation being removed which is expected to impact the Coastal Wetlands north of Tower Road. The overall impact is considered high based on the sensitivity of the space and the quantity of vegetation likely to be impacted by the works.

The EIS assessment reflects this with impacts to the areas designated Coastal Wetland impacted by widenings and resulting in a high sensitivity and magnitude of change.

5.2.2 LCZ2 – Swampland

Figure 24 – View of bushland vegetation along Milperra Road looking west towards Henry Lawson Drive

LCZ2 is located along Milperra Road to the east of Henry Lawson Drive and wraps around into Henry Lawson Drive on its eastern side, extending to the Auld Avenue Bridge.

In Milperra Road, this zone marks a transition from the Milperra industrial area and the beginning of a precinct linked to the Georges River. Both sides of the alignment are well vegetated and present a natural corridor experience that provides a screen to development beyond the road alignment, particularly the Bankstown Aerodrome approximately 100m to the north. Within Henry Lawson Drive the vegetation dominates the eastern edge of the corridor and screens the Bankstown Golf Course.

Sensitivity: High
The landscape is densely vegetated providing screening to the elements beyond the corridor. It provides a scenic outlook along Milperra Road which contrasts with the industrial and commercial character experienced on approach to this section of the corridor. The close proximity of this zone with Bankstown Aerodrome makes the established vegetation significant in helping the road user feel safe whilst driving along Milperra Road. As a narrow undeveloped section of vegetation adjoining the corridor, it has a high sensitivity to change.

EIS – A small section of land occurs in relation to a water course crossing Milperra Road (EIS proposal area 2) and another perpendicular to Henry Lawson Drive within a lot to be acquired as part of the proposal (EIS proposal area 3).

EIS proposal area 2 is within a heavily altered landscape defined predominately by exotic grass and weed species. Its condition has been assessed as being in moderate condition in the biodiversity report and so sensitivity is considered high.
EIS proposal area 3 is within an urban lot surrounded by turfed area and narrow in widths its resilience and condition is assessed as low. Sensitivity is consequently assessed as moderate.
Magnitude: Moderate
The proposal sees an expansion in the footprint of the intersection of Milperra Road with Henry Lawson Drive. Vegetation is to be removed and the formation widened to accommodate additional turning lanes. This will see the impact of a small portion of this character zone on the south eastern corner of the intersection with much of the remaining area unimpacted. The impact has been assessed as moderate.

EIS - The two sections of coastal wetland are impacted by the proposal. EIS proposal area 2 at Milperra Road sees the lengthening of the culvert and channel works. Its impact is considered high.

EIS proposal area 3 falls within acquired lands, although the extent of footprint impacts only the western most limits of the community its impact is considered moderate.

Summary: Moderate to High

The upgrade is expected to have a material impact on the landscape character as the proposal impacts the south eastern corner of the intersection resulting in clearance of much of the vegetation, resulting in an increase in pavement area and reduction in vegetation area as a result of vegetation clearance. Despite clearance extent a body of vegetation is maintained preserving the sense of a vegetation backdrop. The overall impact has been assessed as moderate to high.

The two EIS areas that occur within this zone are assessed as follows: EIS proposal area 2 experiences a high impact on character and EIS proposal area 3 experiences a moderate impact.

5.2.3 LCZ3 – Residential

Figure 25 – View of residential properties along the southern portion of Henry Lawson Drive

LCZ3 is located on the southern leg of the intersection on the western side of Henry Lawson Drive. This residential zone is characterised by a row of detached dwellings, of differing form (single and two storey dwellings), setback, and materials. Transport acquired the frontages of a number of properties in the 1960's for future corridor widening. These properties have been identified as land acquired for road within the Property Information Management System (PIMS). Some sections of properties remain on the Land Acquisition Map within the LEP planning system.

Sensitivity: Moderate

As the residential properties have frontages overlooking Henry Lawson Drive they are both accustomed to the presence of a major road but also sensitive to changes associated with the road. Re-definition of boundaries appears to have been occurring as does the realignment of house frontages, changes in built form a consequently considered to have largely occurred. Sensitivity to change is consequently considered moderate.

Magnitude: High

Scale of works will see the extent of works extend beyond the current road footprint and into the large setback including the shifting and realignment of the shared path. The scale of change requires the redefinition of front boundaries and in some cases will bring the boundary close to the house. These changes will see the loss of much of the vegetation within these residential frontages or the streetscape and the magnitude of change is considered high.

Summary: Moderate to High

Impacts on the character zone are considered moderate to high due to the proximity of the properties to Henry Lawson Drive, loss of vegetation and scale of proposed road upgrade and associated infrastructure.

5.2.4 LCZ4 – Commercial

Figure 26 – View of commercial properties aligning Henry Lawson Drive

LCZ4 comprises two localities. LCZ4a is located southbound on Henry Lawson Drive at the intersection of Henry Lawson Drive and Milperra Road. The area is comprised of single storey commercial properties including a petrol station, fast food restaurants and drive-throughs, and a supermarket, with at grade forecourt carparking to the front of the built form. Large sale signage structures are also a key element of the built form. The relationship between road and building changes as you move south with the last building elevated some 3m above the road on an elevated mound.

LCZ4b is next to Keys Parade and comprises a new commercial site, the Flower Power development comprising at grade carpark in front of a large warehouse style building frontage. The premises are elevated above the alignment and accessed from their own traffic lights. The location (Henry Lawson Drive/ Keys Parade intersection) of this second area is at the southern limit of work and has been assessed to have negligible impact because of the works. Its impacts are consequently not discussed.

Sensitivity: Low

The commercial properties are set back from the road with parking to the front. A large, grassed verge separates Henry Lawson Drive from the boundary. As a commercial precinct it is reliant on passing traffic for trade and so exposure to the road is a critical consideration. The sensitivity of this precinct to the proposal is consequently considered low.

Magnitude: Low

The extent of works will see Henry Lawson Drive widened into the grass verge expanding the pavement footprint and reducing the buffer between the road and the commercial properties. The distance of the commercial property frontages from the proposed works means it is unlikely the character will see significant change. Elements of vegetation screening and access provisions will change however the magnitude of change to the overall character of the precinct is considered low.

Summary: Low

The proposal will see the grassed verge reduced however due the separation of the commercial properties from Henry Lawson Drive it is anticipated the commercial zone will largely retain its existing context. The overall impact is anticipated in this zone is low.

5.2.5 LCZ5 – Road corridor

Figure 27 – View of Henry Lawson Drive / Milperra Road / Newbridge Road intersection from southern eastern corner

LCZ5 is the focus of the proposed works, the intersection of Milperra Road and Henry Lawson Drive provides a gateway to the Hume Highway, M5, Liverpool and the eastern suburbs and introduces the Georges River to the road alignment in this area. The present character is defined by the pavement of the corridor and the character of the precincts which adjoin it. The scale of the pavement varies from 7 to 8 lanes heading east west and 5 to 6 lanes heading north south respectively at the intersection of Milperra Road and Henry Lawson Drive. This transitions to2 lanes (1 lane each way) north and south at the respective limits of the study and 6 lanes (3 each way) in Milperra Road.

Sensitivity: Moderate

The corridor is heavily congested and dominated by the road itself. The proposal would enhance the operation of the intersection which would be evident to the key users of the space, the road user, and will impact the overall character of the space.. The sensitivity to this change is considered moderate.

Magnitude: Moderate

The corridor sees an expansion in overall footprint by doubling the width in certain locations. This sees a large intersection expanded to a larger intersection. The magnitude of this change is considered moderate as the viewers perspective is still of a large scale intersection.

Summary: Moderate

The overall impact of the intersection is considered moderate based upon the impact of the expansion on the road users experience and overall retention of the corridor as a major road intersection.

5.2.6 LCZ6 – Open Space

Figure 28 – View of a park on the corner of Henry Lawson Drive and Newbridge Road

LCZ6 is located at the southern end of the proposal adjoining the western edge of Henry Lawson Drive extending to the Rivers edge. This area is characterised by open grassland among clusters of canopy trees. In parts the open space is formalised into floodlit playing fields and in others the character is naturalised with informal grassed areas among established tree canopies. A small tributary (Milperra Drain) drains through the parkland west to the River. The channel is tree lined and crossed by both the existing road bridge and a pedestrian bridge.

Sensitivity: High

The zone at present provides a well-maintained landscaped area which allows for passive and active recreational activities. As such the sensitivity of users is expected to be high as the focus is on the amenity and setting of the open space.

Magnitude: Low

The extent of works would impact existing vegetation along the creek line and remove a portion of the park along its interface with the road. Despite the loss of parkland and trees the scale of the open space means that it still presents in a similar manner to the existing. The magnitude of change is consequently considered low.

Summary: Moderate

The parkland zone will be affected by the widening of the road and construction of the new bridge resulting in loss of open space and vegetation cover. The impact of these works is likely to be limited to the area of the bridge and Auld Avenue with most of the site to the west largely unaffected. The impact of the proposal is consequently considered moderate.

5.3 Landscape Character Assessment Summary

Six landscape character zones have been identified which address and define the road corridor. These zones have been assessed as part of the landscape character study and consider areas both within and beyond the proposal footprint: The summary of the landscape character assessment is presented in Table 5.1 below. The table reflects the impacts in relation to the REF. Table 5.2 summarises the findings for the EIS areas. The rankings for each reflect the individual assessment ie As the EIS area is smaller, its character could be changed completely as a result of the works. In comparison, the REF has a broader area of impact being assessed and may be better able to accommodate the proposed changes. Impacts to the REF Proposal Area

Table 5.1 – Landscape Character Assessment Summary

Character Definition	Sensitivity	Magnitude	Summary
LCZ1 – River frontage	High	High	High
LCZ2 – Swampland	High	Moderate	Moderate to High
LCZ3 – Residential	Moderate	High	Moderate to High
LCZ4 – Commercial	Low	Low	Low
LCZ5 – Road Corridor	Moderate	Moderate	Moderate
LCZ6 – Open Space	High	Low	Moderate

For the REF proposal there will be a high impact on LCZ1 – River Frontage, moderate to high impacts on both LCZ 2 – Swampland and LCZ3 – Residential areas, moderate impacts to LCZ5 - Road Corridor and LCZ6 - Open space and a low impact on LCZ4 – Commercial. These results reflect the varying uses and the extent of impact. The impacts north of Tower Road should be reviewed as part of the detailed design for opportunities to reduce footprint and impact. Revegetation will be the key irrespective of changes to ensure the corridor remains a strong green connection.

5.3.1 Impacts to the EIS Proposal Area

Table 5.2 – Landscape Character Assessment Summary for EIS Areas

Character Definition	Sensitivity	Magnitude	Summary
LCZ1 – River frontage			
EIS Proposal Area 1	High	High	High
LCZ2 – Swampland			
EIS Proposal Area 2	High	High	High
EIS Proposal Area 3	Moderate	Moderate	Moderate

For the EIS proposal areas, the impacts on EIS proposal area 1 within LCZ1 have been assessed as high based on the extent of vegetation that is impacted and it being identified as Coastal Wetlands north of Tower Road. The extent of vegetation loss in LCZ2 for the EIS proposal area 2 is less, compared to EIS proposal area 1, although both locations of protected vegetation are impacted by either permanent or temporary works and are considered to have a high impact. The impacts on EIS area 3 have been assessed as moderate based on the quantity of works proposed within the EIS area,withmost of the proposals works occurring outside of the EIS area. In all instances impacts will be mitigated through revegetation using the appropriate community as part of the implementation of the landscape strategy, refer further to Section 7.

6 Visual Impact Assessment

6.1 Visual Receptors and Viewpoints

The experience of the viewers varies according to the duration, field of view and nature of exposure to the proposal.

In assessing the visual impact, the visual range has been considered to be the effective distance where a viewer can be influenced by changes in traffic movement and discern individual details such as signage and planting elements. This distance varies in relation to the topography and effectiveness of screening vegetation however the quality of detail in the landscape typically deteriorates rapidly for distances greater than 200 metres.

Typically, the viewpoints have considered the impact of those overlooking the proposal. Of the adjoining observers it is the residential users who would be the most sensitive to change. These are generally the primary viewpoint assessed. In some instances, other viewers have been considered including the road user. Where differences in sensitivities of viewers exists, the worst-case assessment is the stated value in terms of Sensitivity, Magnitude and overall visual impact. The specific rating of the individual viewers is stated as part of the detailed assessment in Section 6.4.

6.2 Visual Catchment

The visual catchment of the proposal is well defined due to the topography of the site and clear barriers to sightlines, including vegetation, built form etc. It is defined by the first line of residential development which overlooks the corridor, the vegetation which lines both the Georges River, adjoining golf courses and open space. The degree of containment is captured in the following visual catchment plan in Figure 27. Individual viewpoints are provided to understand the visibility within the site.

6.3 Viewpoints

The assessment of these views provides:

1. An image of the outlook, including a tone indicating the approximate location of the proposal and its scale (depicted in a yellow tone).
2. A brief description of the view and the proposal
3. An assessment of sensitivity
4. An assessment of magnitude
5. An assessment and explanation of impact

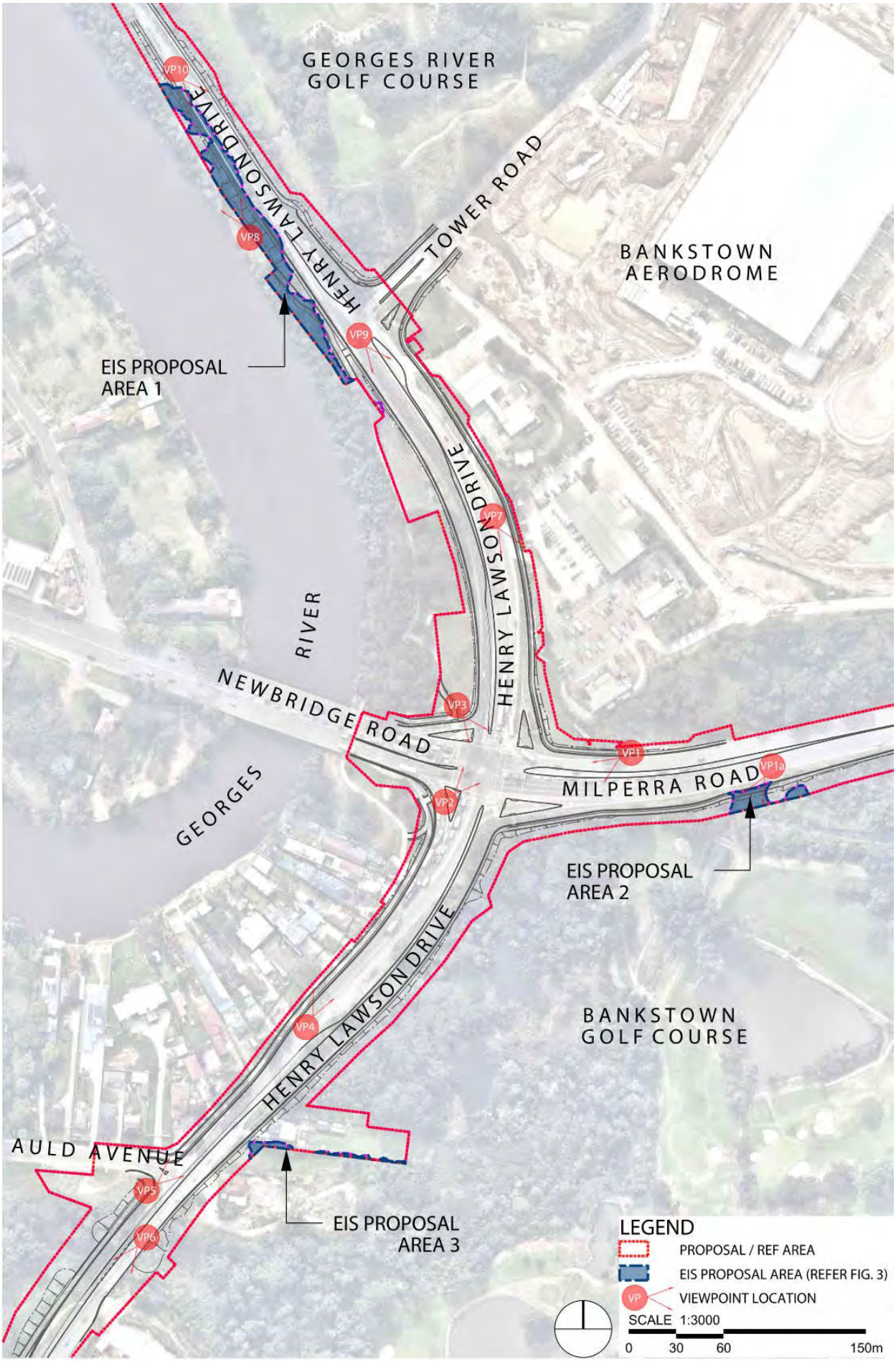


Figure 29 - Visual Impact Assessment Plan

6.4 Key Viewpoints

6.4.1 VP1 – Milperra Road

Figure 30 – View of Henry Lawson Drive / Milperra Road looking west from Milperra Road

View: Looking west from Milperra Road eastbound bus stop.

Viewpoint 1 (VP1) is located about 70 metres from the intersection of Henry Lawson Drive and Milperra Road and provides a view looking west along Milperra Road. To the left of the image the established swampland vegetation adjoining the corridor defines its character and on the right this transitions to a turfed verge and the commercial precinct just beyond.

Sensitivity: Moderate

The view is from a user of the bus stop, the view is defined by the road corridor with turfed verges, user sensitivity will be limited as focus is on the road corridor and the operation of the intersection. The view is softened by vegetation on northern and southern verge providing a contrast to the road corridor whilst providing shade to those at the bus stop. Sensitivity is considered to be moderate reflecting its natural interface and oversight by commuters.

Magnitude: Moderate

The scale of change for the intersection will see an expansion both to the right and left of the image. To the right the extent of grass verge will be reduced and replaced by paving including a turning lane and footpath. To the left the strong vegetation buffer around Bankstown Golf Course will be cut back and the pavement widened, despite the widening a vegetation backdrop is still maintained. The overall scale of the intersection will be increased by 50%. The scale of this change is consequently considered moderate.

Summary: Moderate

The overall impact of the proposal at VP1 is considered moderate, due to the scale of change caused by the expansion of the footprint and the sensitivity of the viewer including public transport users and motorists passing through the corridor.

6.4.2 VP1a – Milperra Road (EIS proposal area 2)

Figure 31 – View looking south from Milperra Road to verge and culvert

View: Looking south from Milperra Road over existing culvert

Viewpoint 1 (VP1) is located about 100 metres from the intersection of Henry Lawson Drive and Milperra Road and provides a view looking south from Milperra Road to the adjoining Bankstown Golf Course and bushland. The established swampland vegetation adjoining the corridor defines its character.

Sensitivity: Moderate

The view depicted is largely that of the motorist, a transitory user of the space whose sensitivity will be limited due to their focus on the road corridor and the operation of the intersection. The view is strongly defined by the vegetation cover and so is considered to have a moderate level of sensitivity reflecting its natural interface and oversight by commuters.

Magnitude: High

The scale of change within the verge will see an expansion of the road pavement, extension to culvert, and the formation itself. The impacts will see both clearance of coastal wetland beyond the built structures plus the widening of drainage channel into the EIS proposal area. Magnitude of the impact is considered high.

Summary: Moderate to High

The overall impact of the proposal at VP1a is considered moderate to high, due to the scale of change caused by the expansion of the road and the sensitivity of the motorists passing through the corridor.

6.4.3 VP2 – Henry Lawson Drive

Figure 32 – View from raised median on the corner of Henry Lawson Drive and Newbridge Road looking north-east

View: Looking northeast from corner Henry Lawson Drive and Newbridge Road

VP2 is located on the crossing island on the south western corner of Henry Lawson Drive and Newbridge Road looking to the commercial precinct to the northeast. The view shows traffic on Milperra Road and cars southbound on Henry Lawson Drive and is dominated by the intersection itself. In the background the advertising and signage of the commercial precinct is evident.

Sensitivity: Low

Those experiencing this view are transitory motorists. The focus of this user group at this point, due to the scale and congestion experienced will be on the operation and movements within the intersection. Sensitivity to change is consequently assessed as low.

Magnitude: Low

The configuration of the intersection will see an expansion to the north-east, centre of photo. Expansion of the intersection is unlikely to have a significant impact on the view of the road user, so the magnitude is considered low.

Summary: Low

The overall impact of the proposal at VP2 is considered low due to the transitory nature of the viewer, the current level of development and focus of the user.

6.4.4 VP3 – Henry Lawson Drive / Newbridge Road

Figure 33 – View looking southeast from shared path connecting Newbridge Road and Henry Lawson Drive to Georges River

View: View from shared path connecting to Henry Lawson Drive looking southeast.
VP3 is taken from the shared path that connects Henry Lawson Drive and Newbridge Road to the shared path running along the Georges River. The foreground of the view is dominated by the grass and shared path and the backdrop by the swampland forest.

Sensitivity: Moderate

The viewer at this location is a pedestrian or cyclist passing through the corridor. This slower rate of transit increases the focus of the view and with that their sensitivity to change. The user has experienced a park like setting which is transitioning to a developed and active interface. Their sensitive is consequently considered to be moderate.

Magnitude: Moderate

Changes to the view will occur as the shared path alignment will be modified and some of the turf will be removed to allow for footpaths and the expansion of the road corridor.

The backdrop would also experience change as it is cut back by an expansion of the road corridor in the southern leg of the intersection. This is expected to retain a vegetated backdrop but set further back and of a lower scale. The overall change in character is considered moderate.

Summary: Moderate

Overall impact of the VP3 is considered moderate reflecting an active transport view and the expansion of infrastructure within the view. Additional care will need to be taken with the design here to minimise impact and enhance overall visual outcome for all users.

6.4.5 VP4 – Henry Lawson Drive (Residential)

Figure 34 – View from shared path along Henry Lawson Drive looking north

View: View from shared path along the southern portion of Henry Lawson Drive looking to the north.

VP4 is taken from the shared path which connects users to Georges River path further north and to the parkland space to the south. The view overlooks the residential properties on the western side and shows the large set back between properties, shared path, and Henry Lawson Drive.

Sensitivity: Moderate

The sensitivity of this view is based upon the residents within these properties who have frontages facing Henry Lawson Drive and those on the shared path. Both users have the time to react to setting. Both residential and shared path uses are accustomed to the busy road yet would be sensitive to increases in traffic movement and changes in vehicle composition. Both users are considered to have moderate sensitivity to change.

Magnitude: High

The impact on the residents will be high as they will see the buffer between the property boundary and road corridor reduced and the area of pavement increased within the corridor. The scale of the change will see the realignment of the northbound lane which will shift and realign the shared path to the west, reducing the setback from the shared path to the property boundary at the expense of the landscaped verge and front yards.

Summary: Moderate to High

VP4 is considered to have a moderate to high impact based upon the scale of change caused by the development of the proposal and the resident's proximity to it.

6.4.6 VP5 – Auld Avenue

Figure 35 – View from Auld Avenue looking north along Henry Lawson Drive towards its intersection with Milperra Road/ Newbridge Road.

View: View from Auld Avenue looking north along Henry Lawson Drive to the swampland vegetation located within its eastern verge and beyond the corridor, that forms part of the landscape buffer to Bankstown Golf Course.

Sensitivity: Moderate
The sensitivity of this view is based on a transitory user of the shared path. Sensitivity is considered moderate based on the reconfiguring of the traffic lanes and widened footprint, which has the potential to change the overall character due to the scale of the change.

EIS – Depicted to the right of the image is EIS proposal area 3 – Auld Avenue. Located in the midground of the image the area is identified as having coastal wetland community so sensitivity to change is considerate moderate reflecting a sensitive subject but low visual prominence.

Magnitude: High

The magnitude is considered high due to the extent of pavement proposed comprising:

- a concrete median will be installed to separate the north and southbound lanes
- the realignment of the northbound lane to accommodate the new northbound bridge.
- expansion of south bound lanes to the east through the incorporation of a turning and merge lane from Milperra Road increasing footprint
- 3.5m shared path to the western edge of the corridor

The expansion in the road corridor through the increase in pavement is considered to have a high impact.

EIS - The magnitude of change to the EIS proposal area 3 is assessed as moderate with footprint impacting a small section of the coastal wetland community.

Summary: Moderate to high

VP5 is considered moderate to high based on the extent of change expected along the corridor, the widened footprint and addition of a concrete median all increasing hardscape of the corridor.

EIS- The impact on EIS Proposal area 3 has been assessed as moderate to high reflecting the expanded footprint and presence of coastal wetland community.

6.4.7 VP6 – Henry Lawson Drive – Auld Avenue Bridge

Figure 36 – View from Henry Lawson Drive looking south towards existing bridge

View: View from Henry Lawson Drive looking south towards the existing Auld Avenue Bridge.
VP6 illustrates the existing bridge and the location of the proposed bridge to its right. Vegetation will be impacted by the construction of the new bridge and the earthworks associated with the proposal. Character of the bridge will also change.

Sensitivity: Moderate

The view is based on a transitory view of a vehicle approaching the bridge and occurs at the intersection of Auld Avenue. The focus of the user is on the road. The landscape character is relatively consistent beyond the road corridor and so the sensitivity for changes is considered moderate.

Magnitude: Moderate

The magnitude is considered to be moderate based upon the road corridor doubling in width to the west with the construction of a new bridge and the integration of a concrete median to separate the two carriageways. Vegetation is expected to be heavily impacted by the proposal which will affect the user's experience. These changes however are localised and within the context will be moderated by the surrounding landscape.

Summary: Moderate

The overall impact for VP6 is considered moderate due to vegetation expected to be removed and the expansion of the corridor to make space for the new bridge.

6.4.8 VP7 – Henry Lawson Drive (Commercial)

Figure 37 – View from Henry Lawson Drive looking south towards the intersection.

View: View is taken from the commercial precinct looking south along Henry Lawson Drive.

VP7 is located approximately 170 metres to the south of Tower Road and shows the existing relationship between Henry Lawson Drive and the access into the commercial precinct. The foreground illustrates a garden bed between the access road and property boundary. In the background a turfed verge transitioning to a mound is evident.

Sensitivity: Low

The view is taken from a pedestrian walking along an unpaved verge aligning Henry Lawson Drive but could also be from a vehicle travelling south. The experience of the environment is shaped by the existing road and so sensitivity has been assessed as low.

Magnitude: Moderate

The magnitude is assessed as low to moderate based on the scale of change expected from the expansion of the road footprint, the garden bed would be removed to allow for the additional southbound lane and pedestrian footpath. The proposed alignment is anticipated to align with the commercial properties boundary which limits opportunities for revegetation and softening of the frontage to these properties.

Summary: Moderate to low

The scale of works will see the garden bed removed to allow for construction of a traffic lane and pedestrian footpath, at present there is no pedestrian footpath on this side of Henry Lawson Drive. The impact is considered from the point of view of transitory traffic and is considered to have a moderate to low impact on these users.

6.4.9 VP8 – Georges River (EIS proposal area 1)

Figure 38 – View from shared path adjacent the Georges River looking north along Henry Lawson Drive

View: Looking north towards Henry Lawson Drive from the shared path adjacent Georges River

VP8 is located on the shared path adjacent the Georges River on the northern end of the proposal looking north. The view is dominated by riverside vegetation providing screening between the shared path and Henry Lawson Drive and the park like setting of the shared path.

Sensitivity: High
This view is from a user on the shared path. The view is along the shared path and overlooks vegetation that provides separation and screening to Henry Lawson Drive. The sensitivity of this view is considered high based on the existing context and susceptibility to notice change caused by changing of the landscape.

Magnitude: High

The scale of works anticipated is likely to cause vegetation (identified as coastal wetland) immediately aligning Henry Lawson Drive to be removed to allow for the corridor widening, including fill batters which expand the footprint of the formation. Due to the extent of works proposed and the affect this will have on the users experience the magnitude is considered high.

Summary: High

VP8 is considered to have a high rating based on the scale of change proposed, most evident in the loss of vegetation and screening of the road alignment and the affect this will have on the users experience in this location.

6.4.10 VP9 – Tower Road

Figure 39 – View from crossing at on Henry Lawson Drive near Tower Road looking south

View: View from the crossing on Henry Lawson Drive near Tower Road looking south towards the commercial precinct.

VP9 is from a crossing on Henry Lawson Drive and shows the view from road users heading south at the Tower Road / Henry Lawson Drive intersection. The background is dominated by commercial properties and their signage on the left and various access points for each business.

Sensitivity: Low
This view is from a pedestrian crossing the street but could be a transitory vehicle travelling south. In both instances the user is transitory and their focus is not primarily on the context of the road. Sensitivity consequently has been assessed as low.

Magnitude: Moderate

The magnitude is considered low reflecting the existing context of the view, which is dominated by pavement and hardscape elements and the expansion of this into the grass verge. The turfed verges will be removed to allow for the expended footprint of the road, driveways and access points will be retained. The users will experience significant change as pavement replaces grass in most instances. Centrally, adjoining the second street sign, the stand of trees will be removed as the dominant context of pavement will be expanded.

Summary: Moderate to low

VP9 is considered moderate to low based on the context of the existing view retaining similar qualities of large pavement elements and access to commercial properties to that of the existing which is not anticipated to affect the transitory users experience.

6.4.11 VP10 – Henry Lawson Drive (River edge) (EIS proposal area 1)

Figure 40 – View from Henry Lawson Drive between Georges River Golf course and Georges River frontage heading south

View: View from Henry Lawson Drive heading south towards Tower Road between Georges River Golf Course and Georges River.

VP10 is taken approximately 100m north of the Tower Road intersection and illustrates the extent of vegetation screening and the visual buffer along the Georges River and the Georges River Golf Course, and the sense of containment this provides.

Sensitivity: High

The view is from Henry Lawson Drive and is from the perspective of a transitory vehicle travelling south. This view is unique as it features a strong vegetated edge along both sides of the corridor with vegetation up to the edge of the road. This provides a scenic corridor where the tree canopy arches over the road. The sensitivity is considered high based on expected impacts on the existing character.

EIS – The presence of the coastal wetland community west of the alignment and its contribution to the corridor sees the EIS proposal area 1 as a high sensitivity.

Magnitude: High

Any works immediately beyond the existing corridor will impact the vegetation which will affect the character of the view. Batters extend several metres into both verges which will impact the existing canopy and park like setting of the Rivers edge. The impact is consequently considered high.

EIS – The expansion of the road footprint west of the existing will see an immediate impact to the coastal wetland and so impact is assessed as high.

Summary: High

VP10 is considered to have a high rating as the scale of the works will see existing vegetation removed, and road width expanded this will affect the existing character of the view and create a new experience for road users.

EIS – Impacts on EIS proposal area 1 are considered high due to impacts on existing canopy and its impact on overall character.

6.5 Visual Assessment Summary

A total of ten viewpoints have been assessed in relation to the permanent works associated with the proposal.

A range of viewpoints have been considered reflecting the nature of land-use and the likely interaction that will occur in relation to the proposal and existing development. The viewpoints selected provide a range of receptors including residents, road users, open space users which reflect a broader cross section of community who will experience changes as a result of the proposal.

Table 6.1 below summarises these impacts. It is divided into an overview of impacts related to REF proposal and EIS impacts in table 6.2. The values differ due to the scale of the area and the values assigned to coastal wetlands.

Table 6.1 - Visual Assessment Summary

Viewpoint	Sensitivity	Magnitude	Impact
VP1	Moderate	Moderate	Moderate
VP2	Low	Low	Low
VP3	Moderate	Moderate	Moderate
VP4	Moderate	High	Moderate to high
VP5	Moderate	High	Moderate to high
VP6	Moderate	Moderate	Moderate
VP7	Low	Moderate	Moderate to low
VP8	High	High	High
VP9	Low	Moderate	Moderate to low
VP10	High	High	High

6.5.1 Impacts to the REF Proposal area

For the REF area, high impacts are assessed in VP8 and VP10. A moderate to high impact is assessed in VP4 and VP5 with moderate impacts assessed in VP1, VP3 and VP6. Moderate to low impacts are assessed in VP7 and VP9. VP2 is assessed as having a low impact on the REF area. Mitigations to limit the impacts on viewpoints 8 and 9 need to consider how the overall footprint of the proposal can be retained to maintain the intimate scale of the setting of landscape treatments seek to provide some of this character over time.

6.5.2 Impacts to EIS proposal area

Table 6.2 - Visual Assessment Summary for EIS areas

Viewpoint	Sensitivity	Magnitude	Impact
VP8 / VP10			
EIS proposal area 1	High	High	High
VP1a			
EIS proposal area 2	Moderate	High	Moderate to high
VP5			
EIS proposal area 3	Moderate	Moderate	Moderate

Figure 41 – Map of EIS proposal areas

VP8 and VP10 relates to viewpoints within EIS proposal Area 1, both of these viewpoints are determined to have a high impact on the EIS as the expansion of the road corridor will directly impact this area resulting in removal of vegetation and widened pavement element.

VP1a relates to viewpoints within EIS proposal Area 2, impact on the EIS areas has been assessed as moderate to high as the proposal directly impacts the area result in removal of vegetation and replacement with road infrastructure.

VP5 relates to viewpoints within EIS proposal Area 3, impact on the EIS areas has been assessed as moderate as the area is not visually prominent but is sensitive due to the presence of Coastal Wetlands.

7 Urban Design Strategy and Concept Design

The development of the urban and landscape design response needs to consider a number of guidelines (Figure 42) which inform the undertaking of the landscape character and visual assessment report as well as the development of the overall concept. These include:

- Road Design Guidelines
- Environmental Impact Assessment Practice Note: Guideline for Landscape Character and Visual Impact Assessment - EIA-N04. Transport for NSW, 2020.
- Beyond the Pavement 2020, Urban Design Policy, Procedures and Design Principles, Transport for NSW January 2020
- Landscape Guidelines, Roads and Maritime, December 2018
- Water Sensitive Urban Design Guideline- Applying water sensitive urban design principles to NSW Transport Projects, Roads and Maritime, 2017.
- Bridge Aesthetics - Design guideline to improve the appearance of bridges in NSW - Centre for Urban Design February 2019
- Reconciliation Action Plan, Transport for NSW, 2019.

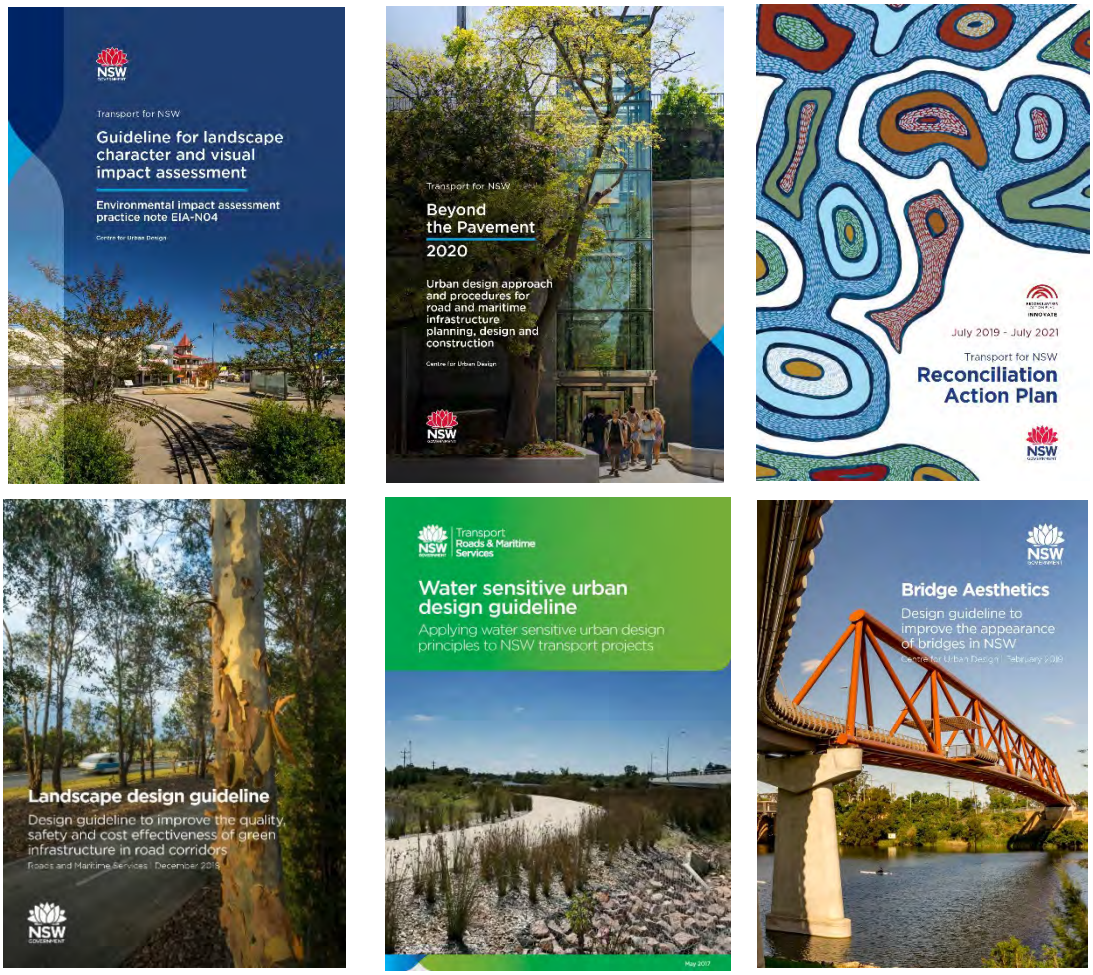


Figure 42 - Guideline covers

The design response for the proposal needs to reflect both the character of the landscape through which the proposals alignment passes, as well as the broader landscape, addressing environmental, visual and physical constraints as part of a holistic design solution. To achieve this, a number of principles and objectives have been developed to inform the design development of the corridor.

7.1 Urban and Landscape Design Principles and Objectives

The following objectives are derived from the nine urban design principles defined in the Transport for New South Wales urban design policy - Beyond the Pavement. They reflect both the unique character of the road, its suburban context and key issues which adjoin it.

7.1.1 Principle 1 – Contribute to the overall landscape structure and revitalisation of the region

Objectives

- Develop an alignment which permits the ongoing development of Henry Lawson Drive through the provision of upgraded capacity and intersections to service the increasing demand on the roads
- Design an alignment which is responsive to its landscape setting and does not detract from it
- Minimise negative physical impacts on drainage corridors and open space networks associated with these.
- Seek opportunities to minimise landscape impacts by investigating possibilities to minimise footprint including the use of retaining walls

7.1.2 Principle 2 – Respect the land uses and built form of the corridor

Objectives

- Minimise the footprint of the corridor to limit impacts to adjoining vegetation, communities, services and service corridors, and industrial lands
- Respond to the ecological communities of the area and landscape character of the corridor
- Minimise the intrusion of road-related elements on the local landscape

7.1.3 Principle 3 – Connecting modes and communities

Objectives

- Provide safe and efficient access to the residential communities of Bankstown residential and commercial precincts
- Investigate best access routes for cyclists and pedestrians to provide high quality crossing points, comfortable and safe connections
- Provide active transport opportunities both within the alignment and connecting to the broader local context and networks, where a need has been identified. A key consideration will be connection to the Hume Highway, M5 Motorway and to Liverpool
- Provide flood free access which maintains access in all weather

7.1.4 Principle 4 – Fit the landform of the corridor

Objectives

- Minimise the footprint of the corridor to limit impacts to adjoining vegetation communities and adjoining land uses
- Provide a formation which addresses local flood patterns .
- Consider form of potential cut and fills and how this sits within the existing landscape

7.1.5 Principle 5 - Responding to natural pattern

Objectives

- Provide a response which addresses the close proximity to commercial properties and the effect of changing character
- Drainage and its management should reflect the fact the alignment is on the floodplain and respond accordingly to areas expected to be subject to inundation
- Preserve existing cultural patterns within the landscape where evident within the corridor
- Vary the gradient of earthworks to provide visual interest and reflect characteristics of the surrounding landform and landscape.

7.1.6 Principle 6 – Protect and enhance the heritage and cultural values of the corridor

Objectives

- Preserve the integrity of heritage items and areas of cultural importance to the local community
- Avoid, where possible areas of identified historic and cultural value
- Acknowledge and respond to the heritage and cultural values of the proposal area
- Acknowledge and respond to Aboriginal values and places in the broader landscape
- Consider the interpretation of the heritage areas along the corridor.

7.1.7 Principle 7 - Designing an experience in movement

Objectives

- Minimise disruption to the visual qualities of the land use
- Use landscape to frame or define views from the road, providing a backdrop and context to the road.
- Investigate potential of using planting to heighten Henry Lawson Drive's sense of place

7.1.8 Principle 8 -Creating self-explaining road environments

Objectives

- Provide plantings that reinforce the character and connections of the corridor with the adjoining development
- Provide a landscape design which reflects the needs and performance requirements of intersections along the corridor
- Utilise landscape design as a way to differentiate character zones, heightening the sense of place

7.1.9 Principle 9 - Achieving integrated and minimal maintenance design

Objectives

- Develop a consistent approach to the design of soft landscaping along the alignment which is responsive to the character and feel of the road environment with which it connects as well as the character of the corridor through which it passes. Planting design Principles to be consistent with those outlined in the 'Landscape Design Guideline: Design guideline to improve the quality, safety and cost effectiveness of green infrastructure in road corridors (Roads and Maritime, 2018)"
- Provide plantings to frame views and guide the driver along the alignment, provide a backdrop and screen in part to the development that is adjacent

7.2 Proposal

The proposal forms Stage 1A of the progressive upgrade of Henry Lawson Drive between the Hume Highway, Villawood, and the M5 South Western Motorway, Milperra. Subject to approval, construction of the Stage 1A proposal may commence in early 2023 and would take about two years to complete. Other stages of upgrading Henry Lawson Drive would be developed separately in the future and will be subject to a separate assessment process.

Key objectives for the proposal are to:

- Improve travel times, journey time reliability and road safety outcomes for all road users.
- Improve freight efficiency and reduce vehicle operating costs on the road network.
- Support new development in the precinct by improving traffic flow and connectivity to Bankstown Aerodrome, Milperra industrial and residential areas and the surrounding road network in the south west of Sydney
- Improve connectivity and safety for pedestrians and cyclists

7.3 Design Responses

The Engineering Concept design has been completed by Transport for NSW and the proposal is moving into detailed design by Aurecon.

As part of the Urban Design scope the following outputs are required to assist both in the assessment of the proposal but also the development of the overall integrated design.

- a succinct landscape character and visual impact assessment, the results of which are iteratively fed into the detailed design development process and environmental assessment.
- detailed urban design drawings and report for the propsal (including but not limited to input on the detailed design drawings for the overall proposal and detailed design for bridges, walls, other structures and landscape works)

As part of the development of the Urban and Landscape Design for the proposal an overall landscape strategy has been developed. This has included the identification of landscape precincts to inform the overall character development along sections of the route and the landscape responses associated with these precincts. The strategy developed has considered both future precinct character and its current character as the landscape solution needs to be responsive to the needs of both.

7.3.1 Landscape Design Precincts

The proposal has been divided in to five distinct character precincts as part of the overall review process and development of design philosophy. This is depicted in Figure 43 – Precinct Plan.

The precincts reflect a simplified contextual character of the route, and the key attributes which will be emphasised as part of the overall integration of the proposal.

- Precinct 1 – Commercial
- Precinct 2 – Swampland
- Precinct 3 – Rivers edge
- Precinct 4 – Residential
- Precinct 5 – Parkland

Peripheral contributors but not directly connected to the alignment include;

- Private recreation: Golf courses (Bankstown and Georges River)
- Bankstown Airport

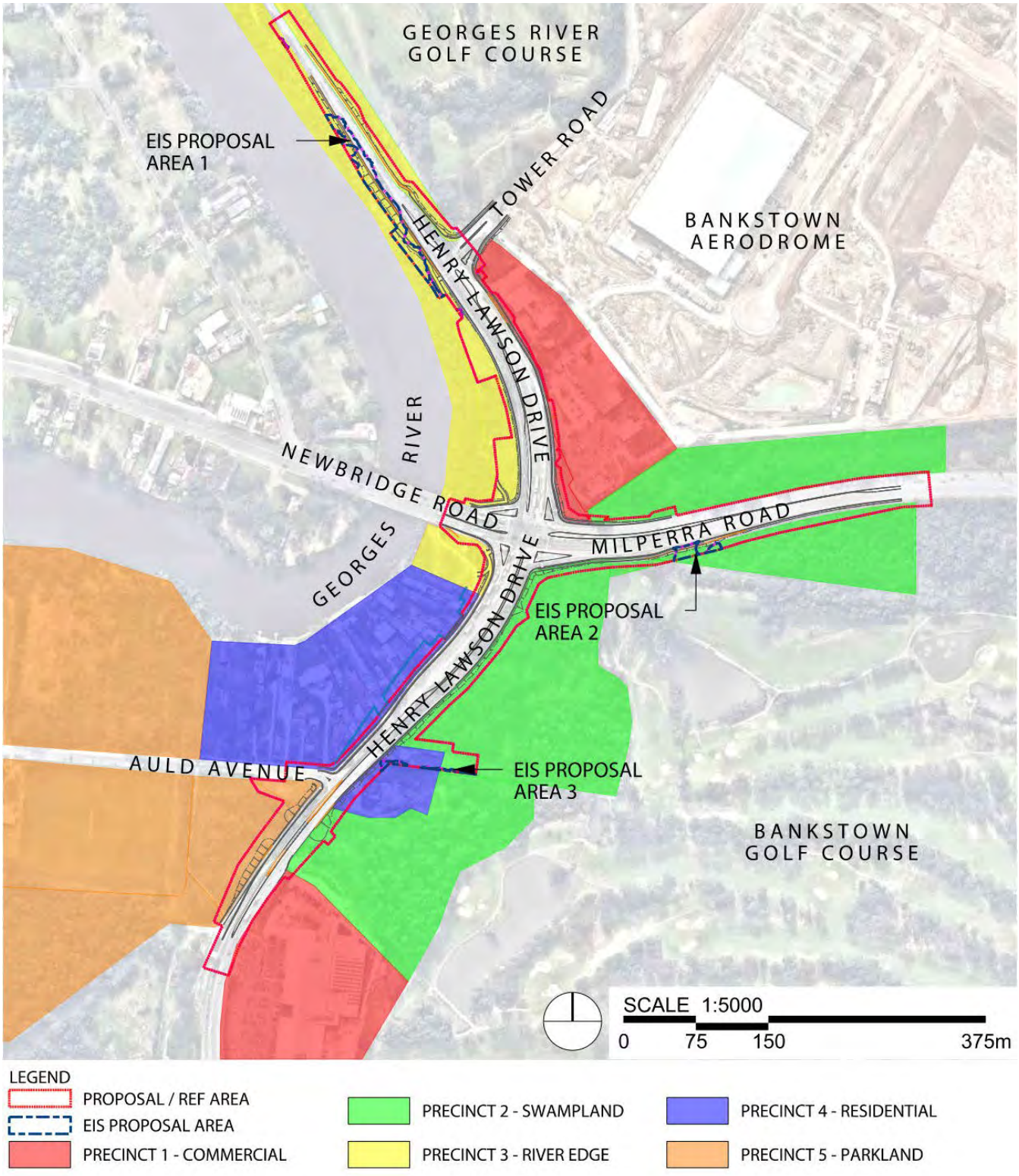


Figure 43 - Landscape Design Precincts

Precinct 1 - Commercial

Figure 44 – View of Hungry Jacks and carpark (looking south) part of the fast precinct on Henry Lawson Drive

Precinct is located aligning the north-eastern portion of Henry Lawson Drive. The precinct is defined by a petrol station, drive through restaurants (KFC, Hungry Jacks), carparks and a supermarket (ALDI).

Precinct 2 - Swampland

Figure 45 – View of swampland planting aligning southern side of Milperra Road

Located along the southern and northern edge of Milperra Road on approach to the intersection with Henry Lawson Drive. The swampland zone forms a strongly defined vegetated margin to the road corridor defined by tea trees and melaleuca species on low lying flood prone lands.

Precinct 3 – River Edge

Figure 46 – View from the shared path aligning Georges River looking north showing vegetation screening Georges River on the left and scattered tree clusters aligning Henry Lawson Drive on the right

Aligning the western edge of Henry Lawson Drive, the river edge landscape typology follows the Georges River and features dense vegetation screening the river and creating separation between Georges River and the proposal. The key vegetation within this community feature casuarinas, eucalyptus and melaleuca species. It provides a distinctly different character to the swamp land being dominated by taller tree species. A shared path passes through this zone and it presents in part as a parkland setting.

Precinct 4 – Residential

Figure 47 – View of the relationship between Henry Lawson Drive northbound, existing shared path and the setback of residential properties overlooking the proposal

Aligning the south western side of Henry Lawson Drive, residential properties feature a significant setback from Henry Lawson Drive. An easement that has been foreshadowed since the 1960s. The front section of the properties are impacted by the proposals works which will see the removal of much of the vegetation which unifies this frontage. Built form and building alignments are varied and provide no consistency to the overall character of the precinct.

Precinct 5 - Parkland

Figure 48 – View of parkland space on the southern side of Newbridge Road, located between Henry Lawson Drive and Georges River

Located in the south western portion of Henry Lawson Drive, the precinct is defined by open space areas characterised by grassed areas with pockets of tree canopy with opportunities for passive and active recreation.

7.3.2 Integration Strategy

The following Landscape Strategy Plan, shown in Figure 49, develops the precinct definition, proposed principles and objectives to define the detailed urban and landscape design response.

The overall strategy is responsive to the key precincts and character zones identified and seeks to reinforce and strengthen the identity of these precincts. It is developed around the natural attributes of the site that set it apart from other roads within the metropolitan network and those immediately adjacent to it. It acknowledges both the river and the vegetation that relates to it and provides a structured landscape where commerce and residents interact with it.

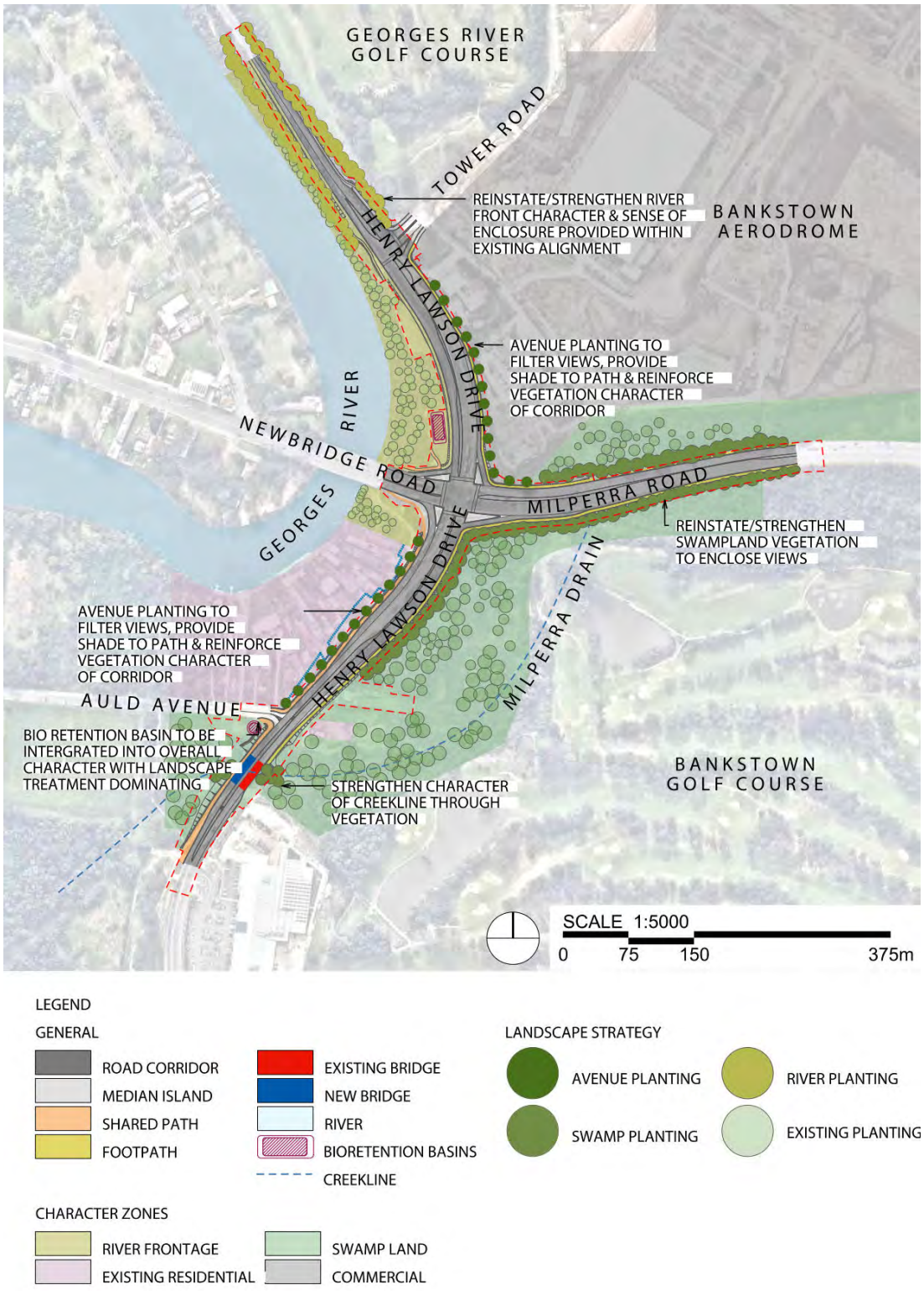


Figure 49 – Urban design strategy

Concept design is responsive to the various interfaces of the alignment but informed by a desire to retain and strengthen the landscape identity of the corridor by reinforcing, reinstating vegetated edges to the corridor. Such a strategy supports and celebrates both the Georges River valley but also the responsiveness of Henry Lawson Drive to the Rivers alignment.

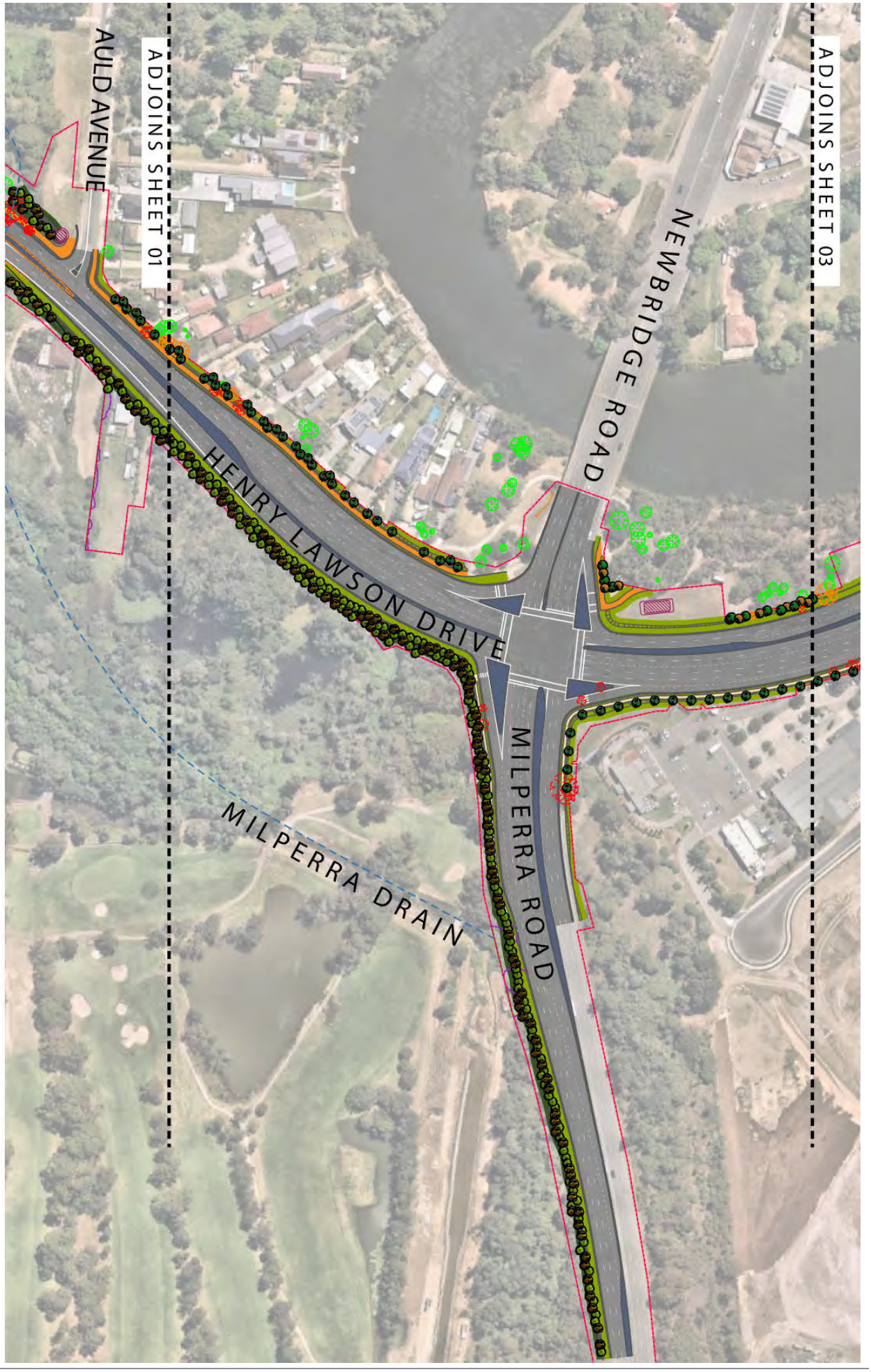
Milperra Road and south eastern leg of Henry Lawson Drive

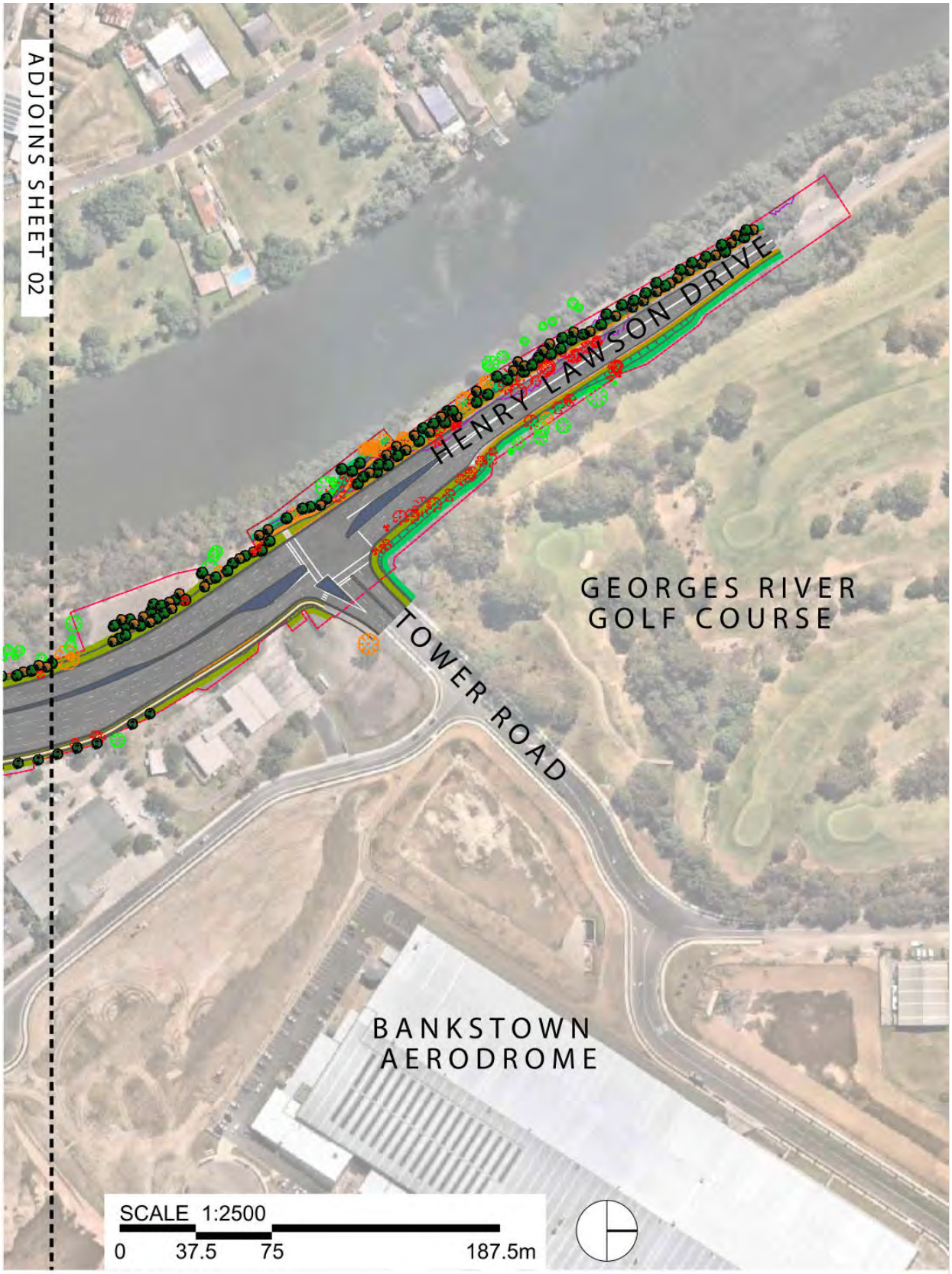
Vegetation currently provides strong definition to the Milperra Road corridor on approach to the intersection with Henry Lawson Drive and a sense of arrival and interface with the Georges River. The strategy for Milperra Road is largely one of reinstatement and enhancement of the vegetated margins impacted by the proposed works. The vegetation community proposed is a wetland community which will both offset impacts on Coastal Wetlands but provide a network which should enhance the water quality passing through the drainage network before it enters the Georges River.

a)

b)

Figure 50 - view looking south east across intersection illustrating current configuration (a) and proposed design (b)


AULD AVENUE
ADJOINS SHEET 01
HENRY LAWSON DRIVE
NEWBRIDGE ROAD
ADJOINS SHEET 03
MILPERRA ROAD
MILPERRA DRAIN



LEGEND

- CADASTRAL BOUNDARY
- PROPOSAL/ REF BOUNDARY
- EIS BOUNDARY
- W-BEAM BARRIER

PAVEMENT

- ROAD ALIGNMENT
- SHARED PATH
- CONCRETE MEDIAN
- FOOTPATH
- BIORETENTION BASIN

LANDSCAPE TREATMENTS

- SWAMPLAND PLANTING
  HYDROMULCH AND PLANTING INTO
  150mm AMELIORATED SITE SOIL OVER
  300mm CULTIVATED SUBGRADE
- RIVER PLANTING
  PLANTING INTO 75mm MULCH OVER
  150mm AMELIORATED SITE SOIL OVER
  300mm CULTIVATED SUBGRADE
- TURF
  OVER 100mm TURF UNDERLAY OVER
  300mm CULTIVATED SUBGRADE

TREE PLANTING

- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING TREES POTENTIALLY RETAINED
- AVENUE TREE PLANTING
- SWAMPLAND TREE PLANTING
- RIVERINE TREE PLANTING

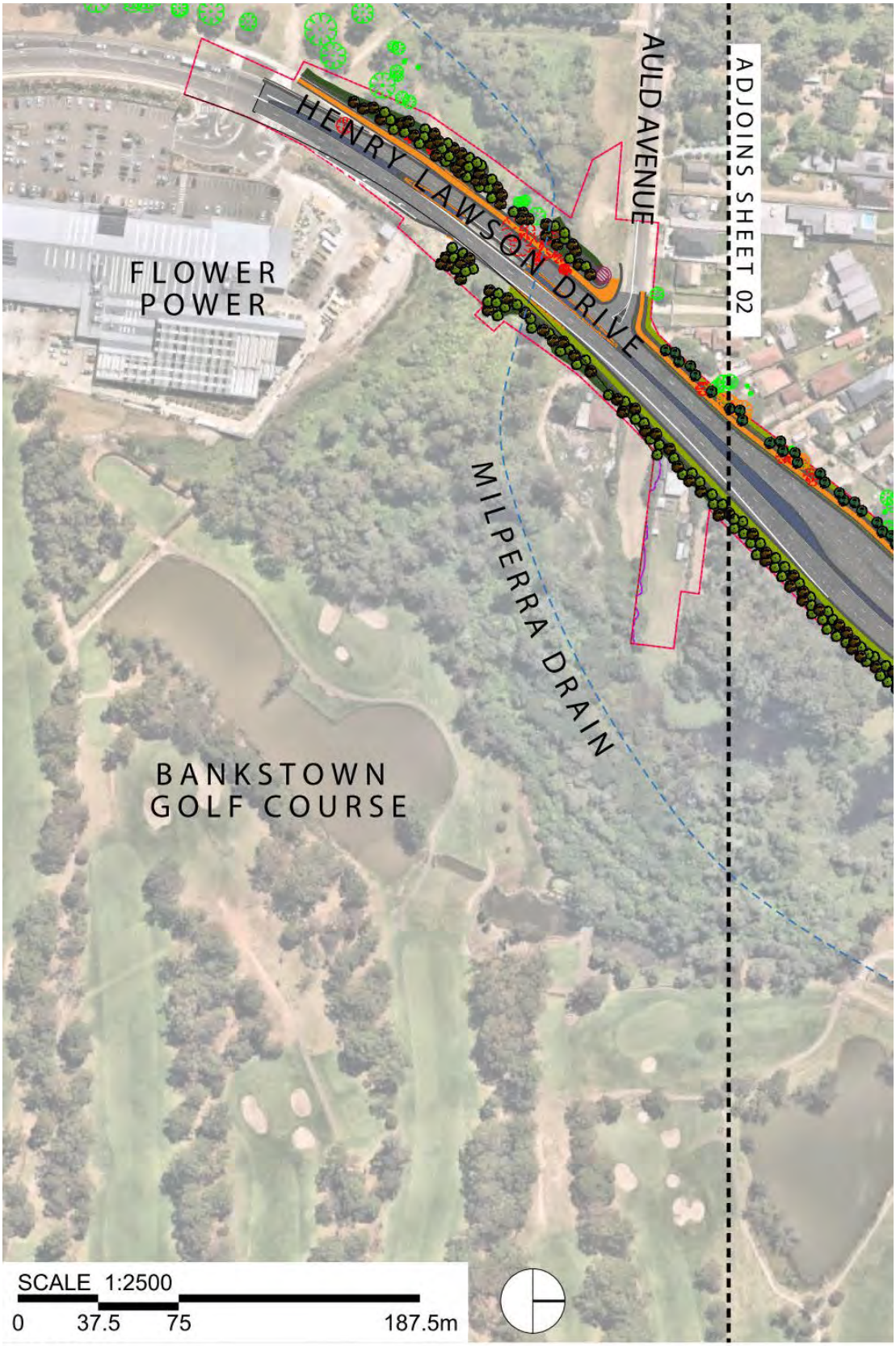


Figure 51 - Concept design general arrangement plans

Henry Lawson Drive - Residential Precinct

The alignment of the new road alters the present address of properties fronting Henry Lawson Drive. Many of these properties have a substantial offset from the road edge both in terms of built form and property boundary. This enables the establishment of a strong streetscape character. The landscape design proposes to adopt a strategy of a structured streetscape planting of a number of rows of Eucalypt trees similar to the character and feel of Henry Lawson Drive south of the study area as illustrated in Figure 52 below.

Figure 52 View of existing portion of Henry Lawson Drive to the south of the proposal

This landscape will both provide shade to the shared path and a sense of scale to the expanded road corridor. It will also strengthen the continuity of the canopy along Henry Lawson Drive.

Henry Lawson Drive – Commercial Precinct

The address of the commercial precinct on the north eastern leg of Henry Lawson Drive is to be altered by the expansion of the road. The road is moved closer, and a formalised path introduced along the property boundary. In order to create a strong setting and definition of the road a structured avenue planting is proposed to both delineate the road corridor but also reduce the dominance of the commercial properties and carparks from the road while maintaining their exposure. A tall open eucalypt is proposed such as *Corymbia maculata* – the spotted gum. Spacing of trees will be set to enable exposure while achieving shading and definition of the road corridor.

a)

b)

Figure 53 - view looking south to intersection illustrating current configuration (a) and proposed design (b)

Henry Lawson Drive – River front and North of Tower Road

This landscape is focused on the river edge of the Georges River and the shared path facility which utilises this space. The shared path and its role as a cultural trail with art works and interpretive elements along its length is to be retained. Vegetation however would be impacted by the proposal and is to be reinstated to provide separation between the shared path and the road as well as define the road corridor itself. Opportunities to minimise the extent of vegetation clearance should be explored in order to minimise impacts on the strip of land between the river and road, and between the road and Golf Course.

Planting proposed would be informal riverside species including Casuarina, Melaleuca and Eucalyptus

a)

b)

Figure 54 - view looking north across Tower Road illustrating current configuration (a) and proposed design (b)

The following outlines specific strategies and approaches adopted within the corridor. Elements discussed include:

- Alignment
- Grading
- Bridges
- Vegetation
- Lighting
- Safety Barrier and Fences
- Signage

7.4.1 Alignment

The alignment design has sought to minimise the increase in footprint while addressing the additional lane and capacity requirements of the proposal. This approach has been adopted because of the limited corridor size and desire to minimise additional works, and potential environmental or property impacts.

Key strategies adopted have been:

- Reduction of footprint to maintain existing character
- Adoption of strategies to limit impacts on the protected wetlands where possible

The opportunity to minimise footprint further through the use of retaining walls is being reviewed as part of the detailed design.

The following sections depict the increase in footprint.

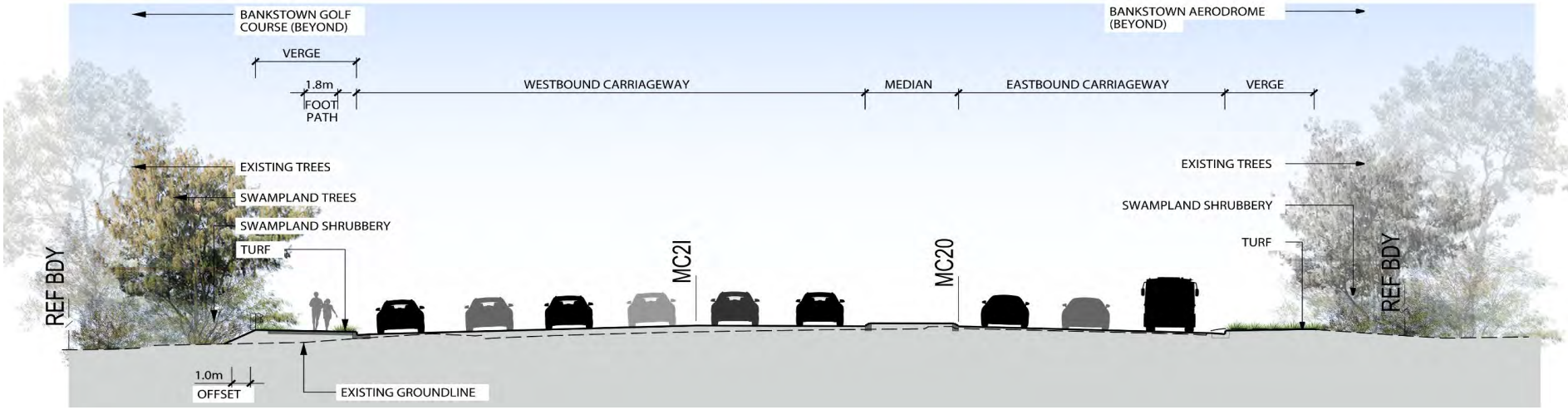


Figure 55 - Section looking westbound along Milperra Road

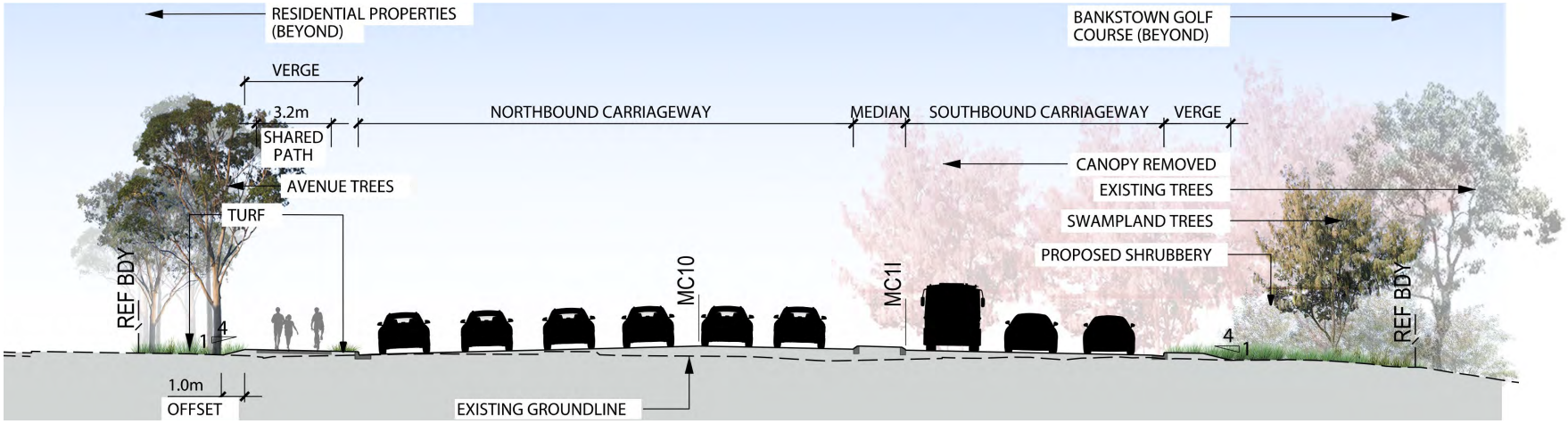


Figure 56 - Figure looking north bound on Henry Lawson Drive south of the intersection

The two sections illustrate an expansion in footprint with the greatest increase evident on the southern side of Milperra Road in Figure 55. which impacts on some elements of Coastal Wetland and a natural well vegetated edge to the corridor and Figure 56. Henry Lawson Drive south of the intersection which impacts both the residential properties to the east but also the vegetated margin adjoining Bankstown Golf Course in the east. Opportunities to minimise the footprint or impacts on the general character through decoupling the shared path or refinement of the alignment should be reviewed further in the detailed design to further mitigate impacts.

7.4.2 Grading

The overall variation in level of formation and associated structures within the corridor is defined by flood impacts and the need to achieve a resilient profile. The alignment of the corridor is flat with only very slight undulations predominantly to the north adjoining Georges River Golf Course.

Key intentions include:

- The construction of a new Auld Avenue bridge which will have impacts on vegetation within the parkland. The impact of construction of the bridge is not anticipated to significantly affect the grading through the park although will require a new formation leading to and from the abutment.
- The expanded footprint will predominantly be constructed on fill which will see both the pavement width plus a verge constructed including batters to tie into the existing ground levels. These batters need to be carefully considered to ensure that their slope bleeds into the existing formation and does not create abrupt transitions in grade. Areas where particular attention is required to minimise impacts are:
  – at the residential interface
  - at the interface with the Georges River and its linear parkland with particular focus on retention of existing canopy
- Other grading considerations include the potential to adopt Water Sensitive Urban Design initiatives in the form of constructed swales to both remove water and integrate with the overall landscape character and biodiversity of the corridor.

7.4.3 Bridges

There is currently one existing bridge within the alignment of the proposal to the south of Auld Avenue. This bridge is a plank bridge one lane in each direction with a footpath on the northbound edge and a rail barrier on the outside. It is comprised of four spans and three piers within the floor of the creek line. This bridge is to be retained as a dual lane southbound bridge adjacent to the new dual lane northbound bridge.

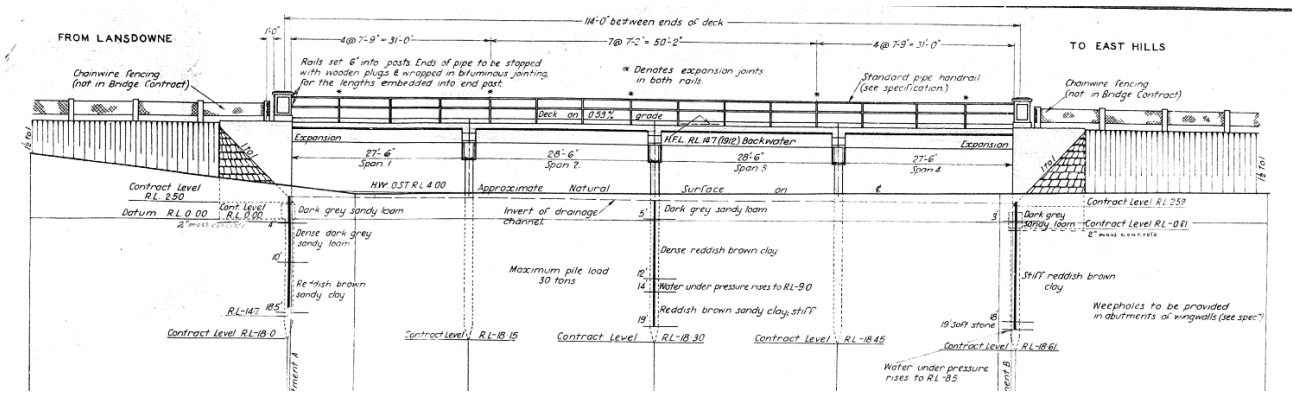


Figure 57 - Existing Auld Avenue Bridge cross section

The proposal will remove the footpath on the existing bridge, allowing for a widening of each traffic lane to 3.5m. Barriers will be upgraded to a standard barrier.

Figure 58 - View south across the existing Auld Avenue Bridge

The proposed bridge will feature a dual carriageway with lanes at 3.5m and 4.0m wide, the structure will also tie into the existing shared path alignment with a 3.5m shared path on the western edge. The barriers on the bridge are to be Type RBO bridge barriers per Transport standards.

The selected concept design option is a two-span plank bridge over a central pier with girders stitched in to the headstock which reduces the maintenance needs by eliminating bearings over water and increases the lengths of the spans, reducing the potential number of piers. The alignment of the pier should consider the alignment of the existing bridge piers and align with them to both enhance the composition of the two structures but also improve the drainage of the creek by reducing turbulence.

The plank bridge presents a slim structural form, with a 700mm girder depth. The number of piers and alignment have sought to match or align with that of the existing structure and so are consistent with the existing bridge form in terms of impacts. The potential to remove the central pier would be investigated during detailed design, which would create less disturbance within the waterway enhancing water flow and simplifying the structure and its maintenance. Visually this option reduces the scale and visual bulk of the infrastructure within the landscape and as viewed along the alignment.

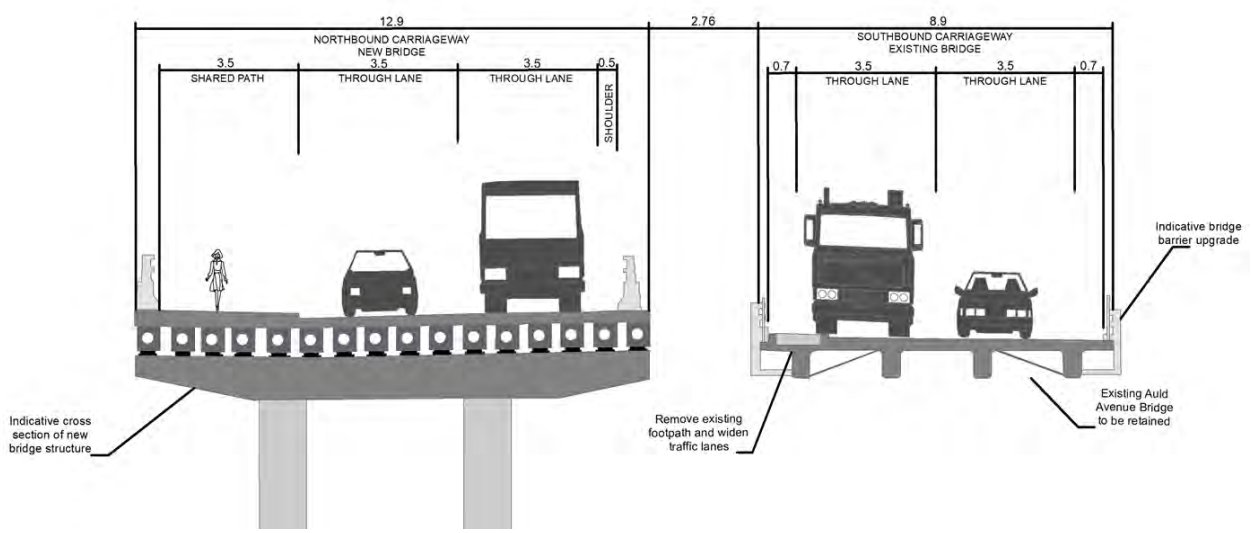


Figure 59 – Plank bridge section concept (Source: Aurecon, Transport)

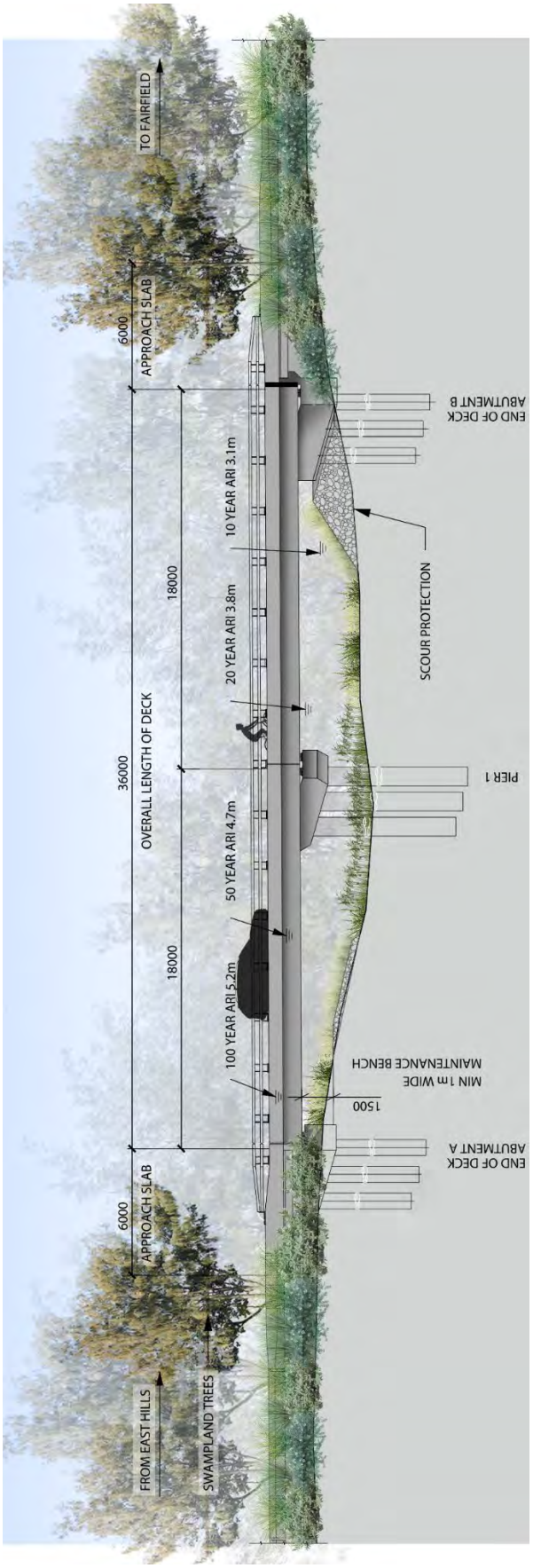


Figure 60 - Elevation of proposed Auld Avenue Bridge

a)

b)

Figure 61 view looking south to Auld Avenue Bridge illustrating current configuration (a) and proposed additional bridge (b)

7.4.4 Shared Paths and footways

The design and the location of shared paths has sought to provide a consistent alignment as a minimum maintaining the connectivity which currently exists. Particular emphasis has been placed on ensuring the existing Henry Lawson Cycleway is maintained and enhanced. The Henry Lawson Drive alignment between Auld Avenue and Newbridge Road is straightened and visibility of driveways enhanced, access across the Henry Lawson Drive bridge is now facilitated with the provision of a separate path, and planting is proposed to provide a level of shade along the alignment.

Currently, pedestrian pathways are limited to the shared path. Pedestrian paths are proposed to be provided to the Milperra Road bus stops enhancing accessibility and their connection to the adjoining landuses. A footpath is also provided along the commercial precinct frontage. Placement of paths considers both the safety of users as well as potential surveillance as part of the adoption of Crime Prevention Through Environmental Design principles (CPTED).

7.4.5 Vegetation

Vegetation within the corridor consists of a strong bushland scrub edge aligning Milperra Road towards Henry Lawson Drive. Vegetation to the south is composed of native trees suited to low lying, flood prone communities including *Melaleuca*, *Casuarina* and *Eucalyptus* species. To the north dense screening planting highlight the connection to the Georges River, this community is made up of *Melaleuca*, *Casuarina* and *Eucalyptus*. Along the river, the vegetation is largely intact, and well established. Pockets of disturbed landscape caused by the adjoining road and its construction requirements occur along Henry Lawson Drive. Further to north along Henry Lawson Drive the vegetation aligns both sides creating a unique woodland typology within an urban environment. The landscape response to the corridor development takes its cues from the character of the present alignment.

Figure 62 – View of the existing landscape character heading north along Henry Lawson Drive to Georges Hall

The design is responsive to the existing vegetation communities of the Georges River Corridor and adopts the indigenous communities as a starting point for species composition for areas where reinstatement is required. This approach is consistent with the relevant planning documents and in particular the GMREP No.2. As a state road it is exempt from the tree management requirements of the DCP, however it seeks to minimise impacts on existing trees and ensure that reinstatement in some form is undertaken where appropriate and compliant with design guidelines and services.

The presence of the adjoining Bankstown Airport however requires consideration of and consultation to occur in relation to the potential for plane strikes with avi-fauna. The finalisation of the design needs to balance both the biodiversity and airport operational requirements. It is noted however that the airport presently operates with the existing vegetation and the operation of the runway is in a northwest - southeast orientation with flight paths beyond the proposal area.

Riverfront Plantings

A key element of the response through the Riverfront precinct will be the protection and/ or re-establishment of a canopy within the verge that both defines the corridor, enables filtered views, provides a sense of separation from the road for those on the shared path while facilitating connections to the adjacent lands and River. Between Tower Road and the northern limits of the proposal incorporate areas covered by the EIS and so planting strategies would adopt the nominated species below in order to see the reestablishment of the relevant community.

Riverfront precinct comprises two dominant plant community types within the proposal area. The distribution of the species should reflect these communities and adopt the following species lists based on the biodiversity assessment, to maintain the biodiversity of the corridor and its communities.

PCT 781 occurs close to the river's edge and at the interface of watercourses and so comprises several emergent sedge species.

Table 7.1 - Recommended plant species for PCT 781

SCIENTIFIC NAME	COMMON NAME
Canopy Species	
Melaleuca ericifolia	Swamp Paperbark
Casuarina glauca	Swamp Oak
Emergent Species	
Baumea juncea	Bare Twig Rush
Carex appressa	Tussock Sedge
Juncus kraussii	Jointed Rush
Phragmites australis	Phragmites
Typha orientalis	Typha

PCT 835 occurs generally in more elevated, less saturated zones.

Table 7.2 - Recommended plant species for PCT 835

SCIENTIFIC NAME	COMMON NAME
Canopy Species	
Eucalyptus amplifolia subsp. amplifolia	Cabbage Gum
Eucalyptus tereticornis	Forest Red Gum

SCIENTIFIC NAME	COMMON NAME
Eucalyptus baueriana	Blue Box
Angophora floribunda	Rough-barked Apple
Mid stratum	
Melaleuca styphelioides	Prickly-leaved Paperbark
Melaleuca linariifolia	Snow-in-summer
Shrub Layer	
Acmena smithii	Lilly Pilly
Glochidion ferdinandi	Cheese Tree
Melaleuca alternifolia	Narrow-leaved Paperbark
Ground Layer	
Dianella caerulea	Blue Flax Lily
Lomandra longifolia	Spiny-headed Mat-rush
Carex appressa	Tussock Sedge
Microlaena stipoides	Rice Grass
Parsonsia straminea	Common Silkpod
Geitonoplesium cymosum	Scrambling Lily
Stephania japonica	Snake Vine

Swampland Plantings

A key element of the Swampland Precinct will be the protection and/ or re-establishment of the vegetation community. The reinstatement of this community reflects the need to maintain the definition of the road corridor and the biodiversity values of the community. A small section of community, within Milperra Road associated with the culvert cross over is identified as part of the EIS scope as is another small area in HLD adjoining the golf course. All other areas within this zone are covered as part of the REF. Swampland precinct is comprised predominantly of PCT 725 and distribution of the species should be reflective of this community.

Table 7.3 - Recommended plant species for PCT 725

SCIENTIFIC NAME	COMMON NAME
Canopy Species	
CASUARINA GLAUCA	SWAMP OAK
Shrub Layer	
Melaleuca ericifolia	Swamp Paperbark
Melaleuca styphelioides	Prickly-leaved Paperbark
Melaleuca decora	White-feather Honeymyrtle
Ground Layer	
Juncus kraussii	Jointed Rush
Microlaena stipoides	Rice Grass
Tetragonia tetragonioides	New Zealand Spinach

Streetscape Plantings

Within the commercial and residential precincts there is a desire for plantings to be introduced to provide shade in relation to the path system and road, and to assist in the definition of the corridor, strengthening its overall character and feel as part of a larger vegetated network along the Georges River.

As part of the overall landscape strategy the adoption of a formalised planting of trees which provides shade and protection for the pedestrians within the verge while maintaining some visibility of the land use beyond. Species selection is proposed to relate to the natural community and comprise any of the following:

Table 7.4 - Recommended plant species for Street Trees

SCIENTIFIC NAME	COMMON NAME
Eucalyptus tereticornis	Forest Red Gum
Melaleuca styphelioides	Prickly-leaved Paperbark

In addition to this structural planting, grass would be used throughout the verge to provide a robust and manageable landscape treatment.

Drainage Plantings

The opportunity to adopt a Water Sensitivity Urban Design approach for drainage within the corridor should be considered. This may include treatments to swales and bioretention basins. As part of this approach the species selection would reflect the local reed and sedge species of this floodplain landscape. Focus is on emergent and plants which can cope with periodic inundation. Species would include:

Table 1.4 - Recommended plant species for Drainage swales and bioretention

SCIENTIFIC NAME	COMMON NAME
Baumea juncea	Bare Twig Rush
Carex appressa	Tussock Sedge
Juncus kraussii	Jointed Rush
Lomandra longifolia	Spiny-headed mat-rush
Gahnia clarkei	Saw-sedge

Finalisation of species mix will occur as part of the overall detailed design for the project. Species selection will be designed to be compatible/complementary with (but not necessarily part of) adjacent vegetation communities. While biodiversity will be a key consideration for the project operational requirements will also need to be considered. Additional considerations include:

- attraction of fauna into road corridor (roosting, foraging or refuge), although connectivity should be allowed for and designed appropriately where identified.
- vegetation groups have to be safely manageable along roadsides ie no large fruit/cone drop onto paths or carriageways, no dangerously thorned species along paths or congregation points (bus stops, schools), no threatened/vulnerable species in spray/mowing zones
- no species with aggressive adventitious traits eg invasive roots, weeping canopy that blocks sightlines/travel envelope etc.
- provision of appropriate transition of the roadside environment to the neighbouring landuse, ie coastal wetlands of the Georges River and recreational use
- Addresses the safety of all users.

7.4.6 Landscape Treatments

A variety of landscape treatments will be considered to enable the implementation of the overall Urban and Landscape Design Strategy. Landscape treatments need to be:

- Robust and durable to minimise ongoing maintenance inputs
- Cost effective, and
- Maintainable meeting operational and safety needs

Treatment types would include:

- Turfing is the application of grass rolls as a verge or broader landscape treatment. Typically, turf will be used as the margin between shared path and road and at areas where amenity is high such as at intersections.
- Bush Regeneration – A significant portion of the corridor is impacted by the presence of weeds of all forms – small annual weeds, climbers, and trees. The overall corridor could be enhanced by a weed management program in which weed species are removed and replanting undertaken, or natural regeneration encouraged to fill the gaps in cover and eliminating the opportunities for weed ingress.
- Planting can be undertaken as individual specimen plantings such as street tree and broad scale tree planting or as garden beds consisting of a prepared mulched bed and the mass planting of shrub and grass species. The use of

garden beds would be utilised in areas of high visual prominence, such as verges and intersections; and where instant plant densities are required to provide stability and minimise weed growth such as in the median and/or drains.

7.4.7 Other Structures

Lighting

The current alignment of Henry Lawson Drive is lit using outreach arms fixed to power poles, or goose neck poles according to context. It is anticipated that the design would continue this approach. The design of lighting should seek to minimise the need for lighting and ensure that light spillage into residential properties is minimised or avoided as per AS1158.

Provision of lighting is primarily on the southern leg of the intersection in association with the residential precinct. Lighting is not provided on the northern leg or within Milperra Road except for the intersection. Lighting is also not provided on the shared path.

Figure 63 –Typical Lighting Layout

Safety Barriers and Fencing

The barrier design within the corridor has sought to minimise the overall impact of these structures both in terms of physical footprint, visibility and impacts to drainage with this in mind a variety of treatments and strategies are proposed. This includes:

- Minimising the extent of barriers. Their refinement should be based on safety and risk assessment.
- Barriers will include standard bridge barriers compliant with Austroads and Transport
- Barriers should seek to be light weight and open where possible to minimise the visual impact of such elements.

The incorporation of barriers both within the alignment and beyond should consider the risk factors and likely consequences if not applied.

7.4.8 Signage

Signage is already a significant element within the landscape. It includes largescale directional and street signs, as well as advertising signage linked to the commercial properties adjoining the corridor.

Signage is largely to be installed in accordance with the requirements of standards. Care needs to be taken to ensure the extent of signage is kept to a minimum and that the signage is integrated with the overall design of the alignment. The following strategies should be adopted:

- Avoidance of signage structures on the skyline and within key views and vistas by considering placement or the incorporation of landscape beyond the structure as a backdrop.
- Rationalise the number of signage structures.

8 Mitigation Measures

8.1 Mitigation Measures

Mitigation measures are treatments developed as part of an overall integrated design process that are recommended to reduce the impacts of a proposal. Mitigation measures are captured in the design to address environmental requirements such as protection of identified vegetation or fauna species; water quality issues; noise etc.

The mitigation measures discussed here address visual and landscape character impacts and those issues addressed as part of the overall urban design response. They may relate to specific viewpoints or address the overall impact of the proposal. Mitigation measures also aim to reduce impacts on the existing landscape character through consideration of existing site features, cultural and environmental heritage.

The urban design principles and objectives along with the overall landscape strategy identified in section 7 incorporate several measures that are proposed and designed to reduce the impacts of the proposal. The key mitigation strategies are summarised below, (Table 8.1), and address both design and construction issues.

Table 8.1 – Mitigation Measures

Proposal EIS or REF	Issue	Stage	Recommendation
EIS/REF	General Design Integration - standard safeguards	Design	- Ongoing integrated proposal development will follow Transport integrated project development processes, including with urban designers as part of the project team.
EIS/REF		Design	- Transport Urban Design Policy (Beyond the Pavement) and Urban Design Guidelines will be used to guide future design development of the proposal.
EIS/REF		Design	- The urban design principles, objectives and concept design strategy presented in the urban design report for the REF/EIS will form the basis for future design development and consultation with stakeholders.
EIS/REF	Earthworks	Design	- Integrate with adjoining landform through adoption of appropriate grades, avoiding sharp transition in profile
EIS/REF		Construction	- Stabilise/revegetate as works progress to limit erosion and visual impacts through early integration with surrounding vegetation
EIS/REF	Retention of Existing vegetation	Design	- Design the proposal to avoid impact to prominent trees and vegetation communities where possible, particular focus should be given to limiting impact north of Tower Road - Existing threatened species will be retained and protected wherever possible

Proposal EIS or REF	Issue	Stage	Recommendation
			- Minimise clearance extent where possible
EIS/REF		Construction	- Clearly define clearance limits and exclusion zones to protect vegetation cover - Clearly define TPZ so impacts are limited
EIS/REF	Revegetation	Design	- Vegetation communities to respond to existing communities and landscape character - Utilise local provenance material - Provide planting within corridor to limit visibility of the proposal from adjoining residential properties enhancing sense of separation. - Propose tree species which provide canopy cover and minimise urban heat effects.
EIS/REF		Construction	- Progressively implement revegetation works to limit erosion and to establish vegetation - Utilise cleared material as part of revegetation works
EIS/REF	Minimise road furniture and signage	Design	- Provide minimum signage requirements and limit structural elements to provide an open and permeable setting
EIS/REF		Construction	- Look for opportunities to minimise designed signage,
EIS/REF	Lighting	Design	- Limit extent of lighting and potential for light spill - Provide lighting to provide safe pedestrian / cycle environment.
EIS/REF		Construction	- Provide lighting which minimises spill during night works
EIS/REF	View management	Design	- Provide visual screening within the road corridor to limit the visual impact of the proposal in areas identified as moderate or high impact - Provide sense of enclosure provide by adjoining vegetation north of Tower Road and reinforce sense of containment provided by vegetation for the proposal generally
EIS/REF		Construction	- Retain vegetation beyond the footprint to retain any existing screening
EIS/REF	Ancillary Facilities	Design	- Setout compounds to limit impacts, consider screening and location of key structures which provide the greatest impact
EIS/REF		Construction	- Maintain compound in a tidy and well-presented manner. Provide and maintain screening
EIS/REF		Construction	- Progressively throughout the work, where feasible and reasonable, the ancillary facility sites will be returned to at least their pre-construction state
EIS/REF	Response to Country	Design	- Engage further with relevant stakeholder groups as to the opportunity to provide interpretation / acknowledgement of country.

9 Conclusion

The proposal is to upgrade a 1.3 kilometre (km) portion of Henry Lawson Drive in addition to intersections of Tower Road and Milperra Road, the proposal is part of a broader proposal to be completed over four stages running from the M5 Motorway through to Tower Road. The proposal falls within the City of Canterbury Bankstown local government area (LGA).

In developing an integrated design response for the proposal, the development of the urban design and landscape objectives and principles has occurred which responds to the landscape character and visual context of the study area. The objectives have been developed to ensure relationship between the proposal and the surrounding precincts are adequately addressed through the design response.

The urban design, and the landscape concept have been developed to achieve an integrated outcome that helps fit the proposal as sensitively as possible into its context and to minimise the impacts of the proposal on the existing landscape character of the proposal area. Mitigation measures as discussed in detail in chapter 8 would be implemented in the detailed design process to ensure these objectives are realised.

The landscape design has identified a number of issues and opportunities to maximise the potential of the proposal, these include;

Key Issues

- Depth of proposed biofiltration basin requires fencing to be installed which will impact the existing views.
- Further discussion required on understanding access in and out of Auld Avenue
- A new formation is required for construction of the new bridge

Key Opportunities

- Potential to reduce proposal footprint to minimise impact on existing vegetation, particularly within EIS areas and retain existing character
- Discussion to be undertaken regarding potential to expand the proposal boundary to incorporate the lands to be acquired, notably within the residential precinct
- Differentiate footways, shared paths and footpaths to clarify widths of verges.
- Illustrate active transport connections and tie in of existing and proposed paths.
- Opportunity to create landscape character zones which respond to and strengthen existing landscape typologies

The urban design response consists of five-character responses as part of its overall strategy to relate to the evolving context of the road corridor. These include:

- Precinct 1 – Commercial
- Precinct 2 – Swampland
- Precinct 3 – River edge
- Precinct 4 – Residential
- Precinct 5 - Parkland

Landscape Character Assessment

Six landscape character units have been identified and assessed as part of the character study:

- LCZ1 – River frontage
- LCZ2 – Swampland
- LCZ3 – Residential
- LCZ4 – Commercial
- LCZ5 – Road corridor
- LCZ6 – Open space

The landscape character assessment illustrates Henry Lawson Drive / Milperra Road and the precincts within the proposal area are largely established and vary along the proposal area. The sensitivity of the landscape character has been assessed at various ratings, the proposal indicates majority of the works will expand the pavement footprint beyond the existing corridor which will likely leave the urban precincts unchanged. Character zones which are heavily vegetated have been rated to have a higher sensitivity as the existing vegetation will be impacted by the proposed works. The river frontage character will have a high magnitude to change related to widening of the road corridor which will remove vegetation along the road edge.

Visual Impact Assessment

Ten viewpoints have been assessed along and looking towards the corridor. The visual impacts of the proposal have been assessed as predominately moderate or low reflecting the scale of change occurring in mostly unprogrammed turf verges. Magnitude and impact on viewpoint are assessed as a higher rating which reflects the vegetation removal associated with widening of the road alignment and duplicating the existing road bridge to carry northbound traffic and keeping the existing bridge for southbound traffic.
A number of mitigation measures have been provided to ensure the proposal results in an acceptable landscape proposal and visual impact assessment. The proposals are to be analysed and finalised to ensure the design is optimised and responds to context.

EIS Areas

The proposal features three EIS areas, the report illustrates these proposal areas and the impact of the proposal on each, a summary is provided below;

EIS proposal area 1 – Henry Lawson Drive opposite Tower Road

EIS area 1 will see the most impact from the proposal, expansion of the road footprint will directly impact coastal wetland areas associated within the EIS Area. The landscape design has investigated potential options to minimise impacts on this area by reducing pavement extent and reducing clearing.

EIS proposal area 2 – Milperra Road opposite Bankstown Airport

The proposal features an additional traffic lane to be installed plus a footpath on the southern edge of Milperra Road, this will push hardscaped elements further into the EIS area, the proposed footway will only extend to the length of the footpath which also coincides with the location of the proposed bus stop. Removing the footway will reduce impacts on the EIS area but the proposal will still have an impact.

EIS proposal area 3 – Henry Lawson Drive opposite Auld Avenue

EIS area 3 is located bordering a residential property along Henry Lawson Drive, the removal of the footway on the eastern verge has seen the footprint reduced, the fill embankments associated with the construction of the corridor are now largely outside of the EIS area, it is anticipated with appropriate protections installed EIS area 3 can be largely protected.

10 Bibliography

Austroads, 2017, *Guide to Road Design Part 6A - Paths for Walking and Cycling*

Canterbury Bankstown City Council (2020) Lo*cal Strategic Planning Statement (LSPS)*

Bankstown Local Environmental Plan (LEP) 2015

Commonwealth of Australia (2019) *National Freight and Supply Chain Strategy*

Infrastructure Australia (2016) *Australian Infrastructure Plan*

Infrastructure Australia (2020) *Infrastructure Priority List*

Infrastructure NSW (2018), *NSW State Infrastructure Strategy 2018-2038*

Lyall and Associates, 2019, Henry Lawson Drive Upgrade - Stage 1a Review of Environmental Factors and Environmental Impact Statement - Flooding Assessment Report

NSW Government (2018) State Environmental Planning Policy (Coastal Management)

NSW Government (2020) *Coastal Management Act 2016*

NSW Government (2020) *Greater Metropolitan Regional Environmental Plan No 2—Georges River Catchment.*

NSW Government Architect (2017) *Green Grid Map*

Roads and Maritime Services, (May 2017) Water Sensitive Urban Design Guideline- Applying water sensitive urban design principles to NSW Transport Projects,

Roads and Maritime Services (2019) Bridge Aesthetics - Design guideline to improve the appearance of bridges in NSW

Sydney Metro Airports , 2019, Bankstown Airport Master Plan

Sydney Metro Airports, 2019, Bankstown Airport South West Precinct Site Works and Warehouse Major Development Plan Volumes 1 and 2

Transport for New South Wales (2020) Beyond the Pavement 2020: Urban Design Approach and procedures for road and maritime infrastructure planning, design and construction

Transport for New South Wales (2020) Environmental Impact Assessment Practice Note: Guidelines for Landscape Character and Visual Impact Assessment. EIA-NO4.

Transport for New South Wales (2020) Environmental Impact Assessment Practice Note: Guideline for Landscape Character and Visual Impact Assessment - EIA-N04.

Transport for New South Wales (2017) Draft Road Safety Plan 2021

Transport for New South Wales (2018) Future Transport Strategy 2056

Transport for New South Wales (Transport) (2020) Landscape Guideline: Landscape design and maintenance guidelines to improve the quality, safety and cost effectiveness of road corridor planting and seeding.

Transport for New South Wales (2018) NSW Freight and Ports Plan 2018- 2023

Transport for New South Wales (2018) Road Network Plan Summary Report – Henry Lawson Drive Woodville Road

WSP and Transport for New South Wales (2021) Henry Lawson Drive Upgrade - Stage 1a - Biodiversity Development Assessment Report

WSP and Tr ansport for New South Wales (2021) Henry Lawson Drive Upgrade - Stage 1a - Biodiversity Assessment Report