



Transport
Roads & Maritime
Services

ADDITIONAL CROSSING OF THE CLARENCE RIVER AT GRAFTON

Appendix J – Technical Paper: Urban
design and landscape concept report
(including landscape character and
visual impact assessment)

AUGUST 2014

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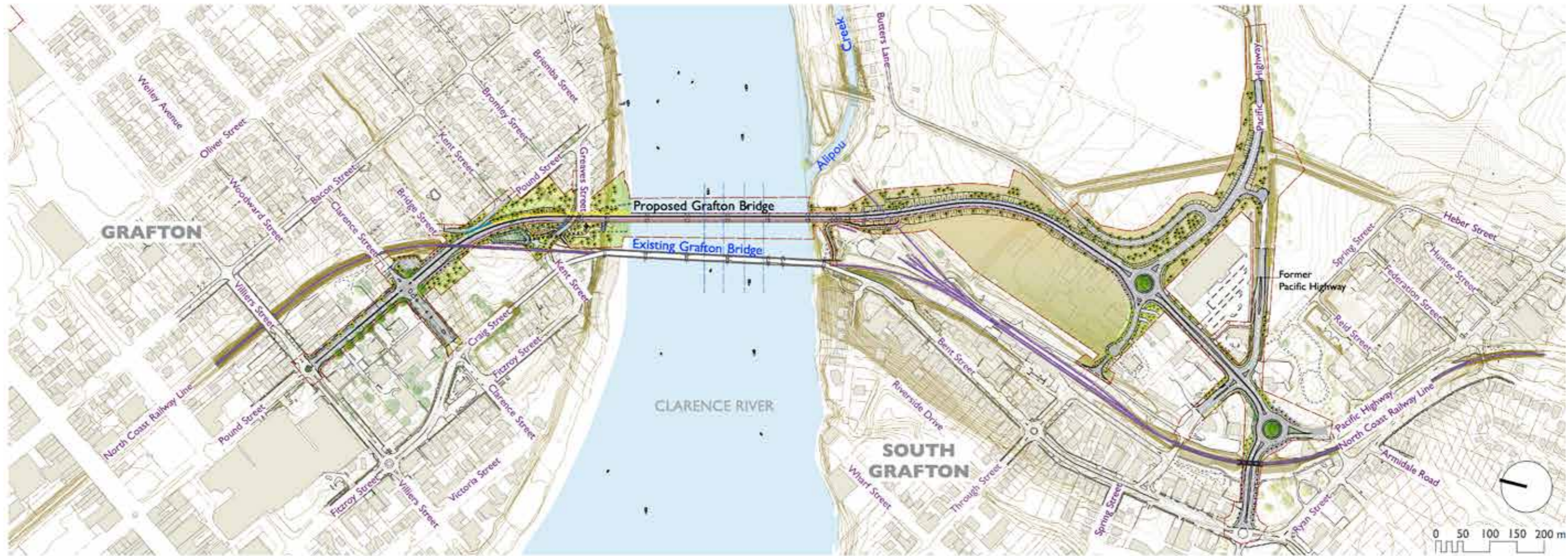


Figure 0.1: Landscape and Urban Design Concept . Refer to Section 6 for further detail.



Figure 0.2: Downstream view of proposed Grafton Bridge from the Clarence River

EXECUTIVE SUMMARY

Purpose

Roads and Maritime Services is seeking approval to construct an additional bridge across the Clarence River at Grafton (the proposal). The proposal would include the construction of a new bridge with viaducts, a pedestrian and cycle path, and upgrades to the road network in Grafton and South Grafton to connect the new bridge to the existing road network. This technical paper has been prepared by Spackman Mossop Michaels (SMM) on behalf of Roads and Maritime Services (Roads and Maritime) as part of the Environmental Impact Statement (EIS) for the project and addresses the Director-General's Environmental Assessment Requirements for visual amenity, bridge form and elements, and landscape aspects of the project that make up its 'urban design'.

Context

Grafton is a major regional centre situated on the Clarence River in the north coast of New South Wales. The existing landscape character of the area is topographically dominated by the Clarence River and its flat river floodplain. Either side of the river sit the town centres of Grafton and South Grafton which consist of wide gracious streets laid out on a square grid. The town centres are connected across the river by an historic bridge which is part of the identity of Grafton. Outside of the town centres are established and newly developing residential areas, and industrial areas, generally concentrated around the regional road and rail corridors and surrounded by the agricultural areas that comprise the city's rural hinterland.

Urban design approach

Understanding the built, natural and community character of Grafton, analysing the impacts that a new crossing of the Clarence River and associated road upgrades can make, identifying opportunities, and articulating urban design objectives and principles has been an integral part of designing the project. An iterative engineering and urban design process has been adopted to produce an integrated design that fits in with its context, complements the existing historic bridge, minimises the impacts and mitigates the impacts that are unavoidable. This follows Roads and Maritime urban design policy document Beyond the Pavement (2009), the Bridge Aesthetics design guideline (2012), the EIS Landscape Character and Visual Impact Assessment guideline (2012) and the Landscape Guideline (2008).

Urban design and landscape concept

The proposed concept plan, in Fig. 1, shows how the project fits into Grafton, South Grafton and the river setting and with the existing historic

bridge, and the future public domain that will be created. The form of the proposed new bridge relative to the existing bridge is shown in elevation in Figure 2. The concept is documented in greater detail in Chapter 6. This includes the proposed new bridge, viaducts and abutments, retaining walls, noise barriers, cuttings, fill embankments, planting to integrate the proposed works with the existing character of the local area, feature planting to define the township entries and other cultural areas, creation of new landscaped public open space, integration of the pedestrian and bicycle network, and retrofitting of local streets affected by road widening.

Proposed new bridge: the river crossing

The proposed new bridge is designed to complement the existing historic bridge:

- It has been designed, within site constraints, to be as parallel as possible to the existing historic bridge
- Its straight horizontal alignment references the straight alignment of the existing bridge
- The piers have been positioned to align as closely as possible with the piers of the existing bridge and match the spans over the Clarence River
- It has been kept as low as possible over the Clarence River to allow the existing bridge to take visual precedence and minimise the loss of views to the existing bridge.

Key design features of the proposed new bridge are:

- The superstructure would be concrete allowing for a simple, clean, contemporary character, and would have long, smoothly tapering haunches that help reduce its visual bulk and create a slender, graceful appearance when viewed in elevation
- The proposed 16.9 metre wide deck, over and above two vehicle lanes, shoulders and a median, includes a pedestrian and cycle path on the western, upstream, side to facilitate connections to existing path systems in Grafton and South Grafton
- Both sides of the bridge would be cantilevered over a box girder to cast a shadow on the vertical face of the girder, helping it to visually recede and minimise its visual bulk. In contrast, the precast concrete parapets would be angled slightly out to catch the sunlight
- The parapets are designed to appear as crisp, uninterrupted linear elements extending the full length of the bridge to beyond the abutments.
- Balustrades are designed to allow views for users.

Proposed urban design and landscape concept in Grafton

To mitigate loss of trees, demolition of houses and noise impacts, the proposed concept includes street tree planting, planting of fig trees within Grafton TAFE (subject to agreement with the TAFE), Jacaranda and formal garden beds at strategic locations, landscaped car park areas, transparent noise barriers on northern bridge approach road and landscaped public open space either side of the Pound Street approach.

Proposed urban design and landscape concept in South Grafton

Key design characteristics are pasture grasses on southern bridge approach embankments, retention of rural views, street tree planting, and feature planting, such as Jacaranda, at major entry points and roundabouts. Native street trees and revegetation would be undertaken to the former Pacific Highway and the Butters Lane extension.

Landscape character impacts

Landscape character impact assessments are provided in Chapter 7. Landscape character assessment determines the impact of the proposal on the aggregate of the built, natural and cultural aspects that make up an area and provide its unique sense of place. The landscape character analysis identifies five landscape character zones in the study area, representing the range of different settings through which the proposal passes.

The landscape character impact assessment identifies that the proposal would have a moderate to high character impact with areas of highest impact concentrated at:

- Pound Street
- The Grafton established residential area in the vicinity of Pound Street, Kent Street, Bridge Street and Greaves Street
- Parts of the Clarence River and foreshore.

Visual impact assessment

Visual impact assessment is provided in Chapter 7, defining the day to day visual effects of a proposal on people's views. It is based on the assessment of a number of selected key viewpoints that are rated according to the sensitivity of the view and the magnitude of the proposal within that view. The locations and directions of the chosen viewpoints are generally representative of the range of viewpoints both within and beyond the study area.

A total of 12 key viewpoints form the basis of the visual impact assessment and the following visual impact ratings were determined:

- Six viewpoints would have High visual impact
- Two viewpoints would have High to Moderate visual impact
- Two viewpoints would have Moderate visual impact
- One viewpoint would have Moderate to Low visual impact
- One viewpoint would have Low visual impact.

Ratings of high and high to moderate impacts occur in the town centre, residential areas, heritage areas, educational precincts, open space areas and the picturesque river setting, where the sensitivity to change is the highest and the magnitude of the works are greatest. The moderate and low ratings occur in areas where distance from the works is greater and in areas of lower sensitivity, for example the South Grafton industrial area.

Mitigation strategy

A mitigation strategy is provided in Chapter 7. It has been developed during the project concept design to mitigate landscape character and visual impacts. It is reflected in the Urban design and landscape concept and should be refined in the ongoing development of the design. The strategy also includes a summary of further mitigation measures to be investigated during the subsequent detailed design phase of the project, and measures to be considered during construction.

Conclusions

The overall fabric of the historic town centres and streetscapes of Grafton and South Grafton are kept largely intact, however, there are unavoidable high visual and landscape character impacts concentrated at Pound Street, Clarence Street and the residential area associated with proposed northern bridge approach road, to a zone of the Clarence River and foreshore where the proposal is inserted, and affecting the ambience around Alipou Creek - which require mitigation. The urban design and landscape objectives and principles developed, take into account urban design and visual character not only for the study area itself, but also reflect its relationship with the surrounding river floodplain and urban areas. The urban design, bridge and landscape concept has 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 future character of the area, through the incorporation of a number of mitigation measures. The urban design will:

- Ensure attractive views into the broader landscape are maintained by planting in appropriate locations.
- Incorporate materials and finishes for new road elements that are site appropriate
- Ensure that the existing Grafton Bridge retains its visual precedence
- Ensure there is a visually complementary relationship between the proposed bridge and the existing bridge
- Include a planting design intended to reduce the scale of the proposed road infrastructure by the provision of appropriate tree species in the streetscapes of the urban areas of Grafton and South Grafton
- Provide new landscaped open spaces at impacted urban development sites
- Provide distinctive town entry points
- Provide screening, through the use of native plant species, of the road infrastructure to residential areas
- Provide new pedestrian and bicycle connections for the community.

Development of the project during a future detail design phase should consider the further key mitigation strategies outlined in this report to further integrate this project into the townships of Grafton and South Grafton.

1 INTRODUCTION

Roads and Maritime Services (Roads and Maritime) is proposing to construct an additional bridge across the Clarence River at Grafton to supplement the existing bridge. In seeking project approval of the additional crossing of the Clarence River at Grafton, Roads and Maritime is preparing an Environmental Impact Statement (EIS) under Part 5.1 of the Environmental Planning and Assessment Act 1979.

This Urban Design and Landscape Concept Report was prepared by Spackman Mossop Michaels (SMM) on behalf of Roads and Maritime and is a Technical Paper that supports the environmental impact Statement (EIS) being prepared by Arup. SMM has worked on this project in conjunction with the Roads and Maritime Centre for Urban Design, other Roads and Maritime specialist advisors, and road and bridge designers from Arup.

1.1 BACKGROUND

In 2002 the NSW Government began formal investigations into an additional crossing of the Clarence River in Grafton. The investigations were deferred in September 2005 and restarted in 2009.

In December 2010 Roads and Maritime announced a revised approach to engage more effectively with the community and stakeholders in identifying a preferred route for an additional crossing. A community update issued in December 2010 identified 13 preliminary route options and invited community comment via a postal survey. Subsequent phone and business surveys were also carried out.

In June 2011 RMS published the Feasibility Assessment Report which described the assessment undertaken of the 41 suggestions identified after the December 2010 to March 2011 community consultation period. Twenty-five preliminary route options in five corridors were identified for engineering and environmental investigation.

In January 2012 six route options were announced for further investigation. The short-listed options and short-listing process are documented in the Preliminary Route Options Report – Final (RMS, January 2012).

Design refinements and further field and technical investigations were undertaken on the six route options. These were documented in the Route Options Development Report (RMS, September 2012).

The six route options were subject to consultation and assessment process in September, October and November 2012 to identify the preferred location for the additional crossing. Based on community feedback, technical investigations and value management workshops Option C was selected as the preferred option which connects the Pacific Highway near the junction with Gwydir Highway in South Grafton to Pound Street in Grafton.

The Recommended Preferred Option Report (RMS, December 2012) documents the process followed for the assessment of the six short-listed route options and the identification of a recommended preferred option. It also provides information on community involvement and feedback received after the display of the Route Options Development Report (RMS, September 2012).

The Recommended Preferred Option Report (RMS, December 2012) was placed on exhibition from 19 December 2012 to 4 March 2013. A number of supporting consultation activities were undertaken to ensure that information was received by the wider community and opportunities were available for comment and questions. The exhibition period, during which comments on the report were invited, was initially due to finish on 18 February 2013, but was extended until 4 March 2013 to allow members of the community impacted by floods in Grafton additional time to comment.

In April 2013, Option C was confirmed as the preferred option for an additional crossing of the Clarence River at Grafton. Refinements were made to the recommended preferred option after Roads and Maritime review of the preliminary design, stakeholder consultation and feedback received during the public display of the Recommended Preferred Option Report (Roads and Maritime, December 2012).

The concept design for the project has been further refined to define those elements of the preferred option that are required to provide acceptable traffic performance at least to year 2039 and to take into consideration issues raised during consultation of general community and stakeholders.

1.2 DESCRIPTION OF THE PROJECT

A description of the project is provided in Chapter 5 and Chapter 6 of the EIS. This section provides a summary of the project.

The main components of the Grafton Bridge project include:

- Construction of a new bridge over the Clarence River about 70 metres downstream (east) of the existing road and rail bridge, comprising two traffic lanes
- Construction of a new road to link the new bridge with Iolanthe Street in South Grafton
- Construction of a new road to link the new bridge with Pound Street in Grafton
- An approach viaduct, about 58 metres long, on the South Grafton side of the Clarence River and 29 metres long on the Grafton side
- Upgrades to the road network in South Grafton to connect the new bridge to the existing road network, including:
 - Widening Iolanthe Street to four lanes
 - Widening the Gwydir Highway to four lanes between Bent Street and the Pacific Highway
 - Realigning the existing Pacific Highway to join Iolanthe Street near Through Street
 - Providing a new roundabout at the intersection of the Pacific Highway and Gwydir Highway
 - Providing a new roundabout at the intersection of Through Street and Iolanthe Street
 - Limiting Spring Street and the Old Pacific Highway to left in and left out only where they meet Iolanthe Street
 - Realigning Butters Lane
- Upgrades to the road network in Grafton to connect the new bridge to the existing road network, including:
 - Widening Pound Street to four lanes between Villiers Street and the approach to the new bridge
 - Providing traffic signals at the intersection at Pound Street and Clarence Street
 - Closing Kent Street where it is crossed by the bridge approach road

1.3 SCOPE OF THIS REPORT

- ↪ Realigning and lowering Greaves Street beneath the new bridge
- ↪ Realigning Bridge Street to join directly to the southern part of Pound Street (east of the new bridge approach). There would be no direct connection between Pound Street south and the new bridge approach
- ↪ Widening Clarence Street to provide formal car park spaces
- ↪ Minor modifications to the existing Dobie Street and Villiers Street roundabout..
- Replacement of the existing three span concrete arch rail viaduct which crosses Pound Street in Grafton with a single span steel truss bridge
- Construction of a pedestrian and cycle path to provide connectivity between Grafton, South Grafton and the new bridge.
- Provision of two pedestrian crossings with lights in South Grafton to improve safety for pedestrians crossing Iolanthe Street and Gwydir Highway
- Construction of new pedestrian links to connect the new bridge with the existing bridge.
- Provision of designated car park spaces in Pound Street and Clarence Street, including some off street parking, to maintain a similar number of existing car park spaces currently available in those two streets.
- Flood mitigation works, which include raising the height of sections of the existing levee upstream from the new bridge in Grafton and South Grafton
- Construction of a stormwater detention basin and pump station in Grafton to manage local flooding.
- Public utilities adjustment.
- Ancillary facilities required for the construction of the project, including some or all of the following: site compounds, concrete batching plant, pre-cast facilities, and stockpile areas for materials and temporary storage of spoil and mulch.

These project elements are described in more detail in Chapter 4 of this report.

This Urban Design & Landscape Concept Report (Including Landscape Character and Visual Impact Assessment) has been prepared for Roads and Maritime by Spackman Mossop Michaels as part of the EIS for the proposed additional crossing of the Clarence River at Grafton (the project) in Clarence Valley Council local government area. This document is a technical paper that supports the EIS being prepared by Arup. Spackman Mossop Michaels has worked on this project in conjunction with, Roads and Maritime Centre for Urban Design, other Roads and Maritime specialist advisors, and road and bridge designers from Arup.

The report documents the landscape character and visual impacts of the project and has been prepared as part of the planning approval process. It aims to facilitate an integrated urban design and engineering design outcome for the proposal, through the utilisation of visual impact assessment to identify and summarise the visual and landscape character opportunities and issues within the study area. This, in turn, would guide the development of the road and bridge concept design process by avoiding or mitigating potential impacts wherever possible.

1.4 CONCEPT DESIGN STUDY METHOD

The preparation of this study follows Roads and Maritime guidelines (refer to Section 1.9) and includes an integrated team design and assessment process which has included consultation with agencies and the local community. The undertaking of the impact assessment and the finalisation of the concept design has been an iterative process which has enabled the concepts to be refined as they were developed, thereby reducing and mitigating the potential impacts wherever possible.

This study has involved the following:

- Site visits and field investigations, reviewing relevant literature, analysing aerial photographs, topographic maps to understand the study area.
- Reviewing the initial engineering concept design and supporting material to gain an appreciation of the project.
- Defining urban and landscape character through a contextual analysis.
- Identifying and describing landscape character zones and evaluating the project's impact on them.
- Identifying the visual catchment of the project.
- Selecting viewpoints within the visual catchment representing a range of different land uses.
- Evaluating the project's visual impact by comparing the sensitivity of viewpoints and the magnitude of the impact of the upgrade upon them.
- Identifying urban design and landscape strategies to mitigate adverse impacts.
- Development of the urban design, bridge and landscape concept for the project.
- Summary recommendations and conclusions for further consideration in the future detailed design phase of the project.

1.5 DIRECTOR GENERAL'S REQUIREMENTS

The Director General's Environmental Assessment Requirements (DGRs) for the visual amenity, bridge form, urban design and landscape aspects of this project are as follows:

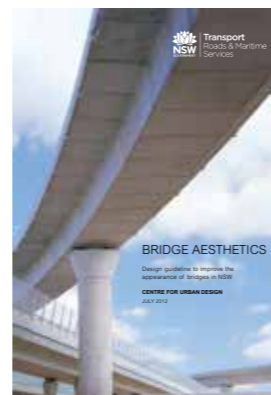
Table 1.1: DIRECTOR GENERAL'S REQUIREMENTS.

KEY ISSUE	REPORT REFERENCE
<p>An assessment of the visual and amenity impacts of the project (height, scale and lighting) on the local and regional area, particularly on:</p> <ul style="list-style-type: none"> – The existing State Heritage listed Grafton Bridge (SHR 01036) and local heritage items, – Any adjoining land owners and land owners along the foreshore of the Clarence River, – Existing and future residential properties in Grafton and South Grafton, – The southern 'town entry', – Use of the Clarence River, and – Significant vantage points in the public domain 	7.2 & 7.3
Overshadowing impacts of the bridge structure, embankments and ramps on existing and proposed public domain, open space, foreshore areas and residential uses	7.4
Integration of the bridge with existing and future pedestrian and cycle network in the local, regional and metropolitan context	6.2, 6.3, 6.4, 6.5
Consideration of design, and safety measures for pedestrian and cycle access on the bridge	6.3
Development of urban design objectives for the new bridge, approaches and local road network treatments	5.0
<p>Rationale for the overall design (length, height, width and appearance) and an assessment of the built form (materials and finishes) and urban design (bulk and scale) of the bridge, including:</p> <ul style="list-style-type: none"> – Justification for the proposed width of the bridge based on shared use by pedestrians, cyclists and public transport, – Details of pedestrian and cyclist access (dedicated or shared-use), and public transport and emergency vehicle access, – Design details such as lighting, balustrades, street furniture and their integration generally, – Design relationship to the existing Grafton and South Grafton built forms and streetscapes, including the existing State Heritage listed Grafton Bridge, – Views to and from the bridge 	6.2, 6.3, 6.4, 6.5, 7.2, 7.3

1.6 ROADS AND MARITIME GUIDELINES

Roads and Maritime have produced a comprehensive list of design guideline documents aimed at achieving good urban design outcomes. This report has been undertaken with reference to the following published documents:

- Beyond the Pavement (Roads and Maritime, 2009).
- Landscape Guideline (Roads and Maritime, 2008).
- Bridge Aesthetics Design Guidelines (Roads and Maritime, 2012).
- Environmental Impact Assessment Guidance Note, Guidelines for Landscape Character and Visual Impact Assessment (Roads and Maritime, 2013).



1.7 REPORT STRUCTURE

This report is structured as follows:

- Chapter 1: Introduction - introduces the project and outlines the scope and study team.
- Chapter 2: Existing Context - a description and illustration of the environmental and cultural factors of the local area.
- Chapter 3: Project Description - a summary of the key concept design works.
- Chapter 4: Project Context - a description of the project in the context of the area it will be located, to assist in the development of the objectives and principles for the project.
- Chapter 5: Objectives and Principles - a description the urban design, bridge and landscape objectives and principles.
- Chapter 6: Urban Design, Bridge and Landscape Concept - illustration of the concept design in graphic format including plans, cross sections and details.
- Chapter 7: Impact Assessment - landscape character, visual impact and overshadowing assessment of the project.
- Chapter 8: Mitigation Measures and Conclusions - provides a list mitigation measures to be considered as part of the detailed design process. It also includes a summary of the conclusions and next steps.