

KINGS HILL GRADE SEPARATED INTERCHANGE

URBAN DESIGN MEMO

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Cover source: *Google Street View*

INTRODUCTION

Spackman Mossop Michaels (SMM) has prepared this Urban Design Memo for Hyder Consulting (Hyder) for the proposed Kings Hill grade separated interchange over the Pacific Highway (the proposal) in the Port Stephens LGA. This document supports the Strategic Design and Review of Environmental Factors (REF) being prepared by Hyder.

The Urban Design Memo briefly describes the landscape context of the study area, develops urban design objectives and principles for the proposed interchange and recommends urban design and landscape treatments and mitigation measures comparable to other Pacific Highway interchanges

LANDSCAPE CONTEXT

The proposed interchange is located along the Pacific Highway, east of the proposed Kings Hill Planned Community, seven kilometres northwest of Raymond Terrace and about 180 kilometres north of Sydney.

The Pacific Highway travels through a flat area of land between Grahamstown Dam to the east and Williams River to the west. The land is cleared to the west in the area of the proposed Kings Hill Planned Community. Further west, the topography is more undulating and is heavily vegetated with native forest. To the east, the narrow strip of land between the highway and Grahamstown Dam, owned by Hunter Water Corporation, is also heavily vegetated.

The highway corridor itself is well vegetated with native plantings to the verge, and a narrow median of mown grass, native grasses and, occasionally, shrubs and small trees. This provides a sense of separation from adjoining areas, although glimpse of the broader landscape can be experienced to the west.

OVERVIEW OF THE PROPOSAL

The proposal is to provide suitable vehicular access from the Kings Hill Planned Community site to the Pacific Highway. The proposal would involve the following key features:

- A service road connecting the development to the interchange, running in an approximately east-west direction from the proposed town-centre roundabout, through the interchange roundabout, and over the Pacific Highway overpass
- An interchange roundabout connecting the northbound exit ramp and northbound entry ramp to the service road, in order to separate westbound traffic on the overpass (from the southbound exit ramp) and traffic on the northbound exit ramp
- Four ramps connecting the development to the Pacific Highway, allowing for all in and out movements both south and north. The northbound exit, northbound entry and southbound entry ramps are all standard diagonal ramps, and the southbound exit ramp is a loop ramp that passes underneath the overpass. The ramps have been designed to allow for acceleration to, and deceleration from highway speeds

- A bridge passing over the Pacific Highway to connect the southbound ramps to the development, designed as a 2-span arrangement with one span 29m and the other 36m, and a central pier in the highway median and spill-through abutments either end
- The provision of two water quality basins on the western side of the interchange, designed to achieve water quality targets for the whole interchange by offsetting the untreated water on the eastern side of the highway.

URBAN DESIGN PRINCIPLES AND OBJECTIVES

Urban design and landscape objectives and principles have been prepared for this proposal to help guide the concept design to ensure that the bridge, ramps and service road are physically, visually and operationally integrated with the surrounding environment.

The objectives reflect an essential goal to achieve a project outcome that is sensitively integrated, taking into account not only the proposal itself but also its relationship with surrounding areas. These would be implemented in accordance with the Roads and Maritime policy Beyond the Pavement (2014) performance themes of safety, cost effectiveness and sustainability.

The following urban design objectives and principles have been devised to guide the development of the concept design outcome for the project.

Objective: To achieve a project that fits sensitively with the existing qualities and characteristics of Pacific Highway and surrounding setting.

Design principles:

- Maintain the integrity of the existing local character, particularly the physical and visual experience of the Pacific Highway and rural environments
- Design major project elements like earthworks and embankments to fit into its setting and reduce its visual and physical obtrusiveness
- Minimise the removal of existing trees along the Pacific Highway corridor
- Provide new planting and revegetation with native species that matches the character of the local landscape and adjoining vegetation communities as closely as possible
- Maximise tree planting opportunities with native species to maintain and enhance the well vegetated green buffer on both sides of Pacific Highway
- Maintain the integrity of endemic plant communities.

Objective: Protect and enhance the natural systems and ecology surrounding the proposal.

Design principles:

- Enhance natural vegetation communities
- Manage and control weed infestations
- Strengthen the existing landscape character so that a continuous and prominent backdrop of landscape is created and maintained.

- Minimise impacts on adjacent State Environmental Planning Policy (SEPP) 14 Wetlands and Grahamstown Dam through the use of appropriate stormwater management measures.

Objective: Facilitate the provision of good urban design outcomes to the future Kings Hill Planned Community.

Design principles:

- Work with appropriate authorities to develop a visual, urban design and landscape character of the road corridor by promoting planning/ design strategies that achieve a high quality environment and amenity at the interface between the highway and the future residential area
- Provide more formal structured planting to the roundabout and service road to define the entry and approach to the future residential area.

Objective: Provide a simple and unified suite of road and roadside elements and details that contribute to establishing a desired future character for Prospect Highway and that are easily maintained.

Design principles:

- Use robust, high quality and durable materials appropriate to the setting and avoid opportunities for vandalism.

URBAN DESIGN RECOMMENDATIONS

The following urban design recommendations respond to the urban design objectives and principles and are provided for the proposed bridge, landscape formations, roadside furniture and landscape works, to achieve an integrated design outcome. These recommendations would be refined further during detailed design and would inform the urban design and landscape plan for the proposed project.

Road design elements

The general approach to the design of road elements would be undertaken in order to satisfy the functional requirements for the safe and efficient operation of the road, while also being appropriate to their location. In all cases, the design and implementation of the road elements would need to satisfy the requirements of Austroads and Roads and Maritime design guidelines and practice notes, as well as local government policies, if necessary. It is also important that in detailed resolution, the visual expression of the road elements is true to their function as items of contemporary road infrastructure that are consistent with other road upgrades in the region.

Landscape formations

Earthworks are required for the construction of the entry and exit ramps. In general, the principle is to limit the footprint of roadworks in order to minimise the clearing of the adjacent planting.

Two general responses to landform are recommended:

- Where the existing landform is relatively flat, space permits, and there is limited vegetation, provide a flatter embankment profile (4H:1V or flatter) to better fit with the surrounding landform
- Where the existing landform is steep or where space is limited, and there are substantial areas of existing vegetation, provide steeper embankments to minimise extent. In all cases a minimum angle of 2H:1V is preferred to facilitate planting.

Provide revegetation on all embankments to allow for better integration of the embankments with the character of the surrounding landscape. The species used for the revegetation of disturbed areas should be native and match the surrounding vegetation species composition.

Road furniture

Roadside barriers

Roadside barriers would be required along the Pacific Highway and at the top of fill embankments. The following recommendations apply:

- Either W Beam guard rail or wire rope barrier, as appropriate for the situation. Either barrier type should preferably be used in conjunction with planting behind
- A double type F barrier would be required to separate the Pacific Highway and the southbound exit ramp. Consideration should be given to investigating the precedents of the concrete barrier constructed at Wyong Interchange.

Planting

The general approach to the planting design for this project is to integrate any new planting into the existing landscape setting and to further define and reinforce the landscape character of this section of the Pacific Highway. In order to achieve this, the planting must strike a balance between screening the works from sensitive visual receptors and maintaining and enhancing key views and vistas to the surrounding landscape.

Planting Design Strategy

Key strategies that would be adopted are:

- Retain as much existing woodland planting as possible
- Revegetate all areas affected by the new works
- Provision of 'gateway' planting to the exit ramps and service road to provide a visual landmark and enhance local identity
- Provision of tree planting in the Pacific Highway median behind the concrete barriers on the approaches to the bridge
- Provision of planting on fill embankments to stabilise the earthworks, minimise their visual impact and integrate them with the character of the surrounding landscape
- Provision of planting to screen the works from sensitive adjacent land uses
- Use of provenance plant material (plants grown from locally collected seeds) wherever possible for all native plantings, in particular native revegetation.

At the detailed planting design stage, which would include further refinement of the plant species selection, particular consideration should be made for ongoing maintenance requirements. Principles include:

- Selection of plant species that are robust, non-invasive and not fire promoting
- Use of local provenance plant material for native revegetation plantings
- Exclusion of all species on weed lists applicable to the local area
- Placement and species selection for planting within the highway corridor to be in accordance with clear zone and sight stopping distance requirements.

Bridge

Overall form

The proposed bridge has a simple appearance that integrates with the environment and is consistent with other bridges in the region.

Superstructure

The proposed bridge superstructure would be concrete, which allows for a simple, clean, contemporary character. The superstructure would consist of 1.8 metre deep super T girders with a reinforced concrete deck and asphalt overlay. It consists of a twin span arrangement with a central pier in the median and spill-through abutments at either end.

Parapets

Simple, unarticulated, precast concrete parapets are proposed for both sides of the bridge. The parapets are designed to appear as crisp, uninterrupted, linear elements that extend the full length of the bridge to beyond the abutments. The outer face of the parapets angle slightly out at the bottom to better catch the sunlight, helping to visually define them against the girder and also to increase the depth of shadow cast on the girder, helping to make the girder visually recede.

Piers

The central pier in the median on the highway would be a simple structure and constructed from reinforced concrete, keeping with the character of other structures along the Pacific Highway and M1 Motorway.

Abutments

Both bridge abutments would be simple, robust and unadorned concrete structures in keeping with the character of other abutments along the Pacific Highway and M1 Motorway.

Vehicle barriers

Vehicle barriers are required on the bridge and will consist of a twin rail. The barrier would be integrated with the parapet that is consistent with other traffic barriers in the area. If safety screens are required, they are to be integrated with the overall bridge design.

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