

3. Project objectives and design principles

3.1 Objectives

The proposed upgrade of the Pacific Highway between Wells Crossing and Iluka Road will need to meet both the Pacific Highway Upgrade Program and the project specific objectives presented in **Table 3-1**.

Table 3-1 Pacific Highway Upgrade Program and Wells Crossing to Iluka Road project objectives

Pacific Highway Upgrade Program objectives	Wells Crossing to Iluka Road project objectives
Significantly reduce road accidents and injuries	<ul style="list-style-type: none"> ■ Develop a dual carriageway road with a route target crash rate of a minimum of 15 crashes per 100 MVK over the project length. ■ A concept design which achieves a 110km/hr design speed for the vertical alignment (for Class M standard) and a minimum 100km/hr design speed for Class A standard⁶. ■ A concept design which achieves a 110km/hr design speed for the horizontal alignment. ■ No access points between interchanges along the length of the project for Class M standard road and minimise access points for Class A standard road sections. ■ A route that can be upgraded to Class M standard in the future (as applicable). ■ Retain or replace existing rest areas within the study area.
Reduce travel times	<ul style="list-style-type: none"> ■ Provide a route that maximises the reduction in travel time for Pacific Highway traffic. ■ Provide intersections designed to at least a Level of Service LOS C, 20 years after opening for the 100th Highest Hourly Volume. ■ Minimise user delay from incidents and road closure on the Highway including from flooding. ■ Reduce delays from holiday congestion. ■ Minimise disruption and delay during construction.
Reduce freight transport costs	<ul style="list-style-type: none"> ■ Provide a route which reduces overall freight transport costs of trucks using the Highway. ■ A route that meets or exceeds B-Double requirements.
Develop a route that involves the community and considers their interests	<ul style="list-style-type: none"> ■ Develop a project that meets the objectives of the Community and Stakeholders Involvement Plan and specifically the Criteria for Successful Projects. ■ Minimise the physical and traffic impacts of the route such as traffic noise levels, intrusion, community severance and access patterns. ■ Minimise the physical impacts on heritage (indigenous and non-indigenous) sites. ■ Provide transport developments which are complementary with land use. ■ Maintain access to affected properties and land during construction. ■ Upgrade and improve the existing highway where it is retained as part of the project.

⁶ 110km/hr vertical alignment is desirable for Class A standard sections (upgrading/duplication of the existing Pacific Highway) where it can be achieved cost-effectively and without compromising environmental or social impact standards.

Pacific Highway Upgrade Program objectives	Wells Crossing to Iluka Road project objectives
<p>Provide a route that supports economic development</p>	<ul style="list-style-type: none"> ■ Maintain accessibility for local industries to regional and interstate markets. ■ Maintain access to local and regional centres of economic importance. ■ Minimise impacts on business/service facilities dependent on Pacific Highway traffic and create opportunities for businesses to capitalise on benefits that may arise from the upgrade. ■ Provide flood immunity on at least one carriageway between 1% AEP (target) and 20% AEP (absolute minimum).
<p>Manage the upgrading of the route in accordance with ecologically sustainable development principles</p>	<ul style="list-style-type: none"> ■ Minimise the effects on sensitive habitats. ■ Minimise the effects on native vegetation. ■ Avoid direct impacts on National Parks and SEPP 14 wetlands where possible. ■ Effectively encapsulate the principles of ESD in the project framework and approach.
<p>Provide the best value for money</p>	<ul style="list-style-type: none"> ■ Minimisation of the Whole of Life Costs of the project. ■ Maximise the use of the existing road reserve for duplicated sections of the project where possible. ■ Achieve a Benefit Cost Ratio of greater than 2. ■ Expenditure supports NSW State Government and Clarence Valley Council development policies.

3.2 Design principles

3.2.1 Highway design principles and standards

The options have been designed in accordance with RTA and Austroads design standards, including the draft *Upgrading Program beyond 2006 – Design Guidelines (Version 1.2)* (RTA, 2005). This document is one of a series that set a framework for the continued delivery of the Pacific Highway Upgrade Program. It describes design standards with respect to matters such as integration between projects, road safety and traffic, geometric design, durability, flooding and drainage (including design of structures), environmental requirements and urban design.

The highway is to be designed initially to accommodate four lanes (two lanes in each direction), but to make allowance for a possible future upgrade to six lanes (three lanes in each direction), if and when needed. The additional two lanes would be accommodated within the central median, which would mean that there would be no need to widen the road reserve.

Two standards of design were considered, defined as:

- Class M projects, which are designed to 110 km/h motorway standard. Traffic access onto or off the motorway is restricted to grade separated interchanges with major roads. Local road routes that cross the upgraded highway are retained through overpasses or underpasses. New local service roads may be required to accommodate individual property access.
- Class A projects, which are also designed to 110 km/h standard, but generally signposted at 100 km/h. These are designed as controlled access roads, with direct access from local roads at limited locations, and interchanges with major roads where traffic demand justifies the cost. Under the Pacific Highway Upgrade Program, Class A roads are designed with provision to enable conversion to Class M standard in the future.

The minimum objective in relation to flood immunity of the road is to provide at least one carriageway above the 1 in 20 year flood level. It is preferable to provide one carriageway above the 1 in 100 year flood level where cost effective.

Figure 3-1 provides examples of Class M and Class A standard roads, from other sections of the Pacific Highway that have been upgraded. The cross section at **Figure 3-2** shows a typical arrangement of the highway upgrade, with a 12 metre wide median. The total width of the road is 32 metres from shoulder to shoulder. The actual road footprint would be potentially wider in areas of cut or fill.

For the purposes of comparative assessment of the route options in this report, a nominal road reserve width of 100 metres wide has been adopted. The road reserve⁷ required for the route options would vary in width. It may be wider in areas of deep cut, where service roads are required and at interchange locations. The road reserve could be narrower in some areas to minimise impacts on sensitive land uses and in areas of small cuts and fills.

The existing Pacific Highway is important as a local access route to properties and towns in and around the study area. It provides direct access to properties with frontage to the Pacific Highway and indirect access to properties in the study area via local and regional roads. It also passes through or close to several towns and villages.

The upgraded highway would be constructed to a motorway standard and would therefore have limited use as a local access route. Access to and from the motorway would be restricted to grade separated interchanges with major roads in the study area, with the exception of some sections that may initially be developed to Class A standard, with allowance for direct access at limited locations. It is a requirement of the design standards for the project that the upgrade does not impact negatively on local access. In order to cater for access to properties via the local road network, service roads and overpasses or underpasses would be provided as required to ensure that an appropriate standard of local access is provided. Typically, service roads would be constructed alongside the upgraded highway alignment. In some cases, where the upgraded highway is to be located adjacent to the existing highway, the existing highway may operate as a local access route or alternative route.

The extent of service roads and bridging would depend on the number and location of local connections and the availability of alternative routes. The design of the road, and associated

⁷ The road reserve refers to the land that would be acquired by the RTA for the construction of the road and all ancillary works.

changes to local access routes, would ensure that access to all properties is maintained to an appropriate standard. This may mean changes to the access route for some properties.

Further discussion of the concept for maintaining local access for the route options is provided in **Section 1**.

Figure 3-1 Examples of Pacific Highway Upgrade road configurations

A typical dual carriageway Class M motorway



An example of how local access can be maintained using an overpass



An example of an interchange on a Class M motorway

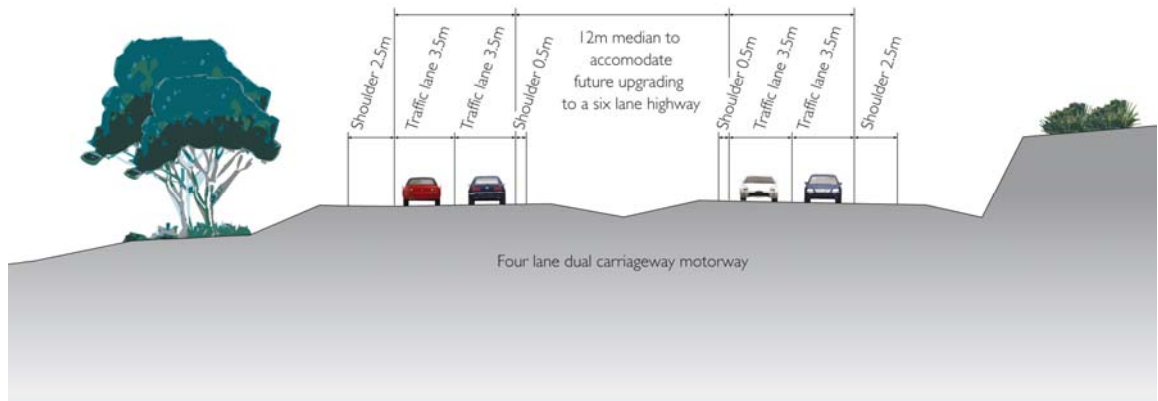


An example of the duplication of an existing single carriageway, to Class A standard

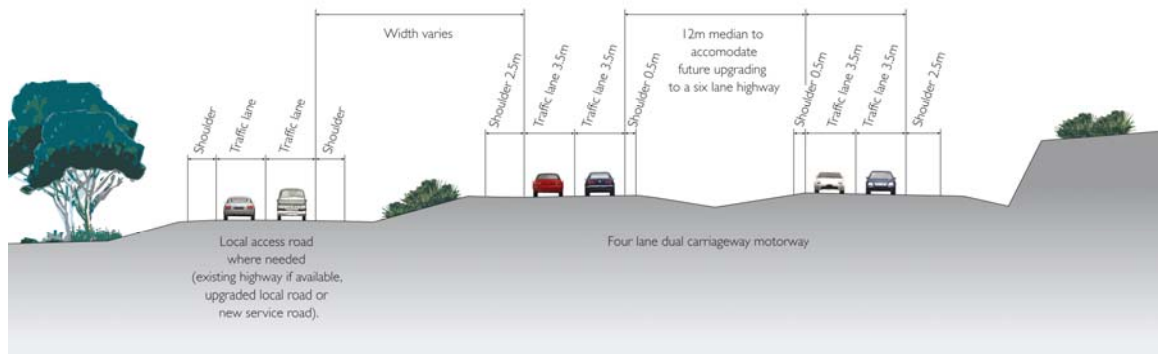


Figure 3-2 Typical cross-sections of the upgraded highway

Typical cross-section showing an upgraded, dual carriageway highway



Typical cross-section showing the new motorway with a local access road running parallel



3.2.2 Urban design principles and strategy

The *Pacific Highway Urban Design Framework* (RTA 2005) provides guidelines for urban design considerations to be incorporated into all stages of the Pacific Highway Upgrade. The Urban Design Framework emphasises the importance of considering urban design early in the project, at the route selection stage. The RTA has defined a vision for the Pacific Highway Upgrade Program:

‘A sweeping, green highway, providing panoramic views to the Great Dividing Range and the forests, farmlands, and coastline of the Pacific Ocean. The route is punctuated by the presence of distinctive settlements, rivers, mountains and bridges.’

Within the context of the Urban Design Framework, the project needs to consider the specific landscape and development considerations of the study area so that the project can be integrated with the local context.

The key principles of the urban and landscape design approach to the project are to:

- Maintain or improve the quality of the visual environment for the local population and tourists in rural and urban contexts.
- Create socio-economic benefits and minimise adverse impacts on local populations and visitors and enhance local functions.
- Enhance the experience of road users and avoid boredom.

The Urban Design Framework for the Pacific Highway Upgrade Program defines six objectives for the planning and design of the highway:

- To design a flowing road alignment that is responsive and integrated with the landscape.
- To provide a well vegetated, natural road reserve.
- To provide an enjoyable, interesting highway with varied views and vistas of the landscape and pleasant restful places to stop.
- To provide value to the communities and towns along the road.
- To provide consistency with variety in road elements.
- To provide a simplified and unobtrusive road design.

The opportunity to achieve these objectives has been considered in developing the route options. Detailed design strategies will be investigated further during the design and environmental assessment of a preferred route.