Roads and Traffic Authority of NSW

Oxley Highway to Kempsey
Upgrading the Pacific Highway

Environmental Assessment

MAIN VOLUME

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18. Traffic and transport

This chapter assesses the impacts on traffic and transport that would result from the construction and operation of the Proposal.

The Director-General's environmental assessment requirements identify traffic and transport impacts to be a key issue. **Table 18-1** indicates where the aspects of the Director-General's environmental assessment requirements that relate to traffic and transport are addressed, either in this chapter or in other chapters (in *italics*).

Table 18-1 Traffic and transport

Environmental assessment requirements	Where addressed
Traffic and Transport – including but not limited to:	
• Operational traffic and transport impacts to the local, regional and Forests NSW road network (existing and planned), including impacts from traffic rerouting and modified access to the upgraded highway.	*Section 10.2.5* **Sections 18.3.2** and **18.3.3**
• Construction traffic impacts (including spoil haulage).	**Section 18.3.1**
• Public transport impacts (including on bus services).	**Sections 18.3.1** and **18.3.2**
• Interactions with rail infrastructure and the viability of a shared road and rail corridor.	**Section 18.3.2**

18.1 Assessment approach

The assessment of potential traffic impacts has taken into account the preliminary traffic assessments undertaken for the route development and preferred route selection phases, together with detailed traffic assessments undertaken for the Proposal. Additional information for the local road network was obtained from local councils and consultations with Forests NSW and local industries.

An origin-destination survey was conducted on Thursday 2 December 2004 over a 12-hour period between 6.30am and 6.30pm at the following locations:

- Pacific Highway (south of Kempsey).
- Pacific Highway (south of Sancrox Road).
- Rollands Plains Road.
- Blackmans Point Road.
- Hastings River Drive.
- Sancrox Road.

A survey of turning movements at key existing intersections was also undertaken in 2004. The findings of these surveys have been used to determine traffic volumes and patterns for the Proposal, including the proposed service road network.

As there has been no significant changes to development patterns in the area, the results of these surveys represent current movement patterns in the Proposal area.

The projected traffic flows for the Proposal were compared to the existing Pacific Highway traffic conditions at an assumed date of opening to traffic (2016), as well as a period of 20 years after that date. This comparison was undertaken for the Proposal including the proposed interchanges and traffic arrangements, together with the possible staging options for the Proposal.

Traffic was assigned to the Proposal for the short term (2016), medium term (2026) and long term (2036) cases based on the results of the 2004 origin-destination survey and on turning movements at key existing intersections.

The traffic assignment was based on the assumption that the Oxley Highway upgrade would be completed prior to the opening of the upgraded Pacific Highway. Consequently, it was assumed that 90 per cent of traffic on Hastings River Drive with destinations to the south in the Sancrox area would use the Oxley Highway. The percentage distribution of traffic assumed at other intersecting roads is provided in **Table 18-2**.

Table 18-2 Assumptions for intersecting road traffic assignments for the Proposal

Location	North	South	Cross/ local traffic
Smiths Creek Road	60%	30%	10%
Upper Smiths Creek Road	70%	20%	10%
Kundabung Road	50%	30%	20%
Yarrabee Road	50%	50%	n/a[1]
Pembrooke Road	80%	20%	n/a[1]
Cairncross waste management facility	10%	90%	n/a[1]
Wharf Road	50%	50%	n/a[1]

Notes: 1. No local cross highway traffic at these locations.

18.2 Existing environment

18.2.1 Existing traffic volumes and patterns

The existing Pacific Highway between the Oxley Highway and Stumpy Creek is predominantly a two lane road, with some sections of four lanes. There are a number of existing public roads, private roads and driveways that directly access the existing highway. In addition, there are a number of direct access points for the state forests and nature reserves. In total, there are 76 direct access points located along the existing Pacific Highway from the Oxley Highway to Stumpy Creek.

Average annual daily traffic

Annual average daily traffic is the total traffic per year divided by the number of days in the year. It is measured by the average number of axle pairs passing in both directions in a 24 hour period. This figure is then estimated over a period of one year. Annual average daily traffic volumes obtained from RTA counting stations for 2004 and projected from this actual data for 2006 are shown in **Table 18-3**.

Table 18-3 Pacific Highway traffic volumes 2004

RTA count station	Location	Annual average daily traffic 2004	Projected annual average daily traffic 2006
09.293	South of Hastings River Drive	12,304	13,290
09.004	Blackmans Point at Hastings River bridge	14,937	16,130
09.137	Telegraph Point (North of Wauchope Road)	14,409	15,560
09.295	At Kempsey local government area boundary	14,310	15,460

Source: *Traffic Volume Data for Hunter and Northern Regions* (RTA 2004d)

The annual average daily vehicles is less than the annual average daily traffic number as, for instance, a heavy vehicle would have more than one axle pair. This correlation is shown in **Table 18-7** in **Section 18.2.3**.

The highest traffic volumes on this section of the Pacific Highway were measured to the north of the Hastings River Drive, and particularly between Hastings River Drive and Telegraph Point. Drivers from Port Macquarie primarily use the existing Oxley Highway interchange to travel south on the Pacific Highway. This explains why traffic volumes on the existing highway south of Hastings River Drive are lower than those recorded north of Hastings River Drive.

Seasonal traffic variations

Daily traffic volumes vary significantly throughout the year with the highest daily traffic volumes occurring in peak holiday periods (December, January and April) as shown in **Figure 18-1**.

Hourly traffic variations

The 2004 traffic data also indicates that the highest hourly traffic volume occurs between 4pm and 5pm on weekdays. Volumes between 7am and 7pm on weekdays are significantly higher than weekends or night times. **Figure 18-2** shows a typical hourly profile for weekday traffic on the existing highway.

Directional traffic split

An assessment of the RTA counts along the Pacific Highway during the period 2002 to 2006 shows, on average, an even (50:50) directional split between northbound and southbound traffic.

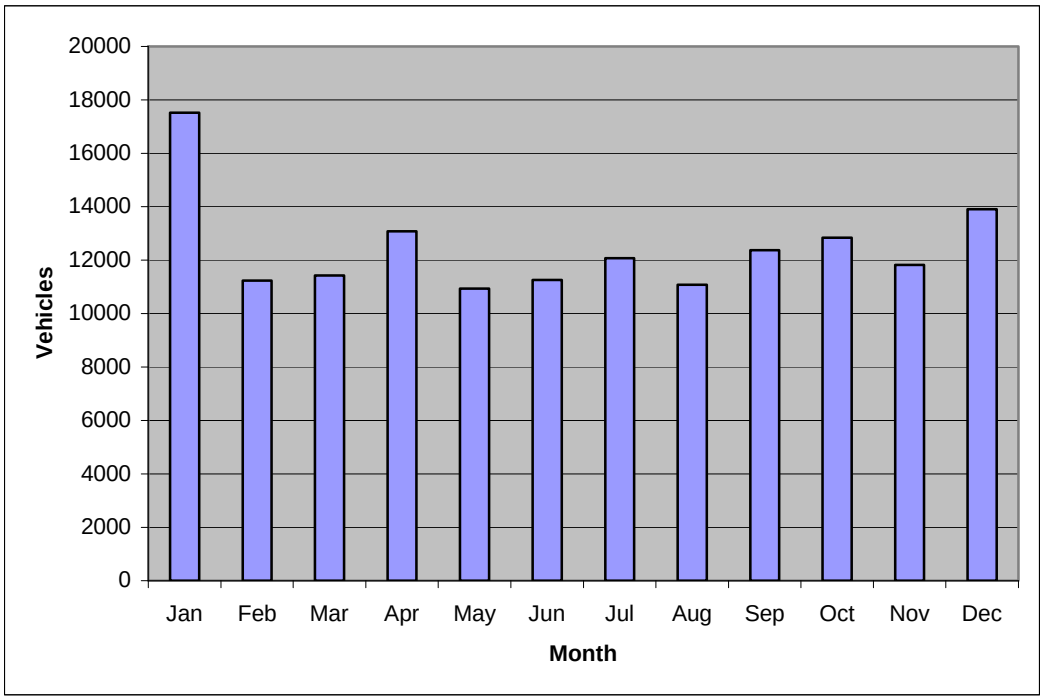
Heavy vehicle traffic

Heavy vehicles comprise on average 20 per cent of the existing highway traffic, varying between approximately 13 per cent during the day (7am to 7pm) to approximately 43 per cent during the night (7pm to 7am) on weekdays.

Through traffic

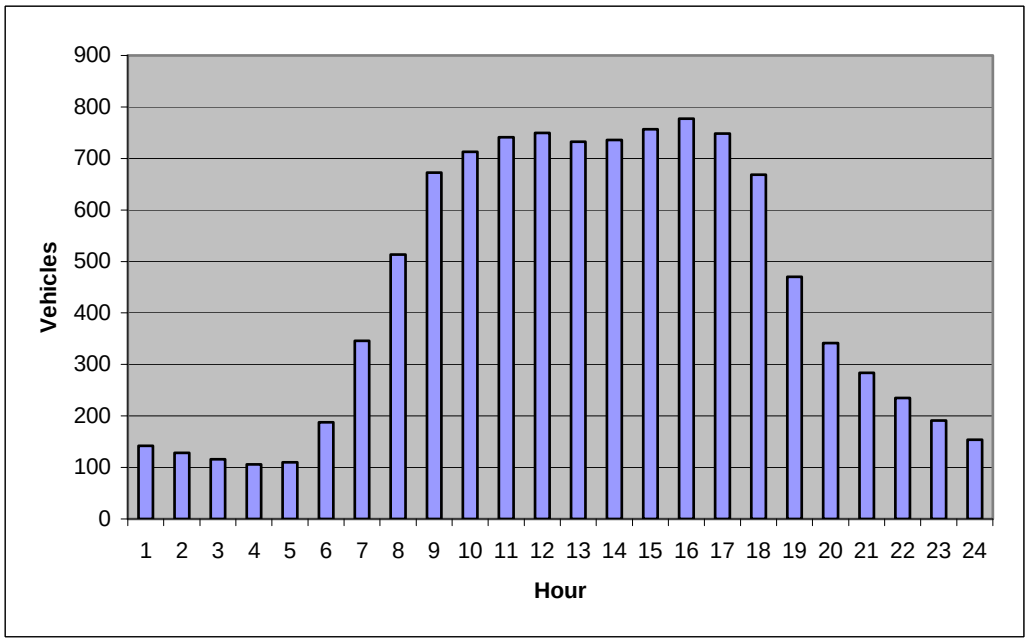
Traffic on the existing highway consists of a combination of both local and through traffic. The results of the origin-destination survey indicate that through traffic accounts for 18 per cent of northbound traffic and 26 per cent of southbound traffic.

Figure 18-1 Pacific Highway traffic – seasonal variations



Source: Data obtained from RTA count station south of existing Oxley Highway interchange (2006)

Figure 18-2 Pacific Highway weekday traffic - typical hourly profile



Source: RTA two-week count (2004)

However, this result would be skewed by the significant imbalance in overnight traffic flow patterns affecting the first hour of the survey period. A much higher proportion of heavy vehicles are present at this time of the day. The majority of heavy vehicles are likely to be through traffic. Therefore the through traffic patterns derived from the origin-destination survey are considered accurate for the day time period only.

Traffic growth

The projected traffic growth for the Oxley Highway to Kempsey section of the Pacific Highway is based on a 4 per cent annual increase. This is based on recorded traffic volumes between 1995 and 2004. Since the projections were calculated further analysis of this data by the RTA, along with recent unpublished data from traffic counts undertaken by the RTA, indicates that the actual long term growth rate could be lower, at approximately 2 per cent. The difference is attributed to a marked increase in traffic volumes using the Pacific Highway, in particular B-doubles, in the period of 2001 to 2004. Therefore the projections upon which this assessment is based should be viewed as a worst case scenario and would be refined during the detailed design phase as more information becomes available.

The projected traffic volumes on the existing highway are given in **Table 18-4**. These projected volumes provide the base projections on the existing highway.

Table 18-4 Existing highway – estimated annual average daily traffic for 2006, 2016, 2026 and 2036

Location	2006	2016	2026	2036
South of Hastings River Drive	13,290	18,210	23,130	28,050
Blackmans Point (at Hastings River bridge)	16,130	22,110	28,080	34,060
Telegraph Point (north of Wauchope Road)	15,560	21,330	27,090	32,850
Kempsey local government area boundary	15,460	21,180	26,900	32,630

18.2.2 Road network

Connectivity and access

There are 76 existing public roads, private roads and driveways that directly access the existing highway. Major intersections are at Hastings River Drive in the south, Sancrox Road, Fernbank Creek Road, Pembrooke Road, and Kundabung Road in the north. These intersections are at-grade with direct access to the existing highway. Other smaller intersections with direct at-grade access to the existing highway are located along the Proposal length. There are also a number of direct access points for private properties, state forests and nature reserves.

The origin-destination survey conducted for the Proposal indicated that during the day time, the majority of traffic is regional or local traffic, being traffic whose journey on the existing highway commenced or ended within the Proposal length.

Regional roads

The Pacific Highway forms the major component of the regional road network and the Pacific Highway Upgrade Program is an integral part of improving the regional road network. The Oxley Highway is located to the south of the Proposal and intersects the Pacific Highway at an existing grade separated interchange. It connects Wauchope and the surrounding area in the west with Port Macquarie on the coast.

The regional roads within the Proposal area are Hastings River Drive and Pembrooke Road. Hastings River Drive carries between 6800 vehicles per day (near the Pacific Highway) and 13,000 vehicles per day (further to the east near Gordon Road). It provides an alternative route to the Oxley Highway for traffic accessing Port Macquarie from the north.

Pembrooke Road provides a secondary link between Oxley Highway at Wauchope and the Pacific Highway south of Telegraph Point. It carries about 500 vehicles per day, of which approximately 8 per cent is estimated to be heavy vehicles.

Local access roads

The results of traffic counts that were undertaken in 2006 for key local roads that intersect with the existing highway are presented in **Table 18-5**.

Table 18-5 Average daily traffic on side roads connecting to the Pacific Highway

Road	Date	Average daily traffic (Mon -Fri)	Average daily traffic (Mon -Sun)	% heavy vehicles
Yarrabee Road	28/8/06 – 10/9/06	72	73	50%
Mingaletta Road	27/6/06- 3/7/06	35	33	-
Upper Smiths Creek Road	27/6/06- 3/7/06	95	85	-
Wharf Road	13/6/06- 22/6/06	41	41	5%
Kundabung Road	13/6/06- 22/6/06	186	175	10%
Old Coast Road	6/7/06- 23/7/06	51	47	-
Glen Ewan Road	28/8/06 – 10/9/06	187	169	6%
Waste management facility	28/8/06 – 10/9/06	218	174	42%
Smiths Creek Road	28/8/06 – 10/9/06	487	486	6%

Source: Tube counts undertaken by Kempsey Shire Council, 2006

Based on analysis of the traffic counts, the principal traffic characteristics for the local access roads are summarised below:

- Hourly variations: There are significant hourly variations on local access roads. The hourly variations for local access roads correspond to the hourly variations for the existing highway traffic, as local movements within the region are predominantly made on the existing highway.
- Daily variations: There are significant daily variations, in particular on Yarrabee Road and the access road to the waste management facility. These variations are predominantly the result of the activities of waste trucks and quarry trucks.

Quarry truck exiting Yarrabee Road

- Directional distribution: Although some evening and morning peaks are evident, volumes vary greatly for all local access roads. An example is Pembrooke Road where westbound traffic is almost double that of the eastbound traffic.
- Heavy vehicles: There are significant variations in the proportions of heavy vehicle traffic. For example Yarrabee Road and the access road to the waste management facility in Cairncross carry a high proportion of heavy vehicles (42 to 50 per cent).

General existing local traffic movements within the area can be summarised as:

- South of the Cairncross State Forest, direct access to the existing highway to travel north or south is available at a number of locations including Sancrox, Fernbank Creek, Glen Ewan, Wharf and Blackmans Point roads with all local traffic using the existing highway for short trips to access Port Macquarie via Hastings River Drive or the Oxley Highway.
- In the vicinity of the village of Telegraph Point, south of the Wilson River, local traffic movements include accessing local services at Mooney Street involving short trips on the existing highway and longer trips to the north or south to access regional centres. Direct access to the existing highway to travel north or south is available at a number of locations including Moorside Drive and Pembrooke Road.
- In the vicinity of the village of Telegraph Point, north of the Wilson River, local traffic movements include accessing local services at Rollands Plains Road, which for those to the east of the existing highway would require short trips on the existing highway. For those generally to the west these trips can be made on Rollands Plains Road and Cooperabung Drive. Direct access to the existing highway to travel north or south is available at a number of locations including Rollands Plains Road, Cooperabung Drive, Haydons Wharf Road and Wilmaria Road.
- At Kundabung local traffic movements include accessing local services at Ravenswood Road requiring short trips on the existing highway for the majority of traffic. Direct access to the existing highway to travel north or south is available at a number of locations including Mingaletta Road, Upper Smiths Creek Road, Wharf Road, Kundabung Road, Smiths Creek Road and Ravenswood Road.
- There are numerous opportunities for direct access to the existing highway within the state forests and nature reserves along the Proposal length.

18.2.3 Level of service of the existing highway

The traffic conditions of major roads and intersections can be described in terms of their operating level of service. *Austroads Guide to Traffic Engineering Practice, Roadway Capacity* (Austroads 1988) assigns a level of service using qualitative measures of features including speed, travel time, traffic interruptions, freedom to manoeuvre, safety, driving comfort, convenience and operating costs. Levels of service definitions are provided in **Table 18-6**.

Table 18-6 Level of service definitions

Level of service	Definition
A	Generally free flow conditions with vehicles unimpeded in manoeuvring in the traffic stream.
B	Stable flow with manoeuvring traffic stream only slightly restricted with the possibility of slight delays.
C	Stable flow with manoeuvring becoming more restricted however any delays are acceptable.
D	Approaching unstable flow with delays common but tolerable.
E	Unstable flow with traffic stream congested and with intolerable delays.
F	Forced flow with movement of traffic stream at very slow speed.

Table 18-7 shows that in 2006 it is estimated that the existing highway was operating at level of service D and was approaching unstable traffic flow conditions during peak traffic periods.

Table 18-7 Estimated level of service on the existing highway in 2006

Location	Annual average daily traffic	Annual average daily vehicles	Average speed (km/h)	Level of service
South of Hastings River Drive	13,290	9840	82.9	D
Blackmans Point (north of the Hastings River)	16,130	11,950	82.0	D
Telegraph Point (north of Wauchope Road)	15,560	11,530	82.2	D
Kempsey local government area boundary	15,460	11,450	82.2	D

Notes: 1. Traffic volumes denote two-way flows. Annual average daily traffic at the above RTA counting stations are in axle pairs. Annual average daily traffic is converted to annual average daily vehicles using a conversion factor of 1.35.

The level of service assigned in **Table 18-7** is based on analysis of the peak period traffic flow conditions for the existing highway with reference to *Guide to Traffic Engineering Practices - Part 2 - Roadway Capacity* (Table 3.1) (Austroads 1988).

If a conservative 4 per cent per annum traffic increase is used for predictions, and if the Proposal were not constructed, in 2016 the existing highway would be expected to operate at level of service D south of Yarrabee Road and level of service E north of Yarrabee Road. This would result in the Pacific Highway operating beyond capacity in this section.

18.2.4 Crash history

Figure 18-3 indicates the locations of all crashes for the period 2002-2006 along the Pacific Highway within the Proposal length.

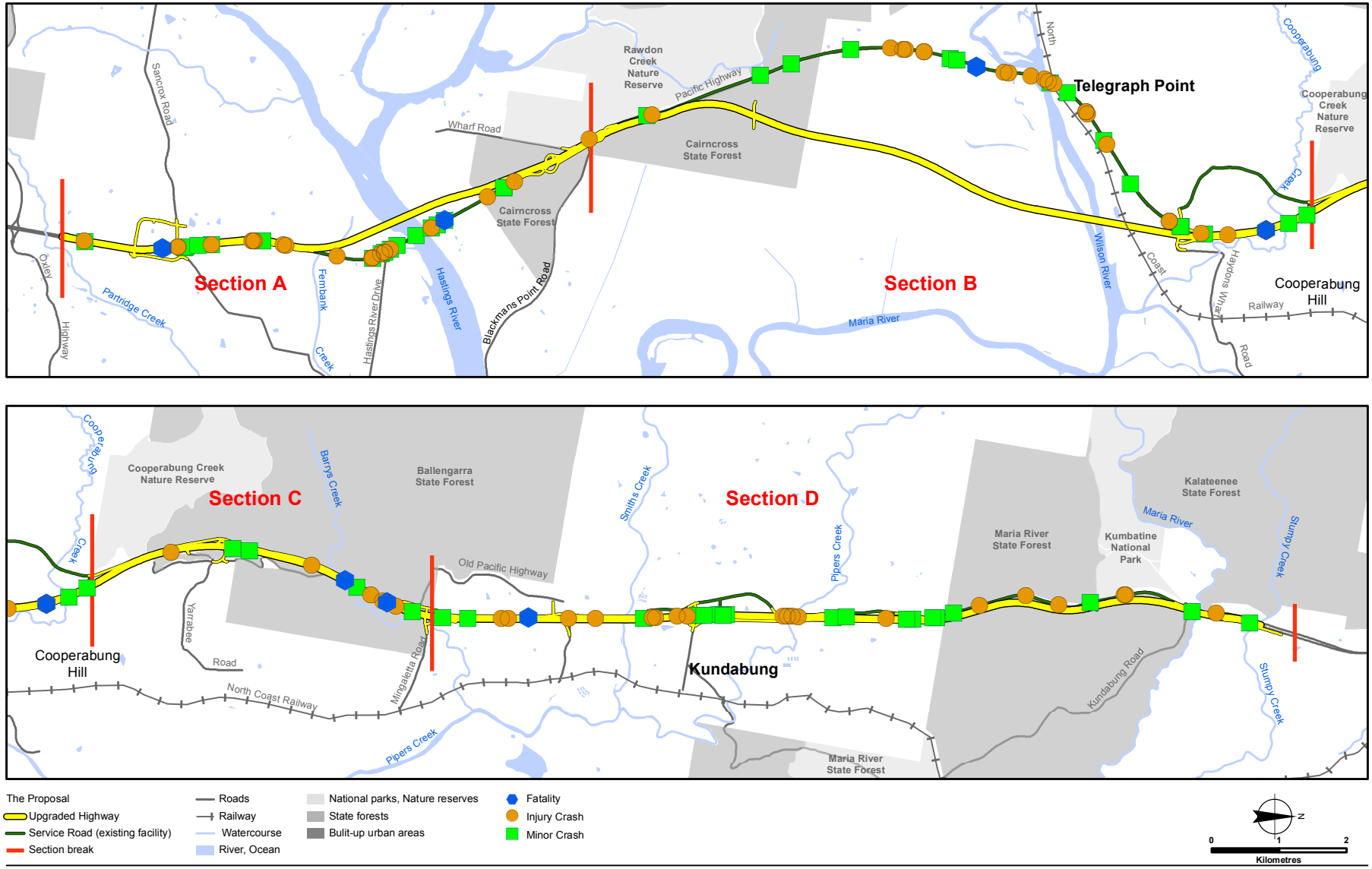
An assessment of reported crashes for the section of the Pacific Highway between the Oxley Highway and Kempsey for the period 2002-2006 shows that:

- 129 crashes occurred in this period.
- Seven of the crashes resulted in fatalities.
- 66 crashes resulted in injuries.
- 56 crashes were without injuries.
- 15.5 per cent of all crashes occurred in the vicinity of intersections.
- 61.2 per cent of all crashes involved single vehicles while 38.8 per cent involved multiple vehicles.
- 57.4 per cent of all crashes occurred during day time.

The crashes involved:

- Off road, on straight, hit object – 27.9 per cent.
- Rear end – 12.4 per cent.
- Head-on (not overtaking) – 11.6 per cent.
- Off road, on straight – 10.1 per cent.
- Other – 38 per cent.

Figure 18-3 Crash sections along the Pacific Highway (2002-2006)



Over the period 2002-2006, the crash rate on the Pacific Highway between the Oxley Highway and Kempsey ranged from 15.4 to 22.3 per 100 million vehicle kilometres and the average crash rate was 19.2 per 100 million vehicle kilometres. This compares poorly with the Pacific Highway Upgrade Program objective of 15 crashes per 100 million vehicle kilometres.

The data shows a concentration of crashes within the vicinity of Telegraph Point, Kundabung and the Hastings River Drive intersection. If the 'do nothing' option was adopted, the number of crashes in this area would be expected to continue, or even increase.

18.2.5 Public transport

Bus services

Bus services utilise the existing Pacific Highway, with school services being the primary service provided. Buses are the primary mode of public transport within the Proposal area with bus services provided between Port Macquarie and Kempsey and the surrounding towns and villages. Informal roadside bus stops are located along the existing highway route. Existing local weekday bus services within the Proposal area along the Pacific Highway are summarised in **Table 18-8**.

Services by other bus operators involve regular travel along the Pacific Highway to other destinations outside the area. The maximum number of buses currently operating on any section of the existing highway between Hastings River Drive and Stumpy Creek is approximately 14 per day.

Rail infrastructure

Functional railway stations operate on the North Coast Railway at Wauchope to the south of the Proposal and Kempsey to the north. Historically, there have been stations in the vicinity of the Proposal at Pembrooke, Telegraph Point, Mingaletta and Kundabung. These railway stations were closed between 1966 and 1983.

The Proposal would cross the North Coast Railway by overbridge in the area north of the Wilson River, east of Telegraph Point. An assessment of the viability for a shared road and rail corridor is provided in **Section 18.3.2**.

Table 18-8 Local weekday bus services

Bus no.	Bus route	Key roads used	Service times	Service
56	Cooperabung to Pembrooke	Pacific Highway via Pembrooke Road	Morning	School
56	Telegraph Point to Torrens Island	Pacific Highway	Afternoon	School
56	Cooperabung to Torrens Island	Pacific Highway	Afternoon	School
66	Torrens Island to Blackmans Point	Pacific Highway via Blackmans Point Road	Morning Afternoon	School
76	Torrens Island to Blackmans Point	Pacific Highway	Morning Afternoon	School
77	The Hatch to Blackmans Point	Pacific Highway via Mooney Street (morning) and Pembrooke Road (afternoon)	Morning Afternoon	School

Bus no.	Bus route	Key roads used	Service times	Service
87	South Kempsey to Blackmans Point	Pacific Highway via Ravenswood Road, Smiths Creek Road and Kundabung Road	Morning Afternoon	Passenger and school
88	Blackmans Point to South Kempsey	Pacific Highway via Smiths Creek Road, Crowthier Drive and Kundabung Road	Morning Afternoon	Passenger and school
93	Kundabung to Blackmans Point	Pacific Highway via Blackmans Point Road, Moorside Drive and Mooney Street	Morning Afternoon	School
93	Kundabung to Blackmans Point	Pacific Highway via Upper Smiths Creek Road and Smiths Creek Road	Morning Afternoon	School

18.3 Traffic and transport impacts of the Proposal

The level of impacts to traffic during the construction period and at opening times are outlined in the following sections, and the extent of impacts would depend on the staging option that is adopted. Staging options are discussed in **Section 7.3**. Measures to minimise these impacts are discussed in **Section 18.4**.

18.3.1 Impacts caused by construction

Construction impacts generally

Impacts on traffic during construction of the Proposal would be temporary and transitory by nature. Traffic impacts would occur as a result of the movement of construction vehicles along the existing highway and along service and access roads, the hauling of construction materials and service and workforce vehicles.

The impacts on any given locality would largely depend on the construction program that is adopted. Staging options for the construction of the Proposal are discussed in **Section 7.3**.

Impacts caused by construction vehicle traffic would include:

- Increased travel times due to reduced speed limit around construction sites.
- Increased travel times due to increased truck and construction machinery movements.
- Partial or complete closure of roads and altered property accesses during construction.

Traffic impacts of construction would be greater in the areas involving duplication of the existing highway than in those areas where the alignment of the Proposal deviates away from the existing highway. The impact of construction activities on traffic in areas such as the bypass of Telegraph Point and the crossing of the Hastings River would not be as great as in other areas, as construction would take place away from traffic using the existing highway and, to some extent, the local road network.

The concept design has sought to minimise the number of traffic switches from one carriageway of the highway to the other during construction to help minimise traffic disruption. However, traffic switching during the construction phase would probably be required in areas involving the duplication of the existing highway.

Traffic management plans to deal with these situations would be developed at the detailed design stage, and further refined during the construction phase to minimise traffic disruption. Management measures to reduce the impact of local road closures, such as temporary diversions, are presented in **Section 18.4**.

Connectivity

Connectivity between communities would be impacted during construction as a result of impediments to traffic flow, the introduction of construction traffic and changes to the service and access road network, however these would be short-term.

Property access

Access to individual properties would be affected by construction activities, either through the loss of existing access arrangements, or the alteration of access arrangements. However, property access would be maintained at all times, and any impacts would be short-term.

Local access

The Proposal would involve the construction of new sections of service and access roads, together with upgrading other sections of existing roads to connect with the Proposal. Existing routes for local traffic movements would be altered during and after construction. This could include temporary closure of some local access roads during construction. Management measures to reduce the impact of local road closures are outlined in **Section 18.4**.

Regional roads

The construction of the Proposal would not impact on regional roads directly. For example, at Hastings River Drive, the Proposal alignment is approximately 300 metres to the west of the existing highway intersection and passes over Glen Ewan Road. At Pembrooke Road the Proposal alignment is approximately 1.6 kilometres to the west of the existing highway. Although the construction of new sections of service and access roads would alter existing local traffic flow patterns, the Proposal is expected to improve connectivity to regional roads.

Haulage

As discussed in **Sections 7.4.4 and 7.5.2,** the Proposal would require the delivery of resources, such as fuel, cement, sand and fill dependent on the staging option (if any) selected, that cannot be sourced onsite. The existing highway and controlled access points to the Proposal would be used for the delivery of materials from offsite.

Generally there are two broad options for the haulage of materials during construction that have been considered in the preparation of this Environmental Assessment. These include the use of the existing highway and/or the construction of temporary haulage tracks along the Proposal.

Haulage along the existing highway is likely to have an impact on traffic and safety for other road users. Haulage along temporary haulage tracks would require the construction of either temporary crossings or permanent bridges at creeks or watercourses. The use of the existing highway or haulage tracks, or a combination of both would depend on the adopted staging option as well as the construction delivery technologies employed at the time.

The impact of haulage would depend on the staging and construction program adopted. However the range of truck movements can be broadly estimated as indicated in **Table 18-9**. Estimates are based on material being extracted from the road cuttings in the Cooperabung Hill and Maria River areas for the construction of the embankments across the Hastings and Wilson river floodplains.

Table 18-9 provides an example of the relative impact on truck movements of using low capacity trucks (eg 12 cubic metres) and high capacity trucks (eg 22.5 cubic metres).

Table 18-9 Anticipated truck movements for haulage

Area	Estimated volume	Truck movements (each way)	
		Low capacity truck	High capacity truck
Hastings River floodplain	250,000 m^3	21,000	11,000
Wilson River floodplain	400,000 m^3	33,000	18,000

Note: No allowance has been made in the above calculations for material type, suitability etc.

As shown in **Table 18-9**, the use of haulage vehicles with higher load capacity would almost halve the number of truck movements. The use of larger capacity vehicles in either the on-highway or off-highway situation would also have a positive impact in reduced use of fossil fuels and less pollution such as noise, fumes and dust. However, the use of such vehicles could also have negative impacts with regard to road and bridge loading capacities, road pavement condition, as well as road user safety and delay issues.

The construction of the Proposal would be expected to take three to five years, however this would be dependent on funding and the construction delivery method and staging options adopted. Assuming the major earthworks are undertaken over a period of 12 months the average daily truck movements each way along the Proposal would be approximately 200 for low capacity trucks and approximately 100 for high capacity trucks, which is relatively low compared with existing heavy vehicles volumes on the Pacific Highway.

While the decision on the best method for the haulage of earthworks materials would be subject to the construction program adopted and the resources available to the construction contractor, the volume of construction and haulage traffic on the existing highway would be minimised wherever possible. The management measures to be adopted for any proposal for the use of the existing highway or local road network by construction traffic are detailed in **Section 18.4**.

Rail infrastructure

The Proposal would involve the construction of two new bridges across the North Coast Railway north of the Wilson River, to the east of Telegraph Point. As discussed in **Section 7.4.4**, a temporary level crossing could also be required. Impacts on the operation of the railway would be managed in cooperation with ARTC.

Public transport

The Proposal would involve the removal of existing informal roadside bus stops from the existing highway during construction. Where the existing highway would be retained as a service road, existing informal bus stops would remain. Generally, where construction is occurring in the vicinity of the existing highway, all traffic, including buses, would continue to be able to use the existing highway, albeit under reduced speed limits for public and workforce safety, or would be provided with alternative travel routes if required.

Staging implications

In preparing this Environmental Assessment, the potential construction traffic and transport impacts of the possible staging option described in **Section 7.3.2** in comparison to the construction of the entire Proposal to a full motorway standard have been considered as outlined below.

Apart from the impacts discussed in **Section 18.3.1**, the only additional impact expected is that the potential construction traffic and transport impacts would occur over two separate time periods if this staging option was adopted.

Any traffic and transport impacts would be managed as discussed in **Section 18.4.1** for the construction phase of both this staging option and the ultimate motorway standard upgrade.

Should the Proposal be delivered in stages, the staging report described in **Section 7.3.3** would detail the construction traffic and transport impacts of the staging option. If any additional or altered impacts are identified, the staging report would further assess these impacts and identify appropriate management measures.

18.3.2 Operational traffic and transport impacts of the Proposal

Traffic on the upgraded highway during operation

Modelling is based on the premise that the Proposal would be constructed in its entirety and opened to traffic in the year 2016.

Projected traffic volumes for 2016, 2026 and 2036 were estimated by applying the traffic assignment assumptions (refer to **Section 18.1**) to the base case traffic projections in **Table 18-4**.

Table 18-10 shows the projected traffic volumes for the Proposal.

Table 18-10 Projected annual average daily traffic volumes after construction of the Proposal

Highway section	2016	2026	2036
Oxley Highway – Sancrox Road	16,920	21,750	26,590
Sancrox Road – Blackmans Point Road	16,110	20,720	25,320
Blackmans Point Road – Haydons Wharf Road	20,650	26,550	32,450
Haydons Wharf Road – Yarrabee Road	21,490	27,630	33,770
Yarrabee Road –Kundabung Road	21,410	27,520	33,640
Kundabung Road – Stumpy Creek	21,300	28,030	34,250

It is forecast that traffic volumes along the Proposal between the Oxley Highway and Blackmans Point Road would be reduced compared to the existing highway. This would be due to:

- The expected re-routing of local traffic on the proposed service road network between Sancrox and Hastings River Drive.
- The diversion of local area traffic from the north that want to access Hastings River Drive. This traffic would be able to leave the upgraded highway at the Blackmans Point interchange and use the existing highway to access Hastings River Drive.

The bypassing of Telegraph Point would separate through highway traffic from local traffic movements. This would result in greatly improved safety conditions for all road users, especially as the traffic volumes for both highway and local traffic increase over time.

Similarly, highway and local traffic would be separated in both the Sancrox and Kundabung areas by the provision of service and access roads that would link the areas to the east and west of the upgraded highway at these locations. This would be of particular value to road users in the Kundabung area where the current at-grade intersection provides the only link between the two parts of this community on either side of the existing highway.

Level of service of the upgraded highway

The level of service has been assessed for the upgraded highway based on the premise that the Proposal would be constructed in its entirety and opened to traffic in the year 2016, and the forecast traffic volumes shown in **Table 18-10** would eventuate. The predicted level of service for the various sections of the Proposal between the Oxley Highway and Kempsey are shown in **Table 18-11**.

Table 18-11 Level of service after construction of the Proposal

Highway section	2016	2026	2036
Oxley Highway – Sancrox Road	A	A	B
Sancrox Road – Blackmans Point Road	A	A	B
Blackmans Point Road - Haydons Wharf Road	A	B	B
Haydons Wharf Road – Yarrabee Road	A	B	B
Yarrabee Road – Kundabung Road	A	B	B
Kundabung Road – Stumpy Creek	A	B	B

The level of service assessment shows that with an adopted date of 2016 for opening to traffic, all sections of the Proposal would operate at level of service B or better within the 20 year operations horizon.

Travel efficiency

The length of the upgraded highway between the Oxley Highway and Stumpy Creek is approximately 700 metres less than the length of the existing Pacific Highway in this section. The Proposal provides more efficient travelling conditions by improving both the horizontal alignment and vertical grading of the upgraded highway, as well as removing a number of potential conflict points and crash blackspots from the upgraded highway alignment. As a result, the Proposal would achieve improved travel times in line with the goals of the Pacific Highway Upgrade Program as shown in **Table 18-12**.

Table 18-12 Estimated travel time savings

Year	Existing highway section (minutes per vehicle)	Arterial standard (minutes per vehicle)	Saving arterial standard (minutes per vehicle)	Motorway standard (minutes per vehicle)	Saving motorway standard (minutes per vehicle)
2016	28.4	26.2	2.2	22.8	5.6
2026	29.2	26.8	2.4	23.2	6.0
2036	30.0	27.3	2.7	23.7	6.3

In conjunction with improved travel times, the Proposal would also result in reduced vehicle running costs. The reduced vehicle running costs would be achieved through improved vertical and horizontal geometry, as well as reducing the route length by approximately 700 metres. Lower vertical grades would reduce fuel usage on inclines and reduce braking wear on declines. Improved horizontal geometry would reduce tyre wear and general vehicle wear and tear. Freight transport costs would be expected to decline because of the distance and time saving.

Road safety and crash rate

Improvements to road safety would be realised through the construction of the Proposal. It is anticipated that the Proposal would reduce crashes on the upgraded highway from 22.3 per 100 million vehicle kilometres based on 2006 crash rates to approximately 12 per 100 million vehicle kilometres. This is well within the overarching objective of the Pacific Highway Upgrade Program to reduce the crash rate to 15 crashes per 100 million vehicle kilometres over the length of the Proposal. Along with economic benefits from reduced vehicle crashes, community benefits such as reduced trauma from the loss of relatives would be achieved.

Examples of safety improvements are:

- Removal of at-grade intersections with the upgraded highway, with new connections provided at new interchanges and traffic arrangements.
- Provision of truck stopping bays.
- Provision of emergency management measures provided in the form of combined emergency crossover facilities and emergency U-turn facilities to divert traffic to the opposing carriageway in the case of an emergency and for use by RTA, police and emergency vehicles.
- Removal of bus stops from the upgraded highway, with new bus stops provided on local roads that carry less traffic.

Buses

Due to safety concerns associated with pedestrian movements on or near a high-speed highway, no provision has been made for bus stops along the upgraded highway. Provision has been made for buses to exit the Proposal at controlled access points (interchanges and traffic arrangements) and use the proposed service road network, which would require some changes to existing bus routes. There are no existing formal bus stops within the Proposal with local buses using informal bus stops to pick up school students and other passengers.

The location of informal bus stops on the local road network, where there would be significantly less traffic than either the existing or upgraded highway, would improve safety for both the bus operator and passengers, and in particular school students.

Any bus services that use the Pacific Highway would benefit from the improved travelling and road safety conditions provided by the Proposal. Local bus services would benefit from the reduced traffic on the local road network compared to the existing or upgraded highway, the relocation of informal bus stops away from the upgraded highway, and the reduced need to travel on the upgraded highway.

Rail

The Proposal would have little direct impact on rail services, apart from a possible improvement in access to railway stations for goods and passengers from the adjoining regional areas.

One of the issues identified in the Director-General's environmental assessment requirements relates to interaction with rail infrastructure operators and consideration of the viability of a shared road and rail corridor. Throughout the development process for the Proposal, the RTA has endeavoured to interact with ARTC with regard to the potential impacts on, and development proposals for, the rail infrastructure in this area.

During the development of the concept design for the Proposal, ARTC was approached to determine what proposals, if any, existed for the development of their infrastructure or a shared road and rail corridor in this area. ARTC's letter in response to this request indicated that, while they were interested in certain aspects of a shared road and rail corridor concept, there was currently no funding or firm proposal for such work.

In March 2008, ARTC was contacted to identify the level of development of any possible rail corridor upgrade route options between Port Macquarie and Kempsey that were contained within the *Sydney-Brisbane Corridor Strategy - Building our National Transport Future* (DOTARS 2007). ARTC was also consulted to determine their level interest in an option for a shared road and rail corridor.

The *Sydney-Brisbane Corridor Strategy - Building our National Transport Future* (DOTARS 2007) was commissioned by the Department of Transport and Regional Services. It identified deficiencies in the existing north-south rail corridor to meet forecast demands for rail services, and also discussed some options to address these deficiencies. The study considered four corridors. Two possible corridors that covered the north coast area were the 'Coastal Sub-corridor' and 'Hybrid Sub-corridor'. These corridors include the subject area of the Proposal.

The study results show that the Coastal Sub-corridor would perform better than the other sub-corridors given that it is an extension of existing north coast rail infrastructure upgrading programs. However, to improve transit times, this sub-corridor would require major investment. Results for the Hybrid Sub-corridor showed it had the weakest time performance of all of the sub-corridors and also had a poor revenue result due to the high level of investment required.

The study contained a preliminary environmental assessment of each of the route options. The Coastal Sub-corridor would have the greatest number of environmental constraints when compared to the other route options. The study identified that further investigations of these route options would be required to properly consider the environmental limitations associated with any rail infrastructure upgrade.

In correspondence dated 17 March 2008, ARTC advised that a preliminary and high-level assessment had been undertaken. The results of this assessment were as follows:

- There was no reasonable prospect for a joint corridor between the Oxley Highway and Telegraph Point.
- Between Telegraph Point and Kundabung there is potential for a joint corridor alignment, but the performance improvements it would offer rail services are minimal and the cost of a new rail alignment is therefore unlikely to be feasible.
- A shared road and rail corridor between Kundabung and Kempsey was both feasible and desirable. (Note a joint corridor in the northern section would also require development of a joint corridor for part of the already approved Kempsey to Eungai Pacific Highway upgrade).

ARTC advised that, to be viable, the development of a shared road and rail corridor would require funding that was not available at that time. The ability to proceed with such a joint road and rail development project is therefore a policy matter at government level, most probably in the context of the Nation Building Program (**Section 2.3.1**).

In this context, the RTA does not consider it appropriate to delay the planning approval process for this Proposal. Further to this, the advanced nature of the development of this Proposal as a single use transport corridor, and the fact that the adjoining Kempsey to Eungai Pacific Highway upgrade has already been approved as a single use transport corridor would make it difficult to achieve a suitable dual use corridor without considerable cost, time delay and community angst. However if, in the future ARTC develops plans for a modified rail corridor in the vicinity of the Proposal, the RTA would be willing to review the plans and provide input as to their appropriateness in relation to the Proposal and the overall Pacific Highway Upgrade Program.

Cyclists and pedestrians

No provision has been made for pedestrian access to the upgraded highway for safety reasons. No specific provision has been made for cyclists, however they would be permitted to use the 2.5 metre wide shoulders. Signposting and crossing points would be provided for cyclists at the interchange and traffic arrangement ramps and on- or off-ramps. Cyclists could also use the service road network, which would offer a safer cycling environment due to lower vehicle speeds and traffic volumes.

Pedestrian footways would be provided at the following locations:

- Sancrox Road overbridge (approximately 600 metres south of Sancrox Road).
- Kundabung Road overbridge (at Kundabung Road).

In addition, there would be opportunities for pedestrians to cross the upgraded highway at other overbridges and vehicular underpasses, however no specific provision has been made due to anticipated low volumes of pedestrian traffic.

Staging implications

In preparing this Environmental Assessment, the potential operational traffic and transport impacts of the possible staging option described in **Section 7.3.2** in comparison to the construction of the entire Proposal to a full motorway standard have been considered as outlined below.

The level of service in this staging option would be slightly less than that of a motorway standard upgrade, given the absence in some areas of service and access roads to separate local traffic movements from the highway traffic flow. The level of service would be mainly affected by the inclusion of at-grade intersections in the northern sections of this staging option, but it would also be affected by the increased use of the upgraded highway by local traffic in this same area. The difference in level of service between the possible staging option and the full motorway standard upgrade would be expected to be fairly minimal, and would still provide a considerable improvement over the level of service for the existing highway.

The adoption of this staging option could also result in the need for ongoing use of the upgraded highway for some, or all, local and school bus services due to the limited grade separated cross highway and right turn movements available in the northern sections of this staging option. This use could include point to point travel by buses, as well as picking up and dropping off school students or other passengers at local road junctions with the upgraded highway.

If this staging option is adopted, this matter would have to be further investigated in consultation with the bus service providers, NSW Transport and Infrastructure, and the local community to determine the most appropriate location of the bus routes and bus stops, along with other potential management measures to improve the safety of both pedestrians and motorists.

All other potential operational traffic and transport impacts would be managed as discussed in **Section 18.4.2**, for both this staging option and the ultimate motorway standard upgrade.

Should the Proposal be delivered in stages, the staging report described in **Section 7.3.3** would detail the operational traffic and transport impacts of the staging option. If any additional or altered impacts are identified, the staging report would further assess these impacts and identify appropriate management measures.

18.3.3 Operational impacts to existing and proposed service roads and access roads

Where the Proposal is to be constructed and opened to traffic at the ultimate motorway standard, access to and from the Proposal would be limited to controlled access points at interchanges and traffic arrangements. In this situation, no properties or local roads would have direct access to the upgraded highway. Property access to the upgraded highway would be provided via service roads or access roads that connect to the proposed interchanges and traffic arrangements. The impacts on regional and local traffic movements for the ultimate motorway standard, upon which this assessment is based, are described in detail below. A detailed description of the arterial standard upgrade in Sections C and D is provided in **Chapter 6 The Proposal**. A continuous alternative route would also be provided for local traffic movements or through traffic that chooses not to use the upgraded highway.

New local roads

The Proposal would result in changed access arrangements to the Pacific Highway, through changes in the connection of both private accesses and local roads. A description of the new service and access roads and the impact on local traffic due to the Proposal is provided below and shown on **Figure 6-1a** to **Figure 6-1b** and **Figure 6-2a to Figure 6-2q**. New service and access roads would consolidate access arrangements to the upgraded highway, reinstate access for isolated properties or areas and improve safety for all road users. New roads would connect to interchanges and traffic arrangements to provide access to the upgraded Pacific Highway.

Any new service and access roads would be designed and constructed to meet the requirements of the local council prior to handover. The RTA would negotiate the handover to local councils of any new service and access roads, as well as the existing highway where it becomes part of the proposed service road network. In such instances, the existing highway would become a local service road, and would connect to interchanges and traffic arrangements to provide access to the upgraded Pacific Highway.

Access to state forests

Access to state forests for logging, maintenance and fire management activities would be maintained or reinstated by way of the proposed service road network. All existing at-grade intersections would be removed where they intersect with the upgraded highway. The service road network would be connected with the upgraded highway via interchanges or traffic arrangements, providing the option for forestry vehicles to easily access the upgraded highway for destinations outside the local area. It would also allow their day to day local operations to be undertaken on the service road network clear of highway traffic.

In the case of the movement of heavier forestry vehicles such as logging trucks, most of these vehicle movements would take place on either the existing highway or on new service or access roads that would be constructed to a standard suitable for these vehicles where required. Discussions with Forests NSW staff indicate that the volume and movement patterns for these types of vehicles would be similar to current levels. Logging trucks have destinations generally outside the local area and would use the service road network primarily to access the nearest interchange or traffic arrangement to travel on the upgraded highway. There are very few logging truck trips to local destinations.

Where the Proposal would result in removal of access roads to or within areas of state forest alternative arrangements would be provided in consultation with Forests NSW.

Access to nature reserves and national parks

Access to nature reserves and national parks for maintenance and fire management activities would be maintained or reinstated by way of the proposed service road network that connect with the upgraded highway via interchanges or traffic arrangements. All existing at-grade intersections would be removed where they intersect with the upgraded highway.

Impacts on regional and local traffic movements

The Proposal would result in changed access arrangements to the upgraded Pacific Highway. Predicted regional and local traffic movements in the ultimate motorway standard are discussed below.

Local movements in the vicinity of Sancrox Road would no longer use the upgraded highway, and would instead travel to and from Port Macquarie via the service road connection to Hastings River Drive or via the Oxley Highway. At Sancrox Road and Fernbank Creek Road, left-in / left-out movements would still be catered for, with all cross highway movements being directed to the overbridge to the south of Sancrox Road. Access to Hastings River Drive would be provided by an eastern service road that runs parallel to the Proposal and follows the existing highway alignment north of Fernbank Creek. As a result it is expected that the majority of Sancrox Road traffic would use the Oxley Highway following upgrade of the highway.

Between Hastings River Drive and Telegraph Point, the existing highway would become a service road. Connection to the upgraded highway would be provided at the proposed Blackmans Point Road interchange and proposed Haydons Wharf Road half interchange (for northbound movements only). From south of Telegraph Point, traffic travelling south to Port Macquarie would:

- Travel along the existing highway (which would be part of the service road network) to the proposed Blackmans Point interchange, access the upgraded highway and travel south to the existing Oxley Highway interchange.
- Travel along the existing highway to the proposed Blackmans Point interchange and continue through on the existing highway to Hastings River Drive.
- From Blackmans Point Road access the existing highway via the proposed Blackmans Point interchange.

The separation of through and local traffic in these areas is expected to result in a decrease in the volume of traffic using the existing highway following construction of the Proposal.

Bill Hill Road provides access to Cairncross State Forest and private properties to the east. Connectivity would be maintained by provision of an overbridge on Bill Hill Road to cross the upgraded highway.

Access to the upgraded highway in the vicinity of Telegraph Point would be provided at the proposed Haydons Wharf Road half interchange for northbound movements only. As discussed above, traffic travelling south would need to go to the proposed Blackmans Point Road interchange to access the upgraded highway and continue south. The proposed Haydons Wharf Road half interchange provides for connection to both the upgraded highway and the existing highway, which forms part of the service road network to the south. To the north, the Wyndell Close extension and Cooperabung Drive would provide connection to a number of local roads and private access including Federation Way, Sun Valley Road and Cooperabung Range Road. The existing at-grade intersection to the existing highway at the northern end of Cooperabung Drive would be closed and all traffic directed either south to the proposed Haydons Wharf Road half interchange or north to Kundabung along a new service road to the west of the Proposal. These changes are expected to result in an:

- Increase in the volume of traffic using the southern sections of Cooperabung Drive, particularly between Federation Way and Wyndell Close.
- Increase in traffic volumes on the Wyndell Close extension.
- Decrease in traffic volumes on Cooperabung Drive north of Federation Way and south of Wyndell Close.

A new access road would be constructed to the east of the Proposal joining Haydons Wharf Road and to the west joining Cooperabung Drive to replace existing private accesses that would be closed.

The existing Yarrabee Road at-grade intersection would be replaced with left-in / left-out slip lanes at the existing Yarrabee Road intersection for southbound movements and a vehicular underpass to the north to provide for left-in / left-out northbound movements. This would significantly enhance safety for truck movements at this location.

At Mingaletta Road and Wharf Road, the existing at-grade intersections would be closed and replaced with overbridges joining the service road to the west of the upgraded highway. This service road would join Cooperabung Drive to the south and the proposed Kundabung Road traffic arrangement to the north. The existing at-grade intersection at Upper Smiths Creek Road would also be closed and joined into the western service road. This service road would join an existing section of Rodeo Drive just south of the proposed Kundabung Road traffic arrangement. A new access road would be constructed to the east of the Proposal joining Mingaletta Road to replace existing private accesses that would be closed.

The Kundabung Road traffic arrangement would provide for full north – south movements and result in replacement of the existing at-grade intersections at Kundabung Road and Smiths Creek Road with left-in / left-out slip lanes. Cross highway movements would be provided by an overbridge, thereby separating local and highway traffic. This traffic arrangement is expected to attract the majority of traffic from Mingaletta Road and Upper Smiths Creek Road to the south and Smiths Creek Road, Rodeo Drive and Ravenswood Road to the north.

A new access road would be constructed to the east of the upgraded highway joining Kundabung Road to replace several existing private accesses that would be closed.

North of the proposed Kundabung Road traffic arrangement, the service road would use the existing sections of Rodeo Drive together with a new section to be constructed to link with Ravenswood Road. The existing at-grade intersections at the northern and southern ends of Ravenswood Road would be closed, with all traffic directed to the south to the proposed Kundabung Road traffic arrangement or north to the northern limit of the Proposal at Stumpy Creek, where it would link to the upgraded highway at the proposed Kempsey to Eungai interchange.

To the north of the existing northern Ravenswood Road intersection the new service road would join into the existing highway. The existing highway would become the service road to connect with the northern limit of the Proposal. The existing at-grade intersections at Bloodwood Ridge Road, Middle Gate Road (western side only), Old Coast Road and Scrubby Creek Road, which provide access to private properties, Maria River and Kalateenee state forests and Kumbatine National Park, would be maintained, joining into the existing highway. The existing at-grade Middle Gate Road intersection with the existing highway on the eastern side would be removed and placed with an overbridge to provide for forestry access across the upgraded highway.

To the east of the upgraded highway, the existing at-grade intersections at Old Camp Road and Kemps Road would be closed. A new access road would be constructed to link Kemps Road to the proposed Kempsey to Eungai interchange. Alternative forestry access would be provided in consultation with Forests NSW.

Table 18-13 summarises the existing and revised traffic volumes on the service road network. The existing and predicted post upgrade traffic volumes are based on assumptions and direction assignment made in the *Oxley Highway to Kempsey Detailed Traffic Assessment* (GHD 2007). Each service and access road section described in **Table 18-13** is shown on **Figure 18-4** and can be identified by item number.

Table 18-13 Predicted traffic volumes on the service road network

	Road section	Road length (km)	Existing traffic (volumes per day)		Post Proposal traffic (volumes per day)	
			Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
1	New service road (west) – upgraded highway overbridge to Sancrox Road	1.3	n/a	n/a	120	35
2	New service road (east) – upgraded highway overbridge to Fernbank Creek Road	0.8	n/a	n/a	120	35
3	New service road – Fernbank Creek Road to Fernbank Creek	2.0	n/a	n/a	40	5
4	Existing highway – Fernbank Creek to Hastings River Drive	1.0	7870	1970	5975	1645
5	Existing highway – Hastings River Drive to Blackmans Point Road interchange	2.3	9560	2390	5070	210

	Road section	Road length (km)	Existing traffic (volumes per day)		Post Proposal traffic (volumes per day)	
			Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
6	New service road (east) – Blackmans Point Road interchange to Blackmans Point Road overbridge	0.7	n/a	n/a	315	155
7	Existing highway / new service road (west) –Wharf Road to Blackmans Point Road overbridge	0.7	n/a	n/a	5	0
8	Existing highway – upgraded highway overbridge to Bill Hill Road	2.5	11,530	2885	1870	240
9	Existing highway – Bill Hill Rd to Rolland Plains Road intersection	5.1	11,530	2885	1695	115
10	Cooperabung Drive – Rolland Plains Road intersection to Wyndell Close	2.2	265	5	55	2
11	Cooperabung Drive – Wyndell Close to Federation Way	0.6	265	7	440	20
12	Cooperabung Drive – Federation Way to Sun Valley Road	1.0	125	6	205	15
13	Cooperabung Dr – Sun Valley Road to existing highway	0.9	170	5	40	10
14	New service road – Cooperabung Range Road (north of existing highway intersection to Mingaletta Road)	5.3	n/a	n/a	15	10
15	New service road – Mingaletta Road to Upper Smiths Creek Road	1.9	n/a	n/a	40	15
16	New service road – Upper Smiths Creek Road to Wharf Road	0.2	n/a	n/a	130	25
17	New service road – Wharf Road to Rodeo Drive	1.4	n/a	n/a	215	30
18	Upgrade Rodeo Drive – south of Kundabung Road	0.7	55	3	215	30
19	Rodeo Drive – Kundabung Road to Smiths Creek Road	0.4	25	1	510	40
20	Rodeo Drive – Smiths Creek Road to cul de sac	0.9	25	1	50	15
21	New service road – Rodeo Drive cul de sac to Ravenswood Road	0.9	n/a	n/a	50	15
22	Existing service road – near service station (Ravenswood Road)	1.0	90	10	45	10

Road section		Road length (km)	Existing traffic (volumes per day)		Post Proposal traffic (volumes per day)	
			Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
23	New service road / existing highway – Ravenswood Road to Old Coast Road	4.3	10	10	10	15
24	New service road (west) – Old Coast Road to Scrubby Creek Road	0.3	n/a	n/a	55	5
25	Existing highway – Scrubby Creek Road to Stumpy Creek	0.9	n/a	80	10	n/a
26	New service road (east) – Kemps Rd to Stumpy Creek	0.7	n/a	10	5	n/a
27	New access road – Kundabung (east side)	3.6	n/a	n/a	190	20
28	New access road – Mingaletta Road (east side)	0.5	n/a	n/a	35	15
29	New access road – Yarrabee Road / existing highway intersection	0.5	75	35	15	5
30	New access road – Haydons Wharf Road	2	n/a	n/a	15	5
31	New access road – Cooperabung Range Road	0.8	n/a	n/a	5	5

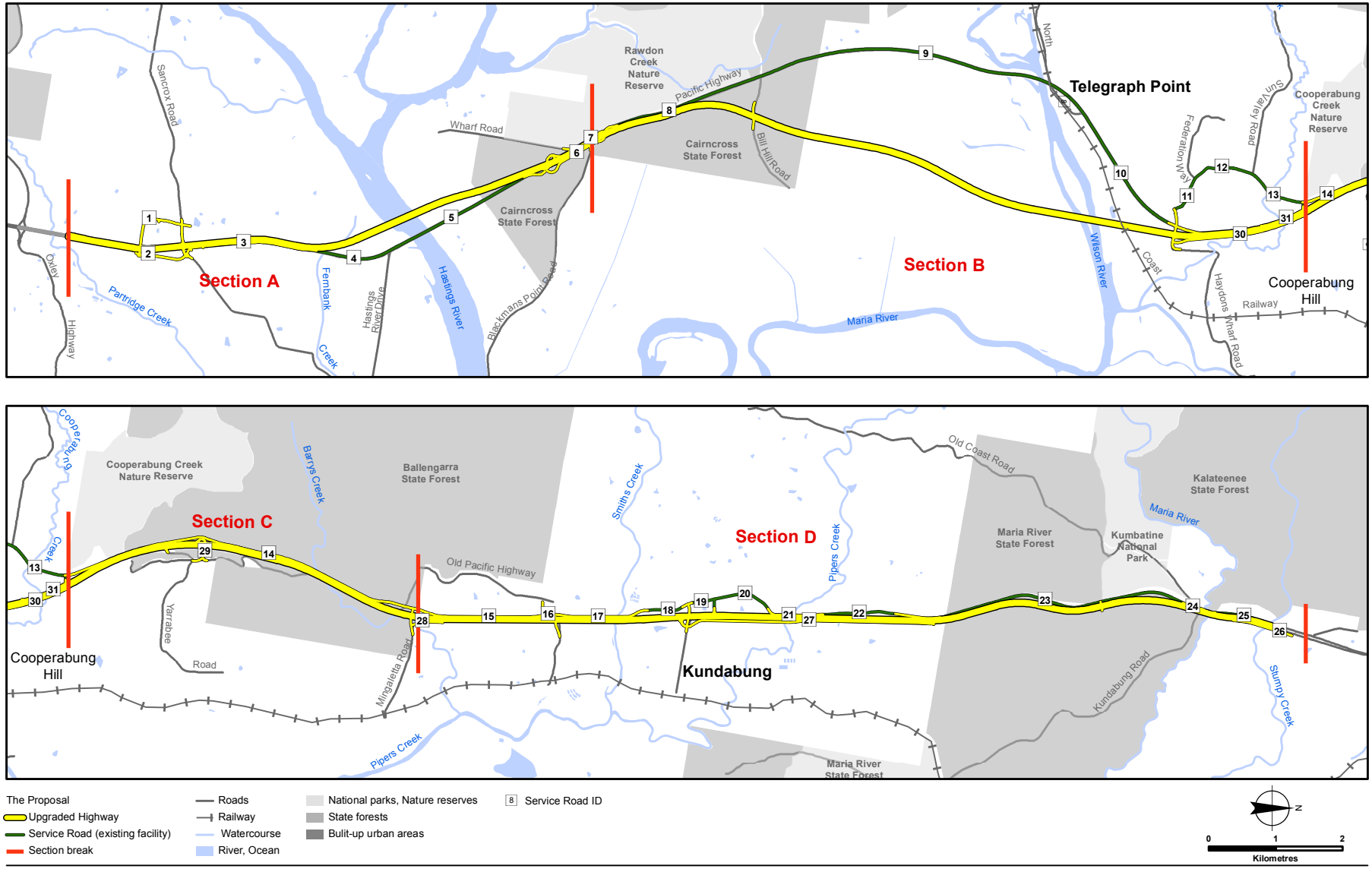
Staging implications

In preparing this Environmental Assessment, the potential operational traffic and transport impacts for the existing and proposed service/access road network of the possible staging option described in **Section 7.3.2** in comparison to the construction of the entire Proposal to a full motorway standard have been considered as outlined below.

This staging option would include some limited provision to the north of the Haydons Wharf Road interchange for at-grade access to the Proposal from both local roads and other access points in place of some of the proposed service and access roads of the ultimate motorway standard upgrade.

Access to the upgraded highway at the Haydons Wharf Road interchange and at the Kundabung Road traffic arrangement would be the same for both this staging option and the ultimate motorway standard upgrade. However, the western service road would not be provided in this staging option between Cooperabung Hill and Smiths Creek, and the eastern access roads would not be provided to the north of Haydons Wharf Road, between Mingaletta and Mobbs Road, and between Kundabung Road and Pipers Creek.

Figure 18-4 Proposed service road network



At-grade intersections would be provided at Cooperabung Close, Cooperabung Drive, Mingaletta Road, Mobbs Road, Upper Smiths Creek Road and Wharf Road. Apart from Cooperabung Drive, which would be a left-in only facility, these at-grade intersections would all provide left-in / left-out access to and from the upgraded highway. U-turn facilities would also be provided in a number of locations in this staging option to permit vehicles to change direction of travel (refer to **Section 6.4.11**).

Provision would also be made in this staging option for northbound vehicles to enter the access road to the east of the upgraded highway north of Pipers Creek in the Kundabung area, by making a right-hand turn across southbound traffic. No other right turn movements would be available in the possible staging option.

All operational traffic and transport impacts for service and access roads would be managed as discussed in **Section 18.4.2**, for both this staging option and the ultimate motorway standard upgrade.

Should the Proposal be delivered in stages, the staging report described in **Section 7.3.3** would detail the operational traffic and transport impacts for the existing and proposed service / access road network of the staging option. If any additional or altered impacts are identified, the staging report would further assess these impacts and identify appropriate management measures.

18.4 Management of impacts

While the Proposal would affect the traffic and transport in the local, regional and wider context due to the changes it would bring to the local, regional and interstate road network, it is considered that most of these changes would be of a positive nature. The main exception would be the impact of the Proposal on the road network during the construction phase.

18.4.1 Construction management measures

Construction traffic impacts would be managed through the implementation of Traffic Management Plans, which would include the following measures:

- Identifying all public roads to be used by construction traffic.
- Implementing control measures to manage traffic consistent with the RTA's *Traffic Control at Work Sites Manual* (RTA 2003a).
- Developing management methods to minimise the impacts of haulage vehicles using or crossing the existing highway and local roads.
- Identifying all public roads that could be partially or completely closed during construction and the expected timing and duration the closures. Where closures are required, alternative routes would be provided in consultation with the affected community.
- Identifying and managing impacts on existing traffic (including pedestrians, disabled persons, cyclists and vehicles), including the provision of alternative routes for land owners and the pubic as required and as necessary.
- Developing methods to minimise road user delay.
- Identifying and managing temporary traffic arrangements, including property access.
- Developing temporary arrangements for public transport.
- Identifying access to construction sites including entry and exit locations, and controlling access to prevent construction vehicles queuing on public roads.

- Developing a response plan for any construction traffic incidents.
- Undertaking a pre-construction dilapidation survey of the existing highway. Defects caused by construction activities would be rectified prior to the transfer to council.
- Developing monitoring, review and amendment mechanisms.

18.4.2 Operational management measures

The access strategy developed for the Proposal would provide net safety benefits for motorists in the area by:

- Separating regional / local traffic and through traffic, reducing potential conflicts in the speed environment and movements.
- Grade separating cross highway movements, resulting in significantly improved safety conditions when compared with the existing at-grade intersections.
- Improving safety on the service road network for local buses and cyclists.
- Improving efficiency of highway operation and savings in travel time and fuel consumption / vehicle running costs.

Further management measures would be implemented, including:

- Consulting with public transport operators and the community regarding bus access and bus stop locations.
- Providing appropriate signage to Port Macquarie and surrounding centres and destinations.
- Where the Proposal would result in removal of access roads to or within areas of state forest, providing alternative arrangements in consultation with Forests NSW.

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