



Transport
Roads & Maritime
Services

PACIFIC HIGHWAY AND MANN'S ROAD PLANNING STUDY

**Narara Creek Road to Parsons Road
DESIGN OPTIONS REPORT**

MAY 2014



Executive summary

This report summarises the design options that Roads and Maritime Services has investigated to upgrade the Pacific Highway between Narara and Lisarow since the preferred route option was approved by the Minister for Roads and Ports in February 2013.

The upgrade is a part of a series of projects on the Pacific Highway between the M1 Pacific Motorway interchange at Ourimbah and Gosford to address capacity, safety and accessibility issues.

This section of Pacific Highway from Narara to Lisarow is currently operating near capacity for through traffic, as are the intersections at Railway Crescent and Manns Road. This results in traffic queues and delays with delays exceed 70 seconds during peak periods.

Three options were considered; the original “Pink” Option displayed in 2012, Temporary Design 3 (TD3) and Temporary Design 4 (TD4). Options TD3 and TD4 are the result of further investigation. Consequently there are only minor differences between the options north of Berrys Head Road.

All three options provided improvements over the existing configuration in terms of traffic capacity, road user accessibility and road safety. All three options included new bridge structures, intersections upgrades and impacted to some degree on the endangered ecological environments.

The evaluation of the options focused on the southern end of the Stage 4 route on the highway between Reeves Street and Berrys Head Road. Each option was evaluated against the project objectives.

Option TD4 was recommended by the project team as the preferred option. This option provided the best connectivity for road users, met capacity requirements for projected traffic volumes and offered the best value for money.

Table of Contents

| | | |
|-----|---|----|
| 1.0 | Introduction | 4 |
| 2.0 | Project objectives and reasons for the project..... | 4 |
| 3.0 | Background..... | 4 |
| 3.1 | Context | 6 |
| 3.2 | Stakeholder consultation | 6 |
| 3.3 | Traffic..... | 7 |
| 3.4 | Road safety | 7 |
| 3.5 | Environmental considerations..... | 8 |
| 3.6 | Flooding..... | 8 |
| 3.7 | Road design | 8 |
| 4.0 | Options considered | 9 |
| 4.1 | Pink option..... | 10 |
| 4.2 | Temporary design 3 (TD3) option..... | 11 |
| 4.3 | Temporary design 4 (TD4) option..... | 12 |
| 5.0 | Evaluation of options..... | 13 |
| 5.1 | Do nothing approach | 13 |
| 5.2 | Proposed options..... | 13 |
| 6.0 | Conclusion | 15 |
| 7.0 | Appendix A – Layout of Options..... | 17 |
| 8.0 | Appendix B – Options assessment matrix..... | 22 |

1.0 Introduction

This report summarises the options that Roads and Maritime Services (Roads and Maritime) has investigated to upgrade the Pacific Highway between Narara and Lisarow since the preferred route option was approved by the Minister for Roads and Ports in February 2013.

2.0 Project objectives and reasons for the project

Project objectives

The objectives of the project are:

- Improve safety for motorist, cyclists and pedestrians by improving the road geometry.
- Increase traffic capacity and improve performance by reducing congestion.
- Improve accessibility for all road user groups by providing reasonable efficiency and acceptable levels of service.
- Minimise impact on the natural environment
- Be as sensitive to surrounding land uses and the community as feasible
- Capitalise on opportunities in urban design.
- Provide the best value for money solution.

Reasons for project

Reasons for the project include:

- Currently, the Pacific Highway operates at or close to capacity (during the peak periods).
- The Pacific Highway currently experiences a crash rate higher than the typical crash rate for similar status roads across the state road network.
- The current road alignment/design provides poor bus, pedestrian and cyclists facilities along the Highway.

3.0 Background

In March 2009 the NSW Government announced planning for the next stage of the upgrade of the Pacific Highway between Narara and the M1 Pacific Motorway at Ourimbah. The planning study was required to identify a preferred route option to improve the main road network between the intersection of Manns Road and Narara Creek Road at Narara and the intersection of the Pacific Highway and Railway Crescent at Lisarow. The upgrade would provide two lanes in each direction separated by a median, with appropriate intersection upgrades. A locality map is shown in Figure 1.

Other stages of the Pacific Highway upgrade between Ourimbah and Gosford are:

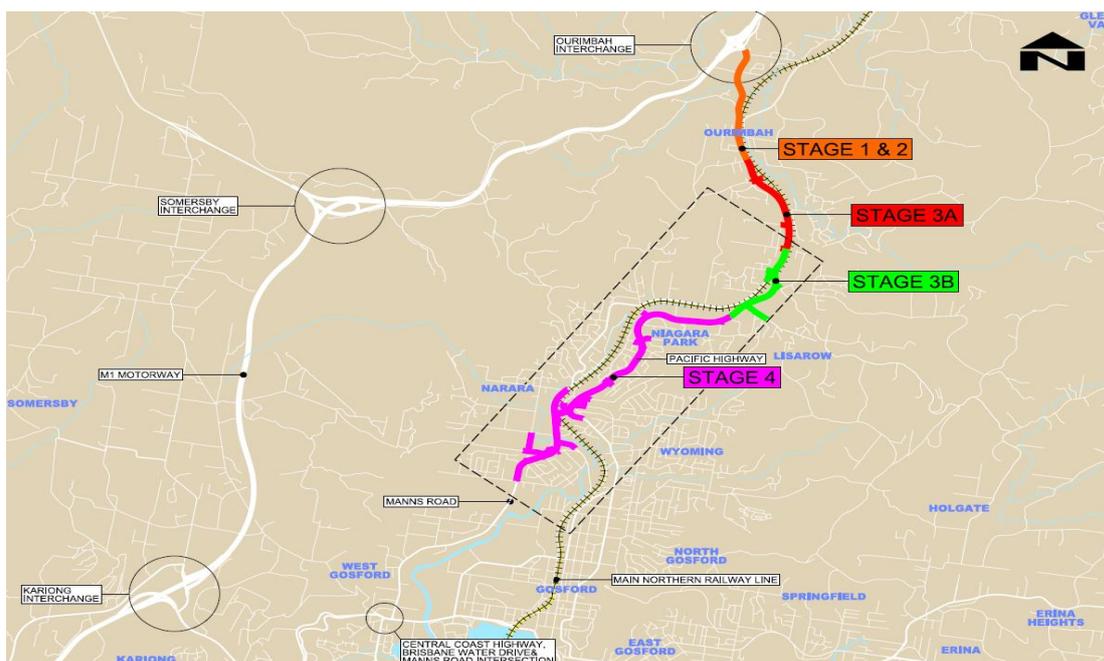
- Stage 1 - Improvement works to the Dog Trap Road intersection have been completed, improving safety, assisting traffic flow during peak periods and easing congestion outside Ourimbah Primary School.
- Stage 2 - Upgrade of the section of the Pacific Highway between Glen Road and Burns Road. Utility relocation and widening of the Dog Trap Gully culvert are under way.
- Stage 3A - The section between Glen Road at Ourimbah and Ourimbah Street at Lisarow. Detailed design is completed.
- Stage 3B – Ourimbah Street and Parsons Road at Lisarow. Concept design is about to commence.

In Stage 4, the existing Pacific Highway is a narrow, winding two-lane urban arterial road with limited shoulders, turning bays, and pedestrian and cycle facilities. The alignment is constrained by steep side slopes, residential property frontages, the main northern railway line and large mature trees within the road reserve as well as wetlands. There are two narrow railway bridges at the intersection of the Pacific Highway and Railway Crescent and Pacific Highway and Manns Road.

This section of Pacific Highway from Narara to Lisarow and the intersections at Railway Crescent and Manns Road are currently operating over capacity for through traffic, carrying around 30,000 vehicles per day. This has resulted in traffic queuing and delays with a Level of Service (LOS) at F during peak periods.

The NSW Minister for Roads and Ports approved the Roads and Maritime recommended route option along the existing Pacific Highway and Manns Road alignment as the preferred route option in February 2013.

Figure 1 Locality Map: Stage 4: Pacific Highway and Manns Road upgrade between Railway Crescent at Lisarow and Narara Creek Road at Narara



3.1 Context

Regional Context

The Pacific Highway is one of the primary points of entry/exit to and from the M1 Pacific Motorway to Gosford and the greater Central Coast Region from the north.

It is a commercial transport route currently servicing a commercial hub in the Ourimbah and Lisarow area. The Pacific Highway is also gazetted as a B-double route between the M1 Pacific Motorway interchange at Ourimbah and Lisarow.

State Context

The NSW Long Term Transport Master Plan (LTTMP) (December 2012) discusses reducing congestion, improving travel time reliability and facilitating bus enhancements on the State road network as critical improvements in the short term. Specifically the LTTMP states (on page 249), we will continue our investment in the urban road network to address capacity constraints that impact on travel time reliability and public transport operations.

The Central Coast Regional Action Plan (2012), lists progressing route assessments and design work for the Pacific Highway, Narara to Lisarow as a priority (Page 18).

Local Context

The Pacific Highway is a major arterial corridor between the M1 Pacific Motorway in the north (Ourimbah) and the Gosford CBD (and further to surrounding suburbs in the south and east).

The Pacific Highway currently carries around 30,000 vehicles per day and is a single lane in each direction, with restricted access and limited bicycle and pedestrian facilities. The current average peak period mid-block traffic flows on the Pacific Highway exceeds the capacity of the roadway and the Manns Road overbridge exhibits significant delays.

3.2 Stakeholder consultation

Extensive community consultation has taken place since 2011 on the route between Narara to Lisarow. Roads and Maritime has received written feedback from the community and the top fives issue raised by the community from the last public display in March 2012 were:

- Property acquisition
- Pedestrian facilities
- Flooding
- Noise
- Intersection treatments/ access.

Feedback from this display also indicated a preference for the Pink Option. Options Temporary Design 3 (TD3) and Temporary Design 4 (TD4) were developed following additional studies.

3.3 Traffic

The Roads and Maritime commissioned Sinclair Knight Merz (SKM) to undertake micro simulation traffic modelling of the options to allow for a comparison of their relative performance. For the purposes of comparison, future demand scenarios were also tested on the existing corridor configuration. The modelling covers the morning and evening weekday peak periods.

A summary of the network performance details are shown in Tables 3.1 and 3.2 for the 2011 AM and PM peak periods. The 2011 base model appears to perform better than the options in the first hour of the AM and PM peak. However in the second hour of these models, the network in the base models performs worse than the option models. The option models are able to maintain consistent performance across both hourly periods and provide more stable conditions for motorists. In particular, the preferred Option TD4 model remains consistent across all modelled periods. This provides excellent reliability for motorists in both the AM and PM peak periods.

Table 3.1 Network performance summary 2011 (AM)

| Scenarios | 7.00am – 8.00am | | | 8.00am – 9.00am | | |
|------------|-----------------|-----------|----------------------|-----------------|-----------|----------------------|
| | VKT (km) | VHT (hrs) | Average Speed (km/h) | VKT (km) | VHT (hrs) | Average Speed (km/h) |
| Base | 25,430 | 467 | 54.5 | 27,058 | 567 | 47.7 |
| Pink | 25,531 | 520 | 49.1 | 27,241 | 556 | 49.0 |
| Option TD3 | 25,407 | 488 | 52.1 | 28,548 | 614 | 46.5 |
| Option TD4 | 25,539 | 526 | 48.6 | 27,311 | 565 | 48.3 |

*Base Option is the existing roadway configuration
VKT Vehicle Kilometres Travelled VHT = Vehicle Hours Travelled*

Table 3.2 Network performance summary 2011 (PM)

| Scenarios | 4.00pm – 5.00pm | | | 5.00pm – 6.00pm | | |
|------------|-----------------|-----------|----------------------|-----------------|-----------|----------------------|
| | VKT (km) | VHT (hrs) | Average Speed (km/h) | VKT (km) | VHT (hrs) | Average Speed (km/h) |
| Base | 28,491 | 549 | 51.9 | 30,313 | 667 | 45.4 |
| Pink | 29,323 | 607 | 48.3 | 31,287 | 650 | 48.1 |
| Option TD3 | 28,630 | 560 | 51.1 | 32,168 | 705 | 45.6 |
| Option TD4 | 29,422 | 610 | 48.2 | 31,312 | 648 | 48.3 |

*Base Option is the existing roadway configuration
VKT Vehicle Kilometres Travelled VHT = Vehicle Hours Travelled

3.4 Road safety

A crash summary for the five year crash history for the period 1 July 2008 to 26 June 2013 was produced for the Pacific Highway between Ourimbah Street, Lisarow and Narara Creek Road, Narara.

A total of 194 crashes were recorded during this period with 76 crashes reported as injury crashes. There were no recorded fatality crashes or crashes involving pedestrians. A large percentage of crashes occurred during the AM and PM peak periods. A summary of the recorded crash types is shown below:

- 86 rear end crashes (49.7%)
- 50 intersection, adjacent approaches (20.6%)
- 14 off road on curve, hit object (8.4%).

3.5 Environmental considerations

Desktop and field studies were undertaken during the route selection phase to assess the ecology within the study area during the route selection process. Results have shown the presence of three endangered ecological communities (EEC) and one threatened flora specie (the biconvex paperbark) in the study area. The studies also showed that the land within the Narara Valley flood plain (around Carrington Street) is considered to be of moderate to high quality remnant vegetation.

3.6 Flooding

Flood modelling was undertaken on the study area during the route selection process. All options were designed to have at least one lane in each direction accessible during the 1% annual exceedance probability (AEP) (ie 1 in 100 years) flood event. Each option was also designed to have as least impact as possible on the existing Narara Valley flood patterns. Further flood modelling will be undertaken for the preferred option during the concept design stage.

3.7 Road design

The following design criteria have been used to develop all options:

- Main carriageway posted speed limit – 60 kph.
- Service roads posted speed limits – 10 to 40 kph (due to the shared nature of the facility with vehicles, pedestrians and cyclists).
- Local roads posted speed limit – 50 kph.
- Pedestrian movements associated with breakdowns, road crossing and other movements.
- Access for maintenance and emergency service vehicles, personnel and plant.
- Provision for on-road and off-road cyclists.
- Determination of possible drainage impacts on the design.
- Requirement for the new road alignment is to have at least one lane in each direction accessible in the 1% AEP flood event

4.0 Options considered

Several options to upgrade the highway were considered and these options have been assessed against each other during the course of this selection process. The three options are:

- Pink Option - The existing Pacific Highway corridor on the eastern side of the Main Northern Railway, as displayed in 2012;
- Option TD3 - The existing Pacific Highway corridor on the eastern side of the Main Northern Railway with a new bridge connecting Renwick Street roundabout over the railway line to Showground Road, and
- Option TD4 - The existing Pacific Highway corridor on the eastern side of the Main Northern Railway with traffic signals replacing the roundabout at Pacific Highway and Manns Road intersection.

A plan showing each of these options is shown in Appendix A.

4.1 Pink option

This option largely follows the existing Pacific Highway alignment from Parsons Road, Lisarow in the north and then follows the existing Manns Road alignment south to the intersection with Narara Creek Road, Narara.

The typical cross section provides dual carriageway separated by a central median with a shared use path on the southbound and a footpath on the northbound. In some locations on the Pacific Highway, a retaining wall structure is used in the median due to level differences between the northbound and southbound carriageways. A new bridge structure at higher level over Narara Creek replaces the existing bridge structure to allow for the new typical section.

The existing roundabout at Manns Road and Narara Valley Drive is upgraded to dual lane roundabout. The existing roundabout at Manns Road and Pacific Highway is also upgraded to include an additional left turn slip for northbound Manns Road traffic and an underpass for northbound traffic on Pacific Highway. These two roundabout intersections are connected by a new road over rail bridge structure.

New traffic signals were proposed at Parsons Road, Newling Street, Lenna Street and Pierce Street, Argyle Avenue and Nurra Road, Berrys Head Road, Showground Road, and Adam Street and Reeves Street. Prings Road intersection has also been upgraded to a dual lane roundabout treatment. These intersections were selected to improve the accessibility and efficiency of the local road connections. All unsignalised intersections will be restricted to left in, left out movements.

The Pacific Highway and Bellbowrie Avenue intersection has been redirected to Showground Road intersection. Goonak Parade will be closed to facilitate the upgrade and a new local road connects Goonak Parade and Karina Crescent to improve the accessibility.



Figure 2 Pink option layout between Reeves Street and Berrys Head Road

4.2 (TD3) option

This option includes a new bridge connecting the southern section of Manns Road with the Pacific Highway at Wyoming. The new bridge acts as an overpass of Showground Road leave in and ramps and connects westbound traffic with Showground Road. Brookes Avenue is then extended to connect with the Pacific Highway at Renwick Street and the existing roundabout at Renwick Street to be upgraded to a signalised intersection. An additional southbound through lane at Pacific Highway and Manns Road will facilitate as an unsignalised bypass lanes to accommodate the southbound traffic.

Two-way ramps connect the bridge to the Pacific Highway allowing vehicles to bypass the roundabouts at Manns Road and Narara Valley Drive and Manns Road and Pacific Highway.

New traffic signals were proposed at Parsons Road, Newling Street, Lenna Street and Pierce Street, Argyle Avenue and Nurra Road, Adam Street and Reeves Street, and intersection realignment at Showground Road and Manns Road. Prings Road intersection has also been upgraded to a dual lane roundabout treatment. All unsignalised intersections will be restricted to left in left out only.



Figure 3 TD3 option layout between Reeves Street and Berrys Head Road

4.3 Temporary design 4 (TD4) option

This option is a revised version of the Pink Option and the features include:

- The existing roundabouts at Manns Road and Narara Valley Drive and Pacific Highway and Manns Road replaced with signalised intersections.
- New bridge structures along Manns Road over Narara Creek and the railway line.
- Traffic signals on the Manns Road at the Adam Street and Reeves Street, and Showground Road intersections.
- Traffic signals on the Pacific Highway at the Parsons Road, Newling Street, Lenna Street/Pierce Street, Nurra Road/Argyle Avenue and Berrys Head Road intersections
- New local road connecting Berrys Head Road and Wyoming Road, and Carrington Street and Reeves Street to improve local connectivity. Wyoming Road and Goonak Parade will be closed when the new traffic signals are installed at Manns Road and Narara Valley Drive intersection, and Pacific Highway and Manns Road intersection.
- The new traffic signals will be synchronised with priority given to traffic flows along the Pacific Highway and Manns Road. This may result in minor delays for traffic exiting local roads.

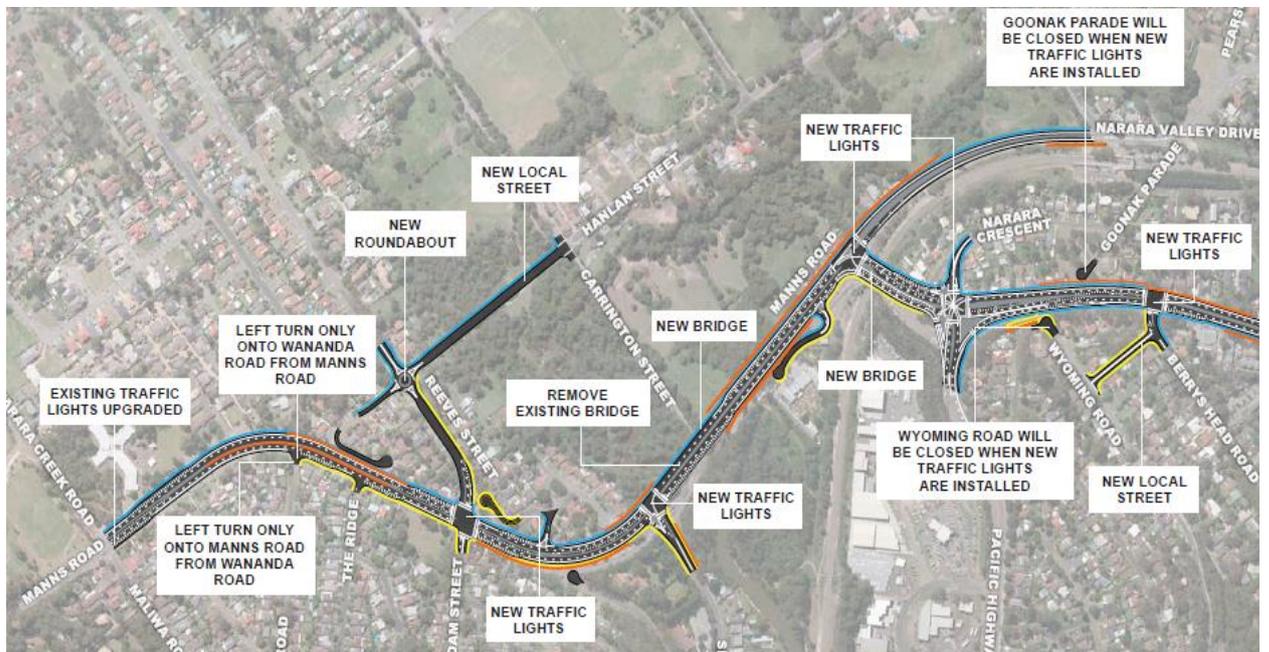


Figure 4 TD4 option layout between Reeves Street and Berrys Head Road

5.0 Evaluation of options

The evaluation of the options focuses on the southern end of the Stage 4 route between Reeves Street and Berrys Head Road at Narara. This is because there are no differences between the options north of Berrys Head Road intersection with the exception of a midblock pedestrian crossing in the Pink Option. The evaluation of each option is based on the project objectives outlined in Section 2 in this report.

An options assessment matrix assessing all options is shown in Appendix B.

5.1 *Do nothing approach*

As detailed in Section 3.1, the section of Pacific Highway from Narara to Lisarow is currently operating near capacity for through traffic and the intersections at Railway Crescent and Manns Road experience queuing and delays with Level of Service (LoS) at F (see table below) during peak periods. It is anticipated that in the “Do Nothing Option”, the LOS of the full length of the highway will fall to F by 2021 with estimated traffic growth rate of 2.3% in the AM peak and 1.9% in the PM peak.

Modelling of the “Do Nothing Option” shows that there is a need to improve the operation of this route to accommodate projected traffic growth. With the “Do Nothing Option”, the existing road safety issues will remain and there will be no improvements to pedestrian and cyclist facilities.

Level of service criteria for intersections

| Level of Service | Average Delay per Vehicle (secs/veh) | Traffic Signals, Roundabout | Give Way & Stop Signs |
|------------------|--------------------------------------|--|---|
| A | < 14 | Good operation | Good operation |
| B | 15 to 28 | Good with acceptable delays & spare capacity | Acceptable delays & spare capacity |
| C | 29 to 42 | Satisfactory | Satisfactory, but accident study required |
| D | 43 to 56 | Operating near capacity | Near capacity & accident study required |
| E | 57 to 70 | At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode | At capacity, requires other control mode |

5.2 *Proposed options*

Road safety

All options performed equally with road user safety and provided improvements over the existing configuration.

Traffic

All of the proposed options improved traffic capacity over the existing configuration. From the traffic modelling results, it indicates that the Pink Option will not provide the required traffic capacity by 2031. Both Option TD3 and TD4 provide sufficient capacity to meet the forecast 2031 traffic demand. Option TD3 had an increase in average network speed and Option TD4 provides less delays and increased average speeds when comparing to the Base and Pink Options. Travel time in the Option TD4 model are similar to Option TD3 for the PM peak, however Option TD4 shows slightly shorter travel times for most routes compared to the Pink Option.

A summary of the traffic modelling details are shown Table 5.1 and 5.3 below for the 2031 AM and PM peak periods.

Table 5.1 Network performance summary 2031 (AM)

| Scenarios | 7.00am – 8.00am | | | 8.00am – 9.00am | | |
|------------|-----------------|-----------|----------------------|-----------------|-----------|----------------------|
| | VKT (km) | VHT (hrs) | Average Speed (km/h) | VKT (km) | VHT (hrs) | Average Speed (km/h) |
| Base | 32,171 | 800 | 40.2 | 34,230 | 971 | 35.3 |
| Pink | 32,765 | 690 | 47.5 | 34,960 | 739 | 47.3 |
| Option TD3 | 32,403 | 629 | 51.5 | 36,408 | 742 | 49.1 |
| Option TD4 | 32,791 | 672 | 48.8 | 35,202 | 735 | 47.9 |

Base Option is the existing roadway configuration

VKT Vehicle Kilometres Travelled VHT = Vehicle Hours Travelled

Table 5.2 Network performance summary 2031 (PM)

| Scenarios | 4.00pm – 5.00pm | | | 5.00pm – 6.00pm | | |
|------------|-----------------|-----------|----------------------|-----------------|-----------|----------------------|
| | VKT (km) | VHT (hrs) | Average Speed (km/h) | VKT (km) | VHT (hrs) | Average Speed (km/h) |
| Base | 33,977 | 1,523 | 22.3 | 36,151 | 1,850 | 19.5 |
| Pink | 34,908 | 772 | 45.2 | 37,246 | 826 | 45.1 |
| Option TD3 | 34,941 | 712 | 49.1 | 38,361 | 826 | 46.4 |
| Option TD4 | 34,964 | 752 | 46.5 | 37,295 | 816 | 45.7 |

Base Option is the existing roadway configuration

VKT Vehicle Kilometres Travelled VHT = Vehicle Hours Travelled

Table 5.3 2031 PM Peak Travel Times (min:sec)

| From | To | Base | Pink | TD3 | TD4 (Recommended) |
|--|--|-------|-------|-------|----------------------|
| Manns Road Intersection with Narara Creek Road, Narara | Pacific Highway Ourimbah Street, Lisarow | 40:58 | 10:37 | 10:31 | 10:01 |
| Pacific Highway Ourimbah Street, Lisarow | Manns Road Intersection with Narara Creek Road, Narara | 26:08 | 11:07 | 10:25 | 10:35 |

The 2031 models show large reductions in the travel times for the three options when compared to the Base. The major movement in the PM peak involves vehicles

travelling from north to south and these are the vehicles that benefit the most from the TD4 model.

All trips from the Pacific Highway North show large reductions in travel time with trips reducing by approximately eight minutes for the entire trip.

Accessibility

All of the proposed options improved accessibility for local roads by upgrading key existing intersections. Option TD4 provided greater accessibility when compared to the Pink Option as it included two new local road connections between Carrington Street and Reeves Street and Berrys Head Road and Wyoming Road.

All of the proposed options improved pedestrian and cyclist accessibility with new shared paths or footpaths. The Pink Option and Option TD4 provide a better pedestrian and cycle network when compared to Option TD3. New shared pedestrian and cycle paths and footpaths are proposed on the majority of the road corridor, where Option TD3 utilised existing footpaths and shared path facilities on the Pacific Highway between Brooks Avenue and Manns Road. Option TD4 also provided better pedestrian connectivity than the Pink Option as there are additional pedestrian crossings at Manns Road and Narara Valley Drive, and Manns Roads and Pacific Highway signalised intersections.

Environment

All of the proposed options impacted to some degree an Endangered Ecological Community (EEC). The Pink Option and Option TD4 impacted a Swamp Mahogany EEC in the Narara Valley floodplain by the installation of a new bridge structure on Manns Road. Option TD3 impacted a potential EEC area near Renwick Street with the installation of ramps required for the bridge structure over Showground Road.

Land use

All options impacted properties adjacent to the corridor requiring full and partial property acquisitions. There was potentially less property acquisition for Option TD3 when compared to the Pink Option and Option TD4. Details of the property acquisition are outlined in Appendix B.

Value for money

An economic assessment was undertaken for the three proposed options with Option TD3 identified as having the lowest Benefit Cost Ratio (BCR). The results of the analysis shown Option TD3 would cost an additional \$58 million over TD4. Option TD4 was identified with the highest BCR and consequently offered the best value for money.

6.0 Conclusion

Options assessment matrix in Appendix B shows the comparison between the options, where Option TD3 and TD4 are identified as the only options that meet the project objectives for traffic capacity and safety. Option TD3 has a significant number of dis-benefits including the very high overall cost and these dis-benefits outweigh the slight traffic benefit gained in capacity.

Based on the assessment, it is the conclusion that Option TD4 is the preferred route option. This option provided the best connectivity for road users, met capacity requirements for projected traffic volumes and offered the best value for money.

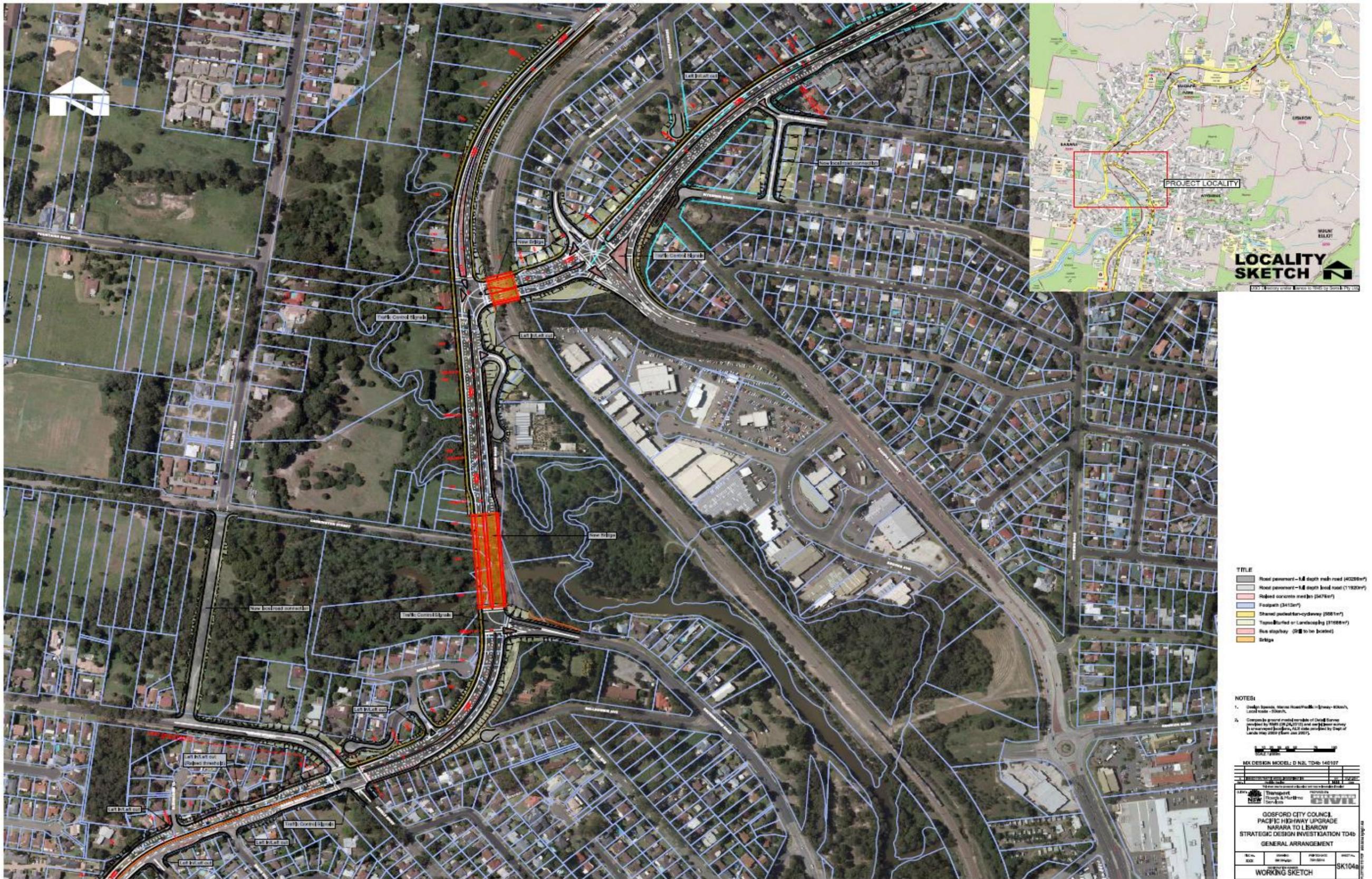
7.0 Appendix A – Layout of Options



Pink Option



Option TD3



Option TD4 (Preferred Option)



Preferred Option between Parsons Road at Lisarow and Berrys Head Road at Narara

8.0 Appendix B – Options assessment matrix

| Option | Meets Traffic criteria | Meets Safety criteria | Value for Money | Meets project life expectancy | Impacts |
|------------------------------|------------------------|-----------------------|-----------------|-------------------------------|---|
| The Do Nothing Option | No | No | No | No | <ul style="list-style-type: none"> • Does not meet current or longer term target capacity objectives. • Does not address increased traffic demand from traffic growth. • No improvements in safety. • Does not meet project objectives. |
| Pink | No | Yes | No | Yes | <ul style="list-style-type: none"> • 112 full property acquisitions and 43 partial acquisitions. • Two new bridge structures at: Manns Road over Narara Creek (approximately 75m long), Manns Road rail overbridge (approximately 30m long) and underpass under roundabout for north bound traffic on Pacific Highway. • Impact on the Swamp Mahogany Endangered Ecological Community (EEC) in the Narara Valley Floodplain. |
| TD3 | Yes | Yes | No | Yes | <ul style="list-style-type: none"> • 94 full property acquisitions and 38 partial acquisitions. • A new bridge connecting the southern section of Manns Road with the Pacific Highway. • Brookes Avenue would then extend to connect with the Pacific Highway at Renwick Street and the existing roundabout upgraded to a signalised intersection. • Narara Crescent access would remain in its current configuration allowing all turning movements into Manns Road. • Impact on potential on EEC near Renwick Street (requiring confirmation). |
| TD4 | Yes | Yes | Yes | Yes | <ul style="list-style-type: none"> • 118 full property acquisitions and 54 partial acquisitions. • Two new bridge structures at Manns Road over Narara Creek and Manns Road rail overbridge. • Traffic signals facilitate better access at the Pacific Highway and Manns Road intersection by controlling each movement and providing priority where and when required, sharing the delays around the intersection. • Impact on the Swamp Mahogany EEC in the Narara Valley Floodplain. |