MOTT MACDONALD

Mooney Mooney & Peat Island Planning Proposal

Traffic & Transport Review

9 August 2021

Department of Planning, Industry and Environment (DPIE) NSW

383 Kent Street
Sydney NSW 2000
PO Box Q1678, QVB
Sydney, NSW 1230
Australia

T +61 (0)2 9098 6800
F +61 (0)2 9098 6810
mottmac.com

4 Parramatta Square,
12 Darcy Street,
Parramatta
NSW 2150

Mooney Mooney & Peat Island Planning Proposal

Traffic & Transport Review

9 August 2021

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	08/08/2016	B. Smith			Draft report
B	26/08/2016	B. Smith L. Labutis	G. Hughes	C. Avis	Final Report
C	06/09/2016	L. Labutis	G. Hughes	C. Avis	Final Report - Minor Amendments
D	12/09/2016	L. Labutis	G. Hughes	C. Avis	Final Report - Minor Amendments
E	12/11/2018	H.Yousaf G.Zaaiter	H. Camcigil	G. Lee	Draft revised report
F	14/12/2018	H.Yousaf G.Zaaiter	H. Camcigil T. V.Vuren	G.Lee	Final Report – Minor Amendments
G	21/02/2019	H Yousaf G Zaaiter	H. Camcigil T. V.Vuren	G Lee	Final Report – Appendix F Amended
H	30/09/2020	J. Muller	J. Wukowic	J. Wukowic	Final Report – Revised Concept Plan
I	16/10/2020	J. Muller	J. Wukowic	J. Wukowic	Final Report – minor updates
J	23/10/2020	J. Wukowic	J. Wukowic	J. Wukowic	Final Report – update to include referencing to RMS consultation
K	26/10/2020	J. Wukowic	J. Muller	J. Wukowic	Final Report – included reference to Future Transport 2056
L	6/8/2021	H. Camcigil	J, Muller	J. Wukowic	Amended to reflect new Concept Plan Revision K

Information class: Standard

Contents

Executive summary

Mott MacDonald has been engaged by Property & Development NSW (P&D NSW) to provide transport planning and engineering services to support the Planning Proposal for the rezoning of P&D NSW land at Mooney Mooney and Peat Island (The Site). This report aims to address all key traffic and transport related matters associated with the proposed Concept Plan and specifically address comments received from the Council, Transport for NSW (TfNSW) and various government agencies following the submission of the Traffic and Transport Review of the development in September 2016 and December 2018.

The proposed development will comprise a mixture of land uses including residential and hospitality. It is expected to generate and attract less than 300 new trips in each peak hour. Those trips are associated with the proposed development.

Analysis of the Australian Bureau of Statistics (ABS) Journey to Work 2016 data indicates that travel by private car is the dominant travel mode for journeys in Mooney Mooney. Trains also attract a significant number of commuters with a 12 percent travel mode share, while buses don't seem to be as attractive with less than one percent of trips made by buses.

Initial investigations identified gaps in the cycling and walking network within The Site, with very limited walking and cycling facilities. Improvements to active transport links and facilities could improve the utilisation of both walking and cycling as travel modes within the development.

A review of available capacity of rail services was undertaken to understand the potential impact on current peak hour commuter services by the proposal. The review indicated that existing rail services operating via Hawkesbury River station operate with some spare capacity and should easily accommodate any additional demand generated by the proposal.

Bus services are infrequent in nature due to the existing low demand, and The Site will therefore have no negative impact on bus services, however, increase in bus routes and frequency will improve the public transport amenity of The Site when the development is could be supported by upgrades to the bus stop facilities within The Site.

Road network performance has been assessed for the current situation and the future 2030 scenario with and without development, to understand the impact of the vehicular trips generated by the development. Intersection analysis was undertaken using SIDRA for the major local intersections within the study area. Additionally, motorway segments including on and off ramps of the Pacific Highway (M1) were assessed using static calculations by applying the Highway Capacity Manual (HCM 2010) criteria. Analysis showed that all intersections and motorway segments are currently operating at very acceptable Level of Service (LoS) and will continue to do so under the future 2030 scenario after the completion of the development.

Various opportunities related to both public transport and active transport have been identified as part of the developed transport strategies and those are detailed in this report.

1 Introduction

1.1 Project Appreciation

This Planning Proposal has been prepared on behalf of Property & Development NSW that seeks amendments to the Gosford Local Environmental Plan 2014 (GLEP 2014) for surplus Government owned land at Peat Island and Mooney Mooney (the Site).

The aim of the Planning Proposal is to facilitate the future redevelopment of the site, for a mix of residential, community, tourism and employment generating land uses.

This Planning Proposal was first submitted to Central Coast Council in November 2016. Gateway Determination was issued by the Department of Planning, Industry and Environment (DPIE) on 10 August 2017 (PP_2017_CCPAS_006_00 (17/06254). The Gateway Determination stated that while the supporting studies were sufficient, a number of conditions are required to be addressed prior to progressing the Planning Proposal further. Since August 2017, Property & Development NSW has undertaken a significant amount of consultation with public authorities and Central Coast Council (Council), including the submission of a revised Planning Proposal to Council in December 2018 for review and comments.

Post the 2018 submission, Property & Development NSW has engaged technical consultants to undertake further environmental investigations to respond to Council's and public authorities feedback.

The indicative Concept Plan has been revised in accordance with the additional technical investigations post 2018 submission. The revised indicative Concept Plan comprehensively evaluated the additional environmental and physical constraints, and responded to site's context, future amenity and connectivity.

The revised indicative Concept Plan is attached at Appendix A.

Lot 9 DP 863305 is excluded from the Planning Proposal, given it is under the care, control and management of Central Coast Council and will be retained as RE1 Public Recreation Zone. The indicative Concept Plan identifies a proposed Rural Fire Services (RFS) at this location. This RFS facility does not form part of this Planning Proposal, and is subject to further stakeholder consultation and a separate planning proposal.

The indicative Concept Plan also identifies a proposed location for a Marine Rescue NSW facility. This facility is subject to further stakeholder consultation and a separate proposal.

Private Recreation land is shown on the Indicative Concept Plan located on the foreshore of the Hawkesbury River adjacent to Peat Island. For the purposes of this assessment , it is assumed that this land use will operate as a dry stack boat storage. However, it does not form part of this planning proposal and would be subject to a separate future planning proposal if it is to proceed. This would include a detailed environmental assessment of the impacts.

This part of the site is currently zoned partly RE1 Public Recreation and partly SP2 Infrastructure (for the purpose of hospital) under GLEP 2014, and is proposed to be rezoned to RE2 Private Recreational Zone. A car park is proposed to be an Additional Permitted Use under Schedule 1 of GLEP 2014 on a portion of the site as part of the Planning Proposal.

This Transport and Traffic Assessment Report has been prepared based on the revised indicative Concept Plan and the draft LEP zoning maps.

PROPOSED PLANNING CONTROL AMENDMENTS

The Planning Proposal is seeking to amend the following provisions of the GLEP 2014:

- Amend Clause 2.1 Land Use Zones of the GLEP 2014 to include SP3 Tourist zone listed under Special Purpose Zones. The proposed SP3 Tourist Zone objectives and proposed permissible uses are consistent with the draft SP3 Tourist zone within the draft Consolidated Central Coast Consolidated Local Environmental Plan (CCLEP). Therefore, this Planning Proposal will be consistent with draft CCLEP, subject to gazettal.

- Amend the GLEP 2014 Land Zoning Map applicable to the site, and rezone SP2 Infrastructure and RE1 Public Recreation zones to E2 Environmental Conservation, R1 General Residential, R2 Low Density Residential, RE1 Public Recreation, RE2 Private Recreation, and SP3 Tourist zones.

- Amend the GLEP 2014 Height of Buildings Map to reflect the maximum height of the buildings proposed (8.5m, 12m and 15m) across selected areas of the site as indicated on the proposed Height of Buildings Map.

- Amend the GLEP 2014 Lot Size Map to allow minimum lots size of 150sqm, 220sqm, 300sqm and 450sqm across selected areas of the site as indicated on the proposed Minimum Lot Size Map.

- Amend the GLEP 2014 Additional Permitted Uses Map and amend the GLEP 2014 Schedule 1 Additional permitted uses to include the use of certain land at Mooney Mooney, including:

    - RE2 Private Recreation zoned land, being portion of Lot 11, DP 1157280 and Lot 12, DP 1158746 as identified on the Additional Permitted Uses Map.
        - To include ‘car parks’ as additional permitted use on this part of the site.
    - R1 General Residential zoned land, being the southern portion of Lot 14, DP1158746 as identified on the Additional Permitted Uses Map.
        - Development for the purposes of emergency services facility is permitted with development consent. The proposed emergency services facility is permissible with consent within the proposed R1 General Residential zone under the draft CCLEP. Therefore, this Planning Proposal will be consistent with draft CCLEP, subject to gazettal).
    - RE1 Public Recreational zoned land, being the southern portion of lot 4 DP239249 as identified on the Additional Permitted Uses Map.
        - Development for the purposes of emergency services facility is permitted with development consent. The proposed emergency services facility is permissible with consent within the proposed RE1 zone under the draft CCLEP. Therefore, this Planning Proposal will be consistent with draft CCLEP, subject to gazettal.
    - R1 General Residential zoned land, being the south eastern portion of lot 12, DP1158746 located along Peats Ferry Road, lot 12, DP863305 and the southernmost portion of lot 14DP1158746, as identified on the Additional Permitted Uses Map:
        - Development for the purpose of ‘food and drink premises’ and ‘shops’ are permitted with development consent.
        - The indicative Concept Plan comprises local shops/restaurants and cafes in the form of shop top housing within the Southern Foreshore precinct and the Chapel precinct, which has an area of approximately 200sqm. The proposed shops and food and drinks premises are of a scale that is better suited for this local area. Shops. Restaurants and cafes are prohibited under the R1 zone of the Gosford LEP and the draft CCLEP. Given the proposal no longer includes a service station and a neighbourhood centre, it is proposed to include food and drink premises and local shops to provide sufficient and much needed local retail services for exiting and incoming residents.
    - RE1 Public Recreation zoned land, being Lot 11 DP863305 as identified on the Additional Permitted Uses Map.
        - Development for the purpose of electricity generating works is permitted with development consent.

In addition, consistent with the recommendation of the CMP, this Planning Proposal includes the proposed LEP amendment to include Peat Island as an Item of Environmental Heritage (Item - General) under Part 1 - Heritage Items, Schedule 5 of the Gosford LEP.

1.2 Project Transport Assessment

Mott MacDonald has been engaged to provide traffic engineering services to support the Planning Proposal to rezone State Government owned land at Mooney Mooney and Peat Island (The Site).

A previous planning proposal was submitted to the Department of Planning and Environment (DPE; now Department of Planning Industry and Environment) for consideration in 2014. As part of the proposal a Traffic, Transport and Access Report was undertaken by GTA Consultants. Comments from the review by DPE indicated that further consideration of the suitability of The Site in terms of existing and future traffic and transport planning and supporting measures needed to be explored and addressed to inform the proposed rezoning of the area and the establishment of new planning controls.

The DPE comments and concerns were addressed in the Traffic and Transport Review that was undertaken by Mott MacDonald in 2016. Following the submission of this report in 2016, further comments were received from the Council, Transport for NSW (TfNSW), and various other government agencies which were addressed. A further updated Concept Plan was developed in July 2021 and is the basis of this current assessment.

1.3 Site Location

The Mooney Mooney and Peat Island site (refer to Figure 1.1) is located on the shores of the Hawkesbury River and adjacent to the M1 Motorway. It is well-connected to nearby regional, sub-regional and local centres by both road and rail.

In terms of its locality to surrounding centres it is situated approximately 50 km north of Sydney CBD, 24 km north of Hornsby rail station, and 2.5km north of Brooklyn. To its north are established regional townships situated at Gosford (approximately 27 km north) and Wyong (approximately 45 km north by road).

The Site has the potential to offer a good level of local and sub-regional access and the area itself provides the opportunity to capture recreational and lifestyle attractions and to support continued growth in NSW tourism.

Refer to Appendix A for further details of The Site, including the Concept Plan.

1.4 Proposed Rezoning

An updated Concept Plan has been developed for The Site. The Concept Plan includes a mix of community, residential and hospitality generating uses, as shown in the Concept Plan provided in Appendix A.

This report will identify opportunities and address potential issues associated with supporting access, movement and the overall integration of the proposed site with its surroundings as part of the proposed rezoning of The Site.

1.5 Purpose of the Report

The purpose of this report is to assess the potential traffic and transport impacts of the revised Concept Plan, and to address relevant traffic and transport issues identified in previous planning and traffic and transport review submissions. The analysis was carried out at an appropriate level that helps to inform rezoning of the land and the establishment of planning controls.

Figure 1.1: Mooney Mooney and Peat Island Location Plan

Source: Google Maps (2016)

1.6 Assumptions and Report Limitations

Our assessment is based on and is limited to the following assumptions and limitations:

- The assessment was based on traffic generation rates as stated in the RMS Guide to Traffic Generating Developments (2002) and the more recent *RMS's Technical Direction 2013/04a: Guide to Traffic Generating Developments – Updated Traffic Surveys* (RMS, 2013) and are generally conservative given the characteristics of planned uses.
- Traffic distribution was based on information extracted from ABS Journey to Work data for the Mooney Mooney area dated 2016.
- The network assessment was carried for Weekday AM and PM peak periods and the Weekend peak period. Traffic volumes for these periods around the Site were obtained from traffic surveys and the TfNSW permanent count stations on the M1 Pacific Motorway (2017).
- The road safety assessment was limited to the TfNSW crash statistics (January 2013- December 2017) provided by TfNSW.
- The concept plan land use was limited to the detail provided in the preferred concept plan for the rezoning of The Site.
- The assessment is based on an existing situation, 2030 without development scenario and full development preferred concept plan scenario, and is limited by the data obtained and identified in this report.
- The assessment of The Site and concept is based on the existing situation and the horizon year 2030.
- The assessment was carried out at a high level using SIDRA modelling software for the local intersection within the development for both weekdays and weekend in addition to operational assessment of the motorway segments including the on and off ramps of the M1 using the Highway Capacity Manual (2010) method.

1.7 Report Structure

The remainder of this report is structured as follows:

- ***This Section*** – introduces the project and the aims and limitations of the report.
- ***Section 2*** – covers the background of the project, previous studies and findings, relevant guidance obtained from consultation with other Government agencies and the project alignment with strategic planning objectives.
- ***Section 3 –*** provides an understanding of the existing situation including area and network characteristics and the service and facility conditions.
- ***Section 4 –*** Provides a broad overview of the preferred concept plan and proposed uses.
- ***Section 5*** – provides an assessment of the road network and local intersections under the current situation and the future 2030 scenario.
- ***Section 6*** – covers the pedestrian and cycling strategy.
- ***Section 7*** – outlines the transport management and access strategy.
- ***Section 8*** – outlines traffic management strategy for the local area.
- ***Section 9*** – provides an overview of the wayfinding strategy.
- ***Section 10*** – summarises the key findings.

2 Background and Planning Context

This section provides an overview of the strategic context, project proposal and previous studies, and the project's alignment with Government planning and policy goals.

2.1 Strategic Context

The strategic context of The Site in relation to nearby centres and transport routes is presented in Figure 2.1.

Figure 2.1: Strategic Context

Source: Google Earth (2016)

Figure 2.1 demonstrates that The Site is well connected to nearby centres via the M1 Motorway, Pacific Highway and T1 North Shore train line. The 592 bus route also connects The Site to the south including Brooklyn (with the Hawkesbury River train station) and Hornsby.

2.2 Alignment with NSW 2021, Future Transport Strategy 2056, and the Central Coast Regional Plan

The key guiding documents that are developed by Government for the rezoning of The Site are *NSW 2021 – a Plan to Make NSW Number One* (2011), *Future Transport Strategy 2056* (2018) and the *Central Coast Regional Plan 2036* (2016).

NSW 2021 is identified to be NSW 10–year plan for guiding policy direction, budget decision making and delivering on community priorities. It sets long–term goals and measurable targets, and outlines immediate actions that will help state growth, and to improve opportunities and quality of life for people situated in both regional and metropolitan areas of NSW.

The *Future Transport Strategy 2056*, which builds upon the previous 2012 NSW Long Term Transport Master Plan and the commitments it has delivered, is an integrated transport strategy for NSW that has a key focus on movement and place, bringing together land use and transport planning which aims to improve the integration of all modes of transport. It proposes to develop target goals and action plans that set a clear direction for all transport modes and establish a path that offers an enhanced transport system that can meet current and future customer needs and support projected growth.

These goals and actions can be supported by the proposed rezoning of The Site, which is demonstrated in the subsequent sections of this report. The travel demand management plan identified in the previous submission together with the transport and traffic related strategies included in this report will help to formulate an appropriate package of measures that help to maintain network reliability, maximise the potential of existing infrastructure and services, and support and promote travel by public transport, walking and cycling, and improving safety.

The *Central Coast Regional Plan 2036* (DPIE, October 2016) provides a regional planning vision for the Central Coast. Due to the early planning status of this rezoning application, The Site itself is not specifically mentioned, however in general terms it is covered through strategic directions that aim to increase residential development through infill and the availability of existing infrastructure and services. This aims and aligns with the planning concept through encouraging increases in housing supply and choice in established areas, which will make best use of existing services and infrastructure such as public transport.

2.3 Alignment with Ministerial Direction

The applicable Ministerial Directions under section 9.1 (2) of the Environmental Planning and Assessment Act indicate the following:

- **Ministerial Direction and Best Practice 3.1 – Residential Zones**

The Ministerial Direction indicates that development proposals should make efficient use of existing infrastructure through locating near to established infrastructure, such as city centres, neighbourhood centres, transport hubs, schools, employment precincts, recreational facilities and regional services.

This proposal is identified to align with these principles and provides good connectivity to established and planned employment, education, retail and recreation facilities. This is achieved through existing services and network infrastructure opportunities, which offers access travel mode choices for both local and regional travel. Its proximity to the above can help to maximise the potential of existing infrastructure and support access by public transport, walking and cycling. Refer to sections 2.1, 6, and 7 for further details.

- **Ministerial Direction and Best Practice 3.4 – Integrating Land Use and Transport**

The Ministerial Direction indicates that the development proposals should have a positive contribution to managing travel demand.

The Site provides an integrated land use and transport solution that aligns with the direction, and the planning principles set out in NSW 2021, Draft Central Coast Regional Plan and the NSW Long Term Transport Master Plan. Its position in the Hawkesbury River catchment can help to support travel by walking, cycling and an existing public transport system. The inclusion of residential density at this site provides an opportunity to support growth while reducing car dependency in the Hawkesbury River catchment. The site is situated within walking distance of a new local centre and established bus service route stops, and within cycling distance of an established township with a railway station.

2.4 Department of Planning and Environment Queries and Consultations with RMS and TfNSW

Traffic and transport issues raised by the DPE (now DPIE) are presented in Appendix B together with how these elements were addressed as part of Traffic and Transport Review report that was issued in September 2016.

Additionally, extensive consultation was undertaken with different departments of RMS (now TfNSW) and TfNSW prior to issuing the report in September 2016 and the key issues raised as part of this process are presented in Appendix B.

Following the submission of the Traffic and Transport Review report on the 12th of September 2016, further issues and queries were raised by the Council, TfNSW, RMS and other government agencies.

Lists of issues raised and responses to each has been included in Appendix C of this report.

Further consultation with RMS/TfNSW related to a proposed service station provided on a parcel of land adjacent to the M1 occurred between 2018 and 2019 (based on a previous layout). Following a number of updates to both the network modelling and reporting, as well as detailed consultation with TfNSW, it was decided that a change to the masterplan layout would be required to resolve the outstanding issues raised, which included the removal of development of the service station site from the Planning Proposal.

Relevant correspondence through this period has been provided in Appendix K of this report.

3 Existing Conditions

3.1 The Site

The Site is separated by the M1 Pacific Motorway (M1) corridor, which is a high-speed interstate corridor with Average Annual Daily Traffic (AADT) volumes of approximately 42,000 vehicles in each direction in 2017 as contained in the TfNSW traffic volume viewer. Access to and from the M1 is via on/off ramps that offer access in both northbound and southbound directions. An established rest area that is positioned on the eastern side (southbound direction) of the corridor is currently used by passing traffic and regularly used by heavy vehicle drivers. This corridor restricts access between the western and eastern sections of The Site, which are limited to a two-lane road corridor running under the M1 and a pedestrian underpass further north. Refer to Figure 3.1 for further details.

The Mooney Mooney and Peat Island local catchment is characterised with the following uses:

- Small pockets of low-density residential housing;
- Disused or infrequently used facilities (Peat Island, TfNSW depot, RFS depot, and a Chapel);
- A public boat ramp at the southern end of the peninsula;
- A limited number of commercial activities on the eastern foreshore;
- The Mooney Mooney Club (off Kowan Street);
- Deerubban Reserve to the southern edge of the area; and
- Brisbane Water Nation Park to the north.

Large parts of The Site are currently zoned SP2 (Special infrastructure) for either road, hospital or educational purposes. In most of cases these uses are now surplus to requirements and Government (the land-owner) is currently seeking to rezone the land for more appropriate uses that could support regional strategies and growth of the economy.

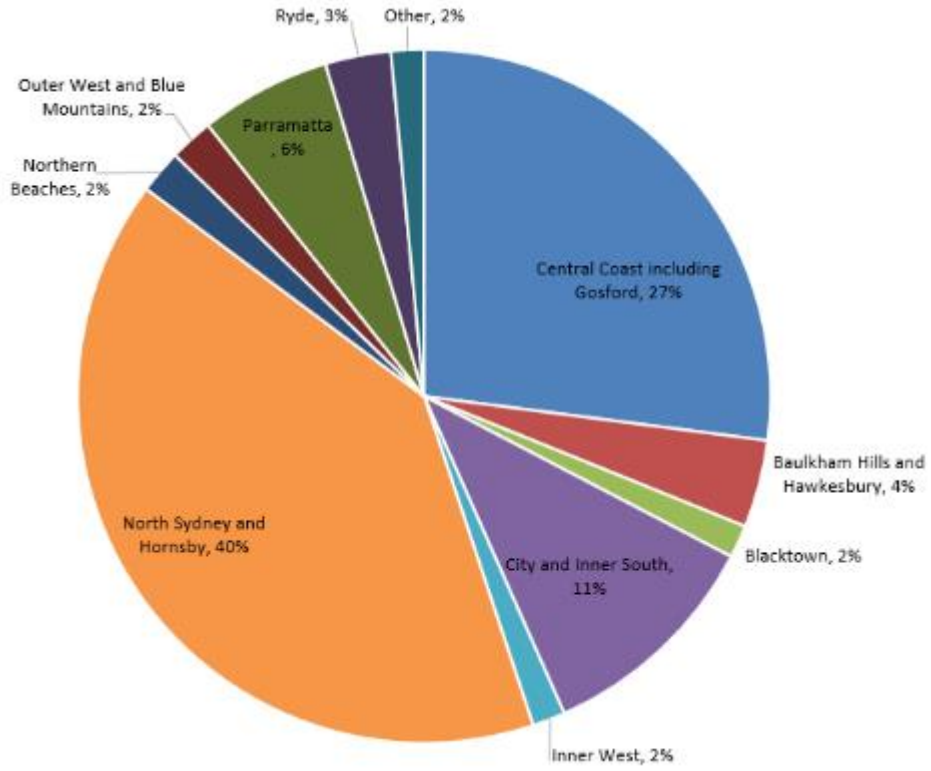
Figure 3.1: Snapshot of the Existing Situation – The Site

Source: Google Maps (2016) combined with Mott MacDonald edits (2018)

3.2 Current Travel Characteristics

An analysis has been undertaken of 2016 Australian Bureau of Statistics (ABS) Journey to Work (JTW) trends for people currently residing in Mooney Mooney. Figure 3.2 shows the normal place of work for people living in Mooney Mooney.

Figure 3.2: JTW Destinations - Place of Work

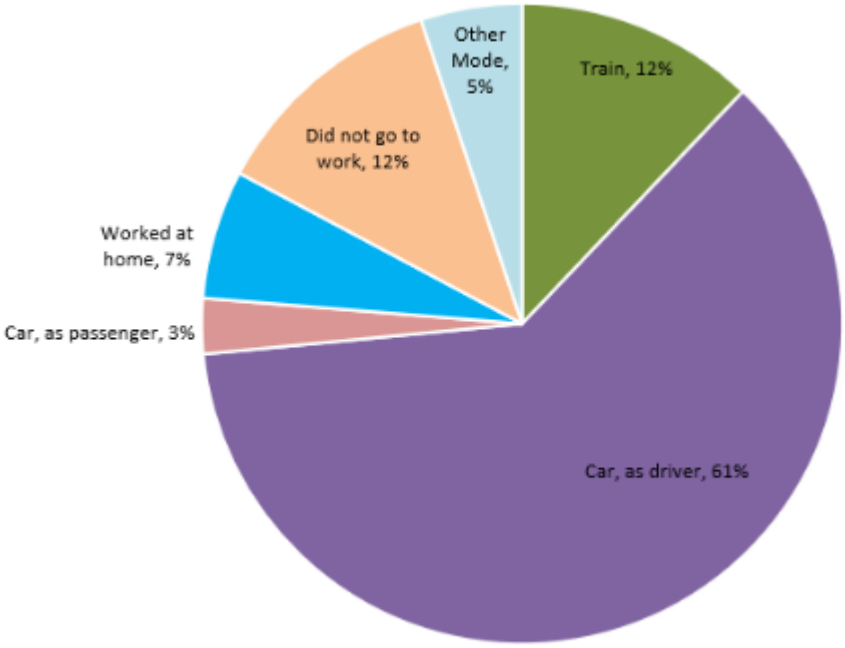


Source: ABS Census Data Journey to Work (2016)

The data indicates that people currently residing in the study area work in a variety of commercial centres and employment areas, with Gosford and Hornsby being key destinations followed by the Sydney CBD, inner south, and Paramatta.

Figure 3.3 shows the normal JTW travel mode for people living in Mooney Mooney. According to ABS data (2016), 215 persons travel to work.

Figure 3.3: JTW Travel Mode



Source: ABS Census Data Journey to Work (2016)

The data indicates that travel by private car is the dominant travel mode for journeys in Mooney Mooney. 64 percent of residents travelled by car as either a driver (61 percent) or a passenger (three percent) and this reflects the quality of access. Trains also attracts a significant number of commuters with a 12 percent travel mode share. The data also highlights that some residents did not go to work (12 percent) and indicates that this area is attractive to retirees.

Hawkesbury River station offers services to the major centres of Gosford and Hornsby (the key journey to work destinations). It is noted that the latest 2016 JTW data shows that none of the people surveyed travelled to work by bus and that road (driving) and rail are the main modes of access for commuting.

3.3 Road Network

The catchment is supported by the following road characteristics and the road network details highlighted in Figure 3.1:

3.3.1 M1 Pacific Motorway

The M1 (previously the F3 Freeway) is a major state road that connects key urban centres and conurbations, including Sydney, the Central Coast and Newcastle. This important arterial road link contains three lanes in each direction and includes entry and exit ramps at Mooney Mooney in both directions. The posted speed limit along this section of the motorway is 110 km/h.

3.3.2 Pacific Highway

The Pacific Highway is a historical strategic road link that was replaced in this section by the M1 and functions as a regional road providing access to surrounding suburbs and recreation areas. This section of the Pacific Highway provides access to Brooklyn to the south (including Hawkesbury River train station) and Cheero Point to the north and contains one lane in each direction and generally does not allow for kerbside parking. The posted speed limit through Mooney Mooney is 60 km/h, which increases to 80km/h over the Hawkesbury River.

3.3.3 Pacific Highway Link Road

The Pacific Highway Link Road functions as a collector road connecting the Pacific Highway and M1 Motorway northbound off and on ramps. It allows access to and from Mooney Mooney for northbound traffic on the motorway and also feeds into local and private roads on the western section of The Site. The Pacific Highway Link Road contains one lane in each direction and has a posted speed limit of 60 km/h.

3.3.4 Peats Ferry Road

Peats Ferry Road is a local access road that services parklands, an existing boat ramp and a car park. It contains one lane in each direction and does not have a posted speed limit.

3.4 Bus services and facilities

The Site catchment is served by one bus service route (592) that travels along the Pacific Highway and is operated by Transdev. The Route 592 provides an important public transport link to this part of the Hawkesbury River catchment and serves:

- The townships of Cheero Point (residential) and Mooney Mooney (residential/ recreational/ tourist village) to the north of the Hawkesbury River; and
- Brooklyn (Hawkesbury River rail station and recreational/tourist village), Cowan (rail station), Berowra (rail station and village centre), and Hornsby to the south.

The access offered by this service was identified to be very important for this catchment through its ability to offer direct access from The Site to other public transport and regional rail connections. This includes the nearby rail stations at Brooklyn that offers fast and reliable connections to regional centres at Gosford and Hornsby, and the metropolitan centres of Sydney and Newcastle. Each of these centres offer employment, health, education, retail and recreation opportunities for existing and proposed residents of Mooney Mooney area.

Refer to Appendix D for an understanding of the bus service route and its connectivity to rail stations and other surrounding local centres.

The review of 592 service operations indicated that it offers an infrequent weekday and Saturday service that is focused around peak commuter periods. This service in general offers limited access opportunities and based on the current timetable does not appear to service weekday and Saturday off peaks, Sundays or public holiday periods. Stopping patterns of the service also appears to be inconsistent with some stops, such as the Peat Island Road bus stop only receiving one service a day. This is based on a new timetable introduced by TfNSW in November 2018 and has been in effect since 2nd December 2018.

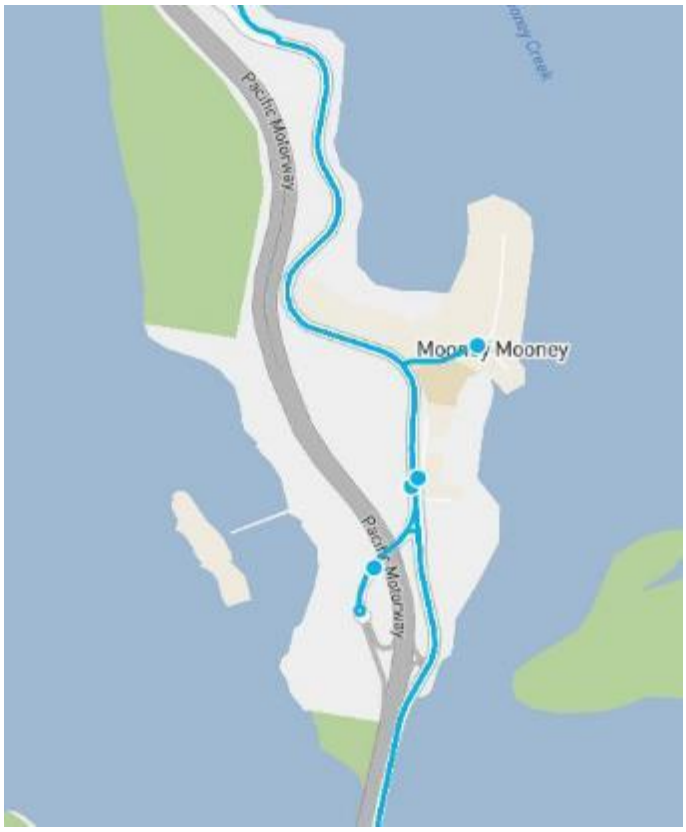
Table 3.1: Bus frequency

Route Number	Route Description	Peak Period (7-9AM, 4-6PM)	Off-Peak Period
592	To Brooklyn Hawkesbury River Station	Ranges between 25 to 50 minutes	--
592	From Brooklyn Hawkesbury River Station	Ranges between 25 to 40 minutes	--

Source: transportnsw.info/routes/bus

There are four bus stops within The Site, two are located on the Pacific Highway near Kowan Road, one is located on the Pacific Highway Link Road near Peat Island and one is on Point Road near Mara Crescent close to Mooney Mooney Public School. The location of the bus stops is as shown in Figure 3.4 below.

Figure 3.4: Bus Stops Locations



Source: Transportnsw.info

Bus stop facilities were identified to be sub-standard with stops not supported by an established footpath network, shelters, bus timetable and passenger information (except for the bus stop on Point Road) or Disability Discrimination Act (DDA) facilities as shown in below Figure 3.5 and Figure 3.6.

Figure 3.5: Bus Stops on the Old Pacific Highway and the Pacific Highway Link Road

Source: Google earth (2018)

Figure 3.6: Bus Stop on Point Road

Source: Google earth (2018)

3.5 Rail services and facilities

The nearest rail station to The Site is the Hawkesbury River station in Brooklyn, which offers Sydney-Newcastle train services. This is situated approximately 5.5 kilometres to the south of The Site by road and offers relatively frequent services to employment and education facilities situated at Sydney, Hornsby, Chatswood, Macquarie Park and Newcastle. The current frequency of rail services is summarised in Table 3.2.

Table 3.2: Train frequencies

Route Description	Peak Period (7-9AM, 4-6PM)	Off-Peak Period
To Newcastle	One every 60 minutes (AM) One every 30 minutes (PM)	One every hour
To Sydney	One every 30 minutes (AM) One every 60 minutes (PM)	One every hour

Source: transportnsw.info/routes/train

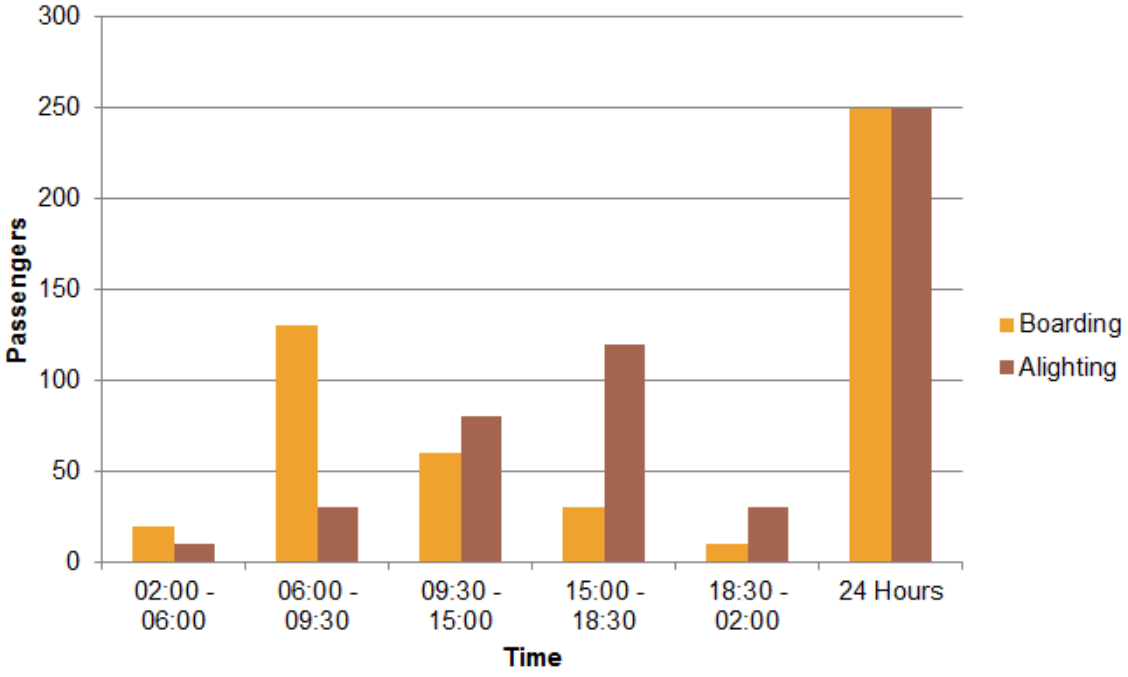
Access to the Hawkesbury River station is possible by private vehicle, bicycle and bus services. However, it is noted that both bus service frequency and parking provision at the station and township are limited as shown below in Figure 3.7. It is also noted that the bus timetable doesn't completely tie-in with the train one, however, there is an average 15-minute difference between buses arriving at Hawkesbury River Station and the train services leaving the station in the PM. In the AM peak, the difference could be anywhere from seven minutes to 50 minutes depending on the bus arrival time at the station. Cycling to the station is influenced by the quality of supporting infrastructure and is also noted to be limited.

Figure 3.7: Limited Parking at Hawkesbury River Station

Source: Google earth (2018)

In order to obtain an understanding of the function of the station and capacity of existing services a review of the daily patronage profile was undertaken. Figure 3.8 provides a breakdown of typical weekday passenger movements at Hawkesbury River station.

Figure 3.8: Weekday Passenger Flow Profile at Hawkesbury River Station (2012)



Source: RailCorp Barrier Counts of Rail Passengers (2012)

The passenger profile indicates that Hawkesbury River station acts as a minor commuter station for passengers situated along the Newcastle and Central Coast line and offers spare capacity to support future growth. Refer to Section 5.2 for an understanding of available spare service capacity.

A review of the station's compliance with current DDA standards was also considered as part of the assessment, which highlighted (based on information contained on the TfNSW website) that the station is not DDA compliant as shown in Figure 3.9 below. The station is only accessible via stairs, with no wheelchair access provided. The nearest station that offers access for people with DDA needs is Cowan and can be accessed via the 592-bus service route.

Figure 3.9: Access to the Hawkesbury River Train Station (Not DDA compliant)

Source: Google earth (2018)

3.6 Ferry Services

The nearest wharf for Ferry services from The Site is the Brooklyn Wharf which is located approximately 200 m east of the Hawkesbury River Train Station.

Brooklyn Ferry Service is a small private ferry company operating under contract for TfNSW. The company operates two restored historic vessels between Brooklyn, Dangar Island and Little Wobby. The ferry service provides essential public transport for commuters and tourists in these areas.

The ferry runs every day to a timetable and, where possible, links with trains arriving and departing from Hawkesbury River railway station. Typically, the ferry service runs at a frequency of 30 to 60 minutes on all weekdays with the services terminating at 20:00 and 19:00 on weekends. The service between Brooklyn and Dangar Island is more frequent than the Little Wobby service. Figure 3.10 below shows a view of Brooklyn Wharf.

Figure 3.10: View of Brooklyn Wharf

Source: Google earth (2018)

3.7 Walking and Cycling

There are currently a limited number of footpaths and bicycle facilities within The Site area and as a result, current opportunities for cycling beyond commuter or recreational uses are limited. A review of Central Coast Council's "*Gosford Bike Strategy 2014*" and subsequent discussions with Council confirmed that there are no commitments to improve cycle routes or other facilities in the Mooney Mooney area. However, it is noted that the G*osford Bike Strategy 2014* states a goal of *increasing the cycling mode share, which is consistent with the NSW State Plan and a commitment to improving road safety, facilities and cycling tourism.*

The existing active transport network is presented in Figure 3.11.

Figure 3.11: Existing Active Transport Network

Source: TfNSW (https://roads-waterways.transport.nsw.gov.au/maps/cycleway_finder)

3.8 Existing Traffic Data

Traffic counts were undertaken in September 2018 for both a weekday AM and PM peak periods, which consisted of a Tuesday counts collected between 05:00 to 08:00 and 15:00 to 18:00 in addition to a weekend peak period which consisted of a Sunday counts collected from 08:00 to 18:00. The intersections appraised are shown in Figure 3.12 and described below:

1. Old Pacific Highway/ B83 Pacific Highway - operates as a give-way controlled T-intersection;
2. M1 Northbound ramps/ Peats Ferry Road/ B2 Site Road/ Pacific Highway Link Road – operates as a four-way roundabout; and
3. M1 Southbound ramps/ B83 Pacific Highway – operates as an all way stopped controlled intersection under normal operations with the ability to operate under traffic signal control (temporary operations).

Figure 3.12: Modelled Intersections

Source: Google Earth (2018)

These intersections represent the key access points to the Mooney Mooney area from the M1, Pacific Highway and the local network.

The analysis of data indicated that 06:30-07:30 and 15:00-16:00 represent the weekday AM and PM peak hours for the Mooney Mooney area. Surveys undertaken on Sunday to determine the impact from weekend traffic showed that the peak hour occurs between 11:30 to 12:30.

A review of traffic data on the M1 was also undertaken, which was extracted from a permanent count stations at Cowan to the south of The Site and Cheero Point to the north. Location of the traffic count stations are shown in Figure 3.13.

Figure 3.13: Location of Permanent Count Stations

Source: Traffic Volume Reviewer (Source: TfNSW)

The review of this data clarified that the peak hours on this section of the network are 06:00 to 07:00 and 16:00 to 17:00 on a weekday and 11:00 to 12:00 on the weekend.

Existing traffic data was used to develop a SIDRA model to assess existing intersection performance in addition to assessing the performance of the motorway segments of the M1 including the on and off ramps from and to Mooney Mooney area as shown in Figure 3.14 below. The motorway segment performance was undertaken using the Highway Capacity Manual HCM (2010).

Refer to Section 5.3 for the results of the assessment and comparison with the results under a scenario including the rezoning proposal and full development of The Site.

Figure 3.14: Analysed Motorway Segments

3.9 Crash Data Analysis

Crash data was obtained for a five-year period from January 2013 to December 2017 to understand the crash history in the area and a summary is presented in Appendix E. The data set used in the analysis is as shown below:

- Crash dataset 8317 - Pacific Highway, between Kangaroo Point and Point Road, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017;
- Crash dataset 8317 - Pacific Motorway (including off/on ramps), between Kangaroo Point and the southbound safety ramp, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017; and
- Crash dataset 8317 - Northbound Pacific Motorway off/on ramp, up to intersection with Pacific Highway, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017.

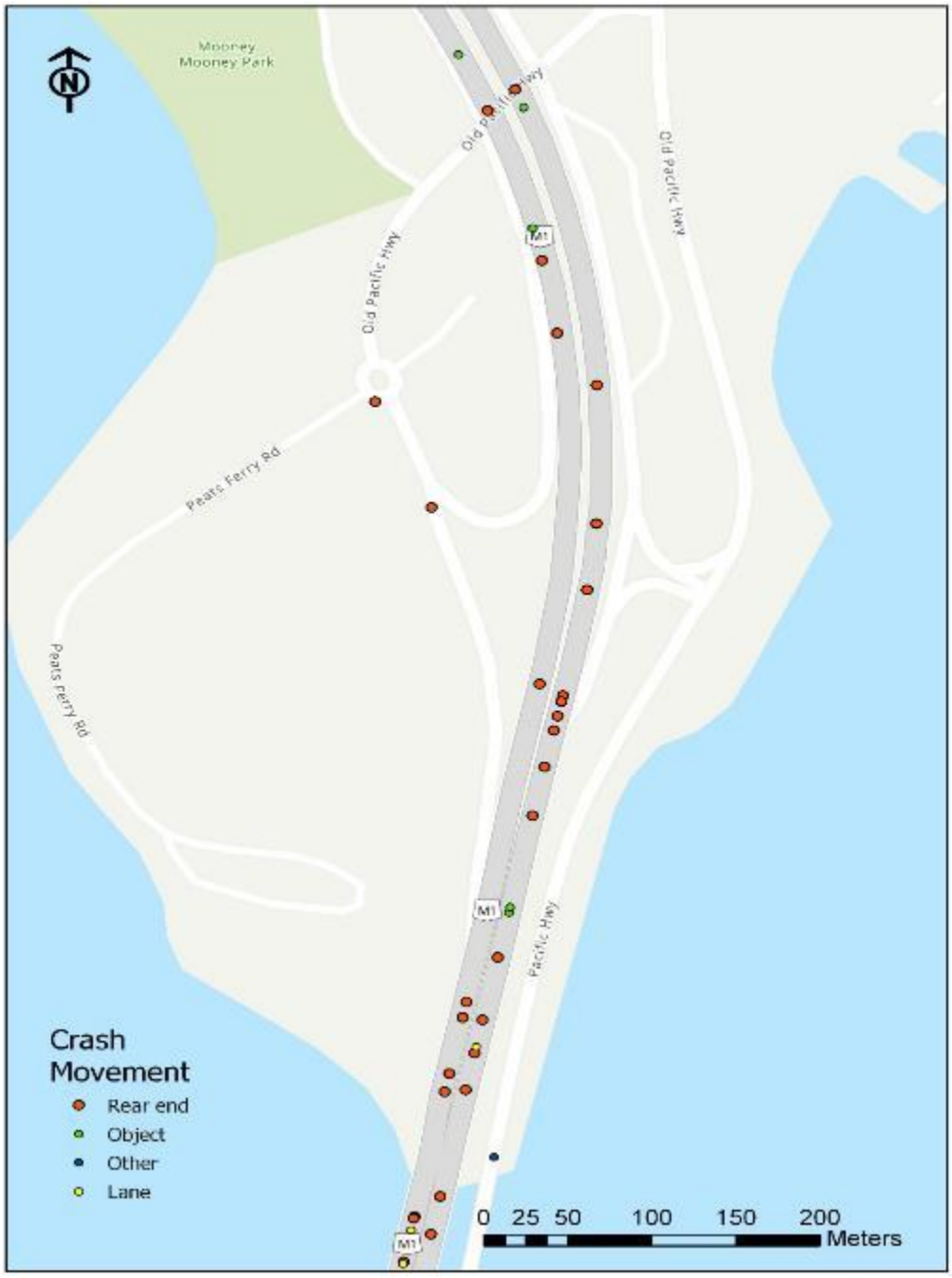
The key findings of the analysis are listed below:

- 68 percent of crash-movements are rear-end movements. This is likely to occur when the Pacific Motorway is congested;

- 70 percent of rear-end crashes occur close to the southern Pacific Motorway ramps;
- Cars are involved in 89 percent of crashes, while light trucks are involved in 42 percent of crashes;
- Weather and visibility conditions do not appear to affect crash rates. Most crashes occur with fine weather and dry conditions;
- Crashes are not significantly increased during holiday periods or weekends;
- The rate of crashes increases during peak hours, likely as a result of higher traffic volumes during these periods; and
- No fatal injuries occurred from 1 Jan 2013 to 31 Dec 2017. Moderate and minor injuries account for almost 85 percent of all injuries. The average number of casualties is 0.78 for each crash.

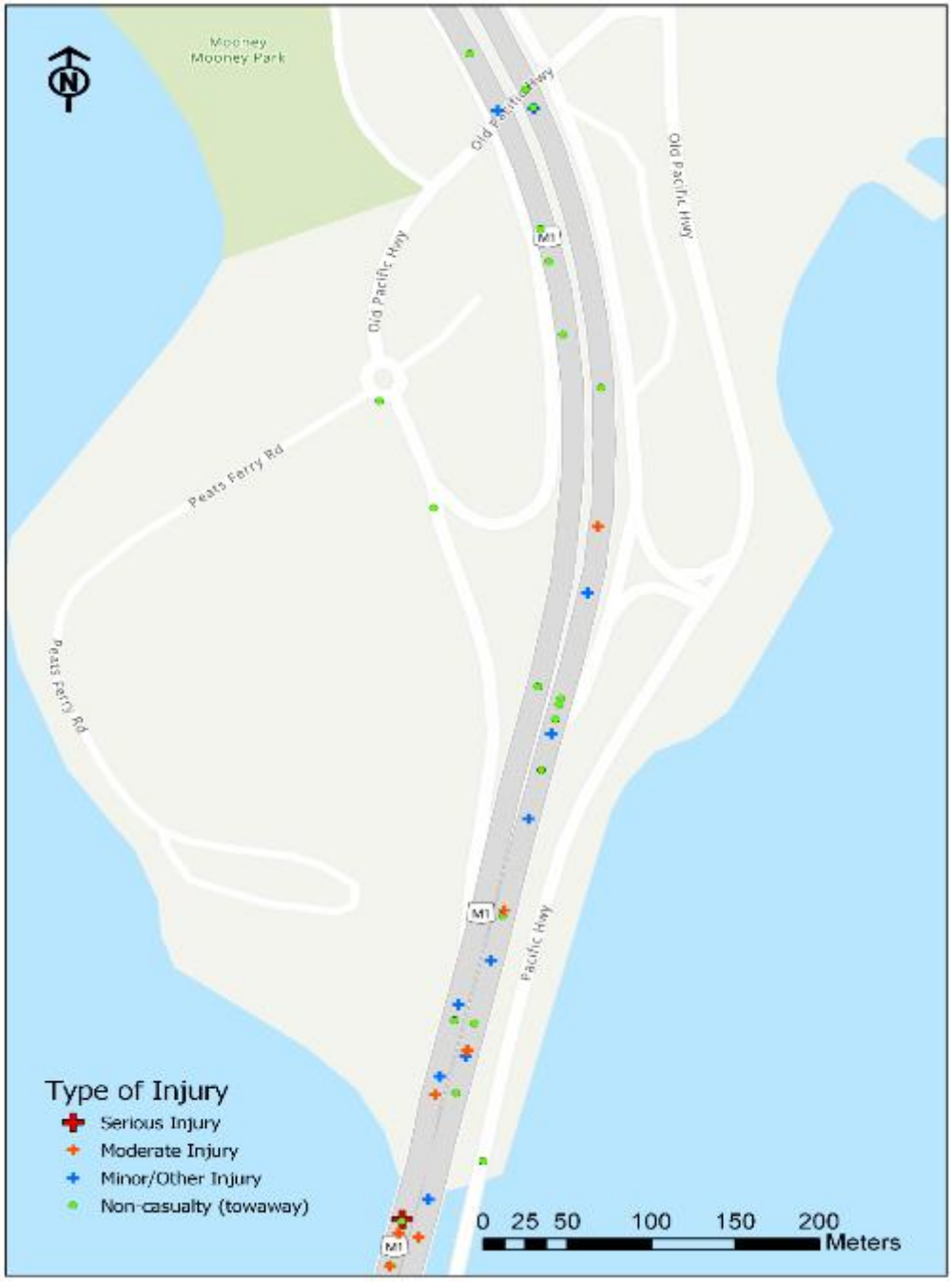
Figure 3.15 and 3.16 highlight the crash movement type and level of injury for each recorded crash in the five-year period.

Figure 3.15: Crash Movement based on Crash Location



Source: Roads and Maritime Services, Crash dataset 8317 - Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

Figure 3.16: Crash Type of Injury based on Crash Location



Source: Roads and Maritime Services, Crash dataset 8317 - Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

It is noted that the crash trend in the area is unrelated to the existing land use and therefore should be addressed as part of an operational solution of the M1 corridor.

Further investigation into the cause of crashes and planned improvements by Government in traffic flow, monitoring and warning management systems are expected to help address this current road safety issue.

The proposal could be configured to help support a design solution that would be addressed during DA phase for this existing issue through the visual appearance of development, separation, and improvements in wayfinding systems and access routes between the western and eastern sides of the corridor. It is also noted that the proposal has the potential to exacerbate the issue if not addressed as part of the above, which is expected to be a focus of Governement under the NSW 2021 targets and goals.

Refer to Appendix E for further details of the crash analysis.

4 Concept Plan

This section details the key components of the Concept Plan. Refer to Appendix A for the proposed Concept Plan.

The proposed development will comprise of a mixture of land uses including residential and hospitality. The key components are described below.

Proposed Component	Description
Adaptive reuse of the existing Peat Island institutional buildings	Intended for hotel/accommodation purposes Constrained by Peat Island causeway and is intended that vehicular access is restricted to service vehicles The hotel parking requirement (location 6) is provided within the at-grade car park adjacent to the buildings at location 4
Private recreation	Located to the south of the Peat Island causeway Includes parking provision. Assumed to be indicative dry-stack boat storage (subject to investigation and separate proposal).
New medium and low-density residential areas	Will accommodate residential developments for pre-retirement/ semi-retired/ fully retired housing markets with a focus on attracting people seeking recreational riverside lifestyle Offers an opportunity for contained travel during peak periods and encourages public transport use due to the proximity and access to nearby centres and rail services
Recreational paths and active transport connectivity	Improvement of the river foreshore to a shared path from the northern residential area to the existing boat ramp at the southern peninsula Will also connect to the new residential areas, dry-stack boat storage (subject to separate proposal) and community facilities Includes a potential east-west connection via the M1 underpass or Pacific Highway Link Road, and a potential extension to Brooklyn and Hawkesbury River train station
Public parklands and public car parking	Provided throughout the western section of The Site and supports proposed land uses

Table 4.1 provides details of the master plan land use.

Table 4.1: Concept Plan Land Use Summary

ZONE	Zoning Land Area (sqm)	# Dwellings			GFA (sqm)	Other (Boats)
		Residential lots	Townhouse	Apartments		
R1 - General Residential						
- Residential	52,591	15	54	162		
- Chapel / community centre	3,882					
- Neighbourhood shops @ Southern Foreshore Precinct					170	
R2 Low Density Residential						
-Residential	36,725	36				
Total Residential	**89,316**	**51**	**54**	**162**		
Total Retail					**170**	
SP3 Tourist - HOTEL	**50,530**					
- New building	50,530	40				
- Existing buildings		45				
Total tourist accommodation		**85**				
RE2 - Private Recreation	**9,150**					
E2 - Environmental Conservation	**104,583**					
RE1 - Public Recreation	**94,709**					
- Substation	7,400					
Total Public Open Space	**208,442**					
TOTAL	**348,287**					

Source: *Mooney Mooney Table of Development* – Urbis (update August 2021)

The above table shows that the development would provide 51 residential lots, 54 townhouses, 162 apartments as well as a hotel with 85 units.

The Southern Foreshore Precinct comprises 170 sqm retail space under the current planning proposal.

5 Traffic and Transport Assessment

This Section provides the results of the traffic and transport assessment undertaken for the development.

5.1 Vehicle Trip Generation

5.1.1 Trip Generation

Trip generation resulting from the potential rezoning and development of The Site was determined using the RMS Guide to Traffic Generating Developments (2002) and the RMS Technical Direction *2013/04a: Updated Traffic Surveys* (2013). A summary of the trip generation based on the Urbis concept plan is presented below in Table 5.1.

Table 5.1: Trip Generation

	AM		PM		Sunday Peak	
Land Use	**IN**	**OUT**	**IN**	**OUT**	**IN**	**OUT**
Low Density Residential	20	73	78	21	20	73
Medium Density Residential	23	86	86	23	23	86
Retail	11	11	11	11	14	14
Hotel / Motel	7	28	28	7	7	28
Private Recreation	9	1	2	13	9	1
Total	**70**	**199**	**205**	**75**	**73**	**202**

As mentioned in Section 4, for the purpose of this assessment, the Private Recreation land use has been assumed to operate as a 60-berth dry stack dock. The future use of this land is subject to a further investigation and a separate planning proposal.

The analysis indicates that The Site could generate nearly 300 vehicle trips in the weekday and weekend peak hours. The key land use generator would be the proposed residential units and the Southern Foreshore Precinct including neighbourhood shops. The previous version of the Traffic and Transport Assessment considered a slightly higher development yield which led a higher trip generation of 294 vehicle trips during the AM peak hour and over 300 trips during the PM and weekend peak hours.

The modelling in this assessment has been maintained using the higher trip generation estimate as this gives a more conservative (worse case) assessment.

5.1.2 Trip Assignment

The estimates of generated trips were distributed across the study area road network to understand the likely impacts on critical points of the road network. The distribution was based on the locality of sites shown on the concept plans and the following assumptions:

- 30 percent of generated trips will arrive from the north and 70 percent from the south, and this is based on JTW 2016 (refer Figure 3.2);
- 70 percent of generated trips will use the M1 Motorway to access The Site, considering that it's the major corridor carrying traffic north-south between major cities and suburbs;
- 30 percent of generated trips will use the Pacific Highway to access The Site, assuming it's used by local sites and neighbourhoods to access the development (such as Brooklyn); and

– No assumptions were made for trip containment based on proposed local facilities. That is, all of the trips shown in Table 5.1 would be generated from areas external to the Site.

Refer to Appendix F for further details of the trip assignment.

5.2 Impact on Public Transport

Refer to Figure 3.3 for an understanding of the travel mode profile generated under the proposed Concept Plan. The data indicates that public transport trips comprise of approximately 12 percent of all commuter trips and that these trips all occur by rail. A review of available capacity of rail services was undertaken to understand the potential impact on current peak hour commuter services by the proposal and is presented as an average peak hour load percentage against the total seating capacity of current services in 2014[1]:

- AM Peak: 64 percent (measured at Woy Woy); and
- PM Peak: 49 percent (measured at Hornsby)

The review indicated that existing rail services operating via Hawkesbury River station operate with some spare capacity that should easily accommodate any additional demand generated by the proposed development.

Increased patronage at Hawkesbury River station, as well as nearby major train stations with more frequent services (e.g. Berowra and Hornsby), as a result of the development will increase commuter parking requirements at those stations. This increase to commuter parking requirements would need to be addressed by Hornsby Shire Council / Central Coast Council and TfNSW. An allowance for these works could be included in a 7.11 Contribution which would apportion costs to the end land user rather than burdening the Authority undertaking the works.

Bus services are infrequent in nature due to the existing low demand. Less than one percent of trips are expected to use the bus as a travel mode, and The Site will therefore have no negative impact on bus services. Increase in bus routes and frequency will improve the public transport amenity of The Site and could be supported by developer contribution and this together with the planned increases in population are likely to attract a larger mode share in the future.

5.3 Road Network Performance

This section of the report provides an understanding of the existing traffic conditions and potential traffic impact resulting from future rezoning and development of the area.

As mentioned in Section 3.8, two types of analysis were undertaken to assess the impact of the future rezoning and development on the road network performance, this included:

- Intersection analysis for three local intersections as highlighted in Figure 3.12. This analysis was undertaken using SIDRA Intersection 7; and
- Motorway segment analysis for M1 on and off ramps as highlighted in Figure 3.14. This analysis was undertaken using the Highway Capacity Manual 2010 methodology.

[1] Data taken from BTS Report on Train Statistics (December 2014)

5.3.1 Modelled Scenarios

The following scenarios have been modelled in SIDRA:

- **Existing (2018)** – existing conditions only based on the traffic counts obtained for the project;
- **Future year (2030) Without Development** – potential future conditions resulting from the projected traffic growth of the area without the development; and
- **Future year (2030) With Development** – potential future conditions resulting from the rezoning proposal and development of the area in line with the Urbis concept plans presented in Appendix A.

To estimate the future scenario 2030 background traffic, a growth factor was applied to the existing intersection and permanent stations counts. The growth factor was derived from the STFM model flows provided by RMS (now TfNSW) for the area. Flows for the base year 2017, in addition to forecast flows for 2021, 2026, and 2031 were provided.

The following growth factors were used to factor the existing traffic counts of 2018:

- A growth factor of two percent per annum was applied to 2018 flows to estimate the 2021 flows;
- A growth factor of 0.6 percent per annum was applied to 2021 flows to estimate 2026 flows; and
- A growth factor 0.9 percent per annum was applied to 2026 flows to estimate the 2030 forecast flows.

5.3.2 Intersection Analysis

5.3.2.1 Traffic modelling performance measures

SIDRA Intersection 7 is a micro-analytical traffic modelling software tool that has been used to appraise the future conditions on the road network.

The 'Level of Service' (LoS) is the standard measure used to understand the operational performance of the network and intersections. This is defined as the qualitative assessment of the quantitative effect of factors such as speed, traffic volume, geometric features, delays and freedom of movement.

The LoS concept is applied to intersections through measures of effectiveness, as summarised in Table 5.2.

Table 5.2: Intersection Measures of Effectiveness

Intersection Control	Measure of Effectiveness
Priority controlled	Degree of Saturation Delay to critical movements (sec/vehicle) Queue length for critical movements
Traffic Signals	Average Delay (sec/vehicle) Delay to critical movements Degree of Saturation Cycle Length Queue length for critical movements
Roundabout	Average Delay (sec/vehicle) Delay to critical movements Degree of Saturation Queue length for critical movements

Source: RTA Guide to Traffic Generating Developments (2002)

The network conditions were evaluated using the LoS criteria defined in the *Guide to Traffic Generating Developments* prepared by NSW Roads and Maritime Services (now Transport for NSW). Details of the criteria are outlined in Table 5.3 below.

Table 5.3: Level of Service (LOS) Criteria for Intersections

Level of Service	Average Delay per Vehicle (sec/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 modes	At capacity, requires other control mode
F	> 70	Over capacity, unstable operation	Over capacity, unstable operation

Note:
1. The average delay assessed for signalised intersections is over all movements.
2. For roundabouts and priority control intersections (with Stop and Give Way signs or operating under the T-junction rule), the critical criterion for assessment is the movement with the highest average delay.
3. Average delay is expressed in seconds per vehicle.

5.3.2.2 Modelled Network

The following intersections were modelled as part of the road network appraisal:

1. Old Pacific Highway/ B83 Pacific Highway - operates as a give-way controlled T-intersection;
2. M1 Northbound ramps/ Peats Ferry Road/ B2 Site Road / Pacific Highway Link Road – operates as a four-way roundabout; and
3. M1 Southbound ramps/ B83 Pacific Highway – operates as an all way stopped controlled intersection under normal operations with the ability to operate under traffic signal control (temporary operations).

The modelled network is presented in Figure 3.12.

5.3.2.3 Modelling Results

The results of the SIDRA intersection modelling for both existing and future development scenarios are presented in Table 5.4, Table 5.5 and Table 5.6 respectively and include weekday AM and PM peak hour assessments in addition to weekend. Detailed SIDRA analysis results are included in Appendix G.

Table 5.4: Intersection Operational Performance - Existing Conditions

		AM (Weekday)			PM (Weekday)			Sunday Peak		
Ref	**Intersection**	**LOS**	**DoS**	**Max. Delay (s)**	**LOS**	**DoS**	**Max. Delay (s)**	**LOS**	**DoS**	**Max. Delay (s)**
1	Old Pacific Highway / Pacific Highway	A	0.051	6.3	A	0.067	6.4	A	0.216	7.9
2	Old Pacific Highway / Peats Ferry Road	A	0.053	10.7	A	0.075	10.8	A	0.161	11.1
3	Pacific Highway / M1 SB Ramps	B	0.164	16.7	B	0.228	14.7	B	0.540	19.5

The results indicate that the existing network operates at the highest level of service with very low degrees of saturation at all intersections. This demonstrates that the existing road network contains a large amount of spare capacity.

Table 5.5: Intersection Operational Performance - Future year 2030 Without Development

		AM (Weekday)			PM (Weekday)			Sunday Peak		
Ref	**Intersection**	**LOS**	**DoS**	**Max. Delay (s)**	**LOS**	**DoS**	**Max. Delay (s)**	**LOS**	**DoS**	**Max. Delay (s)**
1	Old Pacific Highway / Pacific Highway	A	0.059	6.4	A	0.077	6.5	A	0.257	8.4
2	Old Pacific Highway / Peats Ferry Road	A	0.060	10.7	A	0.084	10.8	A	0.183	11.2
3	Pacific Highway / M1 SB Ramps	B	0.185	17.1	B	0.258	15.3	B	0.611	22.4

The results indicate that the existing road network and intersections perform well in the future year 2030 without the additional development trips leaving plenty of spare capacity.

Table 5.6: Intersection Operational Performance – Future year 2030 With Development

		AM (Weekday)			PM (Weekday)			Sunday Peak		
Ref	**Intersection**	**LOS**	**DoS**	**Max. Delay (s)**	**LOS**	**DoS**	**Max. Delay (s)**	**LOS**	**DoS**	**Max. Delay (s)**
1	Old Pacific Highway / Pacific Highway	A	0.186	7.5	A	0.192	7.4	A	0.444	11.3
2	Old Pacific Highway / Peats Ferry Road	A	0.095	10.9	A	0.166	11.1	A	0.262	11.9
3	Pacific Highway / M1 SB Ramps	B	0.337	15.0	B	0.340	16.2	B	0.663	24.0

The results indicate that the potential rezoning and development of The Site will not have a negative impact on the operation of the local road network in 2030 with the additional trips generated. All intersections continue to operate at satisfactory levels of service with spare capacity available.

5.3.3 Motorway Segment Analysis (HCM Analysis)

5.3.3.1 Link Analysis performance measures

The link analysis for all off ramp and on ramp segments was undertaken using the criteria detailed in the Highway Capacity Manual (HCM 2010) and *Austroads Guide to Traffic Management Part 3* section 4.4 and using the following assumptions:

- A conversion factor of two for both heavy vehicles and buses was adopted to convert the flows (in vehicles) to Passenger Car Units (PCUs); and
- A Peak Hour Factor (PHF) of 0.95 was used as worst-case scenario.

The performance of merge/diverge freeway segments are measured based on the densities of vehicles in the influence areas. Table 5.7 outlines the LoS criteria for varying traffic densities as adopted by the HCM 2010.

HCM 2010 also provides LoS criteria for standard freeway segments. Details are provided in Table 5.8.

Table 5.7: LoS Criteria for Freeway Merge and Diverge Segments

LOS	Density (pc/km/ln)	Comments
A	≤ 6	Unrestricted operations
B	> 6–12	Merging and diverging manoeuvres noticeable to drivers
C	> 12–17	Influence area speeds begin to decline
D	> 17–22	Influence area turbulence becomes intrusive
E	> 22	Turbulence felt by virtually all drivers
F	Demand exceeds capacity	Ramp and freeway queues form

Source: Exhibit 13-2 in the HCM 2010

Table 5.8: LoS Criteria for Basic Freeway Segments

Criteria	LOS				
	A	B	C	D	E
FFS = 120 km/h					
Maximum density (pc/km/ln)	7	11	16	22	28
Minimum speed (km/h)	120.0	120.0	114.6	99.6	85.7
Maximum (v/c)	0.35	0.55	0.77	0.92	1.00
Maximum service flow rate (pc/h/ln)	840	1320	1840	2200	2400
FFS = 110 km/h					
Maximum density (pc/km/ln)	7	11	16	22	28
Minimum speed (km/h)	110.0	110.0	108.5	97.2	83.9
Maximum (v/c)	0.33	0.51	0.74	0.91	1.00
Maximum service flow rate (pc/h/ln)	770	1210	1740	2135	2350
FFS = 100 km/h					
Maximum density (pc/km/ln)	7	11	16	22	28
Minimum speed (km/h)	100.0	100.0	100.0	93.8	82.1
Maximum (v/c)	0.30	0.48	0.70	0.90	1.00
Maximum service flow rate (pc/h/ln)	700	1100	1600	2065	2300
FFS = 90 km/h					
Maximum density (pc/km/ln)	7	11	16	22	28
Minimum speed (km/h)	90.0	90.0	90.0	89.1	80.4
Maximum (v/c)	0.28	0.44	0.64	0.87	1.00
Maximum service flow rate (pc/h/ln)	630	990	1440	1955	2250

Source: Exhibit 23-2 in the HCM 2000; the content here is consistent with the LoS criteria in the HCM 2010 (Exhibit 11-5)

The approximate capacity of the entry and exit ramps as well as the freeway segments upstream and downstream of the ramps were calculated using the HCM 2010 requirements. The criteria are provided in Tables 5.9 to 5.11.

Table 5.9: Approximate Capacity of Ramp Roadways in Passenger cars/hour

Free-flow speed of ramp, SFR (km/h)	Capacity (pc/h)[1]	
	Single-lane ramps	Two-lane ramps
> 80	2200	4400
> 65–80	2100	4200
> 50–65	2000	4000
≥ 30–50	1900	3800
< 30	1800	3600

Source: Exhibit 13-10 in the HCM 2010

Table 5.10: Capacity Values for Merge Areas in Passenger cars/hour

Freeway free-flow speed (km/h)	Capacity of upstream/downstream freeway segment (pc/h)[1][3]				Max desirable flow entering merge influence area V_{R12} (pc/h)[2]	Max desirable flow entering influence diverge area V_{12} (pc/h)[2]
	Number of lanes in one direction					
	2	3	4	> 4		
120	4800	7200	9600	2400/ln	4600	4400
110	4700	7050	9400	2350/ln	4600	4400
100	4600	6900	9200	2300/ln	4600	4400
90	4500	6750	9000	2250/ln	4600	4400

Source: Exhibit 13-8 in the HCM 2010

Table 5.11: Capacity Values for Diverge Areas in Passenger cars/hour

Freeway Free-Flow Speed (km/h)	Maximum Upstream, v_{FI} or Downstream Freeway Flow, v (pc/h)				Max Flow Entering Influence Area, v_{12} (pc/h)
	Number of Lanes in One Direction				
	2	3	4	> 4	
120	4800	7200	9600	2400/ln	4400
110	4700	7050	9400	2350/ln	4400
100	4600	6900	9200	2300/ln	4400
90	4500	6750	9000	2250/ln	4400

Source: Exhibit 25-14 in the HCM 2010

5.3.3.2 Analysed Links

As shown in Figure 3.14, the following M1 off-ramp diverge segments and on-ramp merge segments have been assessed using the HCM 2000 criteria:

1. Pacific Highway (M1) Off-Ramp – Diverge (Northbound);
2. Pacific Highway (M1) Off-Ramp – Diverge (Southbound);
3. Pacific Highway (M1) On-Ramp – Merge (Northbound); and
4. Pacific Highway (M1) On-Ramp – Merge (Southbound).

5.3.3.3 Analysis Results

The results of the link analysis for both existing and 2030 future development scenarios are presented in Table 5.12, Table 5.13 and Table 5.14 respectively and include weekday AM and PM and weekend peak hour assessments. Detailed analysis results are provided in Appendix H.

Table 5.12: Link Operational Performance – Existing Conditions

No	Peak Hour	Freeway- Ramp Terminal Segment	Freeway before ramp - All Lanes			Ramp - All Lanes			Freeway after ramp - All Lanes		
			V/C	Density (pc/km/ln)	LoS	V/C	Density (pc/km/ln)	LoS	V/C	Density (pc/km/ln)	LoS
1	AM	Pacific Highway (M1) Off-Ramp (Northbound)	0.29	8.86	B	0.04	1.28	A	0.28	5.94	A
2		Pacific Highway (M1) Off-Ramp (Southbound)	0.77	16.37	C	0.04	1.35	A	0.76	16.18	C
3		Pacific Highway (M1) On-Ramp (Northbound)	0.28	5.96	A	0.02	0.72	A	0.29	7.26	B
4		Pacific Highway (M1) On-Ramp (Southbound)	0.79	16.80	C	0.04	1.47	A	0.80	18.14	D
1	PM	Pacific Highway (M1) Off-Ramp (Northbound)	0.73	16.00	C	0.05	1.81	A	0.71	15.23	C
2		Pacific Highway (M1) Off-Ramp (Southbound)	0.37	10.52	B	0.02	0.82	A	0.37	7.81	B
3		Pacific Highway (M1) On-Ramp (Northbound)	0.66	14.17	C	0.06	2.14	A	0.68	15.34	C
4		Pacific Highway (M1) On-Ramp (Southbound)	0.37	7.93	B	0.04	1.42	A	0.38	9.89	B
1	Sunday	Pacific Highway (M1) Off-Ramp (Northbound)	0.54	13.81	C	0.12	3.93	A	0.51	10.90	B
2		Pacific Highway (M1) Off-Ramp (Southbound)	0.56	13.97	C	0.09	3.02	A	0.53	11.43	B
3		Pacific Highway (M1) On-Ramp (Northbound)	0.44	9.40	B	0.07	2.35	A	0.46	10.93	B
4		Pacific Highway (M1) On-Ramp (Southbound)	0.55	11.66	B	0.07	2.21	A	0.56	13.57	C

Table 5.13: Link Operational Performance – Future year 2030 Without Development

No.	Peak Hour	Freeway- Ramp Terminal	Freeway before ramp - All Lanes			Ramp - All Lanes			Freeway after ramp - All Lanes		
			V/C	Density (pc/km/ln)	LoS	V/C	Density (pc/km/ln)	LoS	V/C	Density (pc/km/ln)	LoS
1	AM	Pacific Highway (M1) Off-Ramp (Northbound)	0.27	8.37	B	0.04	1.46	A	0.25	5.41	A
2		Pacific Highway (M1) Off-Ramp (Southbound)	0.75	16.30	C	0.06	2.05	A	0.74	15.75	C
3		Pacific Highway (M1) On-Ramp (Northbound)	0.32	6.73	B	0.02	0.82	A	0.32	8.04	B
4		Pacific Highway (M1) On-Ramp (Southbound)	0.71	15.21	C	0.05	1.67	A	0.73	16.72	C
1	PM	Pacific Highway (M1) Off-Ramp (Northbound)	0.75	16.25	C	0.06	2.04	A	0.73	15.65	C
2		Pacific Highway (M1) Off-Ramp (Southbound)	0.37	10.55	B	0.03	0.93	A	0.37	7.81	B
3		Pacific Highway (M1) On-Ramp (Northbound)	0.75	16.05	C	0.07	2.44	A	0.77	17.19	D
4		Pacific Highway (M1) On-Ramp (Southbound)	0.42	8.99	B	0.05	1.51	A	0.43	10.89	B
1	Sunday	Pacific Highway (M1) Off-Ramp (Northbound)	0.59	14.59	C	0.13	4.46	A	0.55	11.84	B
2		Pacific Highway (M1) Off-Ramp (Southbound)	0.60	14.63	C	0.10	3.35	A	0.58	12.29	C
3		Pacific Highway (M1) On-Ramp (Northbound)	0.58	12.34	C	0.08	2.65	A	0.60	13.77	C
4		Pacific Highway (M1) On-Ramp (Southbound)	0.61	12.96	C	0.09	3.04	A	0.63	15.00	C

Table 5.14: Link Operational Performance – Future year 2030 With Development

No.	Peak Hour	Freeway- Ramp Terminal	Freeway before ramp - All Lanes			Ramp - All Lanes			Freeway after ramp - All Lanes		
			V/C	Density (pc/km/ln)	LoS	V/C	Density (pc/km/ln)	LoS	V/C	Density (pc/km/ln)	LoS
1	AM	Pacific Highway (M1) Off-Ramp (Northbound)	0.27	8.58	B	0.07	2.23	A	0.25	5.41	A
2		Pacific Highway (M1) Off-Ramp (Southbound)	0.76	16.31	C	0.06	1.86	A	0.74	15.84	C
3		Pacific Highway (M1) On-Ramp (Northbound)	0.32	6.89	B	0.05	1.58	A	0.34	8.37	B
4		Pacific Highway (M1) On-Ramp (Southbound)	0.91	19.36	D	0.10	3.42	A	0.94	21.05	D
1	PM	Pacific Highway (M1) Off-Ramp (Northbound)	0.75	16.29	C	0.07	2.23	A	0.73	15.65	C
2		Pacific Highway (M1) Off-Ramp (Southbound)	0.37	10.63	B	0.05	1.70	A	0.36	7.67	B
3		Pacific Highway (M1) On-Ramp (Northbound)	0.75	16.12	C	0.08	2.82	A	0.78	17.36	D
4		Pacific Highway (M1) On-Ramp (Southbound)	0.43	9.15	B	0.07	2.40	A	0.45	11.28	B
1	Sunday	Pacific Highway (M1) Off-Ramp (Northbound)	0.60	14.77	C	0.16	5.25	A	0.55	11.85	B
2		Pacific Highway (M1) Off-Ramp (Southbound)	0.61	14.65	C	0.09	3.16	A	0.58	12.39	C
3		Pacific Highway (M1) On-Ramp (Northbound)	0.51	10.79	B	0.10	3.40	A	0.53	12.52	C
4		Pacific Highway (M1) On-Ramp (Southbound)	0.63	13.53	C	0.13	4.28	A	0.67	15.87	C

The following can be deduced from the above tables:

1. All on/off ramps are performing at LoS of A or B in the existing, with development and without development scenario for both AM and PM peaks of a weekday and the peak hour in the weekend. No mitigations are required; and
2. All motorway segments before and after the ramp (i.e M1 upstream and downstream segments) are operating with a LoS of D or better for all scenarios. It should be noted that the LoS D is a result of background traffic growth on M1 rather than a result of the development.

5.4 Parking Requirement and Provision

Parking requirements for the development were estimated based on rates outlined in the Gosford DCP and the Guide to Traffic Generating Developments (RMS, 2002). The parking rates adopted for the development are outlined in Table 5.15 below.

Table 5.15: Parking Rates

Land Use	Parking Rate	Units/Remarks	Source
Low Density Residential	2	space per dwelling	Gosford DCP Rates 2013
Medium Density Residential	1.5	space/dwelling + 0.2 space per dwelling for visitor	
Retail (Local Centre)	0.033	1 space per 30 sq.m	
Hotel	1	space per room	
Dry stack boat storage (indicative only)*	0.2	Spaces per Berth	Guide to Traffic Generating Developments, 2002

**The dry stack boat storage is subject to separate planning proposal process as described in Section 1.1.*

The application of the parking rates in Table 5.15 to the proposed development land uses shown in Table 5.16 results in the parking requirements shown in Table 5.17.

A plan showing the position of locations 1-7 is presented in Figure 5.1.

Table 5.16: Summary of Land Use Plan Based on Locations

Land Use	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6	Location 7	Total	Unit
Low Density Residential	54	35	7	-	9	-	-	**105**	dwellings
Medium Density Residential	-	47	57	58	-	-	-	**162**	apartments
Retail	-	-	170	-	-	-	-	**170**	Sq.m
Hotel	-	-	-	-	-	85	-	**85**	rooms
Dry-stack boat storage (indicative only)*	-	-	-	-	-	-	60	**60**	slots

Table 5.17: Minimum Parking Requirements based on Concept Plan

Land Use	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6	Location 7	Total
Low Density Residential	108	70	14	-	18	-	-	214
Medium Density Residential	-	80	97	99	-	-	-	276
Retail	-	-	6	-	-	-	-	6
Hotel	-	-	-	-	-	85	-	85
Total Parking Demand	**108**	**150**	**117**	**99**	**18**	**85**	**-**	**577**
Dry-stack boat storage (indicative only)*							12	

**The dry stack boat storage is subject to separate planning proposal process as described in Section 1.1.*

Figure 5.1: Proposed Development Zoning Map

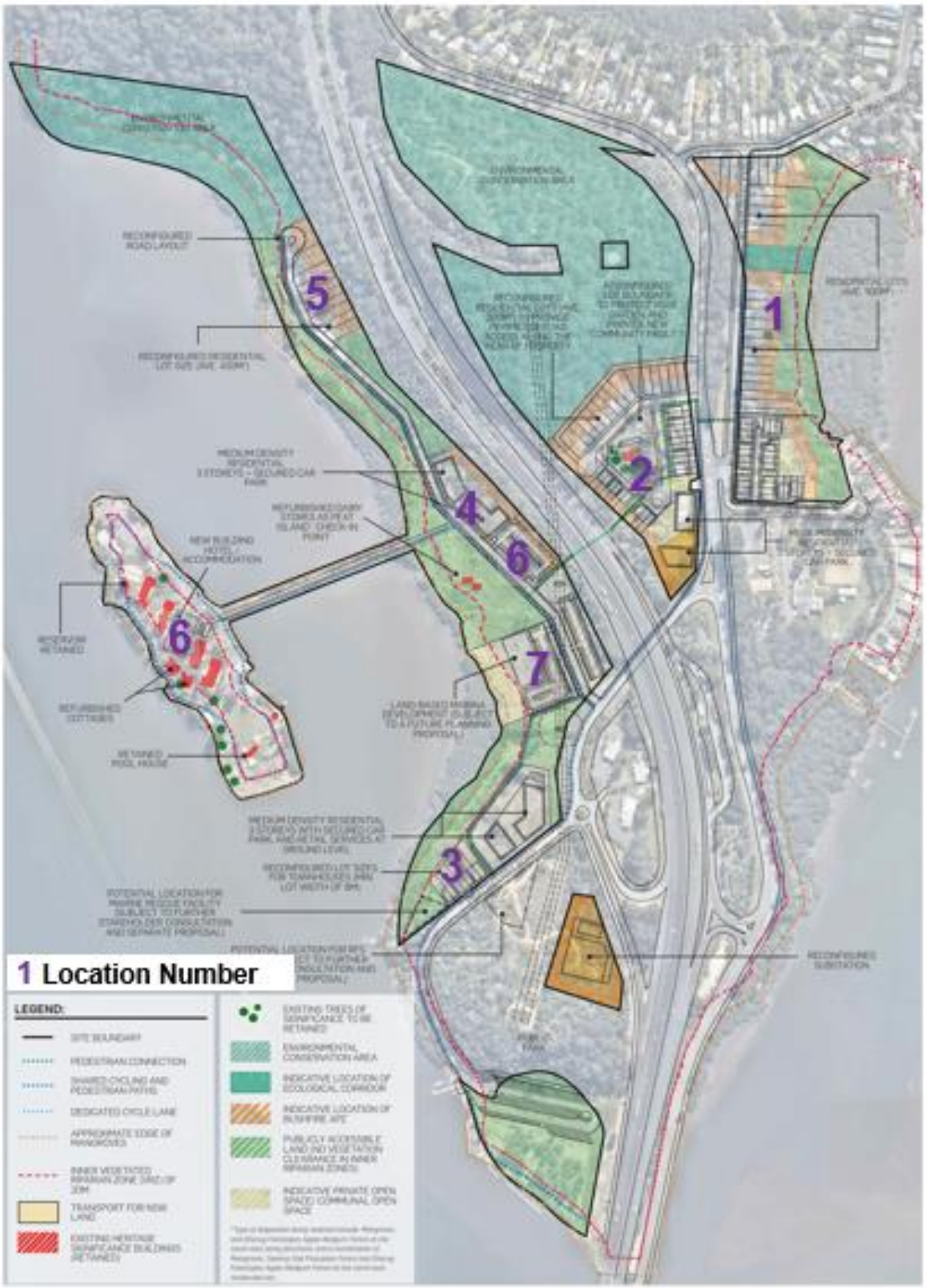


Table 5.17 indicates that a minimum 577 parking spaces would be required for the development of which 486 spaces would be for residential uses and 85 for the hotel. A minimum of six parking spaces would be required for convenience shops located within the Southern Foreshore Precinct.

The proposed parking provisions for the development are provided in Table 5.18. The development would include a minimum of 585 parking spaces (without the dry-stack boat storage area) and therefore an adequate number of spaces will be provided to meet the expected parking demand.

Table 5.18: Parking Provision within the Concept Plan

Land Use	Location 1	Location 2	Location 3**	Location 4	Location 5	Location 6	Location 7
Low Density Residential	108	74	14	-	18	-	-
Medium Density Residential	-	116#	128#	127*	-	-	-
Retail	-	-	**	-	-	-	-
Hotel	-	-	-	-	-	*	-
Dry stack boat storage							97
Total Parking Provision	**108**	**190**	**142**	**127**	**18**	**0**	**(97)**

* The hotel parking requirement (location 6) is provided within the at-grade car park adjacent to the buildings at location 4

** 6 parking spaces for retail are includinged within location 3

Basement Car Park for apartments (buildings)

Parking spaces for medium density residential apartments in Locations 2, 3 and 4 would be provided within basement carparks. The hotel parking would be located as an at-grade dedicated carpark at Location 4. It is recommended that a secured car park area is provided for the hotel.

A dedicated parking area for the dry-stack boat storage areas would be provided at Location 7 (shown indicatively only as the dry-stack boat storage in the concept plan). This area will be subject to a different development proposal process.

6 Pedestrian and Cycling Strategy

This section highlights the pedestrian and cycling opportunities within the Concept Plan.

As discussed in Section 3.7, there are currently a limited number of footpaths and bicycle facilities within The Site area and as a result, current opportunities for cycling are limited. Figure 6.1 identifies opportunities for both cyclists and pedestrians within and around the development. Figure 6.2 shows the detail of the proposed pedestrian connection and the proposed cross section of the dedicated cycle lanes.

Figure 6.1: Proposed Pedestrian and Cycling Strategy

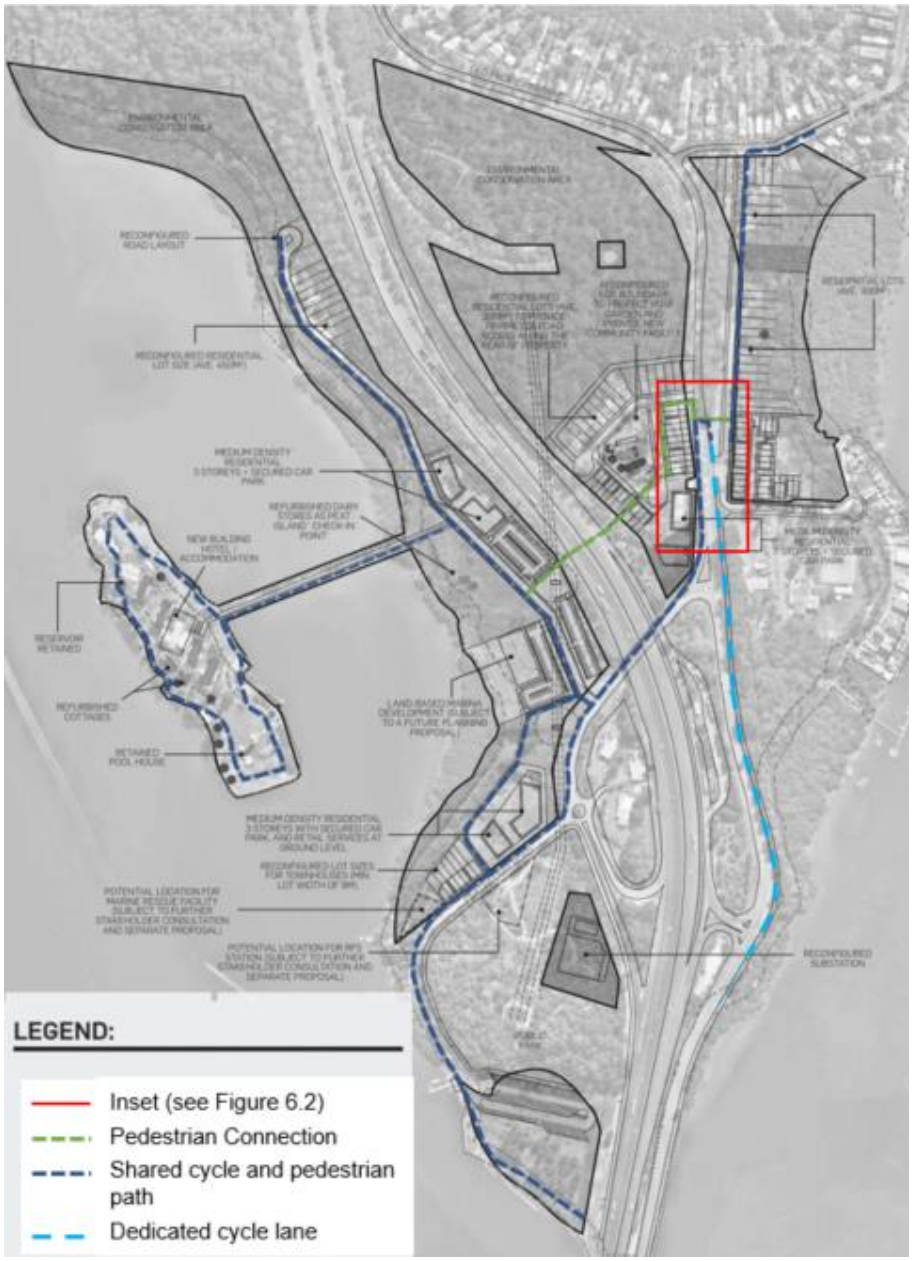


Figure 6.2: Proposed infrastructure around pedestrian connection (left) and concept cross section for dedicated cycle lanes

The following improvements/enhancements are recommended to provide better pedestrian and cycling access:

- A dedicated cycle lane can be provided along the Old Pacific Highway to tie-in with ‘on road’ cycle route already present. Improvements might be considered for the existing cycle lane on Old Pacific Highway with recommendations to extend the cycle lane and formalise it to connect Mooney Mooney area with Hawkesbury River Station in Brooklyn.
- There is an opportunity for providing a number of bicycle parking spaces at Hawkesbury River Station to promote active transport.
- Gosford Council DCP rates (2013) do not specify any rates for cycle parking provision, however, it is recommended that the developer provides a number of cycle parking spaces for the residents of the development within the buildings to promote active transport.
- A shared pedestrian/cycling path is recommended along the Pacific Highway Link through the underpass. The lane continues north with a crossing provided on the Old Pacific Highway and an option for cyclists to travel southbound using the cycle only lane or northbound using the provided shared path that extends into the north-east corner of the development and into Point Road.
- Maintaining the existing pedestrian underpass crossing M1 and links both eastern and western areas of the development and extending it to serve the localities of the proposed development (pink dotted line in Figure 6.1).
- Providing a suitable cycling and pedestrian crossing on the Old Pacific Highway as indicated in Figure 6.1. This provides an opportunity to improve the bus stops on the Old Pacific Highway with possibilities to provide bus shelters by re-configuring curb lines.
- Reduction of the posted speed on the Old Pacific Highway between the Highway Pacific Link and Point Road from 60kph to 50kph is highly recommended as a traffic calming measure to create a safer environment for both pedestrians and cyclists.
- Access to Peat Island is limited to a narrow road that runs along the causeway from the western side of the Mooney Mooney peninsula to Peat Island. The causeway itself is approximately 200m in length and 5m wide (3.0-3.5m wide road carriageway and approximately 1.5m wide footpath = 5m road reserve) between fences, which limits the capacity of the link and access to Peat Island. Due to this constraint and investigations indicating that widening is not feasible from an economic, environmental or heritage perspective, vehicular traffic operating across the causeway is recommended to be limited to service vehicles only and other authorised vehicles.
- A shuttle bus service could be provided for the hotel employees and visitors and that would be operating between the hotel dedicated parking area at location 4 and the hotel.

7 Transport Management and Access Strategy

This section provides recommendations for enhancing the public transport facilities and improving accessibility within the development.

7.1 Transport Management

Around 12% of the local population utilise trains as their mode of travel, however this percentage could be increased by implementing the following measures:

- Improving the connectivity between the Hawkesbury River Train Station and the development by improving the cycling lanes and extending them to link to the residential and leisure uses within the development;
- Provision of secured cycle parking facilities at the station and within the development to promote cycling;
- Enhancing the car parking areas at the station and providing park and ride facilities; and
- Provision of facilities for people with DDA needs should be considered as the station is not DDA compliant.

Statistics show that less than one percent of the local population travel by bus. This percentage could be increased with the following considerations:

- Improving 592 bus services by providing more frequent services and operating during off-peaks, Sundays, and public holidays;
- Providing frequent services to Peat Island as it's currently serviced by one trip a day; and
- Improving the bus stops on the Old Pacific Highway with possibility to provide bus shelters. Refer to Figure 6.1.

For active transport refer to Section 6 – Pedestrian and Cycling Strategy.

7.2 Access Strategy

7.2.1 Access and Parking

Vehicular access to Peat Island will be limited to service vehicles and authorised vehicles with recommendation to provide a shuttle bus service to transfer hotel visitors and employees between the island and the hotel designated parking area. Pedestrians and cyclists will be able to access the island as shown in Figure 6.1.

Parking for Peat Island will be accommodated on the Mooney Mooney Peninsula in the underground car park at Location 4. A secured parking area should be designated for the hotel use.

Adequate parking for all land uses identified in the Concept Plan will be provided in accordance with the DCP as part of future DAs. Refer to section 5.4 for further information on parking provision and proposed locations.

Further consultation with TfNSW as part of future development applications and the detailed design stages will be used to determine an appropriate design solution for The Site.

8 Local Area Traffic Management Strategy

8.1 Posted Speed Reduction

The current posted speed limit on the B83 Pacific Highway and the Pacific Highway Link Road is 60 km/h and it is assumed that all other local roads in The Site area are 50 km/h, given their residential or low-density nature. The concept plan aims to reduce all local road posted traffic speeds limits within The Site to 50 km/h, which would support the proposed future uses of this area and the characteristics of its residents. This 50 km/h urban speed environment would cover the following roads:

- Peats Ferry Road;
- Peat Island Road;
- Pacific Highway Link Road;
- Kowan Street; and
- Chapel Road.
- The Pacific Highway between the Pacific Highway Link Road and Point Road.

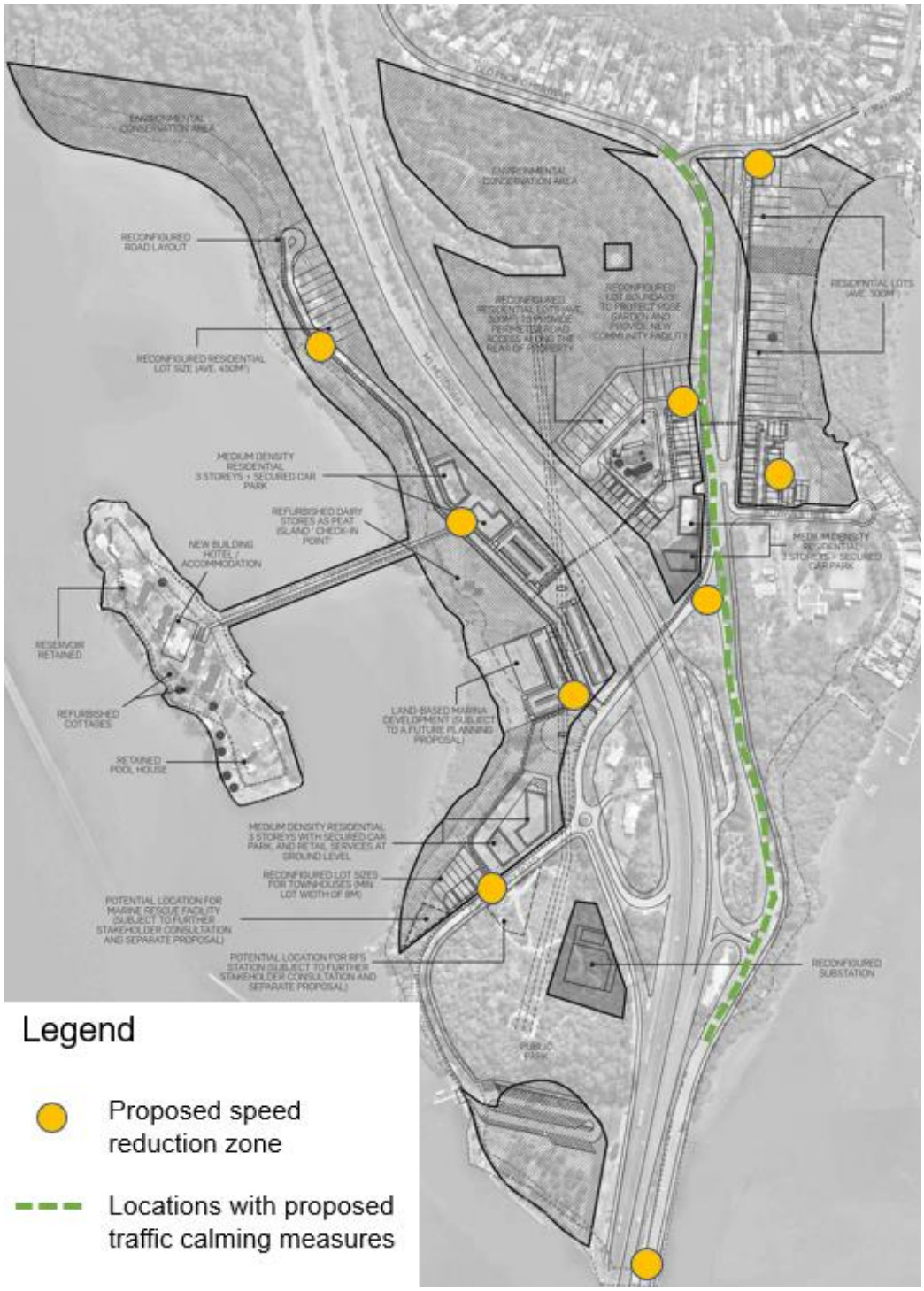
Along with setting the speed environment the local road network will be planned so that safe and efficient movement is promoted. This will be achieved through aligning intersections and access points to help to minimise conflict and promote safe and efficient movement.

8.2 Traffic Calming Measures

In addition to speed reduction, there are other measures that could be considered for traffic calming particularly around the pedestrian/cycling crossing on the Old Pacific Highway and the residential areas of the development. Figure 8.1 below highlights potential locations within the site that could benefit from the provision of traffic calming measures.

There are different traffic calming measures that could be implemented within the development, some of which are detailed below as stated in Section 6.6.7 of the “Global Street Design Guide 2016” by Global Designing Cities Initiative and NACTO (National Association of City Transportation Officials).

Figure 8.1: Proposed Locations for Local Area Traffic Management



8.2.1 Lane Narrowing

Narrow lanes as shown in Figure 8.2 can be used within the residential areas and those reduce the right-of-way and make drivers wary of the traffic and adjacent users. It provides opportunities for using the additional space for pedestrians or cycling facilities

Figure 8.2: Lane Narrowing Measure

Source: Global Street Design Guide

8.2.2 Gateway Treatments

Gateway treatments alert drivers that they are entering a slower area. This measure may include signage, speed tables, raised crossings, and curb extensions. Figure 8.3 provides an example of gateway treatments.

Figure 8.3: Gateway Treatments

Source: Global Street Design Guide

8.2.3 Medians and Refuge Islands

Raised centre medians and pedestrian refuge islands as shown in Figure 8.4 can be used to reduce lane width for vehicles and provide safe linkage for pedestrians.

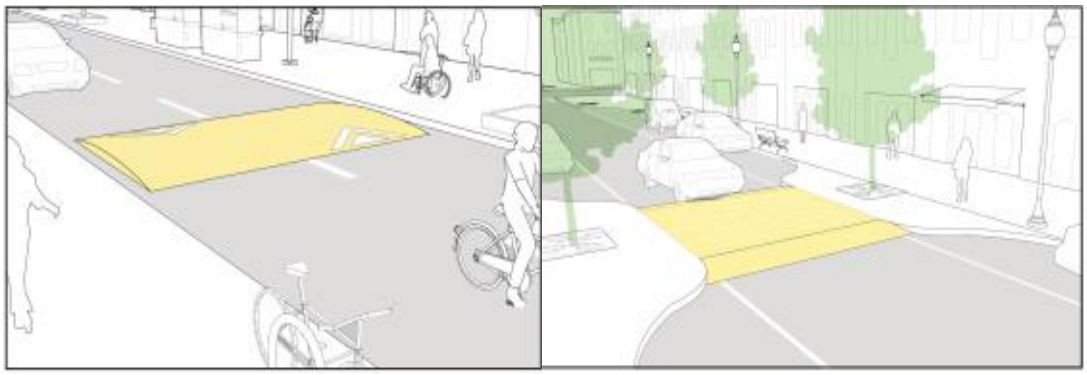
Figure 8.4: Median and Refuge Island

Source: Global Street Design Guide

8.2.4 Speed humps and Speed Tables

Speed humps and tables are effective traffic calming measures to reduce the speed of vehicles on the road. A speed table can be converted into a raised crossing by providing a pedestrian crossing on its flat top.

Figure 8.5: Speed hump and Speed Table



Source: Global Street Design Guide

9 Wayfinding Strategy

A desktop review of the existing signage has been undertaken for the Mooney Mooney area for a radius of 2 km. The existing sign faces have been captured along M1 and Pacific Highway for accessing and exiting The Site. The inventory of existing signs is provided in Appendix I.

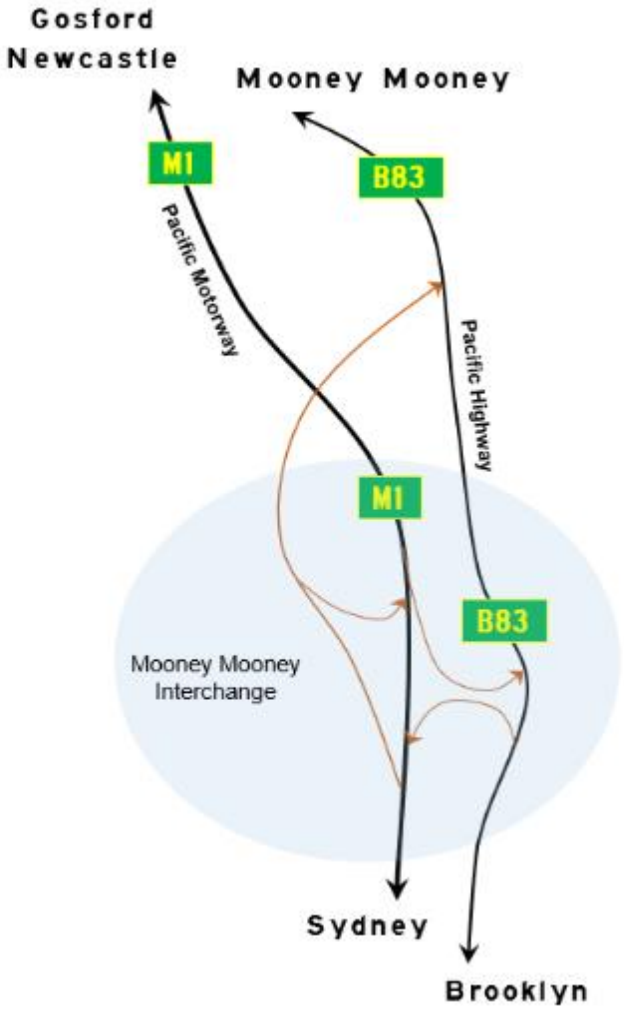
9.1 State Directional Signs

Considering that the proposed development will not introduce any changes to the existing road network and will not include major destinations that commuters travelling along M1 and the Pacific Highway are to be informed of, it is not anticipated that changes will be required for the existing state green signs or that there will be a need to install new wayfinding signs.

The existing focal point map shown in Figure 9.1 below will be valid after the completion of the development. The map shows that Mooney Mooney Interchange has been adequately signposted in accordance with the TfNSW standards of guide signposting.

Additionally, the M1 on and off ramps and the associated intersections 2 and 3 have appropriate advance direction and intersection direction signs. The reassurance direction signs have also been provided after the intersections. Along the M1, the sign for the rest area and stopping bays have also been provided in both directions.

Figure 9.1: Existing Focal Point Map



9.2 Service Signs

With the introduction of the proposed land use such as the Peat Island Hotel, it is suggested that information about these facilities be provided to the commuters, in the form of service signs (blue).

The suggested changes to the existing signs are as detailed below:

- The sign ‘M1_NB_02” located 1.2km south of northbound off-ramp could be updated to show that a hotel and retail facilities are located at Mooney Mooney. The proposed sign is shown in Figure 9.2.

Figure 9.2: Existing and Proposed Sign Face of M1_NB_02 Sign

Existing (M1_NB_02)

Proposed

- The sign ‘M1_SB_04” located 300m north of southbound off-ramp could be modified to show the service symbols as shown in Figure 9.3 below.

Figure 9.3: Existing and Proposed Sign Face of M1_SB_04 Sign

Existing (M1_SB_04)

Proposed

- The ambulance service sign to be removed underneath the sign MMPI_04. Another ambulance service sign underneath the sign MMPI_10 to be re-oriented on the same island to show the new location of the ambulance service station which will be accessible via the south approach of the Pacific Highway/Old Pacific Highway intersection. Another ambulance service sign MMPI_23 to be relocated to the new entrance of the station instead of an intersection direction sign.
- Provision of signs indicating locations of public parking areas within the area.
- The cycle land sign should be used to designate an exclusive bicycle lane where needed.
- A shared path sign should be used to designate a path that is shared by cyclists and pedestrians.
- Local Area Traffic Management (LATM) signs are to be used in reduced speed areas, pedestrian and cycle crossing areas, and within residential areas and those should include regulatory and warning signs.

Sign face requirements and location of signs should be identified through a detailed wayfinding strategy.

10 Key Findings

The key findings of the assessment include the following:

- The existing road network contains spare capacity to accommodate the additional trips associated with proposed rezoning of the area.
- Consultation with TfNSW was important for the masterplan layout, allowing the proposal to be refined and address issues raised.
- The expected development resulting from the rezoning proposal is not expected to have a negative impact on the operational performance of the local road network. The modelling results for both the existing and future 2030 scenario indicate that the road network still contains spare capacity after full development of The Site and that all key intersections operate at satisfactory Level of Service (LoS).
- All motorway segments including the on and off ramps of the M1 are operating at an acceptable LoS and will continue to do so under the future 2030 scenario after the completion of the development.
- Parking provision has been assessed and is found to be adequate for the development.
- The causeway to Peat Island is narrow and is considered suitable for pedestrian, cyclist and one-way vehicular access only. It is therefore recommended that the vehicular movements are limited to service vehicles and shuttle services to and from the hotel.
- The additional development traffic that is expected to travel south on the Hawkesbury River Bridge is estimated to be around 60 trips in the AM, PM, and Sunday peak respectively and therefore will not have any negative impact on the Bridge operation at any time.

The major recommendations related to the public transport are as follows:

- Improving the connectivity between the Hawkesbury River Train Station and the development by improving the cycling lanes and extending them to link to the residential and leisure uses within the development.
- Commuter car parking requirements at Hawkesbury River Train Station, along with Berowra and Hornsby Train Stations, are expected to increase as a result of the development. It is recommended that a Section 7.11 Contribution be considered to accommodate any costs associated with works to improve parking provision at the relevant stations.
- Possibility of providing several secured cycle parking facilities at the station and within the residential buildings to promote cycling.
- Opportunity for providing park and ride facilities at the station.
- Provision of facilities for people with DDA needs could be considered as the station is not DDA compliant.
- Improving 592 bus services by providing more frequent services and operating during off-peaks, Sundays, and public holidays.
- Providing frequent services to Peat Island as it’s currently serviced by one trip a day.
- Improving the bus stops on the Old Pacific Highway with possibility to provide bus shelters and improve the bus stop facilities.

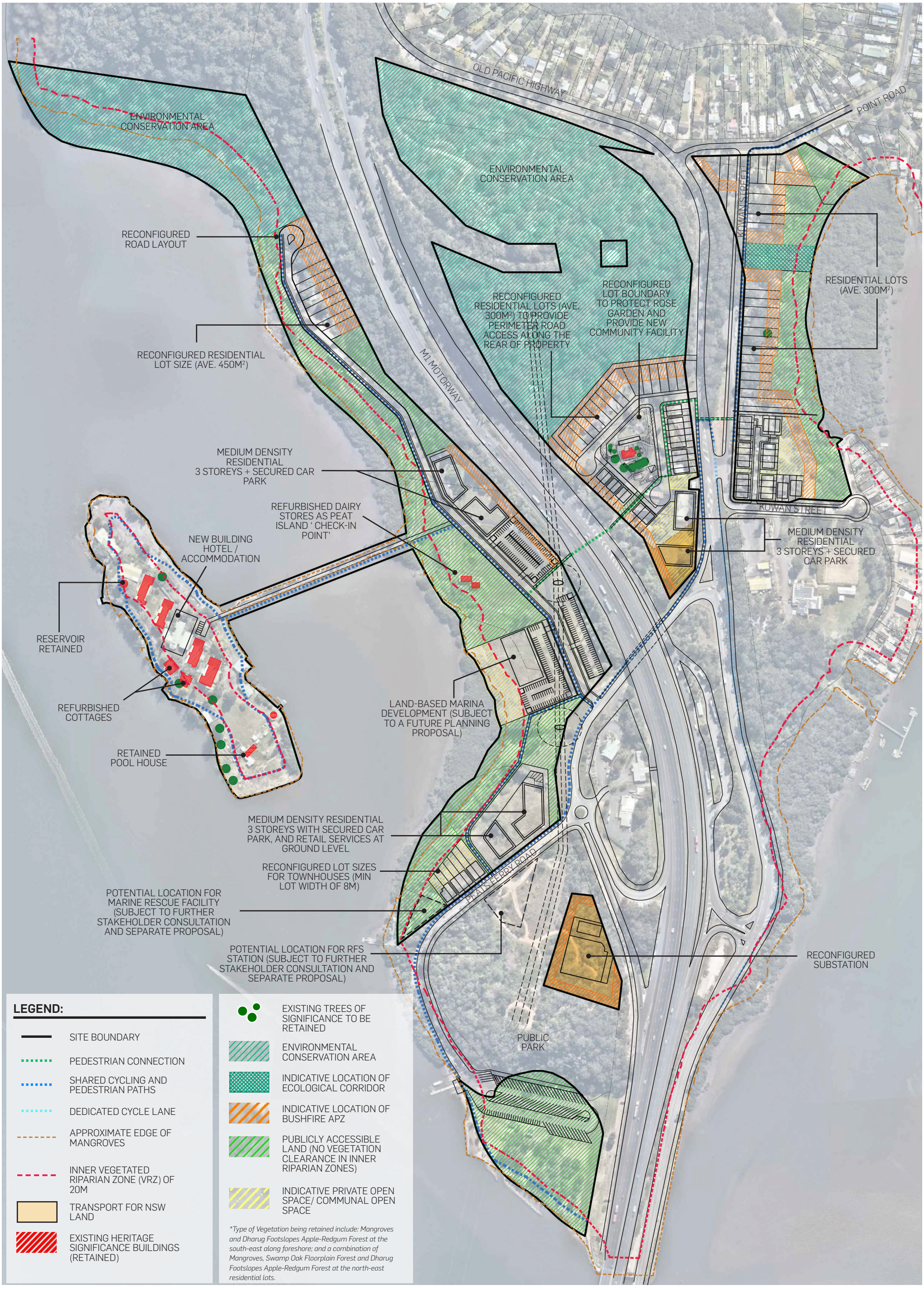
The major recommendations related to the active transport are as follows:

- Gosford Council DCP (2013) do not specify any rates for cycle parking provision, however, it is recommended that the developer provides a number of cycle parking spaces at a rate of one bike parking per residential unit for the residents of the area as an attempt to promote active transport.

- Retain the existing shared pedestrian/cycling path along the foreshore on the western side of the development.
- A shared pedestrian/cycling path can be provided along the Pacific Highway Link through the underpass. The lane continues north with a crossing provided on the Old Pacific Highway and an option for cyclists to travel southbound using the cycle only lane or northbound using the provided shared path that extends into the north-east corner of the development and into Point Road.
- Improvements to the existing pedestrian underpass crossing M1 and links both eastern and western areas of the development and extending it to serve the localities of the proposed development.
- Providing a suitable cycling and pedestrian crossing on the Old Pacific Highway as indicated in Figure 6.1. This provides an opportunity to improve the bus stops on the Old Pacific Highway with possibilities to provide bus shelters by re-configuring curb lines.
- Reduction of the posted speed on the Old Pacific Highway between the Highway Pacific Link and Point Road is highly recommended as a traffic calming measure to create a safer environment for both pedestrians and cyclists.
- Access to Peat Island is limited to a narrow road that runs along the causeway from the western side of the Mooney Mooney peninsula to Peat Island. The causeway itself is approximately 200m in length and 5m wide (3.0-3.5m wide road carriageway and approximately 1.5m wide footpath) between fences. This limits the capacity of the link and access to Peat Island. Due to this constraint and investigations indicating that widening is not feasible from an economic, environmental or heritage perspective, vehicular traffic operating across the causeway is limited to service vehicles only and other authorised vehicles.

Appendices

A. Concept Plan



LEGEND:

- SITE BOUNDARY
- PEDESTRIAN CONNECTION
- SHARED CYCLING AND PEDESTRIAN PATHS
- DEDICATED CYCLE LANE
- APPROXIMATE EDGE OF MANGROVES
- INNER VEGETATED RIPARIAN ZONE (VRZ) OF 20M
- TRANSPORT FOR NSW LAND
- EXISTING HERITAGE SIGNIFICANCE BUILDINGS (RETAINED)
- EXISTING TREES OF SIGNIFICANCE TO BE RETAINED
- ENVIRONMENTAL CONSERVATION AREA
- INDICATIVE LOCATION OF ECOLOGICAL CORRIDOR
- INDICATIVE LOCATION OF BUSHFIRE APZ
- PUBLICLY ACCESSIBLE LAND (NO VEGETATION CLEARANCE IN INNER RIPARIAN ZONES)
- INDICATIVE PRIVATE OPEN SPACE/ COMMUNAL OPEN SPACE

**Type of Vegetation being retained include: Mangroves and Dharug Footslopes Apple-Redgum Forest at the south-east along foreshore; and a combination of Mangroves, Swamp Oak Floorplain Forest and Dharug Footslopes Apple-Redgum Forest at the north-east residential lots.*

URBIS

MOONEY MOONEY & PEAT ISLAND
FINAL CONCEPT PLAN

1:4000 @ A3

0 50 100 150 200

DATE: 28.07.2021
JOB NO: P0020554
DWG NO: PP01
REV: K

B. Previously raised and addressed planning and traffic Issues

Previous Department of Planning and Environment queries with responses as detailed in the report issued 12th September 2016

Issues	Responses (as raised and discussed in the report submitted on 12th September 2016)
Strategic suitability of The Site	The planning proposal is demonstrated to align with the intention of the Draft Central Coast Regional Plan and support future growth near centres and along established transport corridors – refer to section 2 and Figure 2.1. The planning proposal is identified to support the goals and targets identified in NSW 2021 – refer to section 2
Consultation with RMS	Refer to the below for responses to RMS issues listed in the Department of Planning and Environment letter dated 22/9/2015 (ref 15/13626) and the following section of Appendix B
Suitability of development intensity	The capacity appraisal of the existing road network demonstrates that there is adequate spare capacity across the existing local road network to support future increases in development. The appraisal also highlights that the traffic generation from the proposed concept would be moderate and can be managed under current arrangements – refer to section 5
Access to island	Access to the island will be managed and limited to service vehicles and authorised vehicles only. This will ensure that the limited operating capacity and potential for conflict with pedestrians can be appropriately controlled – refer to sections 6 and 7.
Access to the network and safety	The assessment has indicated that the development proposal will have a minor impact on network operations or current historical road safety trends – refer to section 3.9, 5, 6, and 7.
Services centre and rest area	The potential development of a service station will assist in the provision of roadside services for northbound traffic and help to manage historical road safety issues and is expected to be supported by improvements in wayfinding – refer to section 7.2 and Appendix I
Managing potential conflict with existing recreation facilities	The development proposal has limited impact on current recreation activity and proposes an upgrade and expansion to support future needs – refer to Figure 1.1 and section 5.1.
Public transport access	The proposed development aligns with existing service routes and stops, and it is acknowledged through growth along the corridor that there would be potential for future increases in service frequency as part of Government's progressive improvement to public transport services – refer to section 5 and 7.
Connectivity with local facilities and services	Established roads and services, such as the Old Pacific Highway offer efficient and safe connections to surrounding facilities and services located in Brooklyn and Berowra, and more regional based facilities in Gosford and Hornsby. These can be accessed in some cases by both active and public transport - refer to sections 2, 6,7, 8, and 9.
Consultation with TfNSW	Refer to the below for responses to TfNSW issues listed in the Department of Planning and Environment letter dated 22/9/2015 (ref 15/13626)
Public transport demand and servicing	There is adequate capacity on current services to accommodate future increases in demand both by rail and bus. It would be desirable to increase bus route service frequency and consider commuter parking at the rail station to make this a more desirable method of travel - refer to section 3, 5.2, and 7.
Active transport opportunities (TDM)	Active transport is currently supported by limited footpath and cycle lane provision and the development will consider significant internal improvements to encourage active transport activity and investigate future upgrades to improve connectivity to surrounding centres - refer to section 6.

Previous issues raised by TfNSW and RMS during the consultations with them and discussed in the report submitted on 12th September 2016

Agency	Contact Name, Role/Title	Issues raised	Resolution/Action
RMS Hunter Region	**Adam Thomas** Leader – Network Optimisation	Need to consider safety and crash trends, wayfinding needs and avoid modifying motorway ramps.	Crash data provided by RMS and appraised as part of the study - refer to **section 3.9** and **Appendix E** Impact on motorway ramps and wayfinding have been assessed – refer to **section 5.3.3** and **Appendix H**.
RMS Hunter Region	**Ken Saxby** Network & Safety Manager – Network Optimisation	Consider B-double permissible routes, proposed RMS works in the vicinity of The Site and road names.	This has been tested initially in the 2016 report, however, since then, plans to develop the B2 site as a petrol filling station has been cancelled and therefore the development access assessment by B-double is not required. No proposed RMS works proposed and road names adjusted to align with RMS feedback.
RMS Hunter Region	**Paula Goodwin** Senior Property Officer	Raised safety issues related to the M1, boat ramp and public toilets area.	Road safety issues considered as part of the appraisal process and the proposal is considered not to impact on these existing features - refer to **sections 3.9 and 5**.
RMS TMC Sydney	**David Wainwright** Principal Manager – Traffic Operations	Indicated that SIDRA Intersection analysis may not be sufficient to capture the impact of future development on M1 traffic operations.	HCM analysis has been undertaken to assess the performance of all motorway segments including on and off- ramps of the M1 – refer to section **5 and Appendix H.**
TfNSW Active Transport	**Duncan Tjin** Senior Transport Planner – Active Transport	TfNSW satisfied with concept provision of walking and cycling connections to bus stops. Suggested to explore cycle link to Hawkesbury River rail station.	Cycle link to Hawkesbury River rail station to be discussed with RMS as part of future planning proposals. TfNSW indicated walking and cycling connectivity should be delivered by developers, which is acknowledged and addressed in **section 6**.
TfNSW Bus Planning	**Gordon Hunt** Service Planner – Service Planning and Development, Infrastructure and Services	Transdev bus route 592 serves the Mooney Mooney area Services are limited, and the development should support the potential for more frequent and weekend services.	Possible development funding to support improved service provision is supported and will be investigated as part of subsequent studies. The possibility of diverting the 592 services to Peat Island Road and deemed not to be required - refer to **section 6 and 7**.

C. Other raised issues by Council, TfNSW, and other agencies

PP studies which request more technical studies

Submitted report	What is required	Response
Annexure M - Traffic & Transport Review By Mott Macdonald	transport management and access strategy that would facilitate and support safe and efficient access by all modes of travel to and from the site	Refer to **Section 6, 7**
M - Traffic & Transport Review By Mott Macdonald	wayfinding strategy for the area and to address access needs from the strategic transport network	Refer to **Section 9**
M - Traffic & Transport Review By Mott Macdonald	local area traffic management strategy that would support safe movement along the local network and improve connectivity to surrounding centres	Refer to **Section 8**
M - Traffic & Transport Review By Mott Macdonald	more detailed traffic and transport assessment to support future DA submissions and its potential staging and investigate possible future upgrades regional links and services	Refer to **Section 3,4,5,6,7,8,9**
M - Traffic & Transport Review By Mott Macdonald	Crime Prevention through Environmental Design (CPTED) assessment	DA Stage

Issues raised by the Council

Council staff requirements	Further studies and key issues	Response
Steve Green - Transport	There are currently a limited number of footpaths and bicycle facilities within The Site area. There are no commitments to improve cycle routes or other facilities in the Mooney Mooney area. I would question the comments claimed that the PP is located in a location where current education facilities and services like primary and high schools and TAFEs are actually at a considerable distance from proposed residences. Nearest Primary School would be Brooklyn which is 4.7km away. Nearest High school could be Gosford or Hornsby. The nearest TAFE would probably be located in Gosford or Hornsby. Nearest University would probably be Newcastle University through the Central Coast Campus or Sydney University. For cycling to be viable a 5-kilometre cycling distance is favourable provided a safe route can be developed. One of the key actions is to investigate is improved east/west pedestrian/cyclist connectivity from Peat Island to Brooklyn Station, which is supported. The inclusion of residential density at this site, which is situated within walking distance of a new local centre and established bus service route stops, and cycling distance of an established township with a railway station, provides an opportunity supporting growth and at the same time reducing car dependency in the Hawkesbury River catchment. If parents drop children off to primary school in Brooklyn Hawkesbury River Station, this is not Disability Discrimination Act (DDA) compliant. Recommendation From a transport perspective I support the amended PP.	A cycling and parking strategy has been developed for the site with proposed possible improvements to the facilities at the Hawksbury River Train station and the bus stops on the Old Pacific Highway. Refer sections **5,6,7,8**

TfNSW Issues included in their letter received on 18th May 2018

TfNSW Requirements	Response
An assessment of the traffic and safety implications at the Mooney Mooney Interchange, including a review of impacts commercial development to the west of the M1 may have on Interchange operations. It is recommended that a detailed traffic assessment be undertaken, which includes (but not limited to) a microsimulation analysis of the operation of the on and off ramps. Further consultation with Roads and Maritime is recommended to seek advice regarding more detailed scope of work and model specification.	HCM analysis has been undertaken to assess the performance of all motorway segments including on and off- ramps of the M1 - refer **section 5.3.3 and Appendix H**
The 5 studies noted for completion at Section 6 Key Findings and Recommendations of the Traffic and Transport Review should be included in the updated assessment.	Strategies have been included in **sections 6,7,8, and 9**
Consideration of the traffic impacts on the existing intersections and the capacity of the road network to safely and efficiently cater for the additional vehicular traffic generated.	The impact on intersections and motoways segments has been assessed for the existing situation and the future 2030 scenario with the development traffic – refer **section 5 and appendices G and H**
Identify the necessary road network infrastructure upgrades the area requires to maintain existing levels of service on both the local and classified road network. Any proposed changes to the road network will need to be discussed with Council and Roads & Maritime and be supported by a Road Safety Evaluation.	No upgrades are required as a result of the additional trips. Refer **section 5 and appendices G and H.**
Any other impacts upon the road network including consideration of pedestrian, cyclist and public transport facilities including commuter car parking at local railway stations.	These issues have been discussed in the report – refer **section 3,4,5,6, and 7**.
Identify feasible options to modify transport impacts if required.	there are no anticipated impacts on the transport services. Capacity of roads, trains, and buses in the area is sufficient to accommodate the additional resulting trips associated with the development.

D. 592 Bus Service Timetable

592 Brooklyn to Hornsby

B

How to use this timetable

This timetable provides a snapshot of service information in 24-hour time (e.g. 5am = 05:00, 5pm = 17:00). Information contained in this timetable is subject to change without notice. Please note that timetables do not include minor stops, additional trips for special events, short term changes, holiday timetable changes, real-time information or any disruption alerts.

For the most up-to-date times, use the Trip Planner or Departures at **transportnsw.info**

Real-time planning

You can plan your trip with real-time information using the Trip Planner or Departures at **transportnsw.info** or by downloading travel apps on your smartphone or tablet.

The Trip Planner, Departures and travel apps offer various features:

- favourite your regular trips
- see where your service is on the route
- get estimated pick-up and arrival times
- receive service updates
- find nearby stations, stops, wharves and routes
- check accessibility information.

Find the latest apps at **transportnsw.info/apps**

Accessible services

All new buses are wheelchair-accessible with low-level floors and space for wheelchairs, prams or strollers. Look for the ♿ symbol in this timetable. Some older buses may not have all the features you need. There will be more accessible services as older buses are replaced.

Who is providing my bus services?

The bus services shown in this timetable are run by Transdev NSW.

Fares

In Sydney and surrounding regions, fares are based on:

- the distance you travel from tap on to tap off
- the mode of transport you choose
- whether you're eligible for a concession fare or free travel
- any Opal benefits such as discounts and capped fares that apply.

You can use an Opal card or a contactless payment to pay for your travel.

Opal cards

An Opal card is a smartcard you keep and reuse. Add value before you travel, and tap on and tap off to pay your fares throughout Sydney, the Blue Mountains, the Central Coast, the Hunter and the Illawarra.

Which Opal card is right for you?

Adult – Customers 16 years or older who are not entitled to any concessions and normally pay full fare.

Child/Youth – For customers aged 4-15 (inclusive), or customers 16 years or older who hold a NSW/ACT Senior Secondary Student Concession Card.

Gold Senior/Pensioner – For eligible NSW and interstate seniors, pensioners, war widows/ers and asylum seekers.

Concession – For eligible tertiary students, job seekers, apprentices and trainees.

How to get an Opal card

You can get an Adult or Child/Youth Opal card over the counter at Opal retailers that display the Opal sign. To find your nearest retailer visit **transportnsw.info/opal**.

If you are eligible to travel with concession fares, you can apply for a Gold Senior/Pensioner or Concession Opal card online. Visit **transportnsw.info/opal** for more information.

Contactless payments

If you have an American Express, Mastercard, Visa card or linked device, you can use it to pay for all public transport on the Opal network. Just make sure to tap on and tap off at Opal readers at the beginning and end of your trip.

Always separate your cards when you tap on and tap off so your preferred card is charged.

You will receive the same travel benefits of an Adult Opal card when you tap on and tap off consistently with the same credit card, debit card or linked device. This includes daily, weekly and weekend travel caps, and a $2 transfer discount when you change between metro/train, ferry, bus and light rail services within 60 minutes. Adult Opal fare pricing applies.

Find out more at **transportnsw.info/contactless**

Explanation of definitions and symbols

♿ Wheelchair Accessible

NSW GOVERNMENT | Transport

592 Hornsby to Brooklyn

Valid from: 12 July 2021

Creation date: 06 Aug 2021
NOTE: Information is correct on date of download.

Monday to Friday	
Hornsby Station	14:05
Asquith Station	14:08
Mount Colah Station	14:11
Mount Kuring-gai Station	14:15
Pacific Hwy after Collingridge Way, Berowra	14:18
Berowra RSL, Pacific Hwy, Berowra	14:21
Cowan Station	14:25
Hawkesbury River Station	14:40

592 Brooklyn to Hornsby

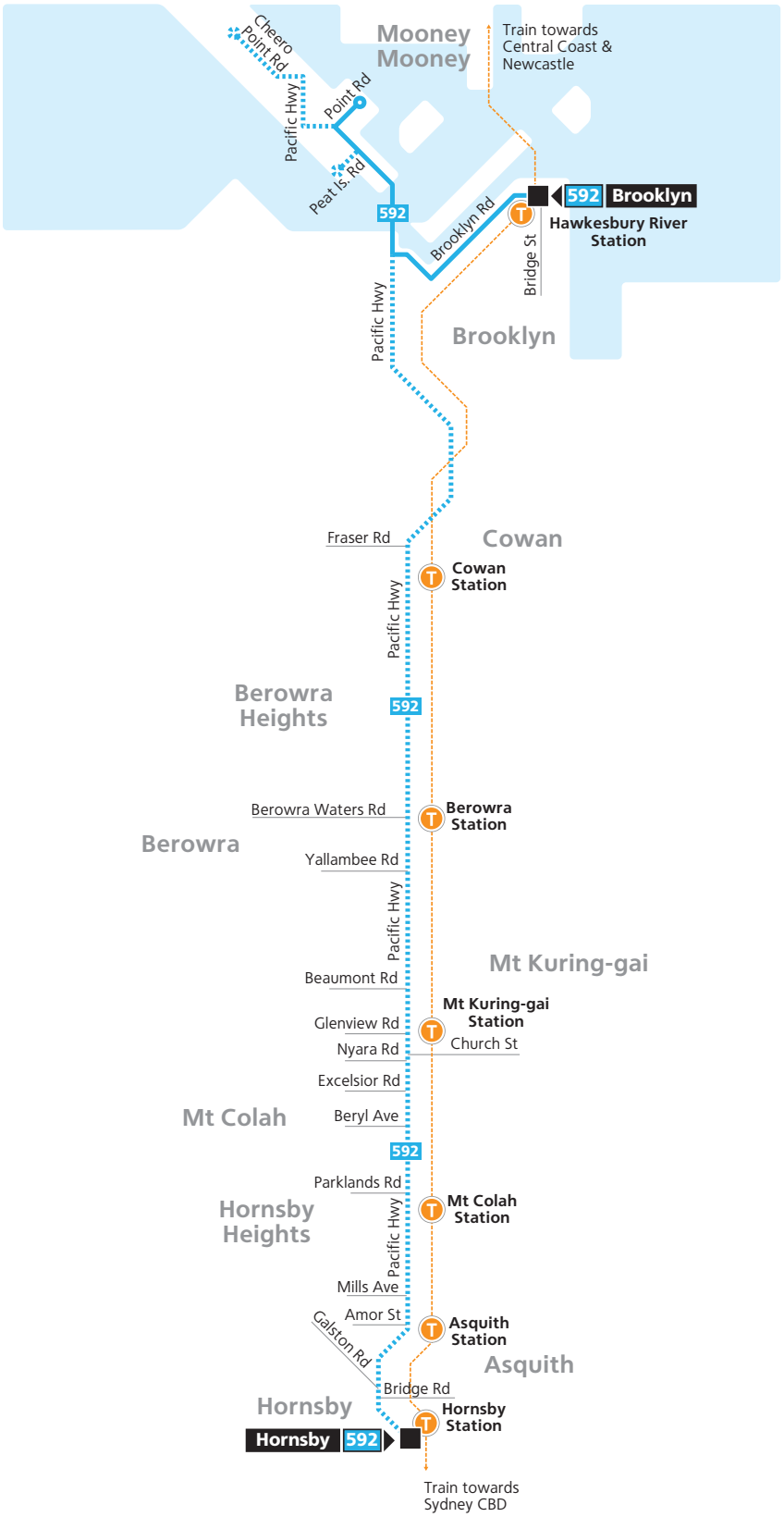
B

Monday to Friday									
Hawkesbury River Station	-	06:50	07:30	07:55	-	09:05	14:49	15:15	16:00
Brooklyn Rd opp Brooklyn Cemetery, Brooklyn	-	06:55	07:35	08:01	-	09:11	14:54	15:23	16:04
Kangaroo Point Park, Brooklyn	-				-			15:25	
Peat Island Centre, Old Pacific Hwy, Mooney Mooney	-	07:00			-				
Cheero Point Rd opp Cararma Pkwy, Cheero Point	-	07:10			08:25	09:20		15:36	16:10
Point Rd at Mara Cres, Mooney Mooney	06:24	07:15	07:40	08:07	08:30	09:25	14:59	15:39	16:15
Peat Island Centre, Old Pacific Hwy, Mooney Mooney				-				15:45	
Information Bay, Brooklyn Rd, Brooklyn	06:29	07:19	07:44	-	08:35		15:05	15:49	16:19
Hawkesbury River Station	06:34	07:25	07:50	-	08:41		15:14	15:55	16:25
Cowan Station	-	-	-	-	-	09:37	-	-	-
Berowra Station	-	-	-	-	-	09:41	-	-	-
Pacific Hwy opp Foster Way, Berowra	-	-	-	-	-	09:43	-	-	-
Mount Kuring-gai Station	-	-	-	-	-	09:46	-	-	-
Mount Colah Station	-	-	-	-	-	09:50	-	-	-
Asquith Station, Pacific Hwy, Asquith	-	-	-	-	-	09:53	-	-	-
Hornsby Station	-	-	-	-	-	09:57	-	-	-

Monday to Friday				
Hawkesbury River Station	16:42	17:12	17:40	18:08
Brooklyn Rd opp Brooklyn Cemetery, Brooklyn	16:46	17:21	17:48	18:16
Cheero Point Rd opp Cararma Pkwy, Cheero Point	16:52			
Point Rd at Mara Cres, Mooney Mooney	17:02	17:29	17:55	18:23
Information Bay, Brooklyn Rd, Brooklyn	17:06	17:34	17:59	-
Hawkesbury River Station	17:12	17:40	18:05	-

Saturday	♿	♿	♿
Hornsby Station	-	-	15:14
Berowra RSL, Pacific Hwy, Berowra	-	-	15:29
Pacific Hwy opp Berowra Station, Berowra	08:59	-	15:29
Cowan Station	09:05	-	15:33
Hawkesbury River Station		09:47	15:48
Brooklyn Rd opp Brooklyn Cemetery, Brooklyn		09:55	15:56
Point Rd at Mara Cres, Mooney Mooney	09:20	10:02	16:03
Information Bay, Brooklyn Rd, Brooklyn	09:24		16:07
Hawkesbury River Station	09:30		16:13
Cowan Station	-	10:14	16:28
Berowra Station	-	10:18	16:33
Pacific Hwy opp Foster Way, Berowra	-	10:20	-
Mount Kuring-gai Station	-	10:23	-
Mount Colah Station	-	10:27	-
Asquith Station, Pacific Hwy, Asquith	-	10:30	-
Hornsby Station	-	10:34	-

Route 592



Legend

- Bus route
- Limited service
- 592 Bus route number
- Bus route start/finish
- Train line/station

North — Diagrammatic Map Not to Scale

NSW GOVERNMENT Transport

transportnsw.info

E. Crash Data Analysis (Jan 2013 – Dec 2017)

Detailed Crash Report

NOTES: 8317 - Pacific Highway, between Kangaroo Point and Point Road, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors	S	F
Hunter Region																											
Central Coast LGA																											
Mooney Mooney																											
Pacific Hwy																											
1062864	P	28/09/2014	Sun	08:00	35 km	S	GOSFORD TN	2WY	CRV	Fine	Dry	60	1	M/C	M26	N in PACIFIC HWY	70	Proceeding in lane	SC	0	1	0	0	0	S		
E57221146								RUM	83	Off rt/rt bnd=>obj				S/Barrier - Guardrail													
1088216	S	18/12/2015	Fri	16:00		at	HEWCASTLE EXP	TJN	STR	Fine	Dry	60	2	4WD	M U	S in PACIFIC HWY	Unk	Proceeding in lane	NC	0	0	0	0	0			
E59733445								RUM	30	Rear end				4WD	M35	S in PACIFIC HWY	0	Stationary									
1110157	P	11/06/2016	Sat	10:30		at	KOWAN ST	TJN	STR	Fine	Dry	60	2	UTE	M26	N in PACIFIC HWY	30	Turning right	SC	0	2	1	0	0			
E61529626								RUM	21	Right through				M/C	M54	S in PACIFIC HWY	50	Proceeding in lane									
1148976	P	20/07/2017	Thu	14:15		at	NUMBER 22 HN	2WY	STR	Fine	Dry	60	3	TRK	M19	W in PACIFIC HWY	10	Forward from drive	SC	0	2	0	0	0			
E65149257								RUM	47	Emerging from drive				M/C	M71	S in PACIFIC HWY	60	Proceeding in lane									
														M/C	M69	S in PACIFIC HWY	60	Proceeding in lane									
1075679	P	29/07/2015	Wed	22:40	10 m	N	PEATS FERRY BDGE	2WY	STR	Fine	Dry	80	2	CAR	U U	S in PACIFIC HWY	Unk	Pulling out	NC	0	0	0	0	0			
E59500539								RUM	42	Leaving parking				M/C	M39	S in PACIFIC HWY	60	Proceeding in lane									
1076930	P	01/08/2015	Sat	10:20		at	POINT RD	TJN	CRV	Fine	Dry	60	2	CAR	M82	N in PACIFIC HWY	5	Turning right	MC	0	0	1	0	0			
E57673830								RUM	21	Right through				M/C	M55	S in PACIFIC HWY	60	Proceeding in lane									
1055840	S	25/12/2014	Thu	12:00	150 m	S	POINT RD	2WY	STR	Fine	Dry	60	5	CAR	M U	N in PACIFIC HWY	Unk	Forward from drive	NC	0	0	0	0	0			
E243621194								RUM	39	Other same direction				CAR	M37	N in PACIFIC HWY	0	Stationary									
														WAG	M22	N in PACIFIC HWY	Unk	Forward from drive									
														WAG	M43	N in PACIFIC HWY	0	Stationary									
														CAR	M25	N in PACIFIC HWY	Unk	Forward from drive									

Report Totals: Crashes: 7 Fatal Crashes(FC): 0 Serious Injury Crashes(SC): 3 Moderate Injury Crashes(MC): 1 Minor/Other Injury Crashes(OC): 0 Uncategorised Injury Crashes(UC): 0 Non-Casualty Crashes(NC): 3

Killed(K): 0 Seriously Injured(S): 5 Moderately Injured(M): 2 Minor/Other Injured(O): 0 Uncategorised Injured(U): 0

Crashid dataset 8317 - Pacific Highway, between Kangaroo Point and Point Road, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

Note: *Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.*

Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data. Reporting yrs 1996-2004 and 2018 onwards contain uncategorised inj crashes.

Summary Crash Report

# Crash Type		
Car Crash	5	71.4%
Light Truck Crash	1	14.3%
Rigid Truck Crash	0	0.0%
Articulated Truck Crash	0	0.0%
'Heavy Truck Crash	*(0)*	*(0.0%)*
Bus Crash	0	0.0%
"Heavy Vehicle Crash	*(0)*	*(0.0%)*
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	5	71.4%
Pedal Cycle Crash	0	0.0%
Pedestrian Crash	0	0.0%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	3	42.9%
Non intersection	4	57.1%

* Up to 10 metres from an intersection

Collision Type		
Single Vehicle	1	14.3%
Multi Vehicle	6	85.7%

Road Classification		
Freeway/Motorway	0	0.0%
State Highway	7	100.0%
Other Classified Road	0	0.0%
Unclassified Road	0	0.0%

Contributing Factors		
Speeding	1	14.3%
Fatigue	0	0.0%

Weather		
Fine	7	100.0%
Rain	0	0.0%
Overcast	0	0.0%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition		
Wet	0	0.0%
Dry	7	100.0%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	0	0.0%
Daylight	6	85.7%
Dusk	0	0.0%
Darkness	1	14.3%

Crash Movement		
Intersection, adjacent approaches	0	0.0%
Head-on (not overtaking)	0	0.0%
Opposing vehicles; turning	2	28.6%
U-turn	0	0.0%
Rear-end	1	14.3%
Lane change	0	0.0%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	1	14.3%
Overtaking; same direction	0	0.0%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	0	0.0%
Permanent obstruction on road	0	0.0%
Hit animal	0	0.0%
Off road, on straight	0	0.0%
Off road on straight, hit object	0	0.0%
Out of control on straight	0	0.0%
Off road, on curve	0	0.0%
Off road on curve, hit object	1	14.3%
Out of control on curve	0	0.0%
Other crash type	2	28.6%

Speed Limit					
40 km/h or less	0	0.0%	80 km/h zone	1	14.3%
50 km/h zone	0	0.0%	90 km/h zone	0	0.0%
60 km/h zone	6	85.7%	100 km/h zone	0	0.0%
70 km/h zone	0	0.0%	110 km/h zone	0	0.0%

~ 07:30-09:30 or 14:30-17:00 on school days	~ 40km/h or less		~ School Travel Time Involvement		
	0	0.0%		1	14.3%

Day of the Week												
Monday	0	0.0%	Wednesday	1	14.3%	Friday	1	14.3%	Sunday	1	14.3%	WEEKEND	3	42.9%
Tuesday	0	0.0%	Thursday	2	28.6%	Saturday	2	28.6%	WEEKDAY	4	57.1%			

CRASHES	7	
Fatal	0	0.0%
Serious inj.	3	42.9%
Moderate inj.	1	14.3%
Minor/Other inj.	0	0.0%
Uncategorised inj.	0	0.0%
Non-casualty	3	42.9%

Self Reported Crash	2	28.57%

Time Group		% of Day	
00:01 - 02:59	0	0.0%	12.5%
03:00 - 04:59	0	0.0%	8.3%
05:00 - 05:59	0	0.0%	4.2%
06:00 - 06:59	0	0.0%	4.2%
07:00 - 07:59	0	0.0%	4.2%
08:00 - 08:59	1	14.3%	4.2%
09:00 - 09:59	0	0.0%	4.2%
10:00 - 10:59	2	28.6%	4.2%
11:00 - 11:59	0	0.0%	4.2%
12:00 - 12:59	1	14.3%	4.2%
13:00 - 13:59	0	0.0%	4.2%
14:00 - 14:59	1	14.3%	4.2%
15:00 - 15:59	0	0.0%	4.2%
16:00 - 16:59	1	14.3%	4.2%
17:00 - 17:59	0	0.0%	4.2%
18:00 - 18:59	0	0.0%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	0	0.0%	8.3%
22:00 - 24:00	1	14.3%	8.3%

Street Lighting Off/Nil		% of Dark
1 of	1 in Dark	100.0%

CASUALTIES	7	
Killed	0	0.0%
Seriously inj.	5	71.4%
Moderately inj.	2	28.6%
Minor/Other inj.	0	0.0%
Uncategorised inj.	0	0.0%
^ Unrestrained	0	0.0%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

Crashes		Casualties
1	2017	2
1	2016	3
3	2015	1
2	2014	1

McLean Periods		%	% Week
A	0	0.0%	17.9%
B	1	14.3%	7.1%
C	2	28.6%	17.9%
D	2	28.6%	3.5%
E	0	0.0%	3.6%
F	0	0.0%	10.7%
G	1	14.3%	7.1%
H	0	0.0%	7.1%
I	1	14.3%	12.5%
J	0	0.0%	10.7%

#Holiday Periods																		
New Year	0	0.0%	Easter	0	0.0%	Queen's BD	1	14.3%	Christmas	1	14.3%	Easter SH	0	0.0%	Sept./Oct. SH	1	14.3%	
Aust. Day	0	0.0%	Anzac Day	0	0.0%	Labour Day	0	0.0%	January SH	0	0.0%	June/July SH	0	0.0%	December SH	1	14.3%	

Crashid dataset 8317 - Pacific Highway, between Kangaroo Point and Point Road, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

Note: *Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.*
Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data.
Reporting yrs 1996-2004 and 2018 onwards contain uncategorised inj crashes.
Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Detailed Crash Report

NOTES: 8317 - Pacific Motorway (including off/on ramps), between Kangaroo Point and the southbound safety ramp, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S F
Hunter Region																									
Central Coast LGA																									
Mooney Mooney																									
Newcastle Exp																									
1001549	P	27/09/2013	Fri	11:27		at	HAWKESBURY RIVER BDGE	D F		STR	Fine	Dry	110	2	CAR	F24	S in NEWCASTLE EXP	20	Proceeding in lane	MC	0	0	2	0	0	
E51884720								RUM		30	Rear end				WAG	M55	S in NEWCASTLE EXP	20	Proceeding in lane							
Newcastle Exp																									
840661	P	20/06/2013	Thu	06:05	10 m	N	HAWKESBURY RIV BDGE	D F		STR	Fine	Dry	110	2	CAR	F26	S in NEWCASTLE EXP	50	Proceeding in lane	NC	0	0	0	0	0	
E51824376								RUM		30	Rear end				CAR	F64	S in NEWCASTLE EXP	0	Stationary							
1042096	P	10/09/2014	Wed	15:10	100 m	N	HAWKESBURY RIVER BDGE	D F		STR	Fine	Dry	110	6	CAR	M46	N in NEWCASTLE EXP	110	Veering right	NC	0	0	0	0	0	
E56388669								RUM		30	Rear end				UTE	M43	N in NEWCASTLE EXP	110	Proceeding in lane							
															CAR	M30	N in NEWCASTLE EXP	110	Proceeding in lane							
															CAR	M52	N in NEWCASTLE EXP	110	Proceeding in lane							
															WAG	M33	N in NEWCASTLE EXP	110	Proceeding in lane							
															4WD	F28	N in NEWCASTLE EXP	110	Proceeding in lane							
1000940	P	15/11/2013	Fri	21:00	200 m	N	HAWKESBURY RIVER BDGE	D F		STR	Overcast	Wet	110	1	CAR	M30	S in NEWCASTLE EXP	100	Proceeding in lane	NC	0	0	0	0	0	F
E53200150								RUM		71	Off rd left => obj				S/Barrier - Guardrail											
843807	P	01/07/2013	Mon	10:55		at	HAWKESBURY RIVER BDGE	D F		STR	Fine	Dry	110	2	TRK	M79	N in NEWCASTLE EXP	30	Proceeding in lane	NC	0	0	0	0	0	
E51920218								RUM		30	Rear end				WAG	M60	N in NEWCASTLE EXP	15	Proceeding in lane							
845320	P	05/07/2013	Fri	17:35		at	HAWKESBURY RIVER BDGE	D F		STR	Fine	Dry	110	8	CAR	F23	N in NEWCASTLE EXP	100	Proceeding in lane	MC	0	0	2	0	0	S
E52516869								RUM		30	Rear end				WAG	F37	N in NEWCASTLE EXP	0	Stationary							
															CAR	F64	N in NEWCASTLE EXP	100	Proceeding in lane							
															CAR	M39	N in NEWCASTLE EXP	80	Proceeding in lane							
															CAR	M55	N in NEWCASTLE EXP	0	Stationary							
															UTE	M27	N in NEWCASTLE EXP	100	Proceeding in lane							
															TRK	M72	N in NEWCASTLE EXP	90	Proceeding in lane							
															CAR	F22	N in NEWCASTLE EXP	95	Proceeding in lane							

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors
																									S F
1020658	P	17/04/2014	Thu	18:25		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	10	TRK	M22	N in NEWCASTLE EXP	100	Proceeding in lane	OC	0	0	0	4	0	
E105889602								RUM	30	Rear end				OMV	F U	N in NEWCASTLE EXP	0	Stationary							
														CAR	F27	N in NEWCASTLE EXP	105	Proceeding in lane							
														TRK	M59	N in NEWCASTLE EXP	105	Proceeding in lane							
														CAR	F U	N in NEWCASTLE EXP	0	Stationary							
														CAR	F35	N in NEWCASTLE EXP	100	Proceeding in lane							
														4WD	F42	N in NEWCASTLE EXP	100	Proceeding in lane							
														4WD	M67	N in NEWCASTLE EXP	100	Proceeding in lane							
														CAR	F29	N in NEWCASTLE EXP	100	Proceeding in lane							
														TRK	M54	N in NEWCASTLE EXP	90	Proceeding in lane							
1031002	P	12/06/2014	Thu	18:10		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	3	CAR	F21	N in NEWCASTLE EXP	80	Proceeding in lane	NC	0	0	0	0	0	
E55037054								RUM	30	Rear end				CAR	M44	N in NEWCASTLE EXP	0	Stationary							
														TRK	M44	N in NEWCASTLE EXP	0	Stationary							
1032234	P	12/06/2014	Thu	18:10		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	7	WAG	M41	N in NEWCASTLE EXP	100	Proceeding in lane	OC	0	0	0	1	0	
E55015926								RUM	30	Rear end				CAR	F59	N in NEWCASTLE EXP	0	Stationary							
														TRK	M40	N in NEWCASTLE EXP	100	Proceeding in lane							
														CAR	F22	N in NEWCASTLE EXP	0	Stationary							
														TRK	M32	N in NEWCASTLE EXP	0	Stationary							
														WAG	M24	N in NEWCASTLE EXP	0	Stationary							
														UTE	M39	N in NEWCASTLE EXP	0	Stationary							
1029806	P	12/06/2014	Thu	18:14		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	7	CAR	F23	N in NEWCASTLE EXP	80	Proceeding in lane	NC	0	0	0	0	0	
E55646063								RUM	30	Rear end				4WD	F22	N in NEWCASTLE EXP	80	Proceeding in lane							
														CAR	M53	N in NEWCASTLE EXP	80	Proceeding in lane							
														CAR	M31	N in NEWCASTLE EXP	80	Proceeding in lane							
														TRK	M39	N in NEWCASTLE EXP	80	Proceeding in lane							
														4WD	M52	N in NEWCASTLE EXP	80	Proceeding in lane							
														CAR	M26	N in NEWCASTLE EXP	80	Proceeding in lane							
1048413	P	03/10/2014	Fri	06:00		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	8	TRK	M34	S in NEWCASTLE EXP	100	Proceeding in lane	MC	0	0	1	1	0	
E55719306								RUM	30	Rear end				CAR	M69	S in NEWCASTLE EXP	0	Stationary							
														TRK	M27	S in NEWCASTLE EXP	100	Proceeding in lane							
														WAG	M42	S in NEWCASTLE EXP	100	Proceeding in lane							
														CAR	M42	S in NEWCASTLE EXP	100	Proceeding in lane							
														TRK	M31	S in NEWCASTLE EXP	0	Stationary							
														4WD	M57	S in NEWCASTLE EXP	0	Stationary							
														CAR	F41	S in NEWCASTLE EXP	100	Proceeding in lane							

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors
																									S F
1059585	S	26/12/2014	Fri	12:18		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	4	CAR	M27	N in NEWCASTLE EXP	Unk	Proceeding in lane	MC	0	0	1	0	0	
E57202679								RUM	30	Rear end				4WD	M41	N in NEWCASTLE EXP	Unk	Proceeding in lane							
														CAR	F27	N in NEWCASTLE EXP	Unk	Proceeding in lane							
														ATKR	M50	N in NEWCASTLE EXP	Unk	Proceeding in lane							
1061995	P	01/01/2015	Thu	11:30		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	2	CAR	F51	N in NEWCASTLE EXP	100	Proceeding in lane	MC	0	0	1	1	0	
E56390117								RUM	30	Rear end				CAR	F30	N in NEWCASTLE EXP	100	Proceeding in lane							
1074663	P	04/07/2015	Sat	15:30		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	2	CAR	F29	N in NEWCASTLE EXP	110	Proceeding in lane	MC	0	0	1	0	0	
E289107693								RUM	33	Lane sideswipe				LOR	M71	N in NEWCASTLE EXP	100	Proceeding in lane							
1075992	P	14/07/2015	Tue	10:25		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	3	WAG	M75	N in NEWCASTLE EXP	90	Proceeding in lane	SC	0	1	0	0	0	
E58418750								RUM	30	Rear end				CAR	M64	N in NEWCASTLE EXP	0	Stationary							
														TRK	M42	N in NEWCASTLE EXP	90	Proceeding in lane							
1099642	S	23/04/2016	Sat	13:45		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	4	CAR	F66	N in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E63060285								RUM	30	Rear end				CAR	M64	N in NEWCASTLE EXP	0	Stationary							
														4WD	M27	N in NEWCASTLE EXP	0	Stationary							
														CAR	F59	N in NEWCASTLE EXP	Unk	Proceeding in lane							
1105292	S	11/06/2016	Sat	10:10		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	3	TRK	M66	S in NEWCASTLE EXP	Unk	Proceeding in lane	OC	0	0	0	1	0	
E61856873								RUM	62	Accident				CAR	F46	S in NEWCASTLE EXP	0	Broken down							
														CAR	M81	S in NEWCASTLE EXP	0	Stationary							
1111081	P	11/06/2016	Sat	10:15		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	3	WAG	M49	S in NEWCASTLE EXP	110	Proceeding in lane	SC	0	1	0	1	0	
E61411307								RUM	62	Accident				TRK	M66	S in NEWCASTLE EXP	0	Broken down							
														PED		N in NEWCASTLE EXP		Against traffic, not edge							
1109903	P	06/07/2016	Wed	17:50		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	3	CAR	M47	N in NEWCASTLE EXP	90	Proceeding in lane	MC	0	0	1	0	0	
E308446993								RUM	30	Rear end				TRK	M55	N in NEWCASTLE EXP	70	Proceeding in lane							
														LOR	M54	N in NEWCASTLE EXP	80	Proceeding in lane							
1165687	P	23/12/2017	Sat	16:50		at	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	3	TRK	F18	N in NEWCASTLE EXP	Unk	Proceeding in lane	MC	0	0	1	0	0	
E67183508								RUM	62	Accident				SEM	M32	N in NEWCASTLE EXP	0	Broken down							
														VAN	M71	N in NEWCASTLE EXP	110	Proceeding in lane							
1072377	S	23/05/2015	Sat	14:30	50 m	N	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	2	TRK	M63	N in NEWCASTLE EXP	Unk	Proceeding in lane	MC	0	0	1	0	0	
E58312254								RUM	30	Rear end				VAN	M U	N in NEWCASTLE EXP	Unk	Proceeding in lane							
1084638	P	29/09/2015	Tue	16:30	80 m	N	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	3	UTE	F35	S in NEWCASTLE EXP	100	Veering right	MC	0	0	1	0	0	
E59311338								RUM	34	Lane change right				CAR	M68	S in NEWCASTLE EXP	100	Proceeding in lane							
														CAR	M24	S in NEWCASTLE EXP	100	Proceeding in lane							
1019592	P	28/03/2014	Fri	18:15	100 m	N	HAWKESBURY RIVER BDGE	D F	STR	Overcast	Dry	110	2	CAR	M33	N in NEWCASTLE EXP	110	Proceeding in lane	NC	0	0	0	0	0	
E54793079								RUM	30	Rear end				CAR	F24	N in NEWCASTLE EXP	Unk	Proceeding in lane							

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors
																									S F
1099236	P	01/04/2016	Fri	06:30	100 m	N	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	3	OMV	U U	S in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E60232015								RUM	30	Rear end				TRK	M23	S in NEWCASTLE EXP	Unk	Proceeding in lane							
														TRK	M38	S in NEWCASTLE EXP	20	Proceeding in lane							
1013771	P	17/02/2014	Mon	06:24	400 m	N	HAWKESBURY RIVER BDGE	D F	STR	Raining	Wet	110	4	TRK	M21	S in NEWCASTLE EXP	Unk	Proceeding in lane	OC	0	0	0	2	0	
E53886212								RUM	30	Rear end				4WD	F31	S in NEWCASTLE EXP	0	Stationary							
														CAR	M56	S in NEWCASTLE EXP	80	Proceeding in lane							
														LOR	M70	S in NEWCASTLE EXP	85	Veering left							
1002073	P	01/12/2013	Sun	18:00	1 km	N	HAWKESBURY RIVER BDGE	D F	CRV	Fine	Dry	100	3	CAR	M25	N in NEWCASTLE EXP	100	Veering right	NC	0	0	0	0	0	S
E54072741								RUM	88	Out of cont on bend				WAG	F75	N in NEWCASTLE EXP	100	Proceeding in lane							
														CAR	F19	N in NEWCASTLE EXP	100	Proceeding in lane							
1031056	P	05/02/2014	Wed	20:30	1 km	N	HAWKESBURY RIVER BDGE	D F	STR	Fine	Dry	110	2	CAR	M38	S in NEWCASTLE EXP	100	Incorrect side	SC	0	4	1	0	0	S F
E53931721								RUM	20	Head on				WAG	F57	N in NEWCASTLE EXP	Unk	Proceeding in lane							
1049186	P	23/10/2014	Thu	13:25	1 km	N	HAWKESBURY RIVER BDGE	D F	CRV	Fine	Dry	90	1	CAR	M31	S in NEWCASTLE EXP	85	Proceeding in lane	SC	0	1	0	0	0	
E56764969								RUM	81	Off left/rt bnd=>obj				Embankment											
1071109	P	01/05/2015	Fri	17:45	1 km	N	HAWKESBURY RIVER BDGE	D F	STR	Raining	Wet	100	3	TRK	M42	N in NEWCASTLE EXP	50	Proceeding in lane	NC	0	0	0	0	0	
E58270449								RUM	30	Rear end				OMV	U U	N in NEWCASTLE EXP	Unk	Proceeding in lane							
														TRK	M34	N in NEWCASTLE EXP	40	Proceeding in lane							
1088583	P	24/11/2015	Tue	03:20	1 km	N	HAWKESBURY RIVER BDGE	D F	CRV	Raining	Wet	110	2	TRK	M20	N in NEWCASTLE EXP	110	Proceeding in lane	SC	0	1	0	0	0	S F
E60010262								RUM	81	Off left/rt bnd=>obj				Signpost		N in NEWCASTLE EXP	0	Parked other							
1017363	P	22/02/2014	Sat	10:30	300 m	S	HAWKSBURY RIVER AMBUI	D F	STR	Fine	Dry	110	2	CAR	M27	N in NEWCASTLE EXP	70	Proceeding in lane	NC	0	0	0	0	0	
E55957085								RUM	30	Rear end				CAR	M66	N in NEWCASTLE EXP	0	Stationary							
1019948	P	28/03/2014	Fri	18:50	2 km	S	JOLLS BDGE	D F	CRV	Raining	Wet	110	3	TRK	M32	N in NEWCASTLE EXP	110	Proceeding in lane	OC	0	0	0	1	0	
E54169433								RUM	30	Rear end				CAR	M52	N in NEWCASTLE EXP	0	Stationary							
														WAG	M24	N in NEWCASTLE EXP	0	Stationary							
1116324	P	17/08/2016	Wed	06:20	400 m	N	MOONEY MOONEY REST A	D F	STR	Fine	Dry	110	3	TRK	M30	S in NEWCASTLE EXP	Unk	Proceeding in lane	SC	0	1	0	2	0	
E61735306								RUM	30	Rear end				TRK	M26	S in NEWCASTLE EXP	0	Stationary							
														TRK	M42	S in NEWCASTLE EXP	0	Stationary							
830846	P	23/03/2013	Sat	10:15		at	NTH END HAWKES BDGE	D F	STR	Fine	Dry	110	2	CAR	F60	N in NEWCASTLE EXP	60	Veering right	MC	0	0	1	0	0	
E51138246								RUM	34	Lane change right				4WD	M53	N in NEWCASTLE EXP	105	Proceeding in lane							
830847	P	23/03/2013	Sat	10:15		at	NTH END HAWKES BDGE	D F	STR	Fine	Dry	110	2	4WD	M49	N in NEWCASTLE EXP	100	Proceeding in lane	NC	0	0	0	0	0	
E51138246								RUM	30	Rear end				CAR	M36	N in NEWCASTLE EXP	70	Proceeding in lane							
841858	P	19/06/2013	Wed	06:00	290 m	S	NTH END HAWKES BDGE	D F	STR	Overcast	Wet	110	2	TRK	M47	S in NEWCASTLE EXP	60	Proceeding in lane	OC	0	0	0	1	0	
E51885640								RUM	30	Rear end				TRK	M36	S in NEWCASTLE EXP	60	Proceeding in lane							
1128722	S	24/02/2017	Fri	13:30	400 m	N	OLD PACIFIC HIGHWAY OP	D F	CRV	Fine	Dry	90	2	LOR	M49	N in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E63211425								RUM	33	Lane sideswipe				CAR	F24	N in NEWCASTLE EXP	Unk	Proceeding in lane							

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S	F
1142996	P	31/05/2017	Wed	10:27	300 m	S	OLD PACIFIC HIGHWAY OP	D F	CRV	Fine	Dry	110	3	OMV	U U	S in NEWCASTLE EXP	Unk	Proceeding in lane	MC	0	0	1	0	0		
E65490515								RUM	30	Rear end				WAG	F67	S in NEWCASTLE EXP	110	Proceeding in lane								
														OMV	U U	S in NEWCASTLE EXP	110	Proceeding in lane								
833751	P	03/04/2013	Wed	17:50	45 m	N	PACIFIC HIGHWA OP	D F	CRV	Raining	Wet	90	1	UTE	M19	N in NEWCASTLE EXP	95	Proceeding in lane	NC	0	0	0	0	0	S	
E50588515								RUM	85	Off rt/lft bnd=>obj				Fence (prior to 2014)												
829176	P	01/03/2013	Fri	13:00	300 m	N	PACIFIC HIGHWA OP	D F	CRV	Raining	Wet	110	1	CAR	M21	N in NEWCASTLE EXP	95	Proceeding in lane	NC	0	0	0	0	0	S	
E50773376								RUM	85	Off rt/lft bnd=>obj				Fence (prior to 2014)												
832556	P	04/04/2013	Thu	10:25	10 m	S	PACIFIC HIGHWA OP	D F	CRV	Raining	Wet	110	1	CAR	M30	S in NEWCASTLE EXP	110	Proceeding in lane	NC	0	0	0	0	0	S	
E51913739								RUM	83	Off rt/rt bnd=>obj				Fence (prior to 2014)												
856820	P	02/11/2013	Sat	11:20	75 m	S	PACIFIC HIGHWA OP	D F	CRV	Fine	Dry	110	1	TRK	M37	N in NEWCASTLE EXP	110	Proceeding in lane	NC	0	0	0	0	0		F
E53445179								RUM	85	Off rt/lft bnd=>obj				Fence (prior to 2014)												
846918	P	22/07/2013	Mon	06:20	25 m	N	PACIFIC HIGHWA TO	D F	STR	Fine	Dry	110	9	TRK	M55	S in NEWCASTLE EXP	110	Proceeding in lane	OC	0	0	0	5	0		
E52549968								RUM	30	Rear end				CAR	M25	S in NEWCASTLE EXP	110	Proceeding in lane								
														TRK	M28	S in NEWCASTLE EXP	110	Proceeding in lane								
														TRK	M35	S in NEWCASTLE EXP	110	Proceeding in lane								
														CAR	M35	S in NEWCASTLE EXP	110	Proceeding in lane								
														TRK	M49	S in NEWCASTLE EXP	Unk	Proceeding in lane								
														WAG	M36	S in NEWCASTLE EXP	100	Proceeding in lane								
														UTE	M39	S in NEWCASTLE EXP	110	Proceeding in lane								
														UTE	M40	S in NEWCASTLE EXP	110	Proceeding in lane								
846910	P	22/07/2013	Mon	06:30	35 m	N	PACIFIC HIGHWA TO	D F	STR	Fine	Dry	110	2	CAR	M45	S in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0		
E52549968								RUM	30	Rear end				4WD	M58	S in NEWCASTLE EXP	0	Stationary								
846917	P	22/07/2013	Mon	06:30	45 m	N	PACIFIC HIGHWA TO	D F	STR	Fine	Dry	110	2	TRK	M57	S in NEWCASTLE EXP	110	Proceeding in lane	NC	0	0	0	0	0		
E52549968								RUM	30	Rear end				TRK	M47	S in NEWCASTLE EXP	Unk	Proceeding in lane								
1011055	P	17/02/2014	Mon	06:24		at	PACIFIC HIGHWAY TO	D F	STR	Overcast	Wet	110	3	OMV	U U	S in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0		
E53675752								RUM	30	Rear end				CAR	M50	S in NEWCASTLE EXP	0	Stationary								
														CAR	M41	S in NEWCASTLE EXP	0	Stationary								
1084988	S	17/11/2015	Tue	07:00	100 m	N	PACIFIC HIGHWAY OP	D F	STR	Fine	Dry	110	2	CAR	M52	S in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0		
E258573894								RUM	30	Rear end				CAR	M44	S in NEWCASTLE EXP	Unk	Proceeding in lane								
1026999	P	20/04/2014	Sun	18:30	200 m	N	PACIFIC HIGHWAY OP	D F	STR	Fine	Dry	110	2	CAR	F U	S in NEWCASTLE EXP	Unk	Proceeding in lane	MC	0	0	1	0	0		
E55161862								RUM	30	Rear end				CAR	M35	S in NEWCASTLE EXP	0	Stationary								

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors
																									S F
1072327	S	26/05/2015	Tue	17:40	500 m	N	PACIFIC HIGHWAY OP	D F	CRV	Fine	Dry	110	5	CAR	M22	N in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E58145004								RUM	30	Rear end				CAR	F35	N in NEWCASTLE EXP	Unk	Proceeding in lane							
														CAR	F26	N in NEWCASTLE EXP	Unk	Proceeding in lane							
														CAR	F U	N in NEWCASTLE EXP	Unk	Proceeding in lane							
														CAR	M U	N in NEWCASTLE EXP	Unk	Proceeding in lane							
1021204	P	27/04/2014	Sun	13:00	830 m	N	PACIFIC HIGHWAY OP	D F	CRV	Raining	Wet	90	1	CAR	M65	N in NEWCASTLE EXP	90	Proceeding in lane	MC	0	0	1	0	0	S
E54373036								RUM	83	Off rt/rt bnd=>obj				S/Barrier - Guardrail											
1062531	S	06/04/2015	Mon	11:00	10 m	S	PACIFIC HIGHWAY OP	D F	CRV	Fine	Dry	110	5	CAR	F31	S in NEWCASTLE EXP	Unk	Other forward	OC	0	0	0	1	0	
E57662557								RUM	39	Other same direction				CAR	F25	S in NEWCASTLE EXP	0	Stationary							
														CAR	F38	S in NEWCASTLE EXP	Unk	Other forward							
														4WD	M51	S in NEWCASTLE EXP	Unk	Other forward							
														4WD	M20	S in NEWCASTLE EXP	Unk	Other forward							
1056177	S	23/01/2015	Fri	14:30	100 m	S	PACIFIC HIGHWAY OP	D F	CRV	Fine	Dry	110	3	TRK	F23	N in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E56665227								RUM	30	Rear end				4WD	M33	N in NEWCASTLE EXP	Unk	Proceeding in lane							
														TRK	M31	N in NEWCASTLE EXP	Unk	Proceeding in lane							
1094134	S	25/02/2016	Thu	17:15	150 m	S	PACIFIC HIGHWAY OP	D F	CRV	Fine	Dry	110	2	4WD	M24	N in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E63153088								RUM	30	Rear end				4WD	M59	N in NEWCASTLE EXP	Unk	Proceeding in lane							
1080693	S	29/09/2015	Tue	16:45	200 m	S	PACIFIC HIGHWAY OP	D F	CRV	Fine	Dry	110	2	CAR	M67	S in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E59672979								RUM	30	Rear end				CAR	M U	S in NEWCASTLE EXP	Unk	Proceeding in lane							
1114276	S	04/09/2016	Sun	16:02	500 m	S	PACIFIC HIGHWAY OP	D F	STR	Fine	Dry	110	3	4WD	F49	S in NEWCASTLE EXP	Unk	Proceeding in lane	OC	0	0	0	1	0	
E63062065								RUM	30	Rear end				TRK	M53	S in NEWCASTLE EXP	Unk	Proceeding in lane							
														4WD	M38	S in NEWCASTLE EXP	Unk	Proceeding in lane							
1152178	S	03/08/2017	Thu	06:15	600 m	S	PACIFIC HIGHWAY OP	D F	STR	Fine	Dry	110	2	4WD	M56	S in NEWCASTLE EXP	Unk	Proceeding in lane	OC	0	0	0	1	0	
E65517944								RUM	30	Rear end				CAR	M50	S in NEWCASTLE EXP	0	Stationary							
1011848	P	17/02/2014	Mon	06:24		at	PACIFIC HIGHWAY TO	D F	STR	Overcast	Wet	110	3	CAR	M26	S in NEWCASTLE EXP	100	Proceeding in lane	NC	0	0	0	0	0	
E53883345								RUM	30	Rear end				CAR	M24	S in NEWCASTLE EXP	0	Stationary							
														CAR	M52	S in NEWCASTLE EXP	0	Stationary							
1119591	S	13/11/2016	Sun	10:25		at	PACIFIC HIGHWAY TO	D F	STR	Fine	Dry	110	2	CAR	M43	S in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E62926748								RUM	39	Other same direction				SEM	M37	S in NEWCASTLE EXP	Unk	Other forward							
1143083	S	27/06/2017	Tue	17:50		at	PACIFIC HIGHWAY TO	D F	STR	Fine	Dry	110	2	TRK	M30	N in NEWCASTLE EXP	Unk	Proceeding in lane	OC	0	0	0	1	0	
E64489427								RUM	30	Rear end				CAR	F65	N in NEWCASTLE EXP	Unk	Proceeding in lane							
1060086	S	27/02/2015	Fri	16:50	50 m	N	PACIFIC HIGHWAY TO	D F	STR	Fine	Dry	110	4	4WD	M65	N in NEWCASTLE EXP	Unk	Proceeding in lane	OC	0	0	0	1	0	
E56946352								RUM	30	Rear end				CAR	U U	N in NEWCASTLE EXP	Unk	Proceeding in lane							
														4WD	M54	N in NEWCASTLE EXP	Unk	Proceeding in lane							
														CAR	M71	N in NEWCASTLE EXP	Unk	Proceeding in lane							

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors S F
1059545	S	23/02/2015	Mon	06:05	300 m	N	PACIFIC HIGHWAY TO	D F	CRV	Raining	Wet	110	3	TRK	M43	S in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E56288320								RUM: 30	Rear end					UTE	M48	S in NEWCASTLE EXP	Unk	Proceeding in lane							
														WAG	M36	S in NEWCASTLE EXP	Unk	Proceeding in lane							
1046963	P	25/08/2014	Mon	13:30	460 m	N	PACIFIC HIGHWAY TO	D F	STR	Fine	Dry	90	1	BDBL	M27	S in NEWCASTLE EXP	90	Proceeding in lane	NC	0	0	0	0	0	
E56477139								RUM: 71	Off rd left => obj					Embankment											
1066233	P	25/04/2015	Sat	21:15	670 m	N	PACIFIC HIGHWAY TO	D F	CRV	Fine	Dry	110	1	CAR	F44	N in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	S
E57636413								RUM: 83	Off rt/rt bnd=>obj					S/Barrier - Guardrail											
1123238	S	19/12/2016	Mon	06:15	10 m	S	PACIFIC HIGHWAY TO	D F	STR	Overcast	Wet	110	2	CAR	F25	S in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E63420961								RUM: 30	Rear end					CAR	M29	S in NEWCASTLE EXP	Unk	Proceeding in lane							
1065798	S	18/04/2015	Sat	20:30	100 m	S	PACIFIC HIGHWAY TO	D F	STR	Fine	Dry	110	1	CAR	M45	S in NEWCASTLE EXP	Unk	Proceeding in lane	MC	0	0	1	0	0	
E57460736								RUM: 73	Off rd rght => obj					S/Barrier - Concr/Jersey											
1018235	P	20/03/2014	Thu	06:15	200 m	S	PACIFIC HIGHWAY TO	D F	STR	Fine	Dry	110	4	TRK	M44	S in NEWCASTLE EXP	90	Proceeding in lane	OC	0	0	0	2	0	
E54444238								RUM: 30	Rear end					WAG	M28	S in NEWCASTLE EXP	0	Stationary							
														OMV	U U	S in NEWCASTLE EXP	0	Stationary							
														CAR	U U	S in NEWCASTLE EXP	Unk	Proceeding in lane							
1146272	S	24/08/2017	Thu	05:50	250 m	S	PACIFIC HIGHWAY TO	D F	CRV	Fine	Dry	110	3	CAR	M48	S in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0	
E65195703								RUM: 30	Rear end					CAR	M52	S in NEWCASTLE EXP	0	Stationary							
														CAR	M28	S in NEWCASTLE EXP	0	Stationary							
1129979	S	15/02/2017	Wed	05:30	300 m	S	PACIFIC HIGHWAY TO	D F	STR	Fine	Dry	110	2	TRK	U U	S in NEWCASTLE EXP	Unk	Proceeding in lane	OC	0	0	0	1	0	
E64032966								RUM: 30	Rear end					CAR	M47	S in NEWCASTLE EXP	0	Stationary							
1023452	P	21/04/2014	Mon	11:30	390 m	S	PACIFIC HIGHWAY TO	D F	STR	Fine	Dry	110	4	CAR	M39	S in NEWCASTLE EXP	80	Proceeding in lane	NC	0	0	0	0	0	
E55387165								RUM: 30	Rear end					TRK	M29	S in NEWCASTLE EXP	Unk	Proceeding in lane							
														CAR	M30	S in NEWCASTLE EXP	100	Proceeding in lane							
														CAR	M60	S in NEWCASTLE EXP	0	Stationary							
1028571	P	07/06/2014	Sat	13:00	100 m	N	PEATS FERRY ROAD OP	D F	STR	Fine	Dry	110	2	CAR	F27	N in NEWCASTLE EXP	90	Proceeding in lane	MC	0	0	1	0	0	
E54711232								RUM: 30	Rear end					CAR	M28	N in NEWCASTLE EXP	Unk	Proceeding in lane							
1028797	P	07/06/2014	Sat	13:00	500 m	N	PEATS FERRY ROAD OP	D F	CRV	Fine	Dry	60	2	SEM	M36	N in NEWCASTLE EXP	100	Proceeding in lane	NC	0	0	0	0	0	S
E55298358								RUM: 33	Lane sideswipe					CAR	F47	N in NEWCASTLE EXP	80	Proceeding in lane							
1052480	P	01/01/2015	Thu	11:38	300 m	S	PRINCES HIGHWAY TO	D F	STR	Fine	Dry	110	3	CAR	M85	S in NEWCASTLE EXP	110	Proceeding in lane	MC	0	0	1	0	0	
E56852148								RUM: 30	Rear end					CAR	F21	S in NEWCASTLE EXP	Unk	Proceeding in lane							
														CAR	M26	S in NEWCASTLE EXP	0	Stationary							
1017089	P	17/02/2014	Mon	06:25	50 m	N	REST AREA TO	D F	CRV	Raining	Wet	110	2	TRK	M44	S in NEWCASTLE EXP	70	Proceeding in lane	NC	0	0	0	0	0	S
E54813108								RUM: 30	Rear end					CAR	F69	S in NEWCASTLE EXP	0	Stationary							

Report Totals: Crashes: 73 Fatal Crashes(FC): 0 Serious Injury Crashes(SC): 6 Moderate Injury Crashes(MC): 17 Minor/Other Injury Crashes(OC): 14 Uncategorised Injury Crashes(UC): 0 Non-Casualty Crashes(NC): 36

Detailed Crash Report

Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors	S	F

Killed(K): 0 Seriously Injured(S): 9 Moderately Injured(M): 20 Minor/Other Injured(O): 28 Uncategorised Injured(U): 0

Crashid dataset 8317 - Pacific Motorway (including off/on ramps), between Kangaroo Point and the southbound safety ramp, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

Note: *Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.*

Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data. Reporting yrs 1996-2004 and 2018 onwards contain uncategorised inj crashes.

Summary Crash Report

# Crash Type		
Car Crash	65	89.0%
Light Truck Crash	31	42.5%
Rigid Truck Crash	4	5.5%
Articulated Truck Crash	6	8.2%
'Heavy Truck Crash	*(10)*	*(13.7%)*
Bus Crash	0	0.0%
"Heavy Vehicle Crash	*(10)*	*(13.7%)*
Emergency Vehicle Crash	1	1.4%
Motorcycle Crash	0	0.0%
Pedal Cycle Crash	0	0.0%
Pedestrian Crash	1	1.4%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	0	0.0%
Non intersection	73	100.0%

* Up to 10 metres from an intersection

Collision Type		
Single Vehicle	10	13.7%
Multi Vehicle	63	86.3%

Road Classification		
Freeway/Motorway	73	100.0%
State Highway	0	0.0%
Other Classified Road	0	0.0%
Unclassified Road	0	0.0%

Contributing Factors		
Speeding	11	15.1%
Fatigue	4	5.5%

Weather		
Fine	57	78.1%
Rain	10	13.7%
Overcast	6	8.2%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition		
Wet	15	20.5%
Dry	58	79.5%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	12	16.4%
Daylight	44	60.3%
Dusk	4	5.5%
Darkness	13	17.8%

Crash Movement		
Intersection, adjacent approaches	0	0.0%
Head-on (not overtaking)	1	1.4%
Opposing vehicles; turning	0	0.0%
U-turn	0	0.0%
Rear-end	50	68.5%
Lane change	5	6.8%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	0	0.0%
Overtaking; same direction	0	0.0%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	0	0.0%
Permanent obstruction on road	0	0.0%
Hit animal	0	0.0%
Off road, on straight	0	0.0%
Off road on straight, hit object	3	4.1%
Out of control on straight	0	0.0%
Off road, on curve	0	0.0%
Off road on curve, hit object	8	11.0%
Out of control on curve	1	1.4%
Other crash type	5	6.8%

Speed Limit					
40 km/h or less	0	0.0%	80 km/h zone	0	0.0%
50 km/h zone	0	0.0%	90 km/h zone	5	6.8%
60 km/h zone	1	1.4%	100 km/h zone	2	2.7%
70 km/h zone	0	0.0%	110 km/h zone	65	89.0%

~ 07:30-09:30 or 14:30-17:00 on school days	~ 40km/h or less	0	0.0%	~ School Travel Time Involvement	2	2.7%

Day of the Week												
Monday	13	17.8%	Wednesday	8	11.0%	Friday	13	17.8%	Sunday	5	6.8%	WEEKEND	19	26.0%
Tuesday	7	9.6%	Thursday	13	17.8%	Saturday	14	19.2%	WEEKDAY	54	74.0%			

CRASHES	73	
Fatal	0	0.0%
Serious inj.	6	8.2%
Moderate inj.	17	23.3%
Minor/Other inj.	14	19.2%
Uncategorised inj.	0	0.0%
Non-casualty	36	49.3%

CASUALTIES	57	
Killed	0	0.0%
Seriously inj.	9	15.8%
Moderately inj.	20	35.1%
Minor/Other inj.	28	49.1%
Uncategorised inj.	0	0.0%
^ Unrestrained	1	1.8%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

Self Reported Crash	21	28.77%

Time Group		% of Day	
00:01 - 02:59	0	0.0%	12.5%
03:00 - 04:59	1	1.4%	8.3%
05:00 - 05:59	2	2.7%	4.2%
06:00 - 06:59	16	21.9%	4.2%
07:00 - 07:59	1	1.4%	4.2%
08:00 - 08:59	0	0.0%	4.2%
09:00 - 09:59	0	0.0%	4.2%
10:00 - 10:59	10	13.7%	4.2%
11:00 - 11:59	6	8.2%	4.2%
12:00 - 12:59	1	1.4%	4.2%
13:00 - 13:59	8	11.0%	4.2%
14:00 - 14:59	2	2.7%	4.2%
15:00 - 15:59	2	2.7%	4.2%
16:00 - 16:59	5	6.8%	4.2%
17:00 - 17:59	7	9.6%	4.2%
18:00 - 18:59	8	11.0%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	4	5.5%	8.3%
22:00 - 24:00	0	0.0%	8.3%

Street Lighting Off/Nil		% of Dark
4	of 13	in Dark 30.8%

Crashes		Casualties
7	2017	5
10	2016	8
17	2015	11
23	2014	22
16	2013	11

McLean Periods		% Week	
A	20	27.4%	17.9%
B	0	0.0%	7.1%
C	15	20.5%	17.9%
D	10	13.7%	3.5%
E	2	2.7%	3.6%
F	8	11.0%	10.7%
G	10	13.7%	7.1%
H	6	8.2%	7.1%
I	0	0.0%	12.5%
J	2	2.7%	10.7%

#Holiday Periods																				
New Year	2	2.7%	Easter	4	5.5%	Queen's BD	4	5.5%	Christmas	2	2.7%	Easter SH	7	9.6%	Sept./Oct. SH	4	5.5%			
Aust. Day	1	1.4%	Anzac Day	3	4.1%	Labour Day	1	1.4%	January SH	3	4.1%	June/July SH	4	5.5%	December SH	2	2.7%			

Crashid dataset 8317 - Pacific Motorway (including off/on ramps), between Kangaroo Point and the southbound safety ramp, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

Note: *Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.*
Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data.
Reporting yrs 1996-2004 and 2018 onwards contain uncategorised inj crashes.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Detailed Crash Report

NOTES: 8317 - Pacific Motorway (including off/on ramps), between Kangaroo Point and the southbound safety ramp, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors	S	F
Hunter Region																										
Central Coast LGA																										
Mooney Mooney																										
Newcastle Exp																										
1158729	S	07/12/2017	Thu	17:30	at	PEATS FERRY RD	RDB	STR	Fine	Dry	60	3	4WD	M U	N in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0			
E66646921							RUM	30	Rear end				CAR	F64	N in NEWCASTLE EXP	0	Stationary									
													TRK	M34	W in PEATS FERRY RD	Unk	Turning right									
1133762	S	14/04/2017	Fri	14:40	80 m	S PEATS FERRY RD	OTH	STR	Fine	Dry	60	3	CAR	M U	N in NEWCASTLE EXP	Unk	Proceeding in lane	NC	0	0	0	0	0			
E322558393							RUM	30	Rear end				TRK	M39	N in NEWCASTLE EXP	0	Stationary									
													CAR	M U	N in NEWCASTLE EXP	0	Stationary									

Report Totals: Crashes: 2 Fatal Crashes(FC): 0 Serious Injury Crashes(SC): 0 Moderate Injury Crashes(MC): 0 Minor/Other Injury Crashes(OC): 0 Uncategorised Injury Crashes(UC): 0 Non-Casualty Crashes(NC): 2

Killed(K): 0 Seriously Injured(S): 0 Moderately Injured(M): 0 Minor/Other Injured(O): 0 Uncategorised Injured(U): 0

Crashid dataset 8317 - Northbound Pacific Motorway off/on ramp, up to intersection with Pacific Highway, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

Note: *Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.*

Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data.

Reporting yrs 1996-2004 and 2018 onwards contain uncategorised inj crashes.

Summary Crash Report

# Crash Type		
Car Crash	2	100.0%
Light Truck Crash	2	100.0%
Rigid Truck Crash	0	0.0%
Articulated Truck Crash	0	0.0%
'Heavy Truck Crash	*(0)*	*(0.0%)*
Bus Crash	0	0.0%
"Heavy Vehicle Crash	*(0)*	*(0.0%)*
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	0	0.0%
Pedal Cycle Crash	0	0.0%
Pedestrian Crash	0	0.0%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	1	50.0%
Non intersection	1	50.0%

* Up to 10 metres from an intersection

Collision Type		
Single Vehicle	0	0.0%
Multi Vehicle	2	100.0%

Road Classification		
Freeway/Motorway	2	100.0%
State Highway	0	0.0%
Other Classified Road	0	0.0%
Unclassified Road	0	0.0%

Contributing Factors		
Speeding	0	0.0%
Fatigue	0	0.0%

Weather		
Fine	2	100.0%
Rain	0	0.0%
Overcast	0	0.0%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition		
Wet	0	0.0%
Dry	2	100.0%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	0	0.0%
Daylight	1	50.0%
Dusk	1	50.0%
Darkness	0	0.0%

Crash Movement		
Intersection, adjacent approaches	0	0.0%
Head-on (not overtaking)	0	0.0%
Opposing vehicles; turning	0	0.0%
U-turn	0	0.0%
Rear-end	2	100.0%
Lane change	0	0.0%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	0	0.0%
Overtaking; same direction	0	0.0%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	0	0.0%
Permanent obstruction on road	0	0.0%
Hit animal	0	0.0%
Off road, on straight	0	0.0%
Off road on straight, hit object	0	0.0%
Out of control on straight	0	0.0%
Off road, on curve	0	0.0%
Off road on curve, hit object	0	0.0%
Out of control on curve	0	0.0%
Other crash type	0	0.0%

Speed Limit					
40 km/h or less	0	0.0%	80 km/h zone	0	0.0%
50 km/h zone	0	0.0%	90 km/h zone	0	0.0%
60 km/h zone	2	100.0%	100 km/h zone	0	0.0%
70 km/h zone	0	0.0%	110 km/h zone	0	0.0%

~ 07:30-09:30 or 14:30-17:00 on school days	~ 40km/h or less	0	0.0%	~ School Travel Time Involvement	0	0.0%

Day of the Week												
Monday	0	0.0%	Wednesday	0	0.0%	Friday	1	50.0%	Sunday	0	0.0%	WEEKEND	0	0.0%
Tuesday	0	0.0%	Thursday	1	50.0%	Saturday	0	0.0%	WEEKDAY	2	**********			

CRASHES	2	
Fatal	0	0.0%
Serious inj.	0	0.0%
Moderate inj.	0	0.0%
Minor/Other inj.	0	0.0%
Uncategorised inj.	0	0.0%
Non-casualty	2	100.0%

Self Reported Crash	2	100%

Time Group		% of Day	
00:01 - 02:59	0	0.0%	12.5%
03:00 - 04:59	0	0.0%	8.3%
05:00 - 05:59	0	0.0%	4.2%
06:00 - 06:59	0	0.0%	4.2%
07:00 - 07:59	0	0.0%	4.2%
08:00 - 08:59	0	0.0%	4.2%
09:00 - 09:59	0	0.0%	4.2%
10:00 - 10:59	0	0.0%	4.2%
11:00 - 11:59	0	0.0%	4.2%
12:00 - 12:59	0	0.0%	4.2%
13:00 - 13:59	0	0.0%	4.2%
14:00 - 14:59	1	50.0%	4.2%
15:00 - 15:59	0	0.0%	4.2%
16:00 - 16:59	0	0.0%	4.2%
17:00 - 17:59	1	50.0%	4.2%
18:00 - 18:59	0	0.0%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	0	0.0%	8.3%
22:00 - 24:00	0	0.0%	8.3%

Street Lighting Off/Nil		% of Dark
0	of 0	in Dark 0.0%

CASUALTIES	0	
Killed	0	0.0%
Seriously inj.	0	0.0%
Moderately inj.	0	0.0%
Minor/Other inj.	0	0.0%
Uncategorised inj.	0	0.0%
^ Unrestrained	0	0.0%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

Crashes	Casualties
2	0
2017	

McLean Periods		% Week	
A	0	0.0%	17.9%
B	0	0.0%	7.1%
C	1	50.0%	17.9%
D	0	0.0%	3.5%
E	0	0.0%	3.6%
F	0	0.0%	10.7%
G	1	50.0%	7.1%
H	0	0.0%	7.1%
I	0	0.0%	12.5%
J	0	0.0%	10.7%

#Holiday Periods												
New Year	0	0.0%	Easter	1	50.0%	Queen's BD	0	0.0%	Christmas	0	0.0%	Easter SH	1	50.0%	Sept./Oct. SH	0	0.0%
Aust. Day	0	0.0%	Anzac Day	0	0.0%	Labour Day	0	0.0%	January SH	0	0.0%	June/July SH	0	0.0%	December SH	0	0.0%

Crashid dataset 8317 - Northbound Pacific Motorway off/on ramp, up to intersection with Pacific Highway, Mooney Mooney Crash Data - 1 Jan 2013 to 31 Dec 2017

Note: *Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.*
Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data.
Reporting yrs 1996-2004 and 2018 onwards contain uncategorised inj crashes.
Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

F. Trip Assignment

Total Trips (In + Out)

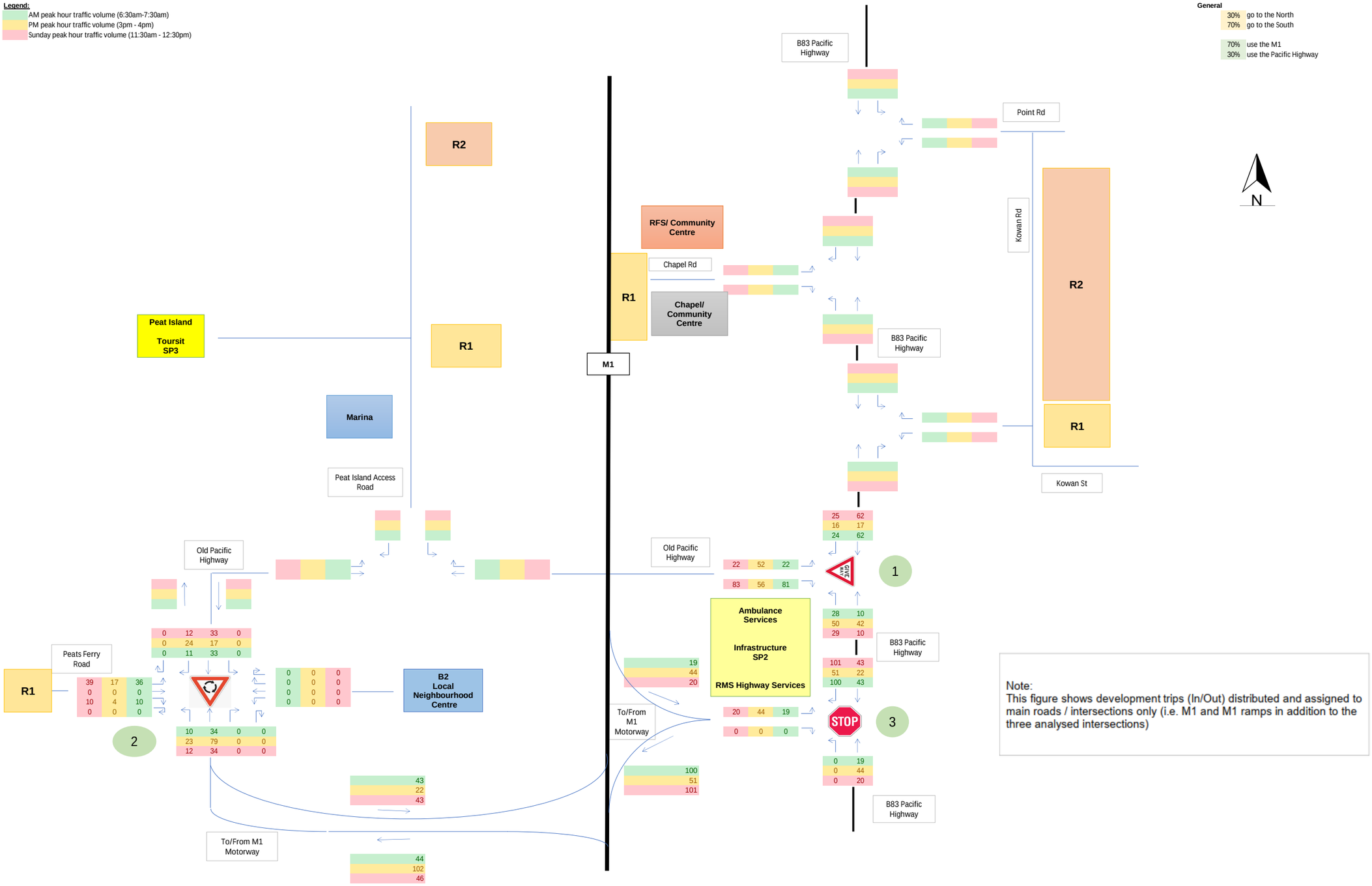
Legend:

- AM peak hour traffic volume (6:30am-7:30am)
- PM peak hour traffic volume (3pm - 4pm)
- Sunday peak hour traffic volume (11:30am - 12:30pm)

Assumptions:

General

- 30% go to the North
- 70% go to the South
- 70% use the M1
- 30% use the Pacific Highway



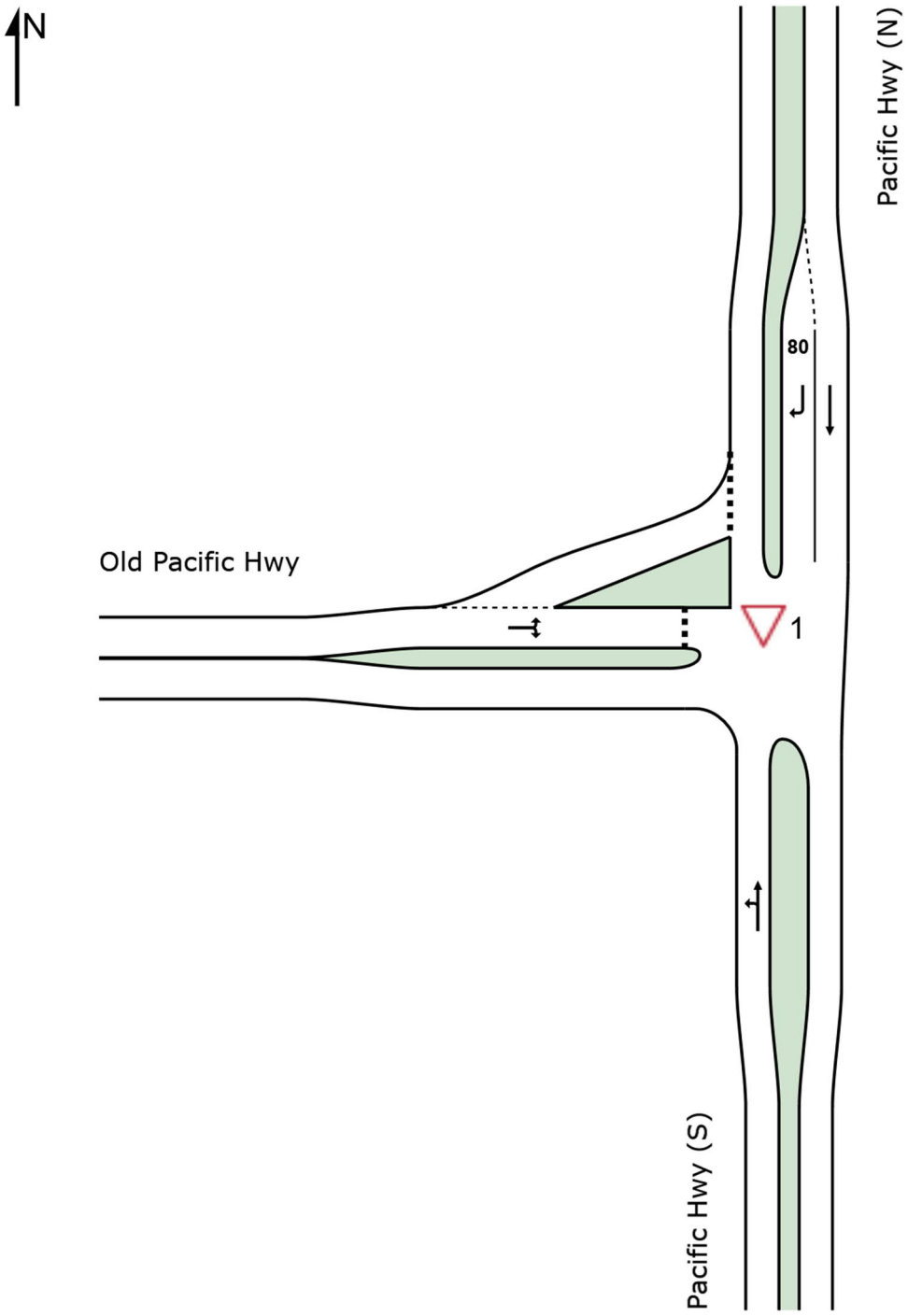
Note:
This figure shows development trips (In/Out) distributed and assigned to main roads / intersections only (i.e. M1 and M1 ramps in addition to the three analysed intersections)

G. SIDRA Analysis

SITE LAYOUT

Site: 1 Pacific Hwy / Old Pacific Hwy

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 1 [AM (Weekday) Pacific Hwy / Old Pacific Hwy - 2018]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	34	10.0	0.029	5.7	LOS A	0.0	0.0	0.00	0.38	0.00	53.6
2	T1	18	10.0	0.029	0.0	LOS A	0.0	0.0	0.00	0.38	0.00	56.6
Approach		52	10.0	0.029	3.7	NA	0.0	0.0	0.00	0.38	0.00	54.7
North: Pacific Hwy (N)												
8	T1	62	5.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	6	16.0	0.004	5.8	LOS A	0.0	0.1	0.14	0.54	0.14	50.5
Approach		68	6.0	0.033	0.5	NA	0.0	0.1	0.01	0.05	0.01	59.2
West: Old Pacific Hwy												
10	L2	13	16.0	0.051	5.8	LOS A	0.2	1.6	0.13	0.56	0.13	51.9
12	R2	42	15.0	0.051	6.3	LOS A	0.2	1.6	0.13	0.56	0.13	50.6
Approach		55	15.2	0.051	6.2	LOS A	0.2	1.6	0.13	0.56	0.13	50.9
All Vehicles		175	10.1	0.051	3.2	NA	0.2	1.6	0.04	0.31	0.04	55.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PM (Weekday) Pacific Hwy / Old Pacific Hwy - 2018]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	53	6.0	0.053	5.6	LOS A	0.0	0.0	0.00	0.32	0.00	54.4
2	T1	44	7.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.32	0.00	57.1
Approach		97	6.5	0.053	3.1	NA	0.0	0.0	0.00	0.32	0.00	55.8
North: Pacific Hwy (N)												
8	T1	55	10.0	0.030	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	25	4.0	0.016	5.8	LOS A	0.1	0.5	0.20	0.55	0.20	50.9
Approach		80	8.1	0.030	1.8	NA	0.1	0.5	0.06	0.17	0.06	57.2
West: Old Pacific Hwy												
10	L2	27	4.0	0.067	5.8	LOS A	0.3	1.9	0.17	0.56	0.17	52.2
12	R2	49	2.0	0.067	6.4	LOS A	0.3	1.9	0.17	0.56	0.17	51.1
Approach		77	2.7	0.067	6.1	LOS A	0.3	1.9	0.17	0.56	0.17	51.5
All Vehicles		254	5.8	0.067	3.6	NA	0.3	1.9	0.07	0.35	0.07	55.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Peak Hour (Sunday) Pacific Hwy / Old Pacific Hwy - 2018]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	73	2.0	0.117	5.6	LOS A	0.0	0.0	0.00	0.19	0.00	55.8
2	T1	148	2.0	0.117	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.2
Approach		221	2.0	0.117	1.8	NA	0.0	0.0	0.00	0.19	0.00	57.5
North: Pacific Hwy (N)												
8	T1	127	2.0	0.066	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	18	2.0	0.012	6.2	LOS A	0.1	0.4	0.32	0.55	0.32	50.6
Approach		145	2.0	0.066	0.8	NA	0.1	0.4	0.04	0.07	0.04	58.9
West: Old Pacific Hwy												
10	L2	43	2.0	0.216	6.2	LOS A	0.9	6.6	0.41	0.66	0.41	51.2
12	R2	149	2.0	0.216	7.9	LOS A	0.9	6.6	0.41	0.66	0.41	50.0
Approach		193	2.0	0.216	7.5	LOS A	0.9	6.6	0.41	0.66	0.41	50.2
All Vehicles		559	2.0	0.216	3.5	NA	0.9	6.6	0.15	0.32	0.15	55.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [AM (Weekday) Pacific Hwy / Old Pacific Hwy - 2030 without Dev.]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	38	10.0	0.033	5.7	LOS A	0.0	0.0	0.00	0.38	0.00	53.6
2	T1	20	10.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.38	0.00	56.6
Approach		58	10.0	0.033	3.7	NA	0.0	0.0	0.00	0.38	0.00	54.7
North: Pacific Hwy (N)												
8	T1	71	5.0	0.037	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	7	16.0	0.005	5.8	LOS A	0.0	0.2	0.15	0.54	0.15	50.5
Approach		78	6.0	0.037	0.6	NA	0.0	0.2	0.01	0.05	0.01	59.1
West: Old Pacific Hwy												
10	L2	15	16.0	0.059	5.8	LOS A	0.2	1.8	0.13	0.56	0.13	51.8
12	R2	47	15.0	0.059	6.4	LOS A	0.2	1.8	0.13	0.56	0.13	50.5
Approach		62	15.2	0.059	6.3	LOS A	0.2	1.8	0.13	0.56	0.13	50.8
All Vehicles		198	10.1	0.059	3.3	NA	0.2	1.8	0.05	0.31	0.05	55.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PM (Weekday) Pacific Hwy / Old Pacific Hwy - 2030 without Dev.]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	60	6.0	0.061	5.6	LOS A	0.0	0.0	0.00	0.32	0.00	54.4
2	T1	51	7.0	0.061	0.0	LOS A	0.0	0.0	0.00	0.32	0.00	57.1
Approach		111	6.5	0.061	3.1	NA	0.0	0.0	0.00	0.32	0.00	55.8
North: Pacific Hwy (N)												
8	T1	62	10.0	0.034	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	28	4.0	0.018	5.8	LOS A	0.1	0.6	0.22	0.55	0.22	50.9
Approach		91	8.1	0.034	1.8	NA	0.1	0.6	0.07	0.17	0.07	57.2
West: Old Pacific Hwy												
10	L2	31	4.0	0.077	5.8	LOS A	0.3	2.2	0.19	0.56	0.19	52.2
12	R2	56	2.0	0.077	6.5	LOS A	0.3	2.2	0.19	0.56	0.19	51.0
Approach		86	2.7	0.077	6.3	LOS A	0.3	2.2	0.19	0.56	0.19	51.4
All Vehicles		287	5.9	0.077	3.6	NA	0.3	2.2	0.08	0.35	0.08	55.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Peak Hour (Sunday) Pacific Hwy / Old Pacific Hwy - 2030 without Dev.]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	82	2.0	0.132	5.6	LOS A	0.0	0.0	0.00	0.19	0.00	55.8
2	T1	168	2.0	0.132	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.2
Approach		251	2.0	0.132	1.8	NA	0.0	0.0	0.00	0.19	0.00	57.5
North: Pacific Hwy (N)												
8	T1	144	2.0	0.076	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	20	2.0	0.014	6.3	LOS A	0.1	0.4	0.34	0.56	0.34	50.6
Approach		164	2.0	0.076	0.8	NA	0.1	0.4	0.04	0.07	0.04	58.9
West: Old Pacific Hwy												
10	L2	48	2.0	0.257	6.3	LOS A	1.1	8.0	0.45	0.69	0.45	50.8
12	R2	169	2.0	0.257	8.4	LOS A	1.1	8.0	0.45	0.69	0.45	49.6
Approach		218	2.0	0.257	7.9	LOS A	1.1	8.0	0.45	0.69	0.45	49.9
All Vehicles		633	2.0	0.257	3.7	NA	1.1	8.0	0.17	0.33	0.17	55.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [AM (Weekday) Pacific Hwy / Old Pacific Hwy - 2030 with Dev.]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	67	10.0	0.056	5.7	LOS A	0.0	0.0	0.00	0.40	0.00	53.4
2	T1	31	10.0	0.056	0.0	LOS A	0.0	0.0	0.00	0.40	0.00	56.5
Approach		98	10.0	0.056	3.9	NA	0.0	0.0	0.00	0.40	0.00	54.4
North: Pacific Hwy (N)												
8	T1	135	5.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	33	16.0	0.022	6.0	LOS A	0.1	0.8	0.21	0.55	0.21	50.3
Approach		167	7.1	0.072	1.2	NA	0.1	0.8	0.04	0.11	0.04	58.2
West: Old Pacific Hwy												
10	L2	38	16.0	0.186	5.9	LOS A	0.8	6.3	0.21	0.59	0.21	51.0
12	R2	134	15.0	0.186	7.5	LOS A	0.8	6.3	0.21	0.59	0.21	49.8
Approach		172	15.2	0.186	7.1	LOS A	0.8	6.3	0.21	0.59	0.21	50.0
All Vehicles		437	11.0	0.186	4.1	NA	0.8	6.3	0.10	0.36	0.10	54.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PM (Weekday) Pacific Hwy / Old Pacific Hwy - 2030 with Dev.]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	96	6.0	0.108	5.6	LOS A	0.0	0.0	0.00	0.29	0.00	54.7
2	T1	101	7.0	0.108	0.0	LOS A	0.0	0.0	0.00	0.29	0.00	57.4
Approach		197	6.5	0.108	2.7	NA	0.0	0.0	0.00	0.29	0.00	56.2
North: Pacific Hwy (N)												
8	T1	45	10.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	80	4.0	0.055	6.2	LOS A	0.2	1.8	0.31	0.57	0.31	50.6
Approach		125	6.2	0.055	3.9	NA	0.2	1.8	0.20	0.37	0.20	54.1
West: Old Pacific Hwy												
10	L2	85	4.0	0.192	6.0	LOS A	0.8	6.0	0.30	0.59	0.30	51.7
12	R2	115	2.0	0.192	7.4	LOS A	0.8	6.0	0.30	0.59	0.30	50.5
Approach		200	2.9	0.192	6.8	LOS A	0.8	6.0	0.30	0.59	0.30	51.0
All Vehicles		522	5.0	0.192	4.6	NA	0.8	6.0	0.16	0.42	0.16	53.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Peak Hour (Sunday) Pacific Hwy / Old Pacific Hwy - 2030 with Dev.]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

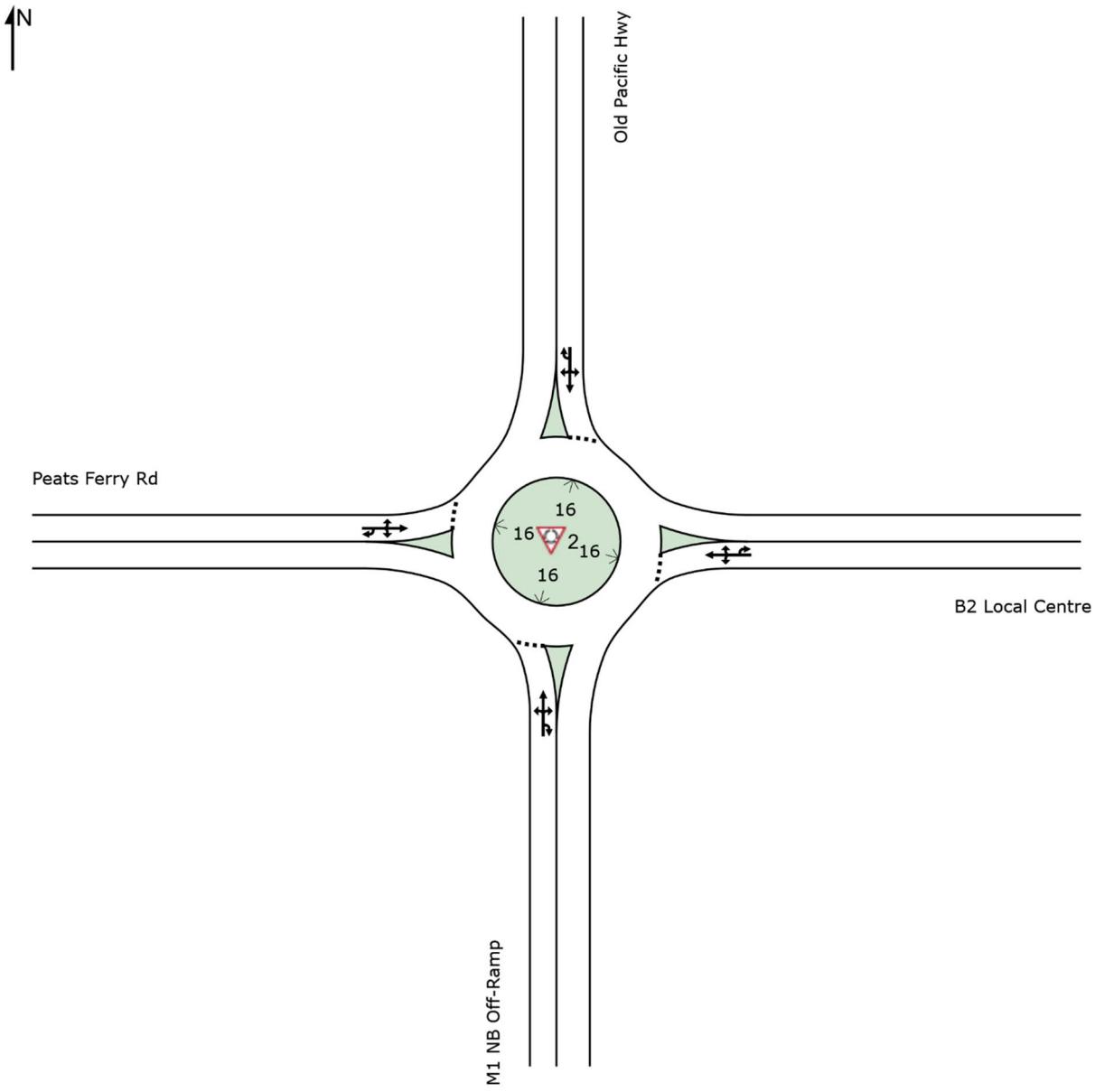
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	113	2.0	0.154	5.6	LOS A	0.0	0.0	0.00	0.23	0.00	55.5
2	T1	179	2.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	57.9
Approach		292	2.0	0.154	2.2	NA	0.0	0.0	0.00	0.23	0.00	57.1
North: Pacific Hwy (N)												
8	T1	209	2.0	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	46	2.0	0.034	6.5	LOS A	0.1	1.1	0.38	0.59	0.38	50.5
Approach		256	2.0	0.110	1.2	NA	0.1	1.1	0.07	0.11	0.07	58.3
West: Old Pacific Hwy												
10	L2	73	2.0	0.444	7.5	LOS A	2.8	20.0	0.55	0.84	0.75	48.7
12	R2	257	2.0	0.444	11.3	LOS A	2.8	20.0	0.55	0.84	0.75	47.6
Approach		329	2.0	0.444	10.4	LOS A	2.8	20.0	0.55	0.84	0.75	47.8
All Vehicles		877	2.0	0.444	5.0	NA	2.8	20.0	0.23	0.42	0.30	53.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 2 Peats Ferry Rd / Pacific Hwy

New Site
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 2 [AM (Weekday) Peats Ferry Rd / Pacific Hwy - 2018]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: M1 NB Off-Ramp												
1	L2	24	10.0	0.053	4.3	LOS A	0.2	1.9	0.09	0.45	0.09	53.7
2	T1	45	10.0	0.053	4.5	LOS A	0.2	1.9	0.09	0.45	0.09	54.5
3	R2	1	10.0	0.053	8.6	LOS A	0.2	1.9	0.09	0.45	0.09	40.2
3u	U	1	10.0	0.053	10.6	LOS A	0.2	1.9	0.09	0.45	0.09	56.0
Approach		72	10.0	0.053	4.6	LOS A	0.2	1.9	0.09	0.45	0.09	54.0
East: B2 Local Centre												
4	L2	4	10.0	0.006	2.1	LOS A	0.0	0.2	0.15	0.50	0.15	51.5
5	T1	1	10.0	0.006	2.6	LOS A	0.0	0.2	0.15	0.50	0.15	52.5
6	R2	1	10.0	0.006	6.2	LOS A	0.0	0.2	0.15	0.50	0.15	47.5
6u	U	1	10.0	0.006	8.2	LOS A	0.0	0.2	0.15	0.50	0.15	12.9
Approach		7	10.0	0.006	3.6	LOS A	0.0	0.2	0.15	0.50	0.15	47.3
North: Old Pacific Hwy												
7	L2	3	10.0	0.022	4.3	LOS A	0.1	0.8	0.09	0.55	0.09	30.6
8	T1	11	10.0	0.022	4.5	LOS A	0.1	0.8	0.09	0.55	0.09	52.7
9	R2	13	10.0	0.022	8.6	LOS A	0.1	0.8	0.09	0.55	0.09	51.4
9u	U	1	10.0	0.022	10.6	LOS A	0.1	0.8	0.09	0.55	0.09	50.0
Approach		27	10.0	0.022	6.6	LOS A	0.1	0.8	0.09	0.55	0.09	49.9
West: Peats Ferry Rd												
10	L2	6	10.0	0.015	4.4	LOS A	0.1	0.5	0.16	0.57	0.16	49.6
11	T1	1	10.0	0.015	4.6	LOS A	0.1	0.5	0.16	0.57	0.16	35.4
12	R2	12	10.0	0.015	8.8	LOS A	0.1	0.5	0.16	0.57	0.16	52.4
12u	U	1	10.0	0.015	10.7	LOS A	0.1	0.5	0.16	0.57	0.16	52.5
Approach		20	10.0	0.015	7.3	LOS A	0.1	0.5	0.16	0.57	0.16	50.9
All Vehicles		126	10.0	0.053	5.4	LOS A	0.2	1.9	0.11	0.49	0.11	52.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [PM (Weekday) Peats Ferry Rd / Pacific Hwy - 2018]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: M1 NB Off-Ramp												
1	L2	35	4.0	0.075	4.2	LOS A	0.4	2.7	0.09	0.49	0.09	53.4
2	T1	58	4.0	0.075	4.4	LOS A	0.4	2.7	0.09	0.49	0.09	54.1
3	R2	1	4.0	0.075	8.6	LOS A	0.4	2.7	0.09	0.49	0.09	39.8
3u	U	14	4.0	0.075	10.5	LOS A	0.4	2.7	0.09	0.49	0.09	55.8
Approach		107	4.0	0.075	5.2	LOS A	0.4	2.7	0.09	0.49	0.09	54.0
East: B2 Local Centre												
4	L2	1	4.0	0.004	2.6	LOS A	0.0	0.1	0.29	0.54	0.29	50.0
5	T1	1	4.0	0.004	3.1	LOS A	0.0	0.1	0.29	0.54	0.29	50.4
6	R2	1	4.0	0.004	6.7	LOS A	0.0	0.1	0.29	0.54	0.29	46.9
6u	U	1	4.0	0.004	8.6	LOS A	0.0	0.1	0.29	0.54	0.29	13.2
Approach		4	4.0	0.004	5.3	LOS A	0.0	0.1	0.29	0.54	0.29	42.0
North: Old Pacific Hwy												
7	L2	1	4.0	0.067	4.5	LOS A	0.3	2.3	0.20	0.47	0.20	31.1
8	T1	65	4.0	0.067	4.7	LOS A	0.3	2.3	0.20	0.47	0.20	53.6
9	R2	11	4.0	0.067	8.8	LOS A	0.3	2.3	0.20	0.47	0.20	52.5
9u	U	2	4.0	0.067	10.8	LOS A	0.3	2.3	0.20	0.47	0.20	52.0
Approach		79	4.0	0.067	5.4	LOS A	0.3	2.3	0.20	0.47	0.20	53.2
West: Peats Ferry Rd												
10	L2	12	4.0	0.043	4.4	LOS A	0.2	1.5	0.20	0.59	0.20	49.1
11	T1	1	4.0	0.043	4.7	LOS A	0.2	1.5	0.20	0.59	0.20	35.0
12	R2	45	4.0	0.043	8.8	LOS A	0.2	1.5	0.20	0.59	0.20	52.1
12u	U	1	4.0	0.043	10.7	LOS A	0.2	1.5	0.20	0.59	0.20	52.2
Approach		59	4.0	0.043	7.9	LOS A	0.2	1.5	0.20	0.59	0.20	51.3
All Vehicles		249	4.0	0.075	5.9	LOS A	0.4	2.7	0.15	0.51	0.15	52.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [Peak Hour (Sunday) Peats Ferry Rd / Pacific Hwy - 2018]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: M1 NB Off-Ramp												
1	L2	63	2.0	0.161	4.2	LOS A	0.9	6.2	0.12	0.44	0.12	53.8
2	T1	167	2.0	0.161	4.5	LOS A	0.9	6.2	0.12	0.44	0.12	54.6
3	R2	1	2.0	0.161	8.6	LOS A	0.9	6.2	0.12	0.44	0.12	40.1
3u	U	5	2.0	0.161	10.5	LOS A	0.9	6.2	0.12	0.44	0.12	56.2
Approach		237	2.0	0.161	4.5	LOS A	0.9	6.2	0.12	0.44	0.12	54.4
East: B2 Local Centre												
4	L2	2	2.0	0.005	2.7	LOS A	0.0	0.2	0.31	0.53	0.31	50.6
5	T1	1	2.0	0.005	3.2	LOS A	0.0	0.2	0.31	0.53	0.31	51.1
6	R2	1	2.0	0.005	6.8	LOS A	0.0	0.2	0.31	0.53	0.31	48.2
6u	U	1	2.0	0.005	8.7	LOS A	0.0	0.2	0.31	0.53	0.31	13.0
Approach		5	2.0	0.005	4.8	LOS A	0.0	0.2	0.31	0.53	0.31	44.5
North: Old Pacific Hwy												
7	L2	2	2.0	0.077	4.5	LOS A	0.4	2.8	0.23	0.49	0.23	30.9
8	T1	67	2.0	0.077	4.7	LOS A	0.4	2.8	0.23	0.49	0.23	53.3
9	R2	20	2.0	0.077	8.9	LOS A	0.4	2.8	0.23	0.49	0.23	52.2
9u	U	1	2.0	0.077	10.8	LOS A	0.4	2.8	0.23	0.49	0.23	52.1
Approach		91	2.0	0.077	5.7	LOS A	0.4	2.8	0.23	0.49	0.23	52.7
West: Peats Ferry Rd												
10	L2	29	2.0	0.074	4.8	LOS A	0.4	2.6	0.32	0.60	0.32	49.2
11	T1	1	2.0	0.074	5.1	LOS A	0.4	2.6	0.32	0.60	0.32	34.9
12	R2	64	2.0	0.074	9.2	LOS A	0.4	2.6	0.32	0.60	0.32	52.1
12u	U	1	2.0	0.074	11.1	LOS A	0.4	2.6	0.32	0.60	0.32	52.2
Approach		96	2.0	0.074	7.8	LOS A	0.4	2.6	0.32	0.60	0.32	51.2
All Vehicles		428	2.0	0.161	5.5	LOS A	0.9	6.2	0.19	0.49	0.19	53.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [AM (Weekday) Peats Ferry Rd / Pacific Hwy - 2030 without Dev.]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: M1 NB Off-Ramp												
1	L2	27	10.0	0.060	4.3	LOS A	0.3	2.2	0.10	0.45	0.10	53.6
2	T1	52	10.0	0.060	4.5	LOS A	0.3	2.2	0.10	0.45	0.10	54.5
3	R2	1	10.0	0.060	8.7	LOS A	0.3	2.2	0.10	0.45	0.10	40.2
3u	U	1	10.0	0.060	10.6	LOS A	0.3	2.2	0.10	0.45	0.10	56.0
Approach		81	10.0	0.060	4.6	LOS A	0.3	2.2	0.10	0.45	0.10	54.0
East: B2 Local Centre												
4	L2	5	10.0	0.007	2.2	LOS A	0.0	0.3	0.18	0.49	0.18	51.6
5	T1	1	10.0	0.007	2.7	LOS A	0.0	0.3	0.18	0.49	0.18	52.6
6	R2	1	10.0	0.007	6.3	LOS A	0.0	0.3	0.18	0.49	0.18	47.6
6u	U	1	10.0	0.007	8.2	LOS A	0.0	0.3	0.18	0.49	0.18	12.8
Approach		8	10.0	0.007	3.6	LOS A	0.0	0.3	0.18	0.49	0.18	48.0
North: Old Pacific Hwy												
7	L2	3	10.0	0.034	4.3	LOS A	0.2	1.2	0.10	0.52	0.10	31.0
8	T1	24	10.0	0.034	4.5	LOS A	0.2	1.2	0.10	0.52	0.10	53.1
9	R2	15	10.0	0.034	8.7	LOS A	0.2	1.2	0.10	0.52	0.10	51.9
9u	U	1	10.0	0.034	10.6	LOS A	0.2	1.2	0.10	0.52	0.10	50.5
Approach		43	10.0	0.034	6.1	LOS A	0.2	1.2	0.10	0.52	0.10	51.4
West: Peats Ferry Rd												
10	L2	7	10.0	0.016	4.4	LOS A	0.1	0.6	0.17	0.57	0.17	49.6
11	T1	1	10.0	0.016	4.6	LOS A	0.1	0.6	0.17	0.57	0.17	35.4
12	R2	13	10.0	0.016	8.8	LOS A	0.1	0.6	0.17	0.57	0.17	52.4
12u	U	1	10.0	0.016	10.7	LOS A	0.1	0.6	0.17	0.57	0.17	52.5
Approach		22	10.0	0.016	7.2	LOS A	0.1	0.6	0.17	0.57	0.17	50.9
All Vehicles		155	10.0	0.060	5.3	LOS A	0.3	2.2	0.11	0.49	0.11	52.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [PM (Weekday) Peats Ferry Rd / Pacific Hwy - 2030 without Dev.]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: M1 NB Off-Ramp												
1	L2	39	4.0	0.084	4.2	LOS A	0.4	3.0	0.09	0.49	0.09	53.4
2	T1	65	4.0	0.084	4.4	LOS A	0.4	3.0	0.09	0.49	0.09	54.1
3	R2	1	4.0	0.084	8.6	LOS A	0.4	3.0	0.09	0.49	0.09	39.8
3u	U	16	4.0	0.084	10.5	LOS A	0.4	3.0	0.09	0.49	0.09	55.7
Approach		121	4.0	0.084	5.2	LOS A	0.4	3.0	0.09	0.49	0.09	54.0
East: B2 Local Centre												
4	L2	1	4.0	0.004	2.7	LOS A	0.0	0.1	0.31	0.55	0.31	49.9
5	T1	1	4.0	0.004	3.2	LOS A	0.0	0.1	0.31	0.55	0.31	50.3
6	R2	1	4.0	0.004	6.8	LOS A	0.0	0.1	0.31	0.55	0.31	46.7
6u	U	1	4.0	0.004	8.7	LOS A	0.0	0.1	0.31	0.55	0.31	13.2
Approach		4	4.0	0.004	5.4	LOS A	0.0	0.1	0.31	0.55	0.31	41.8
North: Old Pacific Hwy												
7	L2	1	4.0	0.075	4.5	LOS A	0.4	2.7	0.22	0.47	0.22	31.0
8	T1	74	4.0	0.075	4.8	LOS A	0.4	2.7	0.22	0.47	0.22	53.5
9	R2	12	4.0	0.075	8.9	LOS A	0.4	2.7	0.22	0.47	0.22	52.4
9u	U	2	4.0	0.075	10.8	LOS A	0.4	2.7	0.22	0.47	0.22	52.0
Approach		88	4.0	0.075	5.4	LOS A	0.4	2.7	0.22	0.47	0.22	53.1
West: Peats Ferry Rd												
10	L2	13	4.0	0.048	4.5	LOS A	0.2	1.7	0.21	0.59	0.21	49.1
11	T1	1	4.0	0.048	4.7	LOS A	0.2	1.7	0.21	0.59	0.21	34.9
12	R2	52	4.0	0.048	8.8	LOS A	0.2	1.7	0.21	0.59	0.21	52.0
12u	U	1	4.0	0.048	10.8	LOS A	0.2	1.7	0.21	0.59	0.21	52.1
Approach		66	4.0	0.048	8.0	LOS A	0.2	1.7	0.21	0.59	0.21	51.3
All Vehicles		280	4.0	0.084	5.9	LOS A	0.4	3.0	0.16	0.51	0.16	52.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [Peak Hour (Sunday) Peats Ferry Rd / Pacific Hwy - 2030 without Dev.]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: M1 NB Off-Ramp												
1	L2	72	2.0	0.183	4.2	LOS A	1.0	7.3	0.13	0.44	0.13	53.8
2	T1	189	2.0	0.183	4.5	LOS A	1.0	7.3	0.13	0.44	0.13	54.5
3	R2	1	2.0	0.183	8.6	LOS A	1.0	7.3	0.13	0.44	0.13	40.1
3u	U	6	2.0	0.183	10.5	LOS A	1.0	7.3	0.13	0.44	0.13	56.2
Approach		268	2.0	0.183	4.6	LOS A	1.0	7.3	0.13	0.44	0.13	54.3
East: B2 Local Centre												
4	L2	2	2.0	0.005	2.8	LOS A	0.0	0.2	0.34	0.53	0.34	50.5
5	T1	1	2.0	0.005	3.3	LOS A	0.0	0.2	0.34	0.53	0.34	51.0
6	R2	1	2.0	0.005	6.9	LOS A	0.0	0.2	0.34	0.53	0.34	48.0
6u	U	1	2.0	0.005	8.8	LOS A	0.0	0.2	0.34	0.53	0.34	12.9
Approach		5	2.0	0.005	4.9	LOS A	0.0	0.2	0.34	0.53	0.34	44.4
North: Old Pacific Hwy												
7	L2	2	2.0	0.088	4.6	LOS A	0.5	3.2	0.25	0.49	0.25	30.8
8	T1	77	2.0	0.088	4.8	LOS A	0.5	3.2	0.25	0.49	0.25	53.2
9	R2	23	2.0	0.088	8.9	LOS A	0.5	3.2	0.25	0.49	0.25	52.1
9u	U	1	2.0	0.088	10.8	LOS A	0.5	3.2	0.25	0.49	0.25	51.9
Approach		103	2.0	0.088	5.8	LOS A	0.5	3.2	0.25	0.49	0.25	52.6
West: Peats Ferry Rd												
10	L2	34	2.0	0.085	4.9	LOS A	0.4	3.0	0.35	0.61	0.35	49.1
11	T1	1	2.0	0.085	5.2	LOS A	0.4	3.0	0.35	0.61	0.35	34.8
12	R2	73	2.0	0.085	9.3	LOS A	0.4	3.0	0.35	0.61	0.35	52.1
12u	U	1	2.0	0.085	11.2	LOS A	0.4	3.0	0.35	0.61	0.35	52.2
Approach		108	2.0	0.085	7.9	LOS A	0.4	3.0	0.35	0.61	0.35	51.1
All Vehicles		485	2.0	0.183	5.6	LOS A	1.0	7.3	0.21	0.49	0.21	53.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [AM (Weekday) Peats Ferry Rd / Pacific Hwy - 2030 with Dev.]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: M1 NB Off-Ramp												
1	L2	38	10.0	0.095	4.3	LOS A	0.5	3.6	0.13	0.44	0.13	53.5
2	T1	87	10.0	0.095	4.6	LOS A	0.5	3.6	0.13	0.44	0.13	54.3
3	R2	1	10.0	0.095	8.7	LOS A	0.5	3.6	0.13	0.44	0.13	40.1
3u	U	1	10.0	0.095	10.6	LOS A	0.5	3.6	0.13	0.44	0.13	55.9
Approach		127	10.0	0.095	4.6	LOS A	0.5	3.6	0.13	0.44	0.13	54.0
East: B2 Local Centre												
4	L2	5	10.0	0.008	2.5	LOS A	0.0	0.3	0.27	0.50	0.27	51.3
5	T1	1	10.0	0.008	3.0	LOS A	0.0	0.3	0.27	0.50	0.27	52.2
6	R2	1	10.0	0.008	6.6	LOS A	0.0	0.3	0.27	0.50	0.27	47.2
6u	U	1	10.0	0.008	8.6	LOS A	0.0	0.3	0.27	0.50	0.27	12.6
Approach		8	10.0	0.008	3.9	LOS A	0.0	0.3	0.27	0.50	0.27	47.7
North: Old Pacific Hwy												
7	L2	3	10.0	0.070	4.3	LOS A	0.3	2.6	0.13	0.50	0.13	31.0
8	T1	59	10.0	0.070	4.6	LOS A	0.3	2.6	0.13	0.50	0.13	53.2
9	R2	25	10.0	0.070	8.7	LOS A	0.3	2.6	0.13	0.50	0.13	52.0
9u	U	1	10.0	0.070	10.6	LOS A	0.3	2.6	0.13	0.50	0.13	50.6
Approach		88	10.0	0.070	5.8	LOS A	0.3	2.6	0.13	0.50	0.13	52.3
West: Peats Ferry Rd												
10	L2	45	10.0	0.053	4.6	LOS A	0.3	2.0	0.23	0.54	0.23	50.5
11	T1	1	10.0	0.053	4.8	LOS A	0.3	2.0	0.23	0.54	0.23	35.9
12	R2	23	10.0	0.053	9.0	LOS A	0.3	2.0	0.23	0.54	0.23	53.2
12u	U	1	10.0	0.053	10.9	LOS A	0.3	2.0	0.23	0.54	0.23	53.5
Approach		71	10.0	0.053	6.1	LOS A	0.3	2.0	0.23	0.54	0.23	51.4
All Vehicles		295	10.0	0.095	5.3	LOS A	0.5	3.6	0.16	0.48	0.16	52.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [PM (Weekday) Peats Ferry Rd / Pacific Hwy - 2030 with Dev.]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: M1 NB Off-Ramp												
1	L2	63	4.0	0.166	4.3	LOS A	0.9	6.5	0.17	0.46	0.17	53.3
2	T1	149	4.0	0.166	4.6	LOS A	0.9	6.5	0.17	0.46	0.17	54.0
3	R2	1	4.0	0.166	8.7	LOS A	0.9	6.5	0.17	0.46	0.17	39.7
3u	U	16	4.0	0.166	10.6	LOS A	0.9	6.5	0.17	0.46	0.17	55.7
Approach		229	4.0	0.166	4.9	LOS A	0.9	6.5	0.17	0.46	0.17	53.9
East: B2 Local Centre												
4	L2	1	4.0	0.004	3.0	LOS A	0.0	0.1	0.36	0.55	0.36	49.6
5	T1	1	4.0	0.004	3.5	LOS A	0.0	0.1	0.36	0.55	0.36	49.9
6	R2	1	4.0	0.004	7.1	LOS A	0.0	0.1	0.36	0.55	0.36	46.4
6u	U	1	4.0	0.004	9.0	LOS A	0.0	0.1	0.36	0.55	0.36	13.1
Approach		4	4.0	0.004	5.6	LOS A	0.0	0.1	0.36	0.55	0.36	41.5
North: Old Pacific Hwy												
7	L2	1	4.0	0.111	4.5	LOS A	0.6	4.2	0.24	0.51	0.24	30.7
8	T1	93	4.0	0.111	4.8	LOS A	0.6	4.2	0.24	0.51	0.24	53.0
9	R2	37	4.0	0.111	8.9	LOS A	0.6	4.2	0.24	0.51	0.24	51.8
9u	U	2	4.0	0.111	10.8	LOS A	0.6	4.2	0.24	0.51	0.24	51.3
Approach		133	4.0	0.111	6.0	LOS A	0.6	4.2	0.24	0.51	0.24	52.5
West: Peats Ferry Rd												
10	L2	31	4.0	0.069	4.8	LOS A	0.3	2.5	0.32	0.59	0.32	49.3
11	T1	1	4.0	0.069	5.1	LOS A	0.3	2.5	0.32	0.59	0.32	35.0
12	R2	56	4.0	0.069	9.2	LOS A	0.3	2.5	0.32	0.59	0.32	52.2
12u	U	1	4.0	0.069	11.1	LOS A	0.3	2.5	0.32	0.59	0.32	52.3
Approach		88	4.0	0.069	7.7	LOS A	0.3	2.5	0.32	0.59	0.32	51.1
All Vehicles		455	4.0	0.166	5.8	LOS A	0.9	6.5	0.22	0.50	0.22	52.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [Peak Hour (Sunday) Peats Ferry Rd / Pacific Hwy - 2030 with Dev.]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

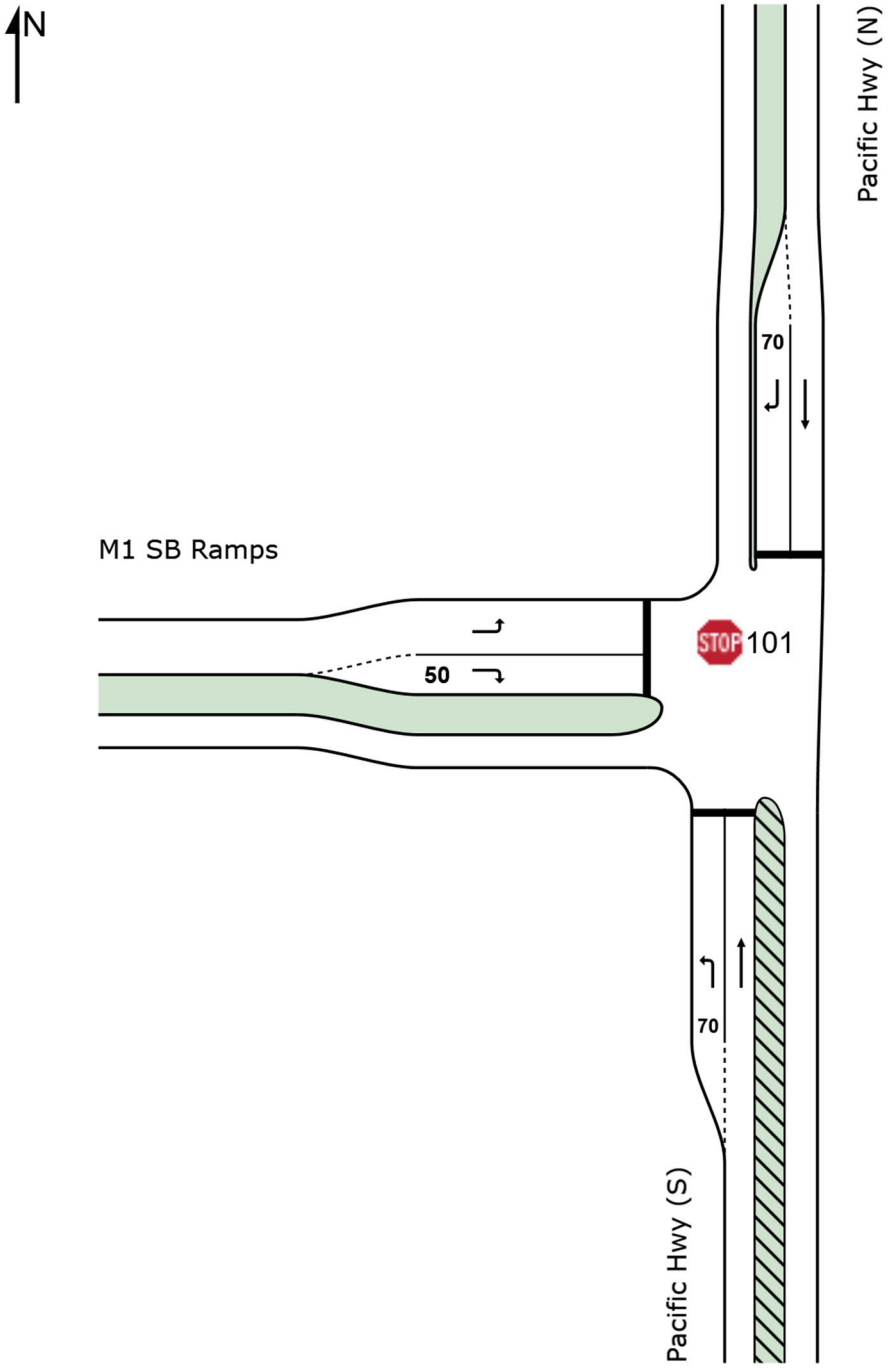
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: M1 NB Off-Ramp												
1	L2	84	2.0	0.262	4.9	LOS A	1.6	11.3	0.37	0.51	0.37	52.8
2	T1	225	2.0	0.262	5.2	LOS A	1.6	11.3	0.37	0.51	0.37	53.4
3	R2	1	2.0	0.262	9.3	LOS A	1.6	11.3	0.37	0.51	0.37	39.1
3u	U	6	2.0	0.262	11.2	LOS A	1.6	11.3	0.37	0.51	0.37	55.2
Approach		317	2.0	0.262	5.3	LOS A	1.6	11.3	0.37	0.51	0.37	53.2
East: B2 Local Centre												
4	L2	31	2.0	0.137	3.4	LOS A	0.7	5.0	0.43	0.65	0.43	48.7
5	T1	1	2.0	0.137	3.9	LOS A	0.7	5.0	0.43	0.65	0.43	48.8
6	R2	104	2.0	0.137	7.5	LOS A	0.7	5.0	0.43	0.65	0.43	45.6
6u	U	1	2.0	0.137	9.4	LOS A	0.7	5.0	0.43	0.65	0.43	12.7
Approach		137	2.0	0.137	6.5	LOS A	0.7	5.0	0.43	0.65	0.43	46.3
North: Old Pacific Hwy												
7	L2	2	2.0	0.128	4.6	LOS A	0.7	5.0	0.28	0.50	0.28	30.7
8	T1	112	2.0	0.128	4.9	LOS A	0.7	5.0	0.28	0.50	0.28	53.0
9	R2	36	2.0	0.128	9.0	LOS A	0.7	5.0	0.28	0.50	0.28	51.9
9u	U	1	2.0	0.128	10.9	LOS A	0.7	5.0	0.28	0.50	0.28	51.7
Approach		151	2.0	0.128	5.9	LOS A	0.7	5.0	0.28	0.50	0.28	52.5
West: Peats Ferry Rd												
10	L2	74	2.0	0.138	5.6	LOS A	0.8	5.5	0.48	0.65	0.48	49.2
11	T1	1	2.0	0.138	5.9	LOS A	0.8	5.5	0.48	0.65	0.48	34.8
12	R2	83	2.0	0.138	10.0	LOS A	0.8	5.5	0.48	0.65	0.48	52.2
12u	U	1	2.0	0.138	11.9	LOS A	0.8	5.5	0.48	0.65	0.48	52.3
Approach		159	2.0	0.138	8.0	LOS A	0.8	5.5	0.48	0.65	0.48	50.8
All Vehicles		763	2.0	0.262	6.2	LOS A	1.6	11.3	0.39	0.56	0.39	51.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 Pacific Hwy / M1 SB Ramps

New Site
Site Category: (None)
Stop (All-Way)



MOVEMENT SUMMARY

Site: 101 [AM (Weekday) Pacific Hwy / M1 SB Ramps - 2018]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	42	10.0	0.164	16.6	LOS B	0.6	4.5	0.97	1.28	2.16	40.6
2	T1	35	10.0	0.151	16.7	LOS B	0.5	4.1	0.98	1.28	2.15	46.2
Approach		77	10.0	0.164	16.6	LOS B	0.6	4.5	0.97	1.28	2.16	43.5
North: Pacific Hwy (N)												
8	T1	56	10.0	0.143	12.8	LOS A	0.5	3.7	0.89	1.28	2.05	48.6
9	R2	45	10.0	0.127	12.8	LOS A	0.4	3.3	0.91	1.27	2.05	41.4
Approach		101	10.0	0.143	12.8	LOS A	0.5	3.7	0.90	1.27	2.05	46.2
West: M1 SB Ramps												
10	L2	20	10.0	0.064	12.1	LOS A	0.2	1.6	0.92	1.25	1.99	42.5
12	R2	55	10.0	0.158	13.0	LOS A	0.6	4.2	0.92	1.28	2.10	43.4
Approach		75	10.0	0.158	12.8	LOS A	0.6	4.2	0.92	1.27	2.07	43.2
All Vehicles		253	10.0	0.164	14.0	LOS A	0.6	4.5	0.93	1.28	2.09	44.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM (Weekday) Pacific Hwy / M1 SB Ramps - 2018]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	36	10.0	0.110	13.1	LOS A	0.4	2.9	0.92	1.27	2.04	43.4
2	T1	81	10.0	0.228	14.7	LOS B	0.8	6.4	0.92	1.30	2.21	47.4
Approach		117	10.0	0.228	14.2	LOS A	0.8	6.4	0.92	1.29	2.16	46.4
North: Pacific Hwy (N)												
8	T1	68	10.0	0.158	12.4	LOS A	0.5	4.1	0.87	1.28	2.05	48.9
9	R2	37	10.0	0.094	11.8	LOS A	0.3	2.4	0.88	1.26	1.98	42.4
Approach		105	10.0	0.158	12.2	LOS A	0.5	4.1	0.87	1.27	2.03	47.3
West: M1 SB Ramps												
10	L2	17	10.0	0.066	13.5	LOS A	0.2	1.7	0.95	1.25	2.02	41.3
12	R2	31	10.0	0.105	13.6	LOS A	0.4	2.7	0.94	1.26	2.05	42.9
Approach		47	10.0	0.105	13.6	LOS A	0.4	2.7	0.94	1.26	2.04	42.4
All Vehicles		269	10.0	0.228	13.3	LOS A	0.8	6.4	0.91	1.28	2.09	46.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Peak Hour (Sunday) Pacific Hwy / M1 SB Ramps - 2018]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	99	5.0	0.278	14.9	LOS B	1.1	7.9	0.93	1.32	2.31	41.8
2	T1	157	5.0	0.400	17.1	LOS B	1.7	12.6	0.94	1.38	2.59	45.9
Approach		256	5.0	0.400	16.3	LOS B	1.7	12.6	0.94	1.36	2.48	44.6
North: Pacific Hwy (N)												
8	T1	245	5.0	0.540	19.5	LOS B	2.8	20.3	0.95	1.49	3.08	44.4
9	R2	34	5.0	0.081	11.2	LOS A	0.3	1.9	0.86	1.25	1.95	42.9
Approach		279	5.0	0.540	18.5	LOS B	2.8	20.3	0.94	1.46	2.94	44.3
West: M1 SB Ramps												
10	L2	60	5.0	0.201	14.4	LOS A	0.7	5.4	0.95	1.29	2.19	40.5
12	R2	88	5.0	0.261	14.8	LOS B	1.0	7.3	0.94	1.31	2.28	42.0
Approach		148	5.0	0.261	14.7	LOS B	1.0	7.3	0.94	1.30	2.25	41.5
All Vehicles		683	5.0	0.540	16.8	LOS B	2.8	20.3	0.94	1.39	2.62	43.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM (Weekday) Pacific Hwy / M1 SB Ramps - 2030 without Dev.]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	47	10.0	0.185	17.0	LOS B	0.7	5.1	0.97	1.29	2.19	40.3
2	T1	39	10.0	0.170	17.1	LOS B	0.6	4.7	0.98	1.28	2.18	45.9
Approach		86	10.0	0.185	17.0	LOS B	0.7	5.1	0.97	1.29	2.19	43.2
North: Pacific Hwy (N)												
8	T1	63	10.0	0.161	13.1	LOS A	0.6	4.3	0.89	1.28	2.08	48.5
9	R2	52	10.0	0.145	13.0	LOS A	0.5	3.8	0.91	1.28	2.08	41.2
Approach		115	10.0	0.161	13.0	LOS A	0.6	4.3	0.90	1.28	2.08	46.0
West: M1 SB Ramps												
10	L2	23	10.0	0.074	12.3	LOS A	0.2	1.9	0.92	1.26	2.00	42.4
12	R2	62	10.0	0.179	13.3	LOS A	0.6	4.8	0.92	1.29	2.13	43.2
Approach		85	10.0	0.179	13.0	LOS A	0.6	4.8	0.92	1.28	2.10	43.0
All Vehicles		286	10.0	0.185	14.2	LOS A	0.7	5.1	0.93	1.28	2.12	44.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM (Weekday) Pacific Hwy / M1 SB Ramps - 2030 without Dev.]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	41	10.0	0.126	13.3	LOS A	0.4	3.3	0.92	1.27	2.06	43.2
2	T1	92	10.0	0.258	15.3	LOS B	1.0	7.4	0.93	1.32	2.27	47.0
Approach		133	10.0	0.258	14.7	LOS B	1.0	7.4	0.93	1.30	2.21	46.1
North: Pacific Hwy (N)												
8	T1	78	10.0	0.180	12.6	LOS A	0.6	4.8	0.87	1.29	2.09	48.8
9	R2	42	10.0	0.107	11.9	LOS A	0.4	2.7	0.88	1.27	2.00	42.2
Approach		120	10.0	0.180	12.4	LOS A	0.6	4.8	0.88	1.28	2.06	47.1
West: M1 SB Ramps												
10	L2	19	10.0	0.074	13.6	LOS A	0.3	1.9	0.95	1.25	2.03	41.2
12	R2	35	10.0	0.119	13.9	LOS A	0.4	3.1	0.94	1.27	2.07	42.7
Approach		54	10.0	0.119	13.8	LOS A	0.4	3.1	0.95	1.26	2.06	42.2
All Vehicles		306	10.0	0.258	13.6	LOS A	1.0	7.4	0.91	1.29	2.12	45.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Peak Hour (Sunday) Pacific Hwy / M1 SB Ramps - 2030 without Dev.]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	113	5.0	0.316	15.7	LOS B	1.3	9.2	0.94	1.34	2.39	41.2
2	T1	178	5.0	0.453	18.5	LOS B	2.1	15.2	0.95	1.42	2.75	45.0
Approach		291	5.0	0.453	17.4	LOS B	2.1	15.2	0.95	1.39	2.61	43.8
North: Pacific Hwy (N)												
8	T1	278	5.0	0.611	22.4	LOS B	3.5	25.8	0.97	1.57	3.46	42.8
9	R2	38	5.0	0.091	11.3	LOS A	0.3	2.2	0.86	1.26	1.96	42.8
Approach		316	5.0	0.611	21.1	LOS B	3.5	25.8	0.96	1.54	3.28	42.8
West: M1 SB Ramps												
10	L2	68	5.0	0.229	14.9	LOS B	0.9	6.3	0.95	1.30	2.24	40.1
12	R2	100	5.0	0.295	15.5	LOS B	1.2	8.5	0.95	1.33	2.35	41.5
Approach		168	5.0	0.295	15.3	LOS B	1.2	8.5	0.95	1.32	2.31	41.0
All Vehicles		775	5.0	0.611	18.4	LOS B	3.5	25.8	0.95	1.43	2.82	42.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM (Weekday) Pacific Hwy / M1 SB Ramps - 2030 with Dev.]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	47	10.0	0.183	16.1	LOS B	0.7	5.1	0.97	1.29	2.19	41.0
2	T1	59	10.0	0.201	16.1	LOS B	0.7	5.6	0.95	1.29	2.20	46.5
Approach		106	10.0	0.201	16.1	LOS B	0.7	5.6	0.96	1.29	2.19	44.5
North: Pacific Hwy (N)												
8	T1	108	10.0	0.249	13.2	LOS A	0.9	7.0	0.89	1.31	2.21	48.4
9	R2	157	10.0	0.337	14.4	LOS A	1.3	10.2	0.89	1.35	2.39	39.9
Approach		265	10.0	0.337	13.9	LOS A	1.3	10.2	0.89	1.34	2.32	44.3
West: M1 SB Ramps												
10	L2	42	10.0	0.178	16.3	LOS B	0.7	4.9	0.98	1.29	2.19	38.8
12	R2	62	10.0	0.231	16.7	LOS B	0.9	6.7	0.97	1.31	2.26	40.4
Approach		104	10.0	0.231	16.5	LOS B	0.9	6.7	0.97	1.30	2.23	39.8
All Vehicles		476	10.0	0.337	15.0	LOS B	1.3	10.2	0.92	1.32	2.27	43.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM (Weekday) Pacific Hwy / M1 SB Ramps - 2030 with Dev.]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	41	10.0	0.112	12.3	LOS A	0.4	2.9	0.90	1.27	2.02	44.0
2	T1	138	10.0	0.340	15.7	LOS B	1.4	10.5	0.92	1.36	2.43	46.7
Approach		179	10.0	0.340	14.9	LOS B	1.4	10.5	0.92	1.33	2.33	46.3
North: Pacific Hwy (N)												
8	T1	101	10.0	0.200	12.0	LOS A	0.7	5.3	0.84	1.30	2.09	49.2
9	R2	96	10.0	0.208	12.2	LOS A	0.7	5.6	0.86	1.30	2.12	41.9
Approach		197	10.0	0.208	12.1	LOS A	0.7	5.6	0.85	1.30	2.10	46.4
West: M1 SB Ramps												
10	L2	65	10.0	0.228	16.2	LOS B	0.9	6.5	0.96	1.30	2.25	38.8
12	R2	35	10.0	0.137	14.5	LOS B	0.5	3.7	0.96	1.27	2.12	42.2
Approach		100	10.0	0.228	15.6	LOS B	0.9	6.5	0.96	1.29	2.20	40.1
All Vehicles		476	10.0	0.340	13.9	LOS A	1.4	10.5	0.90	1.31	2.21	45.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Peak Hour (Sunday) Pacific Hwy / M1 SB Ramps - 2030 with Dev.]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pacific Hwy (S)												
1	L2	113	5.0	0.326	16.1	LOS B	1.3	9.6	0.95	1.34	2.42	40.9
2	T1	198	5.0	0.514	20.9	LOS B	2.6	18.7	0.97	1.47	2.99	43.6
Approach		311	5.0	0.514	19.2	LOS B	2.6	18.7	0.96	1.42	2.78	42.8
North: Pacific Hwy (N)												
8	T1	324	5.0	0.663	24.0	LOS B	4.2	30.9	0.98	1.66	3.82	41.9
9	R2	145	5.0	0.322	13.9	LOS A	1.3	9.3	0.90	1.34	2.36	40.3
Approach		469	5.0	0.663	20.8	LOS B	4.2	30.9	0.95	1.56	3.37	41.6
West: M1 SB Ramps												
10	L2	88	5.0	0.333	18.8	LOS B	1.4	10.0	0.99	1.34	2.47	36.9
12	R2	100	5.0	0.331	17.7	LOS B	1.4	9.9	0.97	1.34	2.45	39.9
Approach		188	5.0	0.333	18.2	LOS B	1.4	10.0	0.98	1.34	2.46	38.6
All Vehicles		968	5.0	0.663	19.8	LOS B	4.2	30.9	0.96	1.47	3.00	41.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

H. HCM Analysis

No.	Year	Peak Hour	Freeway- Ramp Terminal	Merge or Diverge Type	No.of Freeway Lane	Freeway Flow (pc/h)	No. of Ramp Lane	Ramp Flow (pc/h)	Acceleration / Deceleration lane length/ (m)	Ramp Influence Area - Lane 1 & 2 within 450m		Freeway before ramp - All Lanes			Ramp - All Lanes			Freeway after ramp - All Lanes		
										Density /(pc/km/ln)	Level of Service	V/C	Density /(pc/km/ln)	Level of Service	V/C	Density /(pc/km/ln)	Level of Service	V/C	Density (pc/km/ln)	Level of Service
1	2018	AM	Pacific Highway (M1) Off-Ramp (Northbound)	Diverge	3	2038	1	77	60	8.9	B	0.29	8.86	B	0.04	1.28	A	0.28	5.94	A
2			Pacific Highway (M1) Off-Ramp (Southbound)	Diverge	3	5420	1	81	60	16.4	C	0.77	16.37	C	0.04	1.35	A	0.76	16.18	C
3			Pacific Highway (M1) On-Ramp (Northbound)	Merge	3	1966	1	43	150	7.3	B	0.28	5.96	A	0.02	0.72	A	0.29	7.26	B
4			Pacific Highway (M1) On-Ramp (Southbound)	Merge	3	5545	1	88	100	18.1	D	0.79	16.80	C	0.04	1.47	A	0.80	18.14	D
1	2030 without Development	AM	Pacific Highway (M1) Off-Ramp (Northbound)	Diverge	3	1874	1	87	60	8.4	B	0.27	8.37	B	0.04	1.46	A	0.25	5.41	A
2			Pacific Highway (M1) Off-Ramp (Southbound)	Diverge	3	5320	1	123	60	16.3	C	0.75	16.30	C	0.06	2.05	A	0.74	15.75	C
3			Pacific Highway (M1) On-Ramp (Northbound)	Merge	3	2228	1	49	150	8.0	B	0.32	6.75	B	0.02	0.82	A	0.32	8.04	B
4			Pacific Highway (M1) On-Ramp (Southbound)	Merge	3	5020	1	100	100	16.7	C	0.71	15.21	C	0.05	1.67	A	0.73	16.72	C
1	2030 with Development	AM	Pacific Highway (M1) Off-Ramp (Northbound)	Diverge	3	1920	1	134	60	8.6	B	0.27	8.58	B	0.07	2.23	A	0.25	5.41	A
2			Pacific Highway (M1) Off-Ramp (Southbound)	Diverge	3	5340	1	112	60	16.3	C	0.76	16.31	C	0.06	1.86	A	0.74	15.84	C
3			Pacific Highway (M1) On-Ramp (Northbound)	Merge	3	2274	1	95	150	8.4	B	0.32	6.89	B	0.05	1.58	A	0.34	8.37	B
4			Pacific Highway (M1) On-Ramp (Southbound)	Merge	3	6388	1	205	100	21.1	D	0.91	19.36	D	0.10	3.42	A	0.94	21.05	D
1	2018	PM	Pacific Highway (M1) Off-Ramp (Northbound)	Diverge	3	5135	1	108	60	16.0	C	0.73	16.00	C	0.05	1.81	A	0.71	15.23	C
2			Pacific Highway (M1) Off-Ramp (Southbound)	Diverge	3	2626	1	49	60	10.5	B	0.37	10.52	B	0.02	0.82	A	0.37	7.81	B
3			Pacific Highway (M1) On-Ramp (Northbound)	Merge	3	4676	1	128	150	15.3	C	0.66	14.17	C	0.06	2.14	A	0.68	15.34	C
4			Pacific Highway (M1) On-Ramp (Southbound)	Merge	3	2618	1	85	100	9.9	B	0.37	7.93	B	0.04	1.42	A	0.38	9.89	B
1	2030 without Development	PM	Pacific Highway (M1) Off-Ramp (Northbound)	Diverge	3	5285	1	122	60	16.3	C	0.75	16.25	C	0.06	2.04	A	0.73	15.65	C
2			Pacific Highway (M1) Off-Ramp (Southbound)	Diverge	3	2635	1	56	60	10.6	B	0.37	10.55	B	0.03	0.93	A	0.37	7.81	B
3			Pacific Highway (M1) On-Ramp (Northbound)	Merge	3	5297	1	146	150	17.2	D	0.75	16.05	C	0.07	2.44	A	0.77	17.19	D
4			Pacific Highway (M1) On-Ramp (Southbound)	Merge	3	2965	1	91	100	10.9	B	0.42	8.99	B	0.05	1.51	A	0.43	10.89	B
1	2030 with Development	PM	Pacific Highway (M1) Off-Ramp (Northbound)	Diverge	3	5297	1	134	60	16.3	C	0.75	16.29	C	0.07	2.23	A	0.73	15.65	C
2			Pacific Highway (M1) Off-Ramp (Southbound)	Diverge	3	2635	1	102	60	10.6	B	0.37	10.63	B	0.05	1.70	A	0.36	7.67	B
3			Pacific Highway (M1) On-Ramp (Northbound)	Merge	3	5320	1	169	150	17.4	D	0.75	16.12	C	0.08	2.82	A	0.78	17.36	D
4			Pacific Highway (M1) On-Ramp (Southbound)	Merge	3	3019	1	144	100	11.3	B	0.43	9.15	B	0.07	2.40	A	0.45	11.28	B
1	2018	Sunday	Pacific Highway (M1) Off-Ramp (Northbound)	Diverge	3	3832	1	236	60	13.8	C	0.54	13.81	C	0.12	3.93	A	0.51	10.90	B
2			Pacific Highway (M1) Off-Ramp (Southbound)	Diverge	3	3952	1	181	60	14.0	C	0.56	13.97	C	0.09	3.02	A	0.53	11.43	B
3			Pacific Highway (M1) On-Ramp (Northbound)	Merge	3	3102	1	141	150	10.9	B	0.44	9.40	B	0.07	2.35	A	0.46	10.93	B
4			Pacific Highway (M1) On-Ramp (Southbound)	Merge	3	3848	1	133	100	13.6	C	0.55	11.66	B	0.07	2.21	A	0.56	13.57	C
1	2030 without Development	Sunday	Pacific Highway (M1) Off-Ramp (Northbound)	Diverge	3	4176	1	267	60	14.6	C	0.59	14.59	C	0.13	4.46	A	0.55	11.84	B
2			Pacific Highway (M1) Off-Ramp (Southbound)	Diverge	3	4258	1	201	60	14.6	C	0.60	14.63	C	0.10	3.35	A	0.58	12.29	C
3			Pacific Highway (M1) On-Ramp (Northbound)	Merge	3	4074	1	159	150	13.8	C	0.58	12.34	C	0.08	2.65	A	0.60	13.77	C
4			Pacific Highway (M1) On-Ramp (Southbound)	Merge	3	4277	1	182	100	15.0	C	0.61	12.96	C	0.09	3.04	A	0.63	15.00	C
1	2030 with Development	Sunday	Pacific Highway (M1) Off-Ramp (Northbound)	Diverge	3	4224	1	315	60	14.8	C	0.60	14.77	C	0.16	5.25	A	0.55	11.85	B
2			Pacific Highway (M1) Off-Ramp (Southbound)	Diverge	3	4278	1	189	60	14.6	C	0.61	14.65	C	0.09	3.16	A	0.58	12.39	C
3			Pacific Highway (M1) On-Ramp (Northbound)	Merge	3	3561	1	204	150	12.5	C	0.51	10.79	B	0.10	3.40	A	0.53	12.52	C
4			Pacific Highway (M1) On-Ramp (Southbound)	Merge	3	4465	1	257	100	15.9	C	0.63	13.53	C	0.13	4.28	A	0.67	15.87	C

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						MOTT MACDONALD
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Northbound)**				**AM 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 66	veh/h	
V_F					V_F 1,571	veh/h	
					LV	HV	%HV
					V_R 59	7	10.61
FFS -Ramp	S_{FR}	60	km/h		V_F 1,206	365	23.23
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.664	6 Lane FW	0.664	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.410					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.4**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	658.3	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**116.6**	*116.6*	*118.7*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v (pc/h)**	
V_F	1571	0.95	23.23	0.811	1	2038	3
V_R	66	0.95	10.61	0.904	1	77	1
V_{12}						1380	
V_{FO}						1961	3
Diverge							
Density of diverge influence area	D_R	8.9	pc/km/ln				
Level of Service		**B**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**1.3**	**5.9**	pc/km/ln		
Level of Service		**B**	**A**	**A**			
V/C		0.29	0.04	0.28			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						MOTT MACDONALD
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Southbound)**				**AM 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 71	veh/h	
V_F					V_F 4,460	veh/h	
					LV	HV	%HV
					V_R 65	6	8.45
FFS -Ramp	S_{FR}	60	km/h		V_F 3,771	689	15.45
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.509	6 Lane FW	0.509	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.410					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.4**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	2623.3	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**106.5**	*116.6*	*106.5*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v (pc/h)**	
V_F	4460	0.95	15.45	0.866	1	5420	3
V_R	71	0.95	8.45	0.922	1	81	1
V_{12}						2797	
V_{FO}						5339	3
Diverge							
Density of diverge influence area	D_R	16.4	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**1.4**	**16.2**	pc/km/ln		
Level of Service		**C**	**A**	**C**			
V/C		0.77	0.04	0.76			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Northbound)**				**AM 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	35	veh/h	
				V_F	1478	veh/h	
					LV	HV	%HV
				V_R	29	6	17.14
FFS -Ramp	S_{FR}	60	km/h	V_F	1,088	390	26.39
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	150	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.591	6 Lane FW	0.5913	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.286					
Space Mean Speed in Ramp Influence Area (450m)	S_R	97.7	km/h	89%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	803.6	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**108.2**	*110*	*108.2*	*114.4437*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	1478	0.95	26.39	0.791	1	1966	3
V_R	35	0.95	17.14	0.854	1	43	1
V_{12}						1163	
V_{R12}						1206	
V_{FO}						2009	3
Merge							
Density of merge influence area	D_R	7.26	pc/km/ln				
Level of Service		**B**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**5.96**	**0.72**				
Level of Service		**A**	**A**	**B**			
V/C		0.28	0.02	0.29			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Southbound)**				**AM 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	83	veh/h	
				V_F	4572	veh/h	
					LV	HV	%HV
				V_R	82	1	1.20
FFS -Ramp	S_{FR}	60	km/h	V_F	3,876	696	15.22
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	100	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.587	6 Lane FW	0.5867	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.383					
Space Mean Speed in Ramp Influence Area (450m)	S_R	93.5	km/h	85%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	2291.9	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**99.6**	*110*	*99.6*	*99.56143*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v**	
V_F	4572	0.95	15.22	0.868	1	5545	3
V_R	83	0.95	1.20	0.988	1	88	1
V_{12}						3253	
V_{R12}						3342	
V_{FO}						5634	3
Merge							
Density of merge influence area	D_R	18.14	pc/km/ln				
Level of Service		**D**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**16.80**	**1.47**				
Level of Service		**C**	**A**	**D**			
V/C		0.79	0.04	0.80			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						MOTT MACDONALD
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Northbound)**				**PM 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 101	veh/h	
V_F					V_F 4,431	veh/h	
					LV	HV	%HV
					V_R 99	2	1.98
FFS -Ramp	S_{FR}	60	km/h		V_F 3,984	447	10.09
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.521	6 Lane FW	0.521	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.413					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.3**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	2407.1	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**107.9**	*116.6*	*107.9*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v (pc/h)**	
V_F	4431	0.95	10.09	0.908	1	5135	3
V_R	101	0.95	1.98	0.981	1	108	1
V_{12}						2728	
V_{FO}						5026	3
Diverge							
Density of diverge influence area	D_R	16.0	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**1.8**	**15.2**	pc/km/ln		
Level of Service		**C**	**A**	**C**			
V/C		0.73	0.05	0.71			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Southbound)**				**PM 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R	45	veh/h
V_F					V_F	2,209	veh/h
						LV	HV	%HV
					V_R	43	2	4.44
FFS -Ramp	S_{FR}	60	km/h		V_F	1,923	286	12.95
FFS - Freeway	S_{FF}	110	km/h					
No. of lanes on freeway segment		3						
No. of lanes on Off-Ramp		1						
Deceleration lane length	L_D	60	m					
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only				
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only				
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.					
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.638	6 Lane FW	0.638	Equation 5 from Exhibit 25-12			
Intermediate speed determination variable for diverge area	D_S	0.407						
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.5**	km/h	84%	of FFS			
Number of out side lane	N_O	1.0						
Ave. per-lane flow rate in outer lanes	V_{OA}	932.9	<1000pc/h	>1000pc/h				
Space Mean Speed in outer lanes	S_O	**116.6**	*116.6*	*117.0*				
Conversion to pc/h under base conditions								No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v (pc/h)**	
V_F	2209	0.95	12.95	0.885	1	2626	3
V_R	45	0.95	4.44	0.957	1	49	1
V_{12}						1693	
V_{FO}						2577	3
Diverge							
Density of diverge influence area	D_R	10.5	pc/km/ln				
Level of Service		**B**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**0.8**	**7.8**	pc/km/ln		
Level of Service		**B**	**A**	**B**			
V/C		0.37	0.02	0.37			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Northbound)**				**PM 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	118	veh/h	
				V_F	3955	veh/h	
					LV	HV	%HV
				V_R	114	4	3.39
FFS -Ramp	S_{FR}	60	km/h	V_F	3,468	487	12.31
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	150	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.591	6 Lane FW	0.5913	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.315					
Space Mean Speed in Ramp Influence Area (450m)	S_R	96.4	km/h	88%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1911.0	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**101.8**	*110*	*101.8*	*103.37*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	3955	0.95	12.31	0.890	1	4676	3
V_R	118	0.95	3.39	0.967	1	128	1
V_{12}						2765	
V_{R12}						2893	
V_{FO}						4804	3
Merge							
Density of merge influence area	D_R	15.34	pc/km/ln				
Level of Service		**C**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**14.17**	**2.14**				
Level of Service		**C**	**A**	**C**			
V/C		0.66	0.06	0.68			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Southbound)**				**PM 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	74	veh/h	
V_R → V_F				V_F	2205	veh/h	
					LV	HV	%HV
				V_R	67	7	9.46
FFS -Ramp	S_{FR}	60	km/h	V_F	1,923	282	12.79
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	100	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.587	6 Lane FW	0.5867	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.299					
Space Mean Speed in Ramp Influence Area (450m)	S_R	97.2	km/h	88%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1082.0	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**106.6**	*110*	*106.6*	*111.6602*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	2205	0.95	12.79	0.887	1	2618	3
V_R	74	0.95	9.46	0.914	1	85	1
V_{12}						1536	
V_{R12}						1621	
V_{FO}						2703	3
Merge							
Density of merge influence area	D_R	9.89	pc/km/ln				
Level of Service		**B**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**7.93**	**1.42**				
Level of Service		**B**	**A**	**B**			
V/C		0.37	0.04	0.38			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						MOTT MACDONALD
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Northbound)**				**Sunday peak hour 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 224	veh/h	
V_F					V_F 3,501	veh/h	
					LV	HV	%HV
					V_R 224	0	0.00
FFS -Ramp	S_{FR}	60	km/h		V_F 3,362	139	3.97
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.578	6 Lane FW	0.578	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.424					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**91.8**	km/h	83%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1518.0	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**113.4**	*116.6*	*113.4*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v (pc/h)**	
V_F	3501	0.95	3.97	0.962	1	3832	3
V_R	224	0.95	0.00	1.000	1	236	1
V_{12}						2314	
V_{FO}						3596	3
Diverge							
Density of diverge influence area	D_R	13.8	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**3.9**	**10.9**	pc/km/ln		
Level of Service		**C**	**A**	**B**			
V/C		0.54	0.12	0.51			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Southbound)**				**Sunday peak hour 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 156	veh/h	
V_F					V_F 3,569	veh/h	
					LV	HV	%HV
					V_R 140	16	10.26
FFS -Ramp	S_{FR}	60	km/h		V_F 3,384	185	5.18
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.574	6 Lane FW	0.574	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.419					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.0**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1607.4	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**112.8**	*116.6*	*112.8*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v (pc/h)**	
V_F	3569	0.95	5.18	0.951	1	3952	3
V_R	156	0.95	10.26	0.907	1	181	1
V_{12}						2344	
V_{FO}						3771	3
Diverge							
Density of diverge influence area	D_R	14.0	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**3.0**	**11.4**	pc/km/ln		
Level of Service		**C**	**A**	**B**			
V/C		0.56	0.09	0.53			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Northbound)**				**Sunday peak hour 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	133	veh/h	
				V_F	2804	veh/h	
					LV	HV	%HV
				V_R	132	1	0.75
FFS -Ramp	S_{FR}	60	km/h	V_F	2,661	143	5.10
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	150	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.591	6 Lane FW	0.5913	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.289					
Space Mean Speed in Ramp Influence Area (450m)	S_R	97.6	km/h	89%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1267.8	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**105.5**	*110*	*105.5*	*109.8017*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	2804	0.95	5.10	0.951	1	3102	3
V_R	133	0.95	0.75	0.993	1	141	1
V_{12}						1834	
V_{R12}						1975	
V_{FO}						3243	3
Merge							
Density of merge influence area	D_R	10.93	pc/km/ln				
Level of Service		**B**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**9.40**	**2.35**				
Level of Service		**B**	**A**	**B**			
V/C		0.44	0.07	0.46			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Southbound)**				**Sunday peak hour 2018**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	126	veh/h	
				V_F	3476	veh/h	
					LV	HV	%HV
				V_R	126	0	0.00
FFS -Ramp	S_{FR}	60	km/h	V_F	3,296	180	5.18
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	100	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.587	6 Lane FW	0.5867	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.307					
Space Mean Speed in Ramp Influence Area (450m)	S_R	96.8	km/h	88%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1590.6	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**103.7**	*110*	*103.7*	*106.5745*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	3476	0.95	5.18	0.951	1	3848	3
V_R	126	0.95	0.00	1.000	1	133	1
V_{12}						2258	
V_{R12}						2391	
V_{FO}						3981	3
Merge							
Density of merge influence area	D_R	13.57	pc/km/ln				
Level of Service		**C**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**11.66**	**2.21**				
Level of Service		**B**	**A**	**C**			
V/C		0.55	0.07	0.56			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						MOTT MACDONALD
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Northbound)**				**AM 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 75	veh/h	
V_F					V_F 1,780	veh/h	
					LV	HV	%HV
					V_R 67	8	10.67
FFS -Ramp	S_{FR}	60	km/h		V_F 1,366	414	23.26
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.672	6 Lane FW	0.672	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.411					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.3**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	586.6	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**116.6**	*116.6*	*119.2*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v (pc/h)**	
V_F	1780	0.95	0.00	1.000	1	1874	3
V_R	75	0.95	10.67	0.904	1	87	1
V_{12}						1287	
V_{FO}						1786	3
Diverge							
Density of diverge influence area	D_R	8.4	pc/km/ln				
Level of Service		**B**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**1.5**	**5.4**	pc/km/ln		
Level of Service		**B**	**A**	**A**			
V/C		0.27	0.04	0.25			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						MOTT MACDONALD
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Southbound)**				**AM 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 95	veh/h	
V_F					V_F 5,054	veh/h	
					LV	HV	%HV
					V_R 73	22	23.16
FFS -Ramp	S_{FR}	60	km/h		V_F 4,274	780	15.43
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.512	6 Lane FW	0.512	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.414					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.2**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	2535.0	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**107.1**	*116.6*	*107.1*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v (pc/h)**	
V_F	5054	0.95	0.00	1.000	1	5320	3
V_R	95	0.95	23.16	0.812	1	123	1
V_{12}						2785	
V_{FO}						5197	3
Diverge							
Density of diverge influence area	D_R	16.3	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**2.1**	**15.7**	pc/km/ln		
Level of Service		**C**	**A**	**C**			
V/C		0.75	0.06	0.74			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Northbound)**				**AM 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	40	veh/h	
				V_F	1675	veh/h	
					LV	HV	%HV
				V_R	33	7	17.50
FFS -Ramp	S_{FR}	60	km/h	V_F	1,233	442	26.39
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	150	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.591	6 Lane FW	0.5913	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.286					
Space Mean Speed in Ramp Influence Area (450m)	S_R	97.7	km/h	89%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	910.8	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**107.6**	*110*	*107.6*	*113.3724*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	1675	0.95	26.39	0.791	1	2228	3
V_R	40	0.95	17.50	0.851	1	49	1
V_{12}						1318	
V_{R12}						1367	
V_{FO}						2278	3
Merge							
Density of merge influence area	D_R	8.04	pc/km/ln				
Level of Service		**B**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**6.75**	**0.82**				
Level of Service		**B**	**A**	**B**			
V/C		0.32	0.02	0.32			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Southbound)**				**AM 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	94	veh/h	
				V_F	4581	veh/h	
					LV	HV	%HV
				V_R	93	1	1.06
FFS -Ramp	S_{FR}	60	km/h	V_F	4,393	188	4.10
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	100	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.587	6 Lane FW	0.5867	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.340					
Space Mean Speed in Ramp Influence Area (450m)	S_R	95.4	km/h	87%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	2074.8	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**100.9**	*110*	*100.9*	*101.7323*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	4581	0.95	4.10	0.961	1	5020	3
V_R	94	0.95	1.06	0.989	1	100	1
V_{12}						2945	
V_{R12}						3045	
V_{FO}						5120	3
Merge							
Density of merge influence area	D_R	16.72	pc/km/ln				
Level of Service		**C**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**15.21**	**1.67**				
Level of Service		**C**	**A**	**C**			
V/C		0.71	0.05	0.73			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Northbound)**				**PM 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 114	veh/h	
V_F					V_F 5,021	veh/h	
					LV	HV	%HV
					V_R 112	2	1.75
FFS -Ramp	S_{FR}	60	km/h		V_F 4,515	506	10.08
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.514	6 Lane FW	0.514	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.414					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.2**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	2510.2	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**107.2**	*116.6*	*107.2*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v (pc/h)**	
V_F	5021	0.95	0.00	1.000	1	5285	3
V_R	114	0.95	1.75	0.983	1	122	1
V_{12}						2775	
V_{FO}						5163	3
Diverge							
Density of diverge influence area	D_R	16.3	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**2.0**	**15.6**	pc/km/ln		
Level of Service		**C**	**A**	**C**			
V/C		0.75	0.06	0.73			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						MOTT MACDONALD
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Southbound)**				**PM 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 51	veh/h	
V_F					V_F 2,503	veh/h	
					LV	HV	%HV
					V_R 49	2	3.92
FFS -Ramp	S_{FR}	60	km/h		V_F 2,179	324	12.94
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.637	6 Lane FW	0.637	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.408					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.5**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	935.1	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**116.6**	*116.6*	*117.0*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v (pc/h)**	
V_F	2503	0.95	0.00	1.000	1	2635	3
V_R	51	0.95	3.92	0.962	1	56	1
V_{12}						1700	
V_{FO}						2579	3
Diverge							
Density of diverge influence area	D_R	10.6	pc/km/ln				
Level of Service		**B**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**0.9**	**7.8**	pc/km/ln		
Level of Service		**B**	**A**	**B**			
V/C		0.37	0.03	0.37			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Northbound)**				**PM 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
V_R				V_R	134	veh/h	
				V_F	4481	veh/h	
V_F					LV	HV	%HV
				V_R	129	5	3.73
FFS -Ramp	S_{FR}	60	km/h	V_F	3,930	551	12.30
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	150	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.591	6 Lane FW	0.5913	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.359					
Space Mean Speed in Ramp Influence Area (450m)	S_R	94.6	km/h	86%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	2164.8	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**100.3**	*110*	*100.3*	*100.8318*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	4481	0.95	12.30	0.891	1	5297	3
V_R	134	0.95	3.73	0.964	1	146	1
V_{12}						3132	
V_{R12}						3278	
V_{FO}						5443	3
Merge							
Density of merge influence area	D_R	17.19	pc/km/ln				
Level of Service		**D**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**16.05**	**2.44**				
Level of Service		**C**	**A**	**D**			
V/C		0.75	0.07	0.77			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Southbound)**				**PM 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R	78	veh/h
					V_F	2498	veh/h
V_R						LV	HV
V_F					V_R	70	8
FFS -Ramp	S_{FR}	60	km/h		V_F	2,179	319
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	100	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.587	6 Lane FW	0.5867	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.300					
Space Mean Speed in Ramp Influence Area (450m)	S_R	97.1	km/h	88%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1225.5	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**105.8**	*110*	*105.8*	*110.2246*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	2498	0.95	12.77	0.887	1	2965	3
V_R	78	0.95	10.26	0.907	1	91	1
V_{12}						1740	
V_{R12}						1830	
V_{FO}						3056	3
Merge							
Density of merge influence area	D_R	10.89	pc/km/ln				
Level of Service		**B**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**8.99**	**1.51**				
Level of Service		**B**	**A**	**B**			
V/C		0.42	0.05	0.43			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Northbound)**				**Sunday PH 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 254	veh/h	
V_F					V_F 3,967	veh/h	
					LV	HV	%HV
					V_R 254	0	0.00
FFS -Ramp	S_{FR}	60	km/h		V_F 3,810	157	3.96
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.561	6 Lane FW	0.561	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.427					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**91.6**	km/h	83%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1714.9	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**112.2**	*116.6*	*112.2*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v (pc/h)**	
V_F	3967	0.95	0.00	1.000	1	4176	3
V_R	254	0.95	0.00	1.000	1	267	1
V_{12}						2461	
V_{FO}						3908	3
Diverge							
Density of diverge influence area	D_R	14.6	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**4.5**	**11.8**	pc/km/ln		
Level of Service		**C**	**A**	**B**			
V/C		0.59	0.13	0.55			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	Mooney Monney/ Pacific Highway						
Job No.:	397610						
Section Description:	Pacific Highway (M1) Off-Ramp (Southbound)				Sunday PH 2030 - w/o development		
User:	J. Muller						
Date:	28/09/2020						
			V_R	V_R	175	veh/h	
V_F				V_F	4,045	veh/h	
					LV	HV	%HV
				V_R	159	16	9.14
FFS -Ramp	S_{FR}	60	km/h	V_F	3,836	209	5.17
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.559	6 Lane FW	0.559	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.421					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**91.9**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1788.6	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**111.7**	*116.6*	*111.7*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v (pc/h)**	
V_F	4045	0.95	0.00	1.000	1	4258	3
V_R	175	0.95	9.14	0.916	1	201	1
V_{12}						2469	
V_{FO}						4057	3
Diverge							
Density of diverge influence area	D_R	14.6	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**3.4**	**12.3**	pc/km/ln		
Level of Service		**C**	**A**	**C**			
V/C		0.60	0.10	0.58			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Northbound)**				**Sunday PH 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
V_R				V_R	150	veh/h	
				V_F	3713	veh/h	
V_F							
					LV	HV	%HV
				V_R	149	1	0.67
FFS -Ramp	S_{FR}	60	km/h	V_F	3,556	157	4.23
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	150	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.591	6 Lane FW	0.5913	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.299					
Space Mean Speed in Ramp Influence Area (450m)	S_R	97.1	km/h	88%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1664.9	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**103.2**	*110*	*103.2*	*105.8309*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	3713	0.95	4.23	0.959	1	4074	3
V_R	150	0.95	0.67	0.993	1	159	1
V_{12}						2409	
V_{R12}						2568	
V_{FO}						4233	3
Merge							
Density of merge influence area	D_R	13.77	pc/km/ln				
Level of Service		**C**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**12.34**	**2.65**				
Level of Service		**C**	**A**	**C**			
V/C		0.58	0.08	0.60			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Southbound)**				**Sunday PH 2030 - w/o development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
V_R				V_R	158	veh/h	
				V_F	3870	veh/h	
V_F							
					LV	HV	%HV
				V_R	143	15	9.49
FFS -Ramp	S_{FR}	60	km/h	V_F	3,677	193	4.99
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	100	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.587	6 Lane FW	0.5867	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.316					
Space Mean Speed in Ramp Influence Area (450m)	S_R	96.4	km/h	88%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1767.6	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**102.6**	*110*	*102.6*	*104.8038*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	3870	0.95	4.99	0.952	1	4277	3
V_R	158	0.95	9.49	0.913	1	182	1
V_{12}						2509	
V_{R12}						2691	
V_{FO}						4459	3
Merge							
Density of merge influence area	D_R	15.00	pc/km/ln				
Level of Service		**C**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**12.96**	**3.04**				
Level of Service		**C**	**A**	**C**			
V/C		0.61	0.09	0.63			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Northbound)**				**AM 2030 - with development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 119	veh/h	
V_F					V_F 1,824	veh/h	
					LV	HV	%HV
					V_R 111	8	6.72
FFS -Ramp	S_{FR}	60	km/h		V_F 1,410	414	22.70
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.668	6 Lane FW	0.668	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.415					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.2**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	592.5	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**116.6**	*116.6*	*119.1*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v (pc/h)**	
V_F	1824	0.95	0.00	1.000	1	1920	3
V_R	119	0.95	6.72	0.937	1	134	1
V_{12}						1328	
V_{FO}						1786	3
Diverge							
Density of diverge influence area	D_R	8.6	pc/km/ln				
Level of Service		**B**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**2.2**	**5.4**	pc/km/ln		
Level of Service		**B**	**A**	**A**			
V/C		0.27	0.07	0.25			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						MOTT MACDONALD
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Southbound)**				**AM 2030 - with development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 99	veh/h	
V_F					V_F 5,073	veh/h	
					LV	HV	%HV
				V_R	92	7	7.07
FFS -Ramp	S_{FR}	60	km/h	V_F	4,293	780	15.38
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.512	6 Lane FW	0.512	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.413					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.2**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	2553.7	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**107.0**	*116.6*	*107.0*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v (pc/h)**	
V_F	5073	0.95	0.00	1.000	1	5340	3
V_R	99	0.95	7.07	0.934	1	112	1
V_{12}						2786	
V_{FO}						5228	3
Diverge							
Density of diverge influence area	D_R	16.3	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**1.9**	**15.8**	pc/km/ln		
Level of Service		**C**	**A**	**C**			
V/C		0.76	0.06	0.74			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Northbound)**				**AM 2030 - with development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R	83	veh/h
					V_F	1718	veh/h
V_R							
V_F							
						LV	HV
					V_R	76	7
FFS -Ramp	S_{FR}	60	km/h		V_F	1,276	442
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	150	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.591	6 Lane FW	0.5913	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.286					
Space Mean Speed in Ramp Influence Area (450m)	S_R	97.7	km/h	89%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	929.3	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**107.5**	*110*	*107.5*	*113.1875*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v**	
V_F	1718	0.95	25.73	0.795	1	2274	3
V_R	83	0.95	8.43	0.922	1	95	1
V_{12}						1344	
V_{R12}						1439	
V_{FO}						2368	3
Merge							
Density of merge influence area	D_R	8.37	pc/km/ln				
Level of Service		**B**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**6.89**	**1.58**				
Level of Service		**B**	**A**	**B**			
V/C		0.32	0.05	0.34			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Southbound)**				**AM 2030 - with development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R	194	veh/h
					V_F	5281	veh/h
V_R							
V_F							
						LV	HV	%HV
					V_R	193	1	0.52
FFS -Ramp	S_{FR}	60	km/h		V_F	4,493	788	14.92
FFS - Freeway	S_{FF}	110	km/h					
No. of lanes on freeway segment		3						
No. of lanes on On-Ramp		1						
Acceleration lane length	L_A	100	m					
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only				
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only				
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.					
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.587	6 Lane FW	0.5867	Equation 1			
Intermediate speed determination variable for merge area	M_S	0.647						
Space Mean Speed in Ramp Influence Area (450m)	S_R	82.2	km/h	75%	of FFS			
Number of out side lane	N_O	1.0						
Ave. per-lane flow rate in outer lanes	V_{OA}	2640.3	<500pc/h	>500<2300pc/h	>2300pc/h			
Space Mean Speed in outer lanes	S_O	**96.1**	*110*	*97.6*	*96.07666*			
Conversion to pc/h under base conditions								No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}		**fp**	**v**	
V_F	5281	0.95	14.92	0.870		1	6388	3
V_R	194	0.95	0.52	0.995		1	205	1
V_{12}							3748	
V_{R12}							3953	
V_{FO}							6594	3
Merge								
Density of merge influence area	D_R	21.05	pc/km/ln					
Level of Service		**D**						
		V_F	V_R	V_{FO}				
Capacity Check								
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**19.36**	**3.42**					
Level of Service		**D**	**A**	**D**				
V/C		0.91	0.10	0.94				
FW/Ramp max. lane capacity based on speed		2350	2000	2350				

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Northbound)**				**PM 2030 - with development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 119	veh/h	
V_F					V_F 5,032	veh/h	
					LV	HV	%HV
				V_R	111	8	6.72
FFS -Ramp	S_{FR}	60	km/h	V_F	4,618	414	8.23
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.513	6 Lane FW	0.513	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.415					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.2**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	2514.4	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**107.2**	*116.6*	*107.2*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v (pc/h)**	
V_F	5032	0.95	0.00	1.000	1	5297	3
V_R	119	0.95	6.72	0.937	1	134	1
V_{12}						2782	
V_{FO}						5163	3
Diverge							
Density of diverge influence area	D_R	16.3	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**2.2**	**15.6**	pc/km/ln		
Level of Service		**C**	**A**	**C**			
V/C		0.75	0.07	0.73			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						MOTT MACDONALD
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Southbound)**				**PM 2030 - with development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 95	veh/h	
V_F					V_F 2,503	veh/h	
					LV	HV	%HV
					V_R 93	2	2.11
FFS -Ramp	S_{FR}	60	km/h		V_F 2,179	324	12.94
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.636	6 Lane FW	0.636	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.412					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**92.3**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	921.2	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**116.6**	*116.6*	*117.1*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v (pc/h)**	
V_F	2503	0.95	0.00	1.000	1	2635	3
V_R	95	0.95	2.11	0.979	1	102	1
V_{12}						1713	
V_{FO}						2533	3
Diverge							
Density of diverge influence area	D_R	10.6	pc/km/ln				
Level of Service		**B**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**1.7**	**7.7**	pc/km/ln		
Level of Service		**B**	**A**	**B**			
V/C		0.37	0.05	0.36			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Northbound)**				**PM 2030 - with development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
V_R				V_R	156	veh/h	
				V_F	4503	veh/h	
V_F							
					LV	HV	%HV
				V_R	151	5	3.21
FFS -Ramp	S_{FR}	60	km/h	V_F	3,952	551	12.24
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	150	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.591	6 Lane FW	0.5913	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.366					
Space Mean Speed in Ramp Influence Area (450m)	S_R	94.3	km/h	86%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	2174.3	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**100.3**	*110*	*100.3*	*100.7372*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	4503	0.95	12.24	0.891	1	5320	3
V_R	156	0.95	3.21	0.969	1	169	1
V_{12}						3146	
V_{R12}						3315	
V_{FO}						5489	3
Merge							
Density of merge influence area	D_R	17.36	pc/km/ln				
Level of Service		**D**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**16.12**	**2.82**				
Level of Service		**C**	**A**	**D**			
V/C		0.75	0.08	0.78			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Southbound)**				**PM 2030 - with development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R	129	veh/h
					V_F	2549	veh/h
V_R							
V_F					LV	HV	%HV
					V_R	121	8	6.20
FFS -Ramp	S_{FR}	60	km/h	V_F	2,230	319	12.51
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	100	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.587	6 Lane FW	0.5867	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.300					
Space Mean Speed in Ramp Influence Area (450m)	S_R	97.1	km/h	88%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1247.7	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**105.7**	*110*	*105.7*	*110.0027*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v**	
V_F	2549	0.95	12.51	0.889	1	3019	3
V_R	129	0.95	6.20	0.942	1	144	1
V_{12}						1771	
V_{R12}						1915	
V_{FO}						3163	3
Merge							
Density of merge influence area	D_R	11.28	pc/km/ln				
Level of Service		**B**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**9.15**	**2.40**				
Level of Service		**B**	**A**	**B**			
V/C		0.43	0.07	0.45			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) Off-Ramp (Northbound)**				**Sunday PH 2030 - with development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
				V_R	V_R 299	veh/h	
V_F					V_F 4,013	veh/h	
					LV	HV	%HV
					V_R 299	0	0.00
FFS -Ramp	S_{FR}	60	km/h		V_F 3,856	157	3.91
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.558	6 Lane FW	0.558	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.431					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**91.5**	km/h	83%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1728.7	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**112.1**	*116.6*	*112.1*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v (pc/h)**	
V_F	4013	0.95	0.00	1.000	1	4224	3
V_R	299	0.95	0.00	1.000	1	315	1
V_{12}						2496	
V_{FO}						3909	3
Diverge							
Density of diverge influence area	D_R	14.8	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**5.2**	**11.8**	pc/km/ln		
Level of Service		**C**	**A**	**B**			
V/C		0.60	0.16	0.55			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	Mooney Monney/ Pacific Highway						
Job No.:	397610						
Section Description:	Pacific Highway (M1) Off-Ramp (Southbound)				Sunday PH 2030 - with development		
User:	J. Muller						
Date:	28/09/2020						
			V_R	V_R	179	veh/h	
V_F				V_F	4,064	veh/h	
					LV	HV	%HV
				V_R	178	1	0.56
FFS -Ramp	S_{FR}	60	km/h	V_F	3,855	209	5.14
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on Off-Ramp		1					
Deceleration lane length	L_D	60	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 7 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 6 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of through freeway flow remaining in Lanes 1 and 2 immediately upstream of diverge	P_{FD}	0.558	6 Lane FW	0.558	Equation 5 from Exhibit 25-12		
Intermediate speed determination variable for diverge area	D_S	0.420					
Space Mean Speed in Ramp Influence Area (450m)	S_R	**91.9**	km/h	84%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1805.1	<1000pc/h	>1000pc/h			
Space Mean Speed in outer lanes	S_O	**111.6**	*116.6*	*111.6*			
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	**f_{HV}**	**fp**	**v (pc/h)**	
V_F	4064	0.95	0.00	1.000	1	4278	3
V_R	179	0.95	0.56	0.994	1	189	1
V_{12}						2473	
V_{FO}						4088	3
Diverge							
Density of diverge influence area	D_R	14.6	pc/km/ln				
Level of Service		**C**					
Capacity Check		V_F	V_R	V_{FO}			
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**		**3.2**	**12.4**	pc/km/ln		
Level of Service		**C**	**A**	**C**			
V/C		0.61	0.09	0.58			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:	**Mooney Monney/ Pacific Highway**						
Job No.:	**397610**						
Section Description:	**Pacific Highway (M1) On-Ramp (Northbound)**				**Sunday PH 2030 - with development**		
User:	**J. Muller**						
Date:	**28/09/2020**						
V_R				V_R	193	veh/h	
				V_F	3221	veh/h	
V_F							
					LV	HV	%HV
				V_R	192	1	0.52
FFS -Ramp	S_{FR}	60	km/h	V_F	3,059	162	5.03
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	150	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.591	6 Lane FW	0.5913	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.293					
Space Mean Speed in Ramp Influence Area (450m)	S_R	97.4	km/h	89%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1455.4	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**104.5**	*110*	*104.5*	*107.926*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	3221	0.95	5.03	0.952	1	3561	3
V_R	193	0.95	0.52	0.995	1	204	1
V_{12}						2106	
V_{R12}						2310	
V_{FO}						3765	3
Merge							
Density of merge influence area	D_R	12.52	pc/km/ln				
Level of Service		**C**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**10.79**	**3.40**				
Level of Service		**B**	**A**	**C**			
V/C		0.51	0.10	0.53			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

Freeway Off-ramp Diverge LOS Calculation in accordance with Austroads/ HCM

Project:		Mooney Monney/ Pacific Highway					
Job No.:		397610					
Section Description:		Pacific Highway (M1) On-Ramp (Southbound)			Sunday PH 2030 - with development		
User:		J. Muller					
Date:		28/09/2020					
V_R				V_R	244	veh/h	
				V_F	4039	veh/h	
V_F							
					LV	HV	%HV
				V_R	244	0	0.00
FFS -Ramp	S_{FR}	60	km/h	V_F	3,836	203	5.03
FFS - Freeway	S_{FF}	110	km/h				
No. of lanes on freeway segment		3					
No. of lanes on On-Ramp		1					
Acceleration lane length	L_A	100	m				
Distance to adjacent downstream Ramp	L_{down}	N/A	m	applicable for Equation 3 only			
Distance to adjacent upstream Ramp	L_{up}	N/A	m	applicable for Equation 2 only			
Passenger car equivalent for truck (HV factor)	E_t	2	Given by SWTC. Cross check with Exhibit 23-9, if grade is known.				
Proportion of approaching freeway flow remaining in Lanes 1 and 2 immediately upstream of merge	P_{FM}	0.587	6 Lane FW	0.5867	Equation 1		
Intermediate speed determination variable for merge area	M_S	0.326					
Space Mean Speed in Ramp Influence Area (450m)	S_R	96.0	km/h	87%	of FFS		
Number of out side lane	N_O	1.0					
Ave. per-lane flow rate in outer lanes	V_{OA}	1845.5	<500pc/h	>500<2300pc/h	>2300pc/h		
Space Mean Speed in outer lanes	S_O	**102.2**	*110*	*102.2*	*104.0251*		
Conversion to pc/h under base conditions							No.of Lane
pc/h	**V**	**PHF**	**%HV**	f_{HV}	**fp**	**v**	
V_F	4039	0.95	5.03	0.952	1	4465	3
V_R	244	0.95	0.00	1.000	1	257	1
V_{12}						2620	
V_{R12}						2877	
V_{FO}						4722	3
Merge							
Density of merge influence area	D_R	15.87	pc/km/ln				
Level of Service		**C**					
		V_F	V_R	V_{FO}			
Capacity Check							
Density as per Graph (Exhibit 11.6) of HCM 2010 - pc/ln/ speed	**Density**	**13.53**	**4.28**				
Level of Service		**C**	**A**	**C**			
V/C		0.63	0.13	0.67			
FW/Ramp max. lane capacity based on speed		2350	2000	2350			

I. Inventory of Existing Signs

Existing Signs Inventory – Mooney Mooney

M1_NB_01

M1_NB_02

M1_NB_03

M1_NB_04

M1_NB_05

M1_NB_06

M1_NB_07

M1_SB_01

M1_SB_02

M1_SB_03

M1_SB_04

M1_SB_05

M1_SB_06

MMPI_01

MMPI_02

MMPI_03

MMPI_04

MMPI_05

MMPI_06

MMPI_07

MMPI_08

MMPI_09

MMPI_10

MMPI_11

MMPI_12

MMPI_13

MMPI_14

MMPI_15

MMPI_16

MMPI_17

MMPI_18

MMPI_19

MMPI_20

MMPI_21

MMPI_22

MMPI_23

J. NOT USED

K. Authority Correspondence

Mr Brian Glendenning
Chief Executive Officer
Central Coast Council
PO Box 21
GOSFORD NSW 2250

Attention: Robert Drew

Planning Proposal – Peat Island / Mooney Mooney

Dear Mr Glendenning,

Thank you for your correspondence dated 21 September 2017 requesting Transport for NSW (TfNSW) review and comment on the Planning Proposal for the subject site. Please accept this as a joint response with Roads and Maritime Services, collectively referred to as TfNSW.

TfNSW's primary interests are in the road network, traffic and broader transport issues. In particular, the efficiency and safety of the classified road network, the security of property assets and the integration of land use and transport.

In accordance with the *Roads Act 1993*, Roads and Maritime has powers in relation to road works, traffic control facilities, connections to roads and other works on the classified road network. The Pacific Motorway (M1) is a classified (State) road and is a critical freight and transport route within NSW. Roads and Maritime is the Roads Authority for the M1. Central Coast Council is the Roads Authority for all other roads from the Interchange.

In addition to the above, Roads and Maritime is the proprietor of freehold land within the area nominated in the Planning Proposal and also has operational interests in land adjoining the M1.

The subject planning proposal seeks to rezone surplus government land at Mooney Mooney from SP2 Hospital, SP2 Educational Establishment and RE1 Public Recreation to R1 General Residential, R2 Low Density Residential, B2 Local Centre, RE1 Public Recreation and E1 National Park and Nature Reserves. The proposal allows for residential development, community facilities, a neighbourhood retail centre, recreation, a marina, relocation of existing emergency service facilities and addition of land to Popran National Park.

The available information has been reviewed and the following comments are provided for consideration.

Traffic and Transport Assessment

The Traffic and Transport Review prepared by Mott MacDonald in September 2016 should be updated to provide an assessment of the Mooney Mooney Interchange and impacts of the proposed rezoning. The update should be completed in accordance with the *Guide to Traffic Generating Developments* (NSW RTA 2002) and supplements and should include but not be limited to, the following:

- An assessment of the traffic and safety implications at the Mooney Mooney Interchange, including a review of impacts commercial development to the west of the M1 may have on Interchange operations. It is recommended that a detailed traffic assessment be undertaken, which includes (but not limited to) a microsimulation analysis of the operation of the on and off ramps. Further consultation with Roads and Maritime is recommended to seek advice regarding more detailed scope of work and model specification.

- The 5 studies noted for completion at Section 6 *Key Findings and Recommendations* of the *Traffic and Transport Review* should be included in the updated assessment.
- Consideration of the traffic impacts on the existing intersections and the capacity of the road network to safely and efficiently cater for the additional vehicular traffic generated.
- Identify the necessary road network infrastructure upgrades the area requires to maintain existing levels of service on both the local and classified road network. Any proposed changes to the road network will need to be discussed with Council and Roads & Maritime and be supported by a Road Safety Evaluation.
- Any other impacts upon the road network including consideration of pedestrian, cyclist and public transport facilities including commuter car parking at local railway stations.
- Identify feasible options to modify transport impacts if required.

Environmental Assessment

As a green field site offers the greatest flexibility to manage impacts associated with sensitive land uses, it is important that the compatibility of the proposed zones in the vicinity of the M1 Pacific Motorway be considered. The following assessments should be provided for RMS consideration:

- An updated noise impact assessment validated by noise measurements at locations where noise levels are highest and where land is nominated for the most sensitive land uses (i.e. zones where it is expected to be developed for habitable occupation). An assessment should include details of necessary treatments, as required, based on the noise levels to demonstrate that the future land use can implement basic mitigation measures to manage noise in accordance with relevant regulations and standards. Where relevant, the report should nominate any infrastructure upgrades to ensure the proposed rezoned land for future habitable development will not be adversely affected by noise.
- An illumination report identifying whether the Planning Proposal will be adversely affected by light spill created by the lighting of the M1 Pacific Motorway, and nomination of any mitigation measures considered necessary to ameliorate identified adverse impacts.

Property Advice

The property has a common boundary with the Pacific Motorway which has been declared as Freeway. Direct access for any lot across this boundary is restricted. Public access points to the Pacific Highway and Peats Ferry Road are available as shown on the attached Motorway Plan.

TfNSW notes that the strategic concept plan incorporates the relocation of existing RMS operations. It is recommended that NSW Property further consult directly with RMS to satisfy other matters relating to impacts affecting existing RMS operations. Please contact Kylie-Anne Pont, Development Assessment Officer, via email development.hunter@rms.nsw.gov.au to arrange a meeting with relevant stakeholders.

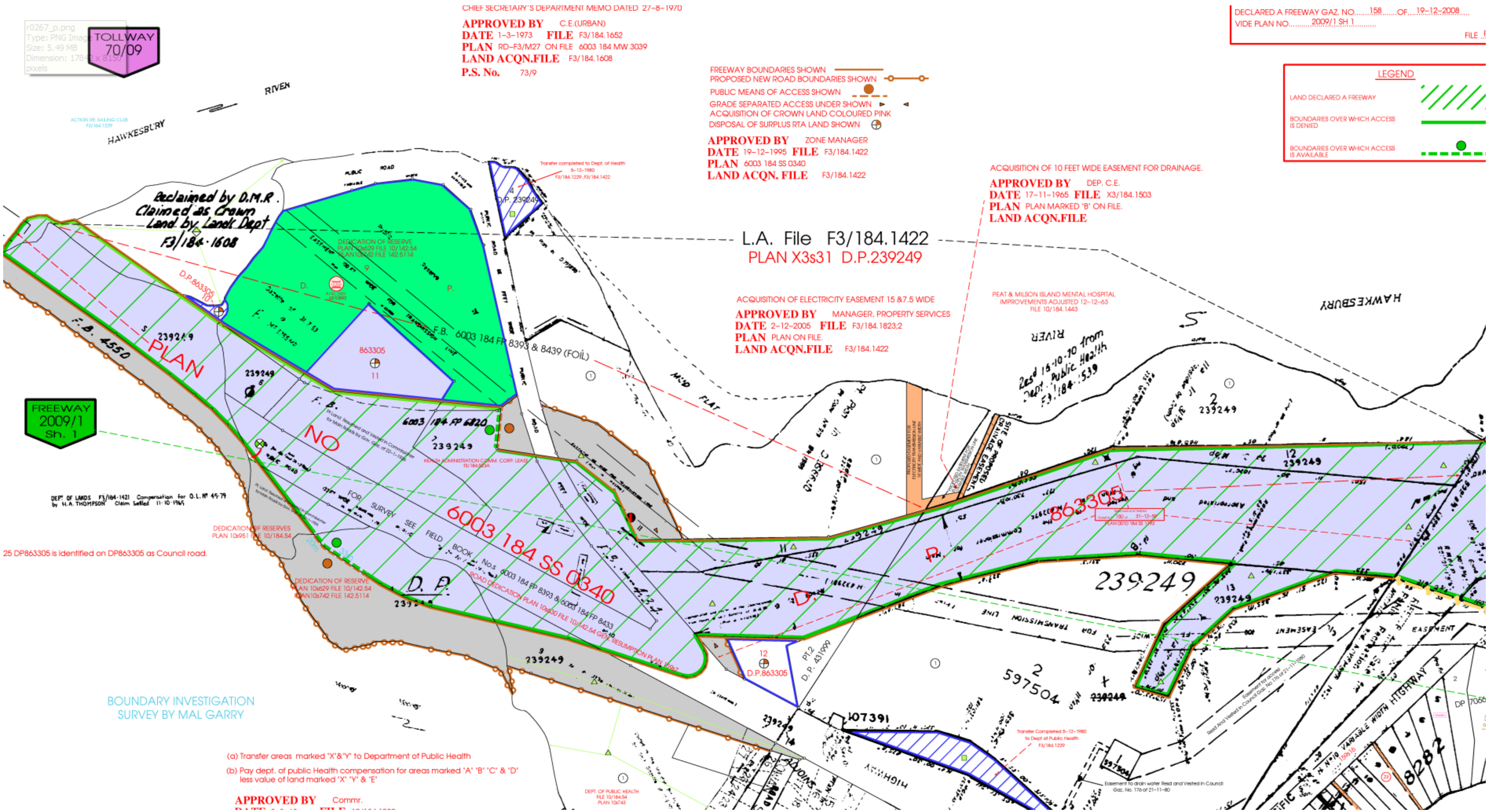
Thank you again for requesting TfNSW comment on this proposal. If you have any further questions, Mr Lee Farrell, Transport Planner at TfNSW, would be pleased to take your call on (02) 8265 9943. I hope this has been of assistance.

Yours sincerely

14/5/2018

Mark Ozinga
Principal Manager, Land Use Planning and Development
Freight, Strategy and Planning Division

CD17/11134
CR2016/005524


TOLLWAY 70/09
CHIEF SECRETARY'S DEPARTMENT MEMO DATED 27-8-1970
APPROVED BY C.E.(URBAN)
DATE 1-3-1973 FILE F3/184.1652
PLAN RD-F3/M27 ON FILE 6003 184 MW 3039
LAND ACQN.FILE F3/184.1608
P.S. No. 73/9
DECLARED A FREEWAY GAZ. NO. 158 OF 19-12-2008
VIDE PLAN NO. 2009/1 SH 1
LEGEND
LAND DECLARED A FREEWAY
BOUNDARIES OVER WHICH ACCESS IS DENIED
BOUNDARIES OVER WHICH ACCESS IS AVAILABLE
FREEWAY BOUNDARIES SHOWN
PROPOSED NEW ROAD BOUNDARIES SHOWN
PUBLIC MEANS OF ACCESS SHOWN
GRADE SEPARATED ACCESS UNDER SHOWN
ACQUISITION OF CROWN LAND COLOURED PINK
DISPOSAL OF SURPLUS RTA LAND SHOWN
APPROVED BY ZONE MANAGER
DATE 19-12-1995 FILE F3/184.1422
PLAN 6003 184 SS 0340
LAND ACQN. FILE F3/184.1422
ACQUISITION OF 10 FEET WIDE EASEMENT FOR DRAINAGE.
APPROVED BY DEP. C.E.
DATE 17-11-1965 FILE X3/184.1503
PLAN PLAN MARKED 'B' ON FILE.
LAND ACQN.FILE
RIVER
HAWKESBURY
Reclaimed by D.M.R. Claimed as Crown Land by Lands Dept F3/184.1608
L.A. File F3/184.1422
PLAN X3s31 D.P.239249
ACQUISITION OF ELECTRICITY EASEMENT 15 &7.5 WIDE
APPROVED BY MANAGER, PROPERTY SERVICES
DATE 2-12-2005 FILE F3/184.1823;2
PLAN PLAN ON FILE.
LAND ACQN.FILE F3/184.1422
PEAT & MILSON ISLAND MENTAL HOSPITAL IMPROVEMENTS ADJUSTED 12-12-63 FILE 10/184.1443
FREEWAY 2009/1 Sh. 1
F.B. 4550
PLAN
NO
6003 184 SS 0340
863305
239249
597504
107391
8282
DEDICATION OF RESERVE
25 DP863305 is identified on DP863305 as Council road.
BOUNDARY INVESTIGATION SURVEY BY MAL GARRY
(a) Transfer areas marked "X"&"Y" to Department of Public Health
(b) Pay dept. of public Health compensation for areas marked 'A' 'B' 'C' & 'D' less value of land marked 'X' 'Y' & 'E'
APPROVED BY Commr.

Loder, Thomas

From: PONT Kylie-Anne <Kylie-Anne.PONT@rms.nsw.gov.au>
Sent: Thursday, September 27, 2018 4:15 PM
To: Lee, Greg A
Cc: Farrell, Lee
Subject: FW: Mooney Mooney - Traffic Study

Hi Greg,

Roads and Maritime's Road Network Analysis team have reviewed your email below and provided the following comments:

- Methodology:
  Given the proposed development scope, and the existing traffic, the SIDRA modelling is recommended for the local road intersection traffic performance assessment.
  The Highway Capacity Manual ('HCM') desktop analysis is recommended for the M1 interchange ramp terminals (exits and entries) assessment.
  Alternatively, VISSIM microsimulation modelling can be used for the M1 interchange analysis providing that the reported ramp performance measures will be the same or similar to HCM measures. VISSIM models can also be used to extract intersections' traffic performance measures.

- Scope - Peak hours relevant for the assessment:
  For M1 Motorway – select the AM peak hour when M1 southbound traffic is at the highest (peak) flow, PM peak hour when M1 northbound traffic is at the peak flow. In a similar way, determine weekend 'midday' peaks for M1 both (southbound and northbound) directions. For the nominated three intersections: select AM, PM and weekend peak hours when the intersections' total flow is the highest. Note, traffic counts may reveal other peak traffic hours relevant to the analysis and assessment. Furthermore, the assessment should also have consideration for future traffic generation for the ultimate development potential, including an outline of background growth and the cumulative traffic impacts for 25 years over 5 year increments.

Further to the above comment, see the additional 'red' comments below in direct response to each of the points raised in your email.

Regards,

Kylie-Anne Pont
Development Assessment Officer
Network & Safety Hunter | Regional & Freight
T 02 4908 7683 **M** 0475 989 994
www.rms.nsw.gov.au
Every journey matters

Roads and Maritime Services
Level 8, 266 King St Newcastle NSW 2300

From: Lee, Greg A [mailto:Greg.Lee@mottmac.com]
Sent: Thursday, 20 September 2018 3:18 PM
To: Development hunter
Cc: Farrell, Lee; Stephens, Matthew; Zaaiter, Ghada; Loder, Thomas
Subject: RE: Mooney Mooney - Traffic Study

Hi Kylie-Anne,

Thank you for your comments below regarding the Mooney Mooney development, apologies it has been a while since our last email exchange, we have since been working with our client to bed down scope and approach. We have agreed with the Client to undertake VISSIM modelling of the study area as opposed to the SIDRA analysis. If possible before we jump into the modelling and obtain traffic counts we would like to discuss and where possible agree in principle to our broad methodology.

Below are the major assumptions considered for the development of the VISSIM model for the Mooney Mooney Planning Proposal.

1. The RMS permanent count data from F3FWY003 and 76001 will be used to establish the traffic flow along the M1 and Pacific Highway, distinguishing between heavy and light vehicles. This data will also serve as a guide to determine timeframes for data collection. OK.

2. Classified video intersection counts will be conducted at three intersections within the site as per the diagram below. As stated above, the RMS permanent counters have been used to determine the timeframes for collection (refer to diagrams attached).
    1. 5:00am – 8:00am for AM weekday
    2. 3:00pm – 6:00pm for PM weekday
    3. 8:00am – 6:00pm for weekend peak
    4. Count M1 Interchange ramp existing and entering traffic in the same time periods as the intersections' counts

3. Three 7x7 'base case' demand matrices (2-hrs = 1-hr lead-in and 1-hr peak) and three 'development case' demand matricies will be developed using both the RMS permanent count data and classified survey as per the diagram below. Given the modelled network extent, the time duration of 1.5 hour (30min 'warm-up' and one peak hour) is enough. And preferable, for each model set 15min matrices (4 matrices) for each peak hour. RMS has no preference whether 15min or 30min matrices are used for the "warm up" and "cool down" periods.

4. Demand matrices will be developed using the IPF (Frataring) matrix scaling method, against observed cordon flows. I am not sure how matrix (Fratar) scaling is relevant here. Estimate traffic matrices for the existing traffic scenario from the traffic counts. Make sure that the existing models replicate the M1 traffic flows and the intersections' turning movements.

Future traffic matrices should comprise the development generated traffic plus 'background traffic'. The 'background' traffic should be for the year when the developments are likely to be completed. Determine the 'background' traffic growth from RMS's STFM model, for AM and PM peak periods. Since the STFM does not have future weekend traffic, assume a weekend traffic growth rate similar to the weekday traffic growth rate – other estimation methods by the Consultants may also be considered but should be justified. Distribute ('in' and 'out') the development generated traffic to zones 1, 5, 6 and 7, proportionally to their demand (production/attraction) volumes.

5. Six VISSIM models, three 'base case' and three 'development case', will be developed using the information above and coded based on a spatially accurate aerial photo. Minimum 8 models (2 x AM, 2 x PM (weekdays), 4 x weekend (Sat and Sun)) over 25 years in 5 year increments.

6. Zones 1, 5 and 7 will extend up to 500m beyond the interchange ramps in each direction. Extend the modelled M1 motorway (zones 1 & 5) beyond the interchange ramps for at least 1km.

7. Given the small scale, mostly free-flow nature of the model travel time calibration is not proposed. Agreed.

8. This will be a 2D model. Acceptable.

9. Model the motorway's existing S/B and N/B parking,

Please advise if this scope and methodology is acceptable. We are happy to discuss any of the above.

With Kind regards,

Greg Lee
Principal Civil Engineer

T +61 (0)2 9098 6800 D +61 (0)2 9098 6714 F +61 (0)2 9098 6810
Greg.lee@mottmac.com

MOTT MACDONALD

Mott MacDonald
383 Kent Street
Sydney NSW 2000
PO Box Q1678, QVB Sydney, NSW 1230
Australia

Website | Twitter | LinkedIn | Facebook | YouTube

From: Development hunter [mailto:Development.hunter@rms.nsw.gov.au]
Sent: Thursday, 23 August, 2018 12:42 PM
To: Lee, Greg A <Greg.Lee@mottmac.com>
Cc: Farrell, Lee <Lee.Farrell@transport.nsw.gov.au>
Subject: FW: Mooney Mooney - Traffic Study

Hi Greg,

I refer to your email below seeking clarification about the electronic analysis to be submitted with the Planning Proposal at Mooney Mooney.

The M1 Pacific Motorway is a critical piece of State road infrastructure facilitating the efficient flow of high volumes of freight and passenger vehicle traffic between Gosford and Newcastle to/from Sydney and beyond. Furthermore the network provides dedicated rest stops for both heavy vehicles and light vehicles promoting safe use of the high speed road network.

The complexity and sensitivity of vehicle movements at the Mooney Mooney interchange is heavily influenced by the high traffic volumes, high speed environment, close proximity of the low speed internal local road network intersections and exiting rest stop facilities on both east and west sides of the M1 Pacific Motorway. As such, it is critical that a comprehensive assessment of the build-up and dissipation of queues and their effect on surrounding congestion and travel times is sensitively modelled to ensure the impacts of the planning proposal on the M1 Pacific Motorway are identified and suitably addressed within a Traffic Impact Assessment. Neither Transport for NSW nor Roads and Maritime support the use of a micro-analytical tool like SIDRA for the analysis of this proposal.

Kylie-Anne Pont
Development Assessment Officer
Network & Safety Hunter | Regional & Freight
T 02 4908 7683 **M** 0475 989 994
www.rms.nsw.gov.au
Every journey matters

Roads and Maritime Services
Level 8, 266 King St Newcastle NSW 2300

From: Lee, Greg A [mailto:Greg.Lee@mottmac.com]
Sent: Tuesday, 21 August 2018 5:56 PM
To: MARLER Peter C
Cc: Gregg, Amy; Loder, Thomas; Higgisson, Rachel
Subject: Mooney Mooney - Traffic Study

Hi Peter,

Greg Sullivan from the Department of Planning mentioned it may be worthwhile touching base with yourself regarding a Planning Proposal we are working on with Property NSW at Mooney Mooney.
We are currently undertaking a Traffic and Transport Assessment of PNSW's Mooney Mooney Site, which they are ultimately looking to divest. I am not sure if you are familiar with the site at all? We are hoping to seek some clarification around scope of works.

We've received the attached joint response from TfNSW/RMS. If possible we would like to discuss the scope and detail, in particular the below request for a microsim model of the on and off ramps.

"An assessment of the traffic and safety implications at the Mooney Mooney Interchange, including a review of impacts commercial development to the west of the M1 may have on Interchange operations. It is recommended that a detailed traffic assessment be undertaken, which includes (but not limited to) a microsimulation analysis of the operation of the on and off ramps. Further consultation with Roads and Maritime is recommended to seek advice regarding more detailed scope of work and model specification."

The proposed development includes the creation of 250 units and approx. 90 bedroom hotel. Given the nature of the area and the expected traffic generation we are proposing to undertake an assessment of the site using SIDRA as per our attached scope. This will still allow us to assess the ramps and queueing from the first intersections from the off ramps.

If possible it would be good to have a quick chat regarding the above as I understand you may not be familiar with the project and there may be a better point of contact at RMS.

With Kind Regards,

Greg Lee
Principal Civil Engineer

T +61 (0)2 9098 6800 D +61 (0)2 9098 6714 F +61 (0)2 9098 6810
Greg.lee@mottmac.com

MOTT MACDONALD

Mott MacDonald
383 Kent Street
Sydney NSW 2000
PO Box Q1678, QVB Sydney, NSW 1230
Australia

Website | Twitter | LinkedIn | Facebook | YouTube