# TRAFFIC & PARKING IMPACT ASSESSMENT OF PROPOSED HARD ROCK QUARRY AT 67 MAYTOMS LANE, BOORAL


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**Development Type:** **Proposed Hard Rock Quarry**

**Site Address:** **67 Maytoms Lane, Booral**

**Prepared for:** **ADW Johnson**

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## EXECUTIVE SUMMARY

*M^CLaren Traffic Engineering (MTE) was commissioned by ADW Johnson to provide a Traffic & Parking Impact Assessment of the Proposed Hard Rock Quarry at 67 Maytoms Lane, Booral.*

*The proposed Hard Rock Quarry includes the staged extraction of approximately 45 million tonnes of hard rock over a planned life of 30 years, with a peak annual extraction of 1.5 million tonnes per annum. The proposal includes clearing vegetation, earthworks, road upgrades to Maytoms Lane and The Bucketts Way, the provision of an internal access road, installation of site servicing infrastructure including site office infrastructure, weighbridges, workshop, parking areas and product storage areas.*

*The proposed development will operate between 7:00am to 6:00pm Monday to Saturday for material deliveries to and from the site, with extraction and processing activities being undertaken between the hours of 6:00am to 10:00pm Monday to Friday and 6am to 4pm Saturday. The largest vehicle that will travel to the site will be a 19m length Truck and Dog Combination, with all heavy vehicles arriving to and departing from the site to the south.*

*All vehicular access to the site will be via a newly created public road intersection of The Bucketts Way / Maytoms Lane which will be upgraded as part of the proposal. In addition to the public road intersection, an internal access road will be provided between Maytoms Lane and the work area / stockpile area.*

*The proposal is anticipated to require 25 to 30 staff members for day to day operations. Accordingly, the recommended on-site parking supply should be 30 staff car parking spaces. If required by Council, a car parking area can be provided on-site accommodating 30 car parking spaces in accordance with AS2890.1:2004 design requirements although this provision is considered unnecessary, as is standard for this type of development, staff park informally near stockpile areas, offices, amenity areas and on the side of the internal road.*

*If overnight parking is required for heavy vehicles, it is anticipated that these will be stored on-site near stockpile areas or on the side of the internal access road near stockpile areas. There is adequate room on-site to provide informal parking facilities for both staff and heavy vehicles. This is common practice for this type of development and all parking for the site will be fully contained on-site.*

*The proposal is expected to generate 27 vehicle trips in the AM (14 in, 13 out) peak hour period and 42 vehicle trips in the PM (13 in, 29 out) peak hour period including 15 outbound staff movements. As a maximum average, the site is expected to generate 136 heavy vehicles per operating day resulting in 272 two-way (136 in, 136 out) vehicle trips by heavy vehicles per day, over an 11-hour operating day. All assessed intersections retain their existing level of service in post development 2023 conditions, except for the AM peak hour period at the intersection of Pacific Highway / The Bucketts Way, which has a change of LoS "B" for the right turn from The Bucketts Way to LoS "C". This represents an increase in average delay of 4 seconds, with LoS "C" representing a satisfactory operation.*

*The proposed development results in a low increase to the surrounding traffic network volume. Although when considered as part of a cumulative assessment with the Deep Creek Quarry, the combined impacts of both developments result in a LoS "D" for the intersection of The Bucketts Way / Pacific Highway during the worst case assessed peak hours of 9:00am to 10:00am and 2:45pm to 3:45pm. This results in an acceptable operation, although the intersection is approaching its operating capacity.*

*Based upon background traffic growth to 2033,* ***without*** *development traffic the intersection of Pacific Highway / The Bucketts Way is expected to operate with worst turning movement of LoS "F" and LoS "C" during the AM (9:00am to 10:00am) and PM (2:45pm to 3:45pm) peak hour periods respectively. This worst turning movement relates to the right turn out of The Bucketts Way. LoS "F" indicates that the turn movement is failing and is above the capacity at which the intersection can handle, therefore requiring an infrastructure upgrade. In future 2033 conditions, with development traffic, the intersection of Pacific Highway / The Bucketts Way is operating with worst turn movement of LoS "F" and LoS "E" during the AM and PM peak hour period respectively. This indicates that the intersection requires an infrastructure upgrade to operate within an acceptable Level of Service as per existing base case 2033 growth conditions without development traffic.*

*Any intersection upgrade to Pacific Highway / The Bucketts Way in 2033 is largely influenced by background traffic growth, rather than the proposed development traffic. The next infrastructure upgrade for Pacific Highway / The Bucketts Way would come in the form of a roundabout or signalised intersection and a likely reduction in the signposted speed limit. Although considering the major role that the Pacific Highway plays in traffic flow efficiency, any roundabout or signalised intersection may not be supported by TfNSW at this location. It is reiterated that there is no proposed upgrade to Pacific Highway / The Bucketts Way as part of this traffic report. The proposed development results in a small increase to the surrounding traffic network volumes and will not have an adverse impact on major traffic flows when considered in isolation. There is the potential for passing background traffic growth along the Pacific Highway to make the right turn out onto the Pacific Highway from The Buckets Way difficult for traffic of the proposed development at peak times, but there is an alternative route that has been proposed to ameliorate any externalised impacts of the subject development upon this intersection in the future.*

*The intersection of The Bucketts Way / Maytoms Lane has been assessed, with the recommended design shown in* ***Section 5.2*** *for reference. It is recommended that the layout include a short deceleration left turn lane for access into Maytoms Lane and a basic right turn into Maytoms Lane. Based upon AUSTROADS turn warrants, the intersection geometry is required to be in the form of a basic right and left turn treatments. As such, these recommended road treatments exceed those requirements as outlined in AUSTROADS and is recommended due to the associated higher levels of heavy vehicle traffic associated with the proposed development.*

*The overall intersection geometry in terms of safety with reference to sight lines is acceptable and it is recommended that regular understorey trimming of trees located within the road reserve occurs to ensure unobstructed sight lines are provided. The existing 85$^{th}$ percentile road speeds of 100km/h, which requires 248m of sight distance, which is achievable as shown in* ***Annexure F****.*

*Once a builder is engaged, the methodology of the build will be detailed within a Construction Program and associated Construction Traffic Management Plan, to be approved by Council. The construction of the development is likely to occur in stages, with the construction of Maytoms Lane and The Bucketts Way occurring first. Once construction of The Bucketts Way / Maytoms Lane is complete, it is expected that all staff and construction vehicles will park on-site and enter and exit the site in a forward direction. It is highly unlikely that heavy construction traffic in conjunction with staff traffic will exceed the assessed peak hour traffic movements.*

# 1 INTRODUCTION

*M$^{C}$Laren Traffic Engineering (MTE)* was commissioned by *ADW Johnson* to provide a Traffic & Parking Impact Assessment of the Proposed Hard Rock Quarry at 67 Maytoms Lane, Booral as depicted in the site concept layout plans in **Annexure A** for reference.

## *1.1 Description and Scale of Development*

The proposed Hard Rock Quarry includes the following relevant to this traffic and parking report:

- Staged extraction of approximately 45 million tonnes of hard rock over a planned life of 30 years at the following annual rate of extraction:
    - Annual extraction up to 1.5 million tonnes per annum for the remaining 30 years.
- Site preparation and earthworks to facilitate extraction of hard rock above as per the following:
    - Clearing of vegetation to make way for access, construction and operational activities;
    - Road upgrade works to Maytoms Lane and the intersection of Maytoms Lane / The Bucketts Way;
    - Construction of internal access roads;
    - Installation and / or upgrade of required site servicing infrastructure;
    - Installation and operation of ancillary site infrastructure, including two weighbridges, site office, workshop, parking areas, product storage and site amenities.
- The proposed hours of operation for the various activities on-site are as per the following:
    - Extraction and processing activities between the hours of 6:00am to 10:00pm Monday to Saturday, with product transfer to stockpiles between 6:00am and 12:00 midnight Monday to Saturday;
    - Haulage of material into the development site and from the development site is proposed between 7:00am to 6:00pm Monday to Saturday.
- The largest vehicle that will travel to the site will be a 19m Truck and Dog Combination. The combination of vehicle that will be used for delivery of material to and from the site consists of the following:

- 96% of all deliveries - Truck and Dog Combination (19m length) with a payload of 39 tonnes;
- 2% of all deliveries – Truck and Dog Combination (19m length) with a payload of 32 tonne;
- 2% of all deliveries – 12.5m length Heavy Rigid Vehicle with a payload of 19 tonnes.

- At full production of the site, staff numbers are anticipated to be in the range of 25 to 30;
- The proposed heavy vehicle haulage routes will be to / from the south most of the times, with occurrences of heavy vehicles travelling north to Stroud.

All vehicular access to the site will be via a newly created public road intersection of The Bucketts Way / Maytoms Lane which is proposed to be upgraded as part of the proposal. In addition to the public road intersection an internal access road will be provided between Maytoms Lane and the work area / stockpile area.

### *1.2 State Environmental Planning Policy (Transport & Infrastructure) 2021*

The proposed development does not qualify as a traffic generating development with relevant size and/or capacity under *Clause 2.122* of the *State Environmental Planning Policy (Transport & Infrastructure) 2021* (SEPP) as Extractive Industry is typically not considered to be the same class of development as "industry".

### *1.3 Secretary's Environmental Assessment Requirements (SEARs)*

The proposed development is classified as State significant development (SSD) under the provisions of *Division 4.7* of *Part 4* of the *Environmental Planning and Assessment Act 1979 (EP&A Act)* in accordance with *State Environmental Planning Policy (State and Regional Development 2011)*. As such it will be required to obtain the *Secretary's Environmental Assessment Requirements* (SEARs). The SEARs relevant to traffic and parking are reproduced in **Annexure B** for reference.

The traffic and transport related items within the SEARs are listed in **Table 1** and Transport for New South Wales comments are reproduced in **Table 2**, with section references that address each requirements.

## TABLE 1: SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

| Requirement | Relevant Section |
|---|---|
| **Traffic & Transport** | |
| Accurate predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products, concrete and other materials. | **Section 1.1, Section 4.1 and Section 0** |
| A detailed assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road network (as identified above), including a road safety audit. | **Section 4.3** |
| An assessment of cumulative traffic impacts, having regard to any other proposed developments in the locality. | **Section 4.3** |
| A description of the measures that would be implemented to mitigate any impacts, including concept plans of any proposed upgrades, developed in consultation with the relevant road and rail authorities (if required). | **Section 5** |
| A description of existing and proposed access roads. | **Section 1.1 and Section 1.4** |

## TABLE 2: TRANSPORT FOR NEW SOUTH WALES REQUIREMENTS

| Requirement | Relevant Section |
|---|---|
| **Traffic & Transport Study** | |
| A map of the surrounding road network identifying the site access, nearby accesses intersections and transport related facilities | **Section 1.5 & Section 2** |
| A map of the proposed transport route/s identifying all public roads proposed to obtain access from the classified (State) road/s to the development. | **Section 3.4.1** |
| The total impact of existing and proposed development on the road network with consideration for a 10 year horizon. This should include;<br>- Identify Annual Average Daily Traffic (AADT) volumes with percentage heavy vehicles along the transport route/s and diagrammatically demonstrate AM and PM peak hour movements at key intersections<br>- Background traffic data from published sources and / or recent survey data. The source of data and any assumptions are to be clearly explained and justified, including the growth rate applied to the future horizon.<br>- The volume and distribution of proposed trips to be generated by the construction, operational and decommission phases of the development. This should identify the maximum daily and hourly demands generated by the development, particularly where they coincide with the network peak hour. | **Annexure C, Section 4.1 4.2, 4.3 & Figure 5 and Section 6** |
| Details of the road geometry and alignment along the identified transport route/s, including existing formations, crossings, intersection treatments and any identified hazards. This should include<br>- Available sight distance at the site access and nearby intersections and any constraint to achieving the required sight distance for the posted speed limit<br>- Available sight distances at intersections along the proposed transport routes and any constraint to achieving the required sight distance for the posted speed limit<br>- An assessment of turn treatment warrants in accordance with Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for intersections along the identified transport route/s, identifying the existence of the minimum basic turn treatments and addressing the need for any warranted higher order treatments<br>- Swept path analysis demonstrating the largest design vehicle entering and leaving the development, and moving in each direction through intersections along the proposed transport route/s. | **Section 3.4.1, 4.3, 5.1.1, 5.2** |
| Capacity analysis using SIDRA or other relevant application, to identify an acceptable Level of Service (LoS) at intersections with the classified (State) road/s, and where relevant, analysis of any other intersections along the proposed transport route/s. | **Section 4.3** |
| A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056. | **Section 5.2.1** |
| Strategic (2d) design drawings of all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. Works must be appropriately designed for the existing posted speed limit. | **For others to address** |

| Requirement | Relevant Section |
|---|---|
| Site plan demonstrating site access, internal manoeuvring, servicing and parking areas consistent with the relevant prats of AS2890 and Council requirements | **Section 3** |
| Details of measures to address impacts and / or provide connections for public transport services and active transport modes, such as, public and school bus services, walking and cycling | **N/A** |
| Details of measures to ameliorate the impacts of road traffic noise, dust, and / or glare generated along the proposed transport route/s | **For others to address** |
| Details of any Traffic Management Plan (TMP) proposed to address the construction and operation phases of the proposed development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017. It is recommended that any TMP include, but not necessarily limited to, the following:<br>- A map of the primary transport route/s highlighting critical locations<br>- An induction process for vehicle operators and regular toolbox meetings<br>- Procedures for travel through residential zones, school zones and / or bus rout/s.<br>- Any proposed temporary measures such a Traffic Guidance Scheme (TGS)<br>- A Driver Code of Conduct for heavy vehicle operators<br>- A complaint resolution and disciplinary procedure<br>- Community consultation measures proposed for peak periods. | **Section 6 & Annexure G** |

### *1.4 Site Description*

The subject site is located approximately 4km south of the Booral township on the western side of The Bucketts Way within the LGA of Mid-Coast Council and is subject to the Great Lakes Council planning controls as adopted by Mid-Coast Council. The subject site consists of land on 8 lots, with the existing use being traditional agricultural production, of which stock grazing being the predominate use.

The site is zoned *RU2 Rural Landscape* under *Great Lakes Council Local Environmental Plan 2014* which permits extractive industries with consent. The sit is generally surrounded by agricultural production land, small scale poultry operations and small low-density dwellings.

All existing vehicle access to the site is provided from Maytoms Lane, which is an unsealed single carriageway road with informal passing opportunities provided on grassy areas where possible.

### *1.5 Site Context*

The site location is shown on aerial imagery and a map in **Figure 1** & **Figure 2** respectively.

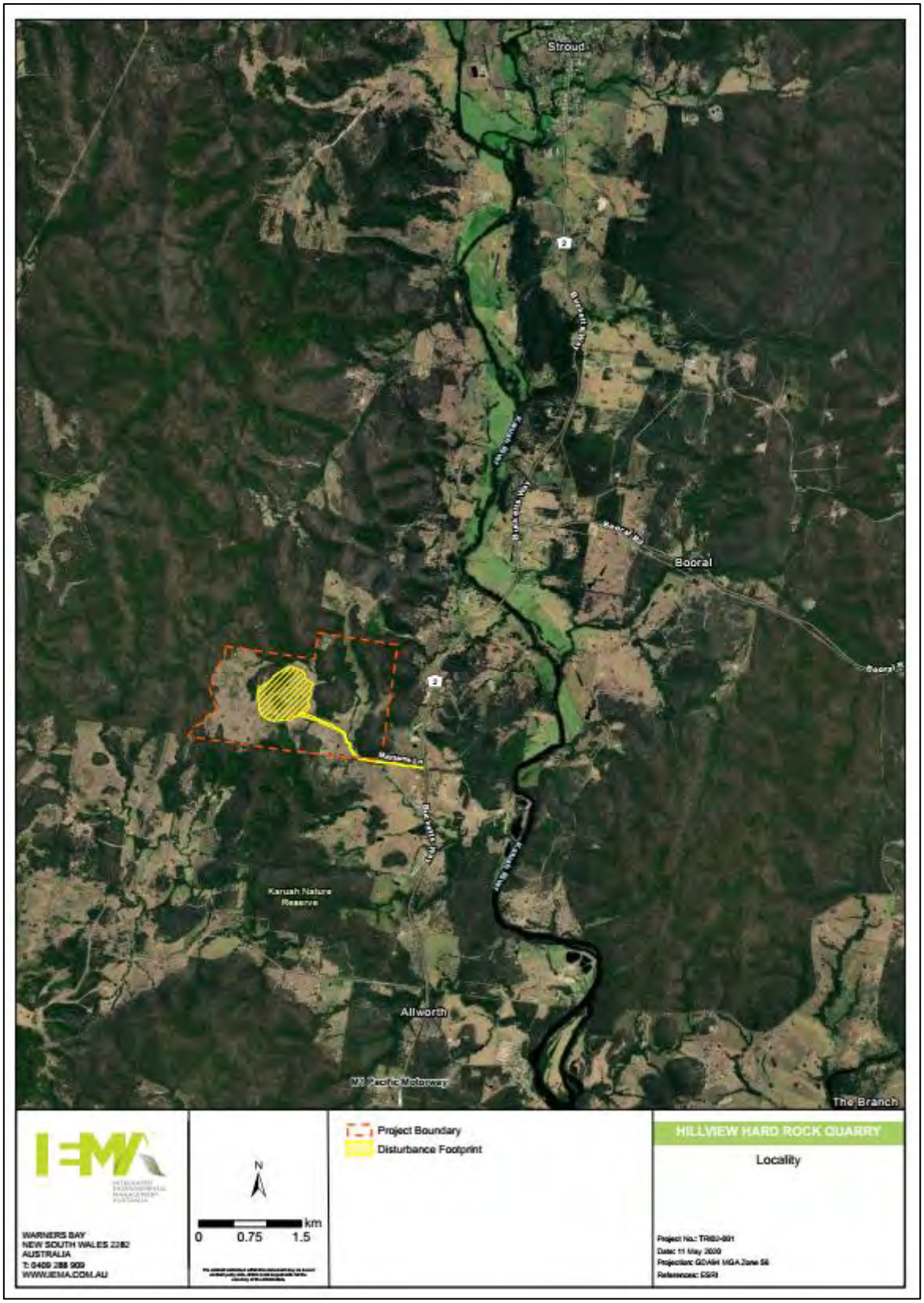



**FIGURE 1: SITE CONTEXT – AERIAL PHOTO**

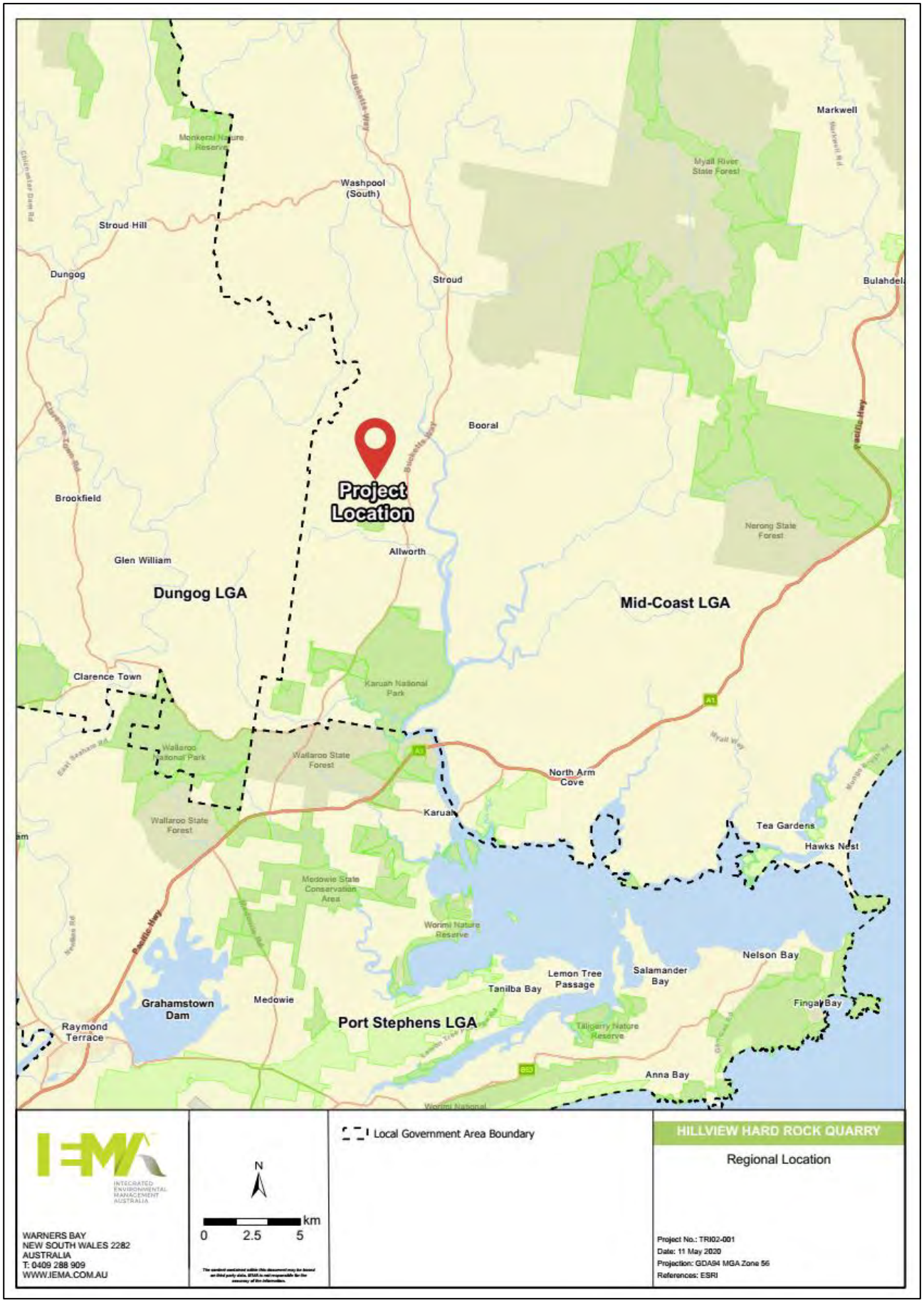



**FIGURE 2: SITE CONTEXT – STREET MAP**

# 2 EXISTING TRAFFIC AND PARKING CONDITIONS

## *2.1 Road Hierarchy*

The road network surrounding the site has the following current characteristics:

### 2.1.1 Maytoms Lane

- Unclassified unsealed Local Road;
- Varying road width of 3m to 3.5m in width facilitating two-way traffic flow within a single traffic lane. Informal kerbside parking and two-way vehicle passing can occur within grassy areas where the terrain permits;
- Signposted rural road, default speed limit of 100km/h restriction would apply, although due to existing geometry and terrain constraints 20-40km/h would likely be prevalent;
- No formal kerbside parking, but informal parking may occur within grassy areas where the terrain permits.

### 2.1.2 The Bucketts Way

- Classified TfNSW Regional Road (No. 90);
- Approximately 6.5m wide carriageway with approximately 0.5m wide road shoulders on both sides of the road, facilitating one traffic flow lane in each direction and no provision for kerbside parking on either side of the road;
- Signposted 90km/h within close proximity to the site;
- No formal kerbside parking provided along both sides of the road, informal parking may occur within the verge.

### 2.1.3 Pacific Highway

- Classified TfNSW State Road (No. 10);
- Approximately 29m in width, facilitating two traffic flow lanes in both directions, 2.5m wide road shoulders for emergency breakdowns on both sides of the road and a 9m wide landscaped area separating eastbound and westbound traffic. In addition a bicycle facility is provided in the eastbound carriageway near The Bucketts Way;
- Signposted 100km/h;
- No provision for kerbside parking on either side of the road, although informal parking may occur within the road shoulder in emergency situations.

### 2.1.4 Booral Road

- Unclassified Collector Road;

- Approximately 8m in width, within close proximity to The Bucketts Way, facilitating one traffic flow lane in each direction and kerbside parking provided along the northern side of the road within close proximity to The Bucketts Way only. Informal kerbside parking may occur within the verge;
- Signposted 60km/h.

### *2.2 Existing Traffic Management*

- Stop controlled intersection of Booral Road / The Bucketts Way;
- Priority controlled intersection of The Bucketts Way / Maytoms Lane;
- Stop controlled seagull intersection of The Bucketts Way / Pacific Highway:
    - Left turns from Pacific Highway are required to give-way to right turning vehicles from the Pacific Highway into The Bucketts Way.

### *2.3 Existing Traffic Environment*

#### 2.3.1 Traffic Surveys

Traffic counts were completed at the intersection of The Bucketts Way / Pacific Highway and Booral Road / The Bucketts Way on Monday the 6 of February 2023 between 6:00am to 10:00am and 2:30pm to 7:00pm, representing a typical operating weekday. Detailed survey results are reproduced in **Annexure C** for reference.

Existing intersection performances have been assessed using SIDRA INTERSECTION 9.0 The results of the analysis are summarised in **Table 4** below, with detailed SIDRA outputs shown in **Annexure D** for reference. The peak hour modelled for each intersection is summarised below, which is the worst case for each intersection, as they had the highest traffic volumes:

- The Bucketts Way / Pacific Highway – 9:00am to 10:00am and 2:45pm to 3:45pm;
- The Bucketts Way / Booral Road – 8:30am to 9:30am and 3:30pm to 4:30pm.

It should be noted that the intersection of the Pacific Highway / The Bucketts Way has been modelled as a seagull intersection (2 stage), with a detailed video review being undertaken of the operation of the intersection with respect to the observed average delay of critical turning movements, particularly the right turn movements into and out of The Bucketts Way. A summary of the average delay for the right turn movements into and out of The Bucketts Way during the above-mentioned peak hour periods is reproduced in **Annexure C** for reference.

To accurately reflect the existing operations, particularly right turns out of The Bucketts Way the following modifications have been made to the gap acceptance and critical gap acceptance parameters within SIDRA:

- Right turn from The Bucketts Way:

- Critical Gap – 5.25 seconds;
- Follow up headway – 3 seconds.

The adoption of the above provides accurate outputs from SIDRA that accurately reflect the real-life operations and are sound and logical changes due to the following:

- Default SIDRA Input is 7 seconds for the critical gap and 4 seconds for the follow up headway which is not appropriate for the seagull intersection, as vehicles turning right from The Bucketts Way do not have to give-way to through movements along the Pacific Highway travelling westbound, so it is reasonable that the critical gap and follow up headway would be lower than 7 seconds and 4 seconds;

- Table 3.5 of Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections provide a critical gap of 4 seconds and follow up headway of 2 seconds for crossing a two lane / one-way road, which the proposal is similar too, but not quite and hence it is considered the critical gap and follow up headway should be more than 4 seconds and 2 seconds respectively.

- Table 3.5 of Austroads Guide to Road Design Part 4A: Unsignalised and Signalised outlines a critical gap of 5 seconds and 3 seconds for a right turn from the minor road across a two lane / two-way road. It is considered that the follow up headway of 3 seconds is appropriate to utilise for the subject intersection.

- The critical gap acceptance was than modified iteratively between 7 seconds and 5 seconds until the SIDRA outputs reflected close to the observed average delay. This found that the critical gap was 5.25 seconds.

A summary of the observed average delay and SIDRA output average delays are provided in **Table 3** for comparison purposes to demonstrate a calibrated model.

**TABLE 3: SIDRA OUTPUT AVERAGE DELAY AGAINST OBSERVED AVERAGE DELAY**

| Peak Period | Turn Movement | Sample Size | Observed Average Delay | SIDRA Output Average Delay |
|---|---|---|---|---|
| **AM (9:00am to 10:00am)** | Right turn from Pacific Highway into The Bucketts Way | 24 | 7.25 seconds | 13.2 seconds |
| **PM (2:45pm to 3:45pm)** | | 25 | 5.4 seconds | 14.6 seconds |
| **AM (9:00am to 10:00am)** | Right turn from The Bucketts Way into Pacific Highway (Stage 1 movement) | 125 | 27.5 seconds | 27.8 seconds |
| **PM (2:45pm to 3:45pm)** | | 97 | 22.3 seconds | 24.8 seconds |

As shown above, the right turn from The Bucketts Way onto Pacific Highway SIDRA output is reflective of the observed average delay. No input changes to the gap acceptance parameters were made to calibrate the right turn movement from Pacific Highway into The Bucketts Way, as in M$^{C}$Laren Traffic Engineering (MTE) view, the sample size for right turning vehicles into The Bucketts Way from Pacific Highway was too small and the default gap acceptance parameters was deemed appropriate and conservative for the purposes of assessment.

**TABLE 4: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.0)**

| Intersection | Peak Hour | Degree of Saturation[1] | Average Delay[2] (sec/vehicle) | Level of Service[3][4] | Control Type | Worst Movement |
|---|---|---|---|---|---|---|
| **EXISTING PERFORMANCE** | | | | | | |
| Pacific Highway / The Bucketts Way[5] | AM | 0.50 | **N/A** (Worst: 27.8) | **N/A** (Worst: B) | Stop | Right turn from The Bucketts Way |
| | PM | 0.47 | **N/A** (Worst: 24.8) | **NA** (Worst: B) | | Right turn from The Bucketts Way |
| Booral Road / The Bucketts Way | AM | 0.08 | **N/A** (Worst: 9.3) | **N/A** (Worst: A) | Stop | RT from Booral Road |
| | PM | 0.08 | **N/A** (Worst: 9.0) | **NA** (Worst: A) | | RT from Booral Road |

NOTES:

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

(4) N/A – 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.

(5) Results are based upon Stage 1 only

As shown above, the intersection of The Bucketts Way / Pacific Highway and Booral Road / The Bucketts Way is operating with worst turning movements of LoS “A” & “B” indicating minor delays and spare capacity.

### 2.3.2 Speed and Volume Survey

One tube count was completed in close proximity to the intersection of The Bucketts Way / Maytoms Lane over a seven-day period from Sunday 5 February to Saturday 11 February 2023. Detailed results of these surveys are reproduced in **Annexure C** for reference, with a summary of speeds and volumes shown in **Table 5** below.

**TABLE 5: 7-DAY SPEED AND VOLUME SURVEY RESULTS**

| Road | Peak Hour Volume (Average) | | | | Average Daily Volume (Weekday) | Heavy Vehicle Percentage | 85th Percentile Speed per direction | |
|---|---|---|---|---|---|---|---|---|
| | Time | Direction | Volume (two-way) | Volume (directional) | | | Northbound | Southbound |
| The Bucketts Way | Weekday AM (8am – 9am) | Northbound | 215 | 102 | 2,840 | 15% | 97.2km/h | 99.6km/h |
| | | Southbound | | 113 | | | | |
| | Weekday PM (4 pm – 5 pm) | Northbound | 247 | 150 | | | | |
| | | Southbound | | 97 | | | | |

As shown above, the existing 85th percentile speed on The Bucketts Way within close proximity to Maytoms Lane is 97.2km/h northbound and 99.6km/h southbound. In addition, the observed traffic volumes within a one hour period are low, with two-way traffic volumes being less than 250 vehicles in any one peak hour period.

### *2.4 Public Transport*

The subject site is not located with an accessible location, having no public bus stop facilities, bicycle or pedestrian facilities within close proximity to the site. This is considered normal considering the rural context of the site, with travel mode to and from the site being primarily private vehicle.

### *2.5 Future Road and Infrastructure Upgrades*

From the Mid-Coast Council Development Application tracker and website, it appears that there are no future planned road or public transport changes that will affect traffic conditions within the immediate vicinity of the subject site.

From the *Department of Infrastructure, Transport, Regional Development and Communications* website, The Bucketts Way has been provided funding for the upgrade of the road ($25 million). The funding will include upgrades of Bucketts Way to prioritise sections of the route that have been identified in the Bucketts Way Route Access Strategy Upgrade Program and upgrades will include reconstruction, widening and resealing.

The project will improve freight efficiency and road safety, improve connectivity between people to jobs and improve movements of goods to market. The construction commenced in mid-2021 and is expected to be completed in mid-2024.

### 2.5.1 Deep Creek Quarry

As part of the development it is a required to consider cumulative traffic impacts generated by other development. There are no known approved developments which would need to be considered within this assessment that would not already have been captured within he traffic surveys. However, there is a proposed Quarry Development located at 279 Deep Creek Road, Limeburners Creek which is understood to be approved.

Reference is made to the Traffic Impact Assessment prepared by Intersect Traffic which outlines the following traffic generation of the Quarry during peak commuter traffic periods.

- 54 two-way vehicle trips per hour during the AM and PM commuter periods (54 heavy vehicles).

The traffic generation outlined above has been added to the existing calibrated base case model, for the intersection of Pacific Highway / The Bucketts Way, with the results provided in **Table 6** and the detailed SIDRA results reproduced in **Annexure D**.

**TABLE 6: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.0)**

| Intersection | Peak Hour | Degree of Saturation(1) | Average Delay(2) (sec/vehicle) | Level of Service(3)(4) | Control Type | Worst Movement |
|---|---|---|---|---|---|---|
| **EXISTING PERFORMANCE + DEEP CREEK QUARRY** | | | | | | |
| Pacific Highway / The Bucketts Way(5) | AM | 0.72 | **N/A** (Worst: 42.7) | **N/A** (Worst: D) | Stop | Right turn from The Bucketts Way |
| | PM | 0.58 | **N/A** (Worst: 35.6) | **NA** (Worst: C) | | Right turn from The Bucketts Way |

NOTES:

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
(2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
(3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
(4) N/A – 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.
(5) Results are based upon Stage 1 only

As shown above, the intersection of The Bucketts Way / Pacific Highway is operating with worst turning movements of LoS “D” & “C” indicating that the intersection is approaching capacity.

# 3 PARKING ASSESSMENT

## *3.1 Council Car Parking Requirements*

The *Great Lakes Region Development Control Plan Chapter 10 – Car Parking, Access, Alternative and Active Transport* as adopted by Mid Coast Council does not outline car parking requirements for extraction industry developments. A first principle parking assessment will be undertaken to determine the anticipated car parking demand of the site.

The site is located within a rural environment with no access by public transport, bicycle routes or pedestrian facilities and as a conservative approach one space per staff member will be applied based upon the operation of the site.

The subject development is anticipated to require 25 to 30 staff members during peak times of operation under the proposal. Accordingly, the recommended on-site parking supply should be 30 staff car parking spaces.

Consideration the nature of the development, it is unnecessary to provide compliant linemarked sealed car parking spaces for staff, as is standard for this type of development, staff park informally near stockpile areas, offices, amenity areas and on the side of the internal road. If required by Council, a car parking area can be provided on-site accommodating 30 car parking spaces in accordance with *AS2890.1:2004* design requirements but is considered unnecessary.

Similar to the above, if overnight parking is required for heavy vehicles, it is anticipated that these will be stored on-site near stockpile areas or on the side of the internal access road near stockpile areas. There is adequate room on-site to provide informal parking facilities for both staff and heavy vehicles traffic. It is reiterated that this is common practice for this type of development and all parking for the site will be fully contained on-site.

## *3.2 Disabled Parking*

Reference is made to the *Building Code of Australia's* (BCA's) *Table D3.5* of which classifies the proposed development as most similar to a Class 7 building, requiring disabled car parking provision of 1 space per 100 car parking spaces. Considering the type of development, the site is unlikely to require the provision of a disabled car parking space. In any event, one disabled car parking space should be accommodated on-site to comply with typical BCA requirements.

## *3.3 Bicycle & Motorcycle Parking Requirements*

Council's DCP does not outline any bicycle or motorcycle parking requirements for quarry developments and it is deemed inappropriate to provided bicycle facilities considering the site context, which has limited bicycle infrastructure.

### *3.4 Servicing & Loading*

Council's DCP does not outline any service or loading requirements for quarry developments. Based upon the proposed fleet size as outlined in **Section 1.1** and reproduced below, the largest vehicle that will travel to the site will be a 19m length Truck and Dog Combination.

- Truck and Dog Combination (19m length) – 39 tonne capacity.

The proposed internal access road, including Maytoms Lane allows for an 14m wide road. This design is adequate to allow for two-way passing of heavy vehicles.

It is expected that any waste collection required for the development will be undertaken from the site and not from The Bucketts Way by the operators of the quarry by one of the above listed vehicles.

#### 3.4.1 Heavy Vehicle Haulage Route

Considering the available haulage routes to and from the site and the existing approved 19m B-Double routes as shown in **Figure 3** below. All heavy vehicles will predominantly arrive from the south and travel from the development to the south towards Sydney, the Hunter and Central Coast. The exception to this is occasionally, vehicles will arrive from the south and depart to the north to travel to Stroud, but this will be a very rare occasion and generally will only be one or two vehicles in any given day.

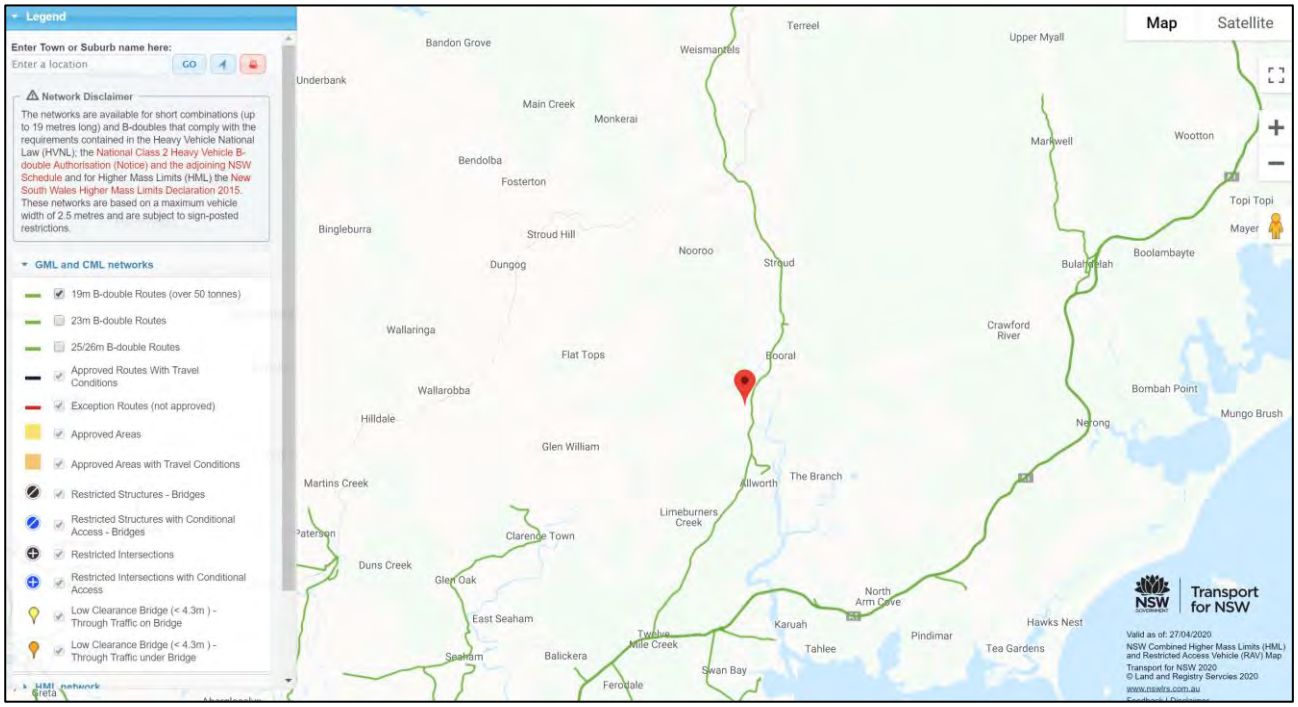



**FIGURE 3: EXISTING APPROVED 19M B-DOUBLE ROUTE**

The primary arterial road that will be relied upon is the Pacific Highway to the south of the site, with the assessment adopting all heavy vehicles arriving and departing towards the Pacific Highway, as this would be the case most days. The proposed and assessed heavy vehicle haulage route is shown in **Figure 4** below. It should be noted that heavy vehicles cannot utilise Booral Road to travel north as it is not an approved 19m B-Double Route, but

they can utilise The Bucketts Way, which an approved B-double route to travel to Stroud. Considering this, a Driver Code of Conduct outlining haulage routes will be provided to all new drivers in addition to an induction to all heavy vehicle drivers.

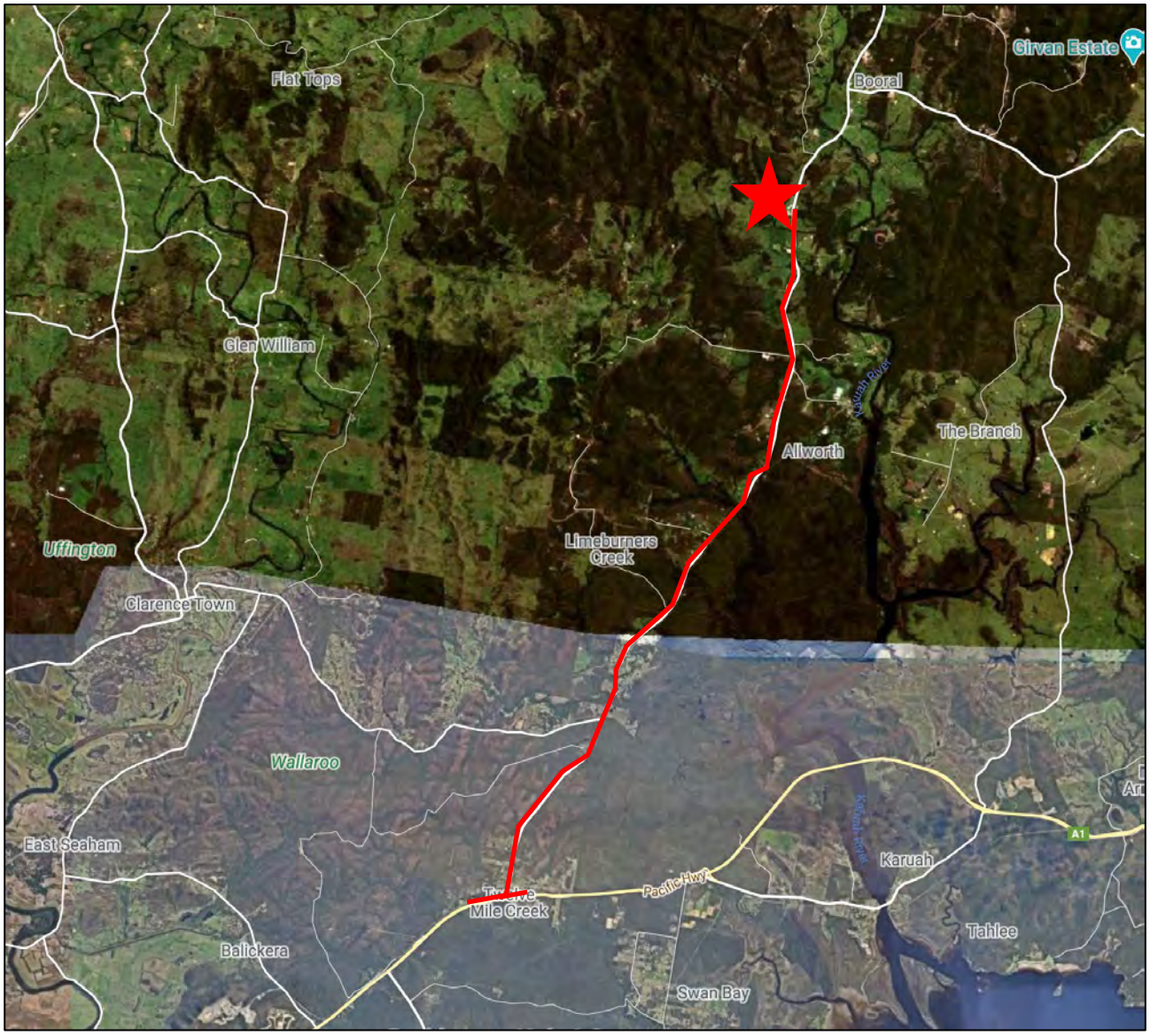



**FIGURE 4: PROPOSED HEAVY VEHICLE HAULAGE ROUTE**

As shown above, all heavy vehicle traffic will be assessed to arrive and depart the site from the Pacific Highway. There is no requirement for swept path testing along the haulage route for all intersections considering the existing approved B-Double route. It should be noted that the civil plans provided design vehicle swept path testing at Maytoms Lane.

# 4 TRAFFIC ASSESSMENT

## *4.1 Traffic Generation*

Typically, the Roads and Maritime Services (now TfNSW) *Guide to Traffic Generating Developments 2002* is used to forecast future development traffic generation; however, the Roads and Maritime Guide does not specify trip generation rates for hard rock extraction. Accordingly, the future development traffic has been estimated based upon a first principles approach.

The general assumptions that will be used for the operation of the development are summarised below:

- One vehicle trip for each staff member during the AM (inbound to site) and PM (outbound from site) peak hour period. The staff arrival times and departures times are 5:30am to 7am and 1:30pm to 3pm;
- Six-day operating week, Monday to Saturday with delivery hours being 7:00am to 6:00pm (11 hours);
    - To provide a conservative assessment, a 10 hour operating day will be assumed, and 290 operating days per year (52*6 less 14 days for Christmas break and less 8 additional public holidays).
- Peak hour vehicle trips will be assumed to be 10% of the daily vehicle trips with the assumption of truck arrival being uniform throughout hours of operation.

### 4.1.1 Hard Rock Extraction

The assumptions adopted to determine the traffic generation of the hard rock extraction are shown below:

- 96% of all deliveries - Truck and Dog Combination (19m length) with a payload of 39 tonnes;
- 2% of all deliveries – Truck and Dog Combination (19m length) with a payload of 32 tonne;
- 2% of all deliveries – 12.5m length Heavy Rigid Vehicle with a payload of 19 tonnes.

The estimated heavy vehicle traffic generation for the hard rock extraction is summarised in **Table 7** below.

**TABLE 7: HARD ROCK EXTRACTION HEAVY VEHICLE TRAFFIC GENERATION**

| Material | Vehicle Carrying Capacity | Annual Scale | Yearly Heavy Vehicle Loads[2] | Daily Scale[1] | Daily Heavy Vehicle Loads[2] | Daily Vehicle Trips (two-way)[3] | Peak Hour Vehicle Trips[4] |
|---|---|---|---|---|---|---|---|
| Hard Rock | 39t | 1.44 million tpa | 36,923 | 4,966t | 127.3 | 272 | 27 |
| | 32t | 0.03 million tpa | 938 | 104t | 3.25 | | |
| | 19t | 0.03 million tpa | 1,579 | 103 | 5.4 | | |
| **Total** | **-** | **-** | **39,440** | **5,173t** | **136** | **272** | **27** |

Notes: 1 – 290 operating days in a year. Example calculation 1,440,000/290 = 4,966t per day

2 – All values results have been rounded up

3 – Two-way vehicle trips is double the number of heavy vehicle loads

4 – Peak hour vehicle trips are assumed to be 10% of two-way daily vehicle trips

As shown above, the hard rock extraction is expected to generate 27 heavy vehicle trips in the AM (14 in, 13 out) and PM (13 in, 14 out) peak hour periods.

### 4.1.2 Staff Traffic Generation

Typically, operational staff for the proposal will arrive outside of the operating hours of heavy delivery vehicles, resulting in no overlapping of heavy vehicle or staff vehicular traffic. The operations of the site includes a maximum of 30 staff, resulting in 30 vehicle movements (assuming one vehicle movement per staff) during both the start and finish periods.

The proposed start time for staff is 6:00am, and hence occurs outside of peak commuter periods and the heavy vehicle delivery periods (starting at 7:00am) and as such will not be included in the AM peak hour assessment.

Similarly, the finish time for staff is 12:00am (midnight), although is expected to be highly limited to only a few staff. This finish time does not overlap with the PM network peak hour period or heavy vehicle deliveries (finishes at 6:00pm). Whilst limited overlap is expected to occur during the road network PM peak hour period for heavy vehicle and staff due to operating hours, some staff are likely to leave the site during the PM network peak hour. As such, to provide a conservative assessment it will be assumed that half of all staff will leave the site during the PM network peak hour period.

### 4.1.3 Traffic Generation Summary

The total number of vehicle movements during the AM and PM commuter peak hours is summarised in **Table 8** below.

**TABLE 8: FORECAST PEAK HOUR TRAFFIC GENERATION BY DIRECTION**

| Movement Type | AM Peak Hour Movements (9:00am to 10:00am) | PM Peak Hour Movements (2:45pm to 3:45pm) |
|---|---|---|
| Hard Rock Extraction | 27 | 27 |
| Operating Staff | 0 | 15 |
| **Total Movements** | **27 (14 in, 13 out)** | **42 (13 in, 29 out)** |

Note: 1 – The peak hour period is taken as the worst case of The Bucketts Way / Pacific Highway as this is the critical intersection.

As shown above the proposed development is expected to generate 27 vehicle trips in the AM (14 in, 13 out) peak hour period and 42 vehicle trips in the PM (13 in, 29 out) peak hour period, of which 15 vehicle trips are associated with outbound staff.

### *4.2 Traffic Assignment*

The traffic assignment for staff is based upon the traffic surveys along The Bucketts Way and is summarised below:

- 60% of staff will arrive to the site from the north in the AM peak hour period (applies to zero vehicle trips);
- 40% of staff will arrive to the site from the south in the AM peak hour period (applies to zero vehicle trips);
- 60% of staff traffic will depart the site and travel north in the PM peak hour period;
- 40% of staff traffic will depart the site and travel south in the PM peak hour period.

Based upon the haulage route for heavy vehicles, all heavy vehicles will arrive and depart the site from the south, using the intersection of The Bucketts Way / Pacific Highway. The resulting future traffic volumes at the intersection of The Bucketts Way / Maytoms Lane is shown in **Figure 5** below.

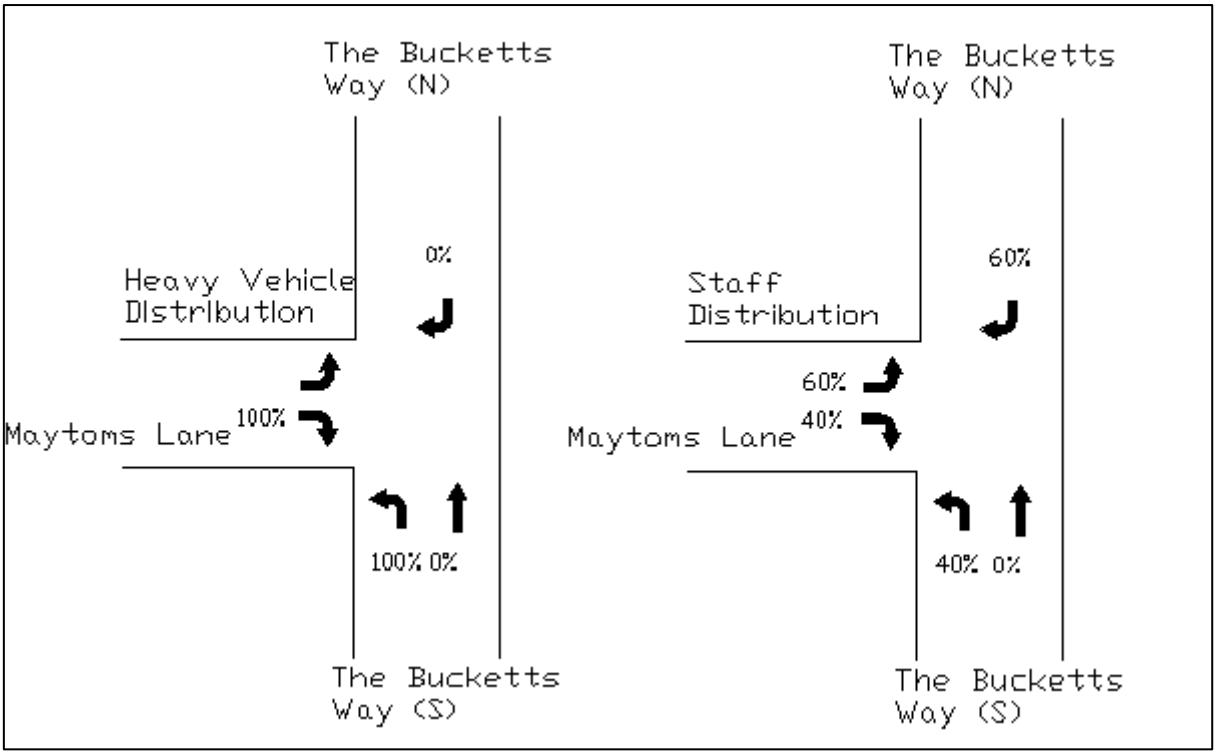



**FIGURE 5: DEVELOPEMNT TRAFFIC DISTRIBUTION AT THE INTERSECTION OF THE BUCKETTS WAY / MAYTOMS LANE**

### *4.3 Traffic Impact*

The traffic generation outlined in **Section 4.1 & 4.2** above has been added to the existing traffic volumes recorded. The purpose of this assessment is to compare the existing intersection operations to the future scenario under the increased traffic load. The results of this assessment are shown in **Table 9** below, with detailed SIDRA outputs provided in **Annexure D** for reference.

## TABLE 9: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.0)

| Intersection | Peak Hour | Degree of Saturation[1] | Average Delay[2] (sec/vehicle) | Level of Service[3][4] | Control Type | Worst Movement |
|---|---|---|---|---|---|---|
| **EXISTING PERFORMANCE** | | | | | | |
| Pacific Highway / The Bucketts Way[5] | AM (9:00am to 10:00am) | 0.50 | **N/A** (Worst: 27.8) | **N/A** (Worst: B) | Stop | Right turn from The Bucketts Way |
| | PM (2:45pm to 3:45pm) | 0.47 | **N/A** (Worst: 24.8) | **NA** (Worst: B) | | Right turn from The Bucketts Way |
| Booral Road / The Bucketts Way | AM (8:30am to 9:30am) | 0.08 | **N/A** (Worst: 9.3) | **N/A** (Worst: A) | Stop | RT from Booral Road |
| | PM (3:30pm to 4:30pm) | 0.08 | **N/A** (Worst: 9.0) | **NA** (Worst: A) | | RT from Booral Road |
| **FUTURE PERFORMANCE** | | | | | | |
| Pacific Highway / The Bucketts Way[5] | AM (9:00am to 10:00am) | 0.57 | **N/A** (Worst: 31.7) | **N/A** (Worst: C) | Stop | Right turn from The Bucketts Way |
| | PM (2:45pm to 3:45pm) | 0.47 | **N/A** (Worst: 28.5) | **NA** (Worst: B) | | Right turn from The Bucketts Way |
| Booral Road / The Bucketts Way | AM (8:30am to 9:30am) | 0.08 | **N/A** (Worst: 9.3) | **N/A** (Worst: A) | Stop | RT from Booral Road |
| | PM (3:30pm to 4:30pm) | 0.09 | **N/A** (Worst: 9.1) | **NA** (Worst: A) | | RT from Booral Road |
| Maytoms Lane / The Bucketts Way | AM (8:00am to 9:00am) | 0.07 | **N/A** (Worst: 9.9) | **N/A** (Worst: A) | Give-Way | Right turn from Maytoms Lane |
| | PM (4:00pm to 5:00pm) | 0.09 | **N/A** (Worst: 9.8) | **NA** (Worst: A) | | Right turn from Maytoms Lane |

NOTES:
Refer to Table 5

As shown above, the intersection of Booral Road / The Bucketts Way and Maytoms Lane / The Bucketts Way is forecast to operate at LoS “A” condition, indicating minor delays and additional spare capacity maintained.

The intersection of Pacific Highway / The Bucketts Way is forecast to operate with worst turn movement of LoS “C” condition in the AM peak hour period and LoS “B” in the PM peak hour period, which is for the right turn from The Bucketts Way onto Pacific Highway. The change in LoS relates to an increase of 3.9 seconds in the AM peak hour period. A LoS “C” condition represents a satisfactory operation, although the RTA Guide to Traffic Generating Development 2002 requires an accident study.

Based upon TfNSW crash data from their website, there are no existing cluster of accidents at the intersection of The Bucketts Way / Pacific Highway and as such the change from LoS “B” to LoS “C” of the right turn movement is acceptable. The intersection has clear sight lines in both directions and due to the geometric arrangement of the existing seagull intersection, right turning vehicles only have to give-way to one major through movement at a time. **Figure 6** below shows the crash data map from the TfNSW website.


**FIGURE 6: TFNSW CRASH DATA MAP – THE BUCKETTS WAY / PACIFIC HIGHWAY**

### 4.3.1 Cumulative Traffic Assessment

As outlined in **Section 2.5.1**, Deep Creek Quarry will utilise the intersection of The Bucketts Way / Pacific Highway. Hence, consideration to the combined traffic impact of both developments has been assessed for the intersection of Pacific Highway / The Bucketts Way. The results of this assessment are shown in **Table 9** below, with detailed SIDRA outputs provided in **Annexure D** for reference.

**TABLE 10: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.0)**

| Intersection | Peak Hour | Degree of Saturation[1] | Average Delay[2] (sec/vehicle) | Level of Service[3][4] | Control Type | Worst Movement |
|---|---|---|---|---|---|---|
| **FUTURE PERFORMANCE + PROPOSED DEVELOPMENT + DEEP CREEK QUARRY** | | | | | | |
| Pacific Highway / The Bucketts Way[5] | AM (9:00am to 10:00am) | 0.80 | **N/A** (Worst: 51.8) | **N/A** (Worst: D) | Stop | Right turn from The Bucketts Way |
| | PM (2:45pm to 3:45pm) | 0.68 | **N/A** (Worst: 41.7) | **NA** (Worst: C) | | Right turn from The Bucketts Way |

NOTES:
Refer to Table 5

As shown above, when considering both the proposed development and the Deep Creek Quarry, the intersection of Pacific Highway / The Bucketts Way is forecast to operate at LoS “D” and “C” doing peak commuter periods. LoS “D” indicates acceptable delays and limited spare capacity remaining with the intersection approaching capacity.

### 4.3.2 Traffic Impact Assessment for 2033

It is important to assess the development under a 10-year growth scenario. There is not expected to be significant growth along The Bucketts Way to result in failure of the proposed intersection of Maytoms Lane / The Bucketts Way, such that investigation into 10-year growth will be limited to the intersection of The Bucketts Way / Pacific Highway.

TfNSW has a count station (Station ID: T0482) located 450m west of Twelve Mile Creek (The Bucketts Way), which provides southbound data only along the Pacific Highway between the years of 2015 to 2018. Based upon the data, during the commuter peak hour periods there is an average increase of 3.2% and 2.7% traffic growth per year for southbound traffic during the AM and PM peak hour periods respectively. As such, a growth rate of 3.2% and 2.7% will be applied to existing through movements along the Pacific Highway to determine a future base case model in the year 2033 and the future development traffic added. The results of this assessment are shown in **Table 11** below, with detailed SIDRA outputs provided in **Annexure E** for reference.

**TABLE 11: INTERSECTION PERFORMANCES 2030 (SIDRA INTERSECTION 9.0)**

| Intersection | Peak Hour | Degree of Saturation[1] | Average Delay[2] (sec/vehicle) | Level of Service[3][4] | Control Type | Worst Movement |
|---|---|---|---|---|---|---|
| **2033 INTERSECTION PERFORMANCE (NO DEVELOPMENT TRAFFIC)** | | | | | | |
| Pacific Highway / The Bucketts Way[5] | AM (9:00am to 10:00am) | 0.92 | **N/A** (Worst: >70) | **N/A** (Worst: F) | Stop | Right turn from The Bucketts Way |
| | PM (2:45pm to 3:45pm) | 0.58 | **N/A** (Worst: 42.4) | **NA** (Worst: C) | | Right turn from The Bucketts Way |
| **2033 + DEVELOPMENT TRAFFIC INTERSECTION PERFORMANCE** | | | | | | |
| Pacific Highway / The Bucketts Way[5] | AM (9:00am to 10:00am) | 1.06 | **N/A** (Worst: >70) | **N/A** (Worst: F) | Stop | Right turn from The Bucketts Way |
| | PM (2:45pm to 3:45pm) | 0.75 | **N/A** (Worst: 58.5) | **NA** (Worst: E) | | Right turn from The Bucketts Way |
| **2033 + DEVELOPMENT TRAFFIC + DEEP CREEK QUARRY INTERSECTION PERFORMANCE** | | | | | | |
| Pacific Highway / The Bucketts Way[5] | AM (9:00am to 10:00am) | 1.64 | **N/A** (Worst: >70) | **N/A** (Worst: F) | Stop | Right turn from The Bucketts Way |
| | PM (2:45pm to 3:45pm) | 1.13 | **N/A** (Worst: >70) | **NA** (Worst: F) | | Right turn from The Bucketts Way |

NOTES:
Refer to Table 5

As shown above, under future 2033 conditions without development traffic the intersection of Pacific Highway / The Bucketts Way is expected to operate with worst turning movement of LoS “F” and LoS “C” during the AM and PM peak hour periods respectively. This worst turning movement relates to the right turn out of The Bucketts Way. LoS “F” indicates that the turn movement is failing and is above the capacity at which the intersection can handle, requiring an infrastructure upgrade or turn restrictions in order to achieve efficient operations.

In future 2033 conditions, with development traffic and the Deep Creek Quarry, the intersection of Pacific Highway / The Bucketts Way is operating with worst turn movement of LoS “F” during the AM and PM peak hour period respectively. This indicates that the intersection requires an infrastructure upgrade during the AM & PM peak hour period to operate within an acceptable Level of Service as per existing future 2033 growth conditions without development traffic.

Considering the high-speed road of Pacific Highway being a signposted speed limit of 100km/h, the next infrastructure upgrade for the Pacific Highway / The Bucketts Way would come in the form of a roundabout or signalised intersection and a likely reduction in the signposted speed limit. Although considering the major role that the Pacific Highway has to provide efficient traffic flow, any roundabout or signalised intersection may not be supported by TfNSW. Rather, the intersection of The Bucketts Way / Pacific Highway would likely be closed to right turning vehicles, with all vehicles required to travel left onto the Pacific Highway. There are U-turn facilities provided 5km to the east of The Bucketts Way available for public use to use to continue to head westbound along the Pacific Highway.

The proposed development results in a low increase to the surrounding traffic network volume when assessed in isolation. Although when considered as part of a cumulative assessment with the Deep Creek Quarry, the combined impacts of both developments result in a LoS “D” for the intersection of The Bucketts Way / Pacific Highway. This results in an acceptable operation, although the intersection is approaching its operating capacity.

Increase in traffic flows as a result of background traffic growth make the right turn out onto the Pacific Highway from Buckets Way difficult at peak times (LoS “F”), but there is an alternative travel route in the event that right turns out of The Bucketts Way are restricted that has been proposed to ameliorate any externalised impacts of the subject development upon this intersection in the future.

## 5 The Bucketts Way / Maytoms Lane Intersection Geometry

### 5.1.1 Sight Line Assessment

Reference is made to *AS2890.2:2018 Parking Facilities – Off-street commercial vehicle facilities*, which provides requirements for the operations of heavy vehicles within sites including the interactions at driveway locations. *Figure 3.3* of *AS2890.2:2018* shows the required sight line distances along a frontage road for heavy vehicles exiting a driveway.

The minimum requirement stated is for a 5 second gap with a note that movements such as a right turn exit into a six-lane road may require up to an 8 second gap. For a conservative assessment, the 8 second gap will be utilised within the analysis of the site access road with The Bucketts Way. It should be noted that the sight distance required under *AS2890.2:2018* relates to the minimum gap sight distance within *AUSTROADS*.

Reference is also made to *Equation 2* of *Section 3.2.2* in *Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* in conjunction with *Section 5.2.2 of the Supplement to Austroads Guide to Road Design Part 3,* which provides the minimum sight distance which is to be provided on major roads at any intersections.

The resultant sight line requirements based upon *AS2890.2:2002* and *AUSTROADS* for the observed 85$^{th}$ percentile road speed of 100km/h is outlined in **Table 12** below.

**TABLE 12: SIGHT LINE REQUIREMENTS AT MAYTOMS LANE**

| Design Guide | Design Parameters | 85$^{th}$ Percentile Speed (km/h) | Sight Distance Requirements | Road / Vehicle which Sight Line applies to |
|---|---|---|---|---|
| AS2890.2:2018(1) | - | 100km/h | 222m | Vehicle leaving Maytoms Lane |
| Austroads Guide to Road Design Part 4A<br>Safe Intersection Sight Distance | Reaction Time = 2.0 seconds(2)<br>Coefficient of Deceleration = 0.36 | 100km/h | 248m | Vehicle travelling along The Bucketts Way |

Note: 1 – Minimum gap sight distance

2 – Section 5.2.2 of Supplement to Austroads Guide to Road Design Part 3.

As shown above, the required safe intersection sight distance based upon *AUSTROADs* requires 248m for vehicles travelling along the major road to Maytoms Lane, whilst heavy vehicles emerging from Maytoms Lane require a sight distance of 222m to achieve the 8 second gap. Considering this, the required sight distance requirement at Maytoms Lane is shown in **Annexure F**.

Based upon the sight line assessment as shown in **Annexure F**, there is no requirement to remove trees within the verge along The Bucketts Way, but it is recommended that regular tree trimming occur to the underside of existing trees within the verge to ensure any low level branches do not obstruct sight lines from the intersection.

### *5.2 Intersection Design*

Reference is made to AUSTROADS *Guide to Traffic Management Part 6: Intersection, Interchanges and Crossings Management* which outlines warrants for road infrastructure turn treatments from the major road based upon traffic flow volumes as shown in **Figure 7** and **Figure 8** below.

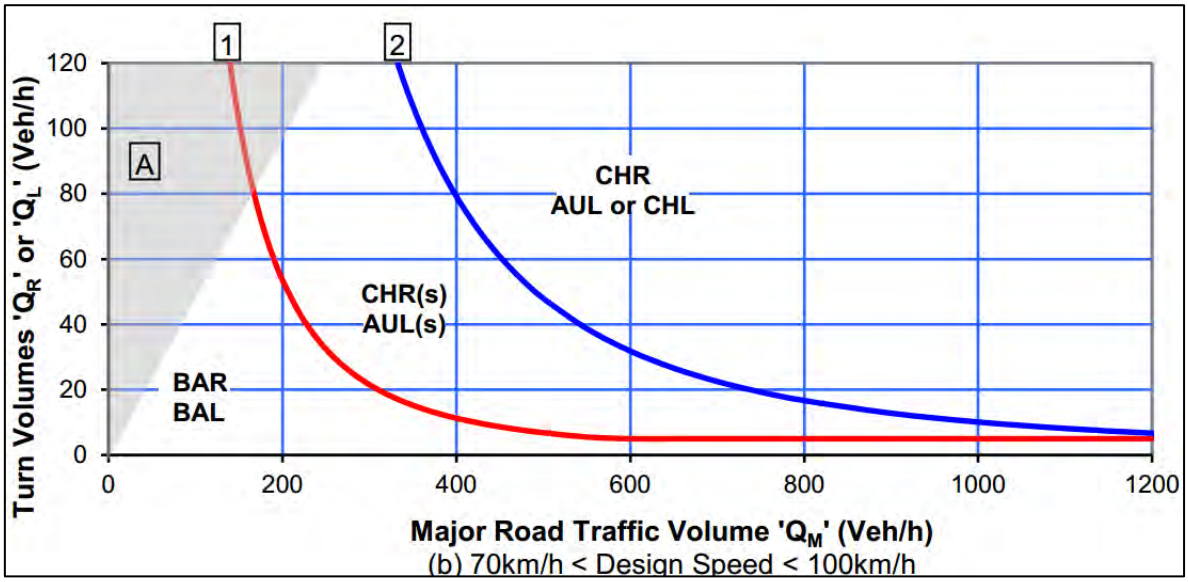
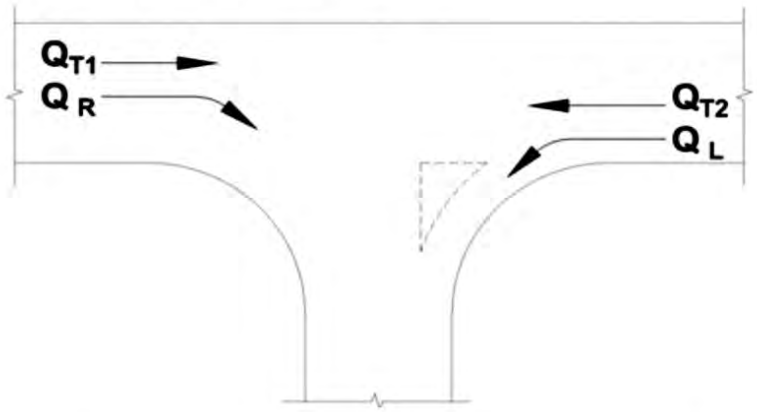



**FIGURE 7: AUSTROAD TURN TREATMENT WARRANTS**

**Figure 2.26: Calculation of the major road traffic volume $Q_M$**




| Road type | Turn type | Splitter island | $Q_M$ (veh/h) |
|---|---|---|---|
| Two-lane two-way | Right | No | = $Q_{T1} + Q_{T2} + Q_L$ |
| | | Yes | = $Q_{T1} + Q_{T2}$ |
| | Left | Yes or no | = $Q_{T2}$ |
| Four-lane two-way | Right | No | = 50% x $Q_{T1} + Q_{T2} + Q_L$ |
| | | Yes | = 50% x $Q_{T1} + Q_{T2}$ |
| | Left | Yes or no | = 50% x $Q_{T2}$ |
| Six-lane two-way | Right | No | = 33% x $Q_{T1} + Q_{T2} + Q_L$ |
| | | Yes | = 33% x $Q_{T1} + Q_{T2}$ |
| | Left | Yes or no | = 33% x $Q_{T2}$ |

*Source: TMR (2016a).*

**FIGURE 8: DETERMINATION OF $Q_M$**

The forecast traffic warrant assessment and traffic volumes at the intersection of Maytoms Lane / The Bucketts Way is outlined in **Table 13** below.

**TABLE 13: WARRANT ASSESSMENT**

| Vehicle Movement | Peak Hour Turn Movement Volume (AM Peak) | Peak Hour Turn Movement Volume (PM Peak) | Resultant $Q_m$ AM Peak | Resultant $Q_m$ PM Peak | Turn Treatment AM / PM |
|---|---|---|---|---|---|
| **Left Turn into Maytoms** | 24 | 24 | 101 | 150 | BAL/BAL |
| **Right Turn into Maytoms** | 1(1) | 1(1) | 238 | 271 | BAL/BAL |
| **Northbound Traffic** | 101 | 150 | - | - | |
| **Southbound Traffic** | 113 | 97 | - | - | |

Note: - 1: Staff do not overlap with peak hour traffic volumes

Based upon the above, the intersection of The Bucketts Way / Maytoms Lane warrants a basic left and basic right (BAL/BAR) turn treatment.

Whilst the above warrant assessment only requires a turn treatment for a BAL, it is recommended that the intersection provide a short deceleration lane (AUL[s]) due to road safety considerations and given the dominant use of heavy vehicles travelling to and from the site. As no regular or high volume of heavy vehicles are anticipated to turn right into the site, a BAR treatment is the preferred right turn treatment.

The relevant design guidelines within AUSTROADS for the above recommendations are shown in **Figure 9** and **Figure 10**. A summary of the required design dimensions for the treatment types is shown in **Table 14**.

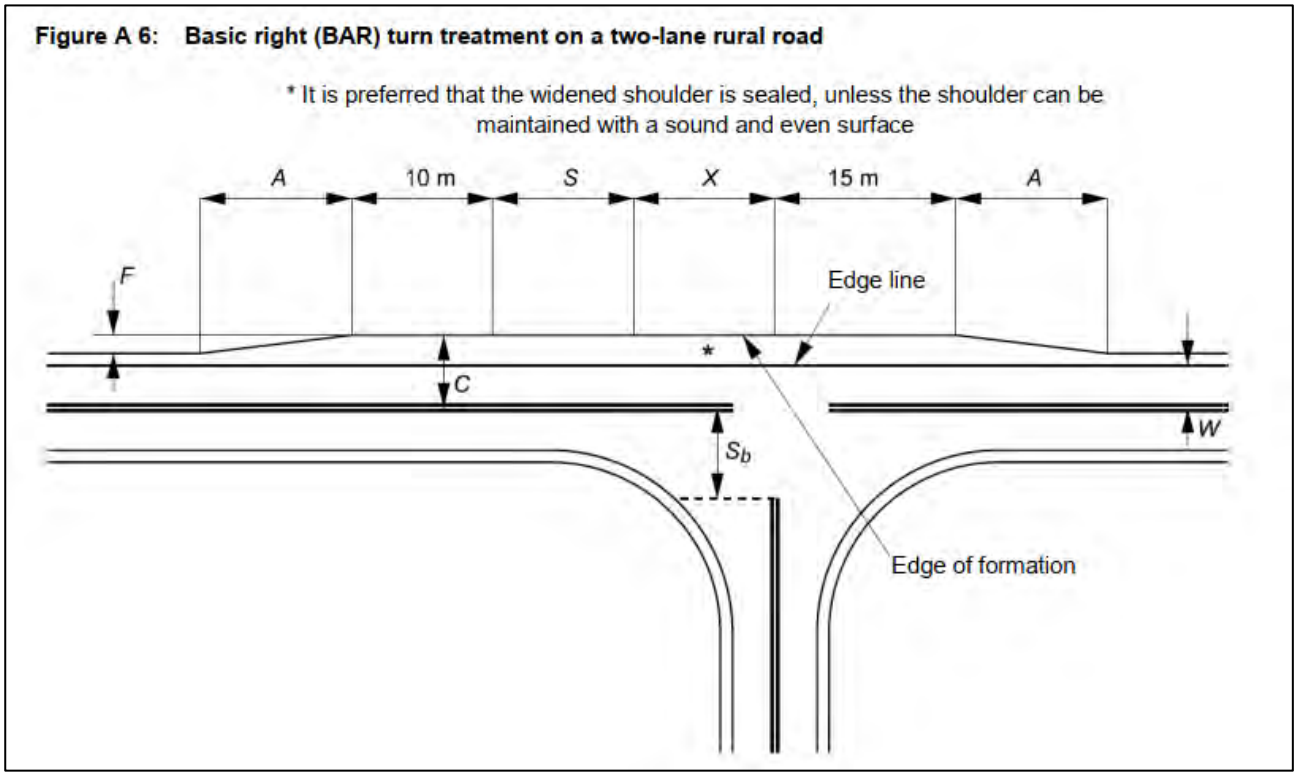



**FIGURE 9: BAR ROAD DESGIN TREATMENT – AUSTROADS GUIDE TO ROAD DESIGN PART 4**

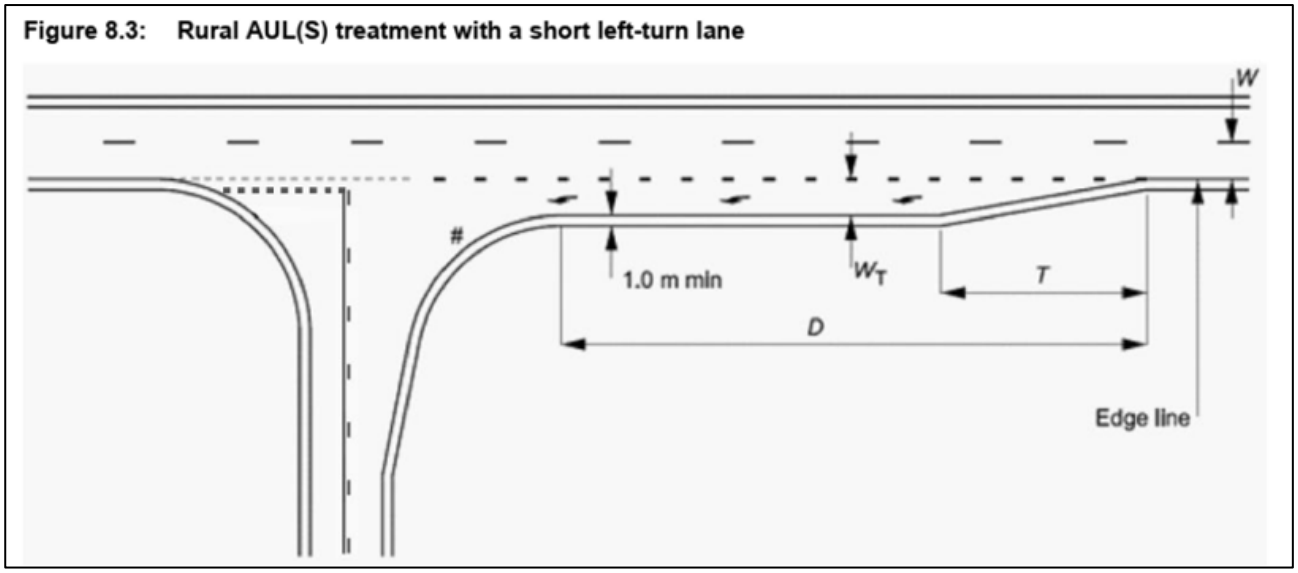



**FIGURE 10: AUL(S) ROAD DESIGN TREATMENT – AUSTROADS GUIDE TO ROAD DESIGN PART 4A**

**TABLE 14: AUSTROAD DESIGN PARAMATERS (APPLIED TO THE BUCKETTS WAY)**

| Rural AUL(S) Parameters | Design Requirements | BAR (rural Road) parameters | Design Requirements |
|---|---|---|---|
| **Design Speed** | 100km/h(1) | Design Speed | 100km/h(1) |
| **Diverge / Deceleration length D** | 70m | Taper Length – A | 42m |
| **Taper Length** | 30m | Storage (S) | 12.5m |
| **Lane Width** | Minimum 3.0m | X | 10m |
| **Road Shoulder** | Minimum 1.0m | C | 6.5 |
| **-** | - | Through Lane Width (W) | Assumed as 3.5m |
| **-** | - | F – Carriageway Widening | 3.0m |

Note: 1 – The Bucketts Way has a 90km/h posted speed limit. The usual practice for the design speed is to add 10km/h to the posted speed limit or use the operating speed of the road. The operating speed of the road is close to 100km/h and hence the adoption of a design speed of 100km/h is appropriate.

### 5.2.1 Historical Crash Data & Safety Assessment

A review of the last 5 year crash data has been reviewed along the Bucketts Way from Maytoms Lane to the Pacific Highway with two (2) crashes occurring in 2018, 2020 and 2021 (total 6 crashes). To determine if there are any serious safety issues associated with the 24km length of Bucketts Way from the Pacific highway to Maytoms Lane a comparison of crash rates will be provided (Crashes per Million Vehicle Kilometres) for The Bucketts Way against a typical undivided rural road.

The below assessment has been undertaken to compare the crash rate of the Project Area to the average crash rate for rural, undivided roads in New South Wales. To determine a figure for crashes per million vehicle kilometres, the following formulae were used:

$$(1) \dots Million\ Vehicle\ Kilometres\ (MVK) = Distance\ Km\ \times Daily\ Volume\ \times \frac{No.\ of\ Days\ per\ year}{1{,}000{,}000}$$

$$(2) \dots Crash\ Rate\ (Crashes/MVK) = \frac{Number\ of\ Crashes}{MVK}$$

The length of Bucketts Way from Maytoms Lane to Pacific Highway has the following parameters applicable to the equations:

- The Project Area stretches for approximately 24km;
- Annual Average Daily Traffic (AADT) of approximately 2,840 vehicles (average AADT based upon survey);
- Crash rate of 2 crashes/year (which is overestimated as it was 6 crashes in 5 years).

$$(1) \ldots Million\ Vehicle\ Kilometres\ (MVK) = 24km \times 2{,}840 \times \frac{365}{1{,}000{,}000} = 24.87\ MVK$$

$$(2) \ldots Crash\ Rate\ \left(\frac{Crashes}{MVK}\right) = \frac{2}{24.87} = 0.08\ Crashes\ per\ Million\ Vehicle\ Kilometres$$

The Project Area has a calculated **0.08 crashes per million vehicle kilometres**.

Reference is made to *AUSTROADS Technical Report – Road Safety Engineering Risk Assessment Part 7: Crash Rates Database* which provides crash rates per 100 million vehicle kilometres travelled (100MVKT) for New South Wales. An extract has been reproduced in **Figure 11**.

| Environment | Carriageway | 100 million VKT (5 years) | Fatal | Fatal CR | Injury | Injury CR | Fatal + injury | Fatal + injury CR | All crashes | Total CR |
|---|---|---|---|---|---|---|---|---|---|---|
| Rural | Divided | 174.14 | 72 | 0.41 | 1,782 | 10.23 | 1,854 | 10.64 | 4,632 | 26.6 |
| Rural | Single | 616.86 | 553 | 0.9 | 7,736 | 12.54 | 8,289 | 13.44 | 17,025 | 27.6 |
| Urban | Divided | 755.21 | 335 | 0.44 | 18,982 | 25.13 | 19,317 | 25.57 | 46,715 | 61.86 |
| Urban | Single | 439.44 | 307 | 0.7 | 15,464 | 35.19 | 15,771 | 35.89 | 36,249 | 82.49 |

**FIGURE 11: AP-T152/10 EXTRACT (TABLE B2)**

As shown, for a rural road with single carriageway, the expected crash rate is 27.6 crashes per 100 million vehicle kilometres travelled. As calculated previously, the crash rate of the Project Area is 0.08 crashes per million vehicle kilometres travelled or 8 crashes per 100 million vehicle kilometres travelled.

The Project Area has a crash rate **0.29** times lower (i.e. 8/27.6) than the NSW crash rate for rural roads with a single carriageway. This indicates that drivers utilising Bucketts Way within the Project Area are less susceptible to crashes in comparison to typical single-carriageway rural roads in NSW and hence there is no need to further investigate safety along the Bucketts Way.

## 6 CONSTRUCTION TRAFFIC MANAGEMENT

Typically, after the development application stage a detailed Construction Traffic Management Plan is provided at the construction certificate stage prior to construction and as part of a consent condition, to be approved by Council. Once a builder has been engaged, confirmation of the number of staff and construction vehicles can be provided and assessed (if required). Construction vehicular traffic is temporary in nature and is not expected to exceed the operating capacities of nearby intersections or be substantially greater than the assessed operation of the proposed development as detailed within this report.

Generally during construction, staff traffic will arrive to the site around 7:00am and depart the site around 5:00pm (or earlier), Monday to Saturday, with construction deliveries provided throughout the day. Considering the location and constraint of the site and surrounding environs, it is expected that all staff and heavy vehicle traffic will park on-site for any construction works required on-site, with all vehicles being capable of entering and exiting the site in a forward direction. Any works associated with the building of Maytoms Lane and The Bucketts Way is likely to require parking within Maytoms Lane, on-site and on The Bucketts Way under the appropriate Works Zone and Construction Traffic Management Plan requirements. The site manager is to promote the use of carpooling amongst staff to reduce the construction staff parking demand. It is highly unlikely that heavy construction traffic in conjunction with staff traffic will exceed the assessed 42 peak hour movements.

Once a builder is engaged, the methodology of the build will be detailed within a detailed Construction Program and associated Construction Traffic Management Plan, to be approved by Council. The construction of the development is likely to occur in stages, with the construction of Maytoms Lane and The Bucketts Way occurring first. The largest construction milestone as part of the proposal will be the construction of Maytoms Lane and The Bucketts Way. Once this is complete it is expected that all staff and construction vehicles will park on-site and enter and exit the site in a forward direction.

The construction of The Bucketts Way / Maytoms Lane will require 40km/h speed zoning and likely reduction in road width to a single carriageway operating under traffic control during construction. Access to any adjacent driveways will also be required to be maintained, with all construction vehicles travelling to and from the site from the Pacific Highway.

Clarification on construction vehicle movements, staff numbers and methodology will need to be confirmed with the builder during the submission of a detailed construction traffic management plan as part of the construction certificate stage and as part of a consent condition.

# 7 CONCLUSION

The traffic and parking impacts of the proposed Quarry at 67 Maytoms Lane, Booral as shown in reduced plans in **Annexure A** to this report, have been assessed.

The proposed development is expected to generate 27 vehicle trips in the AM (14 in, 13 out) peak hour period (9:00am to 10:00am) and 42 vehicle trips in the PM (13 in, 29 out) peak hour period (2:45pm to 3:45pm). As a maximum average, the site is expected to generate 136 heavy vehicles per operating day resulting in 272 two-way (136 in, 136 out) vehicle trips by heavy vehicles per day, over an 11-hour operating day. All assessed intersections retain their existing level of service in future 2023 conditions, except for the AM and PM peak hour period at the intersection of Pacific Highway / The Bucketts Way, which has a change of LoS “B” for the right turn from The Bucketts Way to LoS “C”, representing an increase in average delay of 4 seconds, with LoS “C” and representing a satisfactory operation.

The proposed development results in a low increase to the surrounding traffic network volume when assessed in isolation. Although when considered as part of a cumulative assessment with the Deep Creek Quarry, currently the combined impacts of both developments result in a LoS “D” for the intersection of The Bucketts Way / Pacific Highway. This results in an acceptable operation, although the intersection is approaching its operating capacity.

Based upon background traffic growth to 2033, **without development traffic** the intersection of Pacific Highway / The Bucketts Way is expected to operate with worst turning movement of LoS “F” and LoS “C” during the AM and PM peak hour periods respectively. This worst turning movement relates to the right turn out of The Bucketts Way. LoS “F” indicates that the turn movement is failing and is above the capacity at which the intersection can handle, therefore requiring an infrastructure upgrade. In future 2033 conditions, with development traffic, the intersection of Pacific Highway / The Bucketts Way is operating with worst turn movement of LoS “F” and LoS “E” during the AM and PM peak hour period respectively. This indicates that the intersection requires an infrastructure upgrade to operate within an acceptable Level of Service as per existing base case 2033 growth conditions without development traffic.

Any intersection upgrade to Pacific Highway / The Bucketts Way in 2033 is largely influenced by background traffic growth, rather than the proposed development traffic when assessed in isolation. The next infrastructure upgrade for Pacific Highway / The Bucketts Way would come in the form of a roundabout or signalised intersection and a likely reduction in the signposted speed limit. Although considering the major role that the Pacific Highway plays in traffic flow efficiency, any roundabout or signalised intersection may not be supported by TfNSW at this location. It is reiterated that there is no proposed upgrade to Pacific Highway / The Bucketts Way as part of this traffic report.

The proposed development results in a small increase to the surrounding traffic network volumes and will not have an adverse impact on major traffic flows when considered in isolation. There is the potential for passing background traffic growth along the Pacific Highway to make the right turn out onto the Pacific Highway from The Buckets Way difficult for traffic of the proposed development at peak times, but there is an alternative route that has been proposed to ameliorate any externalised impacts of the subject development upon this intersection in the future.

There is adequate room on-site to provide informal parking facilities for both staff and heavy vehicles traffic. If overnight parking is required for heavy vehicles, it is anticipated that these will be stored on-site near stockpile areas or on the side of the internal access road. This is common practice for this type of development and all parking for the site will be fully contained on-site.

The proposal is unlikely to require the provision of a disabled car parking space. In any event one disabled car parking space should be provided on-site to comply with typical BCA requirements.

Council's DCP does not outline any bicycle or motorcycle requirements quarry developments and it is deemed inappropriate to provided bicycle facilities considering the site context, which has limited bicycle infrastructure.

The largest vehicle that will travel to the site is a 19m length Articulated Vehicle. The proposed internal access road, including Maytoms Lane allows for an 8m wide road, inclusive of 1m wide unsealed road shoulders on both sides of the road. This design is adequate to allow two-way passing of heavy vehicles. The haulage route for heavy vehicles to and from the site will be restricted to the Pacific Highway, with no vehicles travelling to and from the north (including from Booral Road). This can be restricted by the provision of a Driver Code of Conduct (**Annexure G**) and induction procedures for new drivers.

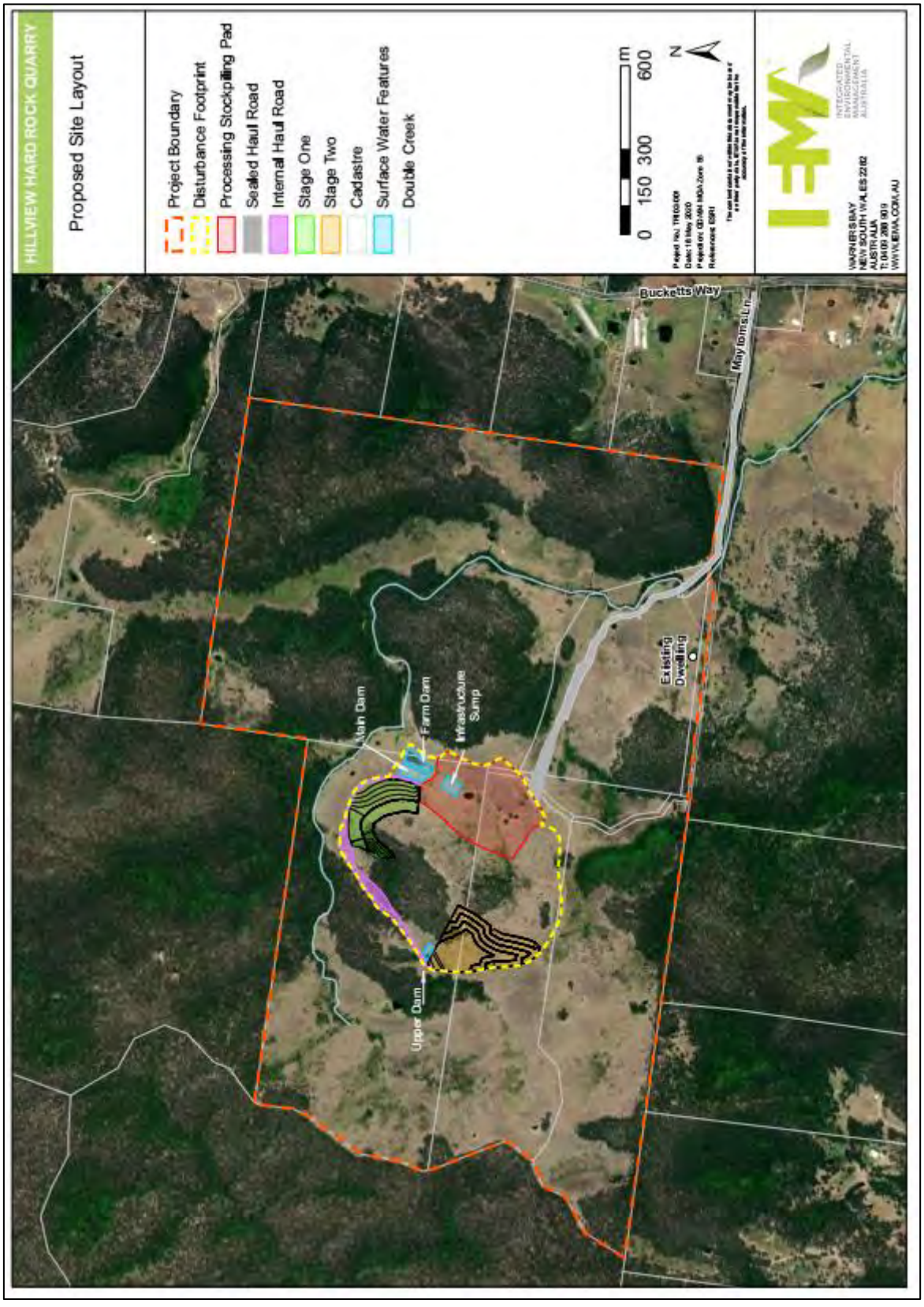
The intersection of The Bucketts Way / Maytoms Lane has been assessed, with the recommended design shown in **Section 5.2**. It is recommended that the future layout include a short deceleration left turn lane into Maytoms Lane and a basic right turn (BAL) treatment. Based upon AUSTROAD turn warrants, the minimum requirements to be provided are basic right and left turn treatments. As such, these recommended road treatments exceed requirements outlined in AUSTROADs and is recommended due to the associated higher levels of heavy vehicle traffic associated with the proposed development.

The overall intersection geometry in terms of safety with reference to sight lines is acceptable and it is recommended that regular understorey trimming of trees located within the road reserve occurs to ensure unobstructed sight lines are provided. The existing 85$^{th}$ percentile road speeds of 100km/h, which requires 248m of sight distance, which is achievable as shown in **Annexure F**.

Once a builder is engaged, the methodology of the build will be detailed within a Construction Program and associated Construction Traffic Management Plan, to be approved by Council. The construction of the development is likely to occur in stages, with the construction of Maytoms Lane and The Bucketts Way occurring first. The largest construction as part of the proposal will be the construction of Maytoms Lane and The Bucketts Way to provide access to the proposed development. Once this is complete it is expected that all staff and construction vehicles will park on-site and enter and exit the site in a forward direction. It is highly unlikely that heavy construction traffic in conjunction with staff traffic will exceed the assessed peak hour movements.

In view of the foregoing, the traffic and parking impacts of the proposed Quarry are fully supported.

## ANNEXURE A: CONCEPTUAL SITE LAYOUT



## ANNEXURE B: SEARS REQUIREMENTS

**(Sheet 1 of 3)**
**NSW PLANNING REQUIREMENTS**

### 7. Traffic and Transport

A traffic and transport impact assessment, including:

- accurate predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products, concrete and other materials;
- a detailed assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road network (as identified above), including a road safety audit;
- an assessment of cumulative traffic impacts, having regard to any other proposed developments in the locality; and
- a description of the measures that would be implemented to mitigate any impacts, including concept plans of any proposed upgrades, developed in consultation with the relevant road and rail authorities (if required); and
- a description of existing and proposed access roads.

Transport for NSW

NSW GOVERNMENT

**ATTACHMENT A - Requested considerations for SEAR - Traffic Impact Assessment**

For context, this attachment must be read with TfNSW letter of 15 May 2024 reference number NTH24/00376/001.

Traffic Impact Assessment (TIA) be prepared by suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and RTA Guide to Traffic Generating Developments.

The TIA is to identify the impacts of the development and the proposed on-site and off-site measures proposed to mitigate the impacts of the development on any road or rail related infrastructure. The TIA must explain and justify all inputs informing the proposed mitigation measures and TIA conclusions.

The TIA should be tailored to the scope of the proposed development and include, but not necessarily be limited to, consideration of the following;

- A map of the surrounding road network identifying the site access, nearby accesses, intersections and transport related facilities.
- A map of the proposed transport route/s identifying all public roads proposed to obtain access from the classified (State) road/s to the development site.
- The total impact of existing and proposed development on the road network with consideration for a 10 year horizon. This should include;
  - Identify Annual Average Daily Traffic (AADT) volumes with percentage heavy vehicles along the transport route/s and diagrammatically demonstrate AM and PM peak hour movements at key intersections.
  - Background traffic data from published sources and/or recent survey data. The source of data and any assumptions are to be clearly explained and justified, including the growth rate applied to the future horizon.
  - The volume and distribution of proposed trips to be generated by the construction, operational and decommission phases of the development. This should identify the maximum daily and hourly demands generated by the development, particularly where they coincide with the network peak hour.
  - The type and frequency of design vehicles accessing the development site.
- Details of the road geometry and alignment along the identified transport route/s, including existing formations, crossings, intersection treatments and any identified hazards. This should include;
  - Available sight distances at the site access and nearby intersections and any constraint to achieving the required sight distance for the posted speed limit.
  - Available sight distances at intersections along the proposed transport routes and any constraint to achieving the required sight distance for the posted speed limit.
  - An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for intersections along the identified transport route/s, identifying the existence of the minimum basic turn treatments and addressing the need for any warranted higher order treatments.
  - Swept path analysis demonstrating the largest design vehicle entering and leaving the development, and moving in each direction through intersections along the proposed transport route/s.

OFFICIAL

- Capacity analysis using SIDRA or other relevant application, to identify an acceptable Level of Service (LOS) at intersections with the classified (State) road/s, and where relevant, analysis of any other intersections along the proposed transport route/s.
- A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.
- Strategic (2D) design drawings of all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. Works must be appropriately designed for the existing posted speed limit.
- Site plan demonstrating site access, internal manoeuvring, servicing and parking areas consistent with the relevant parts of AS2890 and Council requirements.
- Details of measures to address impacts and/or provide connections for public transport services and active transport modes, such as, public and school bus services, walking and cycling.
- Details of measures to ameliorate the impacts of road traffic noise, dust, and/or glare generated along the proposed transport route/s.
- Details of any Traffic Management Plan (TMP) proposed to address the construction and operation phases of the proposed development. The TMP should be prepared and implemented in accordance with *Australian Standard 1742.3* and the *Work Health and Safety Regulation 2017*. It is recommended that any TMP include, but not necessarily limited to, the following;
  - A map of the primary transport route/s highlighting critical locations.
  - An induction process for vehicle operators and regular toolbox meetings.
  - Procedures for travel through residential areas, school zones and/or bus route/s.
  - any proposed temporary measures such a Traffic Guidance Scheme (TGS)
  - A Driver Code of Conduct for heavy vehicle operators.
  - A complaint resolution and disciplinary procedure.
  - Community consultation measures proposed for peak periods.

Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines.

Any roadwork on a classified State road/s is to be designed and constructed in accordance with the current Austroads Guidelines, Australian Standards and TfNSW Supplements.

The developer will be required to enter into a Works Authorisation Deed (WAD) with TfNSW for any roadwork deemed necessary on the classified (State) road. The developer will be responsible for all costs associated with the roadwork and administration for the WAD. It is recommended that developers familiarise themselves with the requirements of the WAD process. Further information can be obtained from the TfNSW website.

# ANNEXURE C: SURVEY RESULTS

## (SHEET 1 OF 3)

**TRANS TRAFFIC SURVEY**

trafficsurvey.com.au

**TURNING MOVEMENT SURVEY**

**Intersection of Pacific Hwy and The Bucketts Way, B**

| | |
|---|---|
| ***GPS*** | *-32.652635, 151.866157* |
| ***Date:*** | Wed 04/03/20 |
| ***Weather:*** | Overcast |
| ***Suburban:*** | Booral |
| ***Customer:*** | McLaren |
| ***North:*** | The Bucketts Way |
| ***East:*** | Pacific Hwy |
| ***South:*** | N/A |
| ***West:*** | Pacific Hwy |
| ***Survey Period*** AM: | 6:00 AM-10:00 AM |
| ***Survey Period*** PM: | 2:30 PM-7:00 PM |
| ***Traffic Peak*** AM: | 8:45 AM-9:45 AM |
| ***Traffic Peak*** PM: | 4:15 PM-5:15 PM |

***All Vehicles***

| Time | | th Approach The Bucketts W | | | East Approach Pacific Hwy | | | West Approach Pacific Hwy | | | Hourly Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Start | Period End | U | R | L | U | R | WB | U | EB | L | Hour | Peak |
| 6:00 | 6:15 | 0 | 20 | 4 | 0 | 5 | 81 | 0 | 70 | 17 | 912 | |
| 6:15 | 6:30 | 0 | 36 | 1 | 0 | 9 | 98 | 0 | 76 | 19 | 984 | |
| 6:30 | 6:45 | 0 | 39 | 3 | 0 | 5 | 70 | 0 | 84 | 24 | 1049 | |
| 6:45 | 7:00 | 0 | 38 | 1 | 0 | 4 | 95 | 0 | 82 | 31 | 1121 | |
| 7:00 | 7:15 | 0 | 42 | 6 | 0 | 2 | 100 | 0 | 98 | 21 | 1228 | |
| 7:15 | 7:30 | 0 | 41 | 2 | 0 | 1 | 123 | 0 | 117 | 20 | 1298 | |
| 7:30 | 7:45 | 0 | 48 | 6 | 0 | 3 | 118 | 0 | 100 | 22 | 1326 | |
| 7:45 | 8:00 | 0 | 52 | 6 | 0 | 1 | 183 | 0 | 91 | 25 | 1397 | |
| 8:00 | 8:15 | 0 | 41 | 4 | 0 | 2 | 148 | 0 | 118 | 26 | 1391 | |
| 8:15 | 8:30 | 0 | 43 | 3 | 0 | 3 | 146 | 0 | 116 | 21 | 1412 | |
| 8:30 | 8:45 | 0 | 51 | 4 | 0 | 4 | 162 | 0 | 127 | 20 | 1456 | |
| 8:45 | 9:00 | 0 | 41 | 8 | 0 | 4 | 151 | 0 | 137 | 11 | 1459 | Peak |
| 9:00 | 9:15 | 0 | 40 | 4 | 0 | 2 | 156 | 0 | 139 | 19 | 1454 | |
| 9:15 | 9:30 | 0 | 39 | 4 | 0 | 2 | 172 | 0 | 140 | 19 | | |
| 9:30 | 9:45 | 0 | 33 | 3 | 0 | 1 | 177 | 0 | 140 | 17 | | |
| 9:45 | 10:00 | 0 | 29 | 2 | 0 | 5 | 160 | 0 | 125 | 26 | | |
| 14:30 | 14:45 | 0 | 18 | 2 | 0 | 2 | 146 | 0 | 170 | 32 | 1498 | |
| 14:45 | 15:00 | 0 | 21 | 4 | 0 | 3 | 156 | 0 | 163 | 29 | 1504 | |
| 15:00 | 15:15 | 0 | 26 | 3 | 0 | 3 | 147 | 0 | 171 | 26 | 1517 | |
| 15:15 | 15:30 | 0 | 33 | 6 | 0 | 8 | 153 | 0 | 142 | 34 | 1527 | |
| 15:30 | 15:45 | 0 | 31 | 5 | 1 | 3 | 126 | 0 | 166 | 44 | 1521 | |
| 15:45 | 16:00 | 0 | 28 | 5 | 0 | 4 | 129 | 0 | 169 | 54 | 1541 | |
| 16:00 | 16:15 | 0 | 22 | 3 | 0 | 9 | 142 | 0 | 181 | 29 | 1546 | |
| 16:15 | 16:30 | 0 | 26 | 4 | 0 | 5 | 111 | 0 | 178 | 46 | 1547 | Peak |
| 16:30 | 16:45 | 0 | 41 | 4 | 0 | 1 | 132 | 0 | 177 | 41 | 1511 | |
| 16:45 | 17:00 | 0 | 25 | 9 | 0 | 5 | 115 | 0 | 190 | 50 | 1451 | |
| 17:00 | 17:15 | 0 | 24 | 1 | 0 | 3 | 133 | 0 | 191 | 35 | 1373 | |
| 17:15 | 17:30 | 0 | 23 | 2 | 0 | 3 | 103 | 0 | 154 | 49 | 1266 | |
| 17:30 | 17:45 | 0 | 27 | 4 | 0 | 7 | 104 | 0 | 153 | 41 | 1217 | |
| 17:45 | 18:00 | 0 | 19 | 7 | 0 | 5 | 111 | 0 | 138 | 36 | 1150 | |
| 18:00 | 18:15 | 0 | 18 | 3 | 0 | 2 | 105 | 0 | 109 | 43 | 1030 | |
| 18:15 | 18:30 | 0 | 18 | 0 | 0 | 3 | 87 | 0 | 132 | 45 | | |
| 18:30 | 18:45 | 0 | 9 | 0 | 0 | 2 | 109 | 0 | 118 | 31 | | |
| 18:45 | 19:00 | 0 | 11 | 1 | 0 | 1 | 53 | 0 | 105 | 25 | | |

# ANNEXURE C: SURVEY RESULTS

## (SHEET 2 OF 3)

**TRANS TRAFFIC SURVEY** trafficsurvey.com.au

### TURNING MOVEMENT SURVEY

**Intersection of The Bucketts Way and Booral Rd, Boo**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***GPS*** | *-32.466943,151.959397* | | | | | | |
| ***Date:*** | Mon 06/02/23 | ***North:*** | The Bucketts Way | ***Survey Period*** | AM: | 6:00 AM-10:00 AM |
| ***Weather:*** | Fine | ***East:*** | Booral Rd | | PM: | 2:30 PM-7:00 PM |
| ***Suburban:*** | Booral | ***South:*** | The Bucketts Way | ***Traffic Peak*** | AM: | 8:30 AM-9:30 AM |
| ***Customer:*** | McLaren | ***West:*** | N/A | | PM: | 3:30 PM-4:30 PM |

***All Vehicles***

| Time | | th Approach The Bucketts \ | | | East Approach Booral Rd | | | th Approach The Bucketts \ | | | Hourly Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Star | Period End | U | SB | L | U | R | L | U | R | NB | Hour | Peak |
| 6:00 | 6:15 | 0 | 16 | 3 | 0 | 1 | 8 | 0 | 1 | 11 | 173 | |
| 6:15 | 6:30 | 0 | 19 | 2 | 0 | 0 | 9 | 0 | 3 | 10 | 180 | |
| 6:30 | 6:45 | 0 | 20 | 1 | 0 | 3 | 5 | 0 | 1 | 20 | 205 | |
| 6:45 | 7:00 | 0 | 14 | 0 | 0 | 2 | 5 | 0 | 1 | 18 | 231 | |
| 7:00 | 7:15 | 0 | 25 | 3 | 0 | 1 | 6 | 0 | 0 | 12 | 259 | |
| 7:15 | 7:30 | 0 | 26 | 2 | 0 | 5 | 7 | 2 | 3 | 23 | 263 | |
| 7:30 | 7:45 | 0 | 29 | 3 | 0 | 8 | 8 | 0 | 4 | 24 | 240 | |
| 7:45 | 8:00 | 0 | 26 | 4 | 0 | 7 | 13 | 0 | 4 | 14 | 237 | |
| 8:00 | 8:15 | 0 | 24 | 2 | 0 | 1 | 0 | 0 | 3 | 21 | 239 | |
| 8:15 | 8:30 | 0 | 16 | 2 | 0 | 3 | 3 | 0 | 1 | 20 | 256 | |
| 8:30 | 8:45 | 0 | 21 | 4 | 0 | 4 | 6 | 0 | 6 | 32 | 274 | Peak |
| 8:45 | 9:00 | 0 | 27 | 3 | 0 | 3 | 11 | 0 | 10 | 16 | 255 | |
| 9:00 | 9:15 | 0 | 21 | 4 | 0 | 3 | 5 | 0 | 4 | 31 | 225 | |
| 9:15 | 9:30 | 0 | 20 | 1 | 0 | 5 | 9 | 0 | 7 | 21 | | |
| 9:30 | 9:45 | 0 | 28 | 5 | 0 | 8 | 2 | 0 | 1 | 10 | | |
| 9:45 | 10:00 | 0 | 17 | 2 | 0 | 4 | 1 | 0 | 3 | 13 | | |
| 14:30 | 14:45 | 0 | 8 | 2 | 0 | 1 | 1 | 0 | 7 | 21 | 207 | |
| 14:45 | 15:00 | 0 | 11 | 3 | 0 | 2 | 8 | 0 | 9 | 19 | 221 | |
| 15:00 | 15:15 | 0 | 15 | 2 | 0 | 2 | 4 | 0 | 8 | 23 | 226 | |
| 15:15 | 15:30 | 0 | 23 | 1 | 0 | 6 | 5 | 0 | 2 | 24 | 245 | |
| 15:30 | 15:45 | 0 | 14 | 1 | 0 | 7 | 4 | 0 | 4 | 24 | 251 | Peak |
| 15:45 | 16:00 | 0 | 16 | 6 | 0 | 5 | 2 | 0 | 6 | 22 | 251 | Peak |
| 16:00 | 16:15 | 0 | 20 | 6 | 0 | 3 | 7 | 0 | 9 | 28 | 244 | |
| 16:15 | 16:30 | 0 | 19 | 1 | 0 | 3 | 6 | 0 | 7 | 31 | 239 | |
| 16:30 | 16:45 | 0 | 14 | 3 | 0 | 4 | 2 | 0 | 4 | 27 | 228 | |
| 16:45 | 17:00 | 0 | 21 | 1 | 0 | 2 | 3 | 0 | 3 | 20 | 217 | |
| 17:00 | 17:15 | 0 | 11 | 3 | 0 | 1 | 5 | 0 | 12 | 36 | 215 | |
| 17:15 | 17:30 | 0 | 18 | 4 | 0 | 2 | 3 | 0 | 6 | 23 | 185 | |
| 17:30 | 17:45 | 0 | 8 | 5 | 0 | 2 | 1 | 0 | 3 | 24 | 164 | |
| 17:45 | 18:00 | 0 | 12 | 0 | 0 | 1 | 2 | 0 | 9 | 24 | 146 | |
| 18:00 | 18:15 | 0 | 14 | 2 | 0 | 2 | 1 | 0 | 4 | 15 | 117 | |
| 18:15 | 18:30 | 0 | 5 | 3 | 0 | 2 | 2 | 0 | 5 | 18 | | |
| 18:30 | 18:45 | 0 | 5 | 1 | 0 | 1 | 3 | 0 | 1 | 14 | | |
| 18:45 | 19:00 | 0 | 3 | 3 | 0 | 1 | 1 | 0 | 0 | 11 | | |

## ANNEXURE C: SURVEY RESULTS

## (Sheet 3 of 3)

**TRANS TRAFFIC SURVEY**
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**AUTOMATIC COUNT SUMMARY**

| | | | |
|---|---|---|---|
| **Street Name :** | The Bucketts Way | **Location :** | South of Maytoms Ln |
| **Suburb :** | Booral | **Start Date :** | 00:00 Sun 05/February/2023 |
| **Metrocount ID** | EK45DTC7 | **Finish Date :** | 00:00 Sun 12/February/2023 |
| **Site ID Number :** | 2351 | **Speed Zone :** | 100 km/h |
| **Prepared By :** | Vo Son Binh | **Email:** | binh@trafficsurvey.com.au |

| GPS information | Lat 32° 29' 58.66 South<br>Long 151° 56' 41.67 East | | Direction of Travel | | |
|---|---|---|---|---|---|
| | | | Both directions | Northbound | Southbound |
| **Traffic Volume :** | | Weekdays Average | 2,840 | 1,468 | 1,372 |
| **(Vehicles/Day)** | | 7 Day Average | 2,757 | 1,409 | 1,348 |
| **Weekday** | **AM** | 08:00 | 215 | 101 | 113 |
| **Peak hour starts** | **PM** | 16:00 | 247 | 150 | 97 |
| **Speeds :** | | 85th Percentile | 98.4 | 97.2 | 99.6 |
| **(Km/Hr)** | | Average | 90.7 | 89.4 | 92.0 |
| **Classification % :** | | Light Vehicles up to 5.5m | 85.0% | 84.7% | 85.2% |

**Location**

GPS Information — Load Google Map (internet required)
(Latitude, Longitude) -32.499628, 151.944908


Speed Data | Speed Graph | Speed Bin
Volume Data | Volume Graph | Classification

| Peak Period | Turn Movement | Sample Size | Observed Average Delay |
|---|---|---|---|
| **AM (9:00am to 10:00am)** | Right turn from Pacific Highway into The Bucketts Way | 24 | 7.25 seconds |
| **PM (2:45pm to 3:45pm)** | | 25 | 5.4 seconds |
| **AM (9:00am to 10:00am)** | Right turn from Bucketts Way into Pacific Highway (Stage 1 movement) | 125 | 27.5 seconds |
| **PM (2:45pm to 3:45pm)** | | 97 | 22.3 seconds |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Booral Road AM Peak EX (Site Folder: Existing)]

The Bucketts Way / Booral Road
AM Peak
Existing
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: The Bucketts Way (S) | | | | | | | | | | | | | | |
| 2 | T1 | 100 | 17 | 105 | 17.0 | 0.078 | 0.1 | LOS A | 0.2 | 1.4 | 0.10 | 0.13 | 0.10 | 58.4 |
| 3 | R2 | 27 | 2 | 28 | 7.4 | 0.078 | 5.9 | LOS A | 0.2 | 1.4 | 0.10 | 0.13 | 0.10 | 55.8 |
| Approach | | 127 | 19 | 134 | 15.0 | 0.078 | 1.3 | NA | 0.2 | 1.4 | 0.10 | 0.13 | 0.10 | 57.8 |
| East: Booral Road | | | | | | | | | | | | | | |
| 4 | L2 | 31 | 4 | 33 | 12.9 | 0.045 | 9.0 | LOS A | 0.2 | 1.3 | 0.21 | 0.91 | 0.21 | 51.2 |
| 6 | R2 | 15 | 2 | 16 | 13.3 | 0.045 | 9.3 | LOS A | 0.2 | 1.3 | 0.21 | 0.91 | 0.21 | 50.6 |
| Approach | | 46 | 6 | 48 | 13.0 | 0.045 | 9.1 | LOS A | 0.2 | 1.3 | 0.21 | 0.91 | 0.21 | 51.0 |
| North: The Bucketts Way (N) | | | | | | | | | | | | | | |
| 7 | L2 | 12 | 0 | 13 | 0.0 | 0.056 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.07 | 0.00 | 57.7 |
| 8 | T1 | 89 | 4 | 94 | 4.5 | 0.056 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.07 | 0.00 | 59.3 |
| Approach | | 101 | 4 | 106 | 4.0 | 0.056 | 0.7 | NA | 0.0 | 0.0 | 0.00 | 0.07 | 0.00 | 59.1 |
| All Vehicles | | 274 | 29 | 288 | 10.6 | 0.078 | 2.4 | NA | 0.2 | 1.4 | 0.08 | 0.24 | 0.08 | 57.0 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Booral Road PM Peak EX (Site Folder: Existing)]

The Bucketts Way / Booral Road
PM Peak
Existing
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: The Bucketts Way (S) | | | | | | | | | | | | | | |
| 2 | T1 | 105 | 15 | 111 | 14.3 | 0.079 | 0.1 | LOS A | 0.2 | 1.3 | 0.08 | 0.12 | 0.08 | 58.5 |
| 3 | R2 | 26 | 1 | 27 | 3.8 | 0.079 | 5.8 | LOS A | 0.2 | 1.3 | 0.08 | 0.12 | 0.08 | 56.2 |
| Approach | | 131 | 16 | 138 | 12.2 | 0.079 | 1.2 | NA | 0.2 | 1.3 | 0.08 | 0.12 | 0.08 | 58.0 |
| East: Booral Road | | | | | | | | | | | | | | |
| 4 | L2 | 19 | 3 | 20 | 15.8 | 0.038 | 9.0 | LOS A | 0.1 | 1.1 | 0.20 | 0.92 | 0.20 | 51.1 |
| 6 | R2 | 18 | 2 | 19 | 11.1 | 0.038 | 9.0 | LOS A | 0.1 | 1.1 | 0.20 | 0.92 | 0.20 | 50.7 |
| Approach | | 37 | 5 | 39 | 13.5 | 0.038 | 9.0 | LOS A | 0.1 | 1.1 | 0.20 | 0.92 | 0.20 | 50.9 |
| North: The Bucketts Way (N) | | | | | | | | | | | | | | |
| 7 | L2 | 14 | 1 | 15 | 7.1 | 0.048 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.10 | 0.00 | 57.1 |
| 8 | T1 | 69 | 6 | 73 | 8.7 | 0.048 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.10 | 0.00 | 59.1 |
| Approach | | 83 | 7 | 87 | 8.4 | 0.048 | 1.0 | NA | 0.0 | 0.0 | 0.00 | 0.10 | 0.00 | 58.7 |
| All Vehicles | | 251 | 28 | 264 | 11.2 | 0.079 | 2.3 | NA | 0.2 | 1.3 | 0.07 | 0.23 | 0.07 | 57.1 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway AM Peak EX (Site Folder: Existing)]

The Bucketts Way / Pacific Highway
AM Peak
Existing
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 26 | 2 | 27 | 7.7 | 0.066 | 13.2 | LOS A | 0.2 | 1.7 | 0.71 | 0.88 | 0.71 | 48.0 |
| Approach | | 26 | 2 | 27 | 7.7 | 0.066 | 13.2 | NA | 0.2 | 1.7 | 0.71 | 0.88 | 0.71 | 48.0 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 22 | 4 | 23 | 18.2 | 0.026 | 8.0 | LOS A | 0.1 | 0.8 | 0.48 | 0.64 | 0.48 | 51.9 |
| 9 | R2 | 124 | 6 | 131 | 4.8 | 0.498 | 27.8 | LOS B | 2.2 | 16.2 | 0.87 | 1.11 | 1.27 | 41.3 |
| Approach | | 146 | 10 | 154 | 6.8 | 0.498 | 24.8 | LOS B | 2.2 | 16.2 | 0.82 | 1.04 | 1.15 | 42.6 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 124 | 9 | 131 | 7.3 | 0.085 | 5.8 | LOS A | 0.4 | 2.7 | 0.10 | 0.52 | 0.10 | 53.7 |
| 11 | T1 | 872 | 131 | 918 | 15.0 | 0.258 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 996 | 140 | 1048 | 14.1 | 0.258 | 0.8 | LOS A | 0.4 | 2.7 | 0.01 | 0.06 | 0.01 | 59.0 |
| All Vehicles | | 1168 | 152 | 1229 | 13.0 | 0.498 | 4.1 | NA | 2.2 | 16.2 | 0.13 | 0.20 | 0.17 | 56.0 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway PM Peak EX (Site Folder: Existing)]

The Bucketts Way / Pacific Highway
PM Peak
Existing
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 31 | 9 | 33 | 29.0 | 0.088 | 14.6 | LOS B | 0.3 | 2.7 | 0.72 | 0.88 | 0.72 | 46.6 |
| Approach | | 31 | 9 | 33 | 29.0 | 0.088 | 14.6 | NA | 0.3 | 2.7 | 0.72 | 0.88 | 0.72 | 46.6 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 15 | 5 | 16 | 33.3 | 0.019 | 8.3 | LOS A | 0.1 | 0.6 | 0.48 | 0.62 | 0.48 | 51.3 |
| 9 | R2 | 91 | 9 | 96 | 9.9 | 0.359 | 24.8 | LOS B | 1.4 | 10.9 | 0.84 | 1.06 | 1.05 | 42.7 |
| Approach | | 106 | 14 | 112 | 13.2 | 0.359 | 22.4 | LOS B | 1.4 | 10.9 | 0.79 | 1.00 | 0.97 | 43.7 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 157 | 9 | 165 | 5.7 | 0.107 | 5.8 | LOS A | 0.5 | 3.4 | 0.11 | 0.52 | 0.11 | 53.7 |
| 11 | T1 | 813 | 117 | 856 | 14.4 | 0.240 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 970 | 126 | 1021 | 13.0 | 0.240 | 1.0 | LOS A | 0.5 | 3.4 | 0.02 | 0.08 | 0.02 | 58.8 |
| All Vehicles | | 1107 | 149 | 1165 | 13.5 | 0.359 | 3.4 | NA | 1.4 | 10.9 | 0.11 | 0.19 | 0.13 | 56.5 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway AM Peak EX + Deep Creek Quarry (Site Folder: Existing + Deep Creek Quarry)]

The Bucketts Way / Pacific Highway
AM Peak
Existing + Deep Creek Quarry
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 31 | 7 | 33 | 22.6 | 0.092 | 15.1 | LOS B | 0.3 | 2.7 | 0.75 | 0.89 | 0.75 | 46.4 |
| Approach | | 31 | 7 | 33 | 22.6 | 0.092 | 15.1 | NA | 0.3 | 2.7 | 0.75 | 0.89 | 0.75 | 46.4 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 27 | 9 | 28 | 33.3 | 0.036 | 8.6 | LOS A | 0.1 | 1.2 | 0.50 | 0.66 | 0.50 | 51.1 |
| 9 | R2 | 144 | 26 | 152 | 18.1 | 0.711 | 42.0 | LOS C | 3.8 | 30.7 | 0.94 | 1.24 | 1.80 | 35.6 |
| Approach | | 171 | 35 | 180 | 20.5 | 0.711 | 36.7 | LOS C | 3.8 | 30.7 | 0.87 | 1.15 | 1.59 | 37.4 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 144 | 29 | 152 | 20.1 | 0.105 | 6.0 | LOS A | 0.5 | 3.7 | 0.12 | 0.51 | 0.12 | 53.1 |
| 11 | T1 | 872 | 131 | 918 | 15.0 | 0.258 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 1016 | 160 | 1069 | 15.7 | 0.258 | 0.9 | LOS A | 0.5 | 3.7 | 0.02 | 0.07 | 0.02 | 58.8 |
| All Vehicles | | 1218 | 202 | 1282 | 16.6 | 0.711 | 6.3 | NA | 3.8 | 30.7 | 0.15 | 0.24 | 0.26 | 54.1 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway PM Peak EX + Deep Creek Quarry (Site Folder: Existing + Deep Creek Quarry)]

The Bucketts Way / Pacific Highway
PM Peak
Existing + Deep Creek Quarry
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 36 | 14 | 38 | 38.9 | 0.112 | 15.8 | LOS B | 0.4 | 3.7 | 0.74 | 0.89 | 0.74 | 45.6 |
| Approach | | 36 | 14 | 38 | 38.9 | 0.112 | 15.8 | NA | 0.4 | 3.7 | 0.74 | 0.89 | 0.74 | 45.6 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 20 | 10 | 21 | 50.0 | 0.028 | 8.9 | LOS A | 0.1 | 1.0 | 0.50 | 0.64 | 0.50 | 50.4 |
| 9 | R2 | 111 | 29 | 117 | 26.1 | 0.554 | 35.3 | LOS C | 2.5 | 21.4 | 0.90 | 1.14 | 1.37 | 38.0 |
| Approach | | 131 | 39 | 138 | 29.8 | 0.554 | 31.3 | LOS C | 2.5 | 21.4 | 0.84 | 1.06 | 1.24 | 39.5 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 177 | 29 | 186 | 16.4 | 0.128 | 5.9 | LOS A | 0.6 | 4.5 | 0.13 | 0.51 | 0.13 | 53.2 |
| 11 | T1 | 813 | 117 | 856 | 14.4 | 0.240 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 990 | 146 | 1042 | 14.7 | 0.240 | 1.1 | LOS A | 0.6 | 4.5 | 0.02 | 0.09 | 0.02 | 58.5 |
| All Vehicles | | 1157 | 199 | 1218 | 17.2 | 0.554 | 5.0 | NA | 2.5 | 21.4 | 0.14 | 0.23 | 0.18 | 55.0 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Booral Road AM Peak Future (Site Folder: Future)]

The Bucketts Way / Booral Road
AM Peak
Future
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: The Bucketts Way (S) | | | | | | | | | | | | | | |
| 2 | T1 | 100 | 17 | 105 | 17.0 | 0.078 | 0.1 | LOS A | 0.2 | 1.4 | 0.10 | 0.13 | 0.10 | 58.4 |
| 3 | R2 | 27 | 2 | 28 | 7.4 | 0.078 | 5.9 | LOS A | 0.2 | 1.4 | 0.10 | 0.13 | 0.10 | 55.8 |
| Approach | | 127 | 19 | 134 | 15.0 | 0.078 | 1.3 | NA | 0.2 | 1.4 | 0.10 | 0.13 | 0.10 | 57.8 |
| East: Booral Road | | | | | | | | | | | | | | |
| 4 | L2 | 31 | 4 | 33 | 12.9 | 0.045 | 9.0 | LOS A | 0.2 | 1.3 | 0.21 | 0.91 | 0.21 | 51.2 |
| 6 | R2 | 15 | 2 | 16 | 13.3 | 0.045 | 9.3 | LOS A | 0.2 | 1.3 | 0.21 | 0.91 | 0.21 | 50.6 |
| Approach | | 46 | 6 | 48 | 13.0 | 0.045 | 9.1 | LOS A | 0.2 | 1.3 | 0.21 | 0.91 | 0.21 | 51.0 |
| North: The Bucketts Way (N) | | | | | | | | | | | | | | |
| 7 | L2 | 12 | 0 | 13 | 0.0 | 0.056 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.07 | 0.00 | 57.7 |
| 8 | T1 | 89 | 4 | 94 | 4.5 | 0.056 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.07 | 0.00 | 59.3 |
| Approach | | 101 | 4 | 106 | 4.0 | 0.056 | 0.7 | NA | 0.0 | 0.0 | 0.00 | 0.07 | 0.00 | 59.1 |
| All Vehicles | | 274 | 29 | 288 | 10.6 | 0.078 | 2.4 | NA | 0.2 | 1.4 | 0.08 | 0.24 | 0.08 | 57.0 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Booral Road PM Peak Future (Site Folder: Future)]

The Bucketts Way / Booral Road
PM Peak
Future
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: The Bucketts Way (S) | | | | | | | | | | | | | | |
| 2 | T1 | 113 | 15 | 119 | 13.3 | 0.087 | 0.1 | LOS A | 0.2 | 1.6 | 0.10 | 0.13 | 0.10 | 58.3 |
| 3 | R2 | 33 | 1 | 35 | 3.0 | 0.087 | 5.8 | LOS A | 0.2 | 1.6 | 0.10 | 0.13 | 0.10 | 56.0 |
| Approach | | 146 | 16 | 154 | 11.0 | 0.087 | 1.4 | NA | 0.2 | 1.6 | 0.10 | 0.13 | 0.10 | 57.8 |
| East: Booral Road | | | | | | | | | | | | | | |
| 4 | L2 | 19 | 3 | 20 | 15.8 | 0.038 | 9.0 | LOS A | 0.1 | 1.1 | 0.20 | 0.92 | 0.20 | 51.0 |
| 6 | R2 | 18 | 2 | 19 | 11.1 | 0.038 | 9.1 | LOS A | 0.1 | 1.1 | 0.20 | 0.92 | 0.20 | 50.7 |
| Approach | | 37 | 5 | 39 | 13.5 | 0.038 | 9.1 | LOS A | 0.1 | 1.1 | 0.20 | 0.92 | 0.20 | 50.9 |
| North: The Bucketts Way (N) | | | | | | | | | | | | | | |
| 7 | L2 | 14 | 1 | 15 | 7.1 | 0.048 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.10 | 0.00 | 57.1 |
| 8 | T1 | 69 | 6 | 73 | 8.7 | 0.048 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.10 | 0.00 | 59.1 |
| Approach | | 83 | 7 | 87 | 8.4 | 0.048 | 1.0 | NA | 0.0 | 0.0 | 0.00 | 0.10 | 0.00 | 58.7 |
| All Vehicles | | 266 | 28 | 280 | 10.5 | 0.087 | 2.3 | NA | 0.2 | 1.6 | 0.08 | 0.23 | 0.08 | 57.0 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway AM Peak Future (Site Folder: Future)]

The Bucketts Way / Pacific Highway
AM Peak
Future
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 33 | 9 | 35 | 27.3 | 0.103 | 15.8 | LOS B | 0.4 | 3.1 | 0.76 | 0.90 | 0.76 | 45.9 |
| Approach | | 33 | 9 | 35 | 27.3 | 0.103 | 15.8 | NA | 0.4 | 3.1 | 0.76 | 0.90 | 0.76 | 45.9 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 28 | 10 | 29 | 35.7 | 0.038 | 8.7 | LOS A | 0.1 | 1.3 | 0.50 | 0.66 | 0.50 | 50.9 |
| 9 | R2 | 130 | 12 | 137 | 9.2 | 0.568 | 31.7 | LOS C | 2.6 | 19.9 | 0.90 | 1.14 | 1.40 | 39.6 |
| Approach | | 158 | 22 | 166 | 13.9 | 0.568 | 27.6 | LOS B | 2.6 | 19.9 | 0.83 | 1.05 | 1.24 | 41.2 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 130 | 15 | 137 | 11.5 | 0.092 | 5.9 | LOS A | 0.4 | 3.0 | 0.12 | 0.52 | 0.12 | 53.4 |
| 11 | T1 | 872 | 131 | 918 | 15.0 | 0.258 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 1002 | 146 | 1055 | 14.6 | 0.258 | 0.8 | LOS A | 0.4 | 3.0 | 0.02 | 0.07 | 0.02 | 58.9 |
| All Vehicles | | 1193 | 177 | 1256 | 14.8 | 0.568 | 4.8 | NA | 2.6 | 19.9 | 0.14 | 0.22 | 0.20 | 55.3 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway PM Peak Future (Site Folder: Future)]

The Bucketts Way / Pacific Highway
PM Peak
Future
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 38 | 16 | 40 | 42.1 | 0.123 | 16.3 | LOS B | 0.4 | 4.1 | 0.75 | 0.89 | 0.75 | 45.3 |
| Approach | | 38 | 16 | 40 | 42.1 | 0.123 | 16.3 | NA | 0.4 | 4.1 | 0.75 | 0.89 | 0.75 | 45.3 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 23 | 11 | 24 | 47.8 | 0.032 | 8.8 | LOS A | 0.1 | 1.2 | 0.50 | 0.65 | 0.50 | 50.5 |
| 9 | R2 | 110 | 15 | 116 | 13.6 | 0.466 | 28.5 | LOS B | 2.0 | 15.7 | 0.87 | 1.10 | 1.22 | 40.9 |
| Approach | | 133 | 26 | 140 | 19.5 | 0.466 | 25.1 | LOS B | 2.0 | 15.7 | 0.80 | 1.02 | 1.09 | 42.3 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 163 | 15 | 172 | 9.2 | 0.114 | 5.9 | LOS A | 0.5 | 3.7 | 0.13 | 0.52 | 0.13 | 53.5 |
| 11 | T1 | 813 | 117 | 856 | 14.4 | 0.240 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 976 | 132 | 1027 | 13.5 | 0.240 | 1.0 | LOS A | 0.5 | 3.7 | 0.02 | 0.09 | 0.02 | 58.7 |
| All Vehicles | | 1147 | 174 | 1207 | 15.2 | 0.466 | 4.3 | NA | 2.0 | 15.7 | 0.14 | 0.22 | 0.17 | 55.6 |

# MOVEMENT SUMMARY

## Site: 101 [Maytoms Lane / The Bucketts Way AM Peak Future (Site Folder: Future)]

Maytoms Lane / The Bucketts Way
AM Peak
Future
Site Category: (None)
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: The Bucketts Way (S) | | | | | | | | | | | | | | |
| 1 | L2 | 19 | 18 | 20 | 94.7 | 0.018 | 6.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.56 | 0.00 | 49.8 |
| 2 | T1 | 101 | 15 | 106 | 14.9 | 0.060 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 60.0 |
| Approach | | 120 | 33 | 126 | 27.5 | 0.060 | 1.1 | NA | 0.0 | 0.0 | 0.00 | 0.09 | 0.00 | 58.1 |
| North: The Bucketts Way (N) | | | | | | | | | | | | | | |
| 8 | T1 | 113 | 17 | 119 | 15.0 | 0.068 | 0.0 | LOS A | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 59.9 |
| 9 | R2 | 1 | 0 | 1 | 0.0 | 0.068 | 6.0 | LOS A | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 57.7 |
| Approach | | 114 | 17 | 120 | 14.9 | 0.068 | 0.1 | NA | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 59.9 |
| West: Maytoms Lane | | | | | | | | | | | | | | |
| 10 | L2 | 1 | 0 | 1 | 0.0 | 0.039 | 5.9 | LOS A | 0.1 | 1.8 | 0.43 | 0.58 | 0.43 | 51.3 |
| 12 | R2 | 19 | 18 | 20 | 94.7 | 0.039 | 9.9 | LOS A | 0.1 | 1.8 | 0.43 | 0.58 | 0.43 | 47.5 |
| Approach | | 20 | 18 | 21 | 90.0 | 0.039 | 9.7 | LOS A | 0.1 | 1.8 | 0.43 | 0.58 | 0.43 | 47.7 |
| All Vehicles | | 254 | 68 | 267 | 26.8 | 0.068 | 1.3 | NA | 0.1 | 1.8 | 0.04 | 0.09 | 0.04 | 57.9 |

# MOVEMENT SUMMARY

## Site: 101 [Maytoms Lane / The Bucketts Way PM Peak Future (Site Folder: Future)]

Maytoms Lane / The Bucketts Way
PM Peak
Future
Site Category: (None)
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: The Bucketts Way (S) | | | | | | | | | | | | | | |
| 1 | L2 | 19 | 18 | 20 | 94.7 | 0.018 | 6.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.56 | 0.00 | 49.8 |
| 2 | T1 | 150 | 23 | 158 | 15.3 | 0.089 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 60.0 |
| Approach | | 169 | 41 | 178 | 24.3 | 0.089 | 0.8 | NA | 0.0 | 0.0 | 0.00 | 0.06 | 0.00 | 58.6 |
| North: The Bucketts Way (N) | | | | | | | | | | | | | | |
| 8 | T1 | 97 | 15 | 102 | 15.5 | 0.058 | 0.0 | LOS A | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 59.9 |
| 9 | R2 | 1 | 0 | 1 | 0.0 | 0.058 | 6.2 | LOS A | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 57.6 |
| Approach | | 98 | 15 | 103 | 15.3 | 0.058 | 0.1 | NA | 0.0 | 0.1 | 0.01 | 0.01 | 0.01 | 59.9 |
| West: Maytoms Lane | | | | | | | | | | | | | | |
| 10 | L2 | 9 | 0 | 9 | 0.0 | 0.053 | 6.0 | LOS A | 0.2 | 2.1 | 0.41 | 0.59 | 0.41 | 51.6 |
| 12 | R2 | 24 | 18 | 25 | 75.0 | 0.053 | 9.8 | LOS A | 0.2 | 2.1 | 0.41 | 0.59 | 0.41 | 48.5 |
| Approach | | 33 | 18 | 35 | 54.5 | 0.053 | 8.8 | LOS A | 0.2 | 2.1 | 0.41 | 0.59 | 0.41 | 49.3 |
| All Vehicles | | 300 | 74 | 316 | 24.7 | 0.089 | 1.4 | NA | 0.2 | 2.1 | 0.05 | 0.10 | 0.05 | 57.8 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway AM Peak Future + Deep Creek Quarry (Site Folder: Future + Deep Creek Quarry)]

The Bucketts Way / Pacific Highway
AM Peak
Future + Deep Creek Quarry
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 38 | 14 | 40 | 36.8 | 0.132 | 17.2 | LOS B | 0.5 | 4.2 | 0.78 | 0.90 | 0.78 | 44.9 |
| Approach | | 38 | 14 | 40 | 36.8 | 0.132 | 17.2 | NA | 0.5 | 4.2 | 0.78 | 0.90 | 0.78 | 44.9 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 33 | 15 | 35 | 45.5 | 0.047 | 9.1 | LOS A | 0.2 | 1.7 | 0.52 | 0.68 | 0.52 | 50.4 |
| 9 | R2 | 150 | 32 | 158 | 21.3 | 0.795 | 51.8 | LOS D | 4.8 | 39.6 | 0.96 | 1.33 | 2.17 | 32.5 |
| Approach | | 183 | 47 | 193 | 25.7 | 0.795 | 44.1 | LOS D | 4.8 | 39.6 | 0.88 | 1.22 | 1.87 | 34.7 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 150 | 35 | 158 | 23.3 | 0.113 | 6.0 | LOS A | 0.5 | 4.1 | 0.14 | 0.51 | 0.14 | 52.9 |
| 11 | T1 | 872 | 131 | 918 | 15.0 | 0.258 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 1022 | 166 | 1076 | 16.2 | 0.258 | 1.0 | LOS A | 0.5 | 4.1 | 0.02 | 0.08 | 0.02 | 58.7 |
| All Vehicles | | 1243 | 227 | 1308 | 18.3 | 0.795 | 7.8 | NA | 4.8 | 39.6 | 0.17 | 0.27 | 0.32 | 52.8 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway PM Peak Future + Deep Creek Quarry (Site Folder: Future + Deep Creek Quarry)]

The Bucketts Way / Pacific Highway
PM Peak
Future + Deep Creek Quarry
Site Category: (None)
Stop (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 43 | 21 | 45 | 48.8 | 0.148 | 17.3 | LOS B | 0.5 | 5.1 | 0.77 | 0.90 | 0.77 | 44.6 |
| Approach | | 43 | 21 | 45 | 48.8 | 0.148 | 17.3 | NA | 0.5 | 5.1 | 0.77 | 0.90 | 0.77 | 44.6 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 28 | 16 | 29 | 57.1 | 0.041 | 9.2 | LOS A | 0.2 | 1.6 | 0.51 | 0.66 | 0.51 | 50.0 |
| 9 | R2 | 130 | 35 | 137 | 26.9 | 0.674 | 41.7 | LOS C | 3.4 | 29.4 | 0.93 | 1.21 | 1.67 | 35.6 |
| Approach | | 158 | 51 | 166 | 32.3 | 0.674 | 36.0 | LOS C | 3.4 | 29.4 | 0.85 | 1.11 | 1.46 | 37.5 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 183 | 35 | 193 | 19.1 | 0.136 | 6.0 | LOS A | 0.6 | 4.9 | 0.15 | 0.51 | 0.15 | 53.0 |
| 11 | T1 | 813 | 117 | 856 | 14.4 | 0.240 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.9 |
| Approach | | 996 | 152 | 1048 | 15.3 | 0.240 | 1.2 | LOS A | 0.6 | 4.9 | 0.03 | 0.09 | 0.03 | 58.5 |
| All Vehicles | | 1197 | 224 | 1260 | 18.7 | 0.674 | 6.3 | NA | 3.4 | 29.4 | 0.16 | 0.26 | 0.24 | 53.9 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway AM Peak 2033 Base (Site Folder: 2033 Modelling)]

The Bucketts Way / Pacific Highway
AM Peak
2033 Base
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 26 | 2 | 27 | 7.7 | 0.113 | 20.2 | LOS B | 0.4 | 2.7 | 0.84 | 0.93 | 0.84 | 43.9 |
| Approach | | 26 | 2 | 27 | 7.7 | 0.113 | 20.2 | NA | 0.4 | 2.7 | 0.84 | 0.93 | 0.84 | 43.9 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 22 | 4 | 23 | 18.2 | 0.033 | 9.3 | LOS A | 0.1 | 1.0 | 0.56 | 0.71 | 0.56 | 51.0 |
| 9 | R2 | 124 | 6 | 131 | 4.8 | 0.915 | 92.5 | LOS F [11] | 6.2 | 45.2 | 0.99 | 1.46 | 2.86 | 23.9 |
| Approach | | 146 | 10 | 154 | 6.8 | 0.915 | 79.9 | LOS F [11] | 6.2 | 45.2 | 0.92 | 1.35 | 2.51 | 26.0 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 124 | 9 | 131 | 7.3 | 0.085 | 5.8 | LOS A | 0.4 | 2.7 | 0.10 | 0.52 | 0.10 | 53.7 |
| 11 | T1 | 872 | 131 | 1212 | 15.0 | 0.341 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 996 | 140 | 1342 | 14.3 | 0.341 | 0.7 | LOS A | 0.4 | 2.7 | 0.01 | 0.05 | 0.01 | 59.1 |
| All Vehicles | | 1168 | 152 | 1523 | 13.4 | 0.915 | 9.0 | NA | 6.2 | 45.2 | 0.12 | 0.20 | 0.28 | 52.1 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway PM Peak 2033 Base (Site Folder: 2033 Modelling)]

The Bucketts Way / Pacific Highway
PM Peak
2033 Base
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 31 | 9 | 33 | 29.0 | 0.137 | 20.8 | LOS B | 0.5 | 3.9 | 0.83 | 0.93 | 0.83 | 43.2 |
| Approach | | 31 | 9 | 33 | 29.0 | 0.137 | 20.8 | NA | 0.5 | 3.9 | 0.83 | 0.93 | 0.83 | 43.2 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 15 | 5 | 16 | 33.3 | 0.023 | 9.3 | LOS A | 0.1 | 0.7 | 0.54 | 0.68 | 0.54 | 50.6 |
| 9 | R2 | 91 | 9 | 96 | 9.9 | 0.573 | 42.4 | LOS C | 2.4 | 18.0 | 0.93 | 1.12 | 1.39 | 35.5 |
| Approach | | 106 | 14 | 112 | 13.2 | 0.573 | 37.7 | LOS C | 2.4 | 18.0 | 0.88 | 1.06 | 1.27 | 37.1 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 157 | 9 | 165 | 5.7 | 0.107 | 5.8 | LOS A | 0.5 | 3.4 | 0.11 | 0.52 | 0.11 | 53.7 |
| 11 | T1 | 813 | 117 | 1087 | 14.4 | 0.305 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 970 | 126 | 1252 | 13.2 | 0.305 | 0.9 | LOS A | 0.5 | 3.4 | 0.02 | 0.07 | 0.02 | 58.9 |
| All Vehicles | | 1107 | 149 | 1396 | 13.6 | 0.573 | 4.3 | NA | 2.4 | 18.0 | 0.10 | 0.17 | 0.13 | 55.8 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway AM Peak 2033 Base + Development (Site Folder: 2033 Modelling + Development)]

The Bucketts Way / Pacific Highway
AM Peak
2033 Base + Development
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 33 | 9 | 35 | 27.3 | 0.189 | 26.2 | LOS B | 0.6 | 5.3 | 0.88 | 0.96 | 0.91 | 40.6 |
| Approach | | 33 | 9 | 35 | 27.3 | 0.189 | 26.2 | NA | 0.6 | 5.3 | 0.88 | 0.96 | 0.91 | 40.6 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 28 | 10 | 29 | 35.7 | 0.048 | 10.3 | LOS A | 0.2 | 1.6 | 0.58 | 0.74 | 0.58 | 49.9 |
| 9 | R2 | 130 | 12 | 137 | 9.2 | 1.061 | 165.7 | LOS F [11] | 12.5 | 94.1 | 1.00 | 1.91 | 4.70 | 16.0 |
| Approach | | 158 | 22 | 166 | 13.9 | 1.061 | 138.1 | LOS F [11] | 12.5 | 94.1 | 0.92 | 1.71 | 3.97 | 18.2 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 130 | 15 | 137 | 11.5 | 0.092 | 5.9 | LOS A | 0.4 | 3.0 | 0.12 | 0.52 | 0.12 | 53.4 |
| 11 | T1 | 872 | 131 | 1212 | 15.0 | 0.341 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 1002 | 146 | 1348 | 14.7 | 0.341 | 0.7 | LOS A | 0.4 | 3.0 | 0.01 | 0.05 | 0.01 | 59.1 |
| All Vehicles | | 1193 | 177 | 1550 | 14.9 | 1.061 | 16.0 | NA | 12.5 | 94.1 | 0.13 | 0.25 | 0.46 | 47.2 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway PM Peak 2033 Base + Development (Site Folder: 2033 Modelling + Development)]

The Bucketts Way / Pacific Highway
PM Peak
2033 Base + Development
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 38 | 16 | 40 | 42.1 | 0.197 | 24.6 | LOS B | 0.7 | 6.3 | 0.86 | 0.95 | 0.90 | 41.0 |
| Approach | | 38 | 16 | 40 | 42.1 | 0.197 | 24.6 | NA | 0.7 | 6.3 | 0.86 | 0.95 | 0.90 | 41.0 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 23 | 11 | 24 | 47.8 | 0.038 | 10.1 | LOS A | 0.1 | 1.4 | 0.56 | 0.71 | 0.56 | 49.7 |
| 9 | R2 | 110 | 15 | 116 | 13.6 | 0.754 | 58.5 | LOS E 11 | 3.7 | 29.0 | 0.96 | 1.23 | 1.87 | 30.7 |
| Approach | | 133 | 26 | 140 | 19.5 | 0.754 | 50.1 | LOS D 11 | 3.7 | 29.0 | 0.89 | 1.14 | 1.64 | 32.9 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 163 | 15 | 172 | 9.2 | 0.114 | 5.9 | LOS A | 0.5 | 3.7 | 0.13 | 0.52 | 0.13 | 53.5 |
| 11 | T1 | 813 | 117 | 1087 | 14.4 | 0.305 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 976 | 132 | 1258 | 13.7 | 0.305 | 0.9 | LOS A | 0.5 | 3.7 | 0.02 | 0.07 | 0.02 | 58.8 |
| All Vehicles | | 1147 | 174 | 1438 | 15.0 | 0.754 | 6.3 | NA | 3.7 | 29.0 | 0.13 | 0.20 | 0.20 | 54.0 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway AM Peak 2033 Base + Development + Deep Creek Quarry (Site Folder: 2033 Modelling + Development + Deep Creek Quarry)]

The Bucketts Way / Pacific Highway
AM Peak
2033 Base + Development + Deep Creek Quarry
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 40 | 16 | 42 | 40.0 | 0.271 | 32.6 | LOS C | 0.9 | 8.6 | 0.90 | 0.99 | 1.01 | 37.7 |
| Approach | | 40 | 16 | 42 | 40.0 | 0.271 | 32.6 | NA | 0.9 | 8.6 | 0.90 | 0.99 | 1.01 | 37.7 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 36 | 18 | 38 | 50.0 | 0.069 | 11.2 | LOS A | 0.2 | 2.5 | 0.60 | 0.78 | 0.60 | 48.9 |
| 9 | R2 | 153 | 35 | 161 | 22.9 | 1.644 | 641.3 | LOS F[11] | 45.5 | 381.2 | 1.00 | 3.39 | 10.43 | 5.1 |
| Approach | | 189 | 53 | 199 | 28.0 | 1.644 | 521.2 | LOS F[11] | 45.5 | 381.2 | 0.92 | 2.89 | 8.55 | 6.1 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 153 | 38 | 161 | 24.8 | 0.116 | 6.1 | LOS A | 0.5 | 4.3 | 0.14 | 0.51 | 0.14 | 52.8 |
| 11 | T1 | 872 | 131 | 1212 | 15.0 | 0.341 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 1025 | 169 | 1373 | 16.2 | 0.341 | 0.8 | LOS A | 0.5 | 4.3 | 0.02 | 0.06 | 0.02 | 58.9 |
| All Vehicles | | 1254 | 238 | 1614 | 18.3 | 1.644 | 65.8 | NA | 45.5 | 381.2 | 0.15 | 0.43 | 1.10 | 28.4 |

# MOVEMENT SUMMARY

## Site: 101 [The Bucketts Way / Pacific Highway PM Peak 2033 Base + Development + Deep Creek Quarry (Site Folder: 2033 Modelling + Development + Deep Creek Quarry)]

The Bucketts Way / Pacific Highway
PM Peak
2033 Base + Development+ Deep Creek Quarry
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Pacific Highway (E) | | | | | | | | | | | | | | |
| 6 | R2 | 43 | 21 | 45 | 48.8 | 0.242 | 27.4 | LOS B | 0.8 | 8.3 | 0.87 | 0.97 | 0.96 | 39.7 |
| Approach | | 43 | 21 | 45 | 48.8 | 0.242 | 27.4 | NA | 0.8 | 8.3 | 0.87 | 0.97 | 0.96 | 39.7 |
| North: The Bucketts Way | | | | | | | | | | | | | | |
| 7 | L2 | 28 | 16 | 29 | 57.1 | 0.050 | 10.6 | LOS A | 0.2 | 1.9 | 0.57 | 0.73 | 0.57 | 49.1 |
| 9 | R2 | 130 | 35 | 137 | 26.9 | 1.131 | 215.8 | LOS F [11] | 16.6 | 143.1 | 1.00 | 2.21 | 5.61 | 13.0 |
| Approach | | 158 | 51 | 166 | 32.3 | 1.131 | 179.5 | LOS F [11] | 16.6 | 143.1 | 0.92 | 1.95 | 4.72 | 15.0 |
| West: Pacific Highway (W) | | | | | | | | | | | | | | |
| 10 | L2 | 183 | 35 | 193 | 19.1 | 0.136 | 6.0 | LOS A | 0.6 | 4.9 | 0.15 | 0.51 | 0.15 | 53.0 |
| 11 | T1 | 813 | 117 | 1087 | 14.4 | 0.305 | 0.1 | LOS A | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 59.8 |
| Approach | | 996 | 152 | 1279 | 15.1 | 0.305 | 1.0 | LOS A | 0.6 | 4.9 | 0.02 | 0.08 | 0.02 | 58.7 |
| All Vehicles | | 1197 | 224 | 1491 | 18.0 | 1.131 | 21.7 | NA | 16.6 | 143.1 | 0.15 | 0.31 | 0.58 | 43.8 |

## ANNEXURE F: SIGHT LINE ASSESSMENT

## (Sheet 1 of 1)

## ANNEXURE G: DRIVER CODE OF CONDUCT

All heavy vehicle drivers associated with the Quarry at 67 Maytoms Lane Booral, including any employees contracted to it, whether directly or indirectly, who engage in the movement of delivery trucks or motor vehicles on the site shall abide by the following code of conduct. All drivers of vehicles including employee and contractor truck drivers will be required to sign a register of inducted drivers confirming that they agree to the obligations, requirements and directions in regard to the Driver's Code of Conduct. The signed drivers code of conduct register shall be kept on the premises at all times and be readily available upon request by authorised Council or TfNSW officers.

In the event that a statutory requirement overlaps the scope of this plan then the statutory requirements will take precedence. If there is a real or perceived difference between the statutory regulations and this document then the contractor or staff member must first seek clarification from the proponent on the implementation of that action for which the difference is identified.

a) Drivers to be appropriately licenced by TfNSW or another Australian state for the vehicle size and combination.

b) Drivers will abide by the Road Rules 2014 (NSW) (NSW Road Rules) as amended at all times when travelling on public roads and within the site.

c) Drivers are prohibited from being under the influence of alcohol while operating a motor vehicle or any machinery on-site in accordance with the Road Rules 2014 (NSW) or as specified in contractual agreements for all employees.

d) Drivers are prohibited from being under the influence of drugs, other than alcohol, while operating a motor vehicle in accordance with Road Rules 2014 (NSW) or as specified in contractual agreements for all employees. This includes illicit drugs and those which may directly or indirectly have an effect such as those accompanied by the warning of "This medicine may cause drowsiness and may increase the effect of alcohol. If affected do not drive a motor vehicle or operate machinery".

e) Contractors will specifically be required to abide by this Drivers Code of Conduct at all times while engaged in performing their duties during their work period. Failure of a contractor to comply with this Code of Conduct (without due cause) may result in reprimand or severance of employment in accordance with relevant government policies and contractual agreements. Failure of compliance will be recorded by Quarry staff who will randomly undertake checks to monitor and record exit of truck numbers turning onto The Bucketts Way.

f) Drivers of all delivery vehicles will follow the required haulage route of transport of materials to and from the site. Drivers are to obey temporary changes in travel routes as directed by regulatory signage or under the direction of Police or traffic controller at work sites and drive their vehicles in a compliant manner appropriate to the size of the vehicle and road conditions. All other vehicles may approach and exit the site in any lawful manner.

g) Drivers of heavy vehicles have a responsibility to obey the Heavy Vehicle National Law 2013 (NSW) as amended at all times when travelling on public roads.

h) If drivers of heavy vehicles upon attempting to enter the Pacific Highway and the time taken to turn right exceeds a two (2) minute wait time, they are to proceed to turn left onto the Pacific Highway and utilise Tarean Road to undertaken a safe U-turn to proceed westbound along the Pacific Highway