

Appendix A - Correspondence from Pacific National



19 November 2012

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Level 4, 2-12 Macquarie Street
Parramatta NSW 2150
Telephone 02 9893 2706

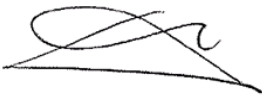
Angus Richmond
Metropolitan Operations Manager
Boral Construction Materials
Clunies Ross St
Prospect NSW 2148

Dear Angus,

Pacific National Bulk Rail is unable to identify a suitable commercial or operational train path for Pacific National to provide a 3rd daily train for PN's current operations for haulage from Boral's Dunmore siding into Sydney.

Please contact me if you require further information on the above.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'David Dark', with a stylized flourish at the end.

David Dark
Account Manager
Bulk Rail

Appendix B - Traffic Impact Assessment



Dunmore Hard Rock Quarry Traffic Impact Assessment

DA 470-11-2003 | Modification 6

Prepared for Boral Resources (NSW) Pty Limited | 3 October 2012

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Dunmore Hard Rock Quarry Traffic Impact Assessment

Final

Report J11024RP1 | Prepared for Boral Resources (NSW) Pty Limited | 3 October 2012

Prepared by	Tim Brooker	Approved by	Brett McLennan
Position	Associate - Transport Planning	Position	Director
Signature		Signature	
Date	3 October 2012	Date	3 October 2012

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Document Control

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1 Introduction

1.1 Overview

EMGA Mitchell McLennan Pty Limited (EMM) has been commissioned by Boral Resources (NSW) Pty Limited (Boral) to undertake a traffic impact assessment to accompany an application to modify Development Consent DA 470-11-2003 (Modification 6) for Dunmore Hard Rock Quarry (also referred to as the Quarry). The purpose of this report is to provide a detailed traffic and transport assessment for the proposed increase of transport of quarry products by road.

This report describes the existing site access, traffic situation, road network performance and transport facilities in the vicinity of the Quarry. The report also provides an assessment of the transport requirements for the proposed transport increase and analyses its effects on the external road network.

1.2 Background

Dunmore Hard Rock Quarry is in a semi-rural setting and is located on Tabbita Road adjacent to the Princes Highway, southwest of Shellharbour. Hard rock has been extracted from the Quarry for 90 years. The Quarry has an extensive resource and, due to its ability to rail product into the Sydney metropolitan market, is a key asset for Boral. Development consent to allow increased production was issued in September 2004 and five modifications have been subsequently approved.

The Quarry currently has approval to transport up to 2.5 million tonnes per annum (Mtpa) of product by road and rail, with road transport limited to 1 Mtpa. Currently up to 1.5 Mtpa of product is transported by train to Boral's metropolitan rail terminals at Enfield and St Peters. However, future rail transport from Dunmore will be limited to 1 Mtpa as a result of changes to terminal capacity and operations in Sydney.

Accordingly, the Dunmore Hard Rock Quarry will be capacity constrained to 1 Mtpa for the transport of rail delivered product and the total product transport would be constrained to 2 Mtpa. The purpose of Modification 6 is to address this constraint and increase the permitted road transport of material from the Quarry from 1 to 1.5 Mtpa. The additional 0.5 Mtpa of product would be delivered by road to locally based customers in the Illawarra, Shoalhaven and Southern Highlands.

1.3 Scope of the report

The scope of this traffic impact assessment is primarily to assess the following matters:

- assessment of the existing quarry traffic and transport arrangements;
- review of onsite parking provision and management;
- determining the forecast traffic generation with the proposal and its impact on the surrounding road networks;
- assessment of the truck ingress, egress and circulation within the Q and any impact on external road networks; and
- determining the impact of the proposal on road network traffic safety and efficiency in the area.

2 Existing environment

2.1 Site area and land uses

Dunmore Hard Rock Quarry is located approximately 12 kilometres (km) north of Kiama township and is about 10 km south of the Oak Flats - Albion Park Rail locality in the Shellharbour local government area (LGA) (see Figure 2.1).

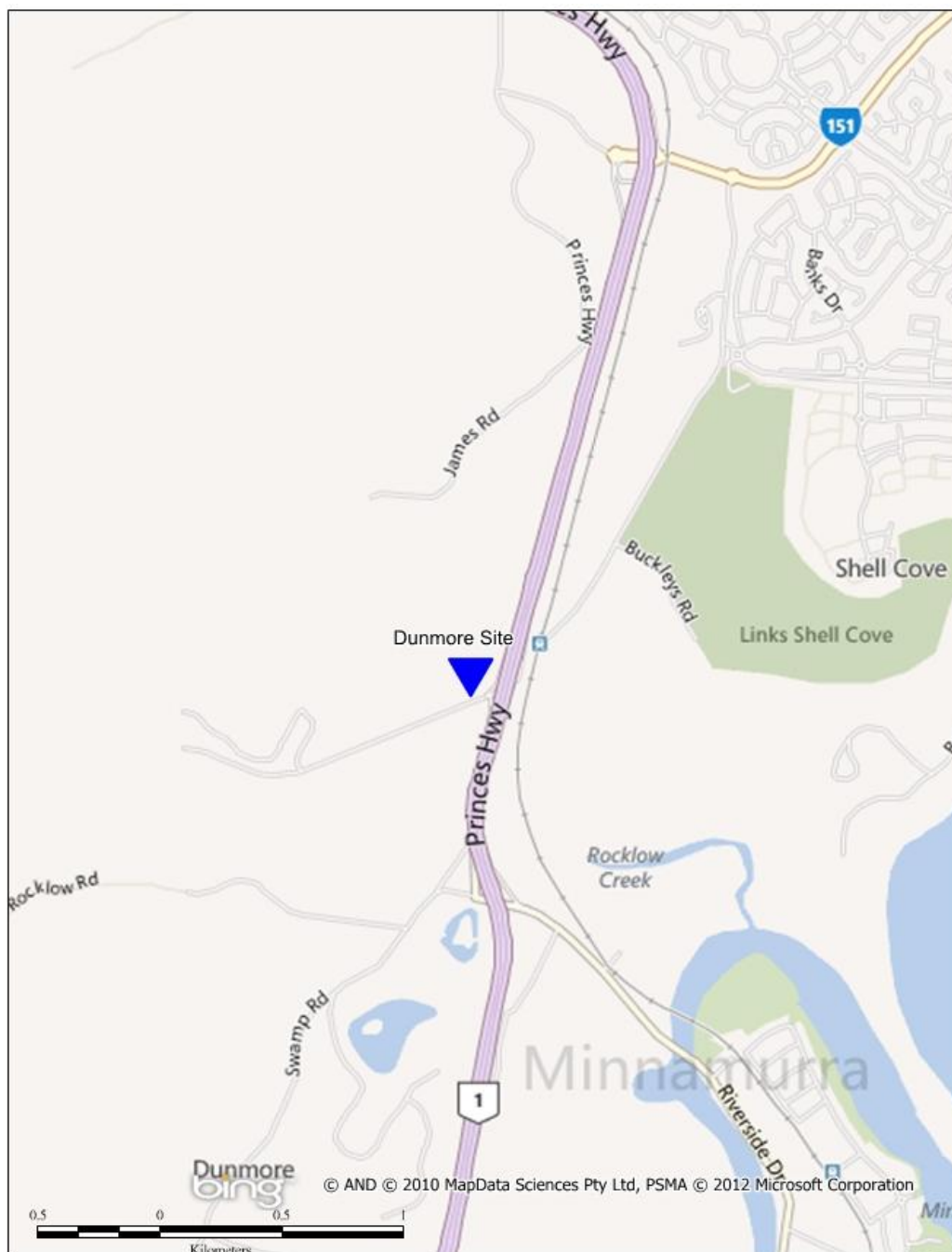
Figure 2.1 Regional road network



The nearest urban residential suburbs to the Quarry are Shellharbour and Kiama (ie Shell Cove to the north-east, Minnamurra to the south-east and Kiama Downs also to the south-east. These residential suburbs are located at least 5 – 10 km from the quarry.

The Quarry is located on the western side of Princes Highway at Tabbita Road, near the village of Dunmore which is located on the opposite side of the highway (see Figure 2.2). Adjacent to the Quarry on Tabbita Road are two other Boral operations – Dunmore Soil and Sand Quarry and Dunmore Concrete Batching Plant. The three Boral operations are collectively referred to in this report as the Dunmore site.

Figure 2.2 Local road network



2.2 Road network

2.2.1 The Princes Highway

The main arterial road near the Quarry is the Princes Highway which starts in Broadway at the intersection with the Great Western Highway in the Sydney suburb of Chippendale, and runs through Sydney's southern suburbs, to the village of Waterfall. After Waterfall the highway becomes the Southern Freeway (national route 1) and continues along the east coast of NSW into Victoria.

North of the Quarry the highway bypasses the city centre of Wollongong and most townships in the Illawarra region. However, the highway does not bypass the township at Oak Flats - Albion Park Rail which has a number of existing traffic signal and roundabout controlled intersections. The current mid-day and peak hour traffic conditions on this section of the Princes Highway are illustrated by Photographs 2.1 and 2.2. The peak hour traffic operations are constrained by the capacity of these intersections as discussed in Section 2.3.

The Princes Highway is a critical link for both passenger and freight transport for most of the southern region of NSW. However, the highway follows indirect and lengthy routes along the coastline for most of its length. The speed limit at Dunmore is 100 km/h but in many sections, where the highway passes through smaller towns, the speed limit is reduced to as low as 50 km/h.

Because of the rural nature and lower traffic volumes over much of its length, the Princes Highway effectively provides a more scenic and leisurely route, compared to the main Hume Highway route between Sydney and Melbourne.

2.2.2 Tabbita Road

Tabbita Road and the Dunmore site can be accessed by southbound and northbound off-ramps from the Princes Highway (Photographs 2.3 and 2.4). However, there is only one on-ramp to the Princes Highway in the northbound direction (Photograph 2.5). Therefore, all southbound traffic from the Dunmore site has to take the Tabbita Road northbound on-ramp to the Princes Highway and then turn around at the Shellharbour Road interchange intersection (Photograph 2.6).

Tabbita Road is approximately 70 m long between the Quarry entrance and the Princes Highway (west side) on and off-ramps intersection (Photographs 2.7 and 2.8). This two lane two way road currently provides motorised vehicular access to the Dunmore site only with no other public use generally.

Photograph 2.1 Princes Highway at Albion Park Rail southbound



Photograph 2.2 Princes Highway intersection at Creamery Road northbound



Photograph 2.3 **Princes Highway exit at Tabbita Road southbound**



Photograph 2.4 **Princes Highway exit at Tabbita Road northbound**



Photograph 2.5 **Princes Highway entry at Tabbita Road northbound**



Photograph 2.6 **U Turn facility for southbound site traffic at Shellharbour Road ramps**



Photograph 2.7 **Tabbita Road intersection with the Princes Highway ramps (west side)**



Photograph 2.8 **Tabbita Road entry to the Dunmore Site- the railway siding is on the left**



2.3 Traffic volumes

The Roads and Maritime Services (RMS) (formerly the Roads and Traffic Authority (RTA)) has permanent traffic count stations at several locations on the Princes Highway, through the Albion Park, Oak Flats, Shellharbour, Dunmore and Kiama areas. The RTA historical traffic count data showing the traffic growth trends at these locations is presented in Table 2.1.

Table 2.1 RTA historical traffic volume data for the Princes Highway

Locality	Location	AADT			
		2000	2003	2005*	2006*
Albion Park	At Macquarie Rivulet Bridge	44,635	48,648	48,842	49,708
Albion Park	South of Illawarra Highway	37,869	41,413	41,595	-
Oak Flats	North of Tongarra Road	30,152	27,835	34,103	-
Oak Flats	East of Tongarra Road	40,689	31,749	38,290	-
Dunmore	North of Shellharbour Road	20,928	22,571	-	-
Dunmore	South of Shellharbour Road	27,956	29,518	-	-
Kiama	At Bombo Railway Station	28,768	29,713	-	27,757
Kiama	At Saddleback	15,081	15,865	-	-

*Note At many locations, survey data more recent than 2003 is not available**

The data in Table 2.1 shows that there have generally been steady increases in the daily traffic on the Princes Highway between the years 2000 – 2005. The steady population growth through urban development in the Kiama and Shellharbour areas has contributed to this background traffic growth. However, since 2005 there has been inconsistent and generally low traffic growth at the locations where the traffic surveys have been undertaken

A 12 hour daytime local road traffic count was carried out on Tabbita Road on Wednesday 12 September 2012 for this traffic impact assessment. The full traffic count results are included in Appendix A. The traffic survey results for the full 12 hour survey period, between 6.00 am and 6.00 pm, showed that Tabbita Road carries about 550 vehicle movements (330 truck movements and 220 private car movements).

On the survey day, the truck traffic constituted approximately 220 truck movements (110 deliveries) from the Dunmore Hard Rock Quarry, approximately 82 truck movements (41 deliveries) from Dunmore Soil and Sand and approximately 28 truck movements (14 deliveries) from the concrete plant.

Truck delivery records from the Dunmore site for the five weekdays 10 - 14 September 2012, are included in Appendix B and show that the survey day, Wednesday 12 September 2012, was the busiest day of that week and represented a relatively busy day for the hard rock quarry and the other Boral operations at the Dunmore site.

The peak hourly traffic movements at Tabbita Road, which occurred between 11.30 am and 12.30 pm on the survey day, are illustrated in Figure 2.3.

A morning and afternoon peak hour intersection traffic count was also undertaken at the Princes Highway/Creamery Road intersection at Albion Park Rail which is shown in Figure 2.4.

Figure 2.3 Traffic Volumes at the Tabbita Road and Princes Highway (on and off - ramp) intersection

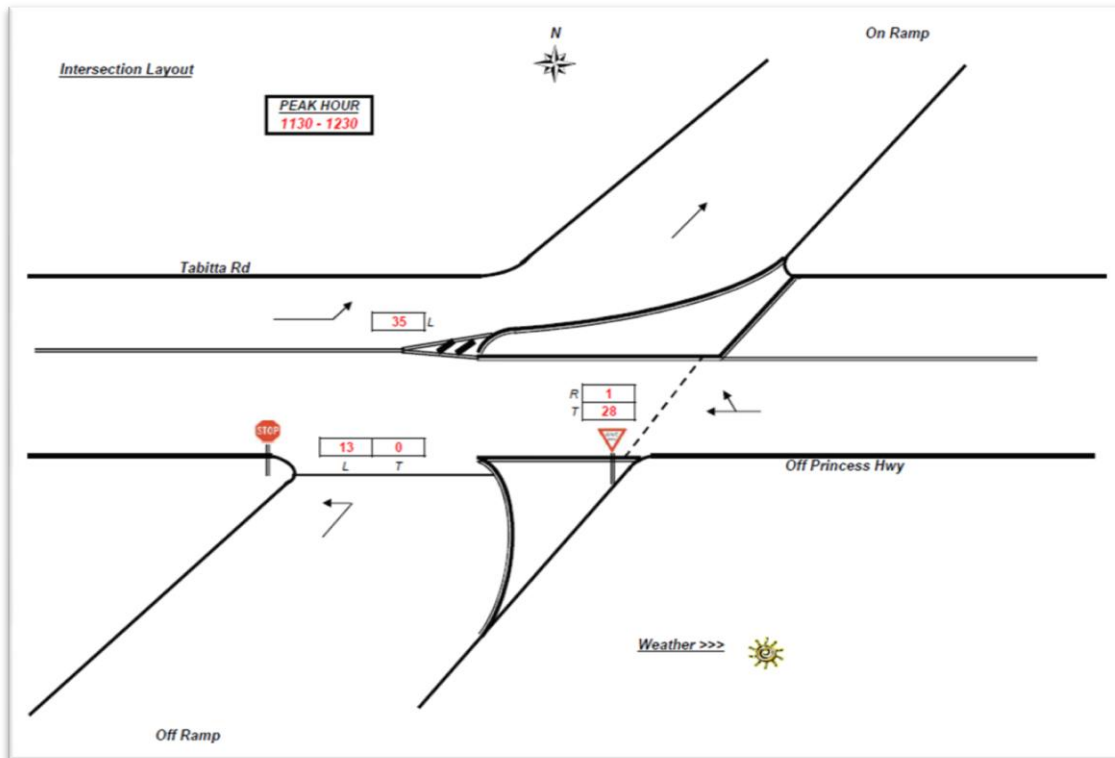
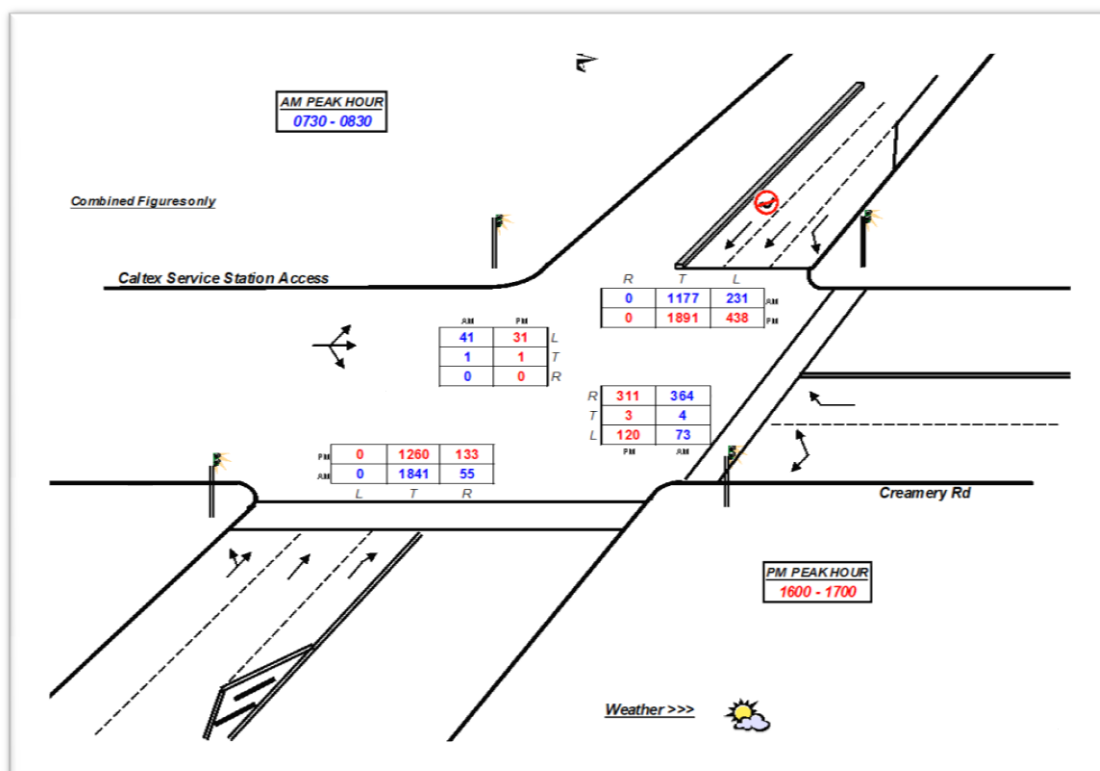


Figure 2.4 Peak hour intersection traffic count at Princes Highway and Creamery Road

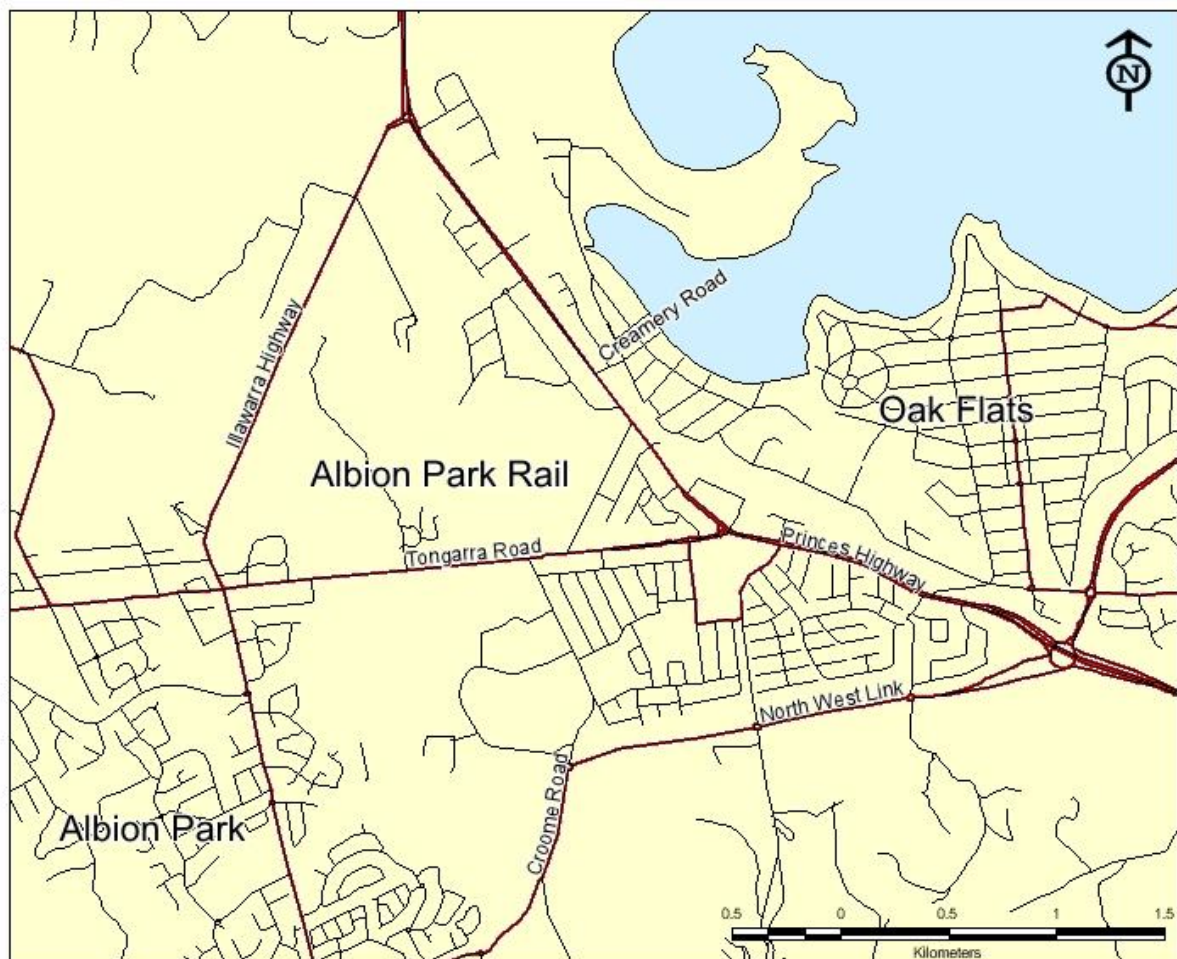


At Tabbita Road, during the mid day peak hourly period there were 76 hourly vehicle movements recorded (which included approximately 30 truck movements per hour in each direction) using Tabbita Road, from the combined Boral operations at the Dunmore site.

The 12 hour traffic count data showed that Tabbita Road currently carries about 60% heavy vehicles. The current north-south distribution of the quarry and the other Dunmore site truck traffic is shown by the inbound truck traffic volumes in the survey, which were 141 trucks per day (87.5%) arriving from the north and 20 trucks per day (12.5% arriving from the south).

The intersection at Princes Highway and Creamery Road was surveyed due to its significance as an important traffic signalled intersection on the regional road network north of Dunmore, Photograph 2.1 and Photograph 2.2, through which all traffic travelling northbound on the Princes Highway must generally pass. The regional location of this intersection is illustrated by the map in Figure 2.5.

Figure 2.5 Regional location of the Princes Highway and Creamery Road intersection



The traffic count was undertaken by traffic contractor R.O.A.R. Data on Tuesday, 7 June 2011 during the following two peak periods:

- 7.00 am – 9.00 am; and
- 4.00 pm – 6.00 pm.

The detailed traffic count results are included in Appendix A. The traffic count results in Figure 2.4 show that the intersection carried 3,787 vehicles in the am peak and 4,188 vehicles in the pm peak hour. In both these peak periods there were high volumes of through traffic recorded on the Princes Highway, including significant heavy vehicle flows. In the am peak hour the majority of the through traffic flow was vehicles travelling northbound and similarly, the dominant flow was vehicles travelling southbound, during the pm peak period.

There were also reasonably high volumes of peak hour traffic turning at the intersection, mainly vehicles accessing Creamery Road to and from the north, during both peak periods. The Caltex Service Station access (west approach) had only minimal traffic flows, mainly left turn egress traffic, and does not have any designated phase at the traffic signals.

2.4 Pedestrian and bicycle facilities and volumes

A shared pedestrian and bicycle facility is provided on the eastern side of the Princes Highway at Dunmore (between the Princes Highway and the South Coast rail track). This path provides a connection to Dunmore Railway Station from the south.

Bicycle paths are also marked (on the pavement) on both sides of the northbound off-ramp. During the site visit a number of cyclists were observed to use the northbound off-ramp exit and then take the northbound on-ramp entry when travelling along the Princes Highway to the north. No pedestrians were observed walking along Tabbita Road during a two hour site visit in June 2011. Boral's Quarry Manager advised that one or two staff normally cycle to and from the Dunmore site.

2.5 Site access

The only vehicular access to the Dunmore site is via Tabbita Road. Just outside the site entrance, there is a truck driver rest area (see Photograph 2.9). During the survey inspection it was observed that many truck drivers leaving the Dunmore site briefly stopped at this rest area before heading north on the Princes Highway.

2.6 Parking provision

Inside the Dunmore site there is an adequate parking supply for trucks and cars (for use by the site staff and visitors). During the survey on Wednesday, 1 June 2011, the staff and visitor parking spaces were observed to be about 30 – 35% occupied, as illustrated by Photographs 2.10 and 2.11.

2.7 Public transport facilities

Dunmore railway station is located on the eastern side of Princes Highway, about 500 m east of the Quarry. Inter-city services operate between Sydney Central Station and Bomaderry (Nowra). The passenger train service frequency is relatively low in the area, due to the generally single track operations south of Dapto. No regular public bus services operate in the area of Dunmore via Tabbita Road.

Dunmore railway station has two side platforms – one on the main line and one on a passing loop, and is used as a regular passing point for trains travelling in opposing directions to cross each other. The second platform was opened in 2001 as part of the extension of electrification to Kiama. One of the side platforms can accommodate 4 V-Set carriages, the other only 2 V-Set Carriages. According to the CityRail current timetable, there are between two and three trains respectively travelling through Dunmore during the am and pm commuter peak hours. However, Boral's quarry manager has advised that none of the site employees travel to and from work by train.

Photograph 2.9 Truck rest area outside the Tabbita Road - Dunmore Site entrance



Photograph 2.10 Site visitor car parking area adjacent to the site office and weighbridge



Photograph 2.11 **Additional site visitor and employee parking areas**



2.8 Site traffic management

Site traffic management is well managed. Traffic management and advisory signs are in place at a number of locations (see Photograph 2.12).

The general speed limit is restricted to 40 km/h or less inside the Dunmore site. In some sections the speed limit is sign posted as 15 km/h. Boral staff have advised that there have been no on-site related vehicular traffic accidents recorded in the last five years.

Quarry road transport deliveries generally occur by truck and dog vehicles. A typical 3-axle truck with a 3-axle dog trailer carries about 33 tonnes (t) of product. The weight of all loaded vehicles is accurately measured when departing the Quarry at the weighbridge (see Photograph 2.13). If any vehicles are found to be overweight, the vehicle is send back to the loading area to reduce its weight to the RMS prescribed vehicle load limit.

There is an additional truck parking/rest area inside the Dunmore site (see Photograph 2.14), which is also used by many of the truck drivers operating to and from the Quarry.

2.9 Hours of operation

Quarry product transport by road occurs during peak and off peak hours. Although the Quarry has consent for external transport for 24 hour operation Monday to Saturday and 8.00 am to 6.00 pm for 15 Sundays per year, external transport generally occurs between 5.00 am and 6.00 pm five days a week, with half day operation on Saturdays and no transport on Sundays. Further, the Quarry generally has a one month shut down period during the Christmas break. Therefore, it is assumed that the Quarry transports product 275 days per year.

Photograph 2.12

Traffic management sign for light vehicles inside the site



Photograph 2.13

Boral truck and dog trailer vehicle departing from the Dunmore site



Photograph 2.14 **Additional truck traffic layover area inside the Dunmore site**



2.9.1 Road transport

As stated in Section 1.1, road transport from the Quarry is currently limited to 1 Mtpa by the development consent. The Quarry currently has 10 permanent full time truck drivers.

2.9.2 Rail transport

Rail transport of product from the Dunmore siding will be limited in the future to 1 Mtpa due to the rail pathing and terminal capacity constraints within the Sydney metropolitan area. Currently two train deliveries occur to Sydney each day, carrying both hard rock (from the Quarry) and sand (from Dunmore Sand and Soil). A typical train load has 27 wagons and carries about 1,600 t of product (see Photograph 2.15).

Photograph 2.15 Rail Transport from the Dunmore siding



3 The proposal

It is proposed to increase the limit for road transport of product from the Dunmore Hard Rock Quarry from 1 Mtpa to 1.5 Mtpa. Modification 6 also includes a change to the Quarry's resource extraction plan. This later element of Modification 6 has no implications for traffic and transport and has not been considered further in this report.

The additional 0.5 Mtpa of road transport will require an enlarged truck fleet to be based at the Quarry with approximately five additional full time truck drivers. There will be no other increase in the number of employees or visitor numbers under this proposal.

There will also be no change in the Quarry stockpile area and truck loading facilities which are currently extensive due to the large number of different materials produced at the Quarry (approximately 20). There will also be no change to truck circulation and parking areas within the Quarry as sufficient parking and circulation areas are currently available.

Current NSW government policy encourages the use of rail transportation for bulk materials (eg quarry products). Boral supports this policy and encourages the use of rail transport at its operations where available. Rail transport is also more reliable and cost effective for the transport of quarry product to regional customers such as in Sydney. However, the future rail product transport capacity from the Quarry will be strictly limited to 1 Mtpa due to limitations on access to Boral's metropolitan rail terminals at Enfield and St Peters in Sydney.

Boral's rail terminal at Enfield has the capacity to receive up to 0.5 Mtpa while the terminal at St Peters has capacity to receive up to 1 Mtpa. With the introduction of the Peppertree Quarry (Marulan South) into Boral's metropolitan quarry products supply network, the 0.5 Mtpa of rail capacity at Enfield which currently receives quarry product from Dunmore will be switched to receive product from Peppertree Quarry.

As the rail transport capacity from Dunmore to Sydney is unlikely to improve in the future it is proposed to transport an additional 0.5 Mtpa of quarry product from Dunmore by road, primarily to locally based markets in the Illawarra, Shoalhaven and Southern Highlands. This is in response to the following local market trends:

- a growing local market for road base product; and
- replacement of other quarry product sales in the:
 - Shoalhaven region due to the planned closure of Boral's Burrier Quarry; and
 - Illawarra region due to a reduction in the local supply of slag based aggregate from the decommissioning of Blast Furnace No 6 at BlueScope Steel's Port Kembla Steelworks.

This modification will enable the Quarry to maintain its production potential in future years and respond to increasing local market demands.

4 Traffic impact assessment

4.1 Traffic generation

4.1.1 Existing

As stated previously, production at the Quarry is constrained by transport requirements to approximately 2.0 Mtpa, where approximately 1.0 Mtpa is transported by rail to customers in the Sydney metropolitan area and 1.0 Mtpa is transported by road, mainly to customers in the local Illawarra Region. Assuming 275 effective working days per year, approximately 3,640 t of quarry product material is transported by road each weekday from the Dunmore site.

A typical truck and dog trailer combination carries about 33 tonnes of material. Therefore, the current hard rock quarry products delivery truck traffic generates approximately 110 truck loads daily, with an hourly maximum of about 20 truck movements per hour in either the am or the pm peak traffic periods (10 loaded truck movements outbound and 10 empty truck movements inbound).

The Quarry truck traffic represents approximately two thirds of the existing total daily truck traffic which is using Tabbita Road. The remaining third is made up of the Dunmore Sand and Soil and Concrete Plant truck traffic.

4.1.2 Forecast

Based on the above traffic calculation, an additional 0.5 Mtpa of product deliveries by road (a 50% increase in existing road transport) would generate an additional 55 truck loads daily (110 additional truck movements) which would normally result in an additional five truck deliveries per hour (10 truck movements per hour) at most times of the working day, including both the am and pm peak traffic periods, travelling either inbound to or outbound from the Dunmore site.

4.2 Traffic distribution

It is anticipated that the majority of the additional product from the Quarry will be transported to customers in the Illawarra and Southern Highlands. It is therefore estimated, based on the likely customer's site delivery requirements, that the distribution of additional vehicles will be approximately 60% north (33 truck loads which equates to 66 truck movements or 6 hourly truck movements) and 40% south (22 truck loads which equates to 44 truck movements or 4 hourly truck movements).

4.3 External road network impact

The recorded daily traffic volume on various sections of the Princes Highway north of Dunmore since 2005 is typically 34,100 to 49,700 vehicles per day (see Table 2.1). In comparison, the likely additional 33 truck loads daily travelling northbound from Dunmore (66 vehicle movements) will have a minimal traffic impact on the existing road network (typically a 0.2 % increase in the total daily traffic flows on the Princes Highway, north of Dunmore). This increase is minor and unlikely to be noticeable.

The recorded daily traffic volume on sections of the Princes Highway south of Dunmore since 2003 is typically 29,700 vehicles per day (see Table 2.1). The likely additional 22 truck loads daily travelling southbound from Dunmore (44 vehicle movements) will similarly have a minor impact on the existing road network (typically a 0.15 % increase in the total daily traffic flows on the Princes Highway, south of Dunmore).

4.4 Impact on intersections

In urban areas, the traffic capacity of the major road network is generally a function of the performance of traffic intersections. This performance is quantified in terms of the Level of Service (LOS), which is an index of the operational performance of traffic at an intersection and is based on the average delay per vehicle. LOS ranges from A = very good to F = highly congested travel conditions, as shown in Table 4.1.

Table 4.1 LOS definitions

Description	LOS (RMS definition)	Average Delay per Vehicle (s)
Very Good	A	< 14.5
Good	B	14.5 ≤ 28.5
Satisfactory	C	28.5 ≤ 42.5
Near Capacity	D	42.5 ≤ 56.5
At Capacity	E	56.5 ≤ 70.5
Over Capacity	F	≥ 70.5

Generally it is desirable to aim for achieving a LOS of C or better at all major road intersections. However in practice, it is reasonable for some intersections to operate at LOS D at peak times.

Another common measure of intersection performance is the Degree of Saturation (DOS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DOS of 1.0 indicates that an intersection is operating at capacity. The desirable maximum degree of saturation for an intersection with traffic signals is 0.9.

The Sidra intersection modelling program (version 5) has been used to assess the Princes Highway and Creamery Road intersection in Albion Park. The intersection has been analysed as a T-junction as the western approach (Caltex Service Station exit driveway) does not have any allocated phase in the traffic signal operations. The existing and future intersection performance is assessed in this report in terms of the following four factors:

- DOS;
- Average Vehicle Delay (AVD) in seconds per vehicle;
- LOS; and
- length and direction of the peak traffic queue (95th percentile traffic queue).

The Princes Highway and Creamery Road intersection has been modelled for the surveyed am (7.30 am – 8.30 am) and pm (4.00 pm – 5.00pm) peak periods when the traffic volumes were the maximum at the intersection. The results of the intersection analysis for the existing and future scenarios (with the additional quarry traffic) are presented in Table 4.2 and in more detail in Appendix C of this report.

Table 4.2 Results of the SIDRA intersection analysis

Intersection	Scenario	am peak (7.30 am – 8.30 am)				pm peak (4.00 pm – 5.00 pm)			
		LOS	DOS	AVD (sec)	Max queue (m)	LOS	DOS	AVD (sec)	Max queue (m)
Princes Highway/ Creamery Road	Existing peak hour traffic situation surveyed in June 2011	B	0.773	20.2	235	D	1.001	46.0	558
	Future situation with increased quarry traffic	B	0.775	20.2	236	D	1.004	46.7	565

Note: LOS – Level of Service, DOS – Degree of Saturation, AVD – Average Vehicle Delay

The results in Table 4.2 show that in the am peak hour, the existing intersection is operating at about 77% capacity with a LOS B and AVD of just over 20 seconds. The maximum traffic queue on the Princes Highway is about 235 m, which occurs on the south approach to the intersection. The maximum traffic queue on Creamery Road is about 96 m which will exceed the nearest cross street intersection at Bateman Avenue but does not affect the railway level crossing.

In the am peak hour with the additional Dunmore quarry traffic (6 truck movements per hour), the intersection will continue to operate at LOS B with a slightly increased DOS. There will be very minor (0-0.4% increases) increases in either the average vehicle delay or the maximum vehicle queue lengths at the intersection, which will not result in any noticeable impact.

The results in Table 4.2 show that in the existing pm peak hour, when there are more vehicles at the intersection (4,188 vehicles) compared to during the am peak hour traffic (3,787 vehicles), the intersection is currently operating at about 100% capacity at LOS D with AVD of about 46 seconds. The longest peak hour traffic queues occur on the north approach to the intersection and are about 558 m. As in the am peak hour, the peak traffic queue on Creamery Road is about 88 m, which does not affect the railway level crossing.

In the pm peak hour with the additional Dunmore quarry traffic (6 truck movements per hour), the intersection will continue to operate at LOS D with a slightly increased DOS. The increases in AVD and the peak hour traffic queue lengths will be about 1% typically. However the intersection is already operating at capacity and the impact of the additional vehicles will be negligible and not significant.

4.5 Parking impact

The additional truck movements are unlikely to have any impacts to parking as general visitor and staff numbers are not expected to increase with the production increase. There will generally be an additional five truck drivers who may either drive their truck to work or drive by car to the Dunmore site. The Quarry currently has sufficient off-street parking provision to accommodate the anticipated additional vehicles if they need to park at the site during the daytime.

4.6 Impact to cyclists, pedestrians and public transport

Due to the minimal existing and future demand for these access facilities, the proposal is unlikely to have any adverse impact on the operation of the existing cyclist, pedestrian and public transport facilities in the Dunmore area. As with the parking demand, there will only be an additional five truck drivers travelling to the Quarry. The capacity of existing cycling, pedestrian and public transport facilities would be able to accommodate this minor increase.

4.7 Cumulative traffic impact

The Traffic, Transport and Parking Impact Assessment for the proposed production increase at the Bass Point Quarry at Shellharbour (McLaren Traffic Engineering May 2010) has been reviewed with the relevant impacts discussed below.

The assessment in the McLaren report defines the local Shellharbour area traffic increases which would be generated by two significant proposed increases to the Bass Point Quarry production levels, as follows:

- a “short term” increase from the current production level of 1.5 Mtpa to 2.4 Mtpa, which is predicted to be achieved within the next three to four years and
- a “long term” increase to a future total production level of 4.0 Mtpa, which may be achieved within a 20 year future period.

The estimated traffic increases in the McLaren report for the peak hour truck traffic which would be generated by these production increases at the Bass Point quarry are as follows:

- an additional 13 truck movements per hour inbound and 13 outbound in the morning peak hour (short term increase);
- an additional seven truck movements per hour inbound and seven outbound in the afternoon peak hour (short term increase);
- an additional 19 truck movements per hour inbound and 19 outbound in the morning peak hour (long term increase); and
- an additional nine truck movements per hour inbound and nine outbound in the afternoon peak hour (long term increase).

The additional Bass Point Quarry truck movements will generally travel to and from Shellharbour in the northbound direction and will impact the intersection of Princes Highway and Creamery Road in Albion Park Rail. The future intersection capacity impacts at this intersection have been assessed in a cumulative impact assessment with the additional predicted Dunmore Quarry traffic and the Bass Point expansion traffic using the SIDRA intersection analysis program.

This cumulative impact assessment has not included any assumed growth in the existing Princes Highway through traffic movements at the intersection as the recent daily traffic volumes surveys for the Princes Highway in the locality, in Table 2.1, show generally low and inconsistent traffic growth trends since 2005.

The detailed intersection results are included in Appendix C and the morning (7.30 am – 8.30 am) and afternoon (4.00 pm – 5.00 pm) peak hour changes to the future intersection operation are summarised in Table 4.3. This cumulative impact assessment for the Princes Highway and Creamery Road intersection

shows that the intersection will continue to operate at the same am and pm peak hour LOS, with only minimal changes in the AVD, DOS and maximum queue lengths.

Table 4.3 Results of the SIDRA intersection analysis – Cumulative traffic impact assessment

Assessment year	Princes Highway/ Creamery Road Intersection	am peak (7.30am – 8.30am)				pm peak (4pm – 5pm)			
		LOS	DOS	AVD (sec)	Max queue (m)	LOS	DOS	AVD (sec)	Max queue (m)
2012	Additional Dunmore quarry truck traffic only	B	0.775	20.2	236	D	1.004	46.7	565
Short term future	Additional Dunmore Quarry truck traffic and Bass Point Quarry short term production increase	B	0.784	20.1	242	D	1.010	48.4	580
Long term future	Additional Dunmore Quarry truck traffic and Bass Point Quarry long term production increase	B	0.788	19.9	245	D	1.012	48.9	584

Note: LOS – Level of Service, DOS – Degree of Saturation, AVD – Average Vehicle Delay

At other major road intersections on the Princes Highway in the Albion Park area which are controlled by traffic signals, the cumulative traffic impacts will be similar to those at the Princes Highway and Creamery Road intersection.

At these intersections, the existing peak hourly intersection traffic flows are currently approximately 4,000 vehicle movements per hour. The combined additional truck traffic movements from the Quarry and the Bass Point Quarry will generally be of the order of 10 to 20 additional trucks per hour travelling in each direction. This additional truck traffic will generally have minimal impacts on the peak hour intersection traffic delays and queue lengths mainly because the additional truck traffic movements will be travelling through the intersection and will not affect the turning traffic movements at the intersection.

5 Summary and conclusions

This report has assessed the anticipated transport impacts of a proposed future increase in road transportation at the Dunmore Hard Rock Quarry. The proposal includes an increase in the proportion of quarry product transported by road from 1.0 to 1.5 Mtpa. The additional quarry product will largely be transported to customers in the Illawarra, Shoalhaven and Southern Highlands. The additional deliveries will occur mostly by truck and dog trailer combination vehicles, similar to the existing Boral truck fleet which operates to and from the Quarry.

The key issues and findings of this report are summarised below:

- The existing Quarry, in combination with other traffic from the Dunmore site, currently generates approximately 550 vehicle movements daily (330 truck movements and 220 car movements) which are distributed via Tabbita Road in an approximate 87.5:12.5 distribution on the Princes Highway, travelling northbound and southbound from Dunmore.
- On 12 September 2012 the peak hourly truck traffic movements from the Dunmore site were recorded as approximately 30 truck movements per hour in each direction during a mid-day peak period between 11.30 am and 12.30 pm.
- The proposal will result in an additional 55 truck loads daily, with an additional 5 truck movements inbound and 5 truck movements outbound during the morning and afternoon peak hour traffic periods. These additional truck movements will primarily be deliveries to serve locally based customers in the Illawarra, Shoalhaven and Southern Highlands and will be distributed with approximately 60% travelling north and 40% travelling south on the Princes Highway.
- This additional traffic can be accommodated on the existing road network with minimal or negligible impact. In the Albion Park area, the Princes Highway and Creamery Road intersection is currently operating within capacity during the am peak period but is operating at capacity during the pm peak period. The predicted additional traffic will result in minimal 0-1% increases in the peak hour traffic delays and queue lengths which will not have a significant traffic impact at this intersection. At other major road intersections on the Princes Highway in the Albion Park area which are controlled by traffic signals, the cumulative traffic impacts will be similar to those at the Princes Highway and Creamery Road intersection.
- The Dunmore site currently has adequate on-site parking provision for all staff and visitors to the three Boral businesses which are based at the site. The site parking demand is unlikely to increase significantly with the proposal.
- There is a proposed expansion of the Bass Point Quarry, south of Shellharbour, to reach future potential production levels of 2.4 Mtpa (short term) and 4.0 Mtpa (long term), which will potentially generate significant additional peak hour truck traffic movements on the Princes Highway. The potential cumulative traffic impact of the proposal with the proposed Bass Point quarry expansion has been assessed at the Princes Highway and Creamery Road intersection, and found to be minimal, with no significant changes in the existing peak hour LOS and DOS at the intersection and only minimal future changes in the intersection peak hour AVD and queue length.

Based on the results of this traffic impact assessment, there are no significant local or regional transport impacts associated with the proposed increase in truck product transport from the Quarry either as a stand-alone assessment or when assessed on a cumulative traffic impact basis.

Appendix A

Intersection count data



R.O.A.R. DATA
Reliable, Original & Authentic Results

Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob. 0418 239019

Client : ARUP

Job No/Name : 3625 ALBION PARK RAIL Creamery Rd
Day/Date : Tuesday 7th June 2011

Heavies	NORTH			WEST			SOUTH			EAST		
	Princess Hwy			S. S. Nth Access			Princess Hwy			Creamery Rd		
	L	I	R	L	I	R	L	I	R	L	I	R
Time Per												TOT
0700 - 0715	0	11	0	0	0	0	0	15	3	0	0	29
0715 - 0730	4	20	0	0	0	0	0	22	2	0	0	48
0730 - 0745	1	14	0	0	0	0	0	23	0	3	0	41
0745 - 0800	0	18	0	0	0	0	0	22	3	2	0	47
0800 - 0815	3	23	0	1	0	0	0	18	0	1	0	46
0815 - 0830	0	20	0	0	0	0	0	13	1	2	0	43
0830 - 0845	3	22	0	0	0	0	0	20	0	2	0	49
0845 - 0900	1	25	0	0	0	0	0	24	1	3	0	54
Period End	12	153	0	1	0	0	0	157	10	13	0	357

Heavies	NORTH			WEST			SOUTH			EAST			
	Princess Hwy			S. S. Nth Access			Princess Hwy			Creamery Rd			
	L	I	R	L	I	R	L	I	R	L	I	R	
Peak Time												TOT	
0700 - 0800	5	63	0	0	0	0	0	82	8	5	0	2	165
0715 - 0815	8	75	0	1	0	0	0	85	5	6	0	2	182
0730 - 0830	4	75	0	1	0	0	0	76	4	8	0	9	177
0745 - 0845	6	83	0	1	0	0	0	73	4	7	0	11	185
0800 - 0900	7	90	0	1	0	0	0	75	2	8	0	9	192

[illegible]

<u>Peds</u>	NORTH	WEST	SOUTH	EAST
	Princess Hwy	S. S. Nth Access	Princess Hwy	Creamery Rd
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Time Per				TOT
0700 - 0715				0
0715 - 0730				0
0730 - 0745	Not	Not	Not	0
0745 - 0800	Required	Required	Required	0
0800 - 0815				0
0815 - 0830				0
0830 - 0845				0
0845 - 0900				0
Period End	0	0	0	0

Peds	NORTH		WEST		SOUTH		EAST	
	Princess Hwy	S. S. Nth Access	Princess Hwy	Creamery Rd	Princess Hwy	Creamery Rd	Princess Hwy	Creamery Rd
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Peak Per								
0700 - 0800	0	0	0	0	0	0	0	0
0715 - 0815	0	0	0	0	0	0	0	0
0730 - 0830	0	0	0	0	0	0	0	0
0745 - 0845	0	0	0	0	0	0	0	0
0800 - 0900	0	0	0	0	0	0	0	0
TOT								

PEAK HR	0	0	0	0	0



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob. 0418 239019

Client : ARUP

Job No/Name : 3625 ALBION PARK RAIL Creamery Rd

Day/Date : Tuesday 7th June 2011

Heavies	NORTH			WEST			SOUTH			EAST			
	Princess Hwy			S. S. Nth Access			Princess Hwy			Creamery Rd			
Time Per	L	I	R	L	I	R	L	I	R	L	I	R	TOT
1600 - 1615	0	15	0	0	0	0	0	16	1	0	0	1	33
1615 - 1630	0	13	0	0	0	0	0	19	1	0	0	1	34
1630 - 1645	0	22	0	0	0	0	0	14	0	0	0	0	36
1645 - 1700	0	9	0	0	0	0	0	12	0	0	0	0	21
1700 - 1715	0	10	0	0	0	0	0	9	1	0	0	0	20
1715 - 1730	0	17	0	1	0	0	0	8	0	0	0	1	27
1730 - 1745	0	7	0	1	0	0	0	10	0	1	0	0	19
1745 - 1800	0	16	0	0	0	0	0	5	0	0	0	0	21
Period End	0	109	0	2	0	0	0	93	3	1	0	3	211

Heavies	NORTH			WEST			SOUTH			EAST			
	Princess Hwy			S. S. Nth Access			Princess Hwy			Creamery Rd			
Peak Time	L	I	R	L	I	R	L	I	R	L	I	R	TOT
1600 - 1700	0	59	0	0	0	0	0	61	2	0	0	2	124
1615 - 1715	0	54	0	0	0	0	0	54	2	0	0	1	111
1630 - 1730	0	58	0	1	0	0	0	43	1	0	0	1	104
1645 - 1745	0	43	0	2	0	0	0	39	1	1	0	1	87
1700 - 1800	0	50	0	2	0	0	0	32	1	1	0	1	87
PEAK HOUR	0	59	0	0	0	0	0	61	2	0	0	2	124

Peds	NORTH		WEST		SOUTH		EAST	
	Princess Hwy	S. S. Nth Access	Princess Hwy	Creamery Rd	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
Time Per								
1600 - 1615								0
1615 - 1630								0
1630 - 1645	Not	Not	Not	Not	Not	Not	Not	0
1645 - 1700	Required	Required	Required	Required	Required	Required	Required	0
1700 - 1715								0
1715 - 1730								0
1730 - 1745								0
1745 - 1800								0
Period End	0	0	0	0	0	0	0	0

Peds	NORTH		WEST		SOUTH		EAST	
	Princess Hwy		S. S. Nth Access		Princess Hwy		Creamery Rd	
	UNCLASSIFIED		UNCLASSIFIED		UNCLASSIFIED		UNCLASSIFIED	
	TOT							
Peak Per								
1600 - 1700	0		0		0		0	0
1615 - 1715	0		0		0		0	0
1630 - 1730	0		0		0		0	0
1645 - 1745	0		0		0		0	0
1700 - 1800	0		0		0		0	0
PEAK HR	0		0		0		0	0

**R.O.A.R. DATA***Reliable, Original & Authentic Results*

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Transport Planning Associates
 Job No/Name : 4265 SHELLHARBOUR Tabitta Rd
 Day/Date : Wednesday 12th September 2012

Lights

Lights	NORTH			WEST			SOUTH			EAST			
	On Ramp			Tabitta Rd			Off Ramp			Off Princess Hwy			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0600 - 0615				1	0	0	0	0	0	0	2	0	3
0615 - 0630				2	0	0	1	0	0	0	2	0	5
0630 - 0645				1	0	0	0	0	0	0	3	1	5
0645 - 0700				0	0	0	1	0	0	0	3	0	4
0700 - 0715				1	0	0	0	0	0	0	2	0	3
0715 - 0730				0	0	0	1	1	0	0	0	1	3
0730 - 0745				0	0	0	0	0	0	0	2	0	2
0745 - 0800				2	0	0	1	0	0	0	4	0	7
0800 - 0815				2	0	0	0	0	0	0	2	0	4
0815 - 0830				0	0	0	1	0	0	0	5	0	6
0830 - 0845				1	0	0	1	0	0	0	3	0	5
0845 - 0900				2	0	0	0	0	0	0	4	0	6
0900 - 0915				0	0	0	1	0	0	0	1	0	2
0915 - 0930				1	0	0	0	0	0	0	2	1	4
0930 - 0945				3	0	0	1	0	0	0	0	0	4
0945 - 1000				0	0	0	1	0	0	0	1	0	2
1000 - 1015				3	0	0	1	0	0	0	0	0	4
1015 - 1030				2	0	0	0	0	0	0	1	0	3
1030 - 1045				0	0	0	0	0	0	0	1	1	2
1045 - 1100				1	0	0	0	0	0	0	0	0	1
1100 - 1115				2	0	0	0	0	0	0	4	0	6
1115 - 1130				3	0	0	1	0	0	0	0	1	5
1130 - 1145				1	0	0	1	0	0	0	0	0	2
1145 - 1200				1	0	0	1	0	0	0	3	1	6
1200 - 1215				5	0	0	2	0	0	0	2	0	9
1215 - 1230				1	0	0	0	0	0	0	0	0	1
1230 - 1245				0	0	0	0	2	0	0	0	0	2
1245 - 1300				0	0	0	1	1	0	0	1	0	3
1300 - 1315				1	0	0	0	0	0	0	2	0	3
1315 - 1330				2	0	0	0	0	0	0	2	1	5
1330 - 1345				2	0	0	0	0	0	0	2	0	4
1345 - 1400				0	0	0	0	0	0	0	2	0	2
1400 - 1415				1	0	0	0	0	0	0	6	3	10
1415 - 1430				5	0	0	0	1	0	0	4	0	10
1430 - 1445				0	0	0	0	0	0	0	1	0	1
1445 - 1500				14	0	0	2	0	0	0	0	0	16
1500 - 1515				8	0	0	0	0	0	0	2	0	10
1515 - 1530				4	0	0	1	2	0	0	0	0	7
1530 - 1545				5	0	0	0	0	0	0	0	2	7
1545 - 1600				2	0	0	0	0	0	0	2	0	4
1600 - 1615				8	0	0	1	0	0	0	0	0	9
1615 - 1630				4	0	0	0	0	0	0	1	0	5
1630 - 1645				11	0	0	0	0	0	0	0	0	11
1645 - 1700				5	0	0	1	0	0	0	1	1	8
1700 - 1715				7	0	0	0	0	0	0	0	1	8
1715 - 1730				3	0	0	0	0	0	0	3	0	6
1730 - 1745				1	0	0	0	0	0	0	0	0	1
1745 - 1800				2	0	0	0	0	0	0	0	0	2
Period End	0	0	0	120	0	0	21	7	0	0	76	14	238

Lights

Lights	NORTH			WEST			SOUTH			EAST			
	On Ramp			Tabitta Rd			Off Ramp			Off Princess Hwy			
Peak Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0600 - 0700	0	0	0	4	0	0	2	0	0	0	10	1	17
0615 - 0715	0	0	0	4	0	0	2	0	0	0	10	1	17
0630 - 0730	0	0	0	2	0	0	2	1	0	0	8	2	15
0645 - 0745	0	0	0	1	0	0	2	1	0	0	7	1	12
0700 - 0800	0	0	0	3	0	0	2	1	0	0	8	1	15
0715 - 0815	0	0	0	4	0	0	2	1	0	0	8	1	16
0730 - 0830	0	0	0	4	0	0	2	0	0	0	13	0	19
0745 - 0845	0	0	0	5	0	0	3	0	0	0	14	0	22
0800 - 0900	0	0	0	5	0	0	2	0	0	0	14	0	21
0815 - 0915	0	0	0	3	0	0	3	0	0	0	13	0	19
0830 - 0930	0	0	0	4	0	0	2	0	0	0	10	1	17
0845 - 0945	0	0	0	6	0	0	2	0	0	0	7	1	16
0900 - 1000	0	0	0	4	0	0	3	0	0	0	4	1	12
0915 - 1015	0	0	0	7	0	0	3	0	0	0	3	1	14
0930 - 1030	0	0	0	8	0	0	3	0	0	0	2	0	13
0945 - 1045	0	0	0	5	0	0	2	0	0	0	3	1	11
1000 - 1100	0	0	0	6	0	0	1	0	0	0	2	1	10
1015 - 1115	0	0	0	5	0	0	0	0	0	0	6	1	12
1030 - 1130	0	0	0	6	0	0	1	0	0	0	5	2	14
1045 - 1145	0	0	0	7	0	0	2	0	0	0	4	1	14
1100 - 1200	0	0	0	7	0	0	3	0	0	0	7	2	19
1115 - 1215	0	0	0	10	0	0	5	0	0	0	5	2	22
1130 - 1230	0	0	0	8	0	0	4	0	0	0	5	1	18
1145 - 1245	0	0	0	7	0	0	3	2	0	0	5	1	18
1200 - 1300	0	0	0	6	0	0	3	3	0	0	3	0	15
1215 - 1315	0	0	0	2	0	0	1	3	0	0	3	0	9
1230 - 1330	0	0	0	3	0	0	1	3	0	0	5	1	13
1245 - 1345	0	0	0	5	0	0	1	1	0	0	7	1	15
1300 - 1400	0	0	0	5	0	0	0	0	0	0	8	1	14
1315 - 1415	0	0	0	5	0	0	0	0	0	0	12	4	21
1330 - 1430	0	0	0	8	0	0	0	1	0	0	14	3	26
1345 - 1445	0	0	0	6	0	0	0	1	0	0	13	3	23
1400 - 1500	0	0	0	20	0	0	2	1	0	0	11	3	37
1415 - 1515	0	0	0	27	0	0	2	1	0	0	7	0	37
1430 - 1530	0	0	0	26	0	0	3	2	0	0	3	0	34
1445 - 1545	0	0	0	31	0	0	3	2	0	0	2	2	40
1500 - 1600	0	0	0	19	0	0	1	2	0	0	4	2	28
1515 - 1615	0	0	0	19	0	0	2	2	0	0	2	2	27
1530 - 1630	0	0	0	19	0	0	1	0	0	0	3	2	25
1545 - 1645	0	0	0	25	0	0	1	0	0	0	3	0	29
1600 - 1700	0	0	0	28	0	0	2	0	0	0	2	1	33
1615 - 1715	0	0	0	27	0	0	1	0	0	0	2	2	32
1630 - 1730	0	0	0	26	0	0	1	0	0	0	4	2	33
1645 - 1745	0	0	0	16	0	0	1	0	0	0	4	2	23
1700 - 1800	0	0	0	13	0	0	0	0	0	0	3	1	17

PEAK HOUR	0	0	0		8	0	0		4	0	0		0	5	1		18
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**R.O.A.R. DATA**

Client : Transport Planning Associates



Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Job No/Name : 4265 SHELLHARBOUR Tabitta Rd
Day/Date : Wednesday 12th September 2012

Heavies

Time Per	NORTH On Ramp			WEST Tabitta Rd			SOUTH Off Ramp			EAST Off Princess Hwy			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0600 - 0615				2	0	0	1	0	0	0	7	0	10
0615 - 0630				4	0	0	2	0	0	0	8	0	14
0630 - 0645				4	0	0	0	0	0	0	2	0	6
0645 - 0700				6	0	0	1	0	0	0	1	0	8
0700 - 0715				6	0	0	0	0	0	0	0	0	6
0715 - 0730				9	0	0	0	0	0	0	0	0	9
0730 - 0745				10	0	0	0	0	0	0	3	0	13
0745 - 0800				2	0	0	0	0	0	0	0	0	2
0800 - 0815				1	0	0	0	0	0	0	2	0	3
0815 - 0830				4	0	0	1	0	0	0	7	0	12
0830 - 0845				4	0	0	1	0	0	0	2	0	7
0845 - 0900				3	0	0	0	0	0	0	4	0	7
0900 - 0915				5	0	0	0	0	0	0	1	0	6
0915 - 0930				1	0	0	0	0	0	0	1	0	2
0930 - 0945				2	0	0	0	0	0	0	3	0	5
0945 - 1000				1	0	0	0	0	0	0	2	0	3
1000 - 1015				2	0	0	0	0	0	0	4	0	6
1015 - 1030				4	0	0	0	0	0	0	4	0	8
1030 - 1045				6	0	0	0	0	0	0	5	0	11
1045 - 1100				6	0	0	0	0	0	0	2	0	8
1100 - 1115				5	0	0	0	0	0	0	4	0	9
1115 - 1130				3	0	0	0	0	0	0	7	0	10
1130 - 1145				3	0	0	3	0	0	0	7	0	13
1145 - 1200				10	0	0	3	0	0	0	7	0	20
1200 - 1215				7	0	0	0	0	0	0	4	0	11
1215 - 1230				7	0	0	3	0	0	0	5	0	15
1230 - 1245				3	0	0	2	0	0	0	0	0	5
1245 - 1300				3	0	0	1	0	0	0	3	0	7
1300 - 1315				8	0	0	0	0	0	0	3	0	11
1315 - 1330				7	0	0	1	0	0	0	3	0	11
1330 - 1345				5	0	0	1	0	0	0	2	0	8
1345 - 1400				2	0	0	0	0	0	0	1	0	3
1400 - 1415				1	0	0	0	0	0	0	2	0	3
1415 - 1430				1	0	0	0	0	0	0	3	0	4
1430 - 1445				2	0	0	0	0	0	0	7	0	9
1445 - 1500				2	0	0	0	0	0	0	4	0	6
1500 - 1515				6	0	0	0	0	0	0	6	0	12
1515 - 1530				5	0	0	0	0	0	0	1	0	6
1530 - 1545				3	0	0	0	0	0	0	4	0	7
1545 - 1600				1	0	0	0	0	0	0	4	0	5
1600 - 1615				3	0	0	0	0	0	0	5	0	8
1615 - 1630				3	0	0	0	0	0	0	0	0	3
1630 - 1645				0	0	0	0	0	0	0	0	0	0
1645 - 1700				0	0	0	0	0	0	0	1	0	1
1700 - 1715				1	0	0	0	0	0	0	0	0	1
1715 - 1730				0	0	0	0	0	0	0	0	0	0
1730 - 1745				0	0	0	0	0	0	0	0	0	0
1745 - 1800				0	0	0	0	0	0	0	0	0	0
Period End	0	0	0	173	0	0	20	0	0	0	141	0	334

Heavies

Peak Per	NORTH On Ramp			WEST Tabitta Rd			SOUTH Off Ramp			EAST Off Princess Hwy			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0600 - 0700	0	0	0	16	0	0	4	0	0	0	18	0	38
0615 - 0715	0	0	0	20	0	0	3	0	0	0	11	0	34
0630 - 0730	0	0	0	25	0	0	1	0	0	0	3	0	29
0645 - 0745	0	0	0	31	0	0	1	0	0	0	4	0	36
0700 - 0800	0	0	0	27	0	0	0	0	0	0	3	0	30
0715 - 0815	0	0	0	22	0	0	0	0	0	0	5	0	27
0730 - 0830	0	0	0	17	0	0	1	0	0	0	12	0	30
0745 - 0845	0	0	0	11	0	0	2	0	0	0	11	0	24
0800 - 0900	0	0	0	12	0	0	2	0	0	0	15	0	29
0815 - 0915	0	0	0	16	0	0	2	0	0	0	14	0	32
0830 - 0930	0	0	0	13	0	0	1	0	0	0	8	0	22
0845 - 0945	0	0	0	11	0	0	0	0	0	0	9	0	20
0900 - 1000	0	0	0	9	0	0	0	0	0	0	7	0	16
0915 - 1015	0	0	0	6	0	0	0	0	0	0	10	0	16
0930 - 1030	0	0	0	9	0	0	0	0	0	0	13	0	22
0945 - 1045	0	0	0	13	0	0	0	0	0	0	15	0	28
1000 - 1100	0	0	0	18	0	0	0	0	0	0	15	0	33
1015 - 1115	0	0	0	21	0	0	0	0	0	0	15	0	36
1030 - 1130	0	0	0	20	0	0	0	0	0	0	18	0	38
1045 - 1145	0	0	0	17	0	0	3	0	0	0	20	0	40
1100 - 1200	0	0	0	21	0	0	6	0	0	0	25	0	52
1115 - 1215	0	0	0	23	0	0	6	0	0	0	25	0	54
1130 - 1230	0	0	0	27	0	0	9	0	0	0	23	0	59
1145 - 1245	0	0	0	27	0	0	8	0	0	0	16	0	51
1200 - 1300	0	0	0	20	0	0	6	0	0	0	12	0	38
1215 - 1315	0	0	0	21	0	0	6	0	0	0	11	0	38
1230 - 1330	0	0	0	21	0	0	4	0	0	0	9	0	34
1245 - 1345	0	0	0	23	0	0	3	0	0	0	11	0	37
1300 - 1400	0	0	0	22	0	0	2	0	0	0	9	0	33
1315 - 1415	0	0	0	15	0	0	2	0	0	0	8	0	25
1330 - 1430	0	0	0	9	0	0	1	0	0	0	8	0	18
1345 - 1445	0	0	0	6	0	0	0	0	0	0	13	0	19
1400 - 1500	0	0	0	6	0	0	0	0	0	0	16	0	22
1415 - 1515	0	0	0	11	0	0	0	0	0	0	20	0	31
1430 - 1530	0	0	0	15	0	0	0	0	0	0	18	0	33
1445 - 1545	0	0	0	16	0	0	0	0	0	0	15	0	31
1500 - 1600	0	0	0	15	0	0	0	0	0	0	15	0	30
1515 - 1615	0	0	0	12	0	0	0	0	0	0	14	0	26
1530 - 1630	0	0	0	10	0	0	0	0	0	0	13	0	23
1545 - 1645	0	0	0	7	0	0	0	0	0	0	9	0	16
1600 - 1700	0	0	0	6	0	0	0	0	0	0	6	0	12
1615 - 1715	0	0	0	4	0	0	0	0	0	0	1	0	5
1630 - 1730	0	0	0	1	0	0	0	0	0	0	1	0	2
1645 - 1745	0	0	0	1	0	0	0	0	0	0	1	0	2
1700 - 1800	0	0	0	1	0	0	0	0	0	0	0	0	1
PEAK HOUR	0	0	0	27	0	0	9	0	0	0	23	0	59



R.O.A.R. DATA
Reliable, Original & Authentic Results

Client : Transport Planning Associates
Job No/Name : 4265 SHELLHARBOUR Tabitta Rd



Ph.88196847, Fax 88196849, Mob.0418-239019

Day/Date : Wednesday 12th September 2012

COMBINED	NORTH			WEST			SOUTH			EAST			TOT
	On Ramp			Tabitta Rd			Off Ramp			Off Princess Hwy			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	
0600 - 0615	0	0	0	3	0	0	1	0	0	0	9	0	13
0615 - 0630	0	0	0	6	0	0	3	0	0	0	10	0	19
0630 - 0645	0	0	0	5	0	0	0	0	0	0	5	1	11
0645 - 0700	0	0	0	6	0	0	2	0	0	0	4	0	12
0700 - 0715	0	0	0	7	0	0	0	0	0	0	2	0	9
0715 - 0730	0	0	0	9	0	0	1	1	0	0	0	1	12
0730 - 0745	0	0	0	10	0	0	0	0	0	0	5	0	15
0745 - 0800	0	0	0	4	0	0	1	0	0	0	4	0	9
0800 - 0815	0	0	0	3	0	0	0	0	0	0	4	0	7
0815 - 0830	0	0	0	4	0	0	2	0	0	0	12	0	18
0830 - 0845	0	0	0	5	0	0	2	0	0	0	5	0	12
0845 - 0900	0	0	0	5	0	0	0	0	0	0	8	0	13
0900 - 0915	0	0	0	5	0	0	1	0	0	0	2	0	8
0915 - 0930	0	0	0	2	0	0	0	0	0	0	3	1	6
0930 - 0945	0	0	0	5	0	0	1	0	0	0	3	0	9
0945 - 1000	0	0	0	1	0	0	1	0	0	0	3	0	5
1000 - 1015	0	0	0	5	0	0	1	0	0	0	4	0	10
1015 - 1030	0	0	0	6	0	0	0	0	0	0	5	0	11
1030 - 1045	0	0	0	6	0	0	0	0	0	0	6	1	13
1045 - 1100	0	0	0	7	0	0	0	0	0	0	2	0	9
1100 - 1115	0	0	0	7	0	0	0	0	0	0	8	0	15
1115 - 1130	0	0	0	6	0	0	1	0	0	0	7	1	15
1130 - 1145	0	0	0	4	0	0	4	0	0	0	7	0	15
1145 - 1200	0	0	0	11	0	0	4	0	0	0	10	1	26
1200 - 1215	0	0	0	12	0	0	2	0	0	0	6	0	20
1215 - 1230	0	0	0	8	0	0	3	0	0	0	5	0	16
1230 - 1245	0	0	0	3	0	0	2	2	0	0	0	0	7
1245 - 1300	0	0	0	3	0	0	2	1	0	0	4	0	10
1300 - 1315	0	0	0	9	0	0	0	0	0	0	5	0	14
1315 - 1330	0	0	0	9	0	0	1	0	0	0	5	1	16
1330 - 1345	0	0	0	7	0	0	1	0	0	0	4	0	12
1345 - 1400	0	0	0	2	0	0	0	0	0	0	3	0	5
1400 - 1415	0	0	0	2	0	0	0	0	0	0	8	3	13
1415 - 1430	0	0	0	6	0	0	0	1	0	0	7	0	14
1430 - 1445	0	0	0	2	0	0	0	0	0	0	8	0	10
1445 - 1500	0	0	0	16	0	0	2	0	0	0	4	0	22
1500 - 1515	0	0	0	14	0	0	0	0	0	0	8	0	22
1515 - 1530	0	0	0	9	0	0	1	2	0	0	1	0	13
1530 - 1545	0	0	0	8	0	0	0	0	0	0	4	2	14
1545 - 1600	0	0	0	3	0	0	0	0	0	0	6	0	9
1600 - 1615	0	0	0	11	0	0	1	0	0	0	5	0	17
1615 - 1630	0	0	0	7	0	0	0	0	0	0	1	0	8
1630 - 1645	0	0	0	11	0	0	0	0	0	0	0	0	11
1645 - 1700	0	0	0	5	0	0	1	0	0	0	2	1	9
1700 - 1715	0	0	0	8	0	0	0	0	0	0	0	1	9
1715 - 1730	0	0	0	3	0	0	0	0	0	0	3	0	6
1730 - 1745	0	0	0	1	0	0	0	0	0	0	0	0	1
1745 - 1800	0	0	0	2	0	0	0	0	0	0	0	0	2
Period End	0	0	0	293	0	0	41	7	0	0	217	14	572

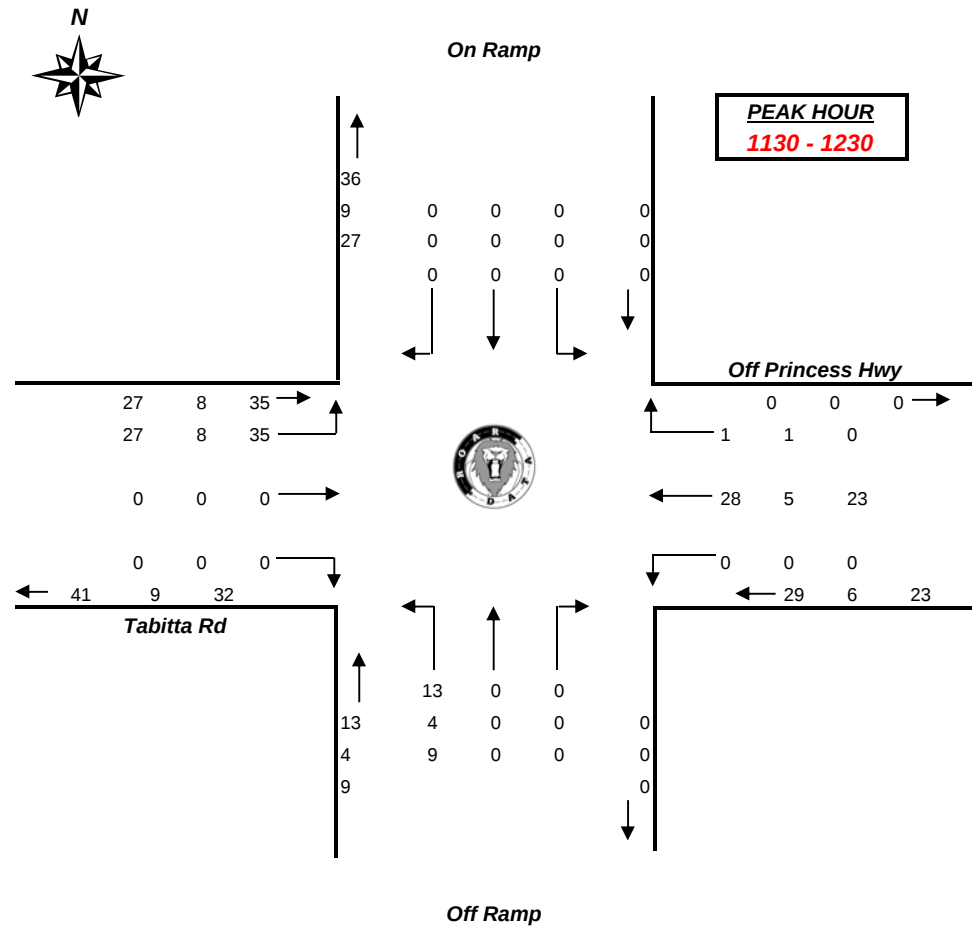
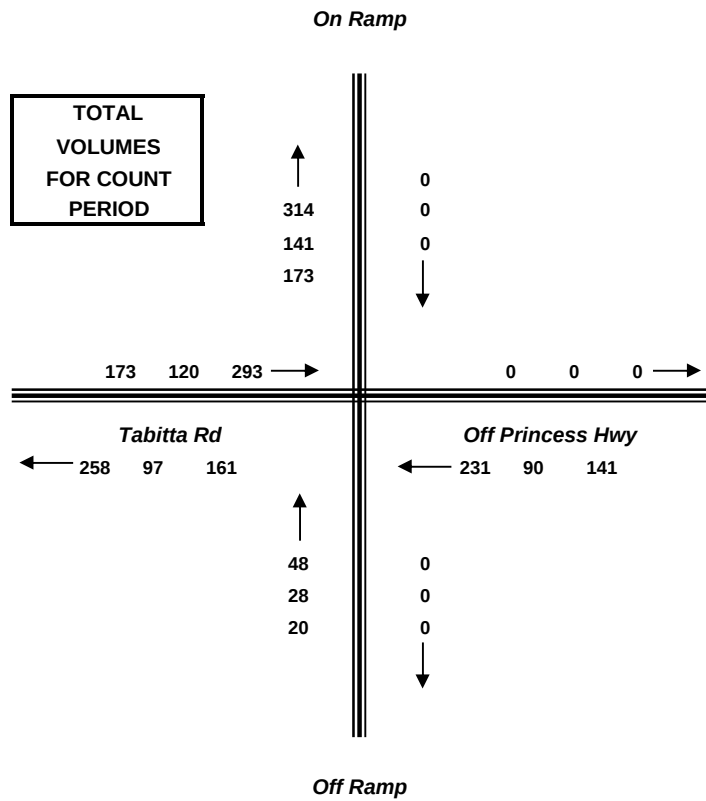
COMBINED	NORTH			WEST			SOUTH			EAST			
	On Ramp			Tabitta Rd			Off Ramp			Off Princess Hwy			
Peak Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0600 - 0700	0	0	0	20	0	0	6	0	0	0	28	1	55
0615 - 0715	0	0	0	24	0	0	5	0	0	0	21	1	51
0630 - 0730	0	0	0	27	0	0	3	1	0	0	11	2	44
0645 - 0745	0	0	0	32	0	0	3	1	0	0	11	1	48
0700 - 0800	0	0	0	30	0	0	2	1	0	0	11	1	45
0715 - 0815	0	0	0	26	0	0	2	1	0	0	13	1	43
0730 - 0830	0	0	0	21	0	0	3	0	0	0	25	0	49
0745 - 0845	0	0	0	16	0	0	5	0	0	0	25	0	46
0800 - 0900	0	0	0	17	0	0	4	0	0	0	29	0	50
0815 - 0915	0	0	0	19	0	0	5	0	0	0	27	0	51
0830 - 0930	0	0	0	17	0	0	3	0	0	0	18	1	39
0845 - 0945	0	0	0	17	0	0	2	0	0	0	16	1	36
0900 - 1000	0	0	0	13	0	0	3	0	0	0	11	1	28
0915 - 1015	0	0	0	13	0	0	3	0	0	0	13	1	30
0930 - 1030	0	0	0	17	0	0	3	0	0	0	15	0	35
0945 - 1045	0	0	0	18	0	0	2	0	0	0	18	1	39
1000 - 1100	0	0	0	24	0	0	1	0	0	0	17	1	43
1015 - 1115	0	0	0	26	0	0	0	0	0	0	21	1	48
1030 - 1130	0	0	0	26	0	0	1	0	0	0	23	2	52
1045 - 1145	0	0	0	24	0	0	5	0	0	0	24	1	54
1100 - 1200	0	0	0	28	0	0	9	0	0	0	32	2	71
1115 - 1215	0	0	0	33	0	0	11	0	0	0	30	2	76
1130 - 1230	0	0	0	35	0	0	13	0	0	0	28	1	77
1145 - 1245	0	0	0	34	0	0	11	2	0	0	21	1	69
1200 - 1300	0	0	0	26	0	0	9	3	0	0	15	0	53
1215 - 1315	0	0	0	23	0	0	7	3	0	0	14	0	47
1230 - 1330	0	0	0	24	0	0	5	3	0	0	14	1	47
1245 - 1345	0	0	0	28	0	0	4	1	0	0	18	1	52
1300 - 1400	0	0	0	27	0	0	2	0	0	0	17	1	47
1315 - 1415	0	0	0	20	0	0	2	0	0	0	20	4	46
1330 - 1430	0	0	0	17	0	0	1	1	0	0	22	3	44
1345 - 1445	0	0	0	12	0	0	0	1	0	0	26	3	42
1400 - 1500	0	0	0	26	0	0	2	1	0	0	27	3	59
1415 - 1515	0	0	0	38	0	0	2	1	0	0	27	0	68
1430 - 1530	0	0	0	41	0	0	3	2	0	0	21	0	67
1445 - 1545	0	0	0	47	0	0	3	2	0	0	17	2	71
1500 - 1600	0	0	0	34	0	0	1	2	0	0	19	2	58
1515 - 1615	0	0	0	31	0	0	2	2	0	0	16	2	53
1530 - 1630	0	0	0	29	0	0	1	0	0	0	16	2	48
1545 - 1645	0	0	0	32	0	0	1	0	0	0	12	0	45
1600 - 1700	0	0	0	34	0	0	2	0	0	0	8	1	45
1615 - 1715	0	0	0	31	0	0	1	0	0	0	3	2	37
1630 - 1730	0	0	0	27	0	0	1	0	0	0	5	2	35
1645 - 1745	0	0	0	17	0	0	1	0	0	0	5	2	25
1700 - 1800	0	0	0	14	0	0	0	0	0	0	3	1	18

PEAK HOUR	0	0	0	35	0	0	13	0	0	0	28	1	77
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**R.O.A.R DATA***Reliable, Original & Authentic Results*

Client : Transport Planning Associates

Job No/Name : 4265 SHELLHARBOUR Tabitta Rd





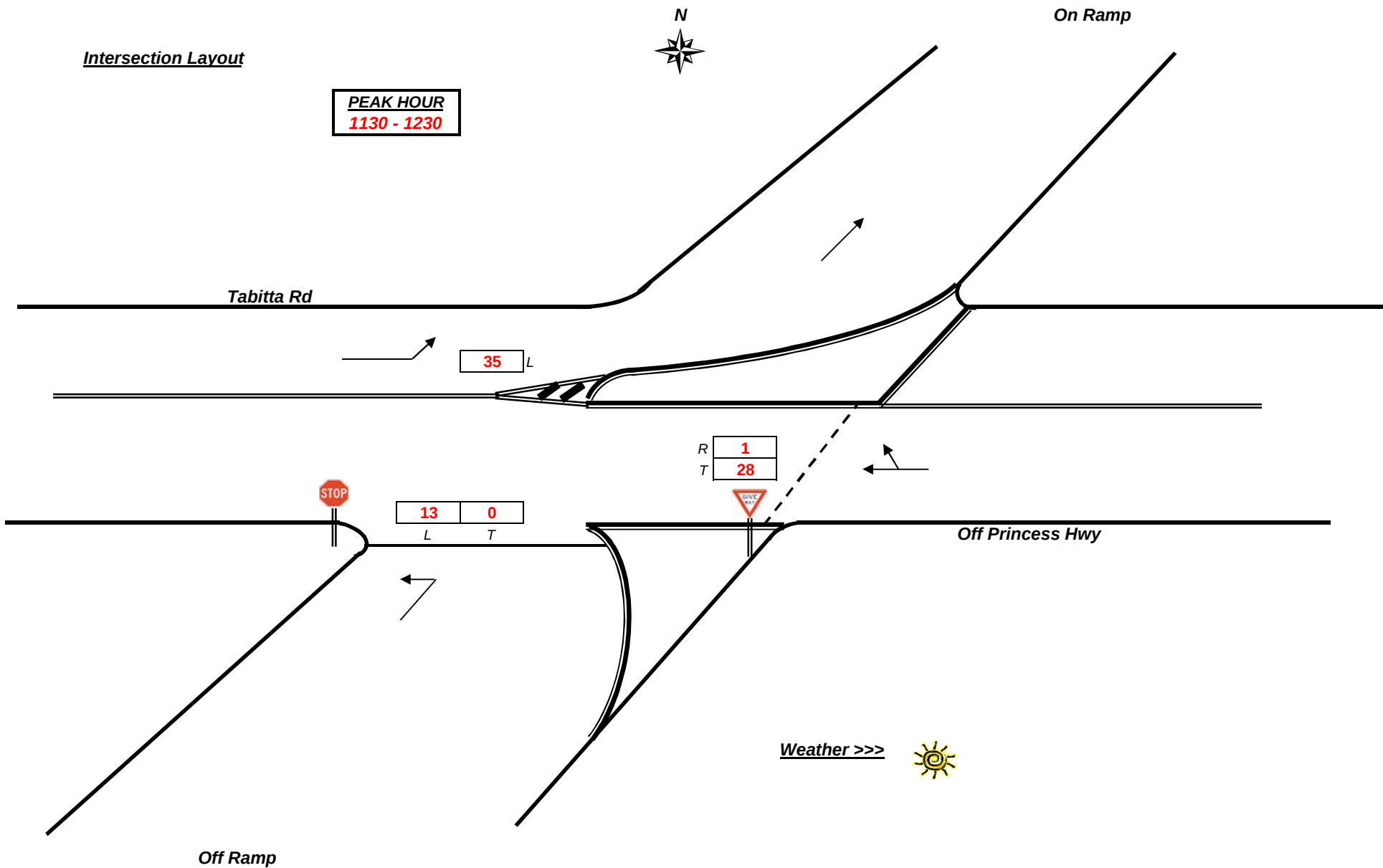
R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Transport Planning Associates
Job No/Name : 4265 SHELLHARBOUR Tabitta Rd
Day/Date : Wednesday 12th September 2012

Intersection Layout



Appendix B

Truck movement data

Boral Quarries....PLANT: 28 DUNMORE SAND & SOIL

PRINTED: 05:41:27pm 10 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant	Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
	Number..								
28	478627	7933	10/09/12	05:58	06:15	00:17		171927	DUNMORE C/SAND
28	478628	8569	10/09/12	06:36	06:48	00:11		133656	FINE SAND
28	478633	TRAIN	10/09/12	06:43	08:22	01:39	X	171927	DUNMORE C/SAND
28	478634	TRAIN	10/09/12	06:43	08:22	01:39	X	133656	FINE SAND
28	478635	TRAIN	10/09/12	06:43	08:22	01:39	X	132827	WASHED DUST
28	478629	BQ94YV	10/09/12	06:50	07:06	00:16	X	133656	FINE SAND
28	478630	7305	10/09/12	06:51	07:10	00:18		133656	FINE SAND
28	478631	5816	10/09/12	07:29	07:43	00:13		133656	FINE SAND
28	478632	ZIV496	10/09/12	07:41	07:51	00:09	X	133656	FINE SAND
28	478636	7933	10/09/12	08:41	08:53	00:11		171927	DUNMORE C/SAND
28	478637	TNH482	10/09/12	08:52	09:06	00:13	X	133656	FINE SAND
28	478638	5816	10/09/12	08:57	09:23	00:25		133656	FINE SAND
28	478639	PRS233	10/09/12	10:45	10:56	00:10	X	171955	COARSE CONC SD
28	478640	BK25KM	10/09/12	11:34	11:35	00:00	X	133656	FINE SAND
28	478641	9415	10/09/12	11:48	12:00	00:11		133656	FINE SAND
28	478642	AU39DM	10/09/12	11:50	12:04	00:14	X	133656	FINE SAND
28	478643	5816	10/09/12	12:24	12:40	00:16		133656	FINE SAND
28	478644	TRN040	10/09/12	12:32	12:42	00:10		171927	DUNMORE C/SAND
28	478645	AT55XE	10/09/12	12:34	12:50	00:15	X	133656	FINE SAND
28	478646	9551	10/09/12	12:47	12:59	00:11		133656	FINE SAND
28	478647	7370	10/09/12	13:36	13:45	00:08		171955	COARSE CONC SD
28	478653	4173	10/09/12	13:41	16:08	02:26		132827	WASHED DUST
28	478648	5744	10/09/12	13:47	14:02	00:14		133656	FINE SAND
28	478649	8949	10/09/12	13:56	14:07	00:10		133656	FINE SAND
28	478650	ZIV496	10/09/12	14:12	14:24	00:11	X	133656	FINE SAND
28	478651	BI07UL	10/09/12	14:29	14:44	00:15	X	133656	FINE SAND
28	478652	7370	10/09/12	15:26	15:36	00:09		171955	COARSE CONC SD

28

27 records listed.

Plant Docket..	Cartier	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..								
28 478654	TRAIN	11/09/12	05:52	05:54	00:01	X	171927	DUNMORE C/SAND
28 478655	TRAIN	11/09/12	05:52	05:54	00:01	X	133656	FINE SAND
28 478656	7933	11/09/12	05:59	06:12	00:12		171927	DUNMORE C/SAND
28 478657	7370	11/09/12	06:02	06:18	00:15		171955	COARSE CONC SD
28 478658	9415	11/09/12	06:12	06:26	00:14		133656	FINE SAND
28 478659	UHS597	11/09/12	06:27	06:38	00:10	X	171955	COARSE CONC SD
28 478660	4173	11/09/12	06:50	07:03	00:12		132827	WASHED DUST
28 478661	UHS597	11/09/12	07:10	07:17	00:07	X	171955	COARSE CONC SD
28 478667	6741	11/09/12	08:15	10:18	02:02		133656	FINE SAND
28 478668	6741	11/09/12	08:16	10:23	02:07		133656	FINE SAND
28 478662	TRAIN	11/09/12	09:12	09:15	00:03	X	171927	DUNMORE C/SAND
28 478663	TRAIN	11/09/12	09:12	09:16	00:03	X	133656	FINE SAND
28 478664	TRAIN	11/09/12	09:12	09:16	00:03	X	132827	WASHED DUST
28 478665	6741	11/09/12	09:31	09:44	00:13		133656	FINE SAND
28 478666	PRS233	11/09/12	09:39	09:56	00:17	X	171955	COARSE CONC SD
28 478670	TOM270	11/09/12	10:08	10:29	00:20	X	132827	WASHED DUST
28 478671	LS993	11/09/12	10:09	10:33	00:23	X	132827	WASHED DUST
28 478675	4172	11/09/12	10:17	10:59	00:42		132827	WASHED DUST
28 478672	7305	11/09/12	10:17	10:37	00:19		133656	FINE SAND
28 478674	5816	11/09/12	10:20	10:55	00:34		132827	WASHED DUST
28 478669	BP17TX	11/09/12	10:24	10:25	00:00	X	133656	FINE SAND
28 478673	JC128	11/09/12	10:26	10:53	00:27	X	133656	FINE SAND
28 478676	7933	11/09/12	10:52	11:10	00:17		171927	DUNMORE C/SAND
28 478677	BA96LM	11/09/12	10:58	11:12	00:13	X	171955	COARSE CONC SD
28 478678	BE11UE	11/09/12	11:38	11:38	00:00	X	133656	FINE SAND
28 478679	JC128	11/09/12	12:20	12:32	00:12	X	133656	FINE SAND
28 478680	BK25KM	11/09/12	12:35	12:47	00:12	X	133656	FINE SAND
28 478681	AT55XE	11/09/12	13:08	13:25	00:17	X	133656	FINE SAND
28 478682	PRS233	11/09/12	13:31	13:46	00:14	X	171955	COARSE CONC SD
28 478683	BK25KM	11/09/12	13:49	14:05	00:16	X	133656	FINE SAND
28 478684	6741	11/09/12	13:58	14:10	00:12		171927	DUNMORE C/SAND
28 478685	7305	11/09/12	14:12	14:24	00:12		132827	WASHED DUST
28 478690	9415	11/09/12	14:22	15:28	01:06		171927	DUNMORE C/SAND
28 478689	5813	11/09/12	14:26	15:22	00:56		133656	FINE SAND
28 478686	6741	11/09/12	14:45	14:55	00:10		171927	DUNMORE C/SAND
28 478687	9415	11/09/12	14:48	15:00	00:12		171927	DUNMORE C/SAND
28 478688	ZIV496	11/09/12	14:48	15:06	00:17	X	133656	FINE SAND
28 478692	4173	11/09/12	14:50	15:31	00:40		132827	WASHED DUST
28 478691	5822	11/09/12	14:52	15:29	00:36		132827	WASHED DUST
28 478693	5884	11/09/12	14:53	15:45	00:51		132827	WASHED DUST

Plant Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..								
28 478694	TRAIN	12/09/12	05:55	05:57	00:01	X	171927	DUNMORE C/SAND
28 478695	TRAIN	12/09/12	05:55	05:58	00:02	X	133656	FINE SAND
28 478696	7370	12/09/12	06:00	06:15	00:15		171955	COARSE CONC SD
28 478697	4173	12/09/12	06:01	06:19	00:18		171927	DUNMORE C/SAND
28 478698	7933	12/09/12	06:06	06:24	00:17		171927	DUNMORE C/SAND
28 478699	9551	12/09/12	06:14	06:43	00:28		171927	DUNMORE C/SAND
28 478700	9415	12/09/12	06:48	07:00	00:12		171927	DUNMORE C/SAND
28 478701	5898	12/09/12	08:10	08:21	00:11		133656	FINE SAND
28 478702	PRS233	12/09/12	08:16	08:25	00:09	X	171955	COARSE CONC SD
28 478703	TRAIN	12/09/12	08:52	09:08	00:16	X	171927	DUNMORE C/SAND
28 478704	TRAIN	12/09/12	08:52	09:08	00:16	X	133656	FINE SAND
28 478706	TNH482	12/09/12	08:58	09:12	00:14	X	133656	FINE SAND
28 478705	TRAIN	12/09/12	09:10	09:10	00:00	X	132827	WASHED DUST
28 478707	AV14EP	12/09/12	09:37	09:49	00:12	X	133656	FINE SAND
28 478708	5898	12/09/12	10:20	10:32	00:12		132827	WASHED DUST
28 478709	7933	12/09/12	10:29	10:42	00:12		171927	DUNMORE C/SAND
28 478710	5916	12/09/12	11:16	11:32	00:15		132827	WASHED DUST
28 478711	5898	12/09/12	11:28	11:46	00:17		132827	WASHED DUST
28 478712	9415	12/09/12	11:39	11:53	00:14		132827	WASHED DUST
28 478713	9415	12/09/12	11:39	11:58	00:19		132827	WASHED DUST
28 478714	5831	12/09/12	11:45	12:02	00:16		132827	WASHED DUST
28 478715	9415	12/09/12	11:50	12:10	00:20		132827	WASHED DUST
28 478716	PRS233	12/09/12	11:56	12:12	00:15	X	171955	COARSE CONC SD
28 478717	9415	12/09/12	11:59	12:16	00:16		133656	FINE SAND
28 478718	ZIV496	12/09/12	12:14	12:26	00:11	X	133656	FINE SAND
28 478719	BG59MG	12/09/12	12:31	12:45	00:14	X	133656	FINE SAND
28 478720	7933	12/09/12	13:30	13:37	00:06		171927	DUNMORE C/SAND
28 478722	ZIV496	12/09/12	14:33	14:52	00:19	X	133656	FINE SAND
28 478726	8949	12/09/12	14:33	15:03	00:29		133656	FINE SAND
28 478728	8949	12/09/12	14:36	15:26	00:49		133656	FINE SAND
28 478724	8949	12/09/12	14:36	14:56	00:20		133656	FINE SAND
28 478723	8949	12/09/12	14:37	14:55	00:17		171927	DUNMORE C/SAND
28 478721	8949	12/09/12	14:38	14:50	00:12		171927	DUNMORE C/SAND
28 478730	7305	12/09/12	14:43	15:39	00:56		171927	DUNMORE C/SAND
28 478729	9415	12/09/12	15:06	15:29	00:22		133656	FINE SAND
28 478727	7370	12/09/12	15:23	15:24	00:00		171955	COARSE CONC SD

Plant Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..								
28 478732	7305	13/09/12	05:59	06:21	00:22		133656	FINE SAND
28 478734	5922	13/09/12	06:00	06:30	00:29		133656	FINE SAND
28 478739	9286	13/09/12	06:02	06:44	00:41		133656	FINE SAND
28 478731	7933	13/09/12	06:03	06:19	00:16		171927	DUNMORE C/SAND
28 478733	9587	13/09/12	06:08	06:26	00:17		171927	DUNMORE C/SAND
28 478737	PRS233	13/09/12	06:15	06:36	00:21	X	171955	COARSE CONC SD
28 478738	9457	13/09/12	06:15	06:41	00:26		171927	DUNMORE C/SAND
28 478735	TRAIN	13/09/12	06:21	06:32	00:11	X	171927	DUNMORE C/SAND
28 478736	TRAIN	13/09/12	06:21	06:33	00:11	X	133656	FINE SAND
28 478740	5886	13/09/12	06:22	06:50	00:27		132827	WASHED DUST
28 478741	7370	13/09/12	06:44	06:59	00:15		171955	COARSE CONC SD
28 478742	JC128	13/09/12	07:16	07:28	00:12	X	133656	FINE SAND
28 478743	8949	13/09/12	08:32	08:42	00:09		133656	FINE SAND
28 478744	7417	13/09/12	08:41	08:52	00:10		171927	DUNMORE C/SAND
28 478745	8949	13/09/12	08:43	08:55	00:12		133656	FINE SAND
28 478746	2816	13/09/12	08:46	08:59	00:13	X	133656	FINE SAND
28 478747	6741	13/09/12	08:50	09:04	00:13		171927	DUNMORE C/SAND
28 478748	JC128	13/09/12	09:02	09:16	00:13	X	133656	FINE SAND
28 478749	6741	13/09/12	09:06	09:19	00:12		171927	DUNMORE C/SAND
28 478750	PRS233	13/09/12	09:31	09:45	00:13	X	171955	COARSE CONC SD
28 478751	9415	13/09/12	09:58	10:06	00:08		171927	DUNMORE C/SAND
28 478752	ZIV496	13/09/12	10:03	10:14	00:11	X	133656	FINE SAND
28 478753	7370	13/09/12	10:10	10:21	00:10		171955	COARSE CONC SD
28 478754	9286	13/09/12	10:30	10:51	00:21		133656	FINE SAND
28 478755	SB9383	13/09/12	10:42	10:54	00:12	X	133656	FINE SAND
28 478756	AD39DW	13/09/12	11:21	11:22	00:00	X	133656	FINE SAND
28 478757	BD78ER	13/09/12	11:28	11:37	00:09	X	132827	WASHED DUST
28 478758	ZIV496	13/09/12	11:54	12:03	00:08	X	133656	FINE SAND
28 478759	7933	13/09/12	11:54	12:11	00:16		171927	DUNMORE C/SAND
28 478760	5142	13/09/12	11:57	12:28	00:30		133656	FINE SAND
28 478761	5798	13/09/12	12:30	12:47	00:16		133656	FINE SAND
28 478762	7370	13/09/12	12:56	13:07	00:11		171955	COARSE CONC SD
28 478763	AN38VQ	13/09/12	13:08	13:20	00:11	X	133656	FINE SAND
28 478764	5884	13/09/12	13:13	13:23	00:10		132827	WASHED DUST
28 478765	5831	13/09/12	13:14	13:28	00:13		132827	WASHED DUST
28 478766	5886	13/09/12	13:22	13:34	00:11		132827	WASHED DUST
28 478771	5823	13/09/12	13:39	15:17	01:38		133656	FINE SAND
28 478767	ZIV496	13/09/12	13:41	13:52	00:11	X	133656	FINE SAND
28 478768	5816	13/09/12	13:41	13:55	00:13		133656	FINE SAND
28 478769	BK25KM	13/09/12	14:00	14:12	00:11	X	133656	FINE SAND
28 478770	BI05UL	13/09/12	14:50	15:02	00:12	X	133656	FINE SAND
28 478772	ZIV496	13/09/12	15:17	15:27	00:09	X	133656	FINE SAND

Boral Quarries....PLANT: 28 DUNMORE SAND & SOIL

PRINTED: 06:34:01am 17 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..								
28 478773	TRAIN	14/09/12	05:46	05:48	00:02	X	171927	DUNMORE C/SAND
28 478774	TRAIN	14/09/12	05:46	05:48	00:02	X	133656	FINE SAND
28 478775	7933	14/09/12	06:00	06:16	00:16		171927	DUNMORE C/SAND
28 478777	5813	14/09/12	06:02	06:22	00:20		133656	FINE SAND
28 478776	7933	14/09/12	06:04	06:18	00:14		171927	DUNMORE C/SAND
28 478778	7370	14/09/12	06:37	06:48	00:10		171955	COARSE CONC SD
28 478779	7933	14/09/12	08:49	09:04	00:14		171927	DUNMORE C/SAND
28 478782	5142	14/09/12	08:51	09:22	00:31		133656	FINE SAND
28 478780	TRAIN	14/09/12	09:08	09:10	00:02	X	133656	FINE SAND
28 478781	TRAIN	14/09/12	09:08	09:11	00:02	X	132827	WASHED DUST
28 478783	JC128	14/09/12	09:24	09:34	00:09	X	133656	FINE SAND
28 478784	7933	14/09/12	12:31	12:39	00:08		171927	DUNMORE C/SAND
28 478785	9415	14/09/12	13:22	13:35	00:12		133656	FINE SAND
28 478787	5884	14/09/12	13:35	15:05	01:30		132827	WASHED DUST
28 478788	5922	14/09/12	13:35	15:10	01:35		132827	WASHED DUST
28 478790	7305	14/09/12	14:11	15:17	01:06		133656	FINE SAND
28 478786	5813	14/09/12	14:21	14:57	00:35		133656	FINE SAND
28 478789	9551	14/09/12	14:43	15:13	00:30		132827	WASHED DUST
28 478791	9415	14/09/12	14:43	15:23	00:40		132827	WASHED DUST
28 478792	5822	14/09/12	14:54	15:50	00:56		133656	FINE SAND

28

20 records listed.

Boral Quarries...PLANT: 04 DUNMORE

PRINTED: 05:40:50pm 10 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant	Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..									
04	926174	7305	10/09/12	05:59	06:10	00:10		132555	20MM AGG
04	926175	AH81UU	10/09/12	05:59	06:18	00:18	X	133435	40 R/GRAVEL
04	926176	AQ89WO	10/09/12	06:02	06:26	00:24	X	133435	40 R/GRAVEL
04	926178	5816	10/09/12	06:06	06:30	00:24		132555	20MM AGG
04	926177	BP17TX	10/09/12	06:11	06:28	00:16	X	142806	BQ SAND
04	926179	4172	10/09/12	06:12	06:33	00:21		132310	AGG 7MM ASP
04	926180	ZGN702	10/09/12	06:13	06:36	00:22	X	132462	14MM DRAINAGE
04	926182	7933	10/09/12	06:19	06:42	00:22		132553	10MM AGG
04	926183	XBH924	10/09/12	06:25	06:53	00:28	X	132486	40MM DRAINAGE
04	926181	BEX710	10/09/12	06:25	06:38	00:12	X	132462	14MM DRAINAGE
04	926184	RT481	10/09/12	06:26	07:02	00:36	X	132486	40MM DRAINAGE
04	926186	DLK104	10/09/12	06:29	07:08	00:38	X	132486	40MM DRAINAGE
04	926188	6009	10/09/12	06:36	07:14	00:37		171950	SCALPS -20MM
04	926193	TRAIN	10/09/12	06:45	08:24	01:38	X	171927	DUNMORE C/SAND
04	926194	TRAIN	10/09/12	06:45	08:24	01:39	X	133656	FINE SAND
04	926195	TRAIN	10/09/12	06:45	08:24	01:39	X	132827	WASHED DUST
04	926196	TRAIN	10/09/12	06:45	08:24	01:39	X	132304	AGG 20MM ASP
04	926197	TRAIN	10/09/12	06:45	08:25	01:39	X	132555	20MM AGG
04	926198	TRAIN	10/09/12	06:45	08:25	01:39	X	132302	AGG 14MM ASP
04	926199	TRAIN	10/09/12	06:45	08:25	01:39	X	132300	AGG 10MM ASP
04	926200	TRAIN	10/09/12	06:46	08:25	01:39	X	132553	10MM AGG
04	926187	CAM956	10/09/12	06:47	07:11	00:24	X	132486	40MM DRAINAGE
04	926185	RT480	10/09/12	07:04	07:04	00:00	X	132486	40MM DRAINAGE
04	926189	BFJ550	10/09/12	07:17	07:32	00:15	X	133435	40 R/GRAVEL
04	926190	BD01DB	10/09/12	07:23	07:34	00:10	X	132826	DUST
04	926191	5816	10/09/12	07:28	07:42	00:14		132553	10MM AGG
04	926192	TOM270	10/09/12	07:38	07:53	00:15	X	132308	AGG 5MM ASP
04	926201	BF43YN	10/09/12	08:21	08:32	00:11	X	220939	20-70 DRAINAGE
04	926202	BAD604	10/09/12	08:27	08:39	00:12	X	132486	40MM DRAINAGE
04	926203	BD23NZ	10/09/12	08:27	08:41	00:14	X	132826	DUST
04	926204	BJ22CX	10/09/12	08:33	08:43	00:10	X	220939	20-70 DRAINAGE
04	926205	KW4040	10/09/12	08:38	08:50	00:11	X	132486	40MM DRAINAGE
04	926206	BR90TJ	10/09/12	08:39	08:56	00:17	X	132486	40MM DRAINAGE
04	926207	GRM407	10/09/12	08:42	08:58	00:16	X	132486	40MM DRAINAGE
04	926208	5816	10/09/12	08:57	09:23	00:26		132555	20MM AGG
04	926209	5823	10/09/12	09:19	09:29	00:10		132567	BESSER 7/5MM
04	926210	BP17TX	10/09/12	09:43	09:53	00:10	X	132826	DUST
04	926211	BJ22CX	10/09/12	10:10	10:17	00:06	X	220939	20-70 DRAINAGE
04	926212	BK90RF	10/09/12	10:20	10:33	00:13	X	132486	40MM DRAINAGE
04	926213	BF43YN	10/09/12	10:28	10:38	00:10	X	220939	20-70 DRAINAGE
04	926214	7305	10/09/12	10:32	10:42	00:10		132555	20MM AGG
04	926215	GRM406	10/09/12	10:36	10:48	00:12	X	133301	CAPPING MAT
04	926217	7305	10/09/12	10:44	10:53	00:08		132555	20MM AGG
04	926218	GRM405	10/09/12	11:11	11:22	00:10	X	133301	CAPPING MAT
04	926222	GRM408	10/09/12	11:12	11:38	00:26	X	133301	CAPPING MAT
04	926220	DLK104	10/09/12	11:17	11:28	00:11	X	132486	40MM DRAINAGE
04	926219	BQ55BB	10/09/12	11:22	11:24	00:01	X	133435	40 R/GRAVEL
04	926221	BJ22CX	10/09/12	11:26	11:37	00:11	X	220939	20-70 DRAINAGE
04	926223	WHY263	10/09/12	11:30	11:41	00:11	X	132826	DUST
04	926225	BAD604	10/09/12	11:44	11:55	00:11	X	133301	CAPPING MAT
04	926224	LS993	10/09/12	11:47	11:48	00:00	X	132308	AGG 5MM ASP
04	926226	XBH924	10/09/12	11:58	12:09	00:11	X	132486	40MM DRAINAGE
04	926227	GRM407	10/09/12	12:11	12:22	00:10	X	133301	CAPPING MAT
04	926228	AH81UU	10/09/12	12:14	12:28	00:14	X	133435	40 R/GRAVEL

Boral Quarries....PLANT: 04 DUNMORE

PRINTED: 05:40:50pm 10 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant	Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
04	926229	BF01KL	10/09/12	12:15	12:30	00:14	X	133435	40 R/GRAVEL
04	926231	5816	10/09/12	12:24	12:40	00:16		132553	10MM AGG
04	926230	YTX690	10/09/12	12:25	12:37	00:11	X	133301	CAPPING MAT
04	926232	BP17TX	10/09/12	12:26	12:45	00:19	X	132826	DUST
04	926233	BQ54BB	10/09/12	12:33	12:49	00:15	X	133435	40 R/GRAVEL
04	926234	BFJ550	10/09/12	12:35	13:08	00:33	X	133435	40 R/GRAVEL
04	926235	AJ47WW	10/09/12	12:57	13:11	00:13	X	133435	40 R/GRAVEL
04	926236	AT58PE	10/09/12	12:59	13:15	00:15	X	132826	DUST
04	926237	BF43YN	10/09/12	13:05	13:16	00:11	X	220939	20-70 DRAINAGE
04	926238	5142	10/09/12	13:20	13:32	00:12		132567	BESSER 7/5MM
04	926247	4174	10/09/12	13:41	16:51	03:09		133435	40 R/GRAVEL
04	926245	5822	10/09/12	13:42	16:15	02:33		132555	20MM AGG
04	926246	5822	10/09/12	13:42	16:16	02:33		132553	10MM AGG
04	926243	5823	10/09/12	13:42	16:02	02:20		132567	BESSER 7/5MM
04	926239	BF70DF	10/09/12	14:17	14:30	00:13	X	133434	20 RD GRAV
04	926240	TOM270	10/09/12	15:07	15:25	00:18	X	132302	AGG 14MM ASP
04	926241	4172	10/09/12	15:24	15:38	00:13		133435	40 R/GRAVEL
04	926242	6741	10/09/12	15:43	15:56	00:13		133435	40 R/GRAVEL
04	926244	6741	10/09/12	15:55	16:11	00:16		133435	40 R/GRAVEL
04	926248	WFS116	10/09/12	17:24	17:36	00:12	X	133140	DGB20

04

74 records listed.

Boral Quarries....PLANT: 04 DUNMORE

PRINTED: 05:28:21pm 11 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..								
04 926249	TRAIN	11/09/12	05:53	05:55	00:02	X	171927	DUNMORE C/SAND
04 926250	TRAIN	11/09/12	05:53	05:55	00:02	X	133656	FINE SAND
04 926251	TRAIN	11/09/12	05:53	05:56	00:02	X	132555	20MM AGG
04 926252	TRAIN	11/09/12	05:53	05:56	00:02	X	132553	10MM AGG
04 926253	TRAIN	11/09/12	05:53	05:56	00:02	X	132461	10MM DRAINAGE
04 926256	AH81UU	11/09/12	06:00	06:24	00:23	X	133435	40 R/GRAVEL
04 926255	7417	11/09/12	06:01	06:21	00:19		133435	40 R/GRAVEL
04 926254	7933	11/09/12	06:02	06:14	00:11		132553	10MM AGG
04 926257	BK40DB	11/09/12	06:03	06:28	00:25	X	133435	40 R/GRAVEL
04 926258	7417	11/09/12	06:03	06:32	00:28		133435	40 R/GRAVEL
04 926259	5898	11/09/12	06:05	06:36	00:31		133435	40 R/GRAVEL
04 926269	UZL699	11/09/12	06:18	07:00	00:42	X	132462	14MM DRAINAGE
04 926263	7333	11/09/12	06:19	06:48	00:29		133435	40 R/GRAVEL
04 926264	7417	11/09/12	06:21	06:51	00:29		133435	40 R/GRAVEL
04 926265	7333	11/09/12	06:23	06:52	00:29		133435	40 R/GRAVEL
04 926266	AI09NI	11/09/12	06:27	06:54	00:27	X	133435	40 R/GRAVEL
04 926270	7417	11/09/12	06:49	07:05	00:16		133435	40 R/GRAVEL
04 926271	5886	11/09/12	06:50	07:09	00:19		133435	40 R/GRAVEL
04 926267	AQ89WO	11/09/12	06:57	06:58	00:00	X	133435	40 R/GRAVEL
04 926268	AQ89WO	11/09/12	06:57	06:58	00:00	X	132826	DUST
04 926272	BP17TX	11/09/12	07:13	07:21	00:08	X	132826	DUST
04 926273	BF43YN	11/09/12	07:13	07:24	00:10	X	132826	DUST
04 926274	7333	11/09/12	07:20	07:30	00:10		133435	40 R/GRAVEL
04 926275	5885	11/09/12	07:24	07:36	00:12		133435	40 R/GRAVEL
04 926276	8949	11/09/12	07:47	08:01	00:13		133435	40 R/GRAVEL
04 926277	7305	11/09/12	07:57	08:08	00:11		132555	20MM AGG
04 926278	7305	11/09/12	08:04	08:14	00:10		171950	SCALPS -20MM
04 926280	BH77CS	11/09/12	08:04	08:26	00:21	X	132826	DUST
04 926279	BEN166	11/09/12	08:05	08:24	00:19	X	133301	CAPPING MAT
04 926281	7417	11/09/12	08:11	08:28	00:17		133435	40 R/GRAVEL
04 926285	9415	11/09/12	08:22	08:45	00:23		133435	40 R/GRAVEL
04 926283	4173	11/09/12	08:22	08:39	00:17		132308	AGG 5MM ASP
04 926282	8949	11/09/12	08:25	08:37	00:11		133435	40 R/GRAVEL
04 926284	8949	11/09/12	08:25	08:41	00:15		133435	40 R/GRAVEL
04 926286	6741	11/09/12	08:27	08:51	00:24		133435	40 R/GRAVEL
04 926287	6741	11/09/12	08:27	08:53	00:25		133435	40 R/GRAVEL
04 926288	AM07NM	11/09/12	08:30	08:56	00:25	X	133435	40 R/GRAVEL
04 926289	9415	11/09/12	08:37	08:59	00:22		133435	40 R/GRAVEL
04 926311	4174	11/09/12	08:37	10:20	01:43		133435	40 R/GRAVEL
04 926290	7417	11/09/12	08:46	09:03	00:17		133435	40 R/GRAVEL
04 926292	7417	11/09/12	08:46	09:08	00:21		133435	40 R/GRAVEL
04 926291	YYN309	11/09/12	08:55	09:06	00:10	X	132826	DUST
04 926293	BH77CS	11/09/12	09:04	09:13	00:09	X	132826	DUST
04 926302	BB62YF	11/09/12	09:09	09:23	00:13	X	132826	DUST
04 926303	BB62YF	11/09/12	09:10	09:23	00:13	X	132462	14MM DRAINAGE
04 926304	6923	11/09/12	09:12	09:30	00:18		133435	40 R/GRAVEL
04 926294	TRAIN	11/09/12	09:13	09:17	00:03	X	171927	DUNMORE C/SAND
04 926295	TRAIN	11/09/12	09:13	09:17	00:04	X	133656	FINE SAND
04 926296	TRAIN	11/09/12	09:13	09:17	00:04	X	132827	WASHED DUST
04 926297	TRAIN	11/09/12	09:14	09:17	00:03	X	132308	AGG 5MM ASP
04 926298	TRAIN	11/09/12	09:14	09:18	00:03	X	132300	AGG 10MM ASP
04 926299	TRAIN	11/09/12	09:14	09:18	00:03	X	132553	10MM AGG
04 926300	TRAIN	11/09/12	09:15	09:18	00:03	X	132304	AGG 20MM ASP
04 926301	TRAIN	11/09/12	09:15	09:18	00:03	X	132555	20MM AGG

Boral Quarries....PLANT: 04 DUNMORE

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YARD TIME REPORT

Plant Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..								
04 926306	AH81UU	11/09/12	09:31	09:54	00:23	X	133435	40 R/GRAVEL
04 926307	7719	11/09/12	09:48	10:05	00:16		133435	40 R/GRAVEL
04 926308	7719	11/09/12	09:49	10:09	00:20		133435	40 R/GRAVEL
04 926310	7719	11/09/12	09:49	10:16	00:27		133435	40 R/GRAVEL
04 926305	BE58BA	11/09/12	09:52	09:52	00:00	X	132465	20MM DRAINAGE
04 926309	YYN309	11/09/12	10:05	10:14	00:08	X	132826	DUST
04 926312	7719	11/09/12	10:17	10:31	00:13		133435	40 R/GRAVEL
04 926313	5898	11/09/12	10:25	10:39	00:14		133435	40 R/GRAVEL
04 926314	4173	11/09/12	10:26	10:45	00:19		132300	AGG 10MM ASP
04 926315	AI09NI	11/09/12	10:32	10:49	00:16	X	133435	40 R/GRAVEL
04 926316	7719	11/09/12	10:39	10:57	00:18		133435	40 R/GRAVEL
04 926317	7719	11/09/12	10:39	11:01	00:22		133435	40 R/GRAVEL
04 926318	6741	11/09/12	10:40	11:03	00:22		133435	40 R/GRAVEL
04 926319	6741	11/09/12	10:41	11:05	00:24		133435	40 R/GRAVEL
04 926323	BF43YN	11/09/12	10:48	11:18	00:30	X	220939	20-70 DRAINAGE
04 926320	6741	11/09/12	10:48	11:08	00:19		133435	40 R/GRAVEL
04 926325	7305	11/09/12	10:54	11:22	00:27		171950	SCALPS -20MM
04 926321	7719	11/09/12	10:56	11:14	00:17		133435	40 R/GRAVEL
04 926322	7719	11/09/12	10:56	11:17	00:20		133435	40 R/GRAVEL
04 926324	7719	11/09/12	10:57	11:20	00:23		133435	40 R/GRAVEL
04 926326	5886	11/09/12	11:00	11:24	00:24		133435	40 R/GRAVEL
04 926327	5831	11/09/12	11:04	11:28	00:23		133435	40 R/GRAVEL
04 926328	5885	11/09/12	11:12	11:31	00:18		133435	40 R/GRAVEL
04 926329	6741	11/09/12	11:13	11:33	00:19		133435	40 R/GRAVEL
04 926331	5798	11/09/12	11:17	11:36	00:19		133435	40 R/GRAVEL
04 926330	5916	11/09/12	11:18	11:35	00:16		132567	BESSER 7/5MM
04 926332	BP17TX	11/09/12	11:26	11:40	00:14	X	220939	20-70 DRAINAGE
04 926344	5142	11/09/12	11:35	13:19	01:43		133435	40 R/GRAVEL
04 926335	4173	11/09/12	11:45	12:04	00:18		132302	AGG 14MM ASP
04 926333	BC61EG	11/09/12	11:47	12:00	00:13	X	133435	40 R/GRAVEL
04 926334	AP66GY	11/09/12	11:47	12:02	00:15	X	133435	40 R/GRAVEL
04 926336	BK40DB	11/09/12	11:50	12:06	00:15	X	133435	40 R/GRAVEL
04 926338	9270	11/09/12	12:12	12:35	00:22		132553	10MM AGG
04 926337	9415	11/09/12	12:13	12:27	00:13		133435	40 R/GRAVEL
04 926339	LS993	11/09/12	12:23	12:37	00:14	X	132300	AGG 10MM ASP
04 926341	AQ89WO	11/09/12	12:36	13:02	00:26	X	133435	40 R/GRAVEL
04 926340	NSS550	11/09/12	12:44	12:58	00:14	X	132462	14MM DRAINAGE
04 926342	AM07NM	11/09/12	12:48	13:06	00:18	X	133435	40 R/GRAVEL
04 926343	9415	11/09/12	12:54	13:09	00:15		133301	CAPPING MAT
04 926348	BK84HK	11/09/12	13:05	13:35	00:30	X	133434	20 RD GRAV
04 926345	BFJ550	11/09/12	13:06	13:23	00:17	X	133435	40 R/GRAVEL
04 926347	BF43YN	11/09/12	13:08	13:33	00:24	X	220939	20-70 DRAINAGE
04 926349	BP17TX	11/09/12	13:10	13:36	00:26	X	220939	20-70 DRAINAGE
04 926350	BJ22CX	11/09/12	13:13	13:38	00:25	X	220939	20-70 DRAINAGE
04 926346	9551	11/09/12	13:13	13:27	00:14		133435	40 R/GRAVEL
04 926351	AJ91QX	11/09/12	13:14	13:39	00:25	X	133434	20 RD GRAV
04 926352	9415	11/09/12	13:26	13:41	00:15		133301	CAPPING MAT
04 926353	4174	11/09/12	13:26	13:48	00:21		133435	40 R/GRAVEL
04 926354	7417	11/09/12	13:26	13:50	00:23		133435	40 R/GRAVEL
04 926355	8949	11/09/12	13:32	13:52	00:19		133301	CAPPING MAT
04 926356	8949	11/09/12	13:32	13:55	00:22		133301	CAPPING MAT
04 926357	8949	11/09/12	13:33	13:57	00:24		133301	CAPPING MAT
04 926358	9415	11/09/12	13:42	14:02	00:20		133301	CAPPING MAT
04 926359	4173	11/09/12	13:55	14:13	00:17		132300	AGG 10MM ASP

Boral Quarries....PLANT: 04 DUNMORE

PRINTED: 05:28:21pm 11 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant	Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
		Number..							
04	926360	5827	11/09/12	14:07	14:19	00:11		132553	10MM AGG
04	926361	7417	11/09/12	14:25	14:40	00:15		133301	CAPPING MAT
04	926363	TOM270	11/09/12	15:27	15:41	00:14	X	132308	AGG 5MM ASP
04	926364	5886	11/09/12	15:27	15:52	00:24		133435	40 R/GRAVEL
04	926365	5885	11/09/12	15:27	15:54	00:26		133435	40 R/GRAVEL
04	926366	5823	11/09/12	15:46	15:58	00:11		133301	CAPPING MAT
04	926367	7370	11/09/12	15:57	16:11	00:13		132553	10MM AGG
04	926368	ZJV174	11/09/12	16:05	16:14	00:09	X	133301	CAPPING MAT
04	926369	7305	11/09/12	16:43	16:54	00:11		133435	40 R/GRAVEL
04	926370	7305	11/09/12	16:59	17:27	00:27		132555	20MM AGG

04

118 records listed.

Boral Quarries...PLANT: 04 DUNMORE

PRINTED: 05:20:42pm 12 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant	Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..									
04	926372	TRAIN	12/09/12	05:56	06:09	00:13	X	133656	FINE SAND
04	926373	TRAIN	12/09/12	05:56	06:11	00:14	X	132555	20MM AGG
04	926374	TRAIN	12/09/12	05:56	06:11	00:15	X	132553	10MM AGG
04	926375	TRAIN	12/09/12	05:56	06:11	00:15	X	132461	10MM DRAINAGE
04	926382	RR917	12/09/12	05:59	06:39	00:40	X	133301	CAPPING MAT
04	926383	AR25TO	12/09/12	05:59	06:45	00:46	X	133301	CAPPING MAT
04	926385	5922	12/09/12	06:00	06:51	00:50		133435	40 R/GRAVEL
04	926387	AH81UU	12/09/12	06:01	06:56	00:55	X	133435	40 R/GRAVEL
04	926388	9415	12/09/12	06:02	06:58	00:56		133435	40 R/GRAVEL
04	926378	5898	12/09/12	06:02	06:32	00:30		132553	10MM AGG
04	926379	5898	12/09/12	06:02	06:33	00:30		132555	20MM AGG
04	926389	4174	12/09/12	06:03	07:02	00:58		133435	40 R/GRAVEL
04	926390	7333	12/09/12	06:05	07:06	01:01		133435	40 R/GRAVEL
04	926392	7333	12/09/12	06:05	07:11	01:06		133435	40 R/GRAVEL
04	926377	7333	12/09/12	06:05	06:29	00:24		132567	BESSER 7/5MM
04	926391	AI09NI	12/09/12	06:06	07:08	01:01	X	133435	40 R/GRAVEL
04	926393	AJ47WW	12/09/12	06:06	07:13	01:06	X	133435	40 R/GRAVEL
04	926394	7719	12/09/12	06:07	07:15	01:08		133435	40 R/GRAVEL
04	926395	7719	12/09/12	06:07	07:17	01:10		133435	40 R/GRAVEL
04	926396	7719	12/09/12	06:07	07:19	01:11		133435	40 R/GRAVEL
04	926376	7305	12/09/12	06:07	06:22	00:14		132555	20MM AGG
04	926371	TRAIN	12/09/12	06:08	06:09	00:00	X	171927	DUNMORE C/SAND
04	926380	5822	12/09/12	06:08	06:34	00:26		132308	AGG 5MM ASP
04	926397	7719	12/09/12	06:09	07:21	01:11		133435	40 R/GRAVEL
04	926399	7719	12/09/12	06:14	07:25	01:10		133435	40 R/GRAVEL
04	926384	BEX730	12/09/12	06:16	06:48	00:32	X	132462	14MM DRAINAGE
04	926398	BF01KL	12/09/12	06:17	07:23	01:06	X	133435	40 R/GRAVEL
04	926400	7719	12/09/12	06:17	07:26	01:09		133435	40 R/GRAVEL
04	926401	BFJ550	12/09/12	06:20	07:28	01:07	X	133435	40 R/GRAVEL
04	926402	7719	12/09/12	06:23	07:30	01:06		133435	40 R/GRAVEL
04	926405	7719	12/09/12	06:24	07:35	01:11		133435	40 R/GRAVEL
04	926403	6923	12/09/12	06:28	07:32	01:03		133435	40 R/GRAVEL
04	926381	TRN021	12/09/12	06:35	06:35	00:00	X	132553	10MM AGG
04	926404	7359	12/09/12	06:36	07:34	00:57		133435	40 R/GRAVEL
04	926406	7359	12/09/12	06:36	07:37	01:01		133435	40 R/GRAVEL
04	926407	6741	12/09/12	06:38	07:39	01:01		133435	40 R/GRAVEL
04	926408	6741	12/09/12	06:39	07:41	01:02		133435	40 R/GRAVEL
04	926409	5884	12/09/12	06:48	07:43	00:55		132300	AGG 10MM ASP
04	926386	UZL699	12/09/12	06:53	06:54	00:00	X	132462	14MM DRAINAGE
04	926410	7417	12/09/12	07:44	07:53	00:09		132826	DUST
04	926411	AP87BD	12/09/12	07:56	08:07	00:10	X	142806	BQ SAND
04	926412	6741	12/09/12	08:07	08:19	00:11		133435	40 R/GRAVEL
04	926413	BB62YF	12/09/12	08:20	08:33	00:13	X	132462	14MM DRAINAGE
04	926414	BB62YF	12/09/12	08:23	08:34	00:11	X	132465	20MM DRAINAGE
04	926416	8949	12/09/12	08:23	08:42	00:18		133435	40 R/GRAVEL
04	926417	8949	12/09/12	08:23	08:45	00:21		133435	40 R/GRAVEL
04	926418	8949	12/09/12	08:23	08:49	00:25		133435	40 R/GRAVEL
04	926415	TRN040	12/09/12	08:24	08:37	00:12	X	132553	10MM AGG
04	926420	8949	12/09/12	08:41	09:02	00:21		133435	40 R/GRAVEL
04	926421	8949	12/09/12	08:41	09:04	00:22		133435	40 R/GRAVEL
04	926422	5884	12/09/12	08:48	09:06	00:17		132302	AGG 14MM ASP
04	926423	BF43YN	12/09/12	08:53	09:07	00:14	X	220939	20-70 DRAINAGE
04	926424	TRAIN	12/09/12	08:53	09:09	00:16	X	171927	DUNMORE C/SAND
04	926425	TRAIN	12/09/12	08:53	09:10	00:16	X	133656	FINE SAND

Boral Quarries...PLANT: 04 DUNMORE

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YARD TIME REPORT

Plant	Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..									
04	926426	TRAIN	12/09/12	08:53	09:10	00:16	X	132827	WASHED DUST
04	926427	TRAIN	12/09/12	08:54	09:11	00:16	X	132308	AGG 5MM ASP
04	926434	7417	12/09/12	09:03	09:21	00:18		132826	DUST
04	926433	9272	12/09/12	09:03	09:14	00:10		133435	40 R/GRAVEL
04	926428	TRAIN	12/09/12	09:04	09:11	00:06	X	132300	AGG 10MM ASP
04	926429	TRAIN	12/09/12	09:05	09:11	00:06	X	132553	10MM AGG
04	926430	TRAIN	12/09/12	09:05	09:12	00:07	X	132302	AGG 14MM ASP
04	926431	TRAIN	12/09/12	09:05	09:13	00:07	X	132304	AGG 20MM ASP
04	926432	TRAIN	12/09/12	09:06	09:13	00:07	X	132555	20MM AGG
04	926435	6741	12/09/12	09:42	09:56	00:14		133435	40 R/GRAVEL
04	926436	BP17TX	12/09/12	09:45	10:00	00:14	X	220939	20-70 DRAINAGE
04	926437	9415	12/09/12	09:50	10:04	00:14		133435	40 R/GRAVEL
04	926438	AH81UU	12/09/12	10:00	10:12	00:11	X	133435	40 R/GRAVEL
04	926439	5885	12/09/12	10:00	10:15	00:14		133435	40 R/GRAVEL
04	926440	7305	12/09/12	10:04	10:17	00:12		133435	40 R/GRAVEL
04	926441	BF43YN	12/09/12	10:14	10:23	00:09	X	220939	20-70 DRAINAGE
04	926442	AJ47WW	12/09/12	10:15	10:30	00:14	X	133435	40 R/GRAVEL
04	926443	5823	12/09/12	10:27	10:38	00:11		133435	40 R/GRAVEL
04	926444	5886	12/09/12	10:35	10:47	00:11		133435	40 R/GRAVEL
04	926446	6741	12/09/12	10:37	10:54	00:17		133435	40 R/GRAVEL
04	926447	BF01KL	12/09/12	10:40	10:56	00:16	X	133435	40 R/GRAVEL
04	926445	5884	12/09/12	10:40	10:52	00:11		132308	AGG 5MM ASP
04	926448	BFJ550	12/09/12	10:43	10:58	00:14	X	133435	40 R/GRAVEL
04	926449	5822	12/09/12	10:44	11:00	00:15		132300	AGG 10MM ASP
04	926450	5922	12/09/12	10:58	11:07	00:09		133435	40 R/GRAVEL
04	926452	AI09NI	12/09/12	11:08	11:24	00:15	X	133435	40 R/GRAVEL
04	926451	BP17TX	12/09/12	11:12	11:21	00:09	X	220939	20-70 DRAINAGE
04	926453	7719	12/09/12	11:16	11:30	00:14		133435	40 R/GRAVEL
04	926454	BF43YN	12/09/12	11:26	11:36	00:10	X	220939	20-70 DRAINAGE
04	926455	BK84HK	12/09/12	11:27	11:42	00:15	X	133435	40 R/GRAVEL
04	926456	4174	12/09/12	11:29	11:44	00:15		133435	40 R/GRAVEL
04	926457	AK04VT	12/09/12	11:31	11:48	00:16	X	133435	40 R/GRAVEL
04	926461	TGS006	12/09/12	11:36	12:07	00:31	X	132468	5MM DRAINAGE
04	926459	7719	12/09/12	11:37	12:00	00:23		133435	40 R/GRAVEL
04	926460	7719	12/09/12	11:38	12:05	00:26		133435	40 R/GRAVEL
04	926463	7719	12/09/12	11:38	12:14	00:35		133435	40 R/GRAVEL
04	926462	6741	12/09/12	11:39	12:09	00:29		133435	40 R/GRAVEL
04	926464	VYL725	12/09/12	11:52	12:18	00:25	X	133435	40 R/GRAVEL
04	926468	5884	12/09/12	11:54	12:29	00:35		132302	AGG 14MM ASP
04	926469	5822	12/09/12	11:55	12:33	00:37		132302	AGG 14MM ASP
04	926465	9415	12/09/12	11:59	12:20	00:20		133435	40 R/GRAVEL
04	926466	6741	12/09/12	12:00	12:22	00:22		133435	40 R/GRAVEL
04	926470	9415	12/09/12	12:18	12:51	00:32		133301	CAPPING MAT
04	926467	7719	12/09/12	12:19	12:24	00:05		133301	CAPPING MAT
04	926471	7719	12/09/12	12:19	12:59	00:39		133301	CAPPING MAT
04	926472	7719	12/09/12	12:21	13:01	00:39		133301	CAPPING MAT
04	926473	9551	12/09/12	12:26	13:06	00:40		133301	CAPPING MAT
04	926475	TRN021	12/09/12	12:56	13:14	00:17	X	132553	10MM AGG
04	926474	7305	12/09/12	12:56	13:09	00:13		133301	CAPPING MAT
04	926476	5826	12/09/12	13:03	13:18	00:15		132553	10MM AGG
04	926477	BP17TX	12/09/12	13:03	13:21	00:17	X	220939	20-70 DRAINAGE
04	926478	BF43YN	12/09/12	13:07	13:23	00:15	X	220939	20-70 DRAINAGE
04	926479	BF70DF	12/09/12	13:18	13:34	00:16	X	133435	40 R/GRAVEL
04	926480	AQ89WO	12/09/12	13:24	13:39	00:15	X	133435	40 R/GRAVEL

Boral Quarries...PLANT: 04 DUNMORE

PRINTED: 05:20:42pm 12 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant	Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
	Number..								
04	926486	7719	12/09/12	13:38	15:16	01:37		132300	AGG 10MM ASP
04	926481	5884	12/09/12	14:09	14:19	00:10		132302	AGG 14MM ASP
04	926482	6923	12/09/12	14:09	14:26	00:16		132300	AGG 10MM ASP
04	926483	5822	12/09/12	14:18	14:28	00:09		132300	AGG 10MM ASP
04	926489	9551	12/09/12	14:24	15:59	01:35		132300	AGG 10MM ASP
04	926485	5886	12/09/12	14:40	15:12	00:31		132308	AGG 5MM ASP
04	926484	7719	12/09/12	15:00	15:05	00:04		132300	AGG 10MM ASP
04	926487	9415	12/09/12	15:29	15:44	00:14		132300	AGG 10MM ASP
04	926488	4173	12/09/12	15:41	15:54	00:12		132300	AGG 10MM ASP
04	926491	7305	12/09/12	15:48	16:03	00:15		132300	AGG 10MM ASP
04	926490	LS993	12/09/12	15:48	16:02	00:13	X	132302	AGG 14MM ASP
04	926492	TOM270	12/09/12	15:49	16:09	00:19	X	132300	AGG 10MM ASP
04	926493	5813	12/09/12	15:52	16:18	00:26		132553	10MM AGG
04	926495	9415	12/09/12	16:04	16:24	00:20		132304	AGG 20MM ASP
04	926494	UZL699	12/09/12	16:07	16:22	00:15	X	132462	14MM DRAINAGE
04	926496	9415	12/09/12	16:54	17:07	00:13		132304	AGG 20MM ASP

04

124 records listed.

Boral Quarries...PLANT: 04 DUNMORE

PRINTED: 05:37:37pm 13 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant	Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..									
04	926498	5823	13/09/12	05:59	06:18	00:18		133301	CAPPING MAT
04	926499	4174	13/09/12	06:00	06:23	00:23		132300	AGG 10MM ASP
04	926508	TRN029	13/09/12	06:02	06:45	00:43	X	132553	10MM AGG
04	926511	7333	13/09/12	06:03	06:55	00:51		132567	BESSER 7/5MM
04	926509	7333	13/09/12	06:04	06:48	00:44		133301	CAPPING MAT
04	926510	7333	13/09/12	06:04	06:53	00:48		133301	CAPPING MAT
04	926500	7305	13/09/12	06:05	06:32	00:27		132555	20MM AGG
04	926507	7305	13/09/12	06:05	06:40	00:34		132555	20MM AGG
04	926497	TRN032	13/09/12	06:16	06:16	00:00	X	132553	10MM AGG
04	926501	7315	13/09/12	06:16	06:35	00:18		132468	5MM DRAINAGE
04	926502	TRAIN	13/09/12	06:21	06:36	00:14	X	171927	DUNMORE C/SAND
04	926503	TRAIN	13/09/12	06:22	06:36	00:13	X	133656	FINE SAND
04	926504	TRAIN	13/09/12	06:22	06:36	00:13	X	132555	20MM AGG
04	926505	TRAIN	13/09/12	06:22	06:36	00:13	X	132553	10MM AGG
04	926506	TRAIN	13/09/12	06:23	06:36	00:13	X	132461	10MM DRAINAGE
04	926512	5142	13/09/12	06:24	06:57	00:33		132300	AGG 10MM ASP
04	926513	BEX760	13/09/12	06:49	07:03	00:14	X	132462	14MM DRAINAGE
04	926514	5886	13/09/12	07:57	08:07	00:09		132308	AGG 5MM ASP
04	926515	5813	13/09/12	08:41	08:48	00:07		132555	20MM AGG
04	926516	7417	13/09/12	08:43	08:58	00:14		133301	CAPPING MAT
04	926517	BN66EV	13/09/12	08:50	09:06	00:15	X	132462	14MM DRAINAGE
04	926518	TRN029	13/09/12	09:09	09:21	00:11	X	132553	10MM AGG
04	926519	9415	13/09/12	09:32	09:48	00:16		132555	20MM AGG
04	926520	BJ22CX	13/09/12	09:35	09:51	00:15	X	133434	20 RD GRAV
04	926521	AT49SK	13/09/12	09:35	09:56	00:20	X	133435	40 R/GRAVEL
04	926522	BD94NL	13/09/12	09:40	10:03	00:23	X	133435	40 R/GRAVEL
04	926524	GP7041	13/09/12	09:43	10:11	00:27	X	132465	20MM DRAINAGE
04	926523	AP94RW	13/09/12	09:52	10:08	00:16	X	133435	40 R/GRAVEL
04	926525	5816	13/09/12	09:52	10:13	00:20		132302	AGG 14MM ASP
04	926526	BEX760	13/09/12	10:11	10:24	00:12	X	132462	14MM DRAINAGE
04	926527	9415	13/09/12	10:13	10:29	00:15		133435	40 R/GRAVEL
04	926528	5886	13/09/12	10:14	10:31	00:16		132300	AGG 10MM ASP
04	926529	5916	13/09/12	10:22	10:37	00:15		132567	BESSER 7/5MM
04	926530	5906	13/09/12	10:22	10:40	00:17		132567	BESSER 7/5MM
04	926531	5851	13/09/12	10:24	10:43	00:19		132553	10MM AGG
04	926532	ZJV174	13/09/12	10:32	10:47	00:15	X	220939	20-70 DRAINAGE
04	926533	9415	13/09/12	11:07	11:26	00:18		133435	40 R/GRAVEL
04	926534	BN98EV	13/09/12	11:44	11:56	00:12	X	133435	40 R/GRAVEL
04	926535	5886	13/09/12	11:45	11:59	00:13		133435	40 R/GRAVEL
04	926536	BD23NZ	13/09/12	12:09	12:18	00:08	X	132826	DUST
04	926537	BJ22CX	13/09/12	12:18	12:24	00:06	X	133434	20 RD GRAV
04	926538	5885	13/09/12	12:23	12:34	00:11		133435	40 R/GRAVEL
04	926539	7333	13/09/12	12:25	12:40	00:15		133301	CAPPING MAT
04	926540	WHY263	13/09/12	12:26	12:49	00:22	X	132826	DUST
04	926541	7333	13/09/12	12:41	12:58	00:16		133301	CAPPING MAT
04	926542	5822	13/09/12	13:15	13:30	00:14		132300	AGG 10MM ASP
04	926543	WHY263	13/09/12	13:38	13:50	00:12	X	132826	DUST
04	926544	5885	13/09/12	13:50	14:09	00:18		132304	AGG 20MM ASP
04	926545	BF70DF	13/09/12	14:01	14:14	00:13	X	133434	20 RD GRAV
04	926557	9415	13/09/12	14:01	16:10	02:08		132555	20MM AGG
04	926546	4173	13/09/12	14:23	14:41	00:18		132300	AGG 10MM ASP
04	926549	AQ89WO	13/09/12	14:25	14:58	00:32	X	132465	20MM DRAINAGE
04	926548	AQ89WO	13/09/12	14:25	14:58	00:32	X	133434	20 RD GRAV
04	926550	LS993	13/09/12	14:47	15:05	00:18	X	132302	AGG 14MM ASP

Boral Quarries....PLANT: 04 DUNMORE

PRINTED: 05:37:37pm 13 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant	Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
		Number..							
04	926551	TOM270	13/09/12	14:47	15:08	00:21	X	132302	AGG 14MM ASP
04	926547	BF43YN	13/09/12	14:54	14:55	00:00	X	220939	20-70 DRAINAGE
04	926552	7305	13/09/12	15:12	15:24	00:12		132555	20MM AGG
04	926553	9415	13/09/12	15:18	15:31	00:13		132308	AGG 5MM ASP
04	926558	7305	13/09/12	15:28	17:25	01:57		132555	20MM AGG
04	926555	AH64RZ	13/09/12	15:28	15:56	00:27	X	132462	14MM DRAINAGE
04	926554	DGS016	13/09/12	15:38	15:54	00:15	X	132468	5MM DRAINAGE
04	926556	9415	13/09/12	15:52	16:02	00:09		132308	AGG 5MM ASP

04

62 records listed.

Boral Quarries....PLANT: 04 DUNMORE

PRINTED: 05:35:42pm 14 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
Number..								
04 926559	TRAIN	14/09/12	05:46	05:48	00:02	X	171927	DUNMORE C/SAND
04 926560	TRAIN	14/09/12	05:47	05:50	00:03	X	133656	FINE SAND
04 926561	TRAIN	14/09/12	05:47	05:50	00:02	X	132555	20MM AGG
04 926562	TRAIN	14/09/12	05:47	05:50	00:03	X	132553	10MM AGG
04 926563	TRAIN	14/09/12	05:47	05:51	00:03	X	132461	10MM DRAINAGE
04 926572	BK93NK	14/09/12	06:00	06:52	00:52	X	132486	40MM DRAINAGE
04 926564	7359	14/09/12	06:03	06:20	00:17		133435	40 R/GRAVEL
04 926565	9415	14/09/12	06:06	06:26	00:19		133301	CAPPING MAT
04 926569	9415	14/09/12	06:06	06:38	00:31		133301	CAPPING MAT
04 926567	7359	14/09/12	06:07	06:32	00:24		133301	CAPPING MAT
04 926566	7359	14/09/12	06:14	06:30	00:15		133301	CAPPING MAT
04 926568	7359	14/09/12	06:15	06:34	00:18		133301	CAPPING MAT
04 926573	GRM409	14/09/12	06:17	06:55	00:37	X	132486	40MM DRAINAGE
04 926570	9415	14/09/12	06:18	06:40	00:22		133301	CAPPING MAT
04 926571	7333	14/09/12	06:28	06:50	00:21		132300	AGG 10MM ASP
04 926619	7305	14/09/12	06:48	13:13	06:24		132555	20MM AGG
926574	BP17TX	14/09/12	07:02	07:18	00:15	X	220939	20-70 DRAINAGE
04 926575	BEX300	14/09/12	07:25	07:37	00:11	X	132462	14MM DRAINAGE
04 926576	7305	14/09/12	07:30	07:42	00:12		133301	CAPPING MAT
04 926577	7305	14/09/12	07:47	07:58	00:11		132555	20MM AGG
04 926578	BJ22CX	14/09/12	07:48	08:00	00:11	X	220939	20-70 DRAINAGE
04 926579	8949	14/09/12	07:56	08:10	00:13		132300	AGG 10MM ASP
04 926580	5813	14/09/12	08:09	08:24	00:14		132553	10MM AGG
04 926588	DIV011	14/09/12	09:01	09:16	00:14	X	133140	DGB20
04 926589	DIV010	14/09/12	09:06	09:19	00:13	X	133140	DGB20
04 926590	DIV015	14/09/12	09:07	09:25	00:18	X	133140	DGB20
04 926581	TRAIN	14/09/12	09:09	09:11	00:02	X	133656	FINE SAND
04 926582	TRAIN	14/09/12	09:09	09:11	00:02	X	132827	WASHED DUST
04 926583	TRAIN	14/09/12	09:09	09:11	00:02	X	132308	AGG 5MM ASP
04 926584	TRAIN	14/09/12	09:09	09:12	00:02	X	132300	AGG 10MM ASP
04 926585	TRAIN	14/09/12	09:10	09:12	00:02	X	132302	AGG 14MM ASP
04 926586	TRAIN	14/09/12	09:10	09:12	00:02	X	132304	AGG 20MM ASP
04 926587	TRAIN	14/09/12	09:10	09:12	00:02	X	132555	20MM AGG
04 926591	5885	14/09/12	09:31	09:48	00:17		133301	CAPPING MAT
04 926592	GRM404	14/09/12	09:36	09:54	00:17	X	220939	20-70 DRAINAGE
926593	AM34TL	14/09/12	09:44	09:57	00:13	X	133434	20 RD GRAV
04 926594	BF43YN	14/09/12	09:45	10:03	00:17	X	220939	20-70 DRAINAGE
04 926595	BP17TX	14/09/12	09:46	10:05	00:19	X	220939	20-70 DRAINAGE
04 926596	7933	14/09/12	10:01	10:09	00:07		132553	10MM AGG
04 926597	BB62YF	14/09/12	10:09	10:22	00:12	X	132826	DUST
04 926598	9415	14/09/12	10:10	10:25	00:15		133301	CAPPING MAT
04 926599	9415	14/09/12	10:12	10:31	00:18		133301	CAPPING MAT
04 926600	9415	14/09/12	10:12	10:34	00:21		133301	CAPPING MAT
04 926601	7359	14/09/12	10:42	10:51	00:08		133435	40 R/GRAVEL
04 926602	BM99ZH	14/09/12	10:54	11:05	00:10	X	132462	14MM DRAINAGE
04 926604	5816	14/09/12	11:09	11:22	00:13		132555	20MM AGG
04 926603	5816	14/09/12	11:09	11:21	00:12		132553	10MM AGG
04 926606	BJ98KQ	14/09/12	11:14	11:32	00:18	X	220939	20-70 DRAINAGE
04 926605	5813	14/09/12	11:15	11:28	00:12		132553	10MM AGG
04 926607	BF43YN	14/09/12	11:18	11:36	00:17	X	132826	DUST
04 926608	BP17TX	14/09/12	11:30	11:39	00:09	X	132826	DUST
04 926621	5827	14/09/12	11:46	13:24	01:38		133301	CAPPING MAT
04 926609	7359	14/09/12	11:58	12:23	00:25		133301	CAPPING MAT
04 926610	7359	14/09/12	11:58	12:25	00:26		133301	CAPPING MAT

Boral Quarries....PLANT: 04 DUNMORE

PRINTED: 05:35:43pm 14 Sep 2012 (YARD.TM)

YARD TIME REPORT

Plant	Docket..	Carter	Date	TIME IN	Time	YARD TIME	EXB	PROD NO	DESC
	Number..								
04	926611	7359	14/09/12	11:58	12:27	00:29		133301	CAPPING MAT
04	926612	BJ22CX	14/09/12	12:22	12:32	00:10	X	220939	20-70 DRAINAGE
04	926622	5885	14/09/12	12:22	13:28	01:05		133435	40 R/GRAVEL
04	926613	TRN021	14/09/12	12:30	12:42	00:11	X	132553	10MM AGG
04	926614	7684	14/09/12	12:33	12:48	00:15		132304	AGG 20MM ASP
04	926615	BC61EG	14/09/12	12:40	12:53	00:13	X	133434	20 RD GRAV
04	926618	9457	14/09/12	12:52	13:07	00:15		133301	CAPPING MAT
04	926616	7305	14/09/12	12:56	12:59	00:03		132555	20MM AGG
04	926620	9415	14/09/12	12:58	13:19	00:20		133435	40 R/GRAVEL
04	926617	9415	14/09/12	12:59	13:03	00:04		132553	10MM AGG
04	926623	BB62YF	14/09/12	13:25	13:37	00:11	X	132826	DUST
04	926624	9415	14/09/12	13:39	13:52	00:12		132553	10MM AGG
04	926625	5885	14/09/12	14:11	14:23	00:11		132304	AGG 20MM ASP
04	926630	5898	14/09/12	14:14	16:53	02:38		132300	AGG 10MM ASP
04	926626	9272	14/09/12	14:36	15:00	00:24		132300	AGG 10MM ASP
04	926629	9415	14/09/12	14:43	16:48	02:04		132304	AGG 20MM ASP
	926627	5823	14/09/12	15:20	15:30	00:10		132300	AGG 10MM ASP
04	926628	9551	14/09/12	15:21	15:43	00:22		132300	AGG 10MM ASP

04

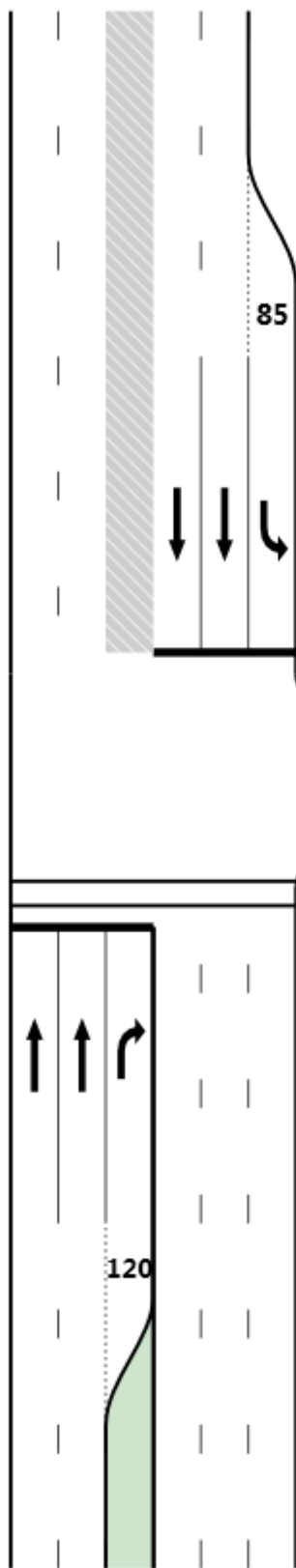
72 records listed.

Appendix C

Sidra results



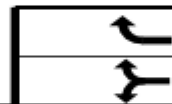
Princes Highway



85

120

Princes Highway



50

Creamery Road

PHASING SUMMARY

Site: AM Peak Existing - 2011

Princes Highway and Creamery Road

Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Phase times determined by the program

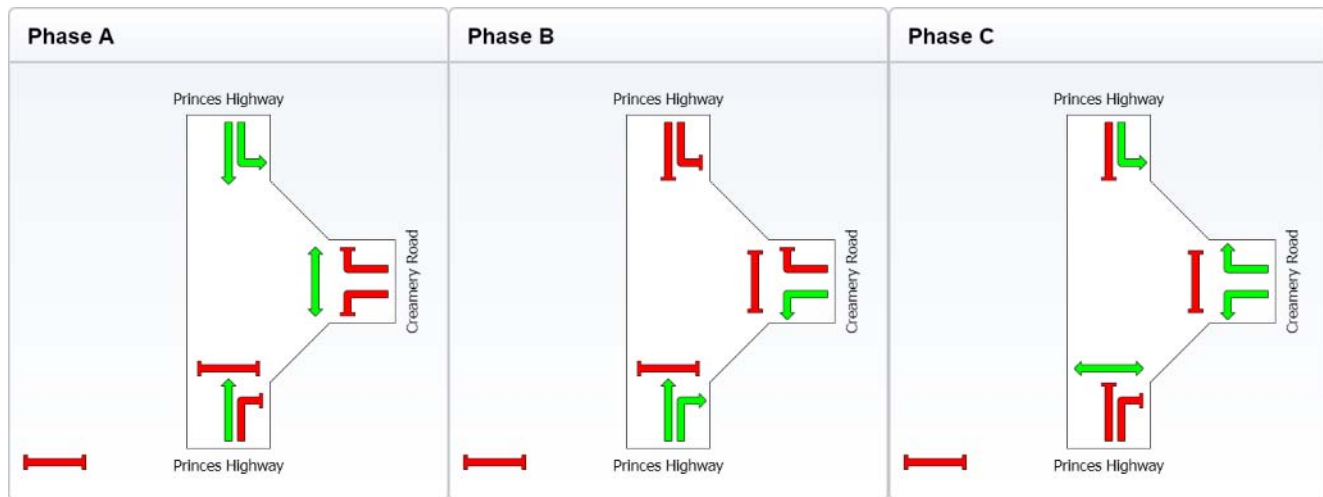
Sequence: Two-Phase

Input Sequence: A, B, C

Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	47	13	22
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	53	19	28
Phase Split	53 %	19 %	28 %



	Normal Movement		Permitted/Opposed
	Slip-Lane Movement		Opposed Slip-Lane
	Stopped Movement		Continuous Movement
	Turn On Red		Undetected Movement
			Phase Transition Applied

Processed: Friday, 7 September 2012 4:36:38 PM
SIDRA INTERSECTION 5.1.12.2089

Project: C:\Program Files\SIDRA RESULTS\Dunmore Quarry\Princes Highway and Creamery Road.sip
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SIDRA
INTERSECTION

PHASING SUMMARY

Site: PM Peak Existing - 2011

Princes Highway and Creamery Road

Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Phase times determined by the program

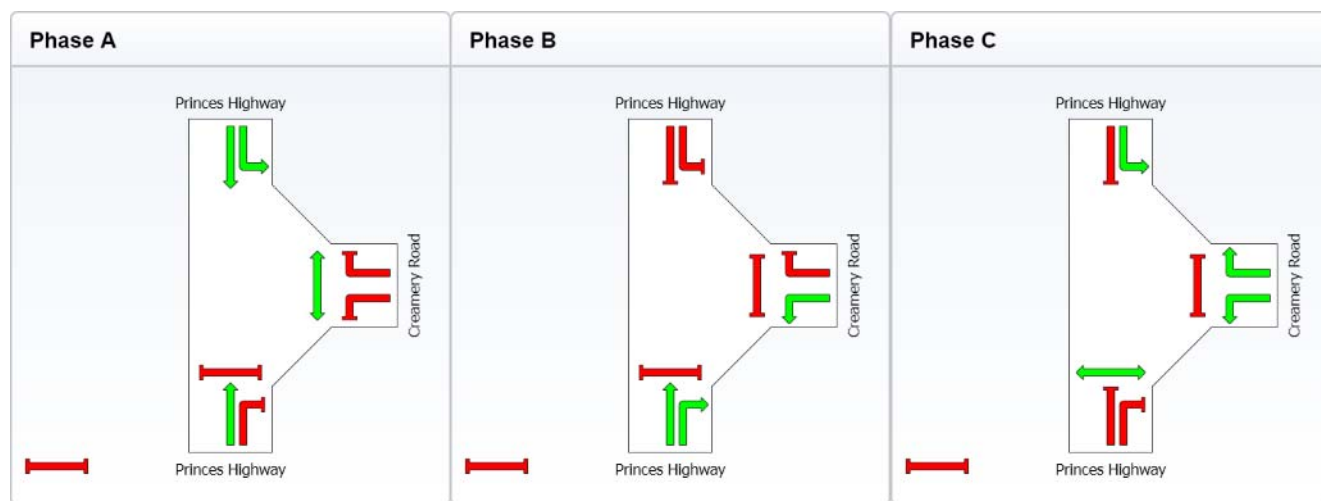
Sequence: Two-Phase

Input Sequence: A, B, C

Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	52	8	22
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	58	14	28
Phase Split	58 %	14 %	28 %



█ Normal Movement	█ Permitted/Opposed
█ Slip-Lane Movement	█ Opposed Slip-Lane
█ Stopped Movement	█ Continuous Movement
█ Turn On Red	█ Undetected Movement
	● Phase Transition Applied

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MOVEMENT SUMMARY

Site: AM Peak Existing - 2011

Princes Highway and Creamery Road

Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Princes Highway											
2	T	1938	4.1	0.773	12.5	LOS A	32.4	235.0	0.75	0.70	42.3
3	R	58	7.3	0.252	51.0	LOS D	2.6	19.5	0.94	0.75	24.1
Approach		1996	4.2	0.773	13.7	LOS A	32.4	235.0	0.76	0.70	41.4
East: Creamery Road											
4	L	81	10.4	0.710	45.0	LOS D	7.9	57.9	0.89	0.85	25.0
6	R	383	2.5	0.710	47.1	LOS D	13.4	95.8	0.96	0.86	24.3
Approach		464	3.9	0.710	46.7	LOS D	13.4	95.8	0.95	0.86	24.4
North: Princes Highway											
7	L	243	1.7	0.281	11.3	LOS A	3.3	23.8	0.31	0.71	44.6
8	T	1239	6.4	0.704	22.5	LOS B	23.9	176.1	0.85	0.77	35.3
Approach		1482	5.6	0.704	20.7	LOS B	23.9	176.1	0.76	0.76	36.5
All Vehicles		3942	4.7	0.773	20.2	LOS B	32.4	235.0	0.78	0.74	36.6

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	27	44.2	LOS E	0.1	0.1	0.94	0.94
P3	Across E approach	27	18.0	LOS B	0.0	0.0	0.60	0.60
All Pedestrians		54	31.1	LOS D			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: PM Peak Existing - 2011

Princes Highway and Creamery Road

Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Princes Highway											
2	T	1326	4.8	0.531	9.4	LOS A	16.7	121.8	0.57	0.51	45.6
3	R	140	1.5	0.952	78.5	LOS F	8.7	61.8	1.00	1.10	18.3
Approach		1466	4.5	0.952	16.0	LOS B	16.7	121.8	0.61	0.57	40.1
East: Creamery Road											
4	L	129	0.0	0.671	40.7	LOS C	7.6	53.2	0.86	0.82	26.2
6	R	327	0.6	0.671	45.7	LOS D	12.5	88.0	0.95	0.84	24.7
Approach		457	0.5	0.671	44.3	LOS D	12.5	88.0	0.93	0.83	25.1
North: Princes Highway											
7	L	461	0.0	0.471	10.4	LOS A	5.9	41.0	0.30	0.72	45.4
8	T	1991	3.1	1.001	76.6	LOS F	77.7	558.2	1.00	1.35	18.7
Approach		2452	2.5	1.001	64.2	LOS E	77.7	558.2	0.87	1.23	21.0
All Vehicles		4375	3.0	1.001	46.0	LOS D	77.7	558.2	0.79	0.97	25.5

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	27	44.2	LOS E	0.1	0.1	0.94	0.94
P3	Across E approach	27	15.1	LOS B	0.0	0.0	0.55	0.55
All Pedestrians		54	29.7	LOS C			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Friday, 7 September 2012 4:35:27 PM

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SIDRA
INTERSECTION

MOVEMENT SUMMARY

Site: AM Peak with Proposal -
2011

Princes Highway and Creamery Road

Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Princes Highway											
2	T	1941	4.3	0.775	12.6	LOS A	32.6	236.3	0.76	0.70	42.3
3	R	58	7.3	0.252	51.0	LOS D	2.6	19.5	0.94	0.75	24.1
Approach		1999	4.4	0.775	13.7	LOS A	32.6	236.3	0.76	0.70	41.4
East: Creamery Road											
4	L	81	10.4	0.710	45.0	LOS D	7.9	57.9	0.89	0.85	25.0
6	R	383	2.5	0.710	47.1	LOS D	13.4	95.8	0.96	0.86	24.3
Approach		464	3.9	0.710	46.7	LOS D	13.4	95.8	0.95	0.86	24.4
North: Princes Highway											
7	L	243	1.7	0.281	11.3	LOS A	3.3	23.8	0.31	0.71	44.6
8	T	1242	6.6	0.707	22.6	LOS B	24.0	177.2	0.85	0.77	35.2
Approach		1485	5.8	0.707	20.7	LOS B	24.0	177.2	0.77	0.76	36.4
All Vehicles		3948	4.9	0.775	20.2	LOS B	32.6	236.3	0.79	0.74	36.5

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	27	44.2	LOS E	0.1	0.1	0.94	0.94
P3	Across E approach	27	18.0	LOS B	0.0	0.0	0.60	0.60
All Pedestrians		54	31.1	LOS D			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PM Peak with Proposal -
2011

Princes Highway and Creamery Road

Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Princes Highway											
2	T	1329	5.1	0.534	9.5	LOS A	16.8	122.6	0.57	0.51	45.6
3	R	140	1.5	0.952	78.5	LOS F	8.7	61.8	1.00	1.10	18.3
Approach		1469	4.7	0.952	16.0	LOS B	16.8	122.6	0.61	0.57	40.1
East: Creamery Road											
4	L	129	0.0	0.671	40.7	LOS C	7.6	53.2	0.86	0.82	26.2
6	R	327	0.6	0.671	45.7	LOS D	12.5	88.0	0.95	0.84	24.7
Approach		457	0.5	0.671	44.3	LOS D	12.5	88.0	0.93	0.83	25.1
North: Princes Highway											
7	L	461	0.0	0.471	10.4	LOS A	5.9	41.0	0.30	0.72	45.4
8	T	1994	3.3	1.004	78.2	LOS F	78.5	564.7	1.00	1.36	18.5
Approach		2455	2.7	1.004	65.5	LOS E	78.5	564.7	0.87	1.24	20.7
All Vehicles		4381	3.1	1.004	46.7	LOS D	78.5	564.7	0.79	0.97	25.3

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	27	44.2	LOS E	0.1	0.1	0.94	0.94
P3	Across E approach	27	15.1	LOS B	0.0	0.0	0.55	0.55
All Pedestrians		54	29.7	LOS C			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: AM Peak with Dunmore and
Bass Point Quarry Traffic (Short
Term)

Princes Highway and Creamery Road
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Princes Highway											
2	T	1955	5.0	0.784	12.7	LOS A	33.2	242.3	0.77	0.71	42.1
3	R	58	7.3	0.273	52.2	LOS D	2.7	19.8	0.95	0.75	23.8
Approach		2013	5.0	0.784	13.9	LOS A	33.2	242.3	0.77	0.71	41.2
East: Creamery Road											
4	L	81	10.4	0.710	45.0	LOS D	7.9	57.9	0.89	0.85	25.0
6	R	383	2.5	0.710	47.1	LOS D	13.4	95.8	0.96	0.86	24.3
Approach		464	3.9	0.710	46.7	LOS D	13.4	95.8	0.95	0.86	24.4
North: Princes Highway											
7	L	243	1.7	0.275	11.0	LOS A	3.2	22.8	0.30	0.71	44.9
8	T	1256	7.6	0.704	21.9	LOS B	24.0	178.8	0.85	0.76	35.6
Approach		1499	6.7	0.704	20.1	LOS B	24.0	178.8	0.76	0.75	36.8
All Vehicles		3976	5.5	0.784	20.1	LOS B	33.2	242.3	0.79	0.74	36.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	27	44.2	LOS E	0.1	0.1	0.94	0.94
P3	Across E approach	27	17.4	LOS B	0.0	0.0	0.59	0.59
All Pedestrians		54	30.8	LOS D			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PM Peak with Dunmore and
Bass Point Quarry Traffic (Short
Term)

Princes Highway and Creamery Road
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Princes Highway											
2	T	1337	5.6	0.538	9.5	LOS A	17.0	124.4	0.57	0.52	45.6
3	R	140	1.5	0.952	78.5	LOS F	8.7	61.8	1.00	1.10	18.3
Approach		1477	5.2	0.952	16.1	LOS B	17.0	124.4	0.61	0.57	40.1
East: Creamery Road											
4	L	129	0.0	0.671	40.7	LOS C	7.6	53.2	0.86	0.82	26.2
6	R	327	0.6	0.671	45.7	LOS D	12.5	88.0	0.95	0.84	24.7
Approach		457	0.5	0.671	44.3	LOS D	12.5	88.0	0.93	0.83	25.1
North: Princes Highway											
7	L	461	0.0	0.471	10.4	LOS A	5.9	41.0	0.30	0.72	45.4
8	T	2001	3.6	1.010	81.9	LOS F	80.3	579.9	1.00	1.39	17.9
Approach		2462	2.9	1.010	68.5	LOS E	80.3	579.9	0.87	1.26	20.1
All Vehicles		4396	3.4	1.010	48.4	LOS D	80.3	579.9	0.79	0.99	24.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	27	44.2	LOS E	0.1	0.1	0.94	0.94
P3	Across E approach	27	15.1	LOS B	0.0	0.0	0.55	0.55
All Pedestrians		54	29.7	LOS C			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: AM Peak with Dunmore and
Bass Point Quarry Traffic (Long
Term)

Princes Highway and Creamery Road
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Princes Highway											
2	T	1961	5.3	0.788	12.8	LOS A	33.5	245.0	0.77	0.72	42.0
3	R	58	7.3	0.298	53.5	LOS D	2.7	20.2	0.96	0.75	23.5
Approach		2019	5.3	0.788	14.0	LOS A	33.5	245.0	0.78	0.72	41.1
East: Creamery Road											
4	L	81	10.4	0.710	45.0	LOS D	7.9	57.9	0.89	0.85	25.0
6	R	383	2.5	0.710	47.1	LOS D	13.4	95.8	0.96	0.86	24.3
Approach		464	3.9	0.710	46.7	LOS D	13.4	95.8	0.95	0.86	24.4
North: Princes Highway											
7	L	243	1.7	0.269	10.7	LOS A	3.1	21.8	0.28	0.70	45.2
8	T	1262	8.1	0.695	21.1	LOS B	23.7	177.5	0.83	0.75	36.1
Approach		1505	7.1	0.695	19.4	LOS B	23.7	177.5	0.74	0.74	37.3
All Vehicles		3988	5.8	0.788	19.9	LOS B	33.5	245.0	0.78	0.74	36.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	27	44.2	LOS E	0.1	0.1	0.94	0.94
P3	Across E approach	27	16.8	LOS B	0.0	0.0	0.58	0.58
All Pedestrians		54	30.5	LOS D			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PM Peak with Dunmore and
Bass Point Quarry Traffic (Long
Term)

Princes Highway and Creamery Road
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Princes Highway											
2	T	1339	5.7	0.540	9.5	LOS A	17.0	124.9	0.57	0.52	45.5
3	R	140	1.5	0.952	78.5	LOS F	8.7	61.8	1.00	1.10	18.3
Approach		1479	5.3	0.952	16.1	LOS B	17.0	124.9	0.61	0.57	40.1
East: Creamery Road											
4	L	129	0.0	0.671	40.7	LOS C	7.6	53.2	0.86	0.82	26.2
6	R	327	0.6	0.671	45.7	LOS D	12.5	88.0	0.95	0.84	24.7
Approach		457	0.5	0.671	44.3	LOS D	12.5	88.0	0.93	0.83	25.1
North: Princes Highway											
7	L	461	0.0	0.471	10.4	LOS A	5.9	41.0	0.30	0.72	45.4
8	T	2003	3.7	1.012	83.0	LOS F	80.9	584.3	1.00	1.40	17.8
Approach		2464	3.0	1.012	69.4	LOS E	80.9	584.3	0.87	1.27	19.9
All Vehicles		4400	3.5	1.012	48.9	LOS D	80.9	584.3	0.79	0.99	24.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	27	44.2	LOS E	0.1	0.1	0.94	0.94
P3	Across E approach	27	15.1	LOS B	0.0	0.0	0.55	0.55
All Pedestrians		54	29.7	LOS C			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Appendix C - Noise Impact Assessment



Noise Impact Assessment

Dunmore Hard Rock Quarry | Modification 6

Prepared for Boral Resources (NSW) Pty Limited | 17 October 2012

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Noise Impact Assessment

Final Draft

Report J11024RP3 | Prepared for Boral Resources (NSW) Pty Limited | 17 October 2012

Prepared by **Oliver Muller**

Approved by **Najah Ishac**

Position Associate

Position Director

Signature



Signature



Date 17/10/2012

Date 17/10/2012

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

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Document Control

Version	Date	Prepared by	Reviewed by
1	24/08/11	Oliver Muller	Najah Ishac
2	17/10/12	Oliver Muller	Najah Ishac



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1 Introduction

EMGA Mitchell McLennan Pty Limited (EMM) has been commissioned by Boral Resources (NSW) Pty Limited to undertake a noise impact assessment of the proposed modification to Development Consent 470-11-2003 for Dunmore Hard Rock Quarry, located at 38 Tabbita Road, Shellharbour NSW.

The impact assessment quantifies noise emissions associated with the proposed increase in road transport of material from 1 million tonnes per annum (Mtpa) to 1.5 Mtpa and an extension to the approved extraction area to allow construction of the southern access area. It should be noted that the current application is not to increase production from the Quarry which is currently 2.5Mtpa.

This assessment has therefore assessed potential traffic noise emissions associated with increased vehicle movements along with potential noise emissions (including cumulative) associated with blasting and operations in the southern access area.

The assessment is conducted with reference to the following documents:

- NSW Office of Environment and Heritage (OEH) Environment Protection Agency - Industrial Noise Policy, January 2000 (INP);
- NSW OEH - Road Noise Policy, 2011 (RNP);
- Development Consent 470-11-2003;
- Boral Resources (NSW) Pty Ltd – Dunmore Quarry Blast Management Plan 2008;
- R.W Corkery & Co Pty Ltd – Dunmore Hard Rock Quarry Extension Statement of Environmental Effects, Section 6: Noise and Vibration, 2008;
- Arup Pty Ltd - Dunmore Quarry Development Consent Modification 6 – Traffic Impact Assessment, 2011;and
- R.W Corkery & Co Pty Ltd – Dunmore Hard Rock Quarry Extension Statement of Environmental Effects, Section 6: Noise and Vibration, 2008.

1.1 Glossary of acoustic terms

A number of technical terms are required for the discussion of noise and vibration. These are explained in Table 1.1.

Table 1.1 **Glossary of acoustic terms**

Term	Description
ABL	Assessment Background Level (ABL) is defined in the Industrial Noise Policy (INP) as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L_{90} statistical noise levels.
dB(A)	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
L_1	The noise level exceeded for 1 % of a measurement time period.
L_{10}	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
L_{90}	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
L_{eq}	It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period. The $L_{eq,15min}$ descriptor refers to an L_{eq} noise level measured over a 15 minute period.
L_{max}	The maximum root mean squared sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single value background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
SI	SI ("Still Isothermal") refers to calm weather conditions (ie. The absence of any wind or temperature gradients).
Sound Power Level	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental property of the source and is independent of the surrounding environment.
Temperature Inversion	A positive temperature gradient. A meteorological condition where atmospheric temperature increases with altitude.
($\sigma\theta$) sigma-theta	The standard deviation of horizontal wind fluctuation.

It is useful also to have some appreciation of the scale of decibels, the unit of noise measurement. The following gives some practical indication as to what an average person perceives about changes in noise levels:

- differences of less than approximately 2 dB are imperceptible in general, (ie most people would find it difficult to discern which is the louder of two noise sources having levels within 2 dB of each other); and
- a difference in noise levels of around 10 dB appears as either doubling or halving of loudness.

2 Project description

Dunmore Hard Rock Quarry, owned and operated by Boral, is located in Shellharbour local government area, approximately 12 km north-west of Kiama and 110 km south of Sydney. The Quarry is located at Boral's Dunmore site adjacent to the Princes Highway which includes other Boral operations - Dunmore Soil and Sand Quarry, and Dunmore Concrete Batching Plant. Surrounding residential suburbs within 10 km of the site are Shell Cove, Minnamurra and Kiama Downs.

2.1 Current operations

Hard rock latite has been extracted from the Quarry for 90 years. The Quarry has an extensive resource and, due to its ability to rail product into the Sydney metropolitan market, is a key asset for Boral. Boral has approval under Development Consent 470-11-2003 to produce 2.5Mtpa of Quarry products which is between 5,000 and 12,000 tonnes of rock extracted per day.

The approved operating and transport hours for the Quarry are:

- extraction and processing activities - 6:00 am to 10:00 pm, Monday to Saturday, with drilling activities during the evening period (ie between 6.00 pm and 10.00 pm) confined to the second or third bench levels;
- blasting - 9.00 am and 5.00 pm, Monday to Saturday;
- product transfer to stockpiles - 6:00 am to Midnight, Monday to Saturday;
- maintenance - 24 hours Monday to Sunday;
- distribution of material by road - 24 hours, Monday to Saturday, with distribution on Sundays allowed between 8 am and 6 pm for 15 Sundays per year; and
- distribution of material by rail - 24 hours, Monday to Sunday.

The Dunmore Quarry currently has approval to produce and transport up to 2.5 Mtpa of Quarry products by road and rail with road transport limited to 1 Mtpa. Currently, the remaining 1.5 Mtpa of Quarry products are required to be transported by rail. Boral operates rail terminals at Enfield and St Peters with Enfield capable of receiving up to 0.5 Mtpa while St Peters has capacity to receive up to 1 Mtpa.

2.2 Proposed modification

It is proposed to make the following modifications to 470-11-2003 (Modification 6) to:

- increase road transport of material from 1 Mtpa to 1.5 Mtpa; and
- extend the approved extraction boundary to the south to allow lateral extraction of the lower latite flow (referred to as the southern access area - see Figure 2.1).

Boral is seeking a modification to increase the road transport limit at Dunmore Quarry from 1 Mtpa to 1.5 Mtpa to meet demand in peak market conditions in Sydney and the Illawarra/Southern Highlands regions. The additional truck deliveries will continue, as per current practice, to travel via the Princes Highway. However, the distribution of product will shift due with 60% dispatched north and 40%

dispatched south. This shift in distribution is in response to the changing local market and an increased demand in the Shoalhaven region, south of the quarry.

An enlarged truck fleet would be needed to transport the additional product. This would result in approximately five additional truck drivers being employed by Boral.

To allow lateral access to the lower latite flow in the original Dunmore Quarry, an extension to the approved extraction area is required. The southern access area is approximately 2 ha in size and is located south of the main stockpiling area and north of the Quarry's processing plant. Blasting will be required within this area to construct the lateral access.



3 Project criteria

3.1 Receivers

Local receivers are generally to the west and to the south-east of the Quarry. The receiver locations and associated MGA coordinates that have been assessed in the report are provided in Table 3.1, while Figure 2.1 presents these locations graphically.

Table 3.1 Assessed receivers and MGA coordinates

Receiver Location	MGA coordinates	
	Easting	Northing
Location A - McParland Residence	298727	6168170
Location J -Creagan Residence	301501	6167650
Location K - Stocker Residence	301376	6167354
Location O - Dunmore Lakes Estate	301486	6166584

3.2 Operational noise assessment criteria

The receiver locations for the Quarry are specified in Development Consent (DA 470-11-2003) along with their relevant Noise Impact Assessment Criteria, as reproduced in Table 3.2.

Table 3.2 Operational noise assessment criteria

Receiver Locations	L _{eq} (15-minute)				L ₁ (1-minute)	
	Day	Evening	Night	Shoulder	Night	Shoulder
Location A - McParland Residence	35	35	35	35	45	45
Location J - Creagan Residence	Negotiated Agreement in Place					
Location K - Stocker Residence	49	44	38	47	48	55
Location O - Dunmore Lakes Estate	49	44	38	47	48	55

Noise criteria for the receiver locations are also included in the Quarry's Environment Protection Licence (EPL) No. 77. These are consistent with the criteria presented in Table 3.2.

3.3 Road traffic noise

The potential impacts of traffic noise resulting from both construction and operational related traffic on public roads are assessed against criteria defined in the RNP. The application of appropriate criteria for this project has followed the two step process identifying the 'assessment' and 'relative increase' criteria as outlined in Section 3.4.1 of the RNP.

Site related traffic will use routes that are currently relatively heavily trafficked and part of the broader road network.

3.3.1 Assessment criteria

Section 2.2.2 of the RNP states that some industries are often, by necessity, in locations that are not served by arterial roads. Heavy vehicles must be able to get to their bases of operation, and this may mean travelling on local roads. Where local authorities identify a 'principal haulage route', the noise criteria for the route should match those for arterial/sub arterial roads, recognising the intent that they carry a different level and mix of traffic to local roads. Thus, although Tabbita Road can currently be classified as a local road, it can be identified as a 'principal haulage route'. The relevant project assessment noise criteria has been set as 60 dB(A) $L_{eq,15hr}$ (daytime) and 55 dB(A) $L_{eq,9hr}$ (night time) adopting the 'principal haulage route' methodology.

3.3.2 Relative increase criteria

In addition to meeting the assessment criterion, any increase in total traffic noise at receivers due to a proposed project or traffic generating development must be considered. Residences experiencing increases in total traffic noise levels above those presented in Table 3.3 should be considered for mitigation.

Table 3.3 presents the relative increase criteria for residential land uses, reproduced from Table 6 of the RNP.

Table 3.3 Relative increase criteria for residential land uses

Road Category	Type of project/development	Total traffic noise level increase – dB(A)	
		Day (07:00-22:00)	Night (22:00 – 07:00)
Freeway/arterial/sub-arterial roads and transitways	New road corridor/redevelopment of existing road/land use development with the potential to generate additional traffic on existing road.	Existing traffic $L_{eq,15hr}$ + 12 dB (external)	Existing traffic $L_{eq,9hr}$ + 12 dB (external)

The environment at receivers in close proximity to the Princes Highway was previously identified as being dominated by road traffic noise (Corkery 2003). However, the contribution from road traffic noise has not been identified; hence, a review of the raw data (ie unattended noise logger charts) for Location J has been undertaken in this assessment.

Location J is considered a representative worst case receiver in the vicinity of the site and the Princes Highway that could potentially be most affected by the Quarry traffic. This location is closer to the Princes Highway than to Tabbita Road and, therefore, the calculation of traffic noise impact is from the Princes Highway only.

Table 3.4 provides the project relative increase criteria for this project based on historic noise logging data at Location J, based on approximated ambient L_{eq} noise levels from logger charts (Corkery 2003).

Table 3.4 **Relative increase criteria**

Period	Ambient (L_{eq}) noise level, dB(A)	Relative increase adjustment, dB(A)	Project relative increase criteria, dB(A)
Day	55	Day $L_{eq, 15hr}$ +12	67
Night	50	Night $L_{eq, 9hr}$ +12	62

It should be noted that the above noise levels have been adopted for all receivers in the vicinity of the Quarry where typical offset distances to the Princes Highway are in the order of 150m; hence, the lower ambient noise levels adopted during the night period.

3.3.3 Sleep disturbance

As discussed in Section 2.1, blasting does not occur after 5 pm and extraction only occurs on the second and third bench levels after 6 pm. Therefore, extraction within the southern access area would cease after 6 pm and an assessment of sleep disturbance, therefore, does not require assessment.

3.3.4 Road traffic noise summary criteria

A summary for the two RNP criteria that the proposed modification should meet are shown in Table 3.5. These apply to receiver Location J and others at similar offset distances from the Princes Highway as per the RNP, the more stringent of the two criteria, RNP assessment criteria in this instance, should be adopted for the assessment.

Table 3.5 **Project road noise criteria**

Period	RNP assessment criteria	Project relative increase criteria, dB(A)
Day	60 L_{eq} , 15 hours or 'no build option' +2 dB	67 L_{eq} , 15 hrs
Night	55 L_{eq} , 9 hours or 'no build option' +2 dB	62 L_{eq} , 9 hrs

Additionally, the RNP states that *'for existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use development, any increase in total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.*

3.4 Blasting limits

Blasting is expected to occur within the southern access area. Development Consent 470-11-2003 and EPL No. 77 provide the airblast overpressure and ground vibration criteria for the Quarry which are reproduced in Table 3.6.

Table 3.6 Airblast overpressure and ground vibration limits

Airblast overpressure	
Airblast overpressure level dB(L _{inpeak})	Allowable exceedance
115	5% of the total number of blasts over a period of 12 months
120	0%
Ground vibration	
Peak particle velocity (mm/s)	Allowable exceedance
5	5% of the total number of blasts over a period of 12 months
10	0%

4 Noise assessment methodology and results

4.1 Plant and equipment

Plant and equipment proposed to be used in the southern access area were sourced from historic noise impact assessments (Corkery 2003 and Corkery 2008).

A summary of plant and their associated sound power levels, to be used in the southern access area only, is presented in Table 4.1.

Table 4.1 Equipment and associated sound power levels

Activity/equipment	L _{eq} Sound power level, dB(A).
1 x Front End Loader (CAT 988)	113
2 x Haul Trucks (Cat 773)	118
1 x Water Cart (Cat 773)	118
1 x Dozer	112
1 x Hydraulic Rock Drill	118

4.2 Operational noise

Operational noise emissions from the proposed southern access area have been modelled in this assessment to quantify the potential impacts against existing noise limits. Additionally, the results of predicted noise levels from the southern extraction area have been compared to existing site noise emissions including from the stationary processing plant to ascertain the potential impacts of total emissions from site when both activities occur simultaneously.

It should be noted that processing and extraction on this site cease at 10:00 pm, therefore this assessment has only assessed day and evening periods.

4.2.1 Calculation procedures - outputs

The prediction of noise from the Quarry was undertaken using the Environmental Noise Model (ENM) prediction software. The ENM predicts total noise levels at residences from the concurrent operation of multiple noise sources. The model included consideration of factors such as the lateral and vertical location of plant, source-to-receiver distances, ground effects, atmospheric absorption, topography of the mine and surrounding area and meteorological conditions.

The noise model predicts L_{eq} noise levels, and it should be noted that this assessment has assumed that all plant and equipment operate simultaneously. In practice, such an operating scenario would be unlikely to occur and the results of this assessment should therefore be considered conservatively high. Where relevant, modifying factors for tonality, impulsiveness and fluctuations in accordance with Section 4.2 of the INP have been applied to calculations.

4.2.2 Assessed meteorological parameters

An analysis of prevailing meteorological conditions on site in accordance with the INP has been previously conducted (Corkery 2003). For consistency this assessment has adopted the same meteorological parameters, although this assessment has not verified the raw data. The two meteorological scenarios include:

- calm: zero wind speed and nil temperature gradient; and
- prevailing: the west south west (WSW) wind scenario consisted of modelling a 3 m/s wind speed (from the bearing 247.5°).

i Southern access area noise emissions

Proposed southern access area operations have been modelled and a summary of predicted noise levels at assessed receivers adjacent to the site are provided in Table 4.2, for both calm and prevailing weather conditions.

Table 4.2 Noise modelling summary – southern access area only

Location	Criteria dB(A),L _{eq}		Southern resource noise emission L _{eq} , dB(A)
	Day	Evening	
Calm			
Location A - McParland Residence	35	35	25
Location J - Creagan Residence	N/A	N/A	41
Location K - Stocker Residence	49	44	39
Location O - Dunmore Lakes Estate	49	44	31
Prevailing (WSW 3 m/s wind)			
Location A - McParland Residence	35	35	22
Location J - Creagan Residence	N/A	N/A	48
Location K - Stocker Residence	49	44	43
Location O - Dunmore Lakes Estate	49	44	38

Noise modelling identified that noise levels for the southern access area will meet the day and evening criteria at all receivers during calm and prevailing winds.

ii Cumulative site noise levels

The predicted noise levels from operations within the southern access area have been compared to overall existing site noise. The existing site noise has been sourced from the most recent noise assessment for site (Corkery 2008). A comparison of noise emissions for the existing operations and the proposed southern access area during calm meteorological conditions is presented in Table 4.3 and during prevailing meteorological conditions (WSW 3 m/s wind) in Table 4.4.

Table 4.3 Noise modelling summary – existing operations and southern access area, calm meteorological conditions

Location	Existing operations ¹ dB(A), L _{eq}	Southern resource dB(A), L _{eq}	Cumulative dB(A), L _{eq}	L _{eq} criteria, dB(A)	
				Day	Evening
Location A - McParland Residence	26	25	29	35	35
Location J - Creagan Residence	30	41	41	N/A	N/A
Location K - Stocker Residence	36	39	41	49	44
Location O - Dunmore Lakes Estate	26	31	32	49	44

Notes: 1. an adjustment of -3 dB has been made to this level to account for existing fleet being utilised in the southern extraction area.

Table 4.4 Noise modelling summary – existing operations and southern access area, prevailing meteorological conditions

Location	Existing operations ¹ dB(A), L _{eq}	Southern resource dB(A), L _{eq}	Cumulative dB(A), L _{eq}	L _{eq} criteria, dB(A)	
				Day	Evening
Location A - McParland Residence	23	22	26	35	35
Location J - Creagan Residence	39	48	49	N/A	N/A
Location K - Stocker Residence	41	43	45	49	44
Location O - Dunmore Lakes	29	38	39	49	44

Notes: 1. an adjustment of -3 dB has been made to this level to account for existing fleet being utilised in the southern extraction area.

Noise modelling identified that cumulative emissions from the Quarry including the southern access area will meet the day and evening criteria at all receivers during calm meteorological conditions. For prevailing meteorological conditions, noise emissions are expected to comply at all receivers with the exception of Location K, where a 1 dB exceedance is identified for the evening period. It should be noted that this assumes a worse case noise emission from the Quarry with all plant (including drilling) operating simultaneously. Additionally, a 1 dB exceedance will not be discernible in practice as discussed in Section 1.1.

4.3 Road traffic noise

The US Environment Protection Agency's method was used to predict the L_{eq} noise levels from traffic travelling along Princes Highway at adjacent residences. This method is an internationally accepted theoretical traffic noise prediction model which takes into account the vehicle noise levels (light and heavy), receiver offset distance, passby duration, vehicle speed, ground absorption (based on the ratio of soft ground and average height of propagation), number of vehicle movements, receiver height, truck exhaust height and the height and location of any intervening barriers.

To predict road traffic noise associated with the site and potential increases relating to increased haulage from the Quarry, it was necessary to take into account the volume of vehicles predicted to travel to and from the site. Maximum traffic movements to and from site were assessed by ARUP (2011) to be 55 road trucks daily or five movements per hour and subsequently adopted in this assessment for both day and night periods.

For simplicity, this assessment has conservatively assumed that all site traffic travel along the Princes Highway in one direction, to and from site. Results of the traffic noise assessment are presented in Table 4.5.

Table 4.5 Project road traffic noise criteria levels at 150 m from Princes Highway

Period	Assessment criteria	Current calculated site traffic noise	Calculated additional site traffic noise (proposed)	Existing + future site combined	Existing Princes Hwy traffic	Total	Change
Leq period, dB(A)							
Day	60	40.3	38.3	42.4	55	55.2	0.2
Night	55	42.3	40.3	44.9	50	51.1	1.1

These results show that the predicted traffic noise from existing Quarry trucks plus additional vehicle movements from increased haulage would remain below the relevant RNP criteria at the nearest receivers to the main transport route in the vicinity of the site. Additionally, the increase in the existing Quarry contribution to road traffic noise is less than 2 dB to overall current Princes Highway emissions which achieves the RNP requirement discussed in Section 3.3.4.

4.4 Blasting

Boral has in place a Blast Management Plan to minimise blasting impacts on surrounding residences and to continuously improve blasts designs which is actively managed by the proponent. Hence, corresponding airblast overpressure and ground vibration can be controlled as demonstrated by ongoing monitoring results (Boral 2008). The blasts undertaken within the proposed southern access area will be similarly controlled.

Blasting that will occur within the southern access area is a significant distance (>500m) from where the most recent and historic blasting has occurred. Therefore, blast overpressure and vibration predictions for this area have been derived using the formula given in the *AS2187-2: Explosives – Storage and use Part 2 : Use of explosives, 2006* and ICI Explosives Blasting Guide applicable to blasting in hard rock. It should be noted that this formula has been shown to be conservative in calculating overpressure and vibration.

The relevant formulae are:

$$PVS = 500 (R/Q^{0.5})^{-1.6}$$

$$dB = 164.2 - 24(\log^{10} R - 0.33 \log^{10} Q)$$

Where,

$$PVS = \text{Peak Vector Sum ground vibration level (mm/s)}$$

$$dB = \text{Peak airblast level (dB Linear)}$$

$$R = \text{Distance between charge and receiver (m)}$$

$$Q = \text{Charge mass per delay (kg)}$$

A review of Dunmore Quarry's historic blast data indicates an average Maximum Instantaneous Charge (MIC) of 100 kg has been used and therefore adopted in this assessment. The near and far offset distances from the proposed southern access area to nearest receivers (Locations A and K) were used. Calculated blast overpressure and vibration levels are summarised in Table 4.6.

Table 4.6 **Derived blast overpressure and vibration levels for southern access area**

Location	Approximate distance from blast (m)	Derived overpressure (dB(L)peak)	Derived vibration PPV (mm/s)	MIC (kg)
Location A – McParland Residence	1800	101.9	0.12	100
Location K – Stocker Residence	900	108.6	0.34	100
<i>Criteria</i>		<i>115</i>	<i>5</i>	

The blast overpressure and vibration levels calculated using the above formulae are generally consistent with, albeit more conservative than, historic monitoring and previous assessments. The predicted levels for overpressure and vibration are below the relevant criteria at all receivers and satisfy Condition 17 of Development Consent 470-11-2003.

5 Summary of findings and conclusion

EMM has completed a noise and vibration impact assessment to quantify potential impacts associated with increased traffic movements associated with the proposed increase in road transport of material from 1 Mtpa to 1.5 Mtpa and the proposed southern access area.

Results of the noise modelling identified that the proposed activities in the southern access area alone will be below relevant noise criteria for all assessed receivers. Additionally, the cumulative noise emissions from worst case existing operations and from activities in the southern access area is expected to meet relevant criteria at all but one receiver (Location K – Stocker) where emissions during prevailing meteorological conditions result in a marginal and indiscernible 1 dB(A) exceedance.

Traffic noise associated with the increase in road transport is expected to be marginal (<2 dB increase) and below the relevant criteria.

The blast overpressure and vibration levels from blasting within the proposed southern access area will meet the relevant criteria at all receivers thereby satisfying Condition 17 of Development Consent 470-11-2003.

Appendix A

Sound power levels

Table A-1 **L_{eq}, dB(A) sound power level spectrum for ENM**

Noise Source	Linear (Z) Frequency (Hz)								Total
	63	125	250	500	1000	2000	4000	8000	dB(A)
Front End Loader (CAT 988)	104	107	110	108	107	107	101	91	113
Haul Trucks (Cat 773)	111	118	114	118	111	111	104	92	118
Water Cart (Cat 773)	111	118	114	118	111	111	104	92	118
Dozer	111	105	108	109	107	105	98	93	112
Hydraulic Rock Drill	117	106	101	107	109	111	113	110	118

Appendix D - Threatened Species Habitat Assessment Table



Table D.1 **Habitat assessment for threatened species recorded within 5 km of the study area**

Flora species name	National status (EPBC Act)	NSW status (TSC Act)	Habitat requirements	Likelihood of occurrence at the site and requirements for further assessment
Barking owl <i>Ninox connivens</i>	-	V	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. Is flexible in its habitat use and hunting can extend into closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile soils. The species roosts in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. They preferentially hunt small arboreal mammals such as squirrel gliders and ringtail possums, but when loss of tree hollows decreases these prey populations, it becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch (OEH 2011).	No suitable roosting habitat occurs. The lack of trees also reduces the potential for prey items to occur. It is therefore considered unlikely to occur and no further assessment is required.
Black bittern <i>Ixobrychus flavicollis</i>	V	-	In NSW, records of the species are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland. This species inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves. It feeds on frogs, reptiles, fish and macroinvertebrates, including snails, dragonflies, shrimps and crayfish. Most feeding is at dusk and night time (Marchant and Higgins 1990).	Suitable shelter and foraging habitat is not present. No further assessment is required.
Eastern bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	V	-	Eastern bent-wing bats occur along the east and north-west coasts of Australia (Churchill 2008). Caves are the primary roosting habitat, but they also use derelict mines, storm-water tunnels, buildings and other man-made structures. They form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young (Dwyer 1995). Hunt in forested areas, catching moths and other flying insects above the tree tops (Churchill 2008).	Very limited potential foraging habitat is present. However, surrounding areas provide more suitable forested habitat and therefore no further assessment is required.

Table D.1 **Habitat assessment for threatened species recorded within 5 km of the study area (Cont'd)**

Flora species name	National status (EPBC Act)	NSW status (TSC Act)	Habitat requirements	Likelihood of occurrence at the site and requirements for further assessment
Eastern false pipistrelle <i>Falsistrellus tasmaniensis</i>	V	-	The eastern false pipistrelle typically roosts in hollow-bearing trees, but it has also been found roosting under bark and in buildings. Within the study area this species has been recorded in Illawarra Lowlands Grassy Woodland (DECCW 2011).	No suitable habitat occurs due to the lack of grassy woodland or hollow-bearing trees. No further assessment is required.
Greater broad-nosed bat <i>Scoteanax rueppellii</i>	V	-	The greater broad-nosed bat typically roosts in hollow-bearing trees and forages along creek and river corridors, feeding on insects and occasionally other bat species. Although this microchiropteran bat is very rare in the Illawarra, a single individual was trapped while flying along Rocklow Creek near the study area in 2009 (Gaia Research 2009 in DECCW 2011).	Given the lack of hollow bearing trees or creeklines, no suitable habitat occurs. No further assessment is required.
Green and golden bell frog <i>Litoria aurea</i>	V	-	Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha</i> spp.) or spikerushes (<i>Eleocharis</i> spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as plague minnow (<i>Gambusia holbrooki</i>), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas (OEH 2011).	No areas of permanent water occur within the site, which is on a steep slope. No further assessment is required.
Grey-headed flying-fox <i>Pteropus poliocephalus</i>	V	V	Grey-headed flying-foxes are found within 200 km of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria (OEH 2012). They occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops (Tidemann 1995). Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, and in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, birth and the rearing of young (Tidemann 1995). They travel up to 50 km to forage on the nectar and pollen of native trees, in particular eucalyptus, melaleuca	Limited but suitable foraging habitat exists at the site. As more suitable habitat occurs outside of the site in surrounding areas, the occurrence of this species within the site is considered to be unlikely. No further assessment is required.

Table D.1 **Habitat assessment for threatened species recorded within 5 km of the study area (Cont'd)**

Flora species name	National status (EPBC Act)	NSW status (TSC Act)	Habitat requirements	Likelihood of occurrence at the site and requirements for further assessment
Illawarra socketwood <i>Daphnandra sp. C</i> 'Illawarra'	E	E	and banksia, and fruits of rainforest trees and vines. They also forage in cultivated gardens and fruit crops and can inflict severe crop damage (Churchill 2008). This rainforest tree is endemic to the Illawarra region where it occurs on rocky hillsides and gully slopes on volcanic or fertile sedimentary soils (DECCW 2011). It shows a strong association with Illawarra Subtropical Rainforest within the Dunmore-Shellharbour area (DECCW 2011). Flowers briefly in September and early October with fruits taking 10 to 12 months to mature.	No remnant rainforest patches occur within the site. Despite targeted surveys for this species, it was not recorded onsite and is unlikely to occur. No further assessment is required.
Illawarra zieria <i>Zieria granulata</i>	E	E	Illawarra zieria is restricted to the Illawarra region where it is recorded from a number of sites. The species primarily occupies the coastal lowlands between Oak Flats and Toolijooa, in the local government areas of Shellharbour and Kiama. This is a range of approximately 22 kilometres. The typical habitat is dry ridge tops and rocky outcrops on shallow volcanic soils, usually on Bumbo Latite. Less frequently found on the moist slopes of the Illawarra escarpment and in low-lying areas on Quaternary sediments. Associated vegetation includes bracelet honey-myrtle (<i>Melaleuca armillaris</i>) scrub, forest red gum (<i>Eucalyptus tereticornis</i>) woodland and rainforest margins, although the species has been recorded from a number of other vegetation types (OEH 2011).	Suitable habitat does not exist, however, a population was recorded in proximity to the site to the north-west of the proposed access. Four plants were recorded within this area. Further assessment is required in the form of an assessment of significance.
Large-eared pied bat <i>Chalinolobus dwyeri</i>	V	V	The current distribution of this species is also poorly known. Little is known about the habitat and roosting requirements of the large-eared pied bat, but natural roosts may depend heavily on sandstone outcrops. It has been found roosting in disused mine shafts, caves, overhangs and disused fairy martin (<i>Hirundo ariel</i>) nests for shelter and to raise young (Hoye & Dwyer 1995). It also possibly roosts in the hollows of trees (Duncan et al. 1999). In NSW this species has been recorded from a large range of vegetation types including: dry and wet sclerophyll forest; cyprus-pine dominated forest; tall open eucalypt forest with a rainforest sub-	Suitable habitat is not present. No further assessment is required.

Table D.1 **Habitat assessment for threatened species recorded within 5 km of the study area (Cont'd)**

Flora species name	National status (EPBC Act)	NSW status (TSC Act)	Habitat requirements	Likelihood of occurrence at the site and requirements for further assessment
Large-footed myotis <i>Myotis macropus</i>	V	-	canopy; sub-alpine woodland; and sandstone outcrop country. In south-eastern Queensland the species has primarily been recorded from higher altitude moist tall open forest adjacent to rainforest (Duncan et al. 1999). The large-footed myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface (OEH 2011). This species has been captured along the Minnamurra River near the study area (DECCW 2011).	No permanent pools of water or suitable roosting habitat occurs. No further assessment is required.
<i>Lespedeza juncea</i> subsp. <i>sericea</i> endangered population in the Wollongong Local Government Area	-	E	This endangered population occurs south of Dapto in the Wollongong local government area. Known from just one roadside population of approximately 200 plants. Located in a small strip of open forest dominated by forest red gum (<i>Eucalyptus tereticornis</i>), woollybutt (<i>E. longifolia</i>), and white feather honeymyrtle (<i>Melaleuca decora</i>), on Budgong Sandstone. Also originally recorded in kikuyu (<i>Pennisetum clandestinum</i>) grassland directly across the road from this site. This grassland was subsequently cleared and the species has not regenerated. Prefers full sun to light shade. Flowers between February and March. Has a long-lived seed and a soil stored seedbank (OEH 2011).	Habitat for this species does not exist. Further, targeted surveys were undertaken during the flowering period of this species, yet none were detected. No further assessment is required.
Osprey <i>Pandion haliaetus</i>	V	M, Mi	Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas (Marchant and Higgins 1993). This species favours coastal areas, especially the mouths of large rivers, lagoons and lakes. They feed on fish over clear, open water. Breed from July to September in NSW (Marchant and Higgins	Suitable habitat is not present. No further assessment is required.

Table D.1 **Habitat assessment for threatened species recorded within 5 km of the study area (Cont'd)**

Flora species name	National status (EPBC Act)	NSW status (TSC Act)	Habitat requirements	Likelihood of occurrence at the site and requirements for further assessment
Painted snipe (Australian subspecies) <i>Rostratula benghalensis australis</i>	E	V, Mi	1993). Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. Incubation of 2-3 eggs, usually by the female, is about 40 days. Female remains with young almost until they fly, usually after about nine weeks in the nest (Hollands 2003). The Australian painted snipe is most common in eastern Australia, where it has been recorded at scattered locations throughout much of Queensland, NSW, Victoria and south-eastern South Australia (Marchant and Higgins 1993). It generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical study areas include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum <i>Muehlenbeckia sp.</i> or canegrass or sometimes tea-tree (<i>Melaleuca sp.</i>). This cryptic species nests on the ground amongst tall reed-like vegetation near water. It emerges from the dense growth at dusk to feed on mudflats and the water's edge taking insects, worm and seeds (Marchant and Higgins 1993).	Suitable habitat is not present at the site. No further assessment is required.
Pink robin <i>Petroica rodinogaster</i>	-	V	The pink robin disperses north and west and into more open habitats in winter, regularly as far north as the ACT, and sometimes being found as far north as the central coast of NSW. Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies. Catches prey by the perch-and-pounce method, foraging more on the ground than the more flycatcher-like rose robin. Insects and spiders are the main dietary items. Breeds between October and January and can produce two clutches in a season. The nest is a deep, spherical cup made of green moss bound with cobweb and adorned with camouflaging lichen, and is lined with fur and plant down (OEH 2011).	Suitable habitat is not present. No further assessment is required.
White-flowered wax	E	E	Restricted to eastern NSW where it is distributed from Brunswick Heads on the	No remnant rainforest patches

Table D.1 **Habitat assessment for threatened species recorded within 5 km of the study area (Cont'd)**

Flora species name	National status (EPBC Act)	NSW status (TSC Act)	Habitat requirements	Likelihood of occurrence at the site and requirements for further assessment
plant <i>Cynanchum elegans</i>			north coast to Gerroa in the Illawarra region. The white-flowered wax plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; coastal tea-tree (<i>Leptospermum laevigatum</i>) coastal banksia (<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>) coastal scrub; forest red gum (<i>Eucalyptus tereticornis</i>) aligned open forest and woodland; spotted gum (<i>Eucalyptus maculate</i>) aligned open forest and woodland; and bracelet honeymyrtle (<i>Melaleuca armillaris</i>) scrub to open scrub. Flowering occurs between August and May, with a peak in November. Flower abundance on individual plants varies from sparse to prolific OEH 2011).	occur. Despite targeted surveys for this species, it was not recorded onsite and is unlikely to occur. No further assessment is required.

Notes: V= vulnerable, E= endangered, M= marine, Mi= migratory.

Appendix E - Assessments of significance



E.1 Assessment of significance for *Melaleuca armillaris* Tall Shrubland endangered ecological community (EEC) in accordance with Section 5a of the Environmental Planning and Assessment Act 1979

Melaleuca armillaris Tall Shrubland occurs on the tops of exposed volcanic outcrops with shallow soils. Its close association with volcanic geology, and therefore the hard-rock resource, makes this vegetation community particularly vulnerable to further clearing for quarrying (OEH 2011).

Over 75% of this vegetation type has already been cleared, and today only 390 hectares remains within the Kiama, Shellharbour and Shoalhaven local government areas, with a large proportion of remnant areas within the Dunmore-Shellharbour Hills area. None of the community occurs within conservation areas.

Within the study area, this community has been recorded in the north-west corner and the central northern area (Mills 2003). A small remnant with indicative species of the community, namely *Melaleuca armillaris*, *Acacia mearnsii*, *Cheilanthes sieberi* and *Zieria granulata* was recorded during the current study to the north-west of the proposed southern access, which is outside the impact area and within the south-eastern part of the quarry. The area is less than 100 m² and it is likely that the patch will be unviable in the long-term without protection and management.

The following factors must be taken into account in making a determination under this section:

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

This section is not relevant as *Melaleuca armillaris* Tall Shrubland is listed as an endangered ecological community.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

This section is not relevant as *Melaleuca armillaris* Tall Shrubland is listed as an endangered ecological community, not an endangered population.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

The proposed southern access will not have any direct impact on the small patch of *Melaleuca armillaris* Tall Shrubland. It is possible that the works may lead to indirect impacts as a result of edge effects, changes in microclimate and also encourage the spread of weeds into this patch. This could reduce the viability of the patch in the long-term, however its long-term viability in the absence of the proposal is already at risk due to its small size, surrounding quarrying activities and lack of connectivity to other patches.

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Due to the disturbed nature of the proposed southern access area and position in the landscape, it is not considered likely to provide potential habitat for this community. Therefore, the proposed works will not remove any potential habitat for this community.

The proposed works will further isolate the patch of *Melaleuca armillaris* Tall Shrubland from nearby remnant vegetation by removing vegetation to the south and south-east of the patch. The further isolation of the patch may reduce its long-term viability. But as stated earlier, its long-term viability is already at risk due to its small patch size, surrounding land uses, etc.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

Critical habitat has not been declared for *Melaleuca armillaris* Tall Shrubland EEC.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No recovery plan or threat abatement plan has been prepared for this EEC. However, recovery strategies for this community which are relevant to the proposed activity are:

- implement feral animal control programs;
- determine and apply appropriate fire management practices;
- consider off-site impacts in the assessment of nearby developments;
- install fencing to exclude livestock and machinery;
- control weeds;
- protect remnants from clearing and further fragmentation; and
- restore degraded habitat using bush regeneration techniques.

Dunmore Quarry has implemented an offset strategy and associated conservation program for this and other significant ecological features within the study area as part of previous approvals. This and other management programs within the site are generally consistent with these strategies.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed activity is likely to constitute “clearing of native vegetation”, which is recognised as a key threatening process under Schedule 3 of the TSC Act.

Only a small area of very degraded and regenerating vegetation will be impacted by the proposed southern access. No areas of the EEC will be directly cleared for the works. Controls and safeguards including weed management will be employed during construction so the activity does not contribute to this key threatening process.

E.1.1 Conclusion

The proposed activity may result in indirect impacts on a small remnant of *Melaleuca armillaris* Tall Shrubland. This vegetation is in a degraded condition and its long-term viability with or without the proposed action taking place is questionable due to existing edge effects and the small size of the remnant. The proposed action is unlikely to have an adverse effect on the extent or composition of the community such that its local occurrence (being that within the Dunmore-Shellharbour Hills area) would be placed at risk of extinction. There is unlikely to be a significant impact on *Melaleuca armillaris* Tall Shrubland endangered ecological community or its habitats as a result of the proposed southern access construction. A species impact statement is not required.

E.2 Assessment of significance for Illawarra zieria in accordance with Section 5a of the *Environmental Planning and Assessment Act 1979*

The Illawarra zieria is a tall shrub or small tree that is endemic to the Shellharbour and Kiama local government areas, where it occurs mostly on dry ridge tops and rocky outcrops on shallow volcanic soils. Only 0.1% of the population is currently protected within conservation reserves (DECCW 2011). The Dunmore-Shellharbour Hills area contains the largest known population of the species with some local remnants containing thousands of individual plants (DECCW 2011). The species appears to be associated with *Melaleuca armillaris* Tall Shrubland, but has also been found within Illawarra Lowlands Grassy Woodland and Illawarra Subtropical Rainforest (DECCW 2011).

A small sub-population (four individuals) of this species was recorded during the current survey within the *Melaleuca armillaris* Tall Shrubland remnant to the north-west of the proposed southern access impact area. The closest previously recorded sub-populations within the quarry occur to the north-west on the opposite side of the quarry. Most of these were considered to have been planted (Mills 2003). A second sub-population was recorded within the western section of the quarry, which are likely to be naturally occurring.

As per the recovery plan for the species, populations are considered to constitute sites of the species which are greater than 1 km apart. The sub-population within the study area is considered to be part of the same population as the individuals occurring directly to the north-west of the quarry. Therefore the population is around 50 individuals (Mills 2003), with four occurring in the sub-population adjacent to the proposed southern access.

The following factors must be taken into account in making a determination under this section:

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The small population identified to the north-west of the proposed southern access may be indirectly impacted by the works as a result of further isolation from other vegetated remnants, edge effects, weed

invasion, etc. The long-term viability of this population is questionable already given the large distances between the nearest known sub-populations, current barriers (the quarry site) and the isolated nature of the patch. This risk is present with or without the proposed works proceeding. As such, the proposed southern access is not likely to directly affect the life cycle of the species such that a local viable population is put at risk.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

This section is not relevant as the Illawarra zieria is listed as a threatened species, not an endangered population. No endangered Illawarra zieria populations have been listed on the TSC Act in the locality of the study area.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

This section is not relevant as Illawarra zieria is listed as an endangered species, not an endangered or critically endangered ecological community.

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Due to the disturbed nature of the proposed southern access area and position in the landscape, it is not considered likely to provide potential habitat for this species. Therefore, the proposed works will not remove any potential habitat for this community.

The proposed works will further isolate the sub-population of Illawarra zieria from nearby remnant vegetation by removing vegetation to the south and south-east of the area. The further isolation of the sub-population may reduce its long-term viability. But as stated earlier, its long-term viability is already at risk due to its small population size, surrounding land uses, etc.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

This section is not relevant as no areas of critical habitat have been listed for Illawarra zieria under Part 3 of the TSC Act.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

The Illawarra Zieria Recovery Plan (DECC 2005c) details the actions that need to be carried out to recover the species. The specific recovery objectives are to:

- conserve *Z. granulata* using land-use and conservation planning mechanisms;
- identify and manage the threats operating at sites that contain the species;
- provide the community with information that assists in conserving the species;
- raise awareness of the species and involve the community in the recovery program;
- promote research that will assist with the management of the species; and
- coordinate an ex-situ conservation program to safeguard genetic material from extinction (DEC 2005c).

The proposed works are within private land surrounded by quarry infrastructure. In addition, this patch had not been identified previously and therefore this has increased the local population numbers and distribution. It is considered that the proposed works, given that it will not directly impact on this sub-population, is not inconsistent with the objectives of the recovery plan. In addition, the proposed mitigation measures may reduce current threats to the sub-population.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed activity is likely to constitute “clearing of native vegetation”, which is recognised as a key threatening process under Schedule 3 of the TSC Act.

Only a small area of very degraded and regenerating vegetation will be impacted by the proposed southern access. No individuals will be directly cleared for the works. Controls and safeguards including weed management will be employed during construction to reduce the potential of the activity to result in the operation of this key threatening process.

E.2.1 Conclusion

The proposed activity may result in indirect impacts on a small sub-population of Illawarra zieria. This population is within a vegetation remnant in a degraded condition and its long-term viability with or without the proposed action is questionable due to the existing edge effects and small size of the remnant and population size. The proposed action is unlikely to result in an adverse effect such that the species local occurrence (being that within the Dunmore-Shellharbour Hills area) would be placed at risk of extinction. There is unlikely to be a significant impact on Illawarra zieria or its habitat as a result of the proposed southern access construction. A species impact statement is not required.

E.3 Assessment of significance for Illawarra zieria in accordance with the Significant Impact Criteria under the *Environment Protection and Biodiversity Conservation Act 1999*

An action is likely to have a significant impact on an endangered species if there is a chance that it will:

(a) Lead to a long-term decrease in the size of a population;

A sub-population of the existing population of the Illawarra zieria was located during the recent survey of the site, increasing the population by four individuals. As this sub-population is outside the proposed southern access impact area, the works are not considered likely to directly impact on it. It may be indirectly impacted by the works as a result of further isolation from other vegetated remnants, edge effects, weed invasion, etc. The long-term viability of this population is questionable already given the large distances between the nearest known sub-populations, current barriers (the quarry site) and the isolated nature of the patch. This risk is present with or without the proposed works proceeding. It is therefore not considered likely that the proposed works would result in the long-term decrease of the population within the study area.

(b) Adversely affect habitat critical to the survival of a species;

This site is not critical habitat as listed on the Commonwealth's Register of Critical Habitat. The current habitat area where this species occurs, which is adjacent to the southern access, provides marginal habitat for the species. The works will not remove any habitat that is highly suitable for this species.

(c) Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;

The proposed works will further isolate the sub-population of Illawarra zieria from nearby remnant vegetation by removing vegetation to the south and south-east of the area. The further isolation of the sub-population may reduce its long-term viability. But as stated earlier, its long-term viability is already at risk due to its small population size, surrounding land uses, etc.

(d) Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;

Controls and safeguards including weed management will be employed during construction to reduce the potential of the activity to result in the spread and invasion of pest species.

(e) Introduce disease that may cause the species to decline

It is unlikely that the proposed works would result in the introduction of disease to the sub-population, given that existing quarry machinery are likely to be used and no soil will be imported for the works.

(f) Interfere with the recovery of the species.

The proposed works are within private land surrounded by quarry infrastructure. In addition, this patch had not been identified previously and therefore this has increased the local population numbers and distribution. The proposed works as they will not directly impact on this sub-population, are not inconsistent with the objectives of the recovery plan. In addition, the proposed mitigation measures may reduce current threats to the sub-population.

E.3.1 Conclusion

The proposed activity may result in indirect impacts on a small sub-population of Illawarra zieria. This population is within a vegetation remnant in a degraded condition and its long-term viability with or without the proposed action is questionable due to the existing edge effects and small size of the remnant and population size. The proposed action is unlikely to result in an adverse effect such that the species' local occurrence (being that within the Dunmore-Shellharbour Hills area) would be placed at risk

of extinction. There is unlikely to be a significant impact on Illawarra zieria or its habitat as a result of the proposed southern access construction. A referral to the Australian Government Department of Sustainability, Environment, Water, Population and Communities is not recommended.

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