



**Holcim (Australia) Pty Ltd**  
**Dunloe Sands Quarry**  
**Modification to Project Approval 06/-0030 Environmental**  
**Assessment**

July 2017

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# 1. Introduction

## 1.1 Background

This Environmental Assessment (EA) is submitted to the Department of Planning and Environment (DP&E) as part of a Section 75W modification application for the existing Dunloe Sands Quarry. Holcim (Australia) Pty Ltd (Holcim) is seeking approval to modify an existing Project Approval condition relating to vehicular movements at the site, in accordance with Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Holcim proposes an increase in heavy vehicle movements at the site (the modified proposal).

This EA has been prepared by GHD Pty Ltd (GHD) on behalf of Holcim to support the modification application. The EA provides a description of the modification and its need and considers the social and environmental impacts of the modification, recommending mitigation and management measures as appropriate.

## 1.2 The proponent

The proponent for the Section 75W modification application is Holcim (Australia) Pty Ltd.

Holcim has been delivering construction materials since 1901, originally serving the industry under the Ready-Mix and Humes brands. Today, Holcim operates across Australia supplying concrete, concrete products, aggregate and sand from a network of over 200 concrete batching plants, 900 mixer trucks, 60 quarries, 16 precast manufacturing plants and mobile and on-site contracting facilities.

Quarry products available from Holcim in Australia include rail ballast, aggregates, gravels, road pavement materials manufactured and natural sands, products essential to building and maintaining our modern communities.

Holcim operates the Dunloe Sands Quarry which produces a very high quality, fine concrete sand as well as a variety of other sand products including plasterer sand, bunker sand and fill sand.

## 1.3 Land ownership

Holcim operates the Dunloe Sands Quarry, located at Pottsville Road, Pottsville, New South Wales (NSW) (the site). The site is leased from Ramtech Pty Ltd. The site comprises the following lots:

- Lots 1 and 2 in DP 780199
- Lot 2 DP 785895
- Lot 1 DP 780200
- Lots 44, 81, 162, 182 and 183 DP 755721
- Lot 1 DP 208249.

## 1.4 Development history

Project Approval 06/-0030 was sought and obtained in 2008 for the construction and operation of the Dunloe Sands Quarry at the site. The Project Approval allowed for use of the site for the extraction of sand by means of both suction dredge (wet extraction) and dry extraction (initial overburden and brickies loam extraction). Sand extraction at the site can be carried out until 1 January 2035, with a maximum extraction rate of 300,000 tonnes per annum.

In 2009, a modification to the existing Project Approval (06/-0030 MOD 1) was approved by DP&E under section 75W of the EP&A Act. The modification sought to construct a machinery shed to house mobile plant equipment within the quarry boundary.

## 1.5 Purpose of this report

This EA report has been prepared to support a section 75W modification application to modify Condition 8 within Project Approval 06/-0030, which reads:

- Schedule 2, Condition 8 – the proponent shall ensure that heavy vehicle movements (in and out) associated within the project do not exceed eight per hour.

This EA report only considers the components of the modified proposal from the approved development, the potential environmental impacts of the modification and the environmental management and mitigation measures proposed to manage these potential environmental impacts.

Where components of the modified proposal do not differ from the approved development, they are not detailed within this document as they are considered to have been addressed as part of the original assessment.

## 1.6 Limitations

This report has been prepared by GHD for Holcim (Australia) Pty Ltd and may only be used and relied on by Holcim (Australia) Pty Ltd for the purpose agreed between GHD and Holcim (Australia) Pty Ltd as set out in section 1.5 of this report.

GHD otherwise disclaims responsibility to any person other than Holcim (Australia) Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section 1.7 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Holcim (Australia) Pty Ltd and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

## 1.7 Assumptions

This report relies on the following information previously prepared and presented to DP&E including:

- PLANIT Consulting, 2007, Environmental Assessment Part 3A
- Carter and Acoustical Consultants, 2007, Traffic Engineering Assessment
- Project Approval 06/-0030

- PLANIT Consulting, 2016, Environmental Management Plan and Environmental Management Strategy for Dunloe Sands.

## 2. Existing development

### 2.1 Overview of the approved development

The site is located at Pottsville Road, approximately three kilometres south of Pottsville. The approved development (based on Project Approval 06/-0030) allows for the extraction of sand at the site, with the following limits:

1. Sand extraction operations may take place until 1 January 2035.
2. The proponent shall not extract to a depth of more than 12 metres below the natural ground surface.
3. The proponent shall not transport more than 300,000 tonnes of sand material a year from the site.
4. The proponent shall ensure that heavy vehicle movements (in and out) associated with the project do not exceed eight per hour.

The quarry layout comprises two main extraction ponds consisting of 25 hectares and 31.7 hectares respectively. Extraction area one is located approximately 1,100 metres north of the southern boundary, whilst extraction area two is located in the south-east corner approximately 100 metres from the southern boundary. Both areas are located adjacent to the eastern boundary.

Large agricultural sheds are also utilised for the purpose of storage and ancillary maintenance of machinery and plant equipment associated with the approved quarry.

A site office and wash plant is located within each extraction area.

Refer to Figure 2-1 to Figure 2-4 respectively.

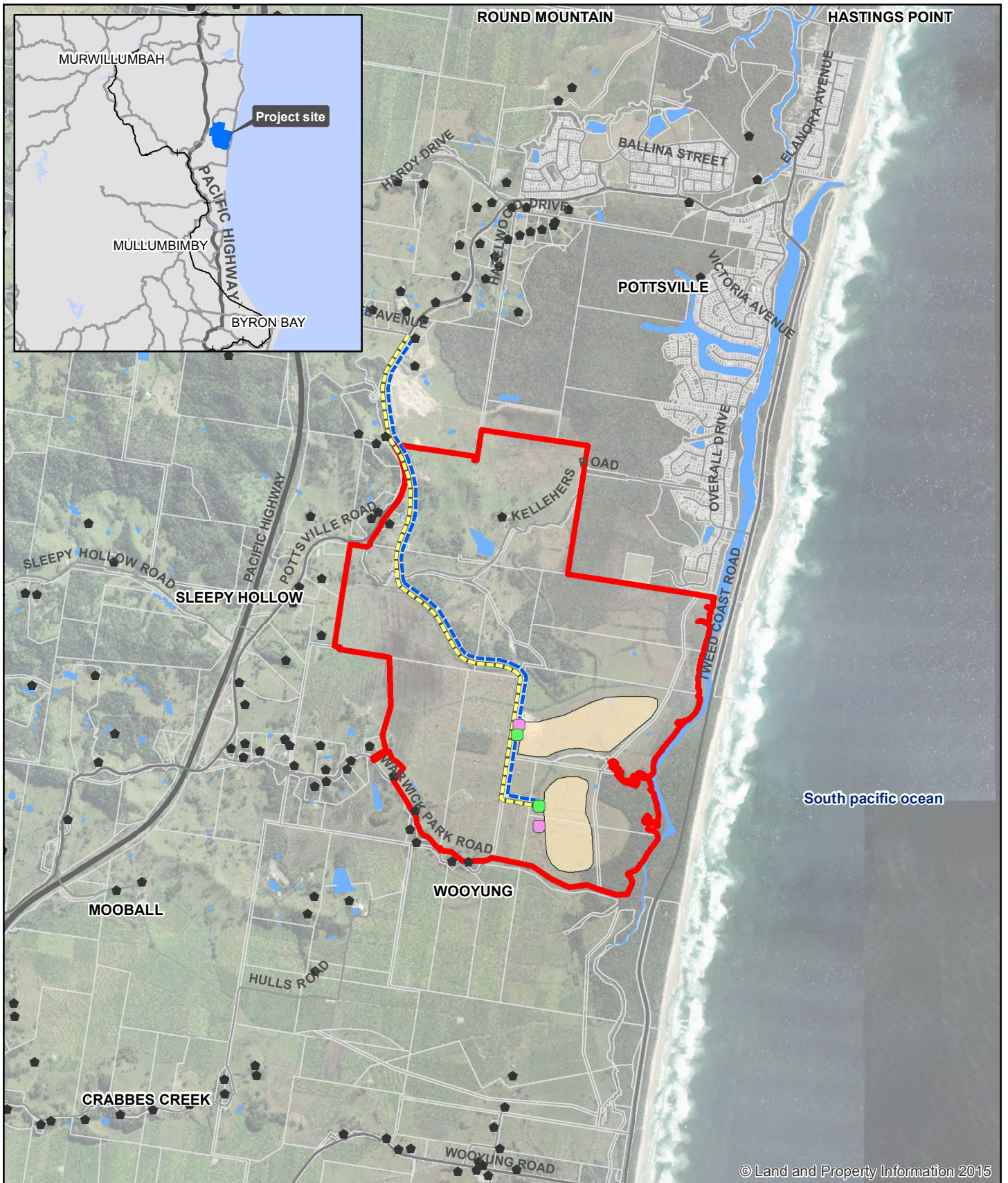
#### 2.1.1 Extraction plan and operational life

Extraction will occur in two stages. Initial extraction is being undertaken within the northern extraction area (stage one), with stage two being the southern extraction area.

Top soil will be stripped back through dry excavation and sold off in 'sub stages' to ensure erosion and dust generation is kept to a minimum. Some overburden will be utilised in the preparation of rehabilitation areas as shown within this submission. However, it is anticipated that much of this soil will be suitable for use as builders or brickies loam.

An initial 'sub stage' of wet dredged excavation will be undertaken, which will then be banded from the large body of the extraction area. This initial area of excavation will then be utilised as a fines return pond. Once the lifespan of extraction pond one has expired, a similar process will occur for extraction pond two.

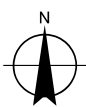
Extraction rates are not to exceed 300,000 tonnes per annum in accordance with Schedule 2, Condition 7 of the Project Approval. Schedule 2, Condition 5 provides for operations being permitted until 1 January 2035.



**Legend**

- Project boundary
- Sand extraction areas
- Incoming haul road
- Outgoing haul road
- Site office
- Washplant
- Existing dwelling house

Paper Size A4  
 0 0.25 0.5 1  
 Kilometers  
 Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 56



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 Dunloe Sand Modification

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Site location and layout

Figure 2-1





Figure 2-2 Processing and storage area



Figure 2-3 Truck turning point for extraction ponds



Figure 2-4 Truck access via Pottsville Road

### 2.1.2 Processing

Processing is undertaken to separate wanted sand resource and fines. This is through hydraulic separation within an onsite wash plant. Wanted materials from this process are then trucked off site to customers.

Unwanted and acidic waste fines are strategically reburied (re-interred) at a level below the water table to prevent oxidation of the contained pyrite. This process is undertaken within the identified fines return pond and is estimated to incorporate approximately 100,000 tonnes of re-interred fines.

Stockpiling of sand resource on site provides for up to one to three months' supply.

No chemical processing occurs on site, although additives to maintain reasonable pH levels will from time to time be used.

### 2.1.3 Utilities management

Water is harvested on site via an on-site tank containing a storage capacity of 10,000 litres and is located adjacent to the amenities building.

Sewage generated by the works on-site is minimal. The staff amenities and office building is provided with an on-site effluent disposal system.

Electricity is provided to the site by aboveground mains from Warwick Park Road.

Diesel is delivered directly to the dredge plant by an off-site contractor. All other equipment is fuelled by way of direct delivery from a company vehicle that is stored off-site. No storage of fuel occurs on-site.

### 2.1.4 Traffic management

The site is accessed via a haulage track on a north south road reserve adjacent to the proposed extraction areas. The inward and outward route utilises the same haulage track and discharges onto Pottsville Road at the northern extent of the property. All access routes are sealed for their entire length.

Daily (two-way) traffic volumes on Pottsville Road are currently in the order of 1,400 – 1,800 vehicles.

### 2.1.5 Operating hours and site personnel

The site operates from Monday to Friday (7 am to 5 pm) and on Saturdays (7 am to 12 pm). No operations occur on Sundays or public holidays. Maintenance activities can occur at any time, but are inaudible to neighbouring residences.

Three full-time employees currently work on site. One additional staff member would be employed as a result of the modified proposal.

### 2.1.6 Environmental management

Holcim has prepared an environmental management plan (EMP) in accordance with Schedule 5, Condition 1 of the Project Approval which outlines the environmental management strategy (EMS) for the site. The EMS details the ongoing compliance with environmental commitments made by Holcim and required by the Project Approval and any associated licences. The EMS requirements include:

- In accordance with Schedule 5, Condition 5 of the Project Approval, an annual environmental management report (AEMR) is prepared and submitted to DP&E and relevant agencies annually.

- An environmental monitoring report in accordance with Schedule 5, Condition 10 of the Project Approval is prepared quarterly to enable staff on-site to respond in a reasonable timeframe to any environmental outcomes.
- An extraction progress report is prepared quarterly to enable management to compile statistics on volumes extracted. These statistics can then be easily transferred to the AEMR allowing informed predictions on the following years' output targets.
- An independent environmental audit is carried out every five years.
- In accordance with Schedule 5, Condition 9 of the Project Approval, a community consultative committee (CCC) has been established. This provides a forum for open discussion between representatives of the company, of the community, Council and other stakeholders on issues relating to the site's operations.

In accordance with Schedule 5, Conditions 1 and 5 of the Project Approval, the EMS must also receive, handle, respond to and record any complaints. The previous operator of the site received a letter from Council dated 23 January 2014 in relation to a complaint received regarding the number of truck movements to and from the site. Specifically, nine truck movements (in and out of the site) were observed within an hour which was non-compliant with Schedule 2, Condition 8 of Project Approval 06/-0030. Since taking over the management of the site in 2016, Holcim have reduced heavy vehicle movements in order to comply with Schedule 2, Condition 8 of the Project Approval. As discussed in section 3 of this report, this application seeks to allow more flexibility in daily quarry trucking movements both in and out of the site.

## 2.2 Current zoning

The site is located on land zoned as follows under the Tweed Local Environmental Plan (LEP) 2014:

- RU2 Rural Landscape
- RU1 Primary Production
- Environmental Protection 7(a) Wetland and littoral rainforest (deferred matters), to which the LEP 2000 will continue to apply.

The quarry operations including the extraction ponds, site offices, wash plants and storage sheds are located wholly on RU2 zoned land. Within the RU2 zone 'extractive industries' are permissible with consent.

## 2.3 Description of the surrounding area

Surrounding zoning includes RU2 Rural Landscape, which is located north, northeast and northwest from the site. RU1 Primary Production is predominantly located south from the site.

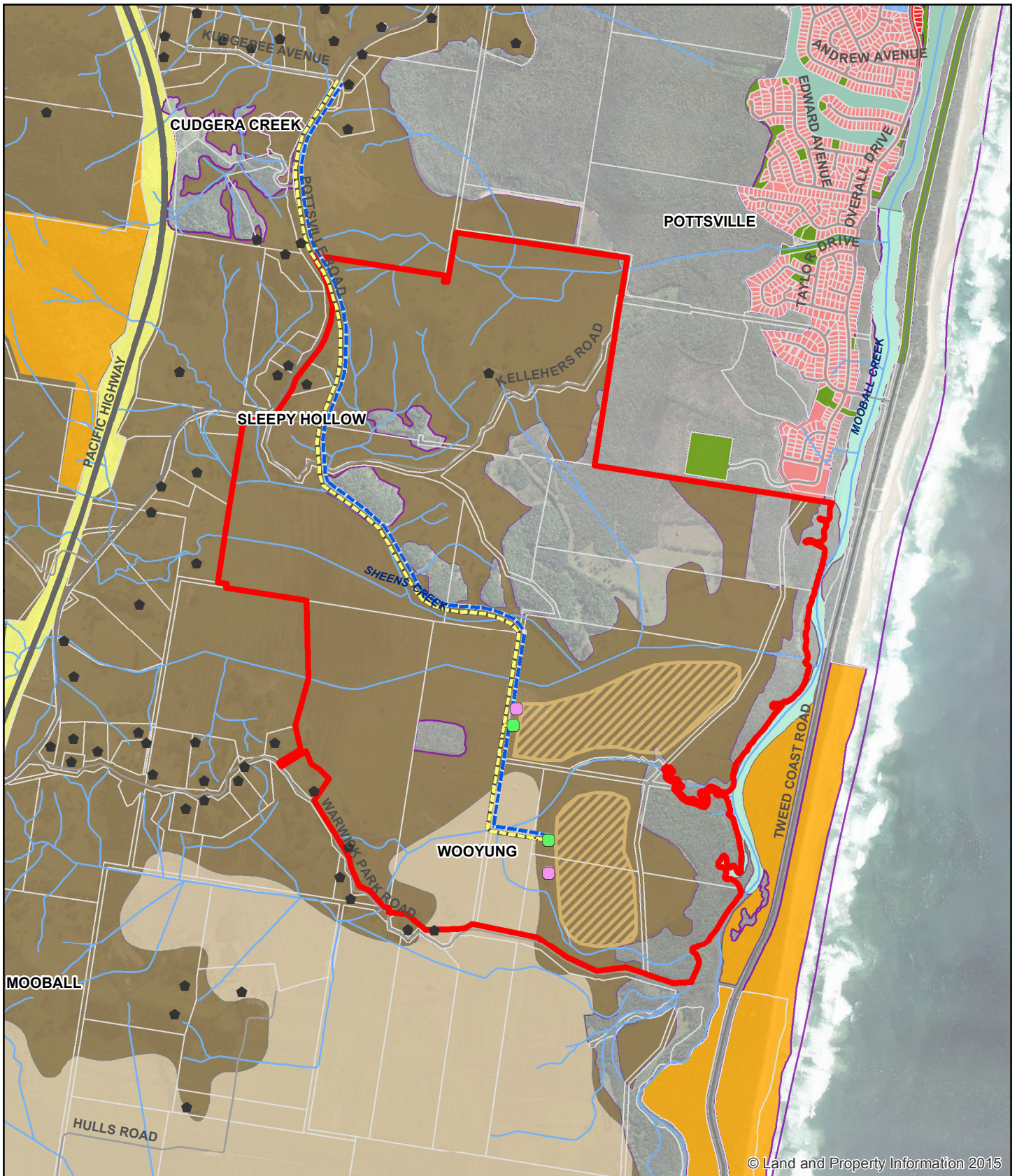
Adjacent properties to the south, west and north-west are currently used for agricultural purposes. The majority are used for either sugar cane farming or are under improved pasture for grazing purposes.

The following sensitive receivers, consisting of rural-residential dwellings, are located within the vicinity of the site:

- 771 Pottsville Road, located 20 metres north-west from the site boundary
- 765 Pottsville Road, located 40 metres north-west from the site boundary
- 265 Warwick Park Road, located 20 metres south from the site boundary
- 94 Warwick Park Road, located 495 metres south-west from the site boundary

- 129 Warwick Park Road, located 175 metres south-west from the site boundary
- 157 Warwick Park Road, located 35 metres south-west from the site boundary.

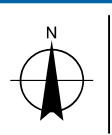
Land uses and zoning (as per the Tweed LEP 2014) surrounding the site as shown on Figure 2-5.



**Legend**

- |                       |                         |  |                            |
|-----------------------|-------------------------|--|----------------------------|
| Project boundary      | Incoming haul road      | E1, National Parks and Nature Reserves | RU2, Rural Landscape       |
| Sand extraction areas | Outgoing haul road      | R2, Low Density Residential            | SP2, Infrastructure        |
| Site office           | Existing dwelling house | R3, Medium Density Residential         | W1, Natural Waterways      |
| Washplant             | B2, Local Centre        | RE1, Public Recreation                 | W2, Recreational Waterways |
| DM, Deferred matters  | RU1, Primary Production |  |                            |

Paper Size A4  
 0 0.25 0.5 1  
 Kilometers  
 Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 56



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**Land use and zoning**

**Figure 2-5**

## 3. Proposed modification

### 3.1 Proposed modification

This EA has been prepared to support a Section 75W application to modify Schedule 2, Condition 8 of Project Approval 06/-0030 to allow up to 120 inbound and 120 outbound heavy vehicle movements from the site per weekday and up to 60 inbound and 60 outbound heavy vehicle movements on Saturdays. These movements average to approximately 100 heavy vehicle movements per working day over the course of a calendar month.

Schedule 2, Condition 8 of the Project Approval requires that *'the proponent shall ensure that heavy vehicle movements (in and out) associated within the project do not exceed 8 per hour'*.

In practice and based on Holcim's experience, the current Project Approval condition has the effect of reducing the potential to achieve the maximum approved annual output of the quarry significantly, well below that permitted under the terms of the Project Approval. This is due to the demand for quarry product fluctuating significantly according to contracts for supply of material, with demand for quarry material (and trucks) typically 'spiking' during morning periods. The current hourly limit has the effect of limiting the ability of the quarry to supply the required quantity of quarry product at the volumes demanded during peak periods, an unintended consequence of the limit on hourly truck numbers.

This application does not seek to modify the existing limit on annual quarry production. Rather, it seeks to enable flexibility in truck numbers during peak periods of demand for quarry products. Hence, the increase in daily quarry truck traffic sought in this application is to allow for up to 120 inbound and 120 outbound heavy vehicle movements from the site per weekday and up to 60 inbound and 60 outbound heavy vehicle movements on Saturdays.

As supported by the results of the traffic assessment provided in section 6.2.1 of this report, the modified proposal does not warrant the upgrading of the approved quarry haulage route. All existing approved traffic and access arrangements will not change as a result.

Appendix A presents the current Project Approval conditions and the changes that are proposed as part of the modification application.

No changes are proposed to the existing site operations. No construction or demolition activities, will be undertaken as part of the proposed modification.

### 3.2 Proposed modification justification

The modification to Schedule 2, Condition 8 of the Project Approval is required to allow Holcim the flexibility to meet market demand for sand products to projects and concrete plants servicing both South East Queensland (SEQ) and northern NSW.

The Gold Coast Commonwealth Games, scheduled to be held in 2018, will create significant, additional demand for quarry products. At present, the requirement for concrete sand volumes is expected to increase from an average 14,000 tonnes per month to 18,000 tonnes per month. The requirement for white sand averages 2,000 tonnes per month, with demand also expected to increase. Supply to the Commonwealth Games project will be in addition to current market requirements.

Additionally, current truck movements restrictions prevent Holcim supplying further contracts such as fill sand jobs and brickies mix/loam mixes.

Flexibility in daily quarry trucking movements will allow Holcim to meet current and forecast market demand.

## 4. Statutory and planning context

Project Approval 06/-0030 was granted by the NSW Minister for Planning on 24 November 2008 under Part 3A of the EP&A Act.

Part 3A of the EP&A Act has since been repealed, however Schedule 6A, Clause 3 of the EP&A Act provides for the continued use of Section 75W to modify a project approval granted under Part 3A of the Act (known as Transitional Part 3A Projects).

There are limitations on the scope of section 75W, as established in *Barrick Australia Limited v Williams* (2009 NSWCA 275). The Court held that the Minister is required to form a view as to whether the proposed changes amount to 'a radical transformation of the terms of the existing development consent'. If the proposed changes constitute a 'radical transformation', section 75W cannot be relied upon because the proposed changes cannot be considered a 'modification'.

The following aspects of the modification will remain consistent with Project Approval 06/-0030:

- The extraction area will remain as approved
- The duration of extraction operations will remain as approved
- The extraction depth and method will remain as approved
- The workforce and hours and operation will remain as approved
- Environmental management activities will remain unchanged.

Schedule 2, Condition 8 of the Project Approval requires that 'the proponent shall ensure that heavy vehicle movements (in and out) associated with the project do not exceed 8 per hour'. This modification seeks to increase daily quarry truck traffic to allow for up to 120 inbound and 120 outbound heavy vehicle movements from the site per weekday and up to 60 inbound and 60 outbound heavy vehicle movements on Saturdays. The modification does not alter the overall footprint of the approved quarry including the extraction areas, batter profiles and the future rehabilitation of disturbed land.

Therefore, the modification does not constitute a radical departure from Project Approval 06/-0030, enabling the Minister to modify Project Approval 06/-0030 under section 75W of the EP&A Act.

DP&E have confirmed that section 75W of the EP&A Act is the appropriate approval pathway for the proposed modification. Advice received from DP&E was as follows:

*'Any modification for the site where it is proposed to increase truck movements from those already assessed and approved should include an environmental assessment (EA) of all potential impacts. The EA should include a traffic/transport impact assessment, a noise assessment and an air quality assessment.'*

*The noise and air quality assessments should demonstrate that the proposed increase in truck movements would not result in impacts beyond the currently approved limits, or if an exceedance/s is predicted that these are justified and acceptable in regards to the relevant legislation and guidelines.*

*The traffic impact study should include:*

- *Accurate predictions of the road traffic generated by the modification*
- *An assessment of the likely transport impacts of the modification on the capacity, condition, safety and efficiency of the local and State road network*

- *A detailed description of the measures that would be implemented to maintain and/or improve the capacity, condition, safety and efficiency of the local and State road network over the life of the development/modification.'*

An email confirming this advice is provided in Appendix E. Traffic, noise and air quality impact assessments have been undertaken to support the proposed modification. Refer to section 6.2.



## 5. Consultation

Holcim is committed to ensuring that key stakeholders and the local community are kept informed about activities at the site.

As discussed in section 2.1.6 above, a community consultative committee (CCC) has been established to provide a forum for open discussion between representatives of the company, the community, Council and other stakeholders on issues relating to the site's operations.

Holcim distributed a newsletter in April 2017 (refer Appendix F) to surrounding residents, detailing the proposed modification and options for community members to provide feedback.

Following distribution of the newsletter, engagement was undertaken when requested with members of the local community on issues related to traffic and noise. These issues raised have been addressed as required within this report and with relevant community members on an individual basis.

# 6. Environmental assessment

## 6.1 Issue identification

The majority of the potential environmental impacts identified and assessed in the original approved development are considered unchanged by the modified proposal.

Table 6-1 provides a summary of the differences in impact between the approved development and the proposed modification. Where additional potential impacts or differences in impacts as a result of the proposed modification are identified, further assessment is provided in section 6.2.

Table 6-1 Identification of environmental issues

Environmental aspect	Further assessment required due to the proposed modification	Reasoning and scope of works
Traffic and access	Yes	The proposed modification will result in changes to the existing heavy vehicle movements associated with the quarry operations. Up to 120 inbound and 120 outbound heavy vehicle movements from the site per weekday and up to 60 inbound and 60 outbound heavy vehicle movements on Saturdays are proposed. These movements average to approximately 100 heavy vehicle movements per day over the course of a calendar month. Therefore, the potential for traffic impacts due to the increase in heavy vehicle movements require assessment. Refer to Section 6.2.1.
Noise	Yes	As discussed above, the potential for noise impacts due to the increase in heavy vehicle movements require assessment. Refer to Section 6.2.1.
Air quality	Yes	As discussed above, the potential for air quality impacts due to the increase in heavy vehicle movements require assessment. Refer to Section 6.2.1.
Soil and water quality	No	The proposed modification will not involve any construction or demolition works, therefore there will be no soil or water quality impacts as a result of the proposed modification. Existing soil and water quality measures will continue to be employed to mitigate any potential impacts. No additional assessment or mitigation is required.
Flora and fauna	No	The proposed modification will not involve any construction or demolition works, therefore there will be no impacts to flora and fauna as a result of the proposed modification. Existing flora and fauna measures will continue to be employed to mitigate any potential impacts. No additional assessment or mitigation is required.
Heritage	No	The proposed modification will not involve any construction or demolition works or changes to built form, therefore there will be no impacts to heritage as a result of the proposed modification. Existing heritage measures will continue to be employed to mitigate any potential impacts. No additional assessment or mitigation is required.
Waste management	No	The proposed modification will not involve any construction or demolition works, therefore there will be no additional waste management impacts as a result of the proposed modification. Existing waste management measures will continue to be employed to mitigate any potential impacts. No additional assessment or mitigation is required.
Visual amenity	No	The proposed modification will not involve any construction or demolition works or changes to built form, therefore there will be no visual impacts as a result of the proposed modification.

Environmental aspect	Further assessment required due to the proposed modification	Reasoning and scope of works
		Existing measures will continue to be employed to mitigate any potential impacts. No additional assessment or mitigation is required.

## 6.2 Environmental assessment

### 6.2.1 Traffic impact assessment

A traffic assessment was undertaken by GHD for the proposed modification and is provided in Appendix B. A summary of the key findings of the assessment is provided in the sections below.

#### *Existing environment*

The site is located on an access road that intersects Pottsville Road at a priority controlled intersection, located approximately 2.3 kilometres to the south of Cudgera Creek Road (Figure 6-1).



Figure 6-1 Dunloe Sands Quarry site

#### **Existing road characteristics**

This section provides an understanding of the existing road network in proximity to the site.

##### *Functional road hierarchy*

Roads are classified according to the functions that they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies, which guide the management of the road according to their intended service or qualities. Functional road classification involves the relative balance of the mobility and access functions.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions throughout the

State. State roads are the responsibility of RMS to fund, prioritise and carry out works. State roads generally include roads classified as Freeways, State Highways, and Main Roads under the Roads Act, and the regulation to manage the road system is stated in the *Australian Road Rules* (1999).

RMS define four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- Arterial roads – generally are controlled by RMS, typically no limit in flow and are designed to carry vehicles long distance between regional centres.
- Sub-arterial roads – can be managed by either Council or RMS under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region, or provide connectivity from arterial road routes (regional links).
- Collector roads – provide connectivity between local sites and the-arterial road network, typically carry between 2,000 and 10,000 vehicles per day and are controlled/maintained by local councils.
- Local roads – provide direct access to properties and the collector roads, typically carry between 500 and 4,000 vehicles per day and are controlled by local councils.

#### *Pottsville Road*

Pottsville Road functions as a collector road that provides connectivity between Mooball (at Tweed Valley Way) and Pottsville. Pottsville Road (in addition to the sand quarry) typically provides access to low density rural dwellings, however, to the north of the site it also provides access to Pottsville golf course.

In the vicinity of the site, Pottsville Road has the following characteristics:

- A two way sealed undivided carriageway of approximately 7.5 metres
- Marked double barrier lines
- A sign posted speed limit of 100 kilometres per hour.



Figure 6-2 Pottsville Road in proximity to the site access intersection

To the north of the site, Pottsville Road intersects Cudgera Road at a priority (stop) controlled T-junction (Figure 6-3).

Outputs from Google Traffic indicate that during peak periods of road network operation, the intersection of Pottsville Road and Cudgera Creek Road operates efficiently with only minor delays.

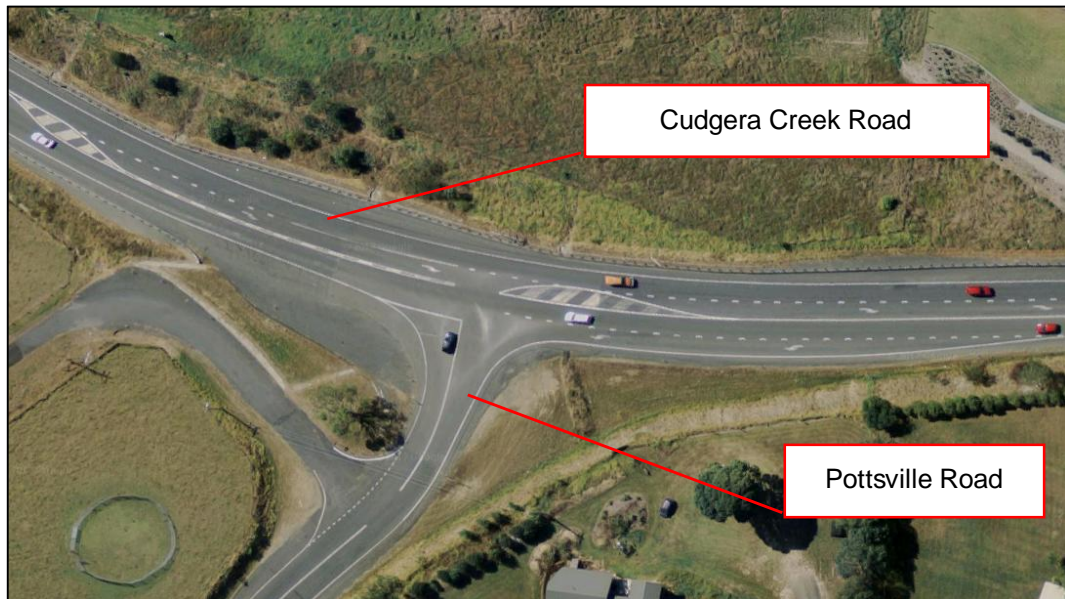


Figure 6-3 Pottsville Road/Cudgera Creek Road intersection

Source: Google Maps

#### *Cudgera Creek Road*

To the east of the Pacific Motorway, Cudgera Creek Road operates as a collector road. However, to the west of the motorway, Cudgera Creek Road operates as a local road that provides access to low density rural dwellings.

Cudgera Creek Road intersects the Pacific Motorway at an interchange with grade separated on-ramps and off-ramps.

East of the Pacific Motorway, Cudgera Creek Road has the following characteristics:

- A two way sealed undivided carriageway of approximately 12 metre width (including shoulders)
- Shoulders that are approximately two metres wide
- Marked double barrier lines
- Turning lanes (left and right) at Pottsville Road
- A sign posted speed limit of 60 kilometres per hour.

#### *Dunloe Sands Quarry access road*

Access to the site is provided via a two-way sealed road, with a single travel lane in each direction and a carriageway width of approximately seven metres.



Figure 6-4 Dunloe Sands Quarry access road

Heavy vehicles access/egress the site utilising the grade separated Pacific Motorway/Cudgera Creek Road Interchange, Cudgera Creek Road and Pottsville Road.

**Existing traffic volumes**

In order to identify the existing traffic volumes in proximity to the site, a seven day tube count (between Tuesday 7 March 2017 and Monday 13 March 2017) was undertaken on Pottsville Road south of Cudgera Creek Road.

The identified traffic volumes (per day and direction) are displayed in Figure 6-5.

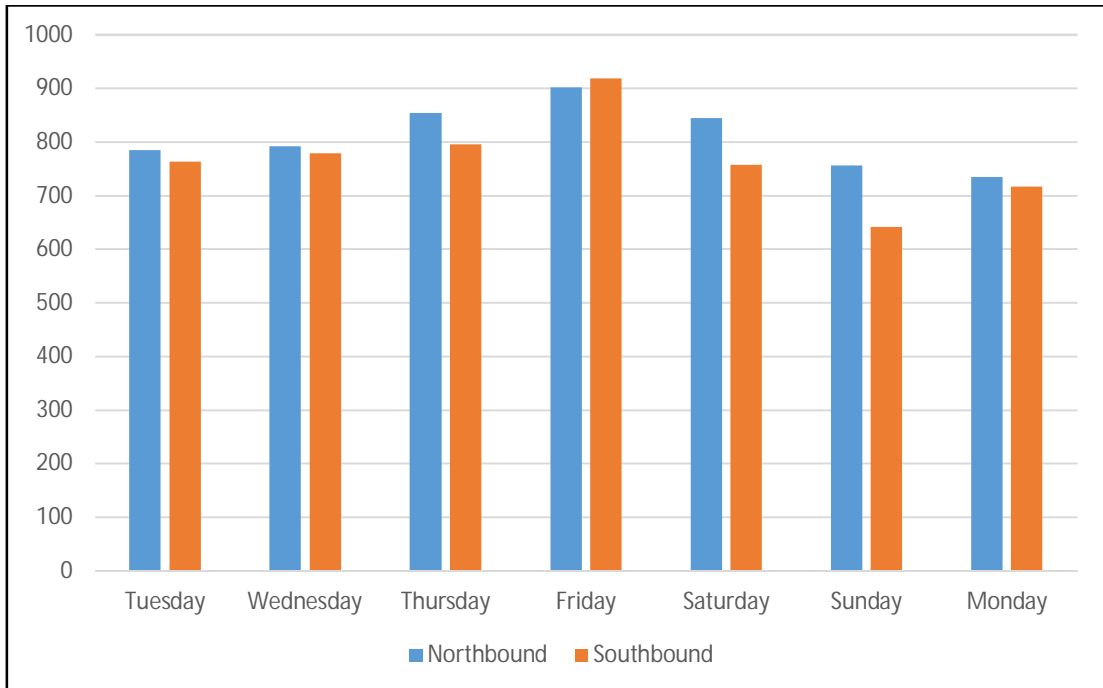


Figure 6-5 Daily traffic volumes on Pottsville Road

The data in Figure 6-5 indicates that daily (two-way) traffic volumes on Pottsville Road are currently in the order of 1,400 – 1,800 vehicles, with peak demand recorded on Friday 10 March 2017.

The hourly (two-way) traffic volumes recorded on Pottsville Road on Friday 10 March 2017 are displayed in Figure 6-6.

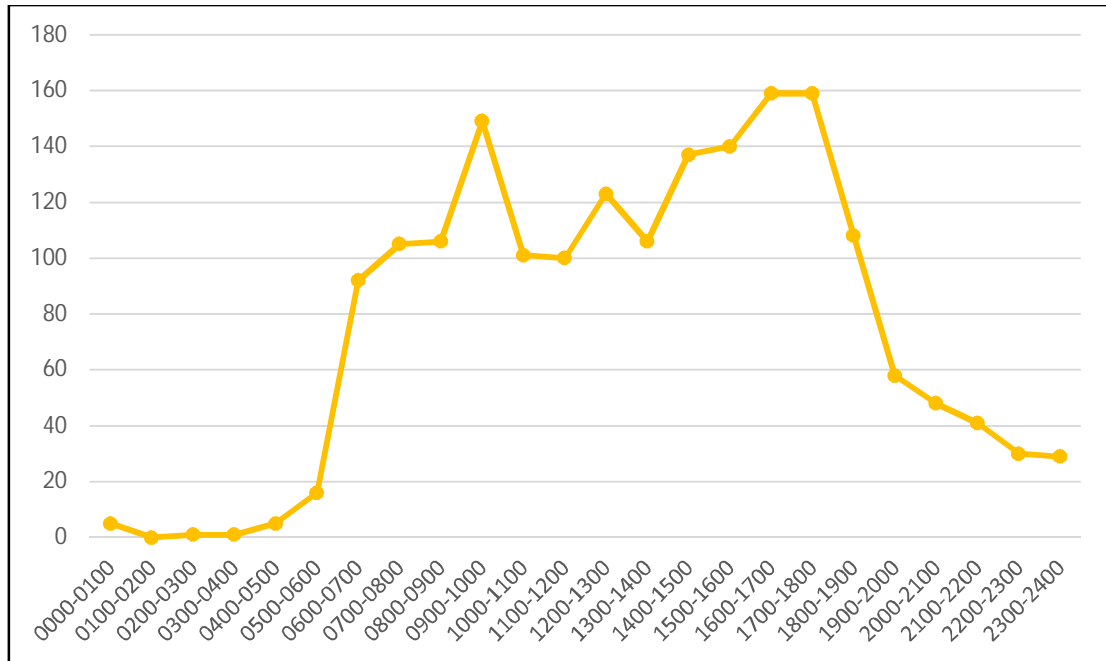


Figure 6-6 Hourly traffic profile for Pottsville Road (Friday 10 March 2017)

The data in Figure 6-6 indicates that peak hour (two-way) traffic activity on Pottsville Road was:

AM Peak (9:00 am – 10:00 am) -149 vehicles per hour

PM Peak (4:00 pm – 5:00 pm) - 159 vehicles per hour

The survey data indicates that approximately seven per cent of vehicles on Pottsville Road consist of heavy vehicles.

The survey outputs are included in Appendix A of the traffic assessment provided in Appendix B.

### Impact assessment

#### Trip generation and distribution

The highest traffic generation for the site expected to be 18 trips, as follows:

- AM – Twelve inbound heavy vehicle trips, twelve outbound heavy vehicle trips, six inbound worker/contractor trips (per hour).
- PM – Twelve inbound heavy vehicle trips, twelve outbound heavy vehicle trips, six outbound worker/contractor trips (per hour).

For the purposes of analysis (as per the existing situation) it is assumed that vehicles will access/egress the site to/from the north via Cudgera Creek Road.

Therefore, vehicles entering the site will undertake a left turn into the access road from Pottsville Road and all vehicles exiting the site a right turn from the access road onto Pottsville Road.

## Road network performance

The traffic impacts of the proposed modifications to the operation of the site has been undertaken utilising absorption capacity analysis (Cp). Absorption capacity analysis determines the maximum rate traffic streams can absorb additional vehicles.

Figure 6-7 displays the number of vehicles that may enter the major stream of traffic for various critical acceptance gaps, namely:

- t(a) - the minimum gap that a driver would use to enter an intersection.
- t(f) – follow-up headway, the gap required by the next queued vehicle.

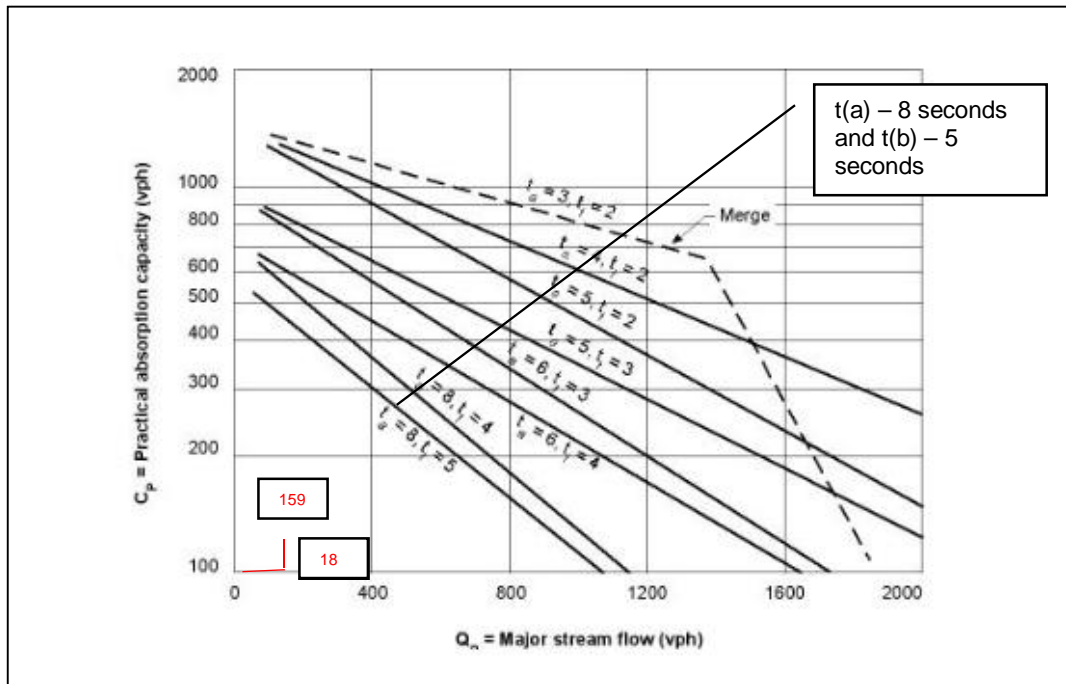


Figure 6-7 Practical absorption capacity at non-signalised intersections

Source: Guide to Traffic Engineering Practice – Part 5 Intersections at Grade

As specified in the *Guide to Traffic Engineering Practice (Part 5: Intersections at Grade)*, for right hand turns from a minor road onto a two way/two lane major road, a critical gap acceptance of five seconds and a follow up headway of three seconds applies.



Movement	Diagram	Description	$t_a$	$t_f$
Left Hand Turn		Not interfering with A Requiring A to slow	14.40 sec 5 sec	2-3 sec 2-3 sec
Crossing		Two lane / one way Three lane / one way Four lane / one way Two lane / two way Four lane / two way Six lane / two way	4 sec 6 sec 8 sec 5 sec 8 sec 8 sec	2 sec 3 sec 4 sec 3 sec 5 sec 5 sec
Right Hand Turn from major road		Across 1 lane Across 2 lanes Across 3 lanes	4sec 5sec 6sec	2 sec 3 sec 4 sec
Right Hand Turn from minor road		Not interfering with A One way Two lane / two way Four lane / two way Six lane / two way	14.40 sec 3 sec 5 sec 8 sec 8 sec	3 sec 3 sec 3 sec 5 sec 5 sec
Merge		Acceleration Lane	3 secs	2 secs

Note:  $t(a)$  = Critical acceptance gap,  $t(f)$  = follow up headway

Figure 6-8 Critical gap acceptance

Source: Guide to Traffic Engineering Practice – Part 5 Intersections at Grade

Vehicles up to the size of a 19-metre truck and dog trailer operate from the site and large vehicles require larger gaps to enter traffic flows compared to passenger vehicles. For the purposes of analysis, a conservative critical gap acceptance of eight seconds and a follow up headway of five seconds have been assumed.

As displayed in Figure 6-7 and based upon the current peak hour traffic volumes on Pottsville Road of 159 vehicles and up to 18 vehicles exiting the site in peak periods, there is adequate capacity to absorb the additional movements without additional traffic control.

Additionally, the Austroads *Guide to Traffic Management* also specifies the criteria whereby capacity analysis at unsignalled intersections is not considered necessary, as presented in Table 6-2.

Table 6-2 Intersection volumes where capacity analysis is not required

	Maximum (two way) peak Hour Flows		
Major Road	400	500	650
Cross Road	250	200	100

Source: Guide to Traffic Management – Part 3 Traffic Studies and Analysis

Based on the current volumes on Pottsville Road (up to 159 vehicles) and the quarry access road (up to 18 vehicles), intersection capacity modelling is not considered necessary for this study.

### Access road intersection layout

#### Sight lines

The Austroads *Guide to Road Design Part 3: Geometric Design* (Table 5.5: Truck stopping sight distances) specifies that (accounting for a reaction time of two seconds) for roads with an operating speed of 100 kilometres per hour, a minimum sight distance of 191 metres should be

provided, plus an additional 22 metres to account for the gradient of Pottsville Road. A desktop review indicates that these sight distances are currently achieved.

A review of crash data indicates that no accidents involving trucks (rigid and articulated) have occurred on Pottsville Road in proximity to the development in the last five years. Therefore the intersection of the quarry access road and Pottsville Road operates safely.

#### Turning treatments

*The Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* provides warrants that apply to major road turn treatments with respect to the provision of basic, auxiliary and channelised lanes. The warrant applicable to roads with speeds of 100 kilometres per hour or greater is displayed below in Figure 6-9.

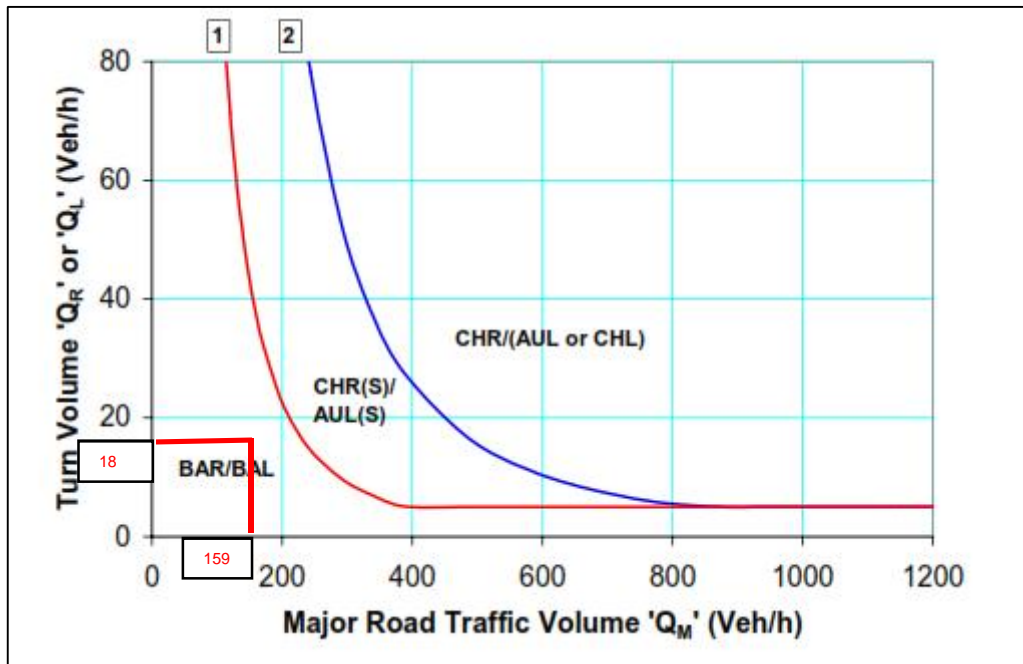


Figure 6-9 Warrants for turn treatments on major road

Source: Guide to Road Design– Part 4A Unsignalised and Signalised Intersections

In accordance with two way traffic volumes on Pottsville Road of 159 vehicles and up to 18 vehicles expected to access the site in peak periods, the provision of a basic left turn lane is appropriate for the access road intersection.

As displayed in Figure 6-10, a basic left turn lane is provided on Pottsville Road at its intersection with the quarry access road.



Figure 6-10 Quarry access road intersection

As displayed in Figure 6-9, the current access arrangement is considered appropriate to accommodate the additional heavy vehicle activity associated with the modification to the site.

#### Mitigation measures

The current intersection arrangement (Figure 6-10) does not support heavy vehicles accessing the site south of Pottsville Road and undertaking a right turn into the access road. Therefore as per the current arrangement, it is recommended that all heavy vehicles continue to access and egress the site to/from Cudgera Creek Road.

#### 6.2.2 Noise impact assessment

A noise impact assessment was undertaken by GHD for the proposed modification and is provided in Appendix C. A summary of the key findings of the assessment is provided in the sections below.

#### Existing environment

The nearest identified sensitive receivers located in the vicinity of the site are detailed in Table 6-3 and shown in Figure 2-1 of the noise impact assessment report provided in Appendix C. Distances are stated from the receiver to the nearest point at the site boundary.

Table 6-3 Identified noise sensitive receivers (from site operations)

Receiver	Receiver type	Address	Distance from site activity (metres)	Direction from site
R1	Residential	265 Warwick Park Road	1,030	South
R2	Residential	265 Warwick Park Road	1,060	South
R3	Residential	200 Warwick Park Road	1,070	Southwest

Receiver	Receiver type	Address	Distance from site activity (metres)	Direction from site
R4	Residential	200 Warwick Park Road	1,060	Southwest
R5	Residential	175 Warwick Park Road	960	Southwest
R6	Residential	157 Warwick Park Road	970	Southwest
R7	Residential	129 Warwick Park Road	1,090	West
R8	Residential	679 Pottsville Road	1,720	Northwest

Sensitive receivers were also identified along Pottsville Road, which will be used to access the quarry. These are detailed in Table 6-4 and Figure 6-11 below.

**Table 6-4 Identified noise sensitive receivers (along Pottsville Road)**

Receiver	Receiver type	Address	Distance from Pottsville Road (metres)
R9	Residential	765 Pottsville Road	96
R10	Residential	771 Pottsville Road	14
R11	Residential	834 Pottsville Road	56
R12	Residential	854 Pottsville Road	46
R13	Residential	866 Pottsville Road	10
R14	Residential	883 Pottsville Road	14
R15	Residential	883 Pottsville Road	16
R16	Residential	940 Pottsville Road	79
R17	Residential	943 Pottsville Road	104
R18	Residential	56 Hazelwood Drive	164
R19	Residential	943 Pottsville Road	69
R20	Residential	940 Pottsville Road	51
R21	Residential	3 Hazelwood Drive	27

### ***Plant and equipment noise monitoring***

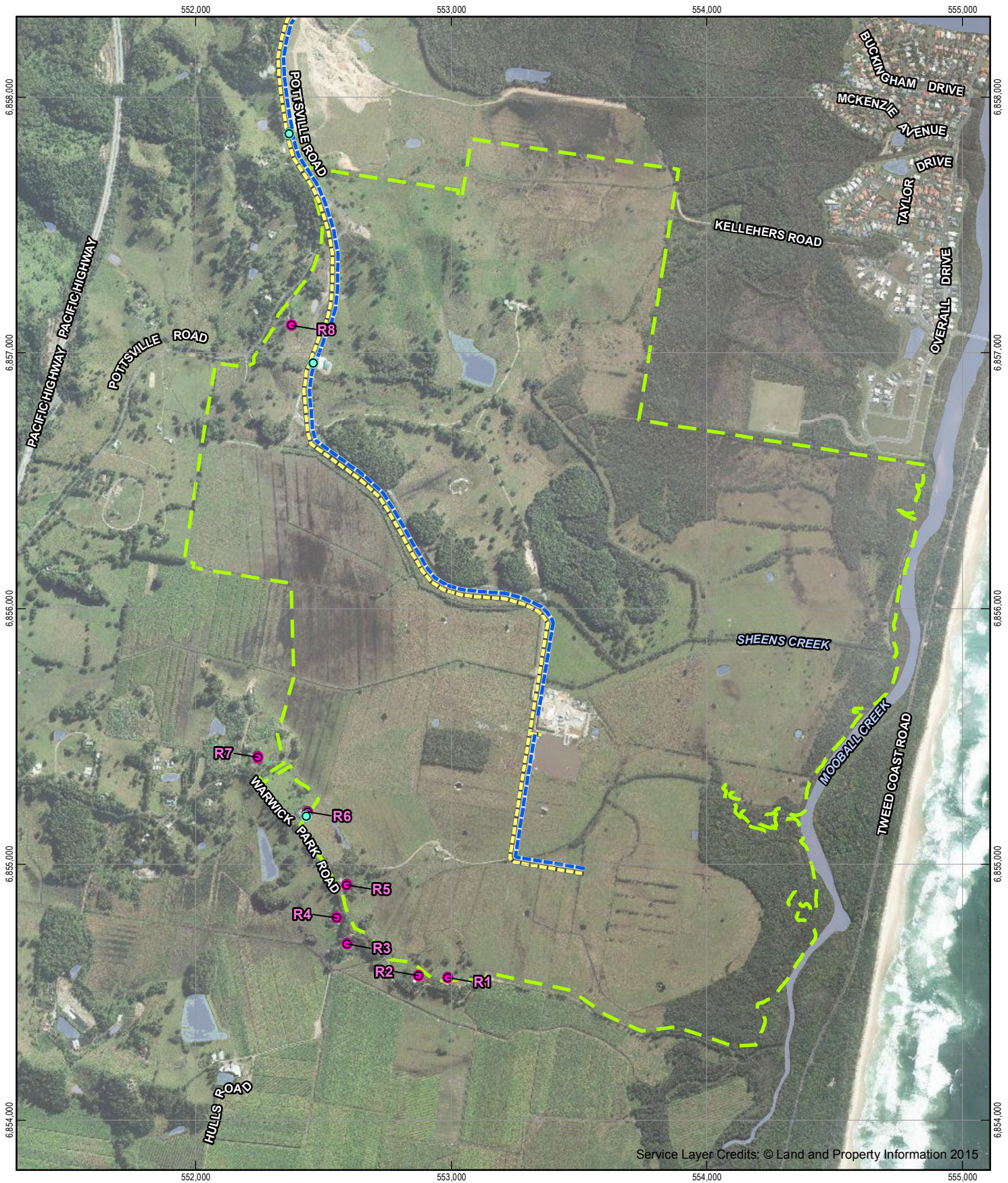
A noise survey of the operational plant and equipment was undertaken to determine the source noise levels which was used for noise monitoring. A minimum of one minute per measurement and four measurements per equipment were conducted in accordance with *AS1217.1 – 1985 Acoustics – Determination of sound power levels of noise sources: Part 7 – survey method*.

The measurements were taken at a fixed distance from each side of the equipment. A summary of the measured equipment levels is provided in Table 2.4 of the noise impact assessment report provided in Appendix C.

### ***Background noise monitoring***

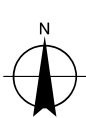
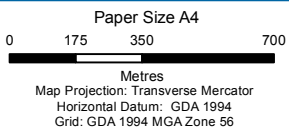
Background noise measurements were undertaken using one SVAN 977 sound level meter on 8 March 2017. The sound level meter was programmed to accumulate environmental noise data continuously. Measurements were taken at three locations each for a period of 30 minutes at locations close to residential receivers.

Measurements of the background noise were taken at three sites for 30 minutes each.  $L_{Aeq}$  values were logged at each period and are shown in Table 6-5 below.



**LEGEND**

- Project boundary
- Incoming haul road
- Outgoing haul road
- Noise monitoring locations
- Receiver locations



Holcim (Australia) Pty Ltd  
Dunloe Sand Modification

**Location of site, sensitive receivers  
and noise monitoring locations**

Job Number | 22-18823  
Revision | A  
Date | 10 Apr 2017

**Figure 6-11**

Table 6-5 Measured background levels at relevant site roads

Location	15 min period	L <sub>Aeq(15min)</sub> dB(A)	L <sub>A90(15min)</sub> dB(A)	Observations
Warwick Park Road	Period 1	40.5	36.3	Quarry not audible
	Period 2	38.8	36.2	
Pottsville Road	Period 1	64.6	40.5	-
	Period 2	62.8	42.1	
Quarry Access Road	Period 1	51.7	38.7	Low frequency sound audible, possible from quarry. Constant road traffic noise audible from the Pacific Highway

### Impact assessment

#### Operational noise criteria

The current site operates in accordance with Project Approval 06/-0030 dated 24 November 2008. Schedule 3 of the Project Approval provides noise limits which the quarry must comply with and are presented below in Table 6-6. These noise limits apply to site operations and traffic on the quarry access road. Different noise criteria applies for additional traffic when the trucks are on Pottsville Road.

Table 6-6 Noise impact assessment criteria

Receiver Location	Day L <sub>Aeq (15 min)</sub> dB(A)
Residences on privately-owned land	48

Notes:

- Noise from the site is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the identified noise limits, except where otherwise specified below.
- Where it can be demonstrated that direct measurement of noise from the project is impractical, alternative means of determining compliance may be acceptable (see Chapter 11 of the NSW Industrial Noise Policy).
- The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise level where applicable.
- The identified noise emission limits apply under meteorological conditions of wind speed up to 3m/s at 10 metres above ground level, and temperature inversion conditions.

#### Hours of operation

Holcim are required to comply with the operating hours in Table 6-7.

Table 6-7 Operating hours

Activity	Day	Time
Sand extraction and processing, delivery and distribution, and other quarry related activities	Monday-Friday	7:00am to 5:00pm
	Saturday	7am to 12:00pm
	Sunday and Public Holidays	Nil
Maintenance (if inaudible at neighbouring residences)	Any day	Any time

### Road traffic noise criteria

The *Road Noise Policy* (RNP) (Department of Environment, Climate Change and Water (DECCW), 2011) provides traffic noise criteria for residential receivers in the vicinity of existing roads, shown in Table 6-8. The criteria is applied to operational and construction traffic on public roads to identify potential road traffic impacts and the requirement for reasonable and feasible mitigation measures.

The RNP application notes state that *“for existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level as a result of the development should be limited to 2 dB above that of the noise level without the development. This limit applies wherever the noise level without the development is within 2 dB of, or exceeds, the relevant day or night noise assessment criterion.”*

If road traffic noise increases from the development are within 2 dB(A) of current levels then the objectives of the RNP are met and no specific mitigation measures are required. The development is considered to be the modified proposal.

Table 6-8 Road traffic noise criteria,  $L_{Aeq(period)}$  dB(A)

Type of Development	Day 7 am to 10 pm	Night 10 pm to 7 am
Existing residence affected by additional traffic on sub-arterial/arterial roads generated by land use developments	60 $L_{Aeq(15hr)}$	55 $L_{Aeq(9hr)}$

The *Roads and Maritime Noise Criteria Guideline* (2015) defines sub-arterial, collector and local roads in as shown in Table 6-9. Based on these definitions, Pottsville Road has been classified as a collector road which is assessed under the sub-arterial road criteria, as outlined in Table 6-8.

Table 6-9 Roads and Maritime road classification criteria

Road	Definition
<b>Sub-arterial</b>	<p>Connects arterials to regions of development and carry traffic from one part of a region to another.</p> <p>Provide connection between arterial roads and local roads. May support arterial roads during peak periods.</p> <p>A road that collects local traffic leaving a locality and connects to another local road, sub-arterial or arterial.</p> <p>Note not all networks are large enough to have both sub-arterial and collector roads.</p>
<b>Collector</b>	<p>Connects the sub-arterial roads to the local road system in developed areas.</p> <p>May support sub-arterial roads during peak periods.</p> <p>May have been designed as local streets but can serve major traffic-generating developments or support non-local traffic.</p> <p>Note not all networks are large enough to have both collector and sub-arterial roads.</p> <p>The Road Noise Policy does not provide separate noise criteria for collector roads. Roads and Maritime applies sub-arterial noise criteria to collector roads and still considers collector roads and sub-arterial roads to be different functional classes.</p>
<b>Local</b>	<p>Provide vehicular access to abutting property and surrounding streets. They are the subdivisional roads within a particular developed area.</p>

### **Modelling method**

The site and quarry road contribution to noise levels at receivers was modelled using noise modelling and assessment software Cadna A. Environmental noise propagation was calculated according to ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors'. The modelling assumptions made are detailed in section 4.1.1 of the noise impact assessment report provided in Appendix C.

A separate model was created using the noise intrusion modelling software SOUNDPLAN v7.4 in order to determine the effects of the trucks on receivers along Pottsville Road. Road traffic noise propagation was calculated according to the *Calculation of Road Traffic Noise* (CoRTN 1998) standard. The modelling assumptions made are detailed in section 4.1.2 of the noise impact assessment report provided in Appendix C.

In order to determine the accuracy and validity of the model, a validation model was created and summarised in Table 4-2 and Table 4-3 of the noise impact assessment report provided in Appendix C. The results show that the model predicts accurately (within 2 dBA) for the measured location when using traffic counts measured on site. The results are therefore taken as validation of the reliability of the model produced.

### **Operational noise impact**

#### *Site operation*

The site operation, consisting of plant and equipment within the quarry, was modelled with the above assumptions and the resulting noise levels at sensitive receivers is shown in Table 6-10 below. Results show that the proposed scenario of twelve trucks per hour will comply with the noise criteria of 48 dBA at all sensitive receivers. A noise emission map for the site has been provided in Figure 4-1 of the noise impact assessment report provided in Appendix C.

**Table 6-10** Noise levels at sensitive receivers from onsite operation

Receiver	Sound Pressure Level $L_{Aeq(15min)}$ dB(A)	Compliance
R1	40	Yes
R2	38	Yes
R3	36	Yes
R4	36	Yes
R5	41	Yes
R6	42	Yes
R7	42	Yes
R8	31	Yes

#### *Quarry road operation*

Operation of the quarry access road was assessed against the noise limits provided in the Project Approval. Truck volumes along the quarry access road are expected to increase from the current scenario of four trucks per hour (eight movements) to twelve trucks per hour (24 movements). The expected truck volume of twelve trucks per hour (24 movements) has been used to assess the noise from operation of the quarry access road. The resulting noise levels at each receiver are shown below in Table 6-11.

Results show that the proposed scenario of twelve trucks per hour on the quarry access road will comply with the noise criteria of 48 dBA at all sensitive receivers. Noise emission maps for the current and proposed cases have been provided for the Quarry Road in Figure 4-2 and Figure 4-3 of the noise impact assessment report provided in Appendix C.



Table 6-11 Noise levels at sensitive receivers from quarry road operation

Receiver	Proposed development twelve trucks per hour $L_{Aeq(15min)}$ dB(A)	Criteria, dBA	Compliance
R1	26	48	Yes
R2	27	48	Yes
R3	24	48	Yes
R4	24	48	Yes
R5	29	48	Yes
R6	31	48	Yes
R7	31	48	Yes
R8	46	48	Yes

#### Traffic noise impacts

The impact on traffic levels and resulting noise at sensitive receivers along Pottsville Road was modelled using SoundPLAN as outlined above. The noise impact was assessed against the noise criteria for a sub-arterial road of 60 dBA  $L_{Aeq(15hr)}$ , as stated above. The resulting noise levels at sensitive receivers are shown in Table 6-12. A noise emission map for Pottsville Road is also provided in Figure 4-4 and Figure 4-5 of the noise impact assessment report provided in Appendix C.

Table 6-12 Noise levels at sensitive receivers from truck operation along Pottsville Road

Receiver	Proposed development $L_{Aeq(15hr)}$ dBA	Criteria dBA	Compliance
R9	52	60	Yes
R10	57	60	Yes
R11	45	60	Yes
R12	49	60	Yes
R13	51	60	Yes
R14	56	60	Yes
R15	48	60	Yes
R16	44	60	Yes
R17	50	60	Yes
R18	42	60	Yes
R19	54	60	Yes
R20	48	60	Yes
R21	38	60	Yes

#### Mitigation measures

From the results outlined above, the proposed development is predicted to comply with the noise criteria. However additional general in-principle noise mitigation and management measures have been provided below.

#### Work ethics

- All activities on site should be confined between the approved hours: daytime hours of 7:00 am to 5:00 pm from Monday to Friday and 7:00 am to 12:00 pm on Saturday. In particular, haul trucks should not arrive on site (or depart) before 7:00 am.
- All personnel on site should be made aware of the potential for noise impacts and should aim to minimise impact or elevated noise levels, where possible.

### Site machinery

- All engine covers should be kept closed while equipment is operating.
- Vehicles should be kept properly serviced and fitted with appropriate mufflers. The use of exhaust brakes should be eliminated, where practicable.
- Machines found to produce excessive noise compared to industry best practice should be removed from the site or stood down until repairs or modifications can be made.

### Access road

- All trucks entering and exiting the quarry should keep at or below the required internal speed limit of 25 kilometres per hour on the quarry road, as outlined in the EMP.

## 6.2.3 Air quality impact assessment

An air quality impact assessment was undertaken by GHD for the proposed modification and is provided in Appendix D. A summary of the key findings of the assessment is provided in the sections below.

### Existing environment

The nearest identified sensitive receivers located in the vicinity of the site are detailed in Table 6-13 and shown in Figure 2-1 of the air quality impact assessment report. Distances are stated from the receiver to the nearest point at the site boundary.

Table 6-13 Identified air quality sensitive receivers

Receiver	Receiver type	Address	Distance from site activity (metres)	Direction from site
R1	Residential	265 Warwick Park Road	1,030	South
R2	Residential	265 Warwick Park Road	1,060	South
R3	Residential	200 Warwick Park Road	1,070	Southwest
R4	Residential	200 Warwick Park Road	1,060	Southwest
R5	Residential	175 Warwick Park Road	960	Southwest
R6	Residential	157 Warwick Park Road	970	Southwest
R7	Residential	129 Warwick Park Road	1,090	West

### Ambient air quality

Holcim conducts monthly dust deposition monitoring at four locations surrounding the site as required by the Project Approval. A summary of the results provided by Holcim for 2016 is provided in Table 6-14. The annual average for all four sites is well below the criteria of 4g/m<sup>2</sup>/year. The highest annual average dust levels are at site DDG2, and represent only 30 per cent of the allowable dust levels, however these results are skewed from one month with elevated levels. The results show that dust impacts from the site are minimal and the site is readily complying with the criteria.

Table 6-14 2016 dust deposition sampling results

Month/site	DDG 1	DDG 2	DDG 3	DDG 4
January	0.3	0.4	0.5	0.6
February	0.4	0.6	0.5	0.5
March	0.2	4.7	0.3	0.5
April	0.2	1.6	0.2	0.8
May	0.3	1.2	0.3	1.6

Month/site	DDG 1	DDG 2	DDG 3	DDG 4
June	0.3	1.1	1.6	0.5
July	0.1	0.5	0.4	0.4
August	0.6	0.5	0.3	0.4
September	0.8	0.5	0.4	0.3
October	0.8	0.5	0.4	0.3
November	0.4	1.9	0.3	0.4
December	0.5	1.7	0.6	0.5
<b>Annual average</b>	<b>0.41</b>	<b>1.23</b>	<b>0.48</b>	<b>0.57</b>

Sampling of total suspended particulate (TSP) and particulate matter less than ten micro metres in aerodynamic equivalent diameter (PM<sub>10</sub>) are not currently required at the site. These are only required once the site is operating at a rate above 200,000 tonnes per annum as documented in the EMP.

There is no particulate (PM<sub>10</sub>) sampling undertaken at the site and the NSW EPA monitoring network does not have a site in the area. The Queensland (QLD) Department of Environment and Heritage Protection (EHP) also have an air quality monitoring network. In order to understand background PM<sub>10</sub> levels in the area, GHD reviewed data from the QLD EHP Springwood sampling station, which is approximately 90 kilometres north of the site. Data referenced for Springwood between the years 2007 and 2011 show the 75th percentile to range between 15.2 and 18.5 µg/m<sup>3</sup>.

In the absence of any site specific data, this can be used as indicative particulate levels in the proposal area.

During a site visit, GHD did not observe any excessive dust from trucks or processes onsite.

### ***Local meteorology***

Local meteorology is dependent on local topography, land use, vegetation, and watercourses and would vary along the proposal site. To conduct a conservative assessment, worst-case meteorology was assumed for dust dispersion, based on all possible wind directions and speeds.

A five year wind rose was sourced for the study area (from willyweather.com.au) for Coolangatta. As shown in Figure 6-12, the five-year wind rose shows that calm, light and gentle winds occur for nearly 70 per cent of the time, with roughly 30 per cent of wind above 19.8 kilometres per hour. This is a level that could cause nuisance dust. Most high winds occur from the north, meaning that dust impacts would be more likely to occur opposite to this direction, to the south.



Figure 6-12 Wind rose for Coolangatta

**Impact assessment**

**Assessment criteria**

Air quality impact assessment criteria are prescribed within the NSW EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, Department of Environment and Conservation* (August 2016) (Approved Methods). Air quality criteria are also listed in the Project Approval 06/-0030, dated 24 November 2008.

To ensure that dust environmental outcomes are achieved, emissions from a quarry must be assessed against the criteria given in Table 6-15.

These criteria should to be met at existing or future off-site sensitive receptors. Particulate and dust deposition levels are provided as cumulative impacts, where the predicted impact of the proposal is added to the adopted background levels.

Table 6-15 Adopted air quality impact assessment criteria

Pollutant	Averaging period	Criteria <sup>1</sup>
PM <sub>10</sub>	24 hours	50 µg/m <sup>3</sup>
	Annual	30 µg/m <sup>3</sup>
Total suspended particles	Annual	90 µg/m <sup>3</sup>
Dust deposition	Annual	2 g/m <sup>2</sup> /month <sup>2</sup>

Notes 1: Based on the Air NEPM and the Approved Methods  
 2: Maximum increment. Maximum cumulative impact of 4 g/m<sup>2</sup>/month

### **Air emissions from additional trucks**

The air quality assessment focuses on dust, particulate matter being the primary emission to air from the quarry with potential for off-site impact. The fractions of interest assessed in this report are airborne concentrations of total suspended particulate (TSP) and fine particulate matter as well as total deposited dust.

Particulate emissions from the additional eight truck movements per hour would mainly be attributed to wheel generated dust on unpaved surfaces and loading of the trucks. The access road from the main road to the site is paved so dust will not be an issue until trucks access the site. Once on the site, there is some potential for dust, however as the site consists of sand, which has large particle size, dust impacts would be minimal.

The worst case scenario for trucks travelling on unpaved surfaces once in the site is assumed to be a truck travelling to the opposite end of the site (to the future second extraction pond) which is approximately 185 metres each way, a total of 370 metres. Worst-case emissions have been estimated using the national pollutant inventory (NPI) *Emissions estimation technique manual for mining*, version 3.1. TSP and particulate matter less than ten micro metres in aerodynamic equivalent diameter (PM<sub>10</sub>) are included in the assessment. A review of particle sizes from the site (provided in Appendix A of the air quality impact assessment report in Appendix D) shows there are no fine particles in the extracted sand and PM<sub>2.5</sub> has not been included in the assessment. TSP is included in the emissions inventory below however this is not discussed in more detail as dust impacts from the site are not currently an issue as discussed above and TSP has annual averaged criteria. PM<sub>10</sub> has a 24 hour averaged criteria so in order to assess if there is potential for dust impacts, this has been assessed in more detail. Dust emissions from additional trucks of the proposal are provided in Table 6-16.

**Table 6-16** Dust emission inventory from trucks

	Scenario one (existing)	Scenario two (proposed)
Trucks per hour	4	12
Metres per truck	370	370
KM per day in total	1.48	4.44
TSP g/s over 10 hour day	0.1739	0.5217
PM <sub>10</sub> g/s over 10 hour day	0.051	0.154

### **Predicted impacts**

A level 1 screening impact assessment was undertaken with consideration to the Approved Methods. Modelling was undertaken using the EPA approved dispersion model, AUSPLUME. A synthetic worst-case meteorological data file was created that considers a range of wind speed and stability class combinations that could occur over the year.

The following assumptions were used in the model:

- Particle size distribution was used as provided by Holcim (refer to Appendix A of the air quality impact assessment report in Appendix D)
- Land use surface roughness coefficient of 0.1 metres (flat rural land)
- Ground level receptors
- Irwin rural wind profile exponents
- All other EPA recommend default settings.

The following scenarios were assessed for the proposal:

- **Scenario one** - Four trucks per hour each travelling 370 metres on unpaved roads within the site. The surface of the road is assumed worst-case with a mix of soil and gravel
- **Scenario two** - Twelve trucks per hour each travelling 370 metres on unpaved roads within the site. The surface of the road is assumed worst-case with a mix of soil and gravel
- **Scenario three** - Twelve trucks per hour each travelling 370 metres on unpaved roads within the site. The surface of the road is assumed to be sand with a particle size of typical sand from the site supplied by Holcim.

A summary of the predicted results from the existing truck volumes and proposed truck volumes is presented below in Table 6-17.

This is the predicted maximum increment from trucks only, but shows how little impact dust from this activity has on the nearest sensitive receptors. This is due to the large particle size of sand, the distance from sensitive receivers and the small scale of operations. These worst-case predictions assume the worst day for dust dispersion in a year and no dust mitigation. Scenario two assumes a worst case gravel road and predicts a worst-case PM<sub>10</sub> increase of 2 µg/m<sup>3</sup> on one day per year (i.e. the maximum predicted 24 hour level). The scenario three prediction which assumes trucks driving over a sand access road onsite predicted no increase in PM<sub>10</sub> at any nearby sensitive receptor.

Table 6-17 Predicted maximum 24 hour PM<sub>10</sub> concentration from trucks  
µg/m<sup>3</sup>

Sensitive receptor	Existing scenario one (four trucks)	Proposed scenario two (twelve trucks) gravel road	Proposed scenario three (twelve trucks) sandy road
R1	0.6	1.8	0
R2	0.7	1.5	0
R3	0.7	1.7	0
R4	0.9	1.8	0
R5	0.9	2.0	0
R6	0.8	1.6	0
R7	0.2	0.7	0

The results in Table 6-17 show that dust impacts from the additional trucks do not have any significant impact at nearby sensitive receptors. The maximum predicted increment of 2 µg/m<sup>3</sup> is well below the criteria of 50 µg/m<sup>3</sup>. This was predicted from a worst-case gravel road, which does not currently or would likely exist and has been presented as a comparison only.

Due to the quarry extracting sand which has a low dust potential, cumulative impacts are not expected, which is demonstrated by the low levels of dust in the monthly sampling at all sites.

Dust monitoring data provided above shows that the annual and monthly deposition results to be consistently below the criteria and no dust complaints have been made at the site.

Results show that worst-case dust impacts from increasing the number of trucks to twelve each hour are minimal and dust impacts are not expected.

### Mitigation measures

While general quarry operations are not expected to exceed air quality goals at nearby receptors, the following mitigation measures are recommended:

- Control on-site traffic by designating specific routes for haulage and access and limiting vehicle speeds to below 25 kilometres per hour
- All trucks hauling material should be covered before exiting the site and should maintain a reasonable amount of vertical space between the top of the load and top of the trailer
- Material spillage on sealed roads should be cleaned up as soon as practicable.

## 7. Conclusion

This EA report has been prepared to assess the modification of Schedule 2, Condition 8 of Project Approval 06/-0030, to increase daily heavy vehicle movements in and out of the site. Currently, the site is restricted to eight movements (in plus out) per hour. This proposal supports the movement of up to twelve trucks per hour (one way), or an average of 100 inbound trucks plus 100 outbound trucks per working day, across the course of a calendar month.

The modified proposal will allow more flexibility in daily quarry heavy vehicle movements to supply to the internal and external market, which service construction material industries and major infrastructure projects being undertaken for the community's benefit.

The proposed modification is considered to be substantially the same development as that approved under Project Approval 06/-0030 as it would not alter the operation or intensify activities beyond the current approved development.

The modification would allow for continued use of the site as a sand quarry, which is consistent with the provisions and objectives of the site's zoning.

Issues identified as having the largest potential for environmental impact as a result of the modified proposal includes traffic, noise and air quality impacts due to increased daily heavy vehicle traffic accessing the site.

The impact assessment has determined that:

- Based upon the current peak hour traffic volumes on Pottsville Road, there is adequate capacity to absorb the additional heavy vehicle movements without additional traffic control. The current road access arrangement is considered appropriate to accommodate additional heavy vehicle activity.
- Increasing the number of trucks at the quarry from four trucks per hour to a maximum of twelve trucks per hour would result in compliance with relevant noise criteria. The results from noise modelling demonstrate that the modified proposal is expected to comply with both the Project Approval criteria and RNP criteria at all nearby sensitive receivers.
- Increases in dust from twelve trucks inbound and twelve trucks outbound per hour are minimal and no significant additional impacts are expected.

The proposed modification has been communicated to the local community through a newsletter. Issues raised through this process have been addressed by Holcim in the EA or on an individual basis with community members.

It is therefore requested that DP&E support the proposed modification as documented.



## 8. References

Australian Government, 2012, National Pollutant Inventory Emissions Estimation Technique Manual for Mining, Version 3.1.

Austrroads, Guide to Traffic Management.

Austrroads, Guide to Road Design.

Austrroads, Guide to Traffic Engineering Practice.

DECCW, 2011, Road Noise Policy.

EPA, 2016, Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, Department of Environment and Conservation.

International Standards, 1996, ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors'.

PLANIT Consulting, 2016, Environmental Management Plan and Environmental Management Strategy for Dunloe Sands.

Roads and Maritime, 2015, Noise Criteria Guideline.

Standards Australia, 1985, AS1217.1 – 1985 Acoustics – Determination of sound power levels of noise sources: Part 7 – survey method.

Tweed Shire Council, 2014, Tweed Local Environmental Plan.

UK Department of Transport, 1998, Calculation of Road Traffic Noise.

WillyWeather, 2017, Coolangatta Wind Rose.

# Appendices

# Appendix A – Project Approval 06/-0030 conditions review

Condition no.	Current condition	Proposed modification to condition
<b>Schedule 2 – Administrative conditions</b>		
1	The Proponent shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.	No modification proposed
2	The Proponent shall carry out the project generally in accordance with the: <ul style="list-style-type: none"> <li>(a) EA;</li> <li>(b) statement of commitments; and</li> <li>(c) conditions of this approval.</li> </ul> <i>Note: The general layout of the project is shown in the figure in Appendix 1.</i>	No modification proposed
3	If there is any inconsistency between the documents referred to above, the conditions of this approval shall prevail to the extent of the inconsistency.	No modification proposed
4	The Proponent shall comply with any reasonable requirement/s of the Director-General arising from the Department’s assessment of: <ul style="list-style-type: none"> <li>(a) any reports, plans, programs or correspondence that are submitted in accordance with this approval; and</li> <li>(b) the implementation of any actions or measures contained in these reports, plans, programs or correspondence.</li> </ul>	No modification proposed
5	Sand extraction operations may take place until 1 January 2035. <i>Note: Under this Approval, the Proponent is required to rehabilitate and revegetate the site to the satisfaction of the Director-General. Consequently this approval will continue to apply in all other respects other than the right to conduct quarrying operations until the site has been rehabilitated and revegetated to a satisfactory standard.</i>	No modification proposed
6	The Proponent shall not extract to a depth of more than 12 m below the natural ground surface. <i>Notes: The Department acknowledges that this limit may have a variance of +/- 1m.</i>	No modification proposed
7	The Proponent shall not transport more than 300,000 tonnes of sand material a year from the site.	No modification proposed
8	The Proponent shall ensure that heavy vehicle movements (in and out) associated with the project do not exceed 8 per hour.	Yes This application seeks to modify this condition to allow up to 120 inbound and 120 outbound heavy vehicle movements from the site per weekday and up to 60 inbound and 60 outbound heavy vehicle movements on Saturdays. These

Condition no.	Current condition	Proposed modification to condition
		movements average to approximately 100 heavy vehicle movements per day over the course of a calendar month.
9	With the approval of the Director-General, the Proponent may submit any management plan or monitoring program required by this approval on a progressive basis.	No modification proposed
10	The Proponent shall ensure that any new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA. <i>Notes:</i> <ul style="list-style-type: none"> <li>• Under Part 4A of the EP&amp;A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.</li> <li>• Part 8 of the EP&amp;A Regulation sets out the requirements for the certification of the project.</li> </ul>	No modification proposed
11	The Proponent shall ensure that all demolition work is carried out in accordance with AS 2601-2001: <i>The Demolition of Structures</i> , or its latest version.	No modification proposed
12	The Proponent shall ensure that all plant and equipment used at the site is: <ul style="list-style-type: none"> <li>(a) maintained in a proper and efficient condition; and</li> <li>(b) operated in a proper and efficient manner.</li> </ul>	No modification proposed
13	Prior to carrying out any development, or as otherwise agreed by Council, the Proponent shall pay Council \$47,250 in accordance with Council's Tweed Road Contribution Plan and \$399.40 in accordance with Tweed Council Section 94 Plan No.18.	No modification proposed
<b>Schedule 3 – Environmental performance conditions</b>		
1	Within 1 month of the date of approval of the Landscape Management Plan (see condition 27 below), the Proponent shall: <ul style="list-style-type: none"> <li>(a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction;</li> <li>(b) submit a survey plan of these boundaries to the Director-General; and</li> <li>(c) ensure that these boundaries are clearly marked at all times in a permanent manner that allows operating staff and inspecting officers to clearly identify those limits.</li> </ul> <i>Note: The limit of extraction includes the area described in the EA and shown conceptually on the plan in Appendix 1.</i>	No modification proposed
2	The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1.	

Condition no.	Current condition	Proposed modification to condition													
	<table border="1"> <thead> <tr> <th>Receiver Location</th> <th>Day <math>L_{Aeq}</math> (15 min) dB(A)</th> </tr> </thead> <tbody> <tr> <td>Residences on privately-owned land</td> <td>48</td> </tr> </tbody> </table> <p><i>Table 1: Noise Impact Assessment Criteria</i></p> <p>Notes:</p> <ul style="list-style-type: none"> <li>• Noise from the site is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the identified noise limits, except where otherwise specified below.</li> <li>• Where it can be demonstrated that direct measurement of noise from the project is impractical, alternative means of determining compliance may be acceptable (see Chapter 11 of the NSW Industrial Noise Policy).</li> <li>• The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise level where applicable.</li> <li>• The identified noise emission limits apply under meteorological conditions of wind speed up to 3m/s at 10 metres above ground level, and temperature inversion conditions.</li> </ul>	Receiver Location	Day $L_{Aeq}$ (15 min) dB(A)	Residences on privately-owned land	48										
Receiver Location	Day $L_{Aeq}$ (15 min) dB(A)														
Residences on privately-owned land	48														
3	<p>The Proponent shall comply with the operating hours in Table 2.</p> <table border="1"> <thead> <tr> <th>Activity</th> <th>Day</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Sand extraction and processing, delivery and distribution, and other quarry related activities</td> <td>Monday – Friday</td> <td>7:00am to 5:00pm</td> </tr> <tr> <td>Saturday</td> <td>7:00am to 12:00pm</td> </tr> <tr> <td>Sunday and Public Holidays</td> <td>Nil</td> </tr> <tr> <td>Maintenance (if inaudible at neighbouring residences)</td> <td>Any day</td> <td>Any time</td> </tr> </tbody> </table> <p><i>Table 2: Operating Hours</i></p>	Activity	Day	Time	Sand extraction and processing, delivery and distribution, and other quarry related activities	Monday – Friday	7:00am to 5:00pm	Saturday	7:00am to 12:00pm	Sunday and Public Holidays	Nil	Maintenance (if inaudible at neighbouring residences)	Any day	Any time	No modification proposed
Activity	Day	Time													
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	Saturday	7:00am to 12:00pm													
	Sunday and Public Holidays	Nil													
Maintenance (if inaudible at neighbouring residences)	Any day	Any time													
4	<p>The Proponent shall:</p> <ol style="list-style-type: none"> <li>implement all reasonable and feasible best practice noise mitigation measures;</li> <li>investigate ways to reduce the noise generated by the project; and</li> <li>report on these investigations and the implementation and effectiveness of these measures in the AEMR, to the satisfaction of the Director-General.</li> </ol>	No modification proposed													
5	<p>The Proponent shall prepare and implement a Noise Monitoring Program for the project to the satisfaction of the Director-General. This program must:</p>	No modification proposed													

Condition no.	Current condition	Proposed modification to condition																							
	<p>(a) be submitted to the Director-General prior to carrying out any development on the site;</p> <p>(b) be prepared in consultation with the DECC;</p> <p>(c) include details of how the noise performance of the project would be monitored, and include a noise monitoring protocol for evaluating compliance with the relevant noise limits in this approval; and</p> <p>(d) include a protocol of monitoring haulage truck noise on Pottsville Road.</p>																								
6	<p>The Proponent shall ensure that dust generated by the project does not cause additional exceedances of the criteria listed in Tables 3 to 5 at any privately owned land.</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td>50 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p><i>Table 3: Short Term Impact Assessment Criteria for Particulate Matter</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulate (TSP) matter</td> <td>Annual</td> <td>90 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>Annual</td> <td>30 µg/m<sup>3</sup></td> </tr> </tbody> </table> <p><i>Table 4: Long Term Impact Assessment Criteria for Particulate Matter</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Maximum increase in deposited dust level</th> <th>Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td>Deposited dust</td> <td>Annual</td> <td>2 g/m<sup>2</sup>/month</td> <td>4 g/m<sup>2</sup>/month</td> </tr> </tbody> </table> <p><i>Table 5: Long Term Impact Assessment Criteria for Deposited Dust</i></p>	Pollutant	Averaging period	Criterion	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>	Pollutant	Averaging period	Criterion	Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month	No modification proposed
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Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level																						
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month																						
7	<p>The Proponent shall prepare and implement a Dust Monitoring Program for the project to the satisfaction of the Director-General. This program must:</p> <p>(a) be submitted to the Director-General prior to carrying out any development on the site;</p> <p>(b) be prepared in consultation with DECC; and</p> <p>(c) include details of how the air quality performance of the project would be monitored, and include a protocol for evaluating compliance with the relevant air quality criteria in this approval.</p>	No modification proposed																							

Condition no.	Current condition	Proposed modification to condition																																																											
	<i>Note: Initially, this program may concentrate on monitoring the dust deposition impacts of the project. However, in time, it may be expanded to include other pollutants.</i>																																																												
8	Except as may be expressly provided for by an EPL, the Proponent shall not discharge any water from the project or ancillary operational areas. The Proponent shall ensure that the extraction pit subject to dredging is maintained and operated to prevent discharges of any surface water from these ponds.	No modification proposed																																																											
9	<p>The Proponent shall aim to meet the water quality objectives in Table 6 for water in the dredge ponds and in groundwater adjacent the dredge ponds, unless otherwise approved by the Director-General.</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Unit of Measure</th> <th>Water Quality Objectives</th> </tr> </thead> <tbody> <tr> <td>Turbidity</td> <td>NTU</td> <td>5 - 20</td> </tr> <tr> <td>pH</td> <td>pH</td> <td>6.5 – 8.5</td> </tr> <tr> <td>Oil and Grease</td> <td>mg/L</td> <td>10</td> </tr> <tr> <td>Salinity</td> <td>µS/cm</td> <td>&lt;3,000</td> </tr> <tr> <td>Dissolved oxygen</td> <td>mg/L</td> <td>&gt;6</td> </tr> <tr> <td>Chlorophyll-a</td> <td>µg/L</td> <td>2-10</td> </tr> <tr> <td>Faecal coliforms</td> <td>Median No./100mL</td> <td>&lt;1000</td> </tr> <tr> <td>Enterococci</td> <td>Median No./100mL</td> <td>&lt;230</td> </tr> <tr> <td rowspan="2">Algae and blue-green algae</td> <td>No.cells/mL (M.aeruginosa)</td> <td>&lt;50,000</td> </tr> <tr> <td>mm<sup>3</sup>/L (total biovolume)</td> <td>&lt;4</td> </tr> <tr> <td>Sodium</td> <td>mg/L</td> <td>500</td> </tr> <tr> <td>Potassium ion</td> <td>mg/L</td> <td>40</td> </tr> <tr> <td>Magnesium ion</td> <td>mg/L</td> <td>100</td> </tr> <tr> <td>Chloride ion</td> <td>mg/L</td> <td>1000</td> </tr> <tr> <td>Sulphate ion</td> <td>mg/L</td> <td>800</td> </tr> <tr> <td>Bicarbonate ion</td> <td>mg/L</td> <td>400</td> </tr> <tr> <td>Soluble Iron ion</td> <td>mg/L</td> <td>20</td> </tr> <tr> <td>Soluble aluminium ion</td> <td>mg/L</td> <td>0.5</td> </tr> <tr> <td>Ammonium ion</td> <td>mg/L</td> <td>20</td> </tr> </tbody> </table> <p><i>Table 6: Water Quality Objectives</i></p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• The objectives for dissolved oxygen, turbidity and algae are relevant to surface water only.</li> <li>• The Department acknowledges that short term exceedances of these objectives may occur during natural events such as flooding.</li> </ul>	Pollutant	Unit of Measure	Water Quality Objectives	Turbidity	NTU	5 - 20	pH	pH	6.5 – 8.5	Oil and Grease	mg/L	10	Salinity	µS/cm	<3,000	Dissolved oxygen	mg/L	>6	Chlorophyll-a	µg/L	2-10	Faecal coliforms	Median No./100mL	<1000	Enterococci	Median No./100mL	<230	Algae and blue-green algae	No.cells/mL (M.aeruginosa)	<50,000	mm <sup>3</sup> /L (total biovolume)	<4	Sodium	mg/L	500	Potassium ion	mg/L	40	Magnesium ion	mg/L	100	Chloride ion	mg/L	1000	Sulphate ion	mg/L	800	Bicarbonate ion	mg/L	400	Soluble Iron ion	mg/L	20	Soluble aluminium ion	mg/L	0.5	Ammonium ion	mg/L	20	No modification proposed
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Condition no.	Current condition	Proposed modification to condition
	<ul style="list-style-type: none"> <li>The Department acknowledges that pre-existing water quality may not meet the objectives for some analytes, including salinity. The proponent shall strive to meet the water quality objectives through implementation of the Soil and Water Management Plan (see condition 18 below), as far as is reasonable and feasible and within the Proponent's control, to the satisfaction of the Director-General.</li> </ul>	
10	The Proponent shall ensure that all excavated potential acid sulfate soil fines material is returned back to below the watertable as soon as possible to prevent oxidation. No potential acid sulfate soil shall be removed from the site, unless adequately neutralised in accordance with methods approved under the Soil and Water Management Plan.	No modification proposed
11	The Proponent shall ensure that all potential acid sulfate soil fines material is discharged into the pond at a depth of no less than 3 metres from the water surface, and that all fines are deposited to a final depth of at least 8 metres from the water surface, unless an alternative method(s) is approved by DWE and the Director-General.	No modification proposed
12	The Proponent shall manage on-site sewage to the satisfaction of Council and DECC. The facility must comply with the requirements of the <i>Environment and Health Protection Guidelines – On-site Sewage Management for Single Households</i> (1998).	No modification proposed
13	The Proponent shall ensure that flood bunding around the Stage 1 and Stage 2 works does not exceed 300 mm in height above natural surface level, to a maximum height of 2.0 m AHD, unless otherwise approved by the Director-General.	No modification proposed
14	The Proponent shall ensure that perimeter drainage must be installed and operational prior to the construction of bunding or the placement of fill on site.	No modification proposed
15	All earthworks, including flood and acoustic bunding works, shall be contained wholly within the site.	No modification proposed
16	The Proponent shall cease dredging and processing activities not less than 24 hours prior to the commencement of overflow from any dredge pond. No dredging or processing shall occur when the dredge ponds are overflowing.	No modification proposed
17	The Proponent shall ensure that the flood storage capacity of the site is no less than the pre-existing flood storage capacity at all stages of the project. Details of the available flood storage capacity shall be reported in the AEMR.	No modification proposed
18	<p>The Proponent shall prepare and implement a Soil and Water Management Plan for the project to the satisfaction of the Director-General. This plan must:</p> <ul style="list-style-type: none"> <li>(a) be prepared in consultation with DWE and DECC;</li> <li>(b) include a: <ul style="list-style-type: none"> <li>• Water Balance;</li> </ul> </li> </ul>	No modification proposed

Condition no.	Current condition	Proposed modification to condition
	<ul style="list-style-type: none"> <li>• Erosion and Sediment Control Plan;</li> <li>• Acid Sulfate Soil Management Plan;</li> <li>• Blue-Green Algae Management Plan;</li> <li>• Surface Water Monitoring Program; and</li> <li>• Groundwater Monitoring Program; and</li> </ul> <p>(c) be submitted to the Director-General prior to starting quarrying operations, and prior to carrying out any development site in the case of the Erosion and Sediment Control Plan.</p>	
19	<p>The Water Balance shall include:</p> <ul style="list-style-type: none"> <li>(a) details of all water extracted, transferred, used and/or discharged by the quarry;</li> <li>(b) the source of all water collected or stored on the site, including rainfall, stormwater and groundwater; and</li> <li>(c) measures to minimise water use by the project.</li> </ul>	No modification proposed
20	<p>The Erosion and Sediment Control Plan shall:</p> <ul style="list-style-type: none"> <li>(a) be consistent with the requirements of Managing Urban Stormwater: Soils and Construction, Volume 1, 4th Edition, 2004 (Landcom), and Council's codes including its Code of Practice for Soil and Water Management on Construction Sites, Development Design Specification D7 – Stormwater Quality and Tweed Urban Stormwater Quality Management Plan;</li> <li>(b) identify activities that could cause soil erosion and generate sediment;</li> <li>(c) describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters;</li> <li>(d) describe the location, function, and capacity of erosion and sediment control structures; and</li> <li>(e) describe what measures would be implemented to maintain these structures over time.</li> </ul>	No modification proposed
21	<p>The Acid Sulfate Soil Management Plan shall:</p> <ul style="list-style-type: none"> <li>(a) be consistent with the NSW Acid Sulphate Soil Advisory Committee's Acid Sulfate Soil Manual; and</li> <li>(b) define procedures for managing the potential acid sulfate soils on the site, including sample testing and procedures.</li> </ul>	No modification proposed
22	<p>The Blue-Green Algae Management Plan shall:</p> <ul style="list-style-type: none"> <li>(a) be prepared by a suitably qualified blue-green algae expert, whose appointment has been approved by the Director-General;</li> </ul>	No modification proposed

Condition no.	Current condition	Proposed modification to condition
	<ul style="list-style-type: none"> <li>(b) be consistent with extant guidelines for blue-green algae management including the NHMRC's Guidelines for Managing Risks in Recreational Water;</li> <li>(c) describe the measures that would be implemented to prevent and control the sources of algal blooms over the short, medium and long term; and</li> <li>(d) define procedures for the management and notification of identified algal blooms.</li> </ul>	
23	<p>The Surface Water Monitoring Program shall include:</p> <ul style="list-style-type: none"> <li>(a) detailed baseline data on surface water quality;</li> <li>(b) surface water impact assessment criteria;</li> <li>(c) a program to monitor surface water flows and quality;</li> <li>(d) a program to manage water releases from the site;</li> <li>(e) a program to monitor bank and bed stability; and</li> <li>(f) a protocol for the investigation, notification and mitigation of identified exceedances of the surface water impact assessment criteria.</li> </ul>	No modification proposed
24	<p>The Ground Water Monitoring Program shall include:</p> <ul style="list-style-type: none"> <li>(a) detailed baseline data on groundwater levels and quality, based on statistical analysis;</li> <li>(b) groundwater impact assessment criteria;</li> <li>(c) a program to monitor ground water levels and quality;</li> <li>(d) a program to monitor ground water level effects on vegetation, and on ground water supply to adjoining properties; and</li> <li>(e) a protocol for the investigation, notification and mitigation of identified exceedances of the groundwater impact assessment criteria</li> </ul>	No modification proposed
25	The Proponent shall rehabilitate the site to the satisfaction of the Director-General.	No modification proposed
26	<p>The Proponent shall:</p> <ul style="list-style-type: none"> <li>(a) rehabilitate and revegetate the 15 ha hectares of land identified in the EA (see the revegetation plan in Appendix 2); and</li> <li>(b) within 12 months of the commencement of quarrying operations, make suitable arrangements to provide appropriate long term security for the revegetation area to ensure it is managed for conservation purposes, to the satisfaction of the Director-General.</li> </ul>	No modification proposed
27	<p>The Proponent shall prepare and implement a Landscape Management Plan for the project to the satisfaction of the Director-General. This plan must:</p> <ul style="list-style-type: none"> <li>(a) be prepared:</li> </ul>	No modification proposed

Condition no.	Current condition	Proposed modification to condition
	<ul style="list-style-type: none"> <li>• by suitably qualified consultants, including a specialist hydrologist, coastal engineer, wetlands ecologist and landscape architect;</li> <li>• in consultation with Council, DWE, DECC, DPI-Fisheries and the CCC; and</li> <li>• in accordance with extant guidelines including the DWE's Constructed Wetlands Manual, Volumes 1 and 2 and the DPI's Policy and Guidelines: Aquatic Habitat Management, 1999;</li> </ul> <p>(b) be submitted to the Director-General prior to starting quarrying operations on the site; and</p> <p>(c) include a:</p> <ul style="list-style-type: none"> <li>• Rehabilitation and Revegetation Management Plan; and</li> <li>• Long Term Management Strategy.</li> </ul> <p><i>Note: The Department accepts that the initial Landscape Management Plan may not include the detailed Long Term Management Strategy. However, a conceptual strategy must be included in the initial plan, along with a timetable for augmentation of the strategy with each subsequent review of the plan.</i></p>	
28	<p>The Rehabilitation and Revegetation Management Plan must include:</p> <p>(a) the rehabilitation objectives for the site and revegetation areas;</p> <p>(b) a description of the short, medium, and long term measures that would be implemented to:</p> <ul style="list-style-type: none"> <li>• rehabilitate and stabilise the site;</li> <li>• implement the revegetation strategy; and</li> <li>• manage the remnant vegetation and habitat on the site and in the revegetation areas;</li> </ul> <p>(c) detailed performance and completion criteria for the rehabilitation and stabilisation of the site and implementation of the revegetation strategy;</p> <p>(d) a detailed description of how the performance of the rehabilitation of the quarry and the revegetation areas would be monitored over time to achieve the stated objectives;</p> <p>(e) a detailed description of what measures would be implemented over the next 5 years to rehabilitate and manage the landscape of the site and revegetation areas including the procedures to be implemented for:</p> <ul style="list-style-type: none"> <li>• progressively rehabilitating and stabilising areas disturbed by quarrying;</li> <li>• implementing revegetation and regeneration within the disturbance areas and revegetation areas;</li> <li>• protecting areas outside the disturbance areas, including SEPP 14 wetlands and SEPP 26 littoral rainforests;</li> <li>• vegetation clearing protocols;</li> </ul>	No modification proposed

Condition no.	Current condition	Proposed modification to condition
	<ul style="list-style-type: none"> <li>• managing impacts on fauna;</li> <li>• controlling terrestrial and aquatic weeds and pests;</li> <li>• controlling access;</li> <li>• bushfire management; and</li> <li>• reducing the visual impacts of the project;</li> </ul> <p>(f) a description of the potential risks to successful rehabilitation and/or revegetation, and a description of the contingency measures that would be implemented to mitigate these risks; and</p> <p>(g) details of who is responsible for monitoring, reviewing, and implementing the plan.</p>	
29	<p>The Long Term Management Strategy must:</p> <ul style="list-style-type: none"> <li>(a) define the objectives and criteria for quarry closure and post-extraction management;</li> <li>(b) investigate options for the future use of the site;</li> <li>(c) describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the project; and</li> <li>(d) describe how the performance of these measures would be monitored over time.</li> </ul>	No modification proposed
30	<p>Prior to starting quarrying operations on the site, the Proponent shall lodge a rehabilitation bond for the project with the Director-General. The sum of the bond shall be calculated at:</p> <ul style="list-style-type: none"> <li>(a) \$2.50/m<sup>2</sup> for the total area to be disturbed and/or revegetated in each 5 year review period (see condition 31 below); and</li> <li>(b) \$1.50/m<sup>2</sup> for the total area of land previously disturbed and/or rehabilitated by the project, to the satisfaction of the Director-General.</li> </ul> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <li>• <i>If the rehabilitation and revegetation works are completed to the satisfaction of the Director-General, the Director-General will release the rehabilitation bond.</i></li> <li>• <i>If the rehabilitation and revegetation works are not completed to the satisfaction of the Director-General, the Director-General will call in all or part of the rehabilitation bond, and arrange for the satisfactory completion of the relevant works.</i></li> </ul>	No modification proposed
31	<p>Within 6 months of each Independent Environmental Audit (see condition 6 of schedule 5) excluding the inaugural audit, unless the Director-General directs otherwise, the Proponent shall review, and if necessary revise, the sum of the rehabilitation bond to the satisfaction of the Director-General. This review must consider:</p> <ul style="list-style-type: none"> <li>(a) the effects of inflation;</li> <li>(b) any changes to the total area of disturbance; and</li> </ul>	No modification proposed

Condition no.	Current condition	Proposed modification to condition
	(c) the performance of the rehabilitation and revegetation to date.	
32	<p>The Proponent shall prepare and implement an Aboriginal Cultural Heritage Management Plan to the satisfaction of the Director-General. This plan must:</p> <p>(a) be prepared in consultation with DECC and all relevant Aboriginal communities;</p> <p>(b) be submitted to the Director-General for approval prior to commencement of construction; and</p> <p>(c) include a:</p> <ul style="list-style-type: none"> <li>• program for additional archaeological survey/s of the disturbance area;</li> <li>• description of the measures that would be implemented to salvage any identified Aboriginal sites within the disturbance area;</li> <li>• description of the measures that would be implemented to protect any Aboriginal sites outside the disturbance area; and</li> <li>• description of the measures that would be implemented if any new Aboriginal objects or skeletal remains are discovered during the project.</li> </ul>	No modification proposed
33	<p>Prior to commencement of operations the Proponent shall:</p> <p>(a) design and construct the haul road and its intersection with Pottsville-Mooball Road; and</p> <p>(b) install advanced truck turning warning signage along Pottsville-Mooball Road, to the satisfaction of Council.</p>	No modification proposed
34	The Proponent shall ensure that all loaded vehicles entering or leaving the site have their loads covered.	No modification proposed
35	The Proponent shall ensure that all loaded vehicles entering or leaving the site have their loads covered.	No modification proposed
36	The Proponent shall provide sufficient parking on-site for all project-related traffic and visitors, in accordance with Council's parking codes and to the satisfaction of the Director-General. No on street parking shall be undertaken.	No modification proposed
37	The Proponent shall minimise the visual impacts of the project to the satisfaction of the Director-General.	No modification proposed
38	<p>The Proponent shall establish and subsequently maintain the vegetated buffer around the extraction area within 12 months of the date of this approval.</p> <p><i>Note: The vegetation buffer shall be detailed in the Landscape Management Plan.</i></p>	No modification proposed
39	<p>The Proponent shall:</p> <p>(a) take all practicable measures to mitigate off-site lighting impacts from the project; and</p>	No modification proposed

Condition no.	Current condition	Proposed modification to condition
	(b) ensure that all external lighting associated with the project complies with Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting, to the satisfaction of the Director-General.	
40	The Proponent shall not erect or display any advertising structure(s) or signs on the site without the written approval of the Director-General. <i>Note: This does not include business identification, traffic management and safety or environmental signs.</i>	No modification proposed
41	The Proponent shall minimise the amount of waste generated by the project to the satisfaction of the Director-General.	No modification proposed
42	The Proponent shall ensure that the storage, handling, and transport of dangerous goods are conducted in accordance with the relevant <i>Australian Standards</i> , particularly AS1940 and AS1596, and the <i>Dangerous Goods Code</i> .	No modification proposed
43	The Proponent shall secure the project to ensure public safety to the satisfaction of the Director-General.	No modification proposed
44	The Proponent shall: (a) ensure that the project is suitably equipped to respond to any fires on-site; and (b) assist the rural fire service and emergency services as much as possible if there is a fire on-site.	No modification proposed
45	The Proponent shall: (a) provide annual production data to the DPI using the standard form for that purpose; and (b) include a copy of this data in the AEMR.	No modification proposed
<b>Schedule 4 – Additional procedures</b>		
1	If the results of monitoring required in schedule 3 identify that impacts generated by the project are greater than the relevant impact assessment criteria, then the Proponent shall notify the Director-General, affected landowners, and/or existing or future tenants accordingly, and provide quarterly monitoring results to each of these parties until the results show that the project is complying with the relevant criteria.	No modification proposed
2	If a landowner considers that the project is exceeding the impact assessment criteria in schedule 3, then he/she may ask the Director-General in writing for an independent review of the impacts of the project on his/her land. If the Director-General is satisfied that an independent review is warranted, the Proponent shall within 3 months of the Director-General advising that an independent review is warranted: (a) consult with the landowner to determine his/her concerns;	No modification proposed

Condition no.	Current condition	Proposed modification to condition
	<p>(b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to conduct monitoring on the land, to determine whether the project is complying with the relevant criteria in schedule 3, and identify the source(s) and scale of any impact on the land, and the project's contribution to this impact; and</p> <p>(c) give the Director-General and landowner a copy of the independent review.</p>	
3	If the independent review determines that the project is complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Director-General.	No modification proposed
4	<p>If the independent review determines that the project is not complying with the relevant criteria in schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent shall:</p> <p>(a) implement all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria; and</p> <p>(b) conduct further monitoring to determine whether these measures ensure compliance; or</p> <p>(c) secure a written agreement with the landowner to allow exceedances of the relevant criteria in schedule 3, to the satisfaction of the Director-General.</p> <p>If the additional monitoring referred to above subsequently determines that the project is complying with the relevant criteria in schedule 3, or the Proponent and landowner enter into a negotiated agreement to allow these exceedances, then the Proponent may discontinue the independent review with the approval of the Director-General.</p>	No modification proposed
5	<p>If the landowner disputes the results of the independent review, either the Proponent or the landowner may refer the matter to the Director-General for resolution.</p> <p>If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process (see Appendix 4).</p>	No modification proposed
<b>Schedule 5 – Environmental management and monitoring conditions</b>		
1	<p>The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must:</p> <p>(a) be submitted to the Director-General prior to starting quarrying operations on the site;</p> <p>(b) be prepared in consultation with the relevant agencies;</p> <p>(c) provide the strategic context for environmental management of the project;</p> <p>(d) identify the statutory requirements that apply to the project;</p>	No modification proposed



Condition no.	Current condition	Proposed modification to condition
	<p>(e) describe in general how the environmental performance of the project would be monitored and managed;</p> <p>(f) describe the procedures that would be implemented to:</p> <ul style="list-style-type: none"> <li>• keep the local community and relevant agencies informed about the construction, operation and environmental performance of the project;</li> <li>• receive, handle, respond to, and record complaints;</li> <li>• resolve any disputes that may arise during the life of the project;</li> <li>• respond to any non-compliance;</li> <li>• manage cumulative impacts; and</li> <li>• respond to emergencies; and</li> </ul> <p>(e) describe the role, responsibility, authority, and accountability of the key personnel involved in the environmental management of the project.</p>	
2	The Proponent shall prepare an Environmental Monitoring Program for the project to the satisfaction of the Director-General. This program must be submitted to the Director-General prior to starting quarrying operations on the site, and consolidate the various monitoring requirements in schedule 3 of this approval into a single document.	No modification proposed
3	Within 24 hours of detecting an exceedance of the limits/performance criteria in this approval or the occurrence of an incident that causes (or may cause) material harm to the environment, the Proponent shall notify the Department and other relevant agencies of the exceedance/incident.	No modification proposed
4	<p>Within 6 days of notifying the Department and other relevant agencies of an exceedance/incident, the Proponent shall provide the Department and these agencies with a written report that:</p> <p>(a) describes the date, time, and nature of the exceedance/incident;</p> <p>(b) identifies the cause (or likely cause ) of the exceedance/incident;</p> <p>(c) describes what action has been taken to date; and</p> <p>(d) describes the proposed measures to address the exceedance/incident.</p>	No modification proposed
5	<p>Within 12 months of the date of this approval, and annually thereafter, the Proponent shall submit an AEMR to the Director-General and relevant agencies. This report must:</p> <p>(a) identify the standards and performance measures that apply to the project;</p> <p>(b) describe the works carried out in the last 12 months;</p> <p>(c) describe the works that will be carried out in the next 12 months;</p> <p>(d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;</p>	No modification proposed

Condition no.	Current condition	Proposed modification to condition
	<ul style="list-style-type: none"> <li>(e) include a summary of the monitoring results for the project during the past year;</li> <li>(f) include an analysis of these monitoring results against the relevant: <ul style="list-style-type: none"> <li>• impact assessment criteria/limits;</li> <li>• monitoring results from previous years; and</li> <li>• predictions in the EA;</li> </ul> </li> <li>(g) identify any trends in the monitoring results over the life of the project;</li> <li>(h) identify any non-compliance during the previous year; and</li> <li>(i) describe what actions were, or are being, taken to ensure compliance.</li> </ul>	
6	<p>Within 2 years of the start of quarrying operations on site, and every 5 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:</p> <ul style="list-style-type: none"> <li>(a) be conducted by a suitably qualified, experienced, and independent person(s) whose appointment has been approved by the Director-General;</li> <li>(b) include consultation with the relevant agencies;</li> <li>(c) assess the environmental performance of the project, and its effects on the surrounding environment;</li> <li>(d) assess whether the project is complying with the relevant standards, performance measures and statutory requirements;</li> <li>(e) review the adequacy of any strategy/plan/program required under this approval; and, if necessary,</li> <li>(f) recommend measures or actions to improve the environmental performance of the project, and/or any strategy/plan/program required under this approval.</li> </ul>	No modification proposed
7	<p>Within 1 month of completion of each Independent Environmental Audit, the Proponent shall submit a copy of the audit report to the Director-General and relevant agencies, with a response to any of the recommendations in the audit report.</p>	No modification proposed
8	<p>Following each Independent Environmental Audit, the Proponent shall review and if necessary revise each of the environmental management and monitoring strategies/plans/programs in schedules 3 and 5, to the satisfaction of the Director-General. The revised strategies/plans/programs shall be submitted to the Director-General within 6 months of completing the audit.</p>	No modification proposed
9	<p>Prior to starting quarrying operations on the site, the Proponent shall establish a CCC for the project.</p>	No modification proposed

Condition no.	Current condition	Proposed modification to condition
	This CCC must be established and operated in accordance with the Guideline for Establishing and Operating Community Consultative Committees for Mining Developments, and to the satisfaction of the Director-General.	
10	<p>Within 1 month of the approval of any plan/strategy/program required under this approval (or any subsequent revision of these plans/strategies/programs), or the completion of any independent environmental audit or AEMR, the Proponent shall:</p> <ul style="list-style-type: none"> <li>(a) provide a copy of the relevant document/s to Tweed Shire Council and relevant agencies; and</li> <li>(b) ensure that a copy of the relevant document/s is made publicly available on site and/or at the Proponent's regional office, to the satisfaction of the Director-General.</li> </ul>	No modification proposed
11	<p>During the project, the Proponent shall:</p> <ul style="list-style-type: none"> <li>(a) make a summary of monitoring results required under this approval publicly available at the Proponent's regional office; and</li> <li>(b) update these results regularly (at least every 3 months), to the satisfaction of the Director-General.</li> </ul>	No modification proposed

# Appendix B – Traffic assessment



**Holcim (Australia) Pty Ltd**  
**Dunloe Sands quarry section 75W modification**  
**Traffic assessment**

July 2017

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# Appendices

Appendix A – Survey outputs

# 1. Introduction

## 1.1 Overview

Holcim (Australia) Pty Ltd (Holcim) is seeking approval to modify an existing Project Approval condition relating to vehicular movements at the Dunloe Sands quarry (the site), in accordance with Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Holcim proposes an increase in heavy vehicle movements at the site (the modified proposal).

A traffic assessment is required to assess the potential traffic impacts of the additional truck movements. Up to twelve inbound and twelve outbound truck movements per hour have been assessed as a worst case assessment, however the volumes of hourly truck movements generated would typically be less.

## 1.2 Purpose of this report

This report provides a desktop assessment of the expected traffic impacts on the surrounding road network as a result of the modified proposal.

## 1.3 Scope of this report

This assessment utilises a practical absorption capacity analysis. Absorption capacity identifies the ability of a major road stream to absorb/accommodate minor stream of traffic flow. The analysis is based upon the residual capacity of the major road and the gap acceptance requirements of the minor road flows.

The study is based on the following assumptions:

- The survey data provided is accurate
- The existing and proposed traffic generation data for the quarry provided by the Client is accurate
- The analysis is a desktop study and no site visits have been undertaken.

## 1.4 Limitations

This report: has been prepared by GHD for Holcim (Australia) Pty Ltd and may only be used and relied on by Holcim (Australia) Pty Ltd for the purpose agreed between GHD and the Holcim (Australia) Pty Ltd as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Holcim (Australia) Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.



GHD has prepared this report on the basis of information provided by Holcim (Australia) Pty Ltd and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

## 2. Project understanding

Project Approval for sand extraction at the site was granted by the Minister for Planning in 2008. Holcim have leased the site from Ramtech Pty Ltd since mid-2016.

The Project Approval specified that heavy vehicle movements associated with the operation of the quarry should not exceed eight per hour. Holcim subsequently received advice from the Department of Planning and Environment that the interpretation of this condition allows for a maximum of four inbound and four outbound heavy vehicle movements in any one hour period.

Holcim are currently seeking to modify this condition to allow for an increase in the hourly movement of heavy vehicles.

Holcim proposes the following operations:

- Up to twelve inbound and twelve outbound heavy vehicle movements per **hour** would be sufficient to accommodate the maximum activity associated with the operation of the quarry.
- Heavy vehicles up to the size of a 19-metre truck and dog trailer operate from the quarry.
- Currently three full time staff work on site and one additional staff member would be employed, following approval of the proposed modification.
- The existing site operation hours of Monday to Friday (7 am to 5 pm) and Saturdays (7 am – 12 pm) will not change.
- In accordance with the operating hours and the current restrictions the site generates up to 40 inbound and 40 inbound heavy vehicle trips per day.
- Up to two contractors work on site at any time.

Subsequent to the modification, the patterns of heavy vehicle arrival and departure would change, however the overall volume of **daily** heavy vehicle movements (approximately 40 in and 40 out) is not expected to change.

## 3. Existing environment

### 3.1 Overview

The site is located on an access road that intersects Pottsville Road at a priority controlled intersection, located approximately 2.3 kilometres to the south of Cudgera Creek Road (Figure 3-1).



Figure 3-1 Dunloe Sands quarry site

### 3.2 Existing road conditions

#### 3.2.1 Functional road hierarchy

Roads are classified according to the functions that they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies, which guide the management of the road according to their intended service or qualities. Functional road classification involves the relative balance of the mobility and access functions.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions throughout the State. State roads are the responsibility of the Roads and Maritime Services (Roads and Maritime) to fund, prioritise and carry out works. State roads generally include roads classified as Freeways, State Highways and Main Roads under the *Roads Act 1993* and the regulation to manage the road system is stated in the *Australian Road Rules (1999)*

Roads and Maritime define four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- Arterial roads – generally are controlled by Roads and Maritime, typically no limit in flow and are designed to carry vehicles long distance between regional centres.
- Sub-arterial roads – can be managed by either Council or Roads and Maritime under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles

per day, and their aim is to carry through traffic between specific areas in a sub region, or provide connectivity from arterial road routes (regional links).

- Collector roads – provide connectivity between local sites and the-arterial road network, typically carry between 2,000 and 10,000 vehicles per day and are controlled/maintained by local councils.
- Local roads – provide direct access to properties and the collector roads, typically carry between 500 and 4,000 vehicles per day and are controlled by local councils.

### 3.2.2 Pottsville Road

Pottsville Road (Figure 3-2) functions as a collector road that provides connectivity between Mooball (at Tweed Valley Way) and Pottsville. Pottsville Road (in addition to the Dunloe Sands Quarry) typically provides access to low density rural dwellings, however, to the north of the site it also provides access to Pottsville Golf Course.

In the vicinity of the site, Pottsville Road has the following characteristics:

- A two way sealed undivided carriageway of approximately 7.5 metres
- Marked double barrier lines
- A sign posted speed limit of 100 kilometres per hour.



Figure 3-2 Pottsville Road in proximity to the site access intersection

To the north of the site, Pottsville Road intersects Cudgera Road at a priority (stop) controlled T-junction (Figure 3-3).

Outputs from Google Traffic indicate that during peak periods of road network operation, the intersection of Pottsville Road and Cudgera Creek Road operates efficiently with only minor delays.

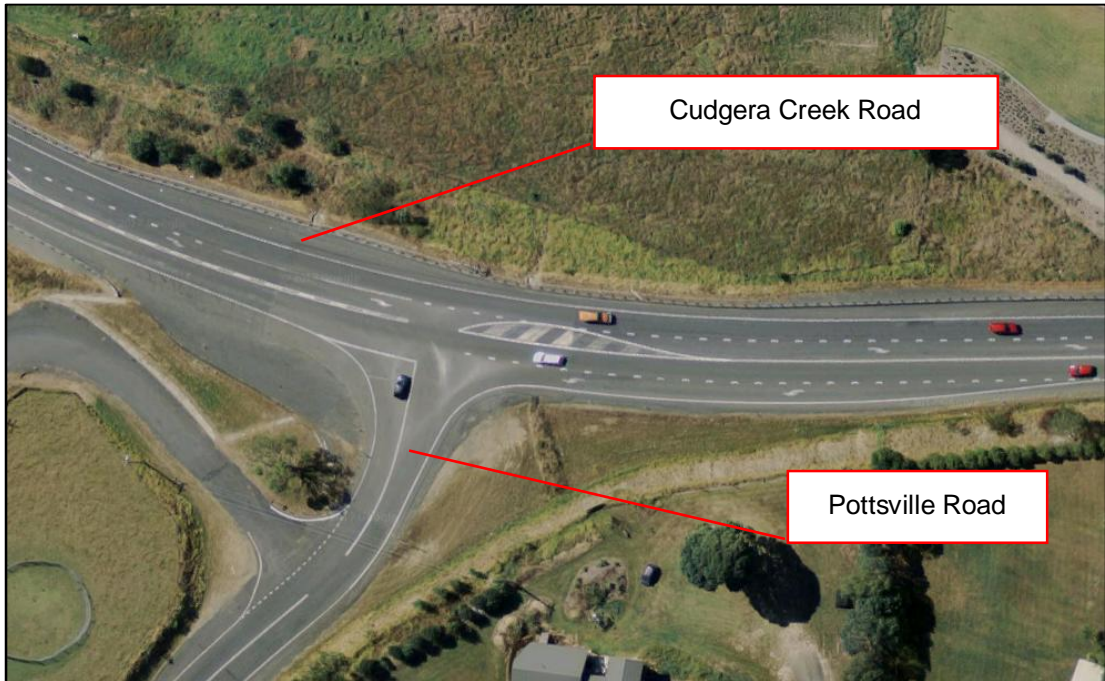


Figure 3-3 Pottsville Road/Cudgera Creek Road intersection

Source: Google Maps

### 3.2.3 Cudgera Creek Road

To the east of the Pacific Motorway, Cudgera Creek Road operates as a collector road. However, to the west of the motorway, Cudgera Creek Road operates as a local road that provides access to low density rural dwellings.

Cudgera Creek Road intersects the Pacific Motorway at an interchange with grade separated on-ramps and off-ramps.

East of the Pacific Motorway, Cudgera Creek Road has the following characteristics:

- A two way sealed undivided carriageway of approximately twelve metres width (including shoulders)
- Shoulders that are approximately two metres wide
- Marked double barrier lines
- Turning lanes (left and right) at Pottsville Road
- A sign posted speed limit of 60 kilometres per hour.

### 3.2.4 Dunloe Sands Quarry access road

Access to the site is provided via a two-way sealed road, with a single travel lane in each direction and a carriageway width of approximately seven metres. Refer to Figure 3-4.



Figure 3-4 Dunloe Sands quarry access road

Heavy vehicles access/egress the site utilising the grade separated Pacific Motorway/Cudgera Creek Road Interchange, Cudgera Creek Road and Pottsville Road.

### 3.2.5 Existing traffic volumes

In order to identify the existing traffic volumes in proximity to the site, a seven day tube count (between Tuesday 7 March 2017 and Monday 13 March 2017) was undertaken on Pottsville Road south of Cudgera Creek Road.

The identified traffic volumes (per day and direction) are displayed in Figure 3-5.

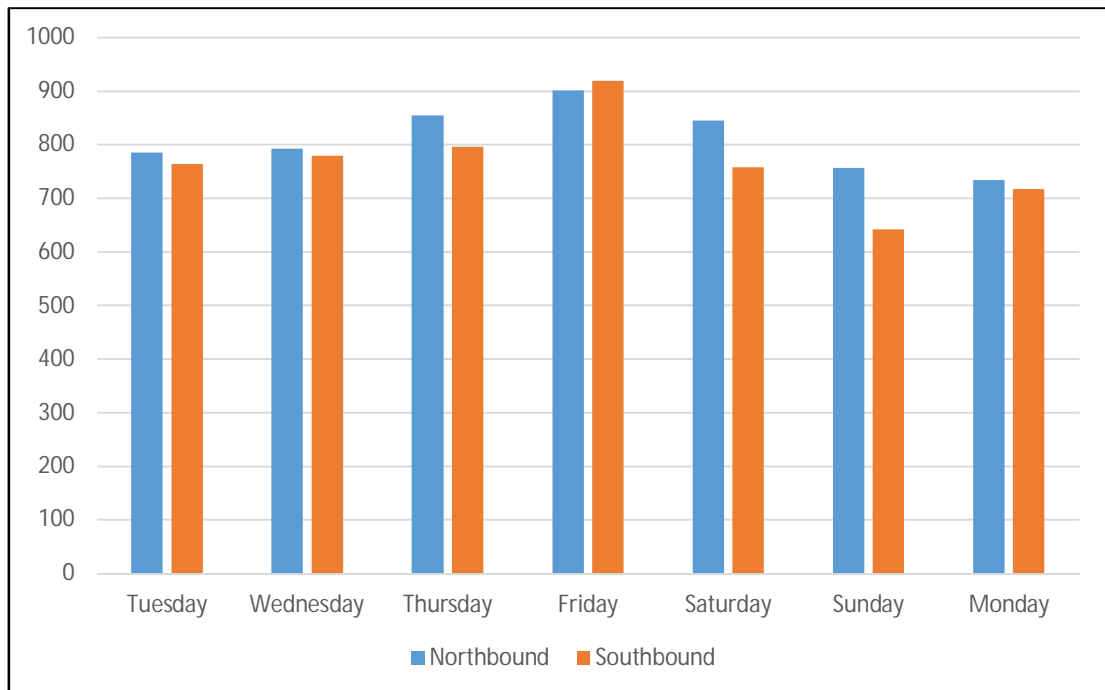


Figure 3-5 Daily traffic volumes on Pottsville Road

The data in Figure 3-5 indicates that daily (two-way) traffic volumes on Pottsville Road are currently in the order of 1,400 – 1,800 vehicles, with peak demand recorded on Friday 10 March 2017.

The hourly (two-way) traffic volumes recorded on Pottsville Road on Friday the 10 March 2017 are displayed in Figure 3-6.

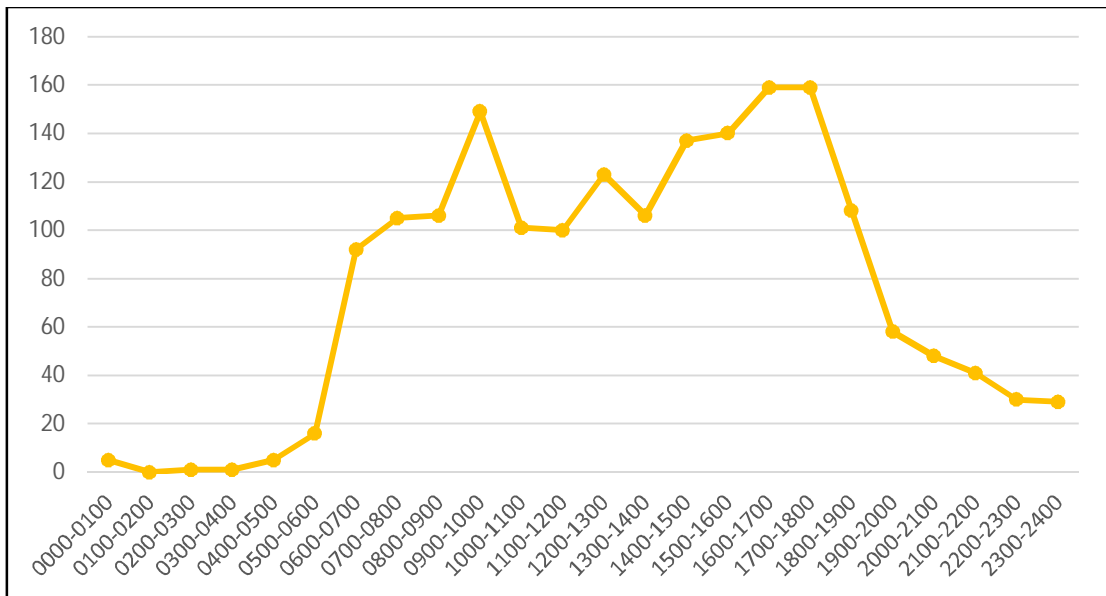


Figure 3-6 Hourly traffic profile for Pottsville Road (Friday 10 March 2017)

The data in Figure 3-6 indicates that peak hour (two-way) traffic activity on Pottsville Road was:

- AM Peak (9:00 am – 10:00 am) - 149 vehicles per hour
- PM Peak (4:00 pm – 5:00 pm) - 159 vehicles per hour

The survey data indicates that approximately 7 per cent of vehicles on Pottsville Road consist of heavy vehicles.

The survey outputs are included in Appendix A.

## 4. Impact assessment

### 4.1 Trip generation

As stated previously:

- Up to 12 inbound and 12 outbound heavy vehicle movements per **hour** would be sufficient to accommodate the maximum activity associated with the operation of the quarry.
- Currently three full time staff work on site and one additional staff member would be employed, following approval of the proposed modification.
- The existing site operation hours of Monday to Friday (7 am to 5 pm) and Saturdays (7 am – 12 pm) will not change.
- Up to two contractors work on site at any time.

The highest traffic generation for the site expected to be 18 trips, as follows:

- AM – 12 inbound heavy vehicle trips, 12 outbound heavy vehicle trips, 6 inbound worker/contractor trips (per hour).
- PM – 12 inbound heavy vehicle trips, 12 outbound heavy vehicle trips, 6 outbound worker/contractor trips (per hour).

### 4.2 Trip distribution

For the purposes of analysis (as per the existing situation) it is assumed that vehicles will access/egress the site to/from the north via Cudgera Creek Road.

Therefore, vehicles entering the site will undertake a left turn into the access road from Pottsville Road and all vehicles exiting the site would make a right turn from the access road onto Pottsville Road.

### 4.3 Road network performance

The traffic impacts of the proposed modifications to the operation of the site has been undertaken utilising absorption capacity analysis (Cp). Absorption capacity analysis determines the maximum rate traffic streams can absorb additional vehicles.

Figure 4-1 displays the number of vehicles that may enter the major stream of traffic for various critical acceptance gaps, namely:

- t(a) - the minimum gap that a driver would use to enter an intersection.
- t(f) – follow-up headway, the gap required by the next queued vehicle.



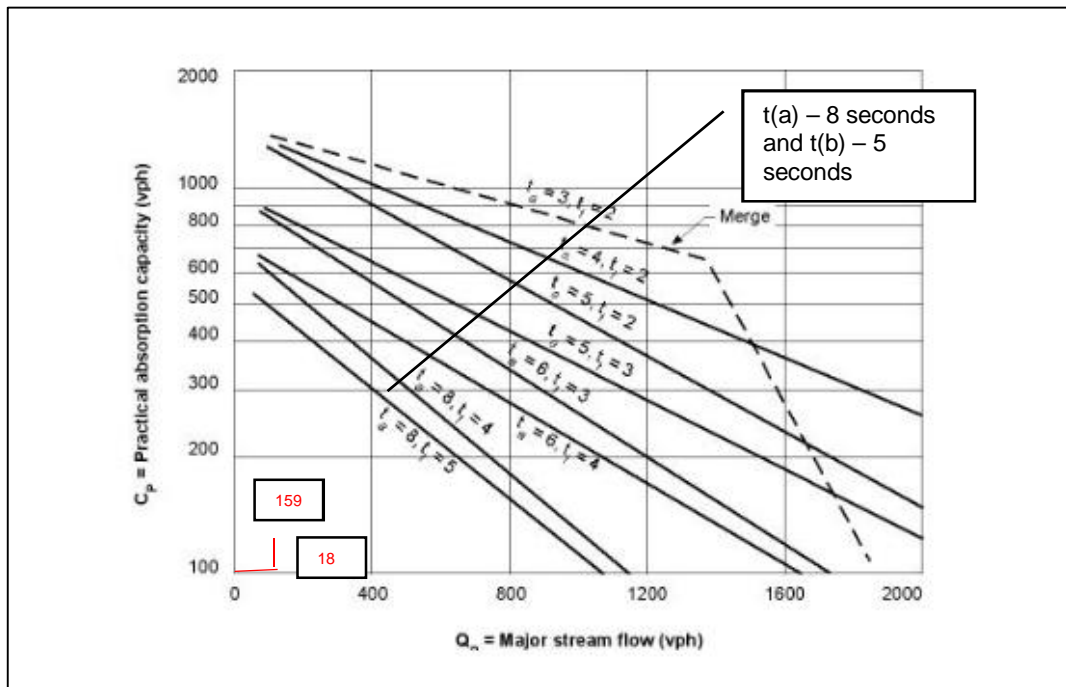


Figure 4-1 Practical absorption capacity at non-signalised intersections

Source: Guide to Traffic Engineering Practice – Part 5 Intersections at Grade

As specified in the *Guide to Traffic Engineering Practice* (Part 5: Intersections at Grade), for right hand turns from a minor road onto a two way/two lane major road, a critical gap acceptance of five seconds and a follow up headway of three seconds applies. Refer to Figure 4-2.

Movement	Diagram	Description	$t_a$	$t_f$
Left Hand Turn		Not interfering with A Requiring A to slow	14-40 sec 5 sec	2-3 sec 2-3 sec
Crossing		Two lane / one way Three lane / one way Four lane / one way Two lane / two way Four lane / two way Six lane / two way	4 sec 6 sec 8 sec 5 sec 8 sec 8 sec	2 sec 3 sec 4 sec 3 sec 5 sec 5 sec
Right Hand Turn from major road		Across 1 lane Across 2 lanes Across 3 lanes	4sec 5sec 6sec	2 sec 3 sec 4 sec
Right Hand Turn from minor road		Not interfering with A One way Two lane / two way Four lane / two way Six lane / two way	14-40 sec 3 sec 5 sec 8 sec 8 sec	3 sec 3 sec 3 sec 5 sec 5 sec
Merge		Acceleration Lane	3 secs	2 secs

Note:  $t(a)$  = Critical acceptance gap,  $t(f)$  = follow up headway

Figure 4-2 Critical gap acceptance

Source: Guide to Traffic Engineering Practice – Part 5 Intersections at Grade

Vehicles up to the size of a 19 metre truck and dog trailer operate from the site and large vehicles require larger gaps to enter traffic flows compared to passenger vehicles. For the

purposes of analysis, a conservative critical gap acceptance of eight seconds and a follow up headway of five seconds have been assumed.

As displayed in Figure 4-1 and based upon the current peak hour traffic volumes on Pottsville Road of 159 vehicles and up to 18 vehicles exiting the site in peak periods, there is adequate capacity to absorb the additional movements without additional traffic control.

Additionally, the Austroads *Guide to Traffic Management* also specifies the criteria whereby capacity analysis at unsignalised intersections is not considered necessary, as presented in Table 1.

**Table 1 Intersection volumes where capacity analysis is not required**

Maximum (two way) peak Hour Flows			
Major Road	400	500	650
Cross Road	250	200	100

Source: Guide to Traffic Management – Part 3 Traffic Studies and Analysis

Based on the current volumes on Pottsville Road (up to 159 vehicles) and the quarry access road (up to 18 vehicles), intersection capacity modelling is not considered necessary for this study.

## 4.4 Access road intersection layout

### 4.4.1 Sight lines

The Austroads *Guide to Road Design Part 3: Geometric Design* (Table 5.5: Truck stopping sight distances) specifies that (accounting for a reaction time of two seconds) for roads with an operating speed of 100 kilometres per hour, a minimum sight distance of 191 metres should be provided, plus an additional 22 metres to account for the gradient of Pottsville Road. A desktop review indicates that these sight distances are currently achieved.

A review of crash data indicates that no accidents involving trucks (rigid and articulated) have occurred on Pottsville Road in proximity to the development in the last five years. Therefore the intersection of the quarry access road and Pottsville Road operates safely.

### 4.4.2 Turning treatments

*The Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* provides warrants that apply to major road turn treatments with respect to the provision of basic, auxiliary and channelised lanes. The warrant applicable to roads with speeds of 100 kilometres per hour or greater is displayed below in Figure 4-3.

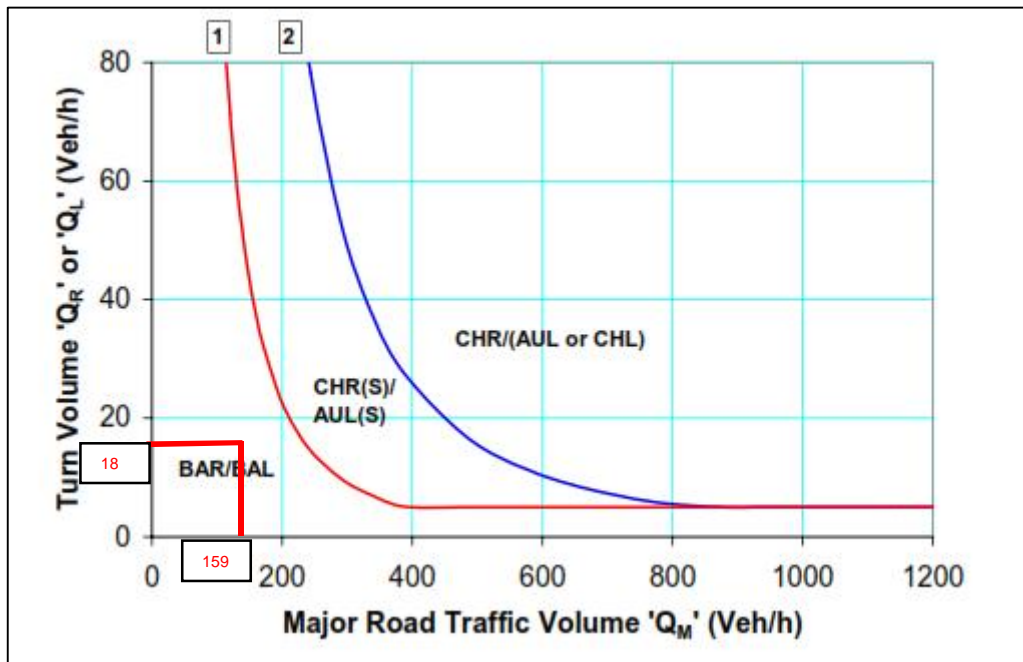


Figure 4-3 Warrants for turn treatments on major road

Source: Guide to Road Design– Part 4A Unsignalised and Signalised Intersections

In accordance with two-way traffic volumes on Pottsville Road of 159 vehicles and up to 18 vehicles expected to access the site in peak periods, the provision of a basic left turn lane is appropriate for the access road intersection.

As displayed in Figure 4-4, a basic left turn lane is provided on Pottsville Road at its intersection with the quarry access road.

Thus (as displayed in Figure 4-3) the current access arrangement is considered appropriate to accommodate the additional heavy vehicle activity associated with the modification to the site.

The current intersection arrangement (Figure 4-4) does not support heavy vehicles accessing the site south of Pottsville Road and undertaking a right turn into the access road. Therefore as per the current arrangement, it is recommended that all heavy vehicles continue to access and egress the site to/from Cudgera Creek Road.



Figure 4-4 Quarry access road intersection

## 5. Summary and conclusion

Under the current conditions of the Project Approval, a maximum of four vehicles inbound and four outbound heavy vehicle movements are permitted in any one hour period. Holcim are now seeking to modify this condition to allow for increased hourly heavy vehicle movements.

Twelve inbound and twelve outbound heavy vehicle movements per hour are proposed to accommodate the maximum activity associated with the operation of the quarry. One additional staff member would also be employed onsite.

A seven day tube count was undertaken on Pottsville Road between Tuesday 7 March 2017 and Monday 13 March 2017. The survey data indicates that (two-way) traffic volumes on Pottsville Road currently consists of 1,400 – 1,800 vehicles per day and approximately 150 – 160 vehicles per hour during peak periods of road network activity.

Absorption capacity analysis indicates that the traffic impacts associated with the proposed modification would be minimal and can be accommodated within the surrounding network.

The current access arrangement for the site (via a basic left turn lane on Pottsville Road) is considered appropriate to accommodate the additional heavy vehicle activity associated with the modification.

# Appendices

# Appendix A – Survey outputs

17SYD0045

Pottsville Rd, south of Cudgera Creek Rd  
Northbound

Time	Week 1							Averages	
	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Weekday	7-day
	7/03/2017	8/03/2017	9/03/2017	10/03/2017	11/03/2017	12/03/2017	13/03/2017		
0000-0100	1	2	2	1	20	4	0	1	4
0100-0200	1	1	1	0	2	3	0	1	1
0200-0300	0	1	0	0	0	2	0	0	0
0300-0400	1	1	1	1	3	2	2	1	2
0400-0500	0	2	2	4	3	0	4	2	2
0500-0600	10	12	14	13	11	8	13	12	12
0600-0700	57	62	51	58	22	17	48	55	45
0700-0800	95	76	87	74	46	24	78	82	69
0800-0900	86	79	91	65	40	44	78	80	69
0900-1000	60	71	73	88	63	66	53	69	68
1000-1100	42	47	53	49	93	66	57	50	58
1100-1200	51	50	61	61	84	59	43	53	58
1200-1300	43	27	51	58	71	73	43	44	52
1300-1400	49	49	46	48	61	61	40	46	51
1400-1500	44	65	67	75	58	63	52	61	61
1500-1600	73	56	56	59	64	72	65	62	64
1600-1700	57	71	68	66	41	53	66	66	60
1700-1800	49	56	51	45	44	50	44	49	48
1800-1900	32	29	32	35	39	40	26	31	33
1900-2000	21	9	13	21	24	22	8	14	17
2000-2100	6	12	12	21	28	8	8	12	14
2100-2200	4	9	14	21	19	8	5	11	11
2200-2300	2	4	2	19	3	6	1	6	5
2300-2400	1	1	6	19	5	5	0	5	5

Totals

0000-0000	785	792	854	901	844	756	734	813	809
0700-0900	181	155	178	139	86	68	156	162	138
1600-1800	106	127	119	111	85	103	110	115	109
Off-Peak	498	510	557	651	673	585	468	537	563



17SYD0045

Pottsville Rd, south of Cudgera Creek Rd  
Northbound

Time	Week 1							Averages	
	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Weekday	7-day
	7/03/2017	8/03/2017	9/03/2017	10/03/2017	11/03/2017	12/03/2017	13/03/2017		
0000-0100	1	2	2	1	20	4	0	1	4
0100-0200	1	1	1	0	2	3	0	1	1
0200-0300	0	1	0	0	0	2	0	0	0
0300-0400	1	1	1	1	3	2	2	1	2
0400-0500	0	2	2	4	3	0	4	2	2
0500-0600	10	12	14	13	11	8	13	12	12
0600-0700	57	62	51	58	22	17	48	55	45
0700-0800	95	76	87	74	46	24	78	82	69
0800-0900	86	79	91	65	40	44	78	80	69
0900-1000	60	71	73	88	63	66	53	69	68
1000-1100	42	47	53	49	93	66	57	50	58
1100-1200	51	50	61	61	84	59	43	53	58
1200-1300	43	27	51	58	71	73	43	44	52
1300-1400	49	49	46	48	61	61	40	46	51
1400-1500	44	65	67	75	58	63	52	61	61
1500-1600	73	56	56	59	64	72	65	62	64
1600-1700	57	71	68	66	41	53	66	66	60
1700-1800	49	56	51	45	44	50	44	49	48
1800-1900	32	29	32	35	39	40	26	31	33
1900-2000	21	9	13	21	24	22	8	14	17
2000-2100	6	12	12	21	28	8	8	12	14
2100-2200	4	9	14	21	19	8	5	11	11
2200-2300	2	4	2	19	3	6	1	6	5
2300-2400	1	1	6	19	5	5	0	5	5

Totals

0000-0000	785	792	854	901	844	756	734	813	809
0700-0900	181	155	178	139	86	68	156	162	138
1600-1800	106	127	119	111	85	103	110	115	109
Off-Peak	498	510	557	651	673	585	468	537	563

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39063/[https://projects.ghd.com/oc/Sydney/holcimdunloesandmodi/Delivery/Documents/2218823\\_R EP\\_Traffic Assessment.docx](https://projects.ghd.com/oc/Sydney/holcimdunloesandmodi/Delivery/Documents/2218823_R EP_Traffic Assessment.docx)

#### Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
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3	M Lucas	G McCabe		S Lawer		11.07.17

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# Appendix C – Noise impact assessment



**Holcim (Australia) Pty Ltd**  
**Dunloe Sands Quarry section 75W modification**  
**Noise impact assessment**

July 2017

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# 1. Introduction

## 1.1 Overview

Holcim (Australia) Pty Ltd (Holcim) is seeking approval to modify an existing Project Approval condition relating to vehicular movements at the Dunloe Sands Quarry (the site), in accordance with Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Holcim proposes an increase in heavy vehicle movements at the site (the modified proposal).

A noise assessment is required to assess the potential noise impacts of the additional truck movements. Up to twelve inbound and twelve outbound truck movements per hour have been assessed as a worst case assessment, however the volumes of hourly truck movements generated would typically be less.

## 1.2 Purpose of this report

This report describes the procedures and results of the assessment of noise impacts resulting from the additional trucks operating at the site as described above. The purpose of this report is to determine if the modified proposal would result in noise impacts within the criteria at sensitive receivers and, if necessary, provide recommendations and mitigation strategies to ensure that these criteria are not exceeded.

## 1.3 Scope of this report

GHD conducted a noise impact assessment to assess the potential impacts of noise from additional trucks at sensitive receptors. The assessment involved the following tasks:

- Initial desktop review to identify key environmental noise catchment areas and anticipated noise sensitive receptors
- Review of client provided information detailing types of quarrying trucks to be used, identification of likely principal noise sources and compilation of a dataset of sound power levels for noise generating equipment at the site
- Undertaking attended noise monitoring at the nearest noise sensitive receiver during normal site operations, including when trucks enter the site and when no trucks are onsite
- Undertaking attended noise monitoring around the site and of noise generating equipment, including truck passbys
- Comparing measured noise levels to the existing noise criteria (from the existing Project Approval)
- If the additional trucks per hour could potentially result in more simultaneous truck movements onsite, calculate the noise level at the nearest receptor based on measured truck noise levels
- Assessing noise impacts from the potential increase in traffic movements associated with material transport (Quarry Road and Pottsville Road). The potential noise impacts associated with the traffic movements were assessed with consideration of the *Road Noise Policy* (DECCW, 2011).

## 1.4 Limitations

This report: has been prepared by GHD for Holcim (Australia) Pty Ltd and may only be used and relied on by Holcim (Australia) Pty Ltd for the purpose agreed between GHD and the Holcim (Australia) Pty Ltd as set out in section 1.2 of this report.



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The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Holcim (Australia) Pty Ltd and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

## 2. Existing environment

### 2.1 The site and sensitive receivers

The site is located within the Tweed Local Government Area, approximately 25 kilometres south of the Tweed town centre. Road access to the site is via Pottsville Road from the north.

The nearest identified sensitive receivers located in the vicinity of the site are detailed in Table 2-1 and shown in Figure 2-1 below. Distances are stated from the receiver to the nearest point at the site boundary.

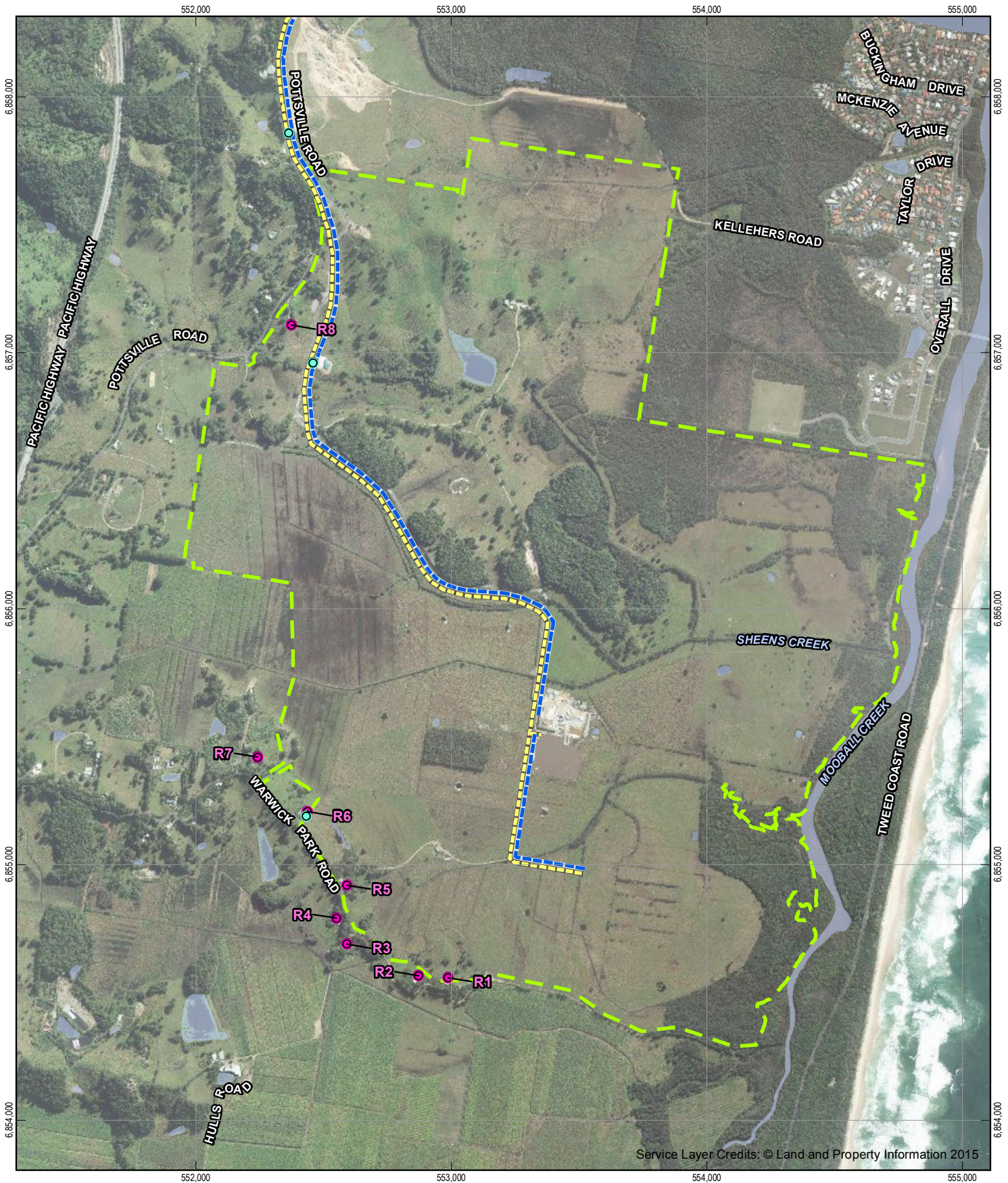
Table 2-1 Identified noise sensitive receivers (from site operations)

Receiver	Receiver type	Address	Distance from site activity (metres)	Direction from site
R1	Residential	265 Warwick Park Road	1,030	South
R2	Residential	265 Warwick Park Road	1,060	South
R3	Residential	200 Warwick Park Road	1,070	Southwest
R4	Residential	200 Warwick Park Road	1,060	Southwest
R5	Residential	175 Warwick Park Road	960	Southwest
R6	Residential	157 Warwick Park Road	970	Southwest
R7	Residential	129 Warwick Park Road	1,090	West
R8	Residential	679 Pottsville Road	1,720	Northwest

Sensitive receivers were also identified along Pottsville Road, which will be used to access the quarry. These are detailed in Table 2-2 and Figure 2-2 below.






Table 2-2 Identified noise sensitive receivers (along Pottsville Road)

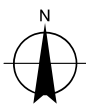
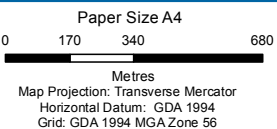
Receiver	Receiver type	Address	Distance from Pottsville Road (metres)
R9	Residential	765 Pottsville Road	96
R10	Residential	771 Pottsville Road	14
R11	Residential	834 Pottsville Road	56
R12	Residential	854 Pottsville Road	46
R13	Residential	866 Pottsville Road	10
R14	Residential	883 Pottsville Road	14
R15	Residential	883 Pottsville Road	16
R16	Residential	940 Pottsville Road	79
R17	Residential	943 Pottsville Road	104
R18	Residential	56 Hazelwood Drive	164
R19	Residential	943 Pottsville Road	69
R20	Residential	940 Pottsville Road	51
R21	Residential	3 Hazelwood Drive	27



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**LEGEND**

-  Project boundary
-  Incoming haul road
-  Outgoing haul road
-  Noise monitoring locations
-  Receiver locations



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Revision | A  
Date | 31 Mar 2017

Location of site, sensitive receivers  
and noise monitoring locations

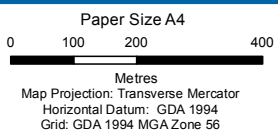
**Figure 2-1**



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**LEGEND**

- Project boundary
- Incoming haul road
- Outgoing haul road
- Building



Holcim (Australia) Pty Ltd  
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Revision	A
Date	31 Mar 2017

Sensitive receivers along Pottsville Rd

Figure 2-2

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 © 2017. Whilst every care has been taken to prepare this map, GHD (and Sixmaps, NSW Land and Property Information) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.  
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## 2.2 Plant and equipment noise monitoring

### 2.2.1 Equipment details

Attended noise measurements were undertaken using a SVAN 977 sound level meter. The sound level meter was programmed to accumulate noise data continuously over the measurement period. A summary of the equipment details is provided in Table 2-3.

A calibration on the noise monitoring equipment was performed prior to deployment using a sound level calibrator with a sound pressure level of 94 dB(A) at 1 kHz. At completion of the measurements, the meter's calibration was re-checked to ensure the sensitivity of the noise monitoring equipment had not varied. The sound level meter was found to be within the acceptable tolerance of  $\pm 0.5$  dB(A).

Table 2-3 Equipment details



Location	Equipment details	Equipment settings	Equipment photo
Around the site	SVAN 977 SN: 36871	1 minute, Fast, A-weighting Pre-cal: 94.8 Post-cal: 94.4	



### 2.2.2 Measured plant and equipment levels



A noise survey of the operational plant and equipment was undertaken to determine the source noise levels which was used for noise modelling. A minimum of one minute per measurement and four measurements per equipment were conducted in accordance with *AS1217.1 – 1985 Acoustics – Determination of sound power levels of noise sources: Part 7 – survey method*.

The measurements were taken at a fixed distance from each side of the equipment. A summary of the measured equipment levels is provided in Table 2-4.


Table 2-4 Measured plant and equipment noise levels, dB(A)

Equipment	Measured distance, metres	Sound pressure level $L_{Aeq}$ dB(A)	Sound power level $L_{WA}$ dB(A)	Equipment photo
Idling truck	3	74	91	
Truck passby	5	61	83	

Equipment	Measured distance, metres	Sound pressure level $L_{Aeq}$ dB(A)	Sound power level $L_{WA}$ dB(A)	Equipment photo
Excavator CAT 320D	5	72	94	
Loader CAT 966G	5.3	72	95	

Equipment	Measured distance, metres	Sound pressure level $L_{Aeq}$ dB(A)	Sound power level $L_{WA}$ dB(A)	Equipment photo
Idling Loader	2.8	79	96	
Screener Terex Supertrak 683	4.3	72	93	



Equipment	Measured distance, metres	Sound pressure level $L_{Aeq}$ dB(A)	Sound power level $L_{WA}$ dB(A)	Equipment photo
Dredge	67	66	110	

## 2.3 Background noise monitoring


### 2.3.1 Equipment details

Background noise measurements were undertaken using one SVAN 977 sound level meter on 8 March 2017. The sound level meter was programmed to accumulate environmental noise data continuously. Measurements were taken at three locations each for a period of 30 minutes at locations close to residential receivers.

A calibration on the noise monitoring equipment was performed prior to deployment using a sound level calibrator with a sound pressure level of 94 dB(A) at 1 kHz. At completion of the measurements, the meter's calibration was re-checked to ensure the sensitivity of the noise monitoring equipment had not varied. The sound level meter was found to be within the acceptable tolerance of  $\pm 0.5$  dB(A).

A summary of the noise monitoring equipment is provided in Table 2-5. A site map and measurement locations are provided in Figure 2-1.

**Table 2-5 Compliance noise monitoring equipment details**

Location	Equipment details	Equipment settings	Equipment photo
157 Warwick Park Road, Wooyung NSW Pottsville Road	SVAN 977 SN: 36871	15 minute, Fast, A-weighting  Pre-cal: 94.8  Post-cal: 94.4	

### 2.3.2 Measured background levels

Measurements of the background noise were taken at three sites for 30 minutes each.  $L_{Aeq}$  values were logged at each period and are shown in Table 2-6 below.

**Table 2-6 Measured background levels at relevant site roads**

Location	15 min period	$L_{Aeq(15min)}$ dB(A)	$L_{A90(15min)}$ dB(A)	Observations
Warwick Park Road	Period 1	40.5	36.3	Quarry not audible
	Period 2	38.8	36.2	
Pottsville Road	Period 1	64.6	40.5	-
	Period 2	62.8	42.1	
Quarry Access Road	Period 1	51.7	38.7	Low frequency sound audible, possible from quarry. Constant road traffic noise audible from the Pacific Highway
	Period 2	52.8	43.8	

## 3. Compliance criteria

### 3.1 Operational noise criteria

The current site operates in accordance with Project Approval 06/-0030 dated 24 November 2008. Schedule 3 of the Project Approval provides noise limits which the quarry must comply with and are presented below in Table 3-1. These noise limits apply to site operations and traffic on the quarry access road. Different noise criteria applies for additional traffic when the trucks are on Pottsville Road.

Table 3-1 Noise impact assessment criteria

Receiver Location	Day $L_{Aeq}$ (15 min) dB(A)
Residences on privately-owned land	48

Notes:

- Noise from the site is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the identified noise limits, except where otherwise specified below.
- Where it can be demonstrated that direct measurement of noise from the project is impractical, alternative means of determining compliance may be acceptable (see Chapter 11 of the NSW Industrial Noise Policy).
- The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise level where applicable.
- The identified noise emission limits apply under meteorological conditions of wind speed up to 3m/s at 10 metres above ground level, and temperature inversion conditions.

### Hours of operation

Holcim are required to comply with the operating hours in Table 3-2.

Table 3-2 Operating hours

Activity	Day	Time
Sand extraction and processing, delivery and distribution, and other quarry related activities	Monday-Friday	7:00am to 5:00pm
	Saturday	7am to 12:00pm
	Sunday and Public Holidays	Nil
Maintenance (if inaudible at neighbouring residences)	Any day	Any time

### 3.2 Road traffic noise criteria

The *Road Noise Policy* (RNP) (Department of Environment, Climate Change and Water DECCW), 2011) provides traffic noise criteria for residential receivers in the vicinity of existing roads, shown in Table 3-3. The criteria is applied to operational and construction traffic on public roads to identify potential road traffic impacts and the requirement for reasonable and feasible mitigation measures.

The RNP application notes state that “for existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any

*increase in the total traffic noise level as a result of the development should be limited to 2 dB above that of the noise level without the development. This limit applies wherever the noise level without the development is within 2 dB of or exceeds, the relevant day or night noise assessment criterion.”*

If road traffic noise increases from the development are within 2 dB(A) of current levels then the objectives of the RNP are met and no specific mitigation measures are required. The development is considered to be the modified proposal.

**Table 3-3 Road traffic noise criteria,  $L_{Aeq(period)}$  dB(A)**

Type of Development	Day 7 am to 10 pm	Night 10 pm to 7 am
Existing residence affected by additional traffic on sub-arterial/arterial roads generated by land use developments	60 $L_{eq(15hr)}$	55 $L_{eq(9hr)}$

The Roads and Maritime *Noise Criteria Guideline* (2015) defines sub-arterial, collector and local roads as shown in Table 3-4. Based on these definitions, Pottsville Road has been classified as a collector road which is assessed under the sub-arterial road criteria as outlined in Table 3-3.

**Table 3-4 Roads and Maritime road classification criteria**

Road	Definition
<b>Sub-arterial</b>	<p>Connects arterials to regions of development and carry traffic from one part of a region to another.</p> <p>Provide connection between arterial roads and local roads. May support arterial roads during peak periods.</p> <p>A road that collects local traffic leaving a locality and connects to another local road, sub-arterial or arterial.</p> <p>Note not all networks are large enough to have both sub-arterial and collector roads</p>
<b>Collector</b>	<p>Connects the sub-arterial roads to the local road system in developed areas.</p> <p>May support sub-arterial roads during peak periods.</p> <p>May have been designed as local streets but can serve major traffic-generating developments or support non-local traffic.</p> <p>Note not all networks are large enough to have both collector and sub-arterial roads.</p> <p>The Road Noise Policy does not provide separate noise criteria for collector roads. Roads and Maritime applies sub-arterial noise criteria to collector roads and still considers collector roads and sub-arterial roads to be different functional classes.</p>
<b>Local</b>	<p>Provide vehicular access to abutting property and surrounding streets. They are the subdivisional roads within a particular developed area.</p>

# 4. Noise impact assessment

## 4.1 Modelling method

### 4.1.1 Site and quarry road operation

The site and quarry road contribution to noise levels at receivers was modelled using noise modelling and assessment software Cadna A. Environmental noise propagation was calculated according to ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors'.

The following noise modelling assumptions were made:

- Surrounding land was modelled as a mix of hard and soft ground with a ground absorption coefficient of 0.75
- Atmospheric absorption was based on an average temperature of ten degrees celcius and an average humidity of 70 per cent
- Atmospheric propagation conditions were modelled with noise enhancing wind conditions for noise propagation (downwind conditions)
- Source noise levels were calculated using the measurements taken on the day of monitoring
- Equipment was assumed to be operational at maximum capacity of 100 per cent of the assessment period.

### 4.1.2 Road traffic noise modelling

A separate model was created using the noise intrusion modelling software SOUNDPLAN v7.4 in order to determine the effects of the trucks on receivers along Pottsville Road. Road traffic noise propagation was calculated according to the *Calculation of Road Traffic Noise* (CoRTN) 1998 standard. The following modelling assumptions were used as shown in Table 4-1.

Table 4-1 Road traffic modelling assumptions

Input	Assumptions
Traffic speeds	80 kilometres per hour
Traffic volumes	Average traffic counts from weekdays during 7-13 of March 2017 (provided by TTM) were used as the base for calculations
Traffic growth	Eight trucks northbound and eight trucks southbound were added to the measured traffic counts
Road gradient	Taken into account based on existing topography
Buildings	Buildings close to receivers were included in the model to account for reflection and wake effects
Receiver heights	1.5 metres above building ground level
Ground absorption	G = 0.75, where 0 is non-porous ground and 1 is porous ground such as that found in a rural setting comprising of mainly grass and vegetation
Ground topography	A digital terrain model with a 1 metre resolution has been used
Façade correction	+2.5 dB(A) to account for noise reflected from the façade

Input	Assumptions
CoRTN factor (Adapted to Australian conditions through research undertaken by the Australian Road Research Board)	-1.7 dB(A) at the façade

#### 4.1.3 Validation model

In order to determine the accuracy and validity of the model, a validation model was created. The noise level at the Pottsville Road measurement location was determined using traffic counts observed during the site visit. The traffic counts are shown in Table 4-2.

Table 4-2 Traffic counts used for validation modelling

Location	Traffic count per hour	
	Cars	Trucks
Pottsville Road Northbound	42	2
Pottsville Road Southbound	36	2

The  $L_{Aeq}$  value for a one-hour period was then calculated by extrapolating the measured 30 minute period. This value was then compared with the modelled results above. The results are shown in Table 4-3 below.

Table 4-3 Validation modelling results

Measured sound level $L_{Aeq(1hr)}$ (dBA)	Modelled sound (on-site traffic counts) $L_{Aeq(1hr)}$	Difference (dBA)
63.8	62.5	1.3

The above results show that the model predicts accurately (within 2 dBA) for the measured location when using traffic counts measured on site. The above results are therefore taken as validation of the reliability of the model produced.

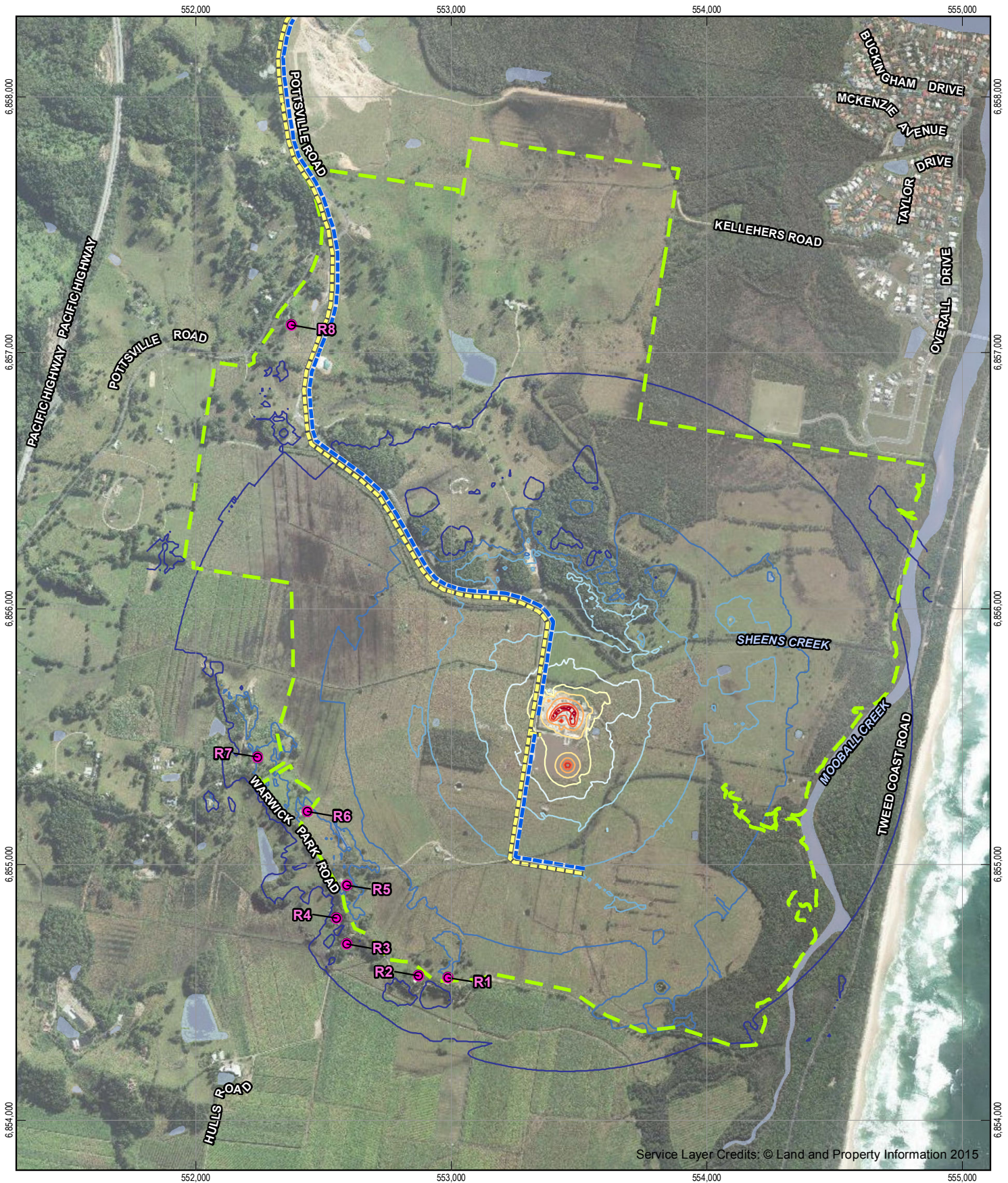
## 4.2 Operational noise impact

### 4.2.1 Site operation

The site operation, consisting of plant and equipment within the quarry, was modelled with the above assumptions and the resulting noise levels at sensitive receivers is shown in Table 4-4 below. Results show that the proposed scenario of twelve trucks per hour will comply with the noise criteria of 48 dBA at all sensitive receivers. A noise emission map for the site has also been provided in Figure 4-1 below.

Table 4-4 Noise levels at sensitive receivers from onsite operation

Receiver	Sound Pressure Level $L_{Aeq(15min)}$ dB(A)	Compliance
R1	40	Yes
R2	38	Yes
R3	36	Yes
R4	36	Yes
R5	41	Yes
R6	42	Yes
R7	42	Yes
R8	31	Yes

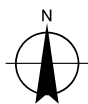
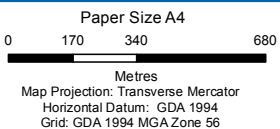


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**LEGEND**

- Project boundary
- Incoming haul road
- Outgoing haul road
- Receiver locations

Level, dBA			
	35		75
	40		80
	45		85
	50		70



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**Predicted operational noise levels from site,  $L_{Aeq}$  (15min) (dBA)**

**Figure 4-1**

#### 4.2.2 Quarry road operation

Operation of the quarry access road was assessed against the noise limits provided in the Project Approval. Truck volumes along the quarry access road are expected to increase from the current scenario of four trucks per hour (8 movements) to twelve trucks per hour (24 movements). The expected truck volume of twelve trucks per hour (24 movements) has been used to assess noise from operation of the quarry access road. The resulting noise levels at each receiver are shown below in Table 4-5.

Results show that the proposed scenario of twelve trucks per hour on the quarry access road will comply with the noise criteria of 48 dBA at all sensitive receivers. Noise emission maps for the current and proposed cases have been provided for the Quarry Road in Figure 4-2 and Figure 4-3 below.

Table 4-5 Noise levels at sensitive receivers from Quarry Road operation

Receiver	Proposed development twelve trucks per hour $L_{Aeq(15min)}$ dB(A)	Criteria, dBA	Compliance
R1	26	48	Yes
R2	27	48	Yes
R3	24	48	Yes
R4	24	48	Yes
R5	29	48	Yes
R6	31	48	Yes
R7	31	48	Yes
R8	46	48	Yes

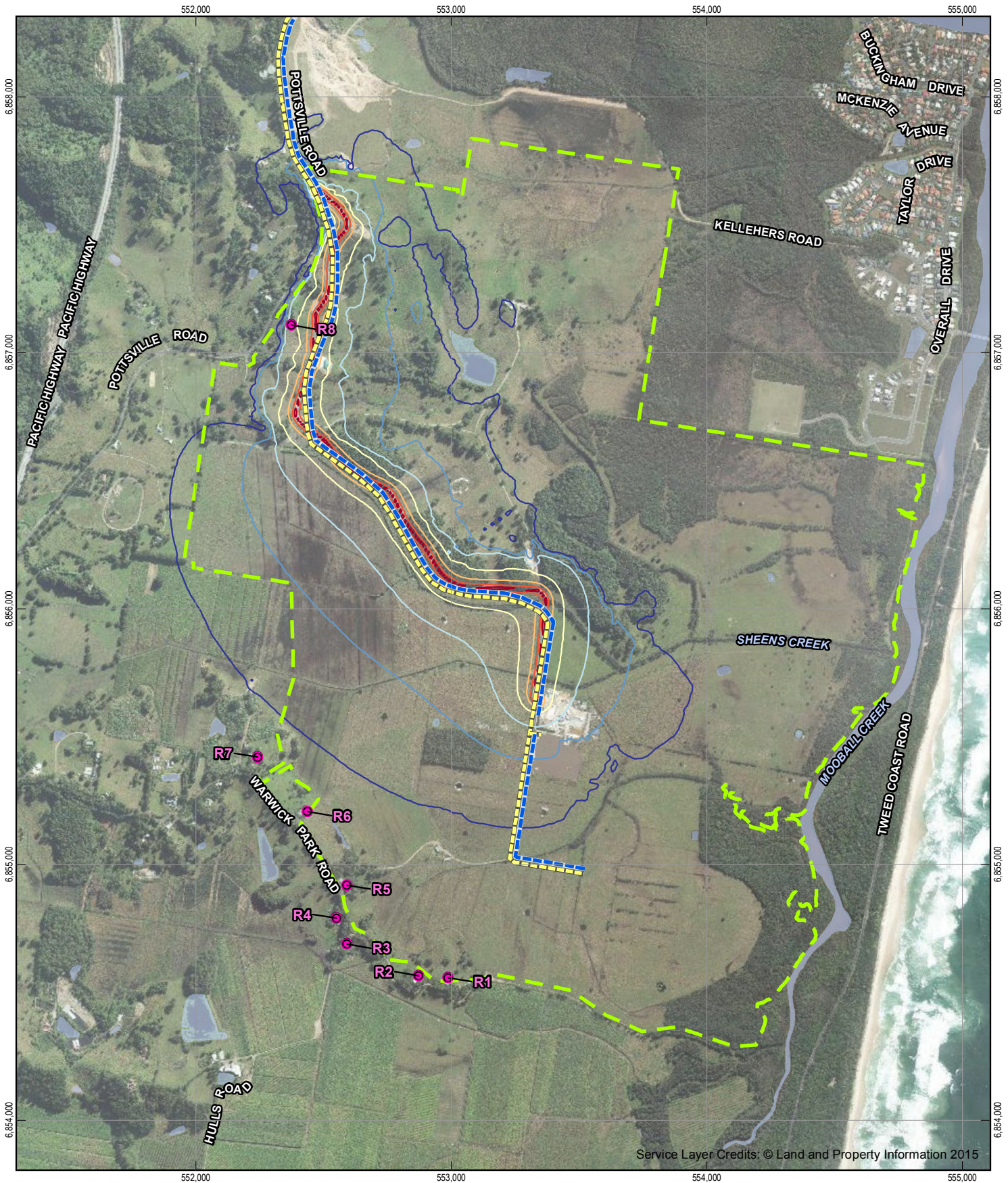
#### 4.3 Traffic noise impacts

The impact on traffic levels and resulting noise at sensitive receivers along Pottsville Road was modelled using SoundPLAN as outlined above. The noise impact was assessed against the noise criteria for a sub-arterial road of 60 dBA  $L_{Aeq(15hr)}$ , as stated in section 3. The resulting noise levels at sensitive receivers are shown in Table 4-6. A noise emission map for Pottsville Road is also provided in Figure 4-4 and Figure 4-5.

Table 4-6 Noise levels at sensitive receivers from truck operation along Pottsville Road

Receiver	Proposed development $L_{Aeq(15hr)}$ dBA	Criteria, dBA	Compliance
R9	52	60	Yes
R10	57	60	Yes
R11	45	60	Yes
R12	49	60	Yes
R13	51	60	Yes
R14	56	60	Yes
R15	48	60	Yes
R16	44	60	Yes
R17	50	60	Yes
R18	42	60	Yes
R19	54	60	Yes
R20	48	60	Yes
R21	38	60	Yes

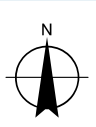
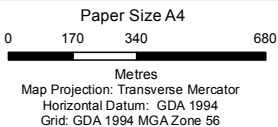




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**LEGEND**

- |                    |                   |    |
|--------------------|-------------------|----|
| Project boundary   | <b>Level, dBA</b> | 50 |
| Incoming haul road | 30                | 55 |
| Outgoing haul road | 35                | 40 |
| Receiver locations | 45                | 60 |

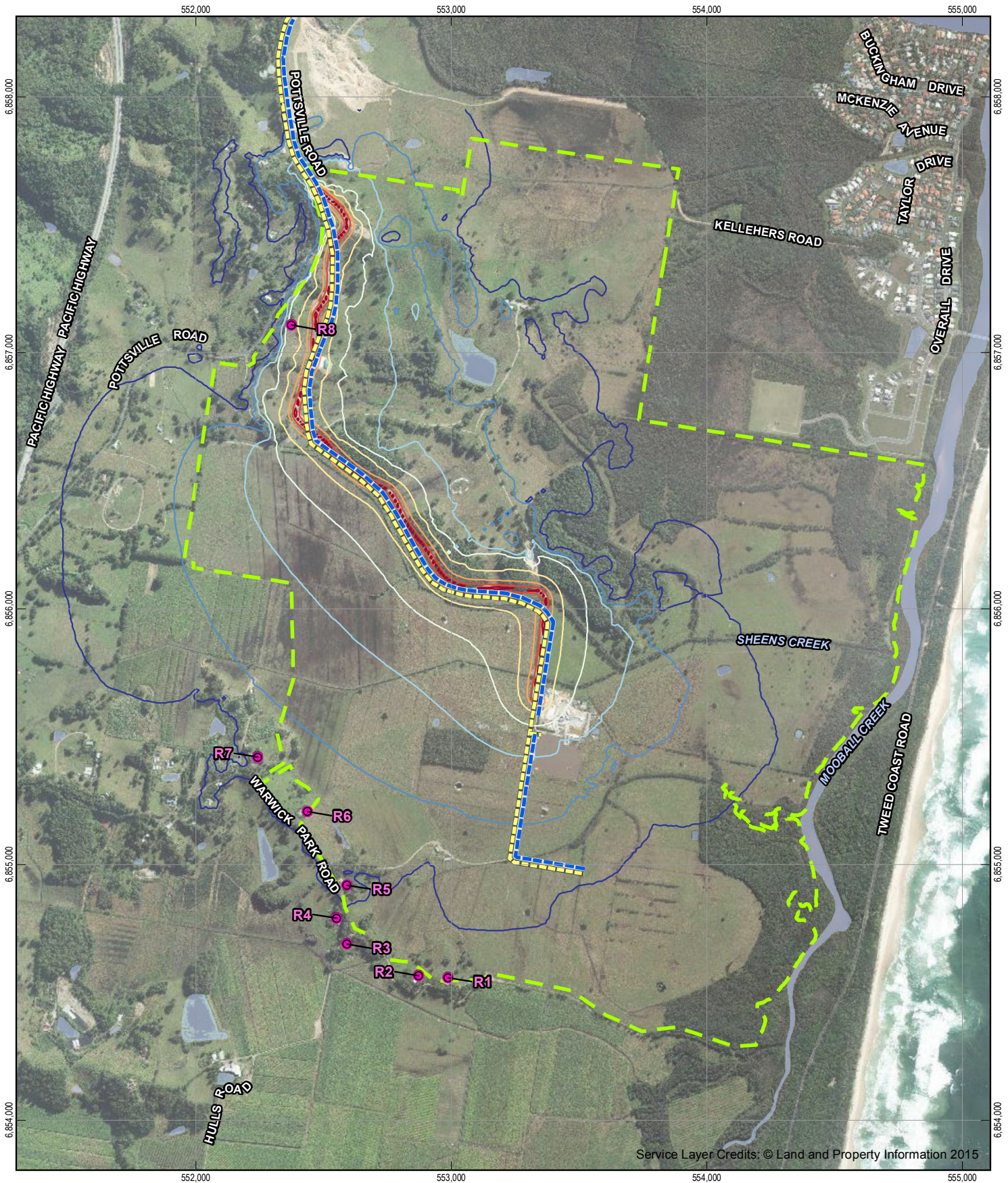


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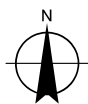
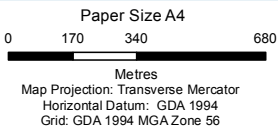
**Predicted operational noise levels from quarry road 4 trucks,  $L_{Aeq}$  (15min) (dBA)**

**Figure 4-2**



**LEGEND**

- |   |  |  |
|---|--|--|
|  Project boundary   | <b>Level, dBA</b>  |  50 |
|  Incoming haul road |  30 |  55 |
|  Outgoing haul road |  35 |  60 |
|  Receiver locations |  40 |  65 |
|   |  45 |  |

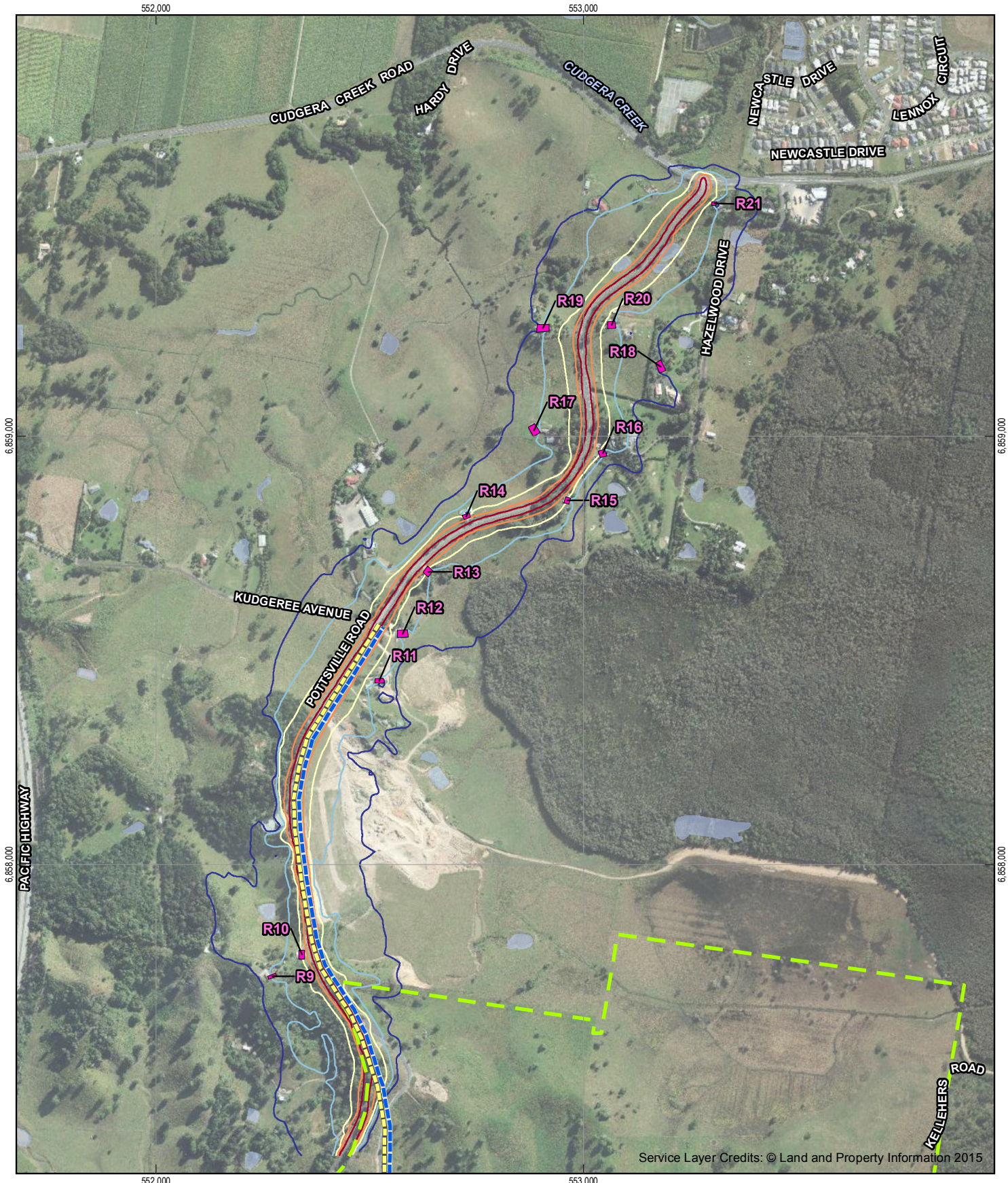


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**Predicted operational noise levels from quarry road 12 trucks,  $L_{Aeq}$  (15min) (dBA)**

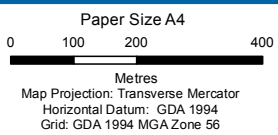
**Figure 4-3**



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**LEGEND**

- Project boundary
  - Incoming haul road
  - Outgoing haul road
  - Building
- | Level, dBA |    |
|------------|----|
|            | 45 |
|            | 50 |
|            | 55 |
|            | 60 |
|            | 65 |



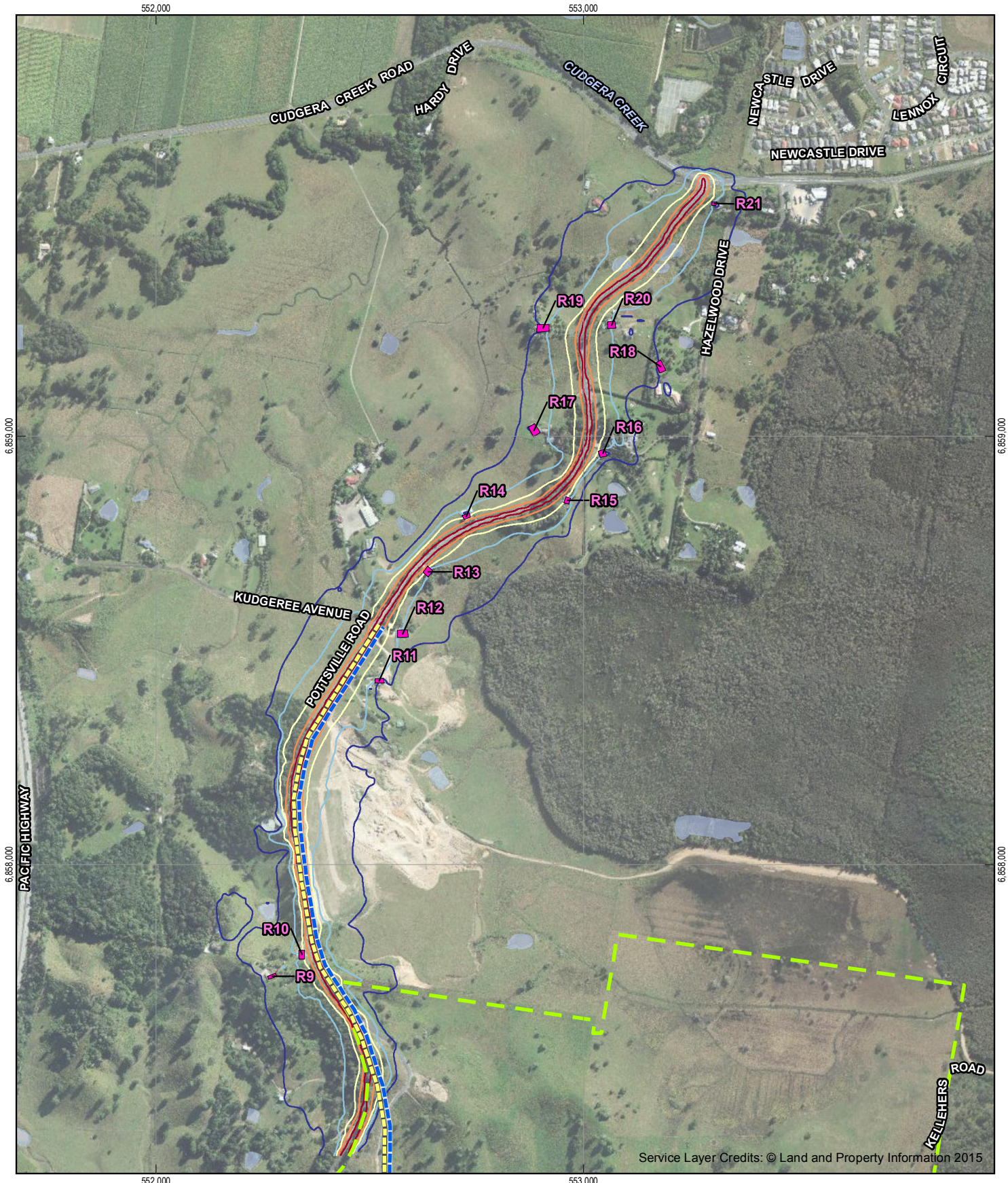
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**Predicted road noise levels along Pottsville Rd – current scenario,  $L_{Aeq}$  (15hr) dBA**

**Figure 4-4**

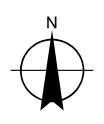
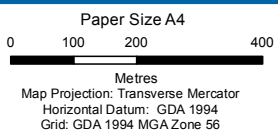
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**LEGEND**

- Project boundary
  - Incoming haul road
  - Outgoing haul road
  - Building
- | Level, dBA |    |
|------------|----|
|            | 45 |
|            | 50 |
|            | 55 |
|            | 60 |
|            | 65 |



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Predicted road noise levels along Pottsville Rd –  
proposed development,  $L_{Aeq}$  (15hr) dBA

**Figure 4-5**

## 5. Mitigation measures

### 5.1 General mitigation measures

From the results outlined in section 4 above, the proposed development is predicted to comply with the noise criteria. However additional general in-principle noise mitigation and management measures have been provided below. These measures would be incorporated in Holcim's Environmental Management Strategy and Environmental Management Plan, as required.

#### *Work ethics*

- All activities on site should be confined between the approved hours: daytime hours of 7:00 am to 5:00 pm from Monday to Friday and 7:00 am to 12:00 pm on Saturday. In particular, haul trucks should not arrive on site (or depart) before 7:00 am.
- All personnel on site should be made aware of the potential for noise impacts and should aim to minimise impact or elevated noise levels, where possible.

#### *Site machinery*

- All engine covers should be kept closed while equipment is operating.
- Vehicles should be kept properly serviced and fitted with appropriate mufflers. The use of exhaust brakes should be eliminated, where practicable.
- Machines found to produce excessive noise compared to industry best practice should be removed from the site or stood down until repairs or modifications can be made.

#### *Access road*

- All trucks entering and exiting the quarry should keep at or below the required internal speed limit of 25 kilometres per hour on the quarry road, as outlined in the EMP.

## 6. Conclusion

GHD has undertaken an assessment of the noise impacts from additional truck movements at the site. The assessment found that increasing the number of trucks at the quarry from four trucks per hour to twelve trucks per hour would result in compliance with relevant noise criteria.

The results from noise modelling outlined in section 4 of this assessment demonstrate that the modified proposal is expected to comply with both Project Approval 06/-0030 criteria and RNP criteria at all nearby sensitive receivers.

General noise mitigation measures have been recommended in order to manage noise at the site. The modified proposal is therefore acceptable from an acoustic perspective based on the assumptions in this report.

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#### Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
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2	C Georgiou	S Smith	<i>ES</i>	S Lawer	<i>SL</i>	29.06.2017
3	V Lau	S Smith				11.07.2017

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# Appendix D – Air quality impact assessment



**Holcim (Australia) Pty Ltd**  
**Dunloe Sands Quarry section 75W modification**  
**Air quality assessment**

July 2017

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# Appendices

Appendix A – Particle size distribution report

# 1. Introduction

## 1.1 Background

Holcim (Australia) Pty Ltd (Holcim) is seeking approval to modify an existing Project Approval condition relating to vehicular movements at the Dunloe Sands Quarry (the site), in accordance with Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Holcim proposes an increase in heavy vehicle movements at the site (the modified proposal).

An air quality assessment is required to assess the potential dust impacts of the additional truck movements. Up to twelve inbound and twelve outbound truck movements per hour have been assessed as a worst case scenario however the volumes of hourly truck movements generated would typically be less.

## 1.2 Purpose of this report

This report reviews the potential air quality (dust) impacts for the proposed additional truck movements at the quarry.

This report has been conducted with consideration to the NSW Environment Protection Authority (EPA) *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, Department of Environment and Conservation* (August 2016) (Approved Methods).

## 1.3 Scope of this report

The assessment included the following scope:

- Desktop review to identify key environmental air quality sensitive receptors
- Review of dust complaint history
- Review of local meteorology and any existing dust sampling undertaken around the site
- Undertaking a screening level dust assessment based on additional trucks entering and leaving the site
- Preparation of a dust inventory based on additional truck movements on any unpaved roads within the quarry site
- Undertaking a level 1 air quality dispersion model (basic, worst case model) to predict worst case dust impacts at nearby sensitive receptors from the additional truck movements
- Discussion about the dust contribution from the additional trucks and determine dust impact on the surrounding environment.

## 1.4 Limitations

This report: has been prepared by GHD for Holcim (Australia) Pty Ltd and may only be used and relied on by Holcim (Australia) Pty Ltd for the purpose agreed between GHD and the Holcim (Australia) Pty Ltd as set out in section 1.2 of this report.

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## 2. Existing environment

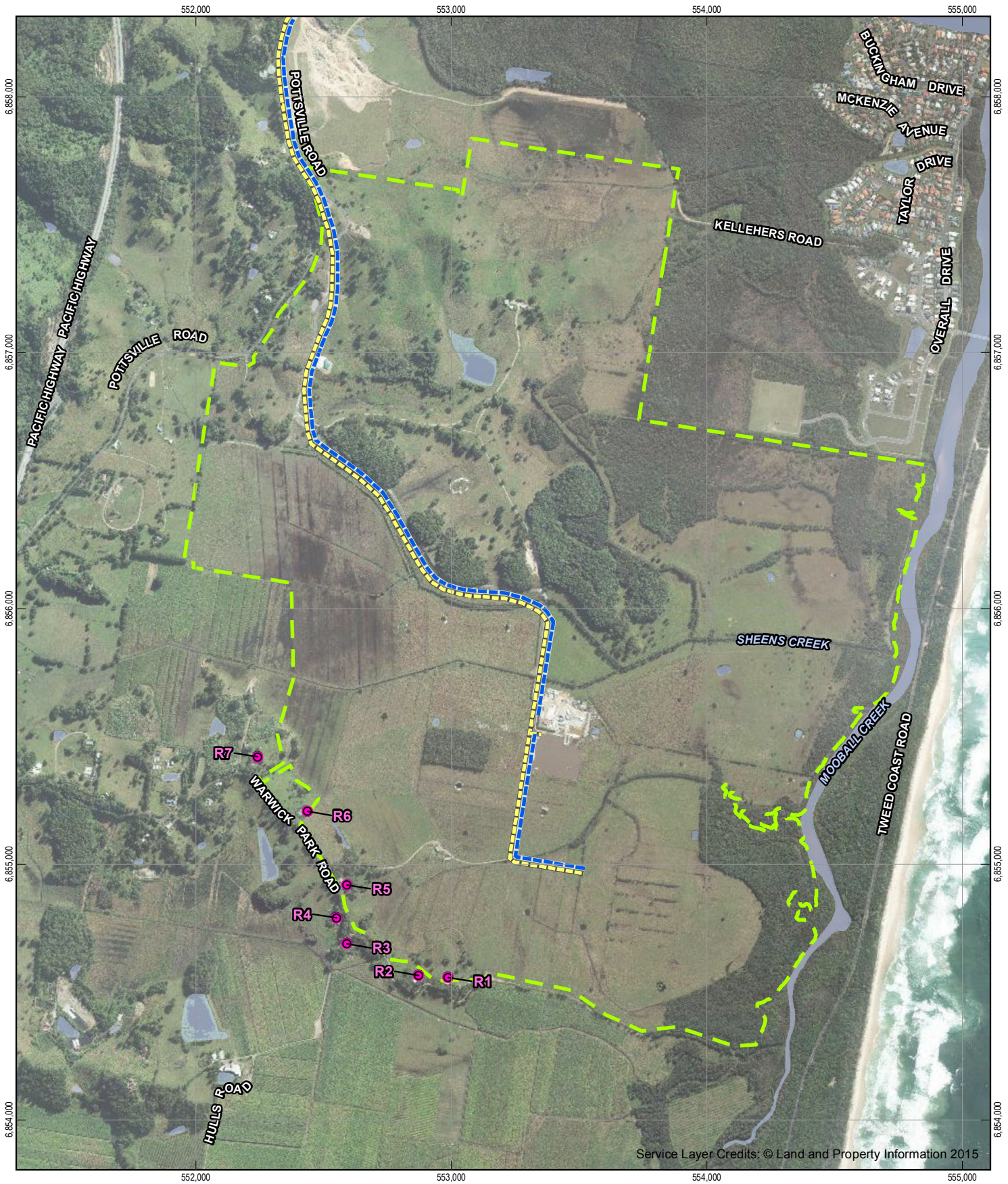
### 2.1 Study area and sensitive receivers

The site is located within the Tweed Local Government Area, approximately 25 kilometres south of the Tweed town centre. Road access to the site is via Pottsville Road.

The nearest identified sensitive receivers located in the vicinity of the site are detailed in Table 2-1 and shown in Figure 2.1 below. Distances are stated from the receiver to the nearest point at the site boundary.

Table 2-1 Identified air quality sensitive receivers

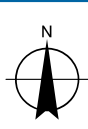
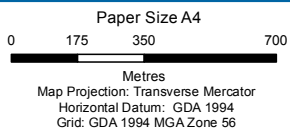
Receiver	Receiver type	Address	Distance from site activity (metres)	Direction from site
R1	Residential	265 Warwick Park Road	1030	South
R2	Residential	265 Warwick Park Road	1060	South
R3	Residential	200 Warwick Park Road	1070	Southwest
R4	Residential	200 Warwick Park Road	1060	Southwest
R5	Residential	175 Warwick Park Road	960	Southwest
R6	Residential	157 Warwick Park Road	970	Southwest
R7	Residential	129 Warwick Park Road	1090	West



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**LEGEND**

- Project boundary
- Incoming haul road
- Outgoing haul road
- Receiver locations



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Site location and sensitive receivers

Figure 2.1

## 2.2 Ambient air quality

Holcim conducts monthly dust deposition monitoring at four locations surrounding the site as required by Project Approval 06/-0030. A summary of the results provided by Holcim for 2016 is provided in Table 2-2. The annual average dust deposition for all four sites is well below the criteria of 4g/m<sup>2</sup>/year. The highest annual average dust levels are at site DDG2, and represent only 30 per cent of the allowable dust levels, however these results are skewed from one month with elevated levels. The results show that dust impacts from the site are minimal and the site is readily complying with the criteria.

Table 2-2 Dust deposition sampling results for 2016

Month/ Site	DDG 1	DDG 2	DDG 3	DDG 4
January	0.3	0.4	0.5	0.6
February	0.4	0.6	0.5	0.5
March	0.2	4.7	0.3	0.5
April	0.2	1.6	0.2	0.8
May	0.3	1.2	0.3	1.6
June	0.3	1.1	1.6	0.5
July	0.1	0.5	0.4	0.4
August	0.6	0.5	0.3	0.4
September	0.8	0.5	0.4	0.3
October	0.8	0.5	0.4	0.3
November	0.4	1.9	0.3	0.4
December	0.5	1.7	0.6	0.5
<b>Annual Average</b>	<b>0.41</b>	<b>1.23</b>	<b>0.48</b>	<b>0.57</b>

Sampling of total suspended particulate (TSP) and particulate matter less than ten micro metres in aerodynamic equivalent diameter (PM<sub>10</sub>) are not currently required at the site. These are required once the site is operating at a rate above 200,000 tonnes per annum as documented in the EMP.

There is no particulate (PM<sub>10</sub>) sampling undertaken at the site and the NSW EPA monitoring network does not have a site in the area. The Queensland Department of Environment and Heritage Protection (EHP) also have an air quality monitoring network. In order to understand background PM<sub>10</sub> levels the area, GHD reviewed data from the QLD EHP Springwood station, which is approximately 90 kilometres north of the site. Data referenced for Springwood between the years 2007 and 2011 show the 75<sup>th</sup> percentile to range between 15.2 and 18.5 µg/m<sup>3</sup>.

In the absence of any site specific data this can be used as indicative background particulate levels in the proposal area.

During a site visit, GHD did not observe any excessive dust from trucks or processes onsite.

## 2.3 Local meteorology

The transport and dispersion of the air emissions from the quarry will be influenced by prevailing meteorology including vertical temperature profiles that will alter both diurnally and with wind direction.

Meteorological data was obtained from the Bureau of Meteorology's Coolangatta Automatic Weather Station (AWS) for this assessment. This is the nearest AWS to the site, situated approximately 25 kilometres to the north. Weather data collected at this location is considered representative of weather conditions at the subject site for the purposes of this assessment.



The data indicates that the study area has a warm temperate climate, with significant temperature variations between summer and winter. January is the hottest month, with a mean maximum temperature of 28.3 degrees celsius. The mean maximum temperature drops to 20.6 degrees in July. Most of the annual rainfall (1520 millimetres) occurs in summer and autumn, with winter and spring being usually drier. Wind speeds, which are of particular importance when determining the potential for dust impacts, are typically greater in spring and summer.

Local meteorology is dependent on local topography, land use, vegetation, and watercourses and would vary along the proposal site. To conduct a conservative assessment, worst-case meteorology was assumed for dust dispersion, based on all possible wind directions and speeds.

A five year wind rose was sourced for the study area from Coolangatta (willyweather.com.au). As shown in Figure 2.2, the five-year wind rose shows that calm, light and gentle winds occur for nearly 70 per cent of the time, with roughly 30 per cent of wind above 19.8 kilometres per hour. This is a level that could cause nuisance dust. Most high winds occur from the north, meaning that dust impacts would be more likely to occur opposite to this direction, southwards.



Figure 2.2 Wind rose for Coolangatta

### 3. Air quality assessment criteria

Air quality impact assessment criteria are prescribed within the NSW EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, Department of Environment and Conservation* (August 2016) (Approved Methods). Air quality criteria are also listed in Project Approval 06/-0030, dated 24 November 2008.

To ensure that dust environmental outcomes are achieved, emissions from a quarry must be assessed against the criteria given in Table 3-1.

These criteria are to be met at existing or future off-site sensitive receptors. Particulate and dust deposition levels are provided as cumulative impacts, where the predicted impact of the modified proposal is added to the adopted background levels.

Table 3-1 Adopted air quality impact assessment criteria

Pollutant	Averaging period	Criteria <sup>1</sup>
PM <sub>10</sub>	24 hours	50 µg/m <sup>3</sup>
	Annual	30 µg/m <sup>3</sup>
Total suspended particles	Annual	90 µg/m <sup>3</sup>
Dust deposition	Annual	2 g/m <sup>2</sup> /month <sup>2</sup>

Notes 1: Based on the Air NEPM and the Approved Methods  
2: Maximum increment. Maximum cumulative impact of 4 g/m<sup>2</sup>/month

## 4. Air emissions from additional trucks

### 4.1 Emissions inventory

The air quality assessment focuses on dust, particulate matter being the primary emission to air from the quarry with potential for off-site impact. The fractions of interest assessed in this report are airborne concentrations of total suspended particulate (TSP) and fine particulate matter as well as total deposited dust.

Particulate emissions from the additional eight truck movements per hour would mainly be attributed to wheel generated dust on unpaved surfaces and loading of trucks. The access road from the main road to the site is paved so dust will not be an issue until trucks access the site. Once on the site, there is some potential for dust, however as the site consists of sand, which has large particle size, dust impacts would be minimal.

The worst case scenario for trucks travelling on unpaved surfaces once in the site is assumed to be a truck travelling to the opposite end of the site (to the future second extraction pond) which is approximately 185 metres each way, a total of 370 metres. Worst-case emissions have been estimated using the national pollutant inventory (NPI) *Emissions estimation technique manual for mining* version 3.1. TSP and particulate matter less than ten micro metres in aerodynamic equivalent diameter (PM<sub>10</sub>) are included in the assessment. A review of particle sizes from the site (refer to Appendix A) shows there are no fine particles in the extracted sand and PM<sub>2.5</sub> has not been included in the assessment. TSP is included in the emissions inventory below however this is not discussed in more detail as dust impacts from the site are not currently an issue as discussed in section 2 and TSP has annual averaged criteria. PM<sub>10</sub> has a 24 hour averaged criteria so in order to assess if there is potential for dust impacts, this has been assessed in more detail. Dust emissions from additional trucks as part of the modified proposal are provided in Table 4-1.

Table 4-1 Dust emission inventory from trucks

	Scenario one (existing)	Scenario two (proposed)
Trucks per hour	4	12
Metres per truck	370	370
KM per day in total	1.48	4.44
TSP g/s over 10 hour day	0.1739	0.5217
PM <sub>10</sub> g/s over 10 hour day	0.051	0.154

## 5. Predicted impacts

A level 1 screening impact assessment was undertaken with consideration to the Approved Methods. Modelling was undertaken using the EPA approved dispersion model, AUSPLUME. A synthetic worst-case meteorological data file was created that considers a range of wind speed and stability class combinations that could occur over the year.

The following assumptions were used in the model:

- Particle size distribution was used as provided by Holcim (refer Appendix A)
- Land use surface roughness coefficient of 0.1 metres (flat rural land)
- Ground level receptors
- Irwin rural wind profile exponents
- All other EPA recommend default settings.

The following scenarios were assessed for the modified proposal:

- **Scenario one** - Four trucks per hour each travelling 370 metres on unpaved roads within the site. The surface of the road is assumed worst-case with a mix of soil and gravel
- **Scenario two** - Twelve trucks per hour each travelling 370 metres on unpaved roads within the site. The surface of the road is assumed worst-case with a mix of soil and gravel
- **Scenario three** - Twelve trucks per hour each travelling 370 metres on unpaved roads within the site. The surface of the road is assumed to be sand with a particle size of typical sand from the site supplied by Holcim.

A summary of the predicted results from the existing truck volumes and proposed truck volumes is presented below in Table 5-1.

This is the predicted maximum increment from trucks only, but shows how little impact dust from this activity has on the nearest sensitive receptors. This is due to the large particle size of sand, the distance from sensitive receivers and the small scale of operations. These worst-case predictions assume the worst day for dust dispersion in a year and no dust mitigation. Scenario two assumes a worst case gravel road and predicts a worst-case PM<sub>10</sub> increase of 2 µg/m<sup>3</sup> on one day per year (i.e. the maximum predicted 24 hour level). Scenario three assumes trucks driving over a sand access road onsite predicted no increase in PM<sub>10</sub> at any nearby sensitive receptor.

Table 5-1 Predicted maximum 24 hour PM<sub>10</sub> concentration from trucks µg/m<sup>3</sup>

Sensitive receptor	Existing scenario one (four trucks)	Proposed scenario two (twelve trucks) gravel road	Proposed scenario three (twelve trucks) sandy road
R1	0.6	1.8	0
R2	0.7	1.5	0
R3	0.7	1.7	0
R4	0.9	1.8	0
R5	0.9	2.0	0
R6	0.8	1.6	0
R7	0.2	0.7	0

The results in Table 5-1 show that dust impacts from the additional trucks do not have any significant impact at nearby sensitive receptors. The maximum predicted increment of 2 µg/m<sup>3</sup> is well below the criteria of 50 µg/m<sup>3</sup>. This was predicted from a worst case gravel road, which does not currently or would likely exist and has been presented as a comparison only.

Due to the quarry extracting sand which has a low dust potential, cumulative impacts are not expected, which is demonstrated by the low levels of dust in the monthly sampling at all sites.

Dust monitoring data provided in section 2, shows that the annual and monthly deposition results to be consistently below the criteria and importantly no dust complaints have been made at the site.

Results show that worst case dust impacts from increasing the number of trucks to twelve each hour are minimal and adverse dust impacts are not expected.

## 6. Dust mitigation measures

### 6.1 General dust mitigation measures

While general quarry operations are not expected to exceed air quality goals at nearby receptors, the following mitigation measures are recommended:

- Control on-site traffic by designating specific routes for haulage and access and limiting vehicle speeds to below 25 kilometres per hour
- All trucks hauling material should be covered before exiting the site and should maintain a reasonable amount of vertical space between the top of the load and top of the trailer
- Material spillage on sealed roads should be cleaned up as soon as practicable.

## 7. Conclusion

GHD has prepared a level 1 dust impact assessment of proposed additional truck volumes at the site. Results of the worst-case assessment show that increases in dust from twelve trucks inbound and twelve trucks outbound per hour operating at the quarry are minimal and no significant additional impacts are expected. The modified proposal would be suitable from an air quality perspective.

It is recommended that existing dust management measures and monitoring at the site be continued once the proposed changes come into effect.

# Appendices

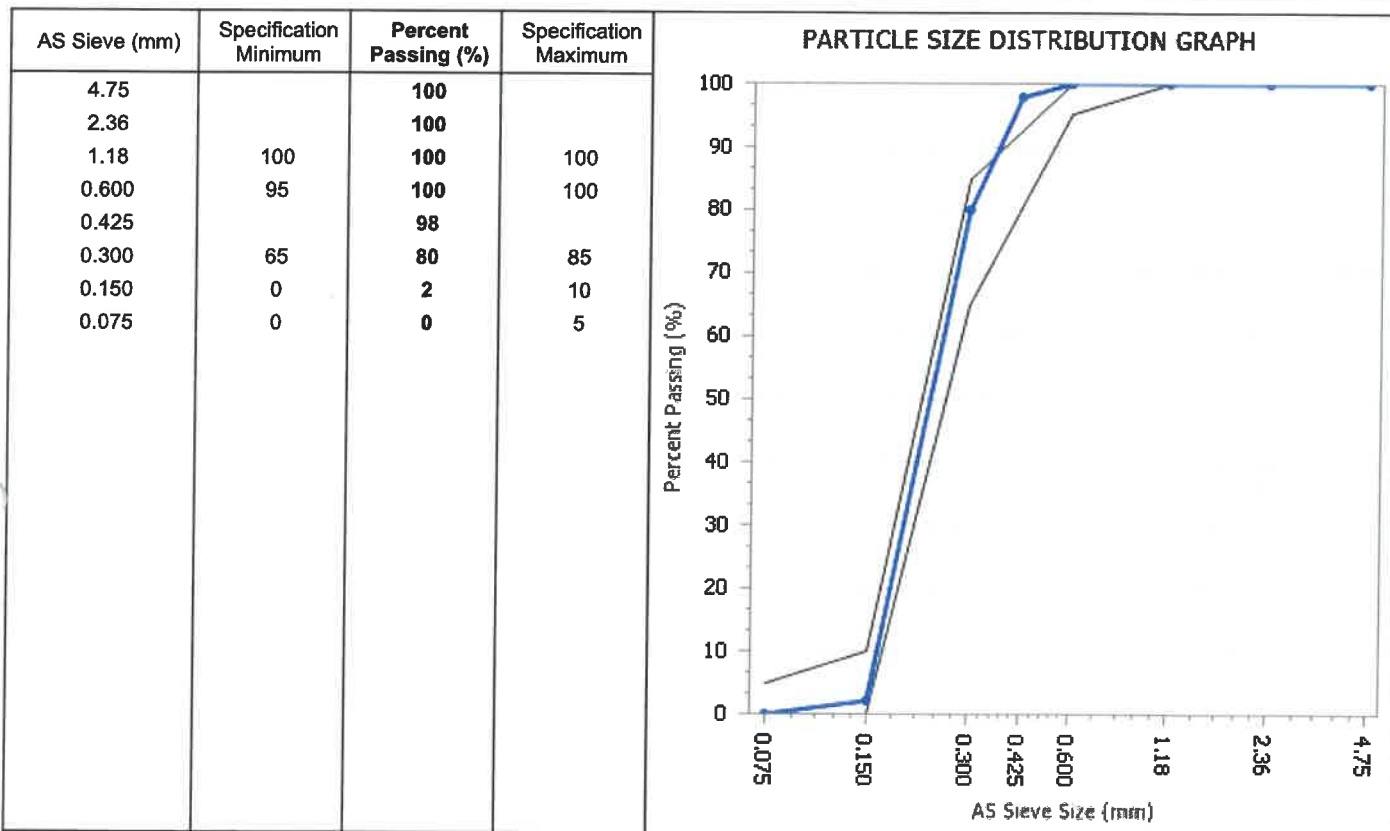


# Appendix A – Particle size distribution report



## PARTICLE SIZE DISTRIBUTION REPORT

<b>Client:</b> Holcim NSW, Country	<b>Report Number:</b> 22373/R/8648-1
<b>Client Address:</b> Area Office, 251 Pac Highway Sth, Coffs Harbour	<b>Project Number:</b> 22373/P/38
<b>Project:</b> Holcim Dunloe Sands	<b>Lot Number:</b> N/A
<b>Location:</b> Pottsville	<b>Internal Test Request:</b> 22373/T/3771
<b>Component:</b> Dunloe Concrete Sand	<b>Client Reference/s:</b> Fine Sand SP#6751
<b>Area Description:</b> Holcim Ballina Batch Plant	<b>Report Date / Page:</b> 3/02/2017 <span style="float: right;">Page 1 of 1</span>

<b>Test Procedures:</b> AS1141.11.1	
<b>Sample Number:</b> 22373/S/33641	<b>Sample Location</b>
<b>Sampling Method:</b> AS1141.3.1 Cl 8.4.3	<b>Location:</b> Concrete Plant Bin
<b>Date Sampled:</b> 1/02/2017	<b>Stockpile Number:</b> 6751
<b>Sampled By:</b> Scott Burnett	
<b>Date Tested:</b> 3/02/2017	
<b>Laboratory Prepared:</b> Washed	
<b>Material Source:</b> Holcim Dunloe Sands	<b>Material Type:</b> Fine Sand (QDNLCS)



**Remarks**

	The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025	
	Accreditation Number: 1986 Corporate Site Number: 22373	Approved Signatory: Scott Burnett Form ID: W9Rep Rev 2

GHD

Level 15, 133 Castlereagh Street  
Sydney NSW 2000

T: 61 2 9239 7100 F: 61 2 9239 7199 E: [sydmal@ghd.com](mailto:sydmal@ghd.com)

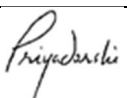

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EP\_Air Quality Assessment.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	E Smith	P Pandey	<i>PP</i>	S Lawer	<i>SL</i>	03.04.17
0	E Smith	P Pandey	<i>PP</i>	S Lawer	<i>SL</i>	11.04.17
1	E Smith	P Pandey	<i>PP</i>	S Lawer	<i>SL</i>	12.04.17
2	E Smith	P Pandey				29.06.17

[www.ghd.com](http://www.ghd.com)



# Appendix E – Department of Planning and Environment correspondence



Ian Shenton &lt;ian.shenton@lafargeholcim.com&gt;

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**Dunloe Quarry - Truck Movements**

4 messages

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**Ian Shenton** <ian.shenton@lafargeholcim.com>  
To: Howard Reed <Howard.Reed@planning.nsw.gov.au>

24 October 2016 at 15:06

Hi Howard,

We had our catchup with the DPE Compliance function last Thursday to discuss truck movements at our Dunloe Quarry. The Compliance representatives stated the Department's position that Schedule 2, Condition 8 should read 8 vehicle movements as four in plus four out. As you're aware, Holcim (and Ramtech before us) interpreted the condition as 1 movement = in and out.

Given this, we would like to pursue a modification to the site development consent. The request would be made to move to an average limit for truck movements at the site. Eg - daily average over the course of a month (operating days only). It is not proposed for the average to be above the currently approved levels, ie - 8 movements per hour - 80 movements/day.

Re: pursuit of the modification could you please give me a call to discuss next steps/scope? I tried to call earlier but couldn't get through. We are eager to pursue ASAP. Happy to come and meet with you if that would make things easier?

Thanks

Ian

--

**Ian Shenton**  
Planning & Environment Manager - NSW & ACT

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A member of LafargeHolcim

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To: "ian.shenton@lafargeholcim.com" <ian.shenton@lafargeholcim.com>  
Cc: "stewart.mclachlan@planning.nsw.gov.au" <stewart.mclachlan@planning.nsw.gov.au>

25 October 2016 at 09:57

Hi Iain,

I am responding on behalf of Howard in regards to the email below. Any modification for Dunloe Quarry where it is proposed to increase truck movements from those already assessed and approved should include an environmental assessment of all potential impacts. In this case I would envisage an EA to include a traffic/transport impact assessment, a noise assessment and an air quality assessment. The noise and air quality assessments should demonstrate that the proposed increase in truck movements would not result in impacts beyond the currently approved limits, or if an exceedance/s is predicted that these are justified and acceptable in regards to the relevant legislation and guidelines.

The traffic impact study should include:

- Accurate predictions of the road traffic generated by the modification;
- An assessment of the likely transport impacts of the modification on the capacity, condition, safety and efficiency of the local and State road network; and
- A detailed description of the measures that would be implemented to maintain and/or improve the capacity, condition, safety and efficiency of the local and State road network over the life of the development/modification.

The Department's position in regards to 'averages' is that, alone, they are generally not an acceptable means of assessing a development or modification in that averages are difficult to assess (ie maximum impacts are not known or modelled) and are hard to monitor and enforce. The Department's preference is that the maxima is predicted and modelled, and these are coupled with an assessment of maximum impacts. The Department accepts averages as a 'second limit' (ie averages PLUS maxima).

Please call if you wish to discuss any of the above.

Thanks

Jessie

### Jessie Evans

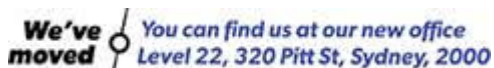
Team Leader

Resource Assessments | Planning Services

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**From:** Ian Shenton [<mailto:ian.shenton@lafargeholcim.com>]

**Sent:** Monday, 24 October 2016 3:06 PM

# Appendix F – Holcim community newsletter



# Dunloe Sands Quarry Community Update

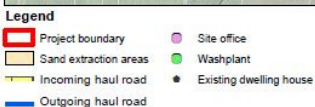
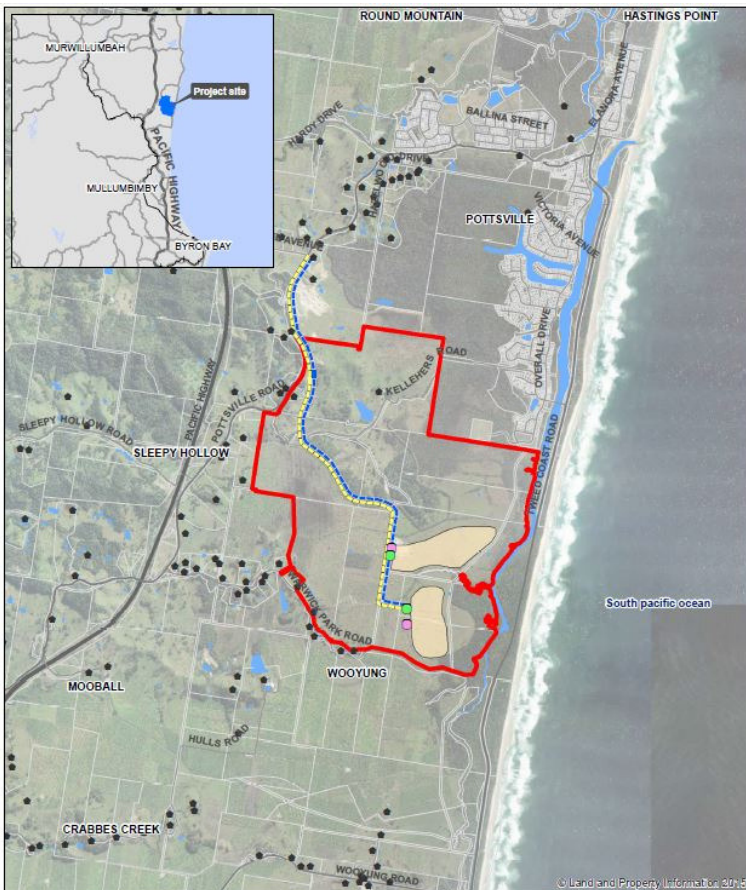
## About the project

Holcim (Australia) Pty Ltd (Holcim) has been delivering construction materials since 1901, originally serving the industry under the Ready-Mix and Humes brands. Today, Holcim operates across Australia supplying concrete, concrete products, aggregate and sand from a network of over 200 concrete batching plants.

Holcim operates the Dunloe Sands Quarry (the site) which produces a very high quality, fine concrete sand as well as a variety of other sand products including plasterer sand, bunker sand and fill sand.

The construction and operation of the Dunloe Sands Quarry is in accordance with Project Approval originally obtained in 2008. Holcim is seeking approval from the Department of Planning and Environment (DP&E) to modify an existing condition of the Project Approval to allow for an increase in heavy vehicle movements and improved flexibility in vehicle movements at the site.

Holcim have engaged GHD to prepare an Environmental Assessment (EA), which will be submitted to DP&E as part of the approval process for the proposed modification.



## Proposed modification

Currently a condition of the Project Approval requires that heavy vehicle movements (in and out of the site) do not exceed eight per hour (80 per weekday). The EA has been prepared to support an allowance of up to 120 inbound and 120 outbound heavy vehicle movements from the site per weekday and up to 60 inbound and 60 outbound heavy vehicle movements on Saturdays.

This results in a maximum of 12 heavy vehicle movements per hour (one way) each day compared to the current limit of eight. These movements average approximately 100 heavy vehicle movements per working day over the course of a calendar month.

There will be no change to operation hours; works will continue to be conducted Monday to Friday 7:00am to 5:00pm and Saturday 7:00am to 12:00pm. No operations are allowed on Sunday or public holidays unless it is maintenance that is inaudible to neighbouring residents.

# Dunloe Sands Quarry Community Update

## Why is the modification needed?

In practice and based on our experience, the current Project Approval condition reduces our ability to service peaks and troughs in market demand. As such, the site cannot meet demand requirements during peak periods (eg - mornings). The modification will allow for more flexibility in daily quarry heavy vehicle movements to supply to the internal and external market, which service construction material industries and major infrastructure projects being undertaken for the community's benefit.

The proposed modification is considered to be substantially the same development as that approved under the Project Approval, as it would not alter the operation or intensify activities beyond the current approved development - the annual output of the site will not change.



## What is an Environmental Assessment (EA)?

An Environmental Assessment is a document detailing a proposed development and its potential impacts.

We engaged an external consultant, GHD, to prepare an EA for submission to DP&E as part of a section 75W modification application under the *Environmental Planning and Assessment Act 1979* for the existing Dunloe Sands Quarry.

The EA provides a description of the modification and its need and considers the social and environmental impacts of the modification, recommending mitigation and management measures as appropriate.

## Will the modification affect me?

Issues identified as having the potential for environmental impact as a result of the modified proposal includes traffic, noise and air quality impacts due to increased daily heavy vehicle traffic in out and of the site.

The EA has determined that:

- Based upon the current peak hour traffic volumes on Pottsville Road, there is adequate capacity to absorb the additional heavy vehicle movements without additional traffic control.
- The current road access arrangement is considered appropriate to accommodate additional heavy vehicle activity.
- Increasing the number of trucks at the quarry from four trucks per hour to a maximum of twelve trucks per hour would result in compliance with relevant noise criteria.

The results from noise modelling demonstrate that the modified proposal is expected to comply with both the Project Approval criteria and Road Noise Policy criteria at all nearby sensitive receivers (such as houses).

- Increases in dust from twelve trucks inbound and twelve trucks outbound per hour are minimal and no significant additional impacts are expected.

# Dunloe Sands Quarry Community Update

## Management actions required

We currently, and will continue, to implement a number of management actions to address environmental impacts. These include:

- Implementing an ongoing Noise Monitoring Program for the project
- Implementing an ongoing Dust Monitoring Program for the project
- A Traffic Assessment, which has been undertaken by GHD for the proposed modification

## How can I view the Environmental Assessment?

The EA will be made available on DP&E's website at [www.planning.nsw.gov.au](http://www.planning.nsw.gov.au). All community members will have the opportunity to provide formal comment on the proposal during this period. Informal comment can be provided to Holcim through the details below.

## How can I find out more?

If you would like to find out more about the project, or have any feedback, you can contact Holcim directly, as follows:

### Mail:

#### **Holcim (Australia) Pty Ltd**

Level 8, 799 Pacific Highway  
Chatswood NSW 2067 Australia

### Direct:

#### **Ian Shenton**

NSW Planning & Environment Manager  
[ian.shenton@lafargeholcim.com](mailto:ian.shenton@lafargeholcim.com)  
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Revision	Author	Reviewer		Approved for Issue		
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A	A Douglas R Ventura	S Lawer	SL	S Lawer	SL	03.04.17
1	A Douglas	S Lawer	SL	S Lawer	SL	11.04.17
2	A Douglas	S Lawer	SL	S Lawer	SL	29.06.17
3	A Douglas	S Lawer		S Lawer		11.07.17

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