



Rockley Falls Quarry

REQUEST FOR MODIFICATION TO THE APPROVED
PROJECT

WET-MIX BATCH PLANT AND EXTENDED
OPERATIONAL HOURS

- Final
- February 2011



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A Team consisting of RTA, Abigroup and SKM
to duplicate the Hume Highway from Woomargama to Table Top

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Assessment summary

In June 2008, approval was granted to Abigroup to establish and operate the Rockley Falls Quarry (the quarry) near Holbrook, NSW. Abigroup is a participant of the Hume Highway Woomargama Alliance (HHWA) that has been formed to construct a dual carriageway bypass of the existing Hume Highway which passes through the village of Woomargama. The quarry is supplying material to the HHWA duplication project, and is now being operated by the HHWA on behalf of Abigroup.

A 'dry-mix' concrete batch plant currently operates at the quarry to supply concrete for drainage and other 'hand pour' operations to the HHWA. The HHWA has identified an opportunity to dramatically reduce the mainline paving program duration by installing and operating a second 'wet-mix' concrete batch plant at the quarry. The timing of the start of operations of the wet-mix batch plant would coincide with a significant reduction in the quarry operations.

The HHWA, on behalf of Abigroup, has assessed the potential environmental impacts of operating a small wet-mix batch plant at the quarry and extending the current operating hours of the quarry during the week, to determine whether these works would be largely consistent with the nature and scale of operations and environmental impacts considered in Project Approval No 07-0078 and Environment Protection Licence (EPL) No. 12884. Consultation with the Department of Planning (DoP) has determined that a modification under Section 75W of the *Environmental Planning and Assessment Act* (EP&A Act) would be required as the activity is not consistent with those described in the Approved Project.

The area is rural in nature and the number of sensitive receivers in the vicinity of the quarry is low (7 receivers within 3 km). The background noise is dominated by highway traffic with vehicle numbers increasing during the evening period. An acoustic model was developed to predict the likely noise levels at sensitive receivers, which were compared against assessment criteria described in the Minister's Conditions of Approval (MCoA) and EPL. Activities associated with the wet-mix batch plant and extended hours of operation are not expected to exceed the criteria.

Incremental dust generated by the wet-mix batch plant and activities conducted in the extended working hours would be minimal and is not likely to significantly increase dust concentrations (measured on a 24-hourly and monthly basis). The air quality in the area is sufficiently good and the currently generated dust sufficiently low to allow for any such increases in dust generation. In summary, the proposed wet-mix batching plant and extended working hours are not expected to result in adverse impacts on air quality or the acoustic amenity of any nearby sensitive receivers during day or evening operations. With cessation of the crushing activities on site, the overall noise and dust impacts are likely to be reduced.

There are no other significant additional impacts on other environmental aspects relating to cumulative operation of the wet-mix batch plant and extended operating hours of the quarry.

Based on this assessment, the HHWA does not anticipate that the proposed wet-mix batch plant or the extension to approved operating hours would result in any additional adverse impacts on sensitive receivers and the impacts would be consistent with those presented in the original

Environmental Assessment (EA) for the project. Overall no modification to the EPL or the MCoA would be required except those relating to a description of the approved activities on site.

It is noted that the HHWA is committed to achieving excellent environmental outcomes and would ensure that all operations are undertaken strictly in accordance with the quarry Environmental Management Plan (EMP), which includes a requirement for regular monitoring, reporting; identification of areas of improvement; and regular consultation with the surrounding community.

1. Introduction

1.1. Background and purpose of this submission

The Hume Highway Duplication Project is a federally funded upgrade of the existing Hume Highway. The section of highway bypassing the village of Woomargama, NSW, (the Project) would be constructed by the Hume Highway Woomargama Alliance (HHWA), comprising the RTA (the Owner Participant), Abigroup and Sinclair Knight Merz (the Non-Owner Participants).

The principle supplier of 'hard rock' road base material to the HHWA project is the Rockley Falls Quarry (the quarry) located on the Hume Highway north of Holbrook, NSW. The quarry is currently being operated by the HHWA (specifically Abigroup) under Ministerial approval 07-0078, dated 16 June 2008 and Environmental Protection Licence (EPL) No. 12884 from the Department of Environment, Climate Change and Water (DECCW 2008).

The Minister's Conditions of Approval (MCoA) and the EPL permit the extraction and processing of up to 700 000 tonnes of quarry material per annum during the operating hours of 7am to 6pm Monday to Saturday.

The HHWA is proposing the following amendments to operation at the quarry:

1) Establishment of a new wet-mix batch plant adjacent to the existing dry batch plant.

The wet-mix batch plant is required for an operational period of 90 days in order to supply 21,000m³ of lean mix concrete to the central section of the Project. This would dramatically reduce the mainline paving program. The wet-mix batch plant would take approximately one month to construct and commission.

It should be noted that the wet-mix batch plant would only supply concrete for the construction of the Project; no other customers would be supplied with concrete.

2) Extension of quarry operating hours

An extension of the quarry operating hours, from 7am - 6pm to 6am - 7pm (i.e. an additional two operational hours per day), Monday to Friday is required to permit higher daily productivity and reduce material supply constraints to the Project. It should be noted that the DoP have previously given approval for the extension of quarry operational hours and that this approval has now lapsed.

Consultation has been undertaken with the Department of Planning (DoP) regarding the approval process for the construction and operation of the wet-mix batch plant and for the extended operational hours. The DoP have advised that a modification under Section 75W of the *Environmental Planning and Assessment Act* (EP&A Act) would be required as the activity is not consistent with those described in the existing project approvals. HHWA has prepared this assessment document to support a request for a modification to the existing project approvals to permit these activities.

The assessment, documented in this report considers:

- The nature and scale of the operation of the proposed wet-mix batch plant in comparison with the approved quarrying operations.

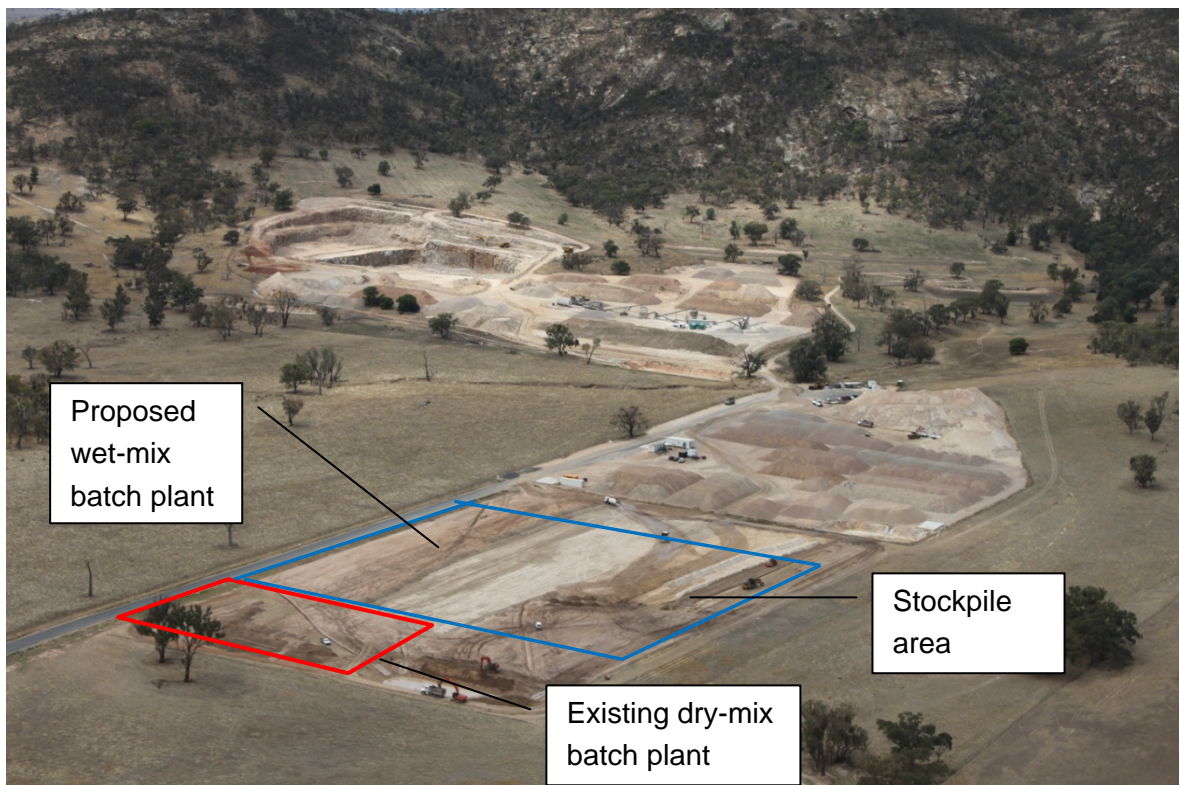
- Potential environmental impacts in addition to those of the approved quarry, including noise, pollution of waters and dust.
- Potential impacts from increasing the operating hours during the week.
- Outcomes of community and stakeholder consultation regarding the wet-mix batch plant and extended operating hours.
- Environmental impact mitigation measures.

2. Description

2.1. Wet-mix batch plant

The proposed location for the wet-mix batch plant is adjacent to the existing dry-mix batch plant which is located on the eastern boundary of the stockpile area, as shown in **Figure 1**. This location is optimum due to its proximity to the aggregate supply at the quarry (minimising material handling); ability to access the Hume Highway and available space. No additional land would be disturbed to allow the establishment of the wet-mix batch plant.

■ **Figure 1: Rockley Falls Quarry and proposed wet-mix batch plant location**



The proposed wet-mix batch plant (shown as the area in blue in **Figure 1**) would be installed adjacent to the current dry-mix batch plant, the location of which is shown as a red box in **Figure 1**. Commissioning of the wet-mix batch plant is anticipated to begin in the first week of March 2011 and operations would commence in mid March 2011. Any stockpiles in this area would be progressively removed during March 2011.

The existing dry-mix batch plant and the mobile quarry plant would continue to operate during the wet-mix batch plant operational period. However, the existing noise environment would be reduced as the operation of the crushing plant would cease at the end of March 2011.

The proposed wet-mix batch plant is comprised of aggregate bins, aggregate loading hoppers, conveyors, a weigh hopper, a split cement and fly ash silo and a tilt-drum mixing bowl as shown in **Figure 2**. The batching process would involve a loader filling the aggregate hopper, whilst cement and fly-ash are supplied to the mixing bowl. Concrete mix would be transferred to open-back concrete trucks which would reverse into the loading bay, load and leave.

The proposed wet-mix batch plant would produce an average of 750m³ of concrete per day and a maximum of 1,300m³ per day. Power to the plant would be generated from a 750kVa diesel generator supplied with the batch plant.

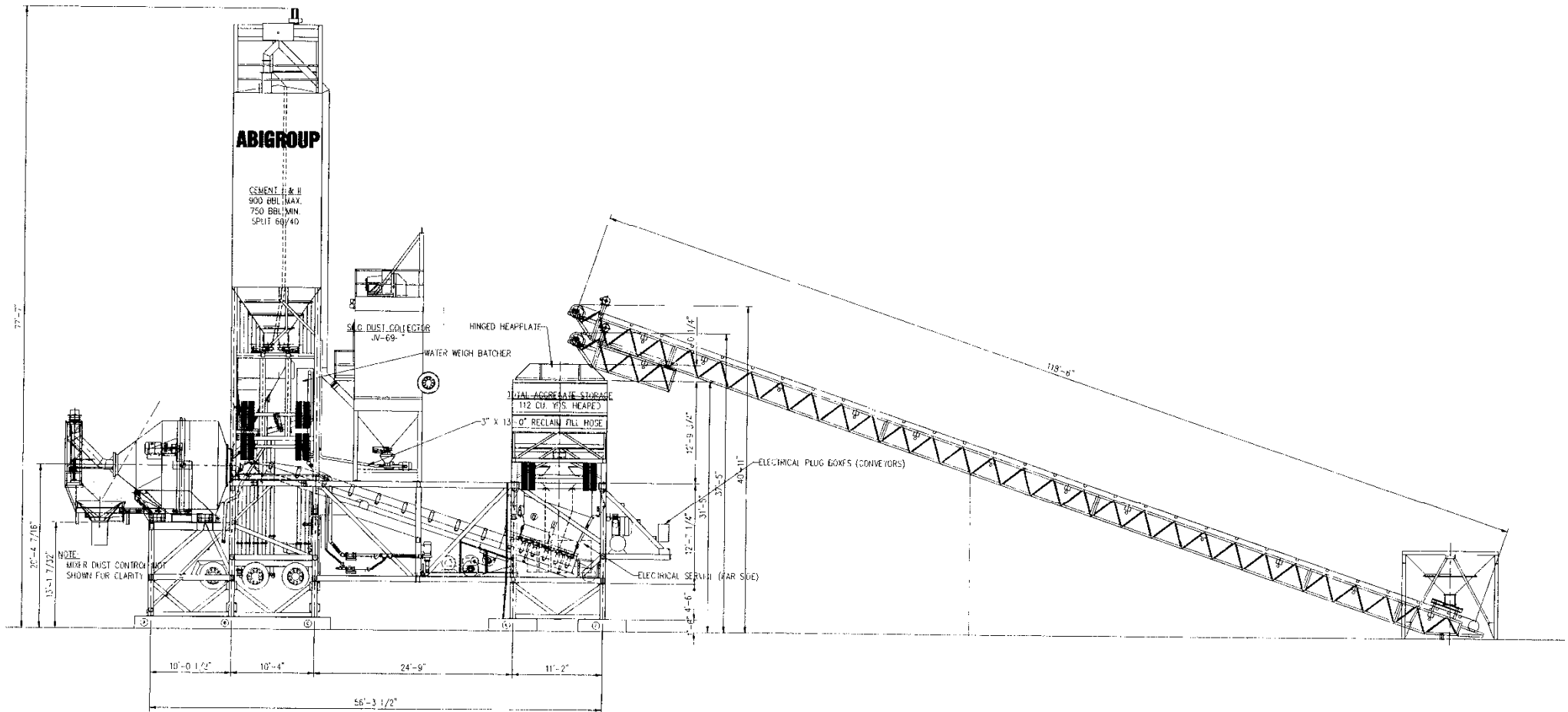
The wet-mix batch plant would operate from 6am to 7pm, with the first load on site scheduled to arrive at 6am. The last load would leave the wet-mix batch plant at 5.30pm allowing 1.5 hours for the plant to be washed down ready for activities the following day.

Traffic to and from the wet-mix batch plant would utilise the existing bitumen access road to the quarry from the Hume Highway. No additional staff would be required for the wet-mix batch plant operations.

The wet-mix batch plant would take about one month to set up and would operate for a period of three months. Following the 90 day operating period the wet-mix batch plant would remain idle prior to being dismantled and removed from site.

The major potential impacts from the wet-mix batch plant are upon noise and dust amenity.

■ **Figure 2: Schematic of the proposed wet-mix batch plant**



2.2. Extension of quarry operating hours

The extended operating hours would enable early operation of the wet-mix batch to ensure deliveries of concrete reach the Project so paving can commence at 7am. It would also provide an additional two hours a day for quarry related activities including washdown, stockpile movements and deliveries.

Crushing activities would remain within the currently approved operating hours, however, the extension of operating hours in the morning would allow time for preparation (including warm ups and pre-starts) prior to commencement of crushing activities at 7am. It is noted that a separate approval has been sought to extend the construction hours of the Project, thereby increasing the constraints on the ability of the quarry to supply sufficient hard rock material. The operating hours for which approval is being sought would be as follows:

- 6.00am to 7.00pm, Mondays to Fridays, (2 hours per day in addition to the existing approval).
- 7.00am to 6.00pm on Saturdays (no change to existing approval).
- at no time on Sundays or public holidays (no change to existing approval).

It is noted that a temporary modification to the approved hours of operation was previously granted to the quarry for the Hume Highway Southern Alliance Project. No complaints were received regarding the extended hours during this period, and as this modification has expired, a modification to the Hume Highway Woomargama Alliance is being sought.

3. Existing environment

3.1. Sensitive receivers

The risk of adverse impacts on noise and air quality is a function of:

- The number of receivers likely to be affected.
- Their proximity to the quarry.
- Existing environmental conditions.

Figure 3 illustrates the identified sensitive receivers and their proximity to the quarry. A tabulated summary is shown in **Table 1**.

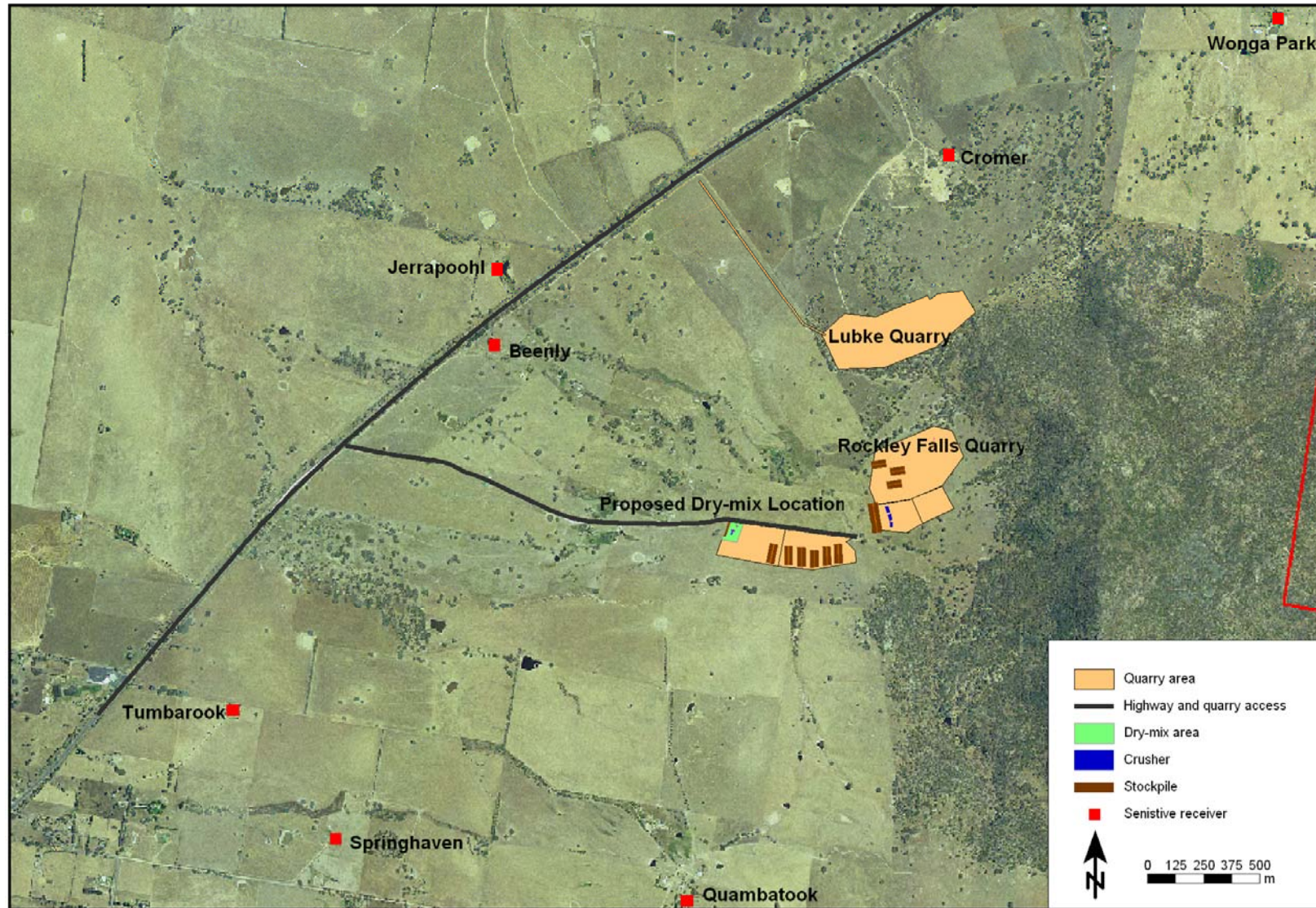
It is evident that there is a low number of receivers near the quarry and that the nearest of these is in excess of 1 kilometre away.

It is noted that the operational Lubke Quarry is positioned between the quarry and the nearest receiver 'Cromer', which is within 800 metres of the Lubke Quarry. Therefore, potential impacts from the quarry would likely be insignificant in comparison with those from the Lubke Quarry.

■ **Table 1: Summary of sensitive receivers within 3 km of quarry operations**

Property name	Orientation from quarry	Distance from quarry (m)
Wonga Park	NE	2500
Cromer	N	1300
Jerrapoohl	NW	2000
Beenly	NW	1900
Tumbarook	SW	3000
Springhaven	SW	2800
Quambatook	S	1800

■ Figure 3: Site layout showing location of Rockley Falls Quarry in relation to sensitive receivers and Lubke Quarry



3.2. Background noise and air quality

3.2.1. Background noise

Noise impacts are assessed by comparing the noise from quarry activities to the underlying background noise at the point of assessment, which is often at a residential or other noise-sensitive location (e.g. school). When noise from the quarry is significantly greater than the background noise of the area, adverse impacts are likely. Conversely, when background noise levels are high, noise from the quarry is less likely to cause an adverse impact. Higher levels of existing or underlying background noise generated by sources other than quarry activities therefore assist to totally or partially “mask” noise from the quarry, making it less intrusive and less likely to cause adverse impacts.

Background noise monitoring was undertaken in three locations around the quarry during July and August 2007 by Noise and Sound Services (2008¹) and a summary of monitoring data is provided in **Table 2**. Noise levels in the area are generally influenced by traffic with observed levels increasing from the day into the evening period and reducing later in the night, a pattern reflecting commuter traffic.

■ **Table 2: Summary of monitored background noise levels**

Location	Period ²	L _{A90}	L _{Aeq}
Cromer	Day	36	51
	Evening	41	52
	Night	35	50
Quambatook	Day	29	48
	Evening	33	46
	Night	30	42
Tumbarook	Day	35	51
	Evening	40	50
	Night	35	50

3.2.2. Background air quality

Given the rural environment and lack of industrial premises, there are few sources of air pollutants. The dominant pollutant in this area would be particulate generated largely by wind erosion of exposed soil, agricultural activities and highway traffic.

No air quality data were obtained prior to commencement of quarry operations; however, monitoring of air quality, in terms of particulate, has been underway since August 2008 at selected representative locations and these data are discussed in **Section 5.3**.

¹ Noise and Sound Services 2008, Noise impact statement for the proposed Rockley Falls Quarry, Report No. NSS 21080 – Rev A Final, Noise and Sound Services, St Ives NSW

² Day – 7 am to 6 pm; Evening – 6 pm to 10 pm; Night – 10 pm to 7 am

4. Planning & Legislative Context

The quarry was approved under Part 3A of the *Environmental Planning and Assessment Act 1979*. Potential modifications to the approved project are dealt with in Section 75W of the Act. Under Section 75W(2) of the Act:

The proponent may request the Minister to modify the Minister's approval for a project.

The EA, Statement of Commitments, MCoA's and EPL do not make any explicit mention of a wet-mix batch plant at the quarry. Furthermore the Modification to the Approved Project for establishment and operation of a dry-mix batch plant does not consider a wet-mix batch plant or extended operational hours at the quarry.

Therefore as noted in **Section 1.1** a modification to the existing project approval is required from the DoP for the proposed wet-mix batch plant and to extend the operational hours of the quarry as these activities are not considered consistent to those described in the approved project.

It should be noted that concrete batching is no longer a scheduled activity under the *Protection of the Environment Operations Act 1997* and the quantity of cement handled is significantly less than the scheduled quantity requiring an EPL.

MCoA and EPL conditions relevant to batch plants are presented in **Table 3** below and consistency is assessed in the following the chapter. **Overall no changes to the EPL or the MCoA are required except those relating to a description of the approved activities on site.**

Table 3: Relevant Conditions of Approval and EPL conditions

Relevant Condition	Requirements of Condition														
MCoA Schedule 2, Condition 9 EPL Condition O2.1	The Proponent shall ensure that all plant and equipment used at this site is: <ul style="list-style-type: none"> a) maintained in a proper and efficient condition; and b) operated in a proper and efficient manner 														
MCoA Schedule 3, Condition 3 EPL Condition L6.1	<p>The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 2.</p> <table border="1"> <thead> <tr> <th>Location</th><th>L_{Aeq} (15 min) dB(A)</th></tr> </thead> <tbody> <tr> <td>Cromer residence</td><td>45</td></tr> <tr> <td>Quambatook residence</td><td>35</td></tr> <tr> <td>Beenly residence</td><td>36</td></tr> <tr> <td>Tumbarook residence</td><td>35</td></tr> <tr> <td>Jerapoohl residence</td><td>35</td></tr> <tr> <td>Springhaven residence</td><td>35</td></tr> </tbody> </table> <p>Table 2: Noise Impact Assessment Criteria</p>	Location	L _{Aeq} (15 min) dB(A)	Cromer residence	45	Quambatook residence	35	Beenly residence	36	Tumbarook residence	35	Jerapoohl residence	35	Springhaven residence	35
Location	L _{Aeq} (15 min) dB(A)														
Cromer residence	45														
Quambatook residence	35														
Beenly residence	36														
Tumbarook residence	35														
Jerapoohl residence	35														
Springhaven residence	35														
MCoA Schedule 3, Condition 4 EPL Condition L6.2	Construction work shall only be carried out: <ul style="list-style-type: none"> c) between 7.00am and 6.00pm Monday to Friday; d) between 8.00am and 1.00pm on Saturdays; and e) at no time on Sundays or Public Holidays. 														
MCoA, Schedule 3,	The project shall operate:														

Relevant Condition	Requirements of Condition																				
Condition 5	a) between 7.00am and 6.00pm Monday to Saturday; and b) at no time on Sundays or Public Holidays.																				
MCoA Schedule 3, Condition 14	<p>The Proponent shall ensure that dust generated by the project does not exceed the criteria listed in Table 5 at any residence on privately owned land</p> <table><tr><th>Pollutant</th><th>Averaging period</th><th>Maximum increase from the project</th><th>Maximum acceptable limit</th></tr><tr><td>TSP</td><td>annual</td><td>70 µg/m³</td><td>90 µg/m³</td></tr><tr><td>PM₁₀</td><td>annual</td><td>20 µg/m³</td><td>30 µg/m³</td></tr><tr><td>PM₁₀</td><td>24- hour</td><td>25 µg/m³</td><td>50 µg/m³</td></tr><tr><td>Deposited dust</td><td>annual</td><td>2 g/m²/month</td><td>4 g/m²/month</td></tr></table> <p>Table 5: Particulate Impact Assessment Criteria</p>	Pollutant	Averaging period	Maximum increase from the project	Maximum acceptable limit	TSP	annual	70 µg/m ³	90 µg/m ³	PM ₁₀	annual	20 µg/m ³	30 µg/m ³	PM ₁₀	24- hour	25 µg/m ³	50 µg/m ³	Deposited dust	annual	2 g/m ² /month	4 g/m ² /month
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TSP	annual	70 µg/m ³	90 µg/m ³																		
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PM ₁₀	24- hour	25 µg/m ³	50 µg/m ³																		
Deposited dust	annual	2 g/m ² /month	4 g/m ² /month																		
MCoA Schedule 3, Condition 19	The Proponent shall not discharge any water from the quarry or its associated operations except in accordance with an EPL.																				
MCoA Schedule 3, Condition 24 a)	All sediment and erosion controls would be consistent with the requirements of <i>Managing Urban Stormwater: Soils and Construction, Volume 1, 4th edition 2004</i> (Landcom).																				
MCoA Schedule 3, Condition 38	<p>Lighting Emissions</p> <p>The Proponent shall:</p> <p>(a) take all practicable measures to mitigate off-site lighting impacts from the project; and</p> <p>(b) ensure that all external lighting associated with the project complies with Australian <i>Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting</i>, to the satisfaction of the Director-General.</p>																				
EPL Condition L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the <i>Protection of the Environment Operations Act 1997</i> .																				
EPL Condition L6.3	Noise from the premises is to be measured at the most affected point within the residential boundary or at the most affected point within 30m of the dwelling (rural situations) where the dwelling is more than 30m from the boundary to determine compliance with L _{Aeq(15 minute)} noise limits on condition L6.1, unless otherwise noted.																				
EPL Condition M2.1	Total suspended solids to be monitored for each discharge point.																				
EPL Condition O3.1	Activities occurring in or on the premises must be carried out in a manner that would minimise the generation, or emissions from the premises, of																				

Relevant Condition	Requirements of Condition
	wind-blown or traffic generated dust.
EPL Condition O3.2	All areas must be maintained in a condition that minimises the generation of dust.

5. Cumulative noise and dust impacts

5.1. Nature and scale of operation

Quarry operations typically involve the following activities, which may result in noise and dust impacts.

- Rock is loosened by drilling and blasting, loaded into haul trucks by an excavator and delivered to processing stockpiles.
- An excavator feeds the rock into the three-stage crushing plant, which sequentially reduces the size and grades the rock to the desired specifications.
- Graded product is delivered to stockpiles via belt conveyors. Noise and dust emissions are generated at each stage of crushing and by material handling (e.g. excavator transfers, conveyor belt discharges and wheel generated dust on exposed surfaces).
- Products from each stage of the crushing plant are delivered by loader and haul truck to stockpiles prior to delivery offsite. The site access road is paved; however the haul roads within the quarry and processing area are unpaved.
- Sand washing may also be undertaken. This may generate some noise but is unlikely to be of the magnitude of the crushing plant.
- Aggregate is transported to the project in open-topped covered haul trucks.

The wet-mix batch plant undertakes similar activities to some of the quarrying activities and the current dry-mix batch plant. Also the proposed wet-mix batch plant is of relatively small capacity and would only be operated for a limited timeframe. Hence, is unlikely to constitute a significant change in the overall nature and scale of quarrying operations on site.

The extension of operating hours would allow for early deliveries (prior to 7am) of concrete so that paving could commence at 7am. The extended hours would also allow for warm up of site machinery and for continuation of maintenance, processing and stockpiling activities on site. Whilst there is the potential that increasing the duration of activities on site may cause greater dust and noise impacts, with the implementation of the appropriate management measures, and due to the lack of sensitive receivers within the locality, the cumulative impacts of the proposal are not considered to be significant.

5.2. Noise impacts

This section demonstrates that sensitive receivers are currently not significantly impacted by quarry operations and that the addition of the wet-mix batch plant and extension of operating hours for the quarry would not likely create additional adverse impacts.

5.2.1. Assessment criteria

In relation to noise impacts, the MCoA and DECCW EPL require that noise from the project does not exceed the noise impact assessment criteria listed in **Table 3**. These criteria are based on operation during the day, 7am to 6pm, and the background noise levels during this time.

■ **Table 3: Operational noise limits for the daytime period (DoP, DECC 2008)**

Residence	Noise assessment criteria $L_{Aeq, 15 \text{ minute}}$ (dB(A))
Cromer	45

Residence	Noise assessment criteria $L_{Aeq, 15 \text{ minute}}$ (dB(A))
Quambatook	35
Beenly	36
Tumbarook	35
Jerrapoohl	35

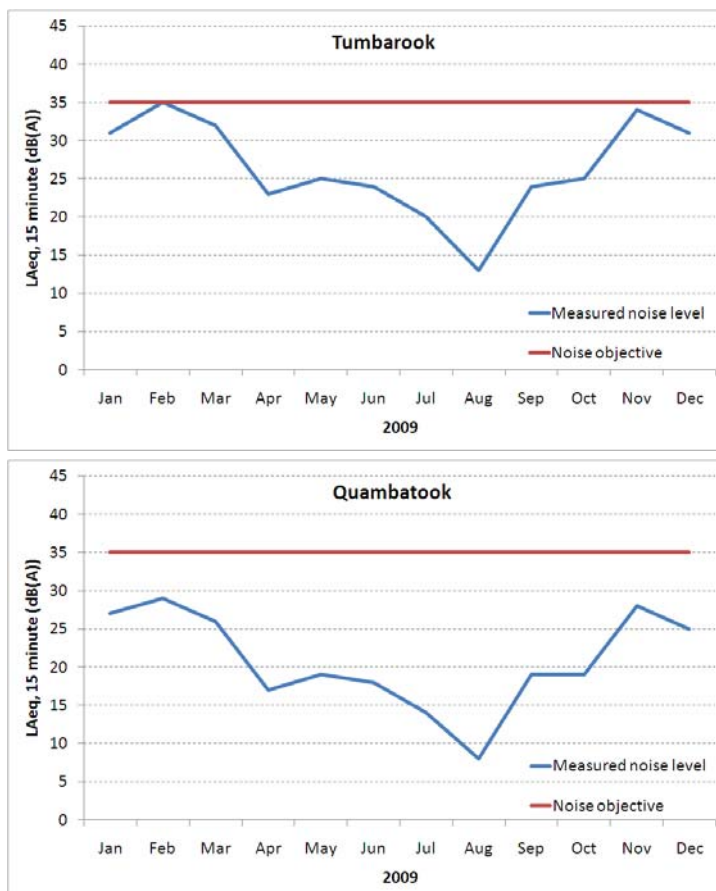
5.2.2. Measured noise levels

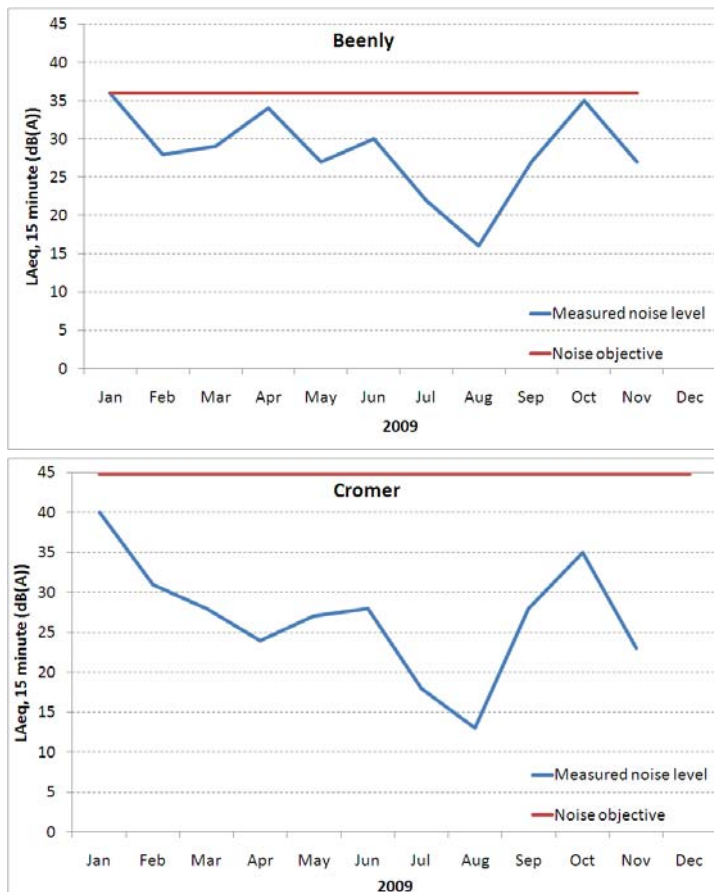
Attended noise monitoring is conducted on a monthly basis. Although meteorological conditions vary for each monitoring period, they are generally appropriate for the assessment, with winds noted as less than 5 m/s for all measurements and any strong winds that would affect the measured levels excluded from assessment.

Figure 4 summarises the $L_{Aeq, 15 \text{ minute}}$ measurement results for representative receivers during 2009 and compares them against the relevant daytime noise criteria. No modification factors are deemed necessary for the quarry noise, which is typically dominated by engine noise (crushers, trucks and loaders).

Monitoring results demonstrate that quarry noise is compliant with the noise limits.

■ Figure 4: Summary of monthly noise monitoring data for the quarry





5.2.3. Predicted noise levels

Wet-mix batch plant

Dominant noise sources from the wet-mix batch plant are provided in **Table 4**.

■ **Table 4: Dominant noise sources of operating batch plants**

Noise source		Description
■ Aggregate loading	■	A front end loader (FEL) is used to load aggregate and sand from the stockpiles into the hoppers.
■ Aggregate hopper gates	■	The aggregate is loaded onto the conveyors via gates which are controlled by compressed-air power rams. There is a significant air release each time gates are opened.
■ Aggregate conveyor	■	The aggregate is loaded to the mixing drum via a conveyor. The conveyor is driven by an electric motor and runs on rollers, which squeal if not properly lubricated.
■ Dust extraction fan	■	The dust extractor fan is externally mounted
■ Vibratory aggregate hopper cleaner	■	This cleaner is activated each batch to ensure all product has been loaded and emits a mid-frequency hum.
■ Mixing drum	■	Rotation powered by an electric motor and tilts into the waiting truck.
■ Truck movements	■	Concrete trucks would create a regular source of noise whilst entering and leaving the batch plant; however whilst loading and waiting to load they would be in idle. Delivery trucks utilise on-board compressors for pneumatically loading cement and fly-ash.
■ Compressor	■	Used to operate aggregate hopper gates, externally mounted.
■ Generator	■	A 750 kVA diesel generator is required for the wet-mix batch plant which would operate continuously whilst the plant is operational.
■ Cement loading	■	Cement is pneumatically loaded to the silo using a blower on the silo.
■ Reverse beepers	■	Trucks are generally required to reverse into the loading bay, however beepers are not a dominant noise source.
■ Light vehicles	■	Regular movements for worker transport and various site activities. Unlikely to contribute significantly to overall plant noise.

Noise impacts on sensitive receivers from operation of the combined existing dry-mix batch and proposed wet-mix batch plants have been assessed by employing an acoustic modelling package to predict likely noise levels in these locations. The model was developed using SoundPLAN V7.0. From the model outputs shown in **Table 5**, it can be seen that the risk of adverse impact from the introduction of the wet-mix batch plant is low, with all assessment criteria predicted to be achieved.

■ **Table 5: Predicted noise levels at identified sensitive receivers**

Receiver No	Distance from batch plant (m)	Predicted noise level at receiver (dB(A))			Daytime criteria, L _{Aeq} , 15 min dB(A)	Evening criteria, L _{Aeq} , 15 min dB(A)
		Wet plant only	Dry plant only	Combined wet and dry plant		
Cromer	1500	28	31	33	45	46
Quambatook	2000	22	22	24	35	38
Beenly	1700	26	30	31	36	45
Tumbarook	1600	24	29	30	35	45
Jerrapoohl	2500	14	20	21	35	45

Operating hours extension

As shown in **Figure 4**, existing noise levels have remained below both daytime and evening noise criteria during existing daytime noise operations. The activities to be undertaken during the extended operating hours would comprise predominantly deliveries, maintenance and preparation of machinery. Crushing activities would not occur within the extended operating hours, as such levels would remain well below the evening noise criteria at all sensitive noise locations.

5.3. Dust impacts

This section demonstrates that sensitive receivers are not currently adversely impacted by quarry operations and that the addition of a wet-mix batch plant and extending the hours of operations would not likely create additional adverse impacts.

5.3.1. Assessment criteria

In order to determine whether receivers are, or are likely to be, adversely impacted by quarrying operations, assessment criteria for air quality impacts are provided in the MCoA, which prescribe acceptable limits to the level of dust at each sensitive receiver. These criteria are reproduced in **Table 6**. EPL 12884 does not prescribe operational limits on dust concentrations.

■ **Table 6: Operational dust limits for the evening period**

Pollutant	Averaging period	Maximum increase from this project	Maximum acceptable level
TSP	Annual	70 $\mu\text{g}/\text{m}^3$	90 $\mu\text{g}/\text{m}^3$
PM ₁₀	Annual	20 $\mu\text{g}/\text{m}^3$	30 $\mu\text{g}/\text{m}^3$
PM ₁₀	24 hour	25 $\mu\text{g}/\text{m}^3$	50 $\mu\text{g}/\text{m}^3$
Deposited dust	Annual	2 $\text{g}/\text{m}^2/\text{month}$	4 $\text{g}/\text{m}^2/\text{month}$

5.3.2. Measured dust levels

Monitoring of deposited dust has been undertaken at a number of locations since commencement of quarry operations. Samples are collected on a monthly basis and analysed at Charles Sturt University's Laboratories. Monitoring is undertaken at the receiver locations shown in **Table 7**.

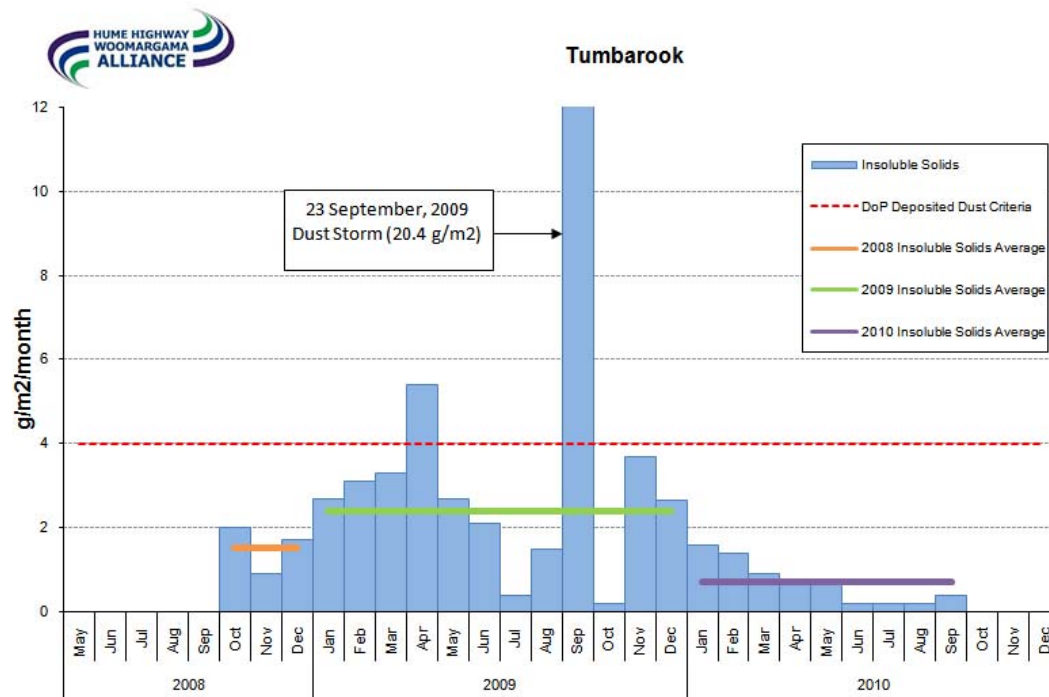
■ **Table 7: Air quality monitoring program**

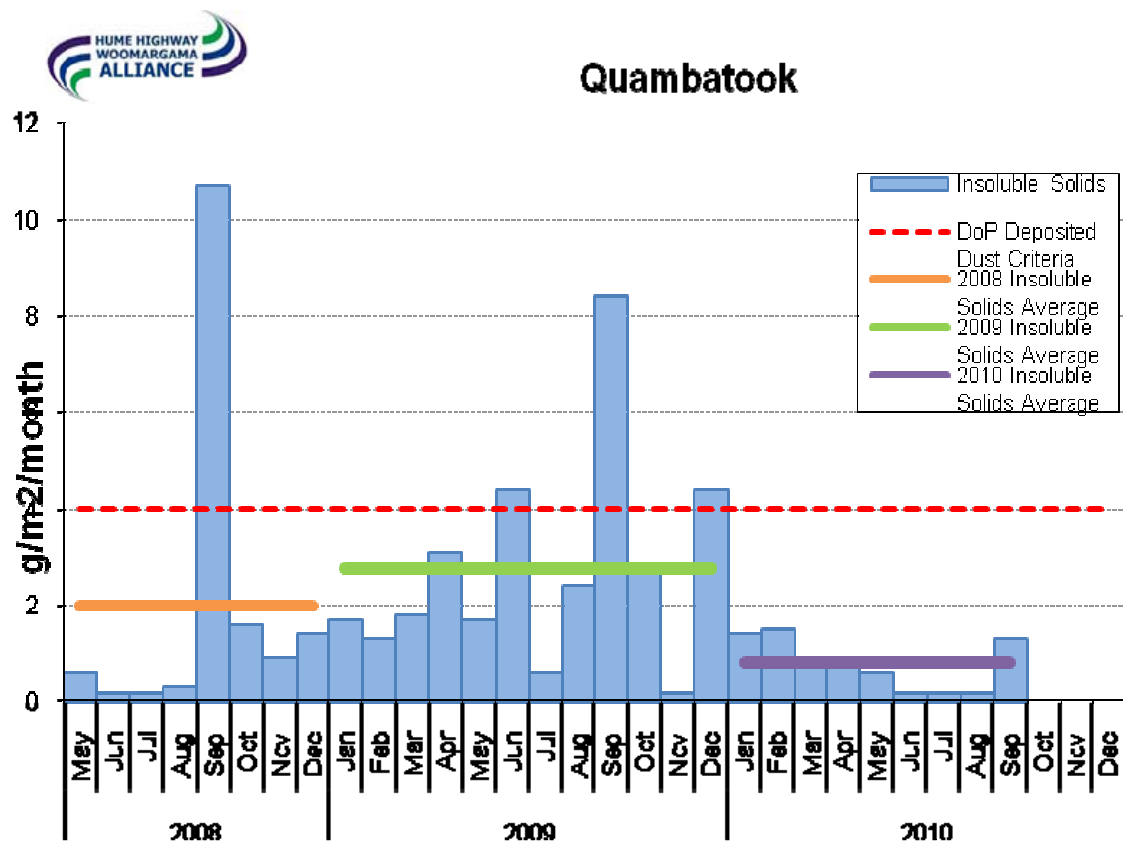
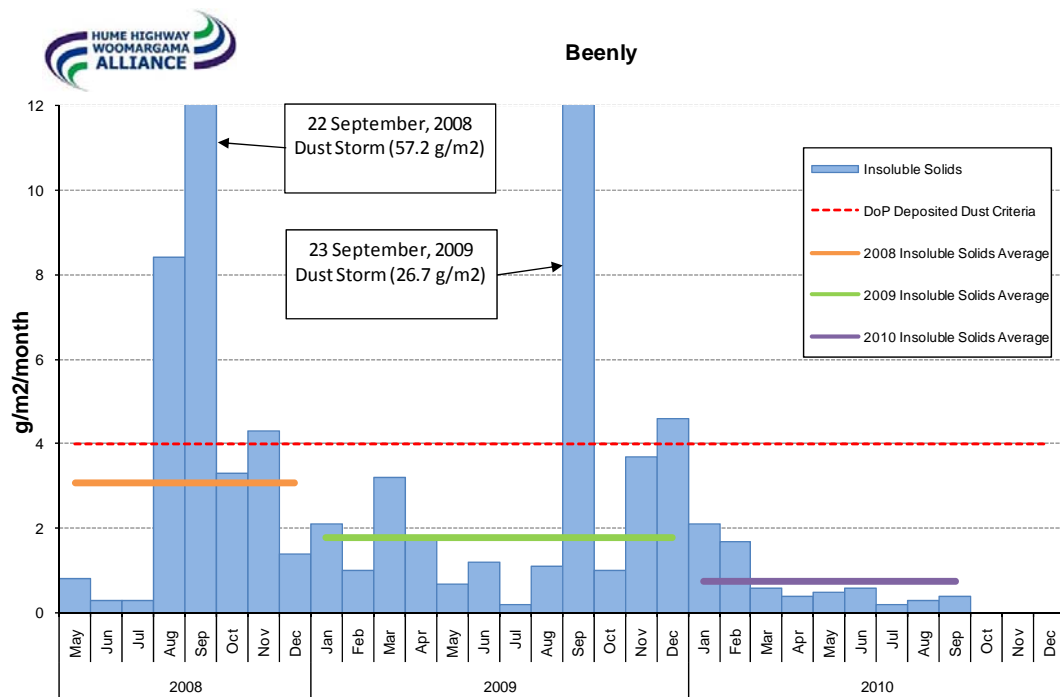
Location	Monitored air quality parameters
Cromer	Deposited dust
Beenly	Deposited dust
Quambatook	Deposited dust, PM ₁₀ 24hr
Tumbarook	Deposited dust, PM ₁₀ 24hr

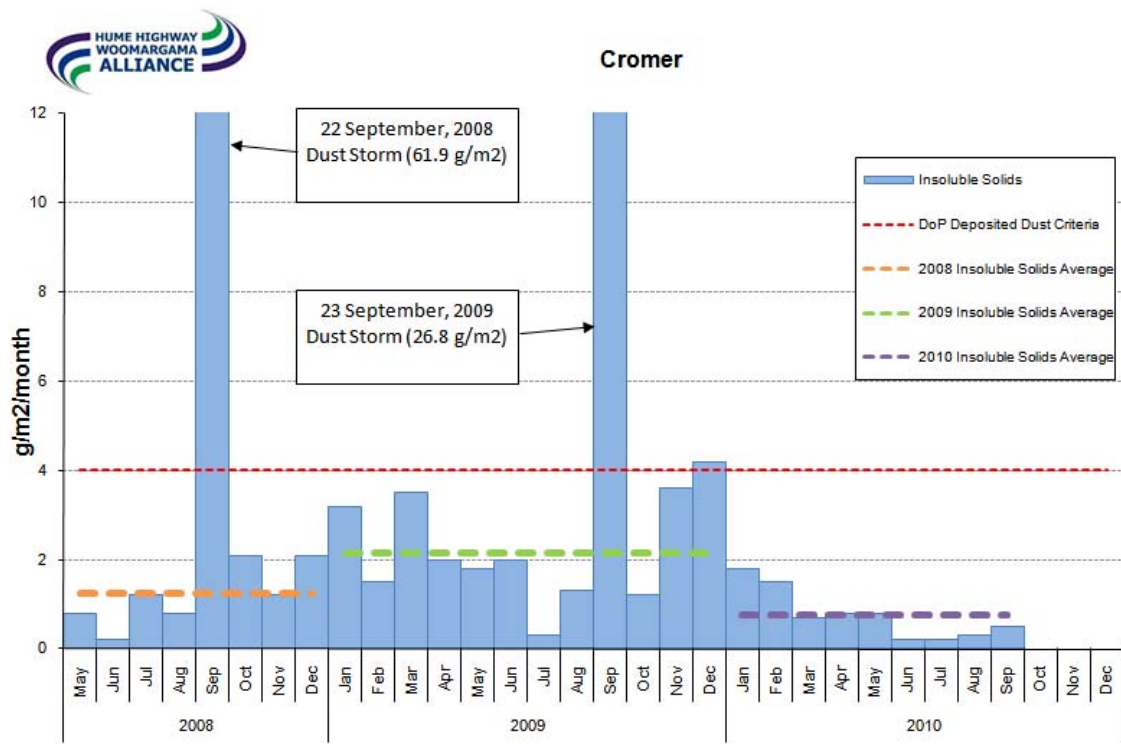
Given that the PM₁₀ criteria are more stringent than the TSP criteria, where compliance with PM₁₀ is achieved, compliance with TSP criterion is generally implied. No monitoring of TSP has been undertaken however, in rural environments, PM₁₀ generally comprises 40-50 % of TSP.

The monthly results to September 2010 are presented in **Figure 5**. These results show the maximum dust levels including operation of the crushing plant. Ignoring the unrelated maximum dust levels highlighted in **Figure 5**, the annual averages for 2008/2009 and 2009/2010 were 2.1 and 1.6 $\text{g}/\text{m}^2/\text{month}$ respectively which demonstrate compliance with the assessment criteria of 4 $\text{g}/\text{m}^2/\text{month}$. Elevated monthly levels are believed to be a result of natural phenomena (e.g. dust storm) or sources outside the control of the quarry (e.g. road works).

■ **Figure 5: Monthly depositional dust monitoring results**

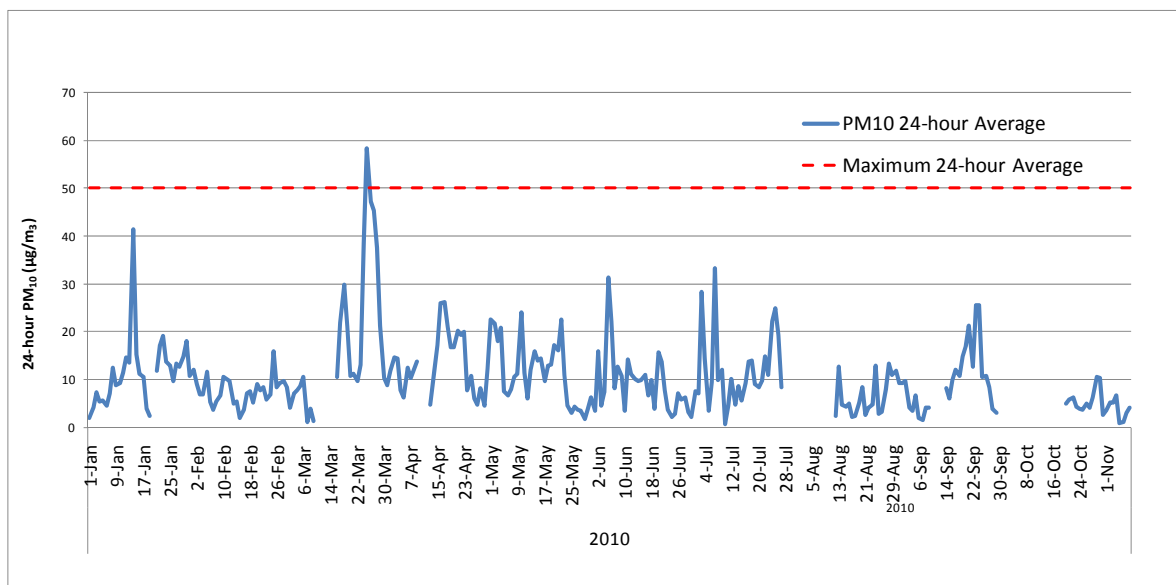






Concentrations of fine particulate, as PM_{10} , have been monitored almost continuously using a DustTrak aerosol monitor from November 2008 at the Tumbarook property (refer **Figure 3**). Results for 2010 in **Figure 6** demonstrate that, with the exception of anomalous dusty conditions due to natural phenomena such as droughts and fires, quarry operations comply with the 24-hour average assessment criterion of $50\mu g/m^3$. The average recorded values, including quarry operations and ambient sources, is approximately $14\mu g/m^3$.

■ **Figure 6: PM_{10} monitoring data – Tumbarook 2010**



5.3.3. Expected dust impacts

Wet-mix batch plant

Typical dust emission sources from a wet-mix batch plant may include:

- Delivery of raw materials in trucks, trailers and tankers.
- Storage of raw materials in bunkers and stockpiles.
- Transfer of raw materials by front end loaders, conveyors, hoppers and agitators.
- Leakage or spillage of raw materials from silos, inspection covers and duct work.

Raw material delivery is unlikely to generate significant dust impacts considering cement and fly ash would be transferred directly to a tilt-drum mixing bowl. A loader would directly fill the aggregate hopper. Aggregate would be taken from existing stockpiles at the quarry and would generate no additional dust to current operations.

With the nearest sensitive receiver approximately 1300m from the proposed site, air quality at sensitive receivers are unlikely to be adversely impacted by the operation of the wet-mix batch plant and with the implementation of the quarry EMP, which includes measures to minimise the generation of dust, the cumulative impact on air quality due to the batch plant would be negligible.

In accordance with the EMP, and consistent with the approved batching plant, dust monitoring would be undertaken during the operation phase to ensure dust levels comply with the project air quality objectives.

Extension of quarry operating hours

The dominant source of dust at the quarry is the crushing plant. As described in **Section 5.2.3**, it is not likely that this activity would be undertaken outside the currently approved operating hours.

As described in **Section 5.3.3**, the wet- and dry-mix batch plants are not expected to present a high risk of adverse dust impacts at sensitive receiver locations, and the small increase in operating duration would result in a negligible increase in dust emissions.

6. Other potential impacts on amenity

In addition to potential impacts on air quality and noise, a range of other environmental aspects have been considered as part of this submission. These aspects are discussed below and include:

- Soil and water
- Heritage
- Traffic
- Flora and fauna
- Waste
- Energy consumption
- Visual impacts

6.1. Soil and Water

Wet-mix batch plant

Approximately 120,000 litres of on-site captured and recycled water per day are currently used on site for existing operations, which includes dust control and sand washing in the crushing plant.

Based on the volume of concrete to be generated by the wet-mix batch plant, an additional 75,000 – 130,000 litres per day of water would be required to make concrete. 90,000 and 250,000 litre water storage tanks would be installed alongside the wet-mix batch facility. Water would be obtained from the existing RTA owned borehole which is located behind the Volume Plus service station. It should be noted that water extraction rates would still be below the licensed capacity of the bore and with a reduction in quarrying activities demand for water would decrease. The EMP's site water balance would be updated to include additional water requirements on the site as required by MCoA 23(a).

Due to the requirement for water for use in the wet-mix batch plant, there is the potential for impacts on water quality if environmental management measures are not appropriately implemented during both construction and operation.

During operation contaminated (cementitious) water would be generated from the wet-mix batch operations. Approximately 2,000 litres per day of waste water would be generated from the mixer bowl wash out. Additional waste water would be generated from the truck washing area, the concrete batching area and any other areas that may generate stormwater contaminated with cement dust or residues. Temporary sediment and erosion controls would be installed during plant operation. Contaminated waste water would be diverted to cementitious settling ponds (designed according to DECCW guidelines of a 1 in 25 year rain event) prior to release via the existing sediment basin. Waste water generated from the bowl wash out would be recycled for concrete tipper washout and a cementitious waste water system would be installed to capture water run-off beneath the plant and bowls. This water would be used to wash out trucks. Clean surface water, including that generated from areas such as the stockpile sites, would be diverted away from the wet-mix batch plant and captured as per the current water management plan into the existing sediment basins.

A Progressive Erosion and Sediment Control Plan would be developed for construction and operation of the wet-mix batch plant. This plan would be developed in accordance with '*Managing Urban Stormwater: Soils and Construction Volume 1 & Volume 2D Main Road Construction*' (the Blue Book). Contaminated water would be fully contained and any discharges would be required to meet the current EPL discharge limits.

Extension to quarry operating hours

The proposed activities to be undertaken during extended operating hours would require minimal volumes of water for vehicle maintenance and from time to time dust suppression activities. Should any waste water be produced, this would be managed in accordance with the EMP.

6.2. Heritage (Aboriginal and Non-Aboriginal)

The quarry footprint is not anticipated to increase as a result of this proposal and there would be no increased impacts on heritage aspects.

6.3. Traffic

Wet-mix batch plant

Traffic generated per day as a result of the wet-mix batch plant would include:

- Cement deliveries (average 3, maximum 5) approaching from the North.
- Fly ash deliveries (average 5, maximum 8) approaching from the North.
- Coarse aggregates and coarse sand (from within the quarry itself).
- Fine sand deliveries (average 5 maximum 9) and admixtures approaching from the South.

The quarry EA used a worst case scenario figure of 20 outbound truck movements per hour. The wet-mix batch plant would generate on average two (2) additional inbound truck movements per hour and up to an additional 20 outbound heavy vehicle movements per hour. The key impact of the additional traffic would result from noise. Potential implications of the additional traffic on noise are discussed further in **Section 5.2.3**.

Extension of quarry operating hours

The extended operating hours allow for early deliveries to the wet-mix batch and to allow for the first concrete load to be on the Project site to commence paving activities at 7am. The extended hours would also allow for early arrival of the workforce to commence warm up activities. Wash down and maintenance of the wet-mix batch would occur from 5.30pm - 7pm. Extending activities for an hour into the evening would allow for out of hours maintenance and internal stockpile movements.

The overall increase in offsite traffic movement is considered to be minor and thus impacts are expected to be negligible and remain consistent with those discussed in the EA.

6.3.1. Flora and Fauna

The quarry footprint of the proposed wet-mix batch plant and the extended operating hours are not proposed to be increased as a result of this proposal and no additional clearing is required, thus there would be no adverse impacts on flora or fauna.

6.4. Waste

Wet-mix batch plant

No additional solid waste would be produced by the wet-mix batch plant operations.

Extension of quarry operating hours

The primary waste from quarrying operations is “manufactured sand” and “scalps”, neither of which are utilised as a resource on the project. Given that these wastes comprise 43% of raw quarry material, extending the operating hours of the quarry would produce additional waste on a daily basis. However, considering that the project requires a fixed volume of aggregate, the net volume of waste would not increase as a result of the extended operating hours. These wastes are stockpiled on site and would be transported on an as-needs basis.

6.5. Energy consumption

Wet-mix batch plant

The wet-mix batch plant is not a significant energy consumer and uses small motors to drive the conveyors. Energy for the wet-mix batch plant would be supplied via a 750kVa generator to be installed alongside the wet-mix batch plant. Diesel fuel would be consumed by the agitator trucks during loading and transport of the concrete. This would be offset by a lower number of haul trucks required to transport aggregate to an alternative batching plant location. Hence, less material handling would be required if the wet-mix batch plant is established at the quarry, reducing fuel consumption and greenhouse gas emissions.

Impacts are expected to be negligible and remain consistent with those discussed in the EA.

Extension of quarry operating hours

Diesel fuel consumption by stationary and mobile equipment is the chief energy use at the quarry. Similar to quarry wastes, a proportional increase in diesel fuel consumption is expected on a daily basis. However, translating fuel consumption into volumes of aggregate processed, no net increase in fuel consumption is expected, since the total volume of aggregate would remain the same.

6.6. Visual impacts

Wet-mix batch plant

The wet-mix batch plant would be approximately 24m high and 60m long and would be located in an existing stockpile area as shown in **Figure 1**. The wet-mix batch plant would be similar in appearance to other plant on site such as the crushers. Only three residents would potentially be able to see the batch plant and they are at least 1.5 km distant. Given the size and scale of the quarrying operations, the similar plant already on site and distances to the nearest residents, the batch plant would have a negligible impact on visual amenity.

Extension to quarry operating hours

Given the proposed extension of operating hours would result in operating after sunset, lighting would be required to illuminate the work area and may have some effect on the environment on which it is installed.

There is potential conflict between the lighting needed to facilitate night activities and the degree of spill light control required to maintain the amenity and environmental integrity of an area. Effects on residents generally involve a perceived change in amenity arising from either of the following:

- The illumination from spill light being obtrusive, particularly where the light enters rooms or dwellings that are normally dark, e.g. bedrooms. The illuminance on surfaces, particularly vertical surfaces, is an indicator of this effect.
- The direct view of bright luminaires from normal viewing directions causing annoyance, distraction or even discomfort. The luminance of a luminaire, in a nominated direction, is an indicator of this effect.

AS 4282 recommends two sets of illuminance limits based on the times of operation of the lighting, i.e. pre-curfew and during curfewed hours (see **Table 10**). The recommended maximum values for the hours of operation between 6am and 11pm are applicable to this submission.

Table 10: Target light emission goals – AS4282 1997

Light technical parameter	Hours of operation	Recommended maximum values		
		Commercial areas or at commercial property boundary	Residential areas	
			Light surrounds	Dark surrounds
Illuminance in vertical plane (V)	6am to 11pm	25 LUX	10 LUX	10LUX
	11pm to 6am	4 LUX	2 LUX	1 LUX
Luminous intensity emitted by each luminaire	6am to 11pm	2500-7500 cd ^{1,2}	2500-7500 cd ^{1,2}	2500-7500 cd ^{1,2}
	11pm to 6am	2500 cd	1000 cd	500 cd

Note 1 Luminous intensity limit is dependent on the size of the lighted area

2 Limits shown assume a 'Level 1 control' for environmentally sensitive areas

Considering the distance to the nearest receiver, lighting is not expected to result in a significant adverse impact on amenity. However, monitoring and consultation would be undertaken to ensure the recommended maximum values for illuminance and luminous intensity are not exceeded and amenity is maintained. Where it is observed or reported that lighting is resulting in an adverse impact on amenity and/or animal life, proactive measures would be implemented to minimise light illuminating the key areas. Such measures would include, where practical:

- Aim the luminaires away from the direction of nearby residential or sensitive areas.
- Use luminaires with precise asymmetrical light control and full cut off above the horizontal.
- Minimise glare by keeping beam angle at 70 degrees for floodlights mounted at high level.

Additional low level lighting should be installed to provide sufficient illumination at the ground level under fog conditions since high level lighting becomes less effective for the movement of vehicles.

Best practice management of lighting should be adopted at each site, and would including the following.

- Lights used to illuminate the site for security must be angled or shielded so that they do not directly illuminate any nearby sensitive land uses.
- Car parks and roads are situated and/or screened to avoid stray lighting from vehicle headlights directly illuminating any nearby sensitive land uses.
- Vegetative screening, earthen banks and constructed walls are used, if required, to screen against light impact.

In relation to light mitigation measures, AS 4282 provides additional information in an Appendix titled "General principles for control of the obtrusive effects of outdoor lighting".

6.7. Environmental Benefits

As noted in the introduction, there are a number of environmental benefits in locating the wet-mix batch plant at the quarry. These include:

- A reduction in the overall duration of construction activities.
- A reduction in the potential for quality risks by supplying LMC and PCP from two different plants (if cross contaminated at the paver it would require the material to be removed and replaced which would add to the waste produced).
- A reduction in the risk to the overall timeframe for operations, as if one wet-mix batch plant breaks down the other would still be functioning and paving activities can continue uninterrupted.

The environmental benefits of extending the working hours during the week include:

- Allows essential maintenance activities to occur outside peak operating hours to reduce potential delays to quarry operations on site.

7. Consultation

HHWA has consulted with the sensitive receivers surrounding the quarry and no objections have been raised in relation to the proposal.

HHWA is in the process of consulting the DECCW regarding the proposed wet-mix batch plant and extended operational hours and any comments would be incorporated into this proposal.

8. Management of environmental impacts

Wet-mix batch plant

The assessment demonstrates that the wet-mix batch plant would be unlikely to result in additional adverse impacts on sensitive receivers or other environmental aspects. The HHWA is committed to achieving excellent environmental outcomes and would ensure that all operations are undertaken strictly in accordance with the quarry EMP, which includes a requirement for regular monitoring, reporting and identification of areas of improvement. The EMP would be updated to include the wet-mix batch plant operations and a separate Progressive Erosion and Sediment Control Plan has been developed to control impacts associated with water supply and waste water generation.

Throughout the period of construction for the project, noise and air quality monitoring would be undertaken at the frequency and location specified in an EMP updated to address this proposal. Any adverse impacts that may occur shall be recorded and managed by the HHWA.

Water quality monitoring of sedimentation basins discharges would be undertaken in compliance with EPL conditions.

The community and stakeholder management program implemented on the project would ensure any issues arising from the operation of the wet-mix batch plant are rapidly identified and managed appropriately.

Extension of quarry operating hours

The assessment demonstrates that an extension of operating hours would be unlikely to result in additional adverse impacts on sensitive receivers and other environmental aspects.

Should community complaints be received, these would be taken seriously, and the reasons for impacts would be investigated. Where complaints are found to be justified, measures would be implemented to ensure these events do not recur.

The EMP would be updated to include additional noise monitoring specifically during the extended hours of operation to confirm that no adverse impact has occurred. Any adverse impacts that may occur shall be recorded and managed by the HHWA.

Predictions of dust concentrations would be confirmed through monitoring and adverse impacts reported and managed. Specifically, a PM₁₀ monitor, in addition to the existing deposited dust monitor, would be located at the 'Beenly' property to further assess and manage dust impacts.

9. Consideration of EPBC Act

Presented in the table below is an assessment of the proposed batch plant against the EPBC Act.

9.1. EPBC ACT 1999 Factors (Commonwealth Legislation)

Factor (Commonwealth Legislation)	Impacts
<p><i>a. Any environmental impact on a World Heritage property?</i></p> <p><u>Comments:</u></p> <p>The works would not be undertaken near any world heritage properties and as such are not expected to have any impact on any world heritage properties.</p>	Nil
<p><i>b. Any environmental impact on wetlands of international importance?</i></p> <p><u>Comments:</u></p> <p>There are no wetlands of international significance in the surrounding area. The proposed works are not expected to have any impact on any wetlands of international significance.</p>	N/A
<p><i>c. Any environmental impact on Commonwealth listed threatened species or ecological communities?</i></p> <p><u>Comments:</u></p> <p>There are no commonwealth listed threatened species or ecological communities that are expected to be impacted on by the proposed works.</p>	Nil
<p><i>d. Any environmental impact on Commonwealth listed migratory species?</i></p> <p><u>Comments:</u></p> <p>The proposed works would not result in any vegetation removal, and are to be undertaken in an area which is already cleared. As such the proposed works are not expected to have any impact on any habitat for Commonwealth listed migratory species or any actual Commonwealth listed threatened species.</p>	Nil
<p><i>e. Does any part of the proposal involve a nuclear action?</i></p> <p><u>Comments:</u></p> <p>No part of the proposed works involves a nuclear action.</p>	N/A
<p><i>f. Any environmental impact on a Commonwealth marine area?</i></p> <p><u>Comments:</u></p> <p>The proposed works are not expected to have any impact Commonwealth marine areas.</p>	N/A
<p><i>g. Any direct or indirect effect on Commonwealth land?</i></p> <p><u>Comments:</u></p> <p>The proposed works are not expected to have any impact on any Commonwealth Land.</p>	NA

10. Conclusion

In the following table the consistency of the proposed batch plant with the Approved Project is summarised.

FACTOR	YES	NO
3.1 Fundamental consistency with project		
<p>Will all proposed modifications, considered together, result in a radical change to the activity as approved? (Note – this question is aimed at the fundamental concept of the project, its location and standard.)</p> <p>The proposed establishment of a wet-mix batch plant and the extension of the week day operating hours is not expected to result in a major change to the approved project or its described activities. There would be no change in the scale of the extractive activities as described in the EA, MCoA and EPL. The environmental impacts associated with the wet-mix batch plant are consistent with those already outlined in the EA.</p>		✓
3.2 Consistency with objectives and functions of approved activity as a whole		
<p>Will all proposed modifications, considered together, result in any substantive change to the objectives and functions of the approved project as a whole?</p> <p>The proposed modification would not result in a substantive change to the objectives or functions of the approved activity as a whole as they are consistent with the objectives and functions as outlined in the EA being to supply road building materials to the Hume Highway Duplication Projects until 2012.</p>		✓
3.3 Consistency with objectives and functions of elements of approved activity		
<p>Will each separate proposed modification result in any substantive change to the objectives and functions of that element of the approved activity which it modifies AND do so without better satisfying any other Conditions of Approval such that a net improvement in the environment results?</p> <p>The production of concrete for the Hume Highway Duplication Projects was not identified as a specific element or activity at the quarry.</p>	✓	

FACTOR	YES	NO
3.4 Consistency with environmental impact		
<p>Are there any new environmental impacts or changes to environmental impact associated with the proposed modification that are not covered by safeguards or mitigation measures identified in the EIS, Representations Report or associated documents; or any Condition of Approval; or which would make safeguards, mitigation measures or Conditions of Approval ineffective?</p> <p>The proposed establishment of a wet-mix batch plant and the extension of weekday operating hours would result in no net change in environmental outcomes. The mitigation measures identified in the EA, SoC and the Conditions of Approval would all still apply and be effective to manage the proposed works.</p>		✓
3.5 Consistency with particular Conditions of Approval		
<p>Will any proposed modification, either by itself or in association with any other proposed modifications, result in the inability to satisfy any Condition of Approval?</p> <p>The proposed modification would not result in a change in impact that due to its nature or scale, should be made public. The potential impacts of the proposal are discussed in Section 5 and Section 6.</p>		✓

It is concluded that the proposed activities do not result in a substantial change to the approved project and remain consistent with the objectives and function of quarry as outlined in the EA. The proposed works are generally consistent with the specific relevant MCoA, SoC and EPL.

Potential impacts to the environment from the proposed works have been identified and discussed in **Section 5** and **Section 6**. Given the rural nature of the area, the number and density of sensitive receivers adjacent to the construction corridor is very low. Noise monitoring of existing operations has shown that the quarry has not exceeded the Project noise criteria to date, and furthermore, the background noise at most receivers is dominated by highway traffic, with existing quarry operations generally audible only 50% of the time. Similarly air quality monitoring has shown that depositional dust levels generally comply with criteria, and that where exceedances have been recorded, these have occurred as a result of external influences.

Water use would increase with the installation of the wet-mix batch plant. However, water would be supplied through the borehole water source currently used on the site. Potentially contaminated waste water would be managed through a Progressive Erosion and Sediment Control Plan prepared specifically for the wet-mix batch plant activities, which forms part of the overall site *EMP*. The proposed works are not likely to significantly increase dust or noise emissions above current levels. The proposed works are also not likely to result in any other significant impacts above current conditions.

Consequently, the proposed changes arising from the establishment of a wet-mix batch plant and an extension of the weekday operating hours are considered to be consistent with the approved project.