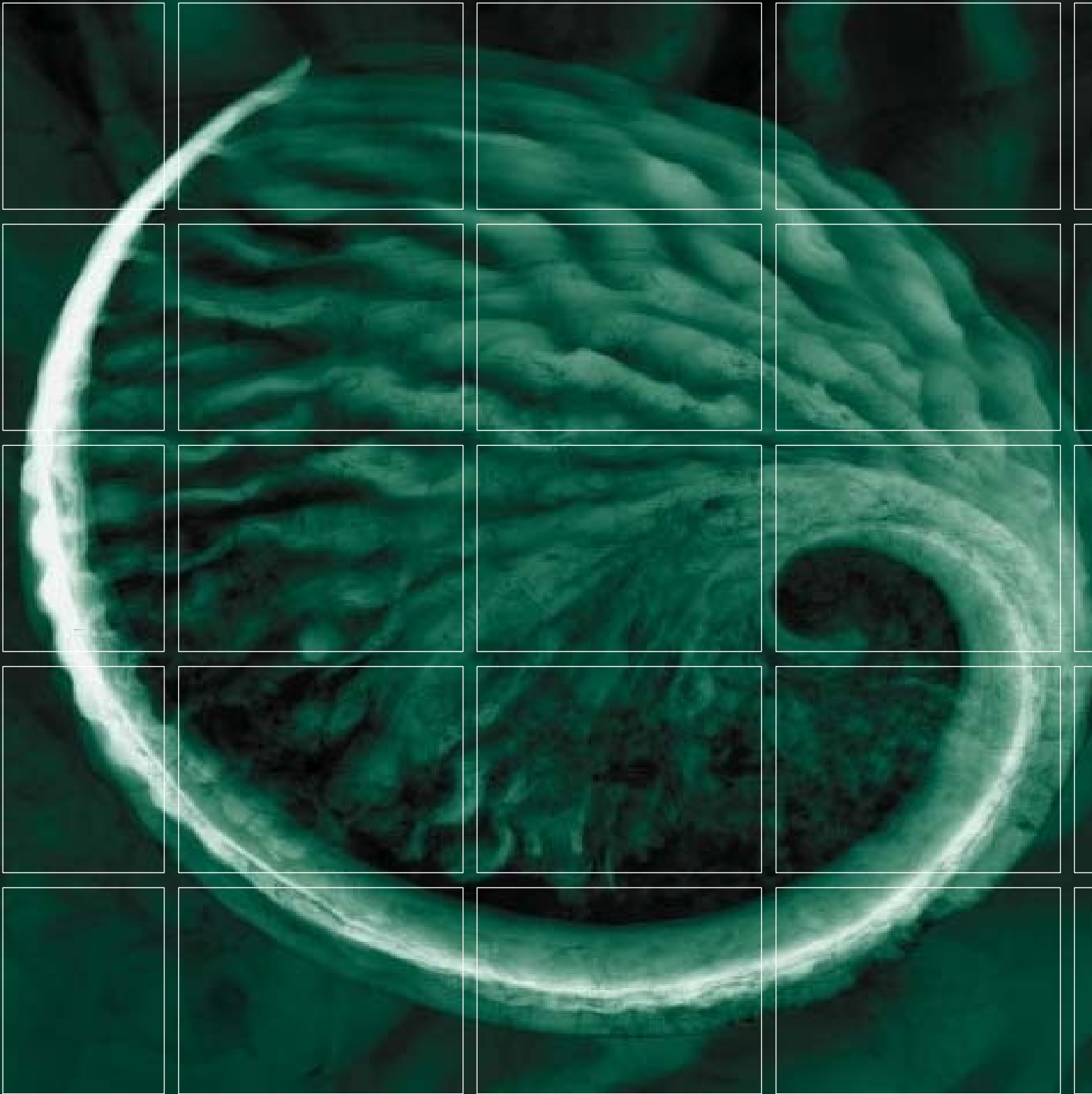




Marulan South Quarry

Submissions Report

Boral Resources (NSW) Pty Ltd

December 2006

0035194 Final

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Marulan South Quarry *Submissions Report*

Approved by:	<u>Mike Shelly</u>
Position:	<u>Project Director</u>
Signed:	
Date:	<u>18 December 2006</u>

Environmental Resources Management Australia Pty Ltd Quality System

Boral Resources (NSW) Pty Ltd

December 2006

0035194 Final

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1 INTRODUCTION

1.1 BACKGROUND

An Environmental Assessment (EA) has been prepared for the proposed Marulan South Quarry under Part 3A of the *Environmental Planning and Assessment Act 1979*. The EA has been submitted to the NSW Department of Planning (DoP) for assessment and placed on public exhibition. Members of the community, interest groups and government authorities have had the opportunity to view the EA and write submissions.

Submissions have been received from:

- four government agencies: Department of Environment and Conservation (DEC), Department of Primary Industries (DPI), Sydney Catchment Authority (SCA) and the Roads and Traffic Authority (RTA)
- four local residents;
- a local community focus group; and
- two recently approved local industries.

This submissions report has been prepared to address the comments raised in these submissions received to date.

1.2 SUMMARY OF SUBMISSIONS

The following table provides a summary of the submissions received up to the 15th of December, 2006. Any consequent submissions will be responded to in a supplementary submissions report.

Table 1.1 *Summary of Government Agency Submissions*

Topic	Issue summary
DEC	
<i>Air</i>	▪ Predicted 24-hr average PM₁₀ impacts must be assessed as 50µg/m³ for cumulative impact as per DEC Approved Methods for assessing air pollutants <i>or</i> may be assessed against a quarry-only increment of 50µg/m³ if the proposal incorporates best management practices (as per Section 8.5 of the air quality assessment) ie continuous PM₁₀ monitoring and an adequate commitment to eliminate potential future impact at receptors. ▪ Significantly greater dust mitigation required to demonstrate compliance ▪ Consent conditions must include best management practices be incorporated to control emissions, ongoing monitoring and commitment to eliminating potential future impact at receptors
<i>Noise</i>	▪ NIA does not indicate whether there are noise sensitive receivers around the junction of the rail spur with the Main Southern Line; ▪ No dates provided for attended noise monitoring ▪ Existing road traffic noise impacts must be assessed and all mitigation measures implemented to reduce existing noise levels where exceeded as per DG's EAR's/ ECRTN ▪ Operational noise levels – concern that the tertiary plant enclosure may not achieve the 20 dB(A) and design should be further considered ▪ DEC notes that no modifying factor corrections have been applied to the predicted operational noise levels ▪ Predicted reasonable worst-case scenarios for combined quarry and rail pass-by noise may be underestimated due to the likelihood of two trains departing along the rail spur within any 15 minute period ▪ Query the use of 81 Class locomotives for the noise assessment to be based on a reasonable worst-case scenario ▪ NIA notes exceedance of the LA₉₀ (Max) criterion up to 25m from the rail line to the north of the quarry but doesn't indicate how many residences are likely to be affected ▪ Table 5.11 does not clearly indicated whether predicted sleep disturbance levels includes <10 dB(A) as a worst-case scenario for uncontrolled front-end loader dumping – implications for licence limits ▪ Excavators with rock breakers, and pile driving/ concrete pouring have not been included in the assessment of construction noise ▪ A Construction Noise Management Plan should be included with mitigation measures and best practice management practices to keep construction noise levels within the criteria ▪ A Noise Management Plan must be prepared that covers extraction, processing and transport operations ▪ DEC does not agree with current blasting times and noise limits and recommends alternatives as well as methods of assessment ▪ Airblast overpressure and ground vibration levels must be measured and recorded ▪ A Blasting/ Vibration Management Protocol must be prepared and approved prior to blasting

Table 1.1 **Summary of Government Agency Submissions (cont)**

<i>Water</i>	- management structures must be designed and constructed to a design criteria of 1 in 20 year ARI 24 hr event and critical structures to a 1 in 100 yr ARI 24 hr event - No overflow to waterways permitted from dirty-water dams - Water quality monitoring for specific pollutants and locations must be undertaken: - fortnightly for two months prior to construction for ambient water quality determination - quarterly and after significant rainfall events after construction commences - before environmental flow releases - during, or no more than 5 days after an environmental flow release - A review of suite of indicators may be requested after three years of monitoring - Flow rate monitoring will be undertaken for environmental flow releases from Dam 1
<i>Waste</i>	Consent condition that the licensee must not receive waste generated outside of the premises that requires an EPL for storage, treatment, processing, reprocessing or disposal unless expressly permitted by an EPL
<i>Threatened species and their habitat</i>	- Considers the loss of 2.6ha of Box-Gum woodland EEC significant in the local context given the generally poor condition of the remaining EEC in the region 2.6ha of EEC at Dam 1 site should be retained and subject to improved management strategies, or - Offset area should be at least 26ha (10:1 offset ratio) and should improve management of existing EEC rather than replanting of cleared paddocks. Necessary replanting should be at dam margins and along Tangarang Cr line and should include the EECs shrub and ground layer as well as tree species
<i>Aboriginal Heritage Assessment</i>	- Concern that the assessment was not undertaken in accordance with the draft "Guidelines for Aboriginal Cultural heritage Impact Assessment and Community Consultation" and as such DEC disagrees that there is no known ethnohistorical or post contact history relevant to the proposal - Management strategy to be included for the discovery of unanticipated Aboriginal objects of significance - DEC has not received site recording forms for the November 2005 and March 2006 surveys as legally required
<i>Reserved lands</i>	- Visual and other impacts to the national park should be avoided - Bunding should be constructed so as to avoid risk of machinery and materials entering Barbers Cr, Bungonia and Shoalhaven gorges and to minimise dust in these gorges
<i>Rehabilitation</i>	Consent condition that a contingent rehabilitation plan be prepared and contingent funds secured prior to construction commencing in the event that operation ceases after the initial 30 year period
RTA	
<i>Intersection</i>	Recommendation that DoP require appropriate contributions from proponent towards the construction of the grade separated interchange given use of junction for staff and delivery movements and potential for future modification to long-term haulage arrangement

Table 1.1 *Summary of Government Agency Submissions (cont)*

DPI	
<i>Mineral Resources Division</i>	"The operator is required to provide annual production data as requested by the Mineral Resources Division of DPI
<i>Agricultural Division</i>	An assessment of noise, blasting and vibration impacts on the poultry farm
SCA	
Demonstration of neutral or beneficial impact	Proposal specifically addresses SEPP 58 Detailed SWWP will be provided to DG prior to construction Basic clarification of key issues

Table 1.2 *Summary of Local Industry and Community Submissions*

Submission	Issue Summary
Foti International Fireworks	▪ Special zoning request for industries along Marulan Road that require buffer zones
Readymix	▪ Requests condition that no product be transported by road under any circumstances
R & S Montgomery	▪ Hume Hwy intersection safety during construction ▪ Overburden emplacement visibility in 3D photos ▪ Accuracy of overburden emplacement noise assessment ▪ Acceptable cumulative noise levels may be significantly noticeable ▪ Loss of property value
W Brown	▪ EPA guidelines for sleep disturbance not considered adequate for the current BCSC Mine operation ▪ Current BCSC rail traffic noise not acceptable given house proximity to the track ▪ Cumulative noise assessment not inclusive of the limestone crushing plant and should be assessed when fully operational in three months time ▪ Assessment at receiver three should be undertaken at house and not 600m further distant as per EAR. Receiver location not accurately shown in EAR Figures

Table 1.2 **Summary of Local Industry and Community Submissions (cont)**

Tallong Community Focus Group	▪ Increased road tonnage and road maintenance costs from backloading of Penrose Quarry trucks. Costs of road improvements to be met by Boral ▪ Increase in road traffic due to service vehicles for quarry equipment ▪ Sleep disturbance from night rail traffic not adequately assessed given the 17% increase in train movements. Dwelling distance from rail spur (25m) too far for noise assessment in rural environments. Further assessment of night time sleep disturbance to villages along rail line recommended and addition of attenuation barriers requested if guidelines exceeded ▪ Dust from uncovered train bogies not assessed although raised during community consultation. Request that tarpaulins be used on all train bogies ▪ Impact of reduced daily flows on flora and fauna downstream of proposed dam not fully assessed. EIS to substantiate future daily environmental flows recommended ▪ Dust impacts to Barbers Creek and Bungonia Gorge ▪ Noise assessment should include initial (<20m pit) crushing, current noise from BCSC truck and conveyor reversing alarms during low inclement weather and cumulative impacts to properties up to 5.5km distant ▪ Vibration assessment should widen area of vibration study and should include risk of collapsing rock formations, shale scree slopes, overburden and bunding into surrounding land; ▪ Concern over visual impact of 30m high visual and acoustic bunds in proximity to the gorge and over the effectiveness of 10m high bunding above Tangarang Cr ▪ Claims of blasting vibrations felt up to 5.5km away from BCSC mine not examined ▪ Use of an environmental sustainable mine rather than the BCSC mine is recommended as a precedent for the visual impact given the high environmental conservation value of the area ▪ Recommend assessment of light spillage and affect on environment neighbouring properties
Armit	▪ Potential for a property purchase ▪ Affect of the quarry on subdivision potential ▪ 30 versus 70 year quarry ▪ Increased noise from the rail spur ▪ Overburden operational times ▪ Accuracy of the noise logger data ▪ In-pit crushing benefits ▪ Description of the quarry as a 30 year operation rather than a 70 year operation as described in information sessions ▪ Accuracy of Noise logging
Mr Coluccio	▪ Road traffic Noise

2.1 DEC

2.1.1 Air Quality

The DEC submission states that the assessment has not been prepared strictly in accordance with DEC's approved methods and will result in a high level dust impact at sensitive receivers. DEC's main concern was in regards to the assessment of 24 hour PM₁₀ concentrations, which have traditionally been problematic and difficult to accurately predict.

Holmes Air Sciences undertook the air quality assessment for the EA and used a methodology very similar to that used for the recently approved Lynwood Quarry and used for many other examples to assess extractive industries in NSW.

The proposal presented in the EA was developed in conjunction with the environmental assessment process to ensure the acceptable emissions and best management practices are incorporated into the design of the quarry as outlined in Section 6 of the Air Quality Technical Report (refer Annex H Volume 2). The operation of the quarry will fall within the assumptions adopted for the modelling scenarios to ensure a conservative assessment. The results of the original assessment indicated that the proposed quarry would fall within relevant DEC criteria with the exception of a minor exceedance of the 24 hour PM₁₀ concentration criteria when modelled concurrently with the operation of the BCSC Limestone Mine.

The assessment procedure has been modified to make it more closely align with DEC's Level 2 Assessment Procedures as outlined in a letter to DOP from Holmes Air Sciences dated 30th of November 2006 (copy attached as *Annex A*). The revised analysis incorporated an analysis of variance in existing PM₁₀ monitoring data to construct a time series of background concentrations to be entered into the model in conjunction with modelled emissions from the proposed quarry and the existing Limestone Quarry.

Management procedures in addition to the mitigation committed to in the EA have also been incorporated into the revised model including the use of chemical treatment for the overburden haul road to BCSC and the commitment to cease hauling overburden to the BCSC South Pit when winds are from the north-east. The results of the modified assessment were included in the Holmes Air Sciences letter which is included as Attachment A. The results indicate that there will still be a small number of exceedances (approximately 8) of the DEC's 24 hour PM₁₀ criteria at one receiver, however the results would comply with internationally accepted procedures (ie US EPA).

2.1.2

Noise

A number of issues have been raised in the detailed noise assessment for the proposal, which are addressed generally in the order of the submission.

Receivers on spur line

There are no noise sensitive receivers in the vicinity of the northern portion of the railway spur near the junction with the Main Southern Line. The EA noise assessment has identified the closest residences to the spur.

Attended monitoring

Attended noise monitoring was undertaken on 24 February 2006. At this time, locomotive pass by noise on the existing spur was quantified as well as the BCSC industrial noise at the Ordasi Property (Location 2). Attended noise measurements were also undertaken during the validation exercise from the 4th of July to the 8th of July 2006

Road traffic noise

Road traffic noise was not originally assessed as a part of the EA as all product is proposed to be transported by rail. A road traffic noise assessment has subsequently been undertaken and shows that the proposal complies with relevant criteria.

Design of enclosure

The enclosure around the tertiary plant will be carefully designed to achieve the required mitigation. The 20 dB reduction has been incorporated into the model as part of a suite of mitigation measures to meet the predicted noise levels at nearby receivers. With such treatment residences are predicted to be generally well below the Project Specific Noise Levels.

Correction factors

No modifying factor corrections have been incorporated into the noise model. Equipment will be selected to negate tonal or low frequency noise, which in any case is not typically associated with extractive industries.

Rail spur noise

The EA assessment and subsequent information provided to DEC confirms that rail spur noise is assessed as part of the industrial site and therefore against the INP.

The current DEC approach outlined in their submission appears inconsistent with the INP for the reasons discussed here.

Historically general rail movements have been assessed against criteria significantly higher than those for industrial premises. These are 60dB(A)Leq,24hr and 85dB(A)Lmax for existing rail lines as per the EPA's Environmental Noise Control Manual 1994. Similar criteria are being developed by DEC and as an example apply in the Australian Rail Track Corporation's Pollution Reduction Programs.

More recently, there has been a shift to split private rail spurs and loops from the above general rail line criteria to be included as part of the industrial site it is servicing. This has been the DEC's approach, adopted by practitioners. It is arguable as to whether rail noise on the main rail line effects residences differently than when travelling on a separate spur. It is generally accepted that locomotive noise idling and loading of rail carriages at or near the site (eg rail loader) is defined and assessed as an industrial site. This is consistent and analogous with say cargo vessels at ports. The berthed vessel noise and its loading/unloading is assessed as part of the industrial site against the INP, but once underway it is not and becomes an issue for the Waterways Authority.

Nonetheless, for the current time and this project, the adopted approach is to assess rail spur train movement noise together with the industrial site and therefore against the DEC's INP.

The DEC's submission on this project in respect of rail spur noise is not consistent with previous similar studies in our experience. It requires that cumulative noise from rail spur movements from two separate operations be assessed against an INP intrusiveness criterion.

It is acknowledged that the spur is to be included as part of site operations and is therefore assessed against the INP for the proposal. Combining this with another industrial site, on the presumption that the spur is part of the existing BCSC site, is analogous to combining two separate industrial sites and assessing these against the INP intrusiveness criterion (as opposed to say the INP amenity criterion).

It is correct that Boral owns and operates the spur as part of the existing BCSC Limestone Mine. However, the proposal is a separate operation and separate business entity. It appears that this DEC recommendation applies because the proposal is to use an existing spur. To that end, if the proposal included a duplication of the rail spur the DEC's approach would not apply. This seems inappropriate given the same issues arise in reality.

The approach postulated by DEC could be extended to include the entire limestone mine operational noise with the proposal. This is something normally done for cumulative assessment. To that end, it would be more reasonable to adopt the cumulative noise target based on the INP's Amenity target for all industrial and rail spur movements. This has been undertaken in the EA Noise Assessment and subsequent information provided to DEC, with the assumption that there is only one train movement on the spur in any 15 minute period for both operations.

On the basis of amenity noise, the targets for rural residences of $50\text{dB(A)}L_{\text{eq,day}}$, $45\text{dB(A)}L_{\text{eq,evening}}$ and $40\text{dB(A)}L_{\text{eq,night}}$ will not be exceeded as a result of the two operations, inclusive of spur movements. Hence, the DEC referenced possible exceedance at locations 3 and 4 would not occur on the basis of amenity noise targets.

A further mitigation measure would be to limit night train movements to 1 in any 15 minute period from both sites, when ever practicable, noting that train arrival and departure times are outside of Boral's direct control and subject to train path availability. The likelihood of more than one train within 15 minutes is remote, due to the practicalities of train signalling, and receipt and despatch at site.

DEC has raised concerns that the modelling was based upon an 81 class locomotive and that it may not represent the "worst case scenario". Pacific National Bulk who supply the service to Marulan South does not have any of the older style 48 class locos so they will not be proposed to be used at Marulan South. Site measurements of existing locomotives on the rail spur was undertaken as part of the assessment.

Further information was provided to DEC on the 15th of DEC regarding the assessment of combined site and rail spur noise as described below.

- locomotive noise during rail loading is included in all calculations and noise contours in the EA. Noise from a train pass-by on the rail spur has been assessed as part of the INP process as stated in Section 5.6 of the *EA Noise Assessment (Annex G)*. The train pass-by noise levels are quoted in Table 5.7. A total combined site and train pass-by noise level can be calculated by adding results of Table 5.7 to corresponding data in any of Tables 5.1 to 5.6; and
- a worst case example is provided below (*Table 2.1 and Table 2.2*) and demonstrates the findings of the EA that rail spur noise does not significantly add to quarry noise. This is expected due to the intermittent nature of train pass-by and hence relatively limited time exposure. The total noise levels remain within 2dB of the project specific targets at most receivers and the noise levels are only sustained for a relatively short duration (ie each train pass-by). The exception is Location 3 during the day only where an exceedance of up to 5dB is demonstrated due to quarry operations and not from train pass-by noise.

Table 2.1 *L_{eq,15minute} Noise Under Day INP Weather Conditions, Mitigated dB (A)*

Receiver Location	Rail Pass-by	Quarry (20m Pit) + Pass-by	Quarry (40m Pit) + Pass-by	Project Specific Noise Criteria
1	23	32	33	36
2	28	38	39	39
3	32	44	43	39
4	33	38	37	36
5	31	36	32	35
6	29	30	30	35

Table 2.2 *L_{eq,15minute} Noise Under Night INP Weather Conditions, Mitigated dB (A)*

	Quarry 20m Pit (Adverse Wind)	Rail Spur	Total	Project Specific Noise Criteria
1	28	23	29	35
2	29	28	32	39
3	33	32	36	39
4	34	33	37	36
5	25	31	32	35
6	22	29	30	35

Main Rail Noise Assessment

The rail noise assessment was based on the incremental increase in rail movements on the Main Southern Line. The existing operation of the main southern line meets the Rail Noise Criteria for residences greater than 25 metres from the rail line. The proposal assessed noise from an incremental increase to average existing rail movements and indicated a marginal (1 db) increase to noise levels. The Main Southern Line is considered by ARTC to have considerable spare capacity and is governed by a separate Environment Protection Licence with DEC.

Sleep Disturbance

Front end loaders have been modelled outside the enclosure for loading the rail carriages with a relatively high representative sound power level of 124 dB(A). In our experience, this is a level similar to that used on large scale open cut mining operations. While it is acknowledged there may be variation depending on operator practice, it is considered a conservative assessment that is representative of typical practices. Appropriate training and management of operators will be undertaken in regards to loading of rail carriages to minimise noise emissions.

Construction Noise

Overburden is expected to be removed with standard excavators. Use of rock breakers for overburden removal would be a rare occurrence, simply because if the material is harder enough to need a rock breaker, it is most likely suitable for processing into aggregates. Construction noise management will be incorporated into the Construction EMP for the proposal.

Recommended Conditions of Consent

The noise limits specified in DEC's submission are reflective of the assessment or the existing background noise levels.

Specifying noise limits for 20 m and 40 m pits is realistic as there will be periods when active equipment will be positioned on multiple levels as the quarry progresses.

Proposed day limits have been derived from the assessment and are considered realistically achievable.

Evening limits have been specified to correspond with night limits, although the monitored background limits indicate slightly elevated background noise is experienced during the evening. Operations are proposed to be split into two 12 hour shifts with in-pit activities limited to the period 7.00am to 7.00pm. Noise from an active pit is expected to exceed the specified noise limits for the evening shoulder period of 6.00pm – 7.00pm, a period which corresponds to the elevated background noise levels. It is proposed that evening noise limits should correspond to day limits given that Boral has committed to considerable noise mitigation.

Night limits have not taken into account the rated background noise levels for each receiver.

Realistically achievable noise limits are specified in *Table 2.3*. DEC's proposed limits are shown in brackets for comparison and bolded where they differ. In respect of location 2, long term monitoring data indicates influence of BCSC operations. This influence is demonstrated in the similarity of RBL values for the day, evening and night at this location. Consistent with the INP practice notes, the lowest RBL of the three assessment periods is adopted here.

Table 2.3 *Achievable Noise Limits*

Residential Assessment Location	Day	Evening	Night	
	L _{Aeq} ,15minute	L _{Aeq} ,15minute	L _{Aeq} ,15minute	L _{A1} ,1minute
1	36 (35)	35 (35)	35 (35)	45
2	39 (39)	39 (35)	39 (35)	49
3	44 (44)	44 (36)	39 (36)	49
4	38 (38)	38 (37)	36 (37)	46
5	36 (36)	36 (35)	35 (35)	45
6	35 (35)	35 (35)	35 (35)	45
Any other	35 (35)	35 (35)	35 (35)	45

Blasting

Blast times will be redefined to reflect ANZECC guideline recommendations of 9am to 5pm Monday to Saturday. However, the guidelines acknowledge that there may be times when prevailing winds are more favourable during other times. Notwithstanding this, a 9am to 5pm blast window will be generally adopted with an extreme range of 7am to 6pm only used during favourable wind conditions. The site weather station will be used for assessing wind conditions prior to blasts.

Road Traffic Noise

The Marulan South Quarry proposal has been amended through the EIA process to address community concerns regarding rail haulage. Boral proposes to transport all product via rail and currently only seeks approval for road usage during construction and for employee, maintenance and delivery vehicles during operation. Road traffic noise was therefore not specifically included in the assessment for the EA. The following information is provided as supplementary to that in the EA Noise and Vibration assessment and relates specifically to road traffic noise from the proposal.

The NSW DEC Environmental Criteria for Road Traffic Noise (ECRTN) recommends external and internal traffic noise goals.

The first step in the assessment process is categorising the public road subject of the assessment in accordance with the ECRTN. Marulan South Road is best categorised as a local rural road, defined as a road situated in a rural area and handling local traffic with characteristically intermittent traffic flows. For such roads the ECRTN recommends a limit of 55dB(A) and 50dB(A) $L_{eq,1hr}$ for the daytime and night time respectively. This limit is the ECRTN's most stringent for existing roads of any category.

However, it is worth noting that a local authority may identify and classify an existing road as a principal haulage route. This could apply to Marulan South Road on the basis of the restricted access vehicle status with approval for use

of B-Doubles to service the existing BCSC Mine and other existing industrial operations on Marulan South Road. In such cases, the ECRTN recommends that the traffic noise criteria for the route match those for collector roads. For collector roads the ECRTN recommends a limit of 60dB(A) and 55dB(A) $L_{eq,1hr}$ for the daytime and night time respectively.

For traffic noise assessment the ECRTN defines daytime and night time hours as 7am to 10pm and 10pm to 7am respectively. The proposal will generally only generate traffic during the daytime period, hence the noise assessment is confined to the daytime.

The above criteria apply at 1 m from the most exposed façade to traffic. Dwellings along Marulan South Road are set back considerably from the road. The closest representative existing dwelling to Marulan South Road is that at the Ordasi Property or Location 2 in the EA Noise Assessment, approximately 165m north of Marulan South Road nearside lane edge.

Assuming a worst case scenario of up to 10 heavy vehicle movements per day for delivery of materials and equipment and 40 individual construction contractor vehicle movements, the construction vehicles would constitute less than 12% of the average daily traffic flows. A conservative representation of the typical peak hour volume for say the morning start or afternoon finish time, would be all contractors and heavy vehicles in the same hour. This equates to 20 car arrivals (or departures) and 5 heavy vehicles.

The Marulan South Quarry will employ up to 30 staff with two to three shifts per day. A shuttle bus currently operates between Goulburn and the BCSC limestone mine to accommodate a number of staff movements. Conservatively assuming that all staff drove independently to the quarry site, an increase of approximately 12% would be expected over existing traffic flows along Marulan South Road. The majority of movements would consist of passenger vehicles.

Additional heavy vehicles would be restricted to maintenance and delivery vehicles, which could be expected to result in up to ten vehicle movements per week for the life of the quarry operations. For noise calculation purposes, the worst case peak hour volume is based on 15 staff arriving in the same hour.

Based on the information above traffic noise levels are provided in *Table 2.4*. The calculations are based on the United States Federal Highways (FHWA) algorithm as this is best suited for relatively low traffic flow. The FHWA is a more conservative road traffic noise algorithm than more commonly used UK equivalent, the Calculation of Road Traffic Noise (CORTN).

Table 2.4 Marulan South Road Traffic Noise Assessment – Location 2 Odasi Dwelling

Existing Traffic Volume Counts (2- way)		Proposed Boral Quarry Traffic (Peak Hour)		Predicted Peak L _{eq,1hour} Traffic Noise, dB(A)			ECRTN L _{eq,1hour} Traffic Noise Criteria, dB(A)
Weekday Average, vpd	Peak Hour, vph	Construction Traffic, vph	Operational Traffic, vph	Existing	Existing + Construction	Existing + Operation	
443 (21%HV)	53 (6- 7am)	25 (20%HV)	15 (7%HV)	48	50	49	55 Day and 50 Night (Local Road) 60 Day and 55 Night (Collector or Principle Haulage Road)
Notes: 1.vpd = vehicles per day; vph = vehicles per hour; HV = Heavy Vehicles.							

Noise management procedures will be incorporated into both the Construction and operational EMPs. Clauses in conditions of employment or in contracts regarding driver behaviour and EMP compliance is not practicable or realistically achievable.

2.1.3 Water

The DEC submission outlines design specifications and requirements for a water quality monitoring program prior to construction and during operation of the quarry.

The proponent agrees with the overall intent of a monitoring program and is committed to the implementation of a plan to confirm the proposal does not have any detrimental impacts upon water resources. However, the monitoring program should be practicable and realistically targeted towards confirming the impacts associated with the proposal. The details of the monitoring program would be most appropriately decided and agreed post-approval.

Barbers Creek is in a steep gorge with extremely problematic access via rough walking trails from Bungonia or Long Point lookouts. Sampling on Barbers Creek near the confluence of the Shoalhaven River will not contribute significant additional value to sampling within Dam No.1 and immediately downstream of the discharge to Tangerang Creek. Barbers Creek has a large variable catchment area with a range of influences on water quality. Monitoring water quality in Tangerang Creek downstream from Dam No.1 will confirm that the quarry is not contributing to a deterioration of water quality in the catchment.

Sampling water quality in the existing farm dams also seems to have limited value in monitoring the impacts of the proposal other than confirming the assumptions for nutrient levels in catchment run-off incorporated into the

water quality modelling for the EA. Selection of groundwater bores will also need to be refined as quarrying proceeds.

All sediment dams will be designed so that they do not overflow directly to waterways. Dirty water dams will be constructed to accommodate design storms and designed so that any overflows are directed to the pit. Any sediment dams positioned on land sloping away from the pit will incorporate provisions for the pumping of water back to an in-pit sediment dam to avoid direct discharges to waterways. Monitoring of any excess water in pit storages will be undertaken prior to discharge to Dam No.1 via the wetland to ensure that any releases do not exceed ANZECC guidelines.

2.1.4 *Offset Plan*

Introduction

Project approval is being sought for an area sufficient for 30 years of quarrying with an area of approximately 70 ha. Two water supply dams are therefore proposed to be constructed within the headwaters of Tangarang Creek immediately to the north of the proposed quarry footprint. The two water supply dams are required to allow the quarry to develop a self sufficient water supply system.

The northern dam is in an area containing a 6.3 hectare (ha) stand of endangered White Box, Yellow Box, Blakely's Gum Woodland (Box-Gum Woodland). At capacity the dam will flood an area of approximately 2.6 ha of Box-Gum Woodland.

The design of the proposed quarry has been undertaken concurrently with the environmental assessment to ensure environmental sensitivities were incorporated into all stages of quarry development. Biodiversity values of the site were a key consideration and all potential alternatives to the requirement to clear 2.6 ha of Box-Gum Woodland were considered in the development of the proposal. Dam No.1 is located within the only substantial catchment area in the proposal area and its siting was a function of the compromise between the need for conservation of water resources and biodiversity values of the site.

An environmental offset program is proposed to achieve net environmental improvement in biodiversity values at the site to offset against the loss of 2.6 ha of Box-Gum Woodland. This conceptual plan has been developed in accordance with the principles contained in the EPA 2002 Concept Paper – Green Offsets for Sustainable Development and DEC's BioMetric Assessment Tool for the NSW Property Vegetation Plan.

The majority of the study area has been cleared of native vegetation and is used for grazing livestock. Vegetation over the majority of the site is

predominantly pasture grasses with only small, isolated stands of trees scattered throughout.

Native ground cover and shrub species are present along drainage lines and at the boundaries of the study area. Densities of canopy species are greatest within the drainage lines. Native ground covers and shrubs in these areas are protected from ploughing and grazing. There was very little regeneration of eucalypts and shrubs were largely absent across the study area. A list of all flora species recorded across the study area are included in the Marulan South Quarry Environmental Assessment Report (Volume 2 – Annex E).

Dominant canopy species varied across the study area, with Narrow-leaved Stringybark (*Eucalyptus eugenoides*) being dominant in the northern section of the study area, and Yellow Box (*Eucalyptus melliodora*) dominant in the southern section. Blakely's Red Gum (*Eucalyptus blakelyi*) was recorded predominantly within the southern section of the study area.

An isolated area of trees covers approximately 6.3 hectares near the location of the proposed Dam 1 and is separated from a much larger area of woodland by the railway spur line to the adjoining BSCS Limestone Mine. The canopy was dominated by mature Blakely's Red Gum, with a few Narrow-leaved Stringybarks present. Vegetation within the ephemeral drainage lines was dominated by exotic species, namely Blackberry and *Cyperus eragrostis*, with numerous mature eucalypts and *Acacia mearnsii* also present. Regenerating and immature eucalypts were present throughout and this area also had a relatively high diversity and abundance of native grasses. In contrast to the rest of the study area, native grasses comprised at least 70% of the ground-layer vegetation. Grass species included Kangaroo Grass (*Themeda australis*), Red Leg Grass (*Bothriochloa macra*), Wallaby Grass (*Austrodanthonia* sp.), Poa Tussock Grass (*Poa sieberiana*) and Spear Grass (*Austrostipa* sp.). The native Bluebell (*Wahlenbergia gracilis*) was also present in this area. These species, together with Blakely's Red Gum, are characteristic of the TSC Act listed endangered ecological community Box-Gum Woodland (NPWS Box-Gum Woodland Species Profile).

Box-Gum Woodland has also recently been included as critically endangered under the EPBC Act, after a recommendation from the Scientific Committee (Scientific Committee, 2006).

Discussions have been held with DoP and DEC on the likely impacts of the proposal and its regional significance. Following these discussions, the initial offset approach outlined in the EA has been further developed to protect and enhance the ecological value of the study area.

General Principles and Objectives

The general principles of the proposed offsets are as follows:

- the offset should last for the life of the impact;

- after completion, there should be net improvement in the quantity and quality of flora and fauna in the area; and
- best practice flora and fauna management measures should be implemented.

The broad objectives of the Green Offset Strategy is to develop an expanded and sustainable land system that:

- results in a net improvement in ecological value and connectivity;
- protects and enhances the biological diversity of the area;
- over time increases the area of Box-Gum Woodland;
- manages, maintains and enhances vegetation and habitat for threatened species; and
- offers long term management and protection.

Habitat Management Area

A Habitat Management Area will be established around the area of Box-Gum Woodland to be retained and around the periphery of Dam No. 1 and Tangarang Creek to enhance and protect the area from development for the life of the quarry as shown on *Figure 1*. The Habitat Management Area will be protected from future quarrying and will include active management of the Box-Gum Woodland to be retained and the establishment of new areas of Box-Gum Woodland. The boundaries shown are indicative only and are subject to change following survey and design.

2.1.5 *Ethnohsitory*

From what ERM is aware, there is no relevant and specifics data relating to post-contact ethnohsitory at the Marulan South site. ERM staff are discussing this question directly with DEC cultural heritage staff to determine if DEC holds any new relevant information.

The site environmental management plan will specify a management strategy to address the discovery of unanticipated Aboriginal objects of significance.

Site cards will be forwarded as requested.

2.1.6 *Reserved Land*

The proposed quarry will not directly affect the adjoining or nearby National Parks estate lands. The visual impact of the quarry from the gorges is nil, given the topography, and minor from the various vantage points. The main

Bungonia Lookdown currently provides clear vistas into the Limestone Mine pit, but the quarry and ancillary plant will not be able to be seen from here.

2.1.7 *Rehabilitation*

As noted by DEC, Boral expects that a contingent rehabilitation security deposit will be required by the minister for Planning.

2.2 *ROADS AND TRAFFIC AUTHORITY*

The Roads and traffic Authority has suggested that Boral contributes to the intersection currently being designed and built for use by the Lynwood Quarry, which intends to road haul a large proportion of its product. There will be no road haulage of products from the proposed Marulan South Quarry, so there is no justification or need for Boral to pay a contribution towards un-required roadworks.

2.3 *DEPARTMENT OF PRIMARY INDUSTRIES*

Boral will supply the Mineral Resources Division of DPI with the required production data for the departmental database.

Section 5.11 of the noise assessment in the EA volume 2 specifically discusses the impact on poultry farms.

2.4 *SYDNEY CATCHMENT AUTHORITY*

2.4.1 *Dirty Water Management*

The water management system is designed to contain all dirty water on site. To achieve this, dirty water storage dams will be located so that all overflows will flow into the pit. Any sediment located outside the catchment to the pit will be emptied by pumping to those that are in the pit catchment immediately after rain. No discharges will be made to any receiving waters unless water quality is compliant with ANZECC and other relevant guidelines.

Dams 3, 4 & 5 are essentially temporary dams for management of dirty water during the construction phase and will be completely contained within the pit once quarrying commences. These dams will be designed to have sufficient capacity to contain the 1 in 100yr ARI 24hr event as required and will be emptied soon after rainfall events by pumping to Dam 1 following any required water treatment (settlement, flocculation etc).

As per normal practice, clean water will be diverted away from any potentially dirty areas. As stated in the EA, this will be achieved using contour drains designed to contain all flows without failure. Hence there will be no impact on receiving waters as a result of these diversions.

2.4.2 *Neutral or Beneficial Impact*

A MUSIC model proved that the quarry would have a neutral or beneficial effect on the environment. The results of this model were included in the EA and indicate a slight improvement to water quality mainly as a result of dam 1 intercepting agricultural runoff from the general catchment.

As state previously all dirty water will be directed to storages that do not overflow to external waterways. These storages will only overflow to the pit which will have the capacity to contain all storm events.

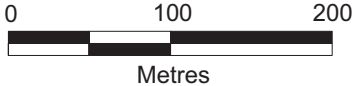
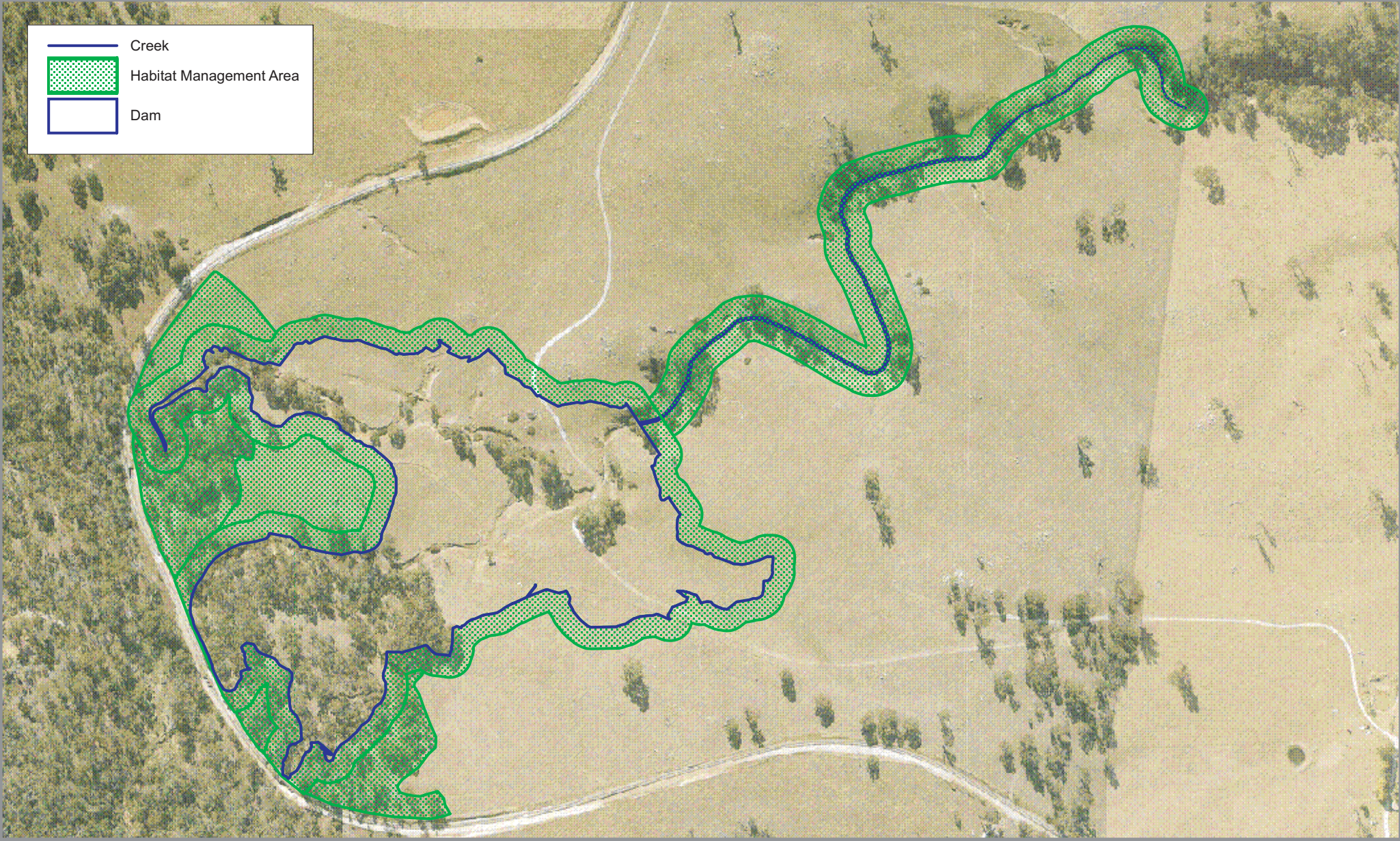
Any sediment dam outside of the pit catchment will be pumped to these designated dirty water storages immediately after rain. Dams and other water management structures (including critical structures such as dirty water dams) will be designed and constructed to contain all runoff up to the 1 in 20 year ARI 24 hours event. Where design capacity is exceeded, "Dirty water" dams will not overflow directly to waterways.

Matters of Consideration under SEPP 58 have been explicitly addressed in Appendix D of the Water Management Study included in the EA (refer Annex C – Volume 2).

2.4.3 *Management Plans*

Detailed Soil and Water Management Plans will be prepared for the construction and operation phases in conjunction with EMP preparation

Normal soil and water management requirements will be implemented in accordance with the "Blue Book" to ensure no adverse impacts during construction phase works. Erosion and sediment control plan will include all necessary items to prevent erosion and contain all potentially contaminated (dirty) water on site. No dirty water will be discharged to receiving waters without treatment to ensure water quality meets ANZECC and other relevant guidelines.



Note: The boundaries shown are indicative only and are subject to change following survey and design.

Figure 1
Habitat Management Area
Marulan South Quarry

3.1 FOTI INTERNATIONAL FIREWORKS PTY LTD, FOTI PYROTECHNICS CORPORATION

FOTI Pyrotechnics Corporation are in support of the proposal but request that a review of the zoning for the area be undertaken to cater for industries that require buffer zones such as those industries along Marulan South Road.

This issue is related to the Council's local environmental plan rather than the proposed project.

3.2 READYMIX – RINKER AUSTRALIA PTY LTD

This submission strongly supports the proposal. On the premise that Readymix is meeting the full cost of a grade separation interchange at the junction of the Hume Highway with Marulan South Road, Readymix has requested the following condition of approval be included:

"No product is to be transported from site by road under any circumstances"

All product is currently proposed to be undertaken by rail to address community concerns regarding road haulage. As stated in the EA road haulage may be required as an emergency haulage option in the event that the rail network becomes unavailable for extended periods of time during operation. If emergency road haulage is required, temporary approval will be sought from the Director General prior to the commencement of haulage.

Concern was also expressed over the safety of Boral's construction traffic using the interchange prior to Readymix's construction of the grade separated interchange in 2008-2009. The results of the EA's INTANAL analysis indicate that the additional vehicle movements associated with construction will result in minimal change to the acceptable Level Of Service (LOS) ("B") at which the intersection currently operates and will not impact on the safety of the intersection.

Should the construction phase of the quarry overlap with Readymix's construction of the intersection, the additional Boral construction vehicle movements would be of little concern considering that predicted total traffic flows during construction of the quarry will remain less than 25% of the total approved vehicle flows for Marulan South Road.

3.3 *R & S MONTGOMERY*

3.3.1 *Visual*

The viewpoint were selected on the Montgomery property to represent worst-case scenarios in regards to the visibility of the proposal, based upon the closest location with unobstructed views to the quarry.

The assessment utilised 3D digital terrain modelling overlayed onto photographs of the existing views. The expected future views show the full extent of the pit, bunding and overburden emplacements. In accordance with the proposed mitigation measures of the quarry, these emplacement areas were shown as vegetated, hence the visual impact is not as significant as otherwise expected. Figures showing the outline of the final overburden emplacements in relation to the vegetated view are provided in *Annex I*, Volume 2 of the EA.

3.3.2 *Noise*

The noise assessment incorporated a dozer and truck working at the top of the 30 metre emplacement area in the model for the 40 metre pit as indicated in the Table of Noise Sources included as Appendix 1 in the NIA (refer annex G – Volume 2).

The assessment was undertaken in accordance with the Industrial Noise Policy (INP) as is the NSW standard for the assessment extractive industries and industrial premises. Where cumulative noise may be audible on occasions at this receiver, the NIA has shown the proposal will comply with relevant guidelines specified in the INP.

3.3.3 *Property Value*

The EA has demonstrated that the proposal will have minimal intrusion upon the amenity of nearby receivers including properties on the eastern side of Barbers Creek. Considerable effort has been made in the design of the quarry to screen the proposal and minimise noise and dust emissions.

The proposal is permitted under the area's zoning and demonstrates compliance with the various environmental guidelines. The limited cumulative affect of the proposal, in conjunction with the existing Limestone Mine is not expected to adversely impact upon property values in the locality.

3.4 *MR BROWN*

The assessments of both disruption to sleep disturbance and of rail traffic noise in the EA were undertaken using guidelines and limits derived from the

INP. While trains are expected to be audible at nearby receivers, the assessment shows that the proposal falls within the relevant assessment limits.

The NIA has assessed cumulative noise specifically for the concurrent operation of the proposal with the BCSC Limestone Mine. The affected receiver is most influenced by the operation of the limestone plant with operation of the quarry having minimal affect on Leq Noise levels.

The Brown residence is location 3 in the EA, and Mr Brown has raised an issue in respect of cumulative industrial noise and the limestone crushing facility on the adjoining lot north of their property. In the absence of monitored noise levels for the limestone crushing operations at the Brown residence, ERM obtained the noise assessment for the limestone crushing facility on Marulan South Road from Council records. This was prepared by Dick Benbow & Associates Pty Ltd in June 2003. This assessment predicted that noise from the operation of the limestone crushing plant at the Brown property is 38dB(A). The operation would occur between 6am to 6pm, and therefore generally within DEC defined daytime hours. Nonetheless, both daytime and night time cumulative noise levels are discussed here.

The limestone plant noise contributes 38dB(A) at this location, whilst ERM documents a measured noise level of 34dB(A) from the existing BCSC facility. The total existing industrial noise level at the Brown property is therefore 40dB(A), comprising the BCSC and crushing facilities.

For the night time period the EA predicts a noise level of 24dB(A) from the proposal. Hence, for the 6am to 7am night period the limestone crushing operation is the highest contributing industrial noise at the Brown property. This is not unexpected given the relative distances between this residence and the three industrial sites. For the remainder of the night time period, the existing industrial noise level is represented by the BCSC operations of 34dB(A). The DEC cumulative night time industrial noise target for rural residences is 40dB(A), with a maximum target of 45dB(A). Hence, existing night time industrial noise levels are below the DEC target. The introduction of the proposal by Boral will not add to the existing night time industrial noise levels as demonstrated in the EA Volume 2 Noise Assessment (Table 5.12). This remains unchanged.

For the daytime period, the existing industrial noise level at the Brown property is 40(A) from the limestone crushing and BCSC facilities as per above. The predicted daytime operational noise level at the Brown residence from the Boral proposal is up to 44dB(A)Leq,15minue during adverse wind conditions. Adopting a conservative assumption that this worst case 15-minute noise level is maintained during the whole of the 11-hour daytime period, increases the existing industrial noise level during the daytime to up to 46dB(A). The DEC cumulative daytime industrial noise target for rural residences is 50dB(A), with a maximum target of 55dB(A). Hence, daytime industrial noise levels are predicted to remain below the DEC target.

The noise modelling of the receiver was undertaken for the receiver at the residential property rather than on South Marulan Road as stipulated in the submission. Results are both tabulated for the residential premise and presented in contours for the overall locality.

Attended noise monitoring was undertaken along the road outside of the property boundary, the logger located at Receiver 2 was used to be representative of existing noise levels at Receiver 3. This logger is located closer to both the existing BCSC mine and Marulan South Road. Therefore predicted background noise levels at receiver 3 are likely to be conservative estimates.

These predictions point to noise exceedences at this receiver during the day under adverse wind conditions only. All feasible and reasonable mitigation measures have been proposed and Boral has attempted to cooperate with the landholder in order to achieve acceptable levels during adverse conditions.

3.5 TALLONG COMMUNITY FOCUS GROUP

3.5.1 Road Transport

Through the operation of the BCSC Limestone Mine, Boral already makes considerable contributions to the maintenance of Marulan South Road. Maintenance and delivery vehicles and staff movements for the ongoing operation of the quarry have been included in the transport assessment as part of the EA.

3.5.2 Rail Transport

Rail traffic noise has been assessed in accordance with the EPA's Environmental Noise Control Manual (ENCM) which applies to rail traffic on non-private track. Rail traffic noise was calculated for increments of 25 metre away from the rail line to demonstrate impacts at any given location in proximity of the main southern line. The assessment shows that in a given 24 hour period any resident set back more than 25 metres from the railway line is unlikely to exceed the rail noise criteria. The proposal will result in an extremely minor alteration (1 dB) to the current noise levels. The operation of train movements on the main southern line is regulated under a separate environment protection licence with DEC.

Dust from uncovered train carriages is unlikely to significantly impact upon nearby receivers. Water sprays will be used on aggregate loading stockpiles so the product will be damp. The typical grain size of the product will be for concrete and asphalt aggregate is not expected to lead to a significant generation of dust.

Transport logistics for the rail network is governed by the rail providers who conform to practical best management practices. The use of uncovered carriages for the transport of stone aggregate is standard industry practice throughout NSW and Australia. The operation of the rail network is subject to an Environmental Protection Licence (EPL) issued to the Australian Rail Track Corporation (ARTC) by the EPA.

3.5.3 *Water Management*

Tanagarang Creek is an ephemeral drainage line which typically consists of a series of unlinked ponds. The proposal incorporates the use of environmental flow releases equivalent to 10% of average daily flows to minimise the ecological impact of reduced flows to flora and fauna downstream of the proposed dam. Flood spills and flows from the catchment area downstream of the dam will also flow to Tangarang Creek and downstream to Barbers Creek gorge. The timing and duration of an environmental flow is designed to maximise the effectiveness of the flows and is often timed to natural rainfall events to prevent infiltration in the upper reaches of the creek and maximise delivery of water to downstream communities.

A Habitat Management Area is also proposed to be established around the Tangarang Creek corridor to enhance the habitat value of the creek.

3.5.4 *Dust Noise and Vibration*

The impact of dust, noise and vibration has been modelled in accordance with relevant DEC guidelines and assessment methodologies. The EA has included an assessment of both expected emissions for the quarry alone and cumulatively with the BCSC Limestone Mine operations. The design of the quarry has been refined in conjunction with the environmental assessment process including the adoption of best practice mitigation to ensure acceptable impacts to nearby sensitive receivers including the conservation areas within Morton Nation Park and Bungonia State Conservation Area.

The NIA has included expected noise emissions during the initial construction period. Overburden stripped during construction will be used to build the 10 metre acoustic bund. Active quarry operations will not commence until sufficient overburden has been stripped to access the resource and position in pit crushers at the initial bench level approximately 20 metres below the surface.

Truck and conveyor reversing alarms are intermittent noise sources which will not affect the compliance of the operational noise with INP limits. The cumulative noise and vibration assessment was undertaken in accordance with the INP and ANZECC guidelines and found to be acceptable for six residential receivers much closer to the proposed quarry and the existing BCSC mine.

Blasting will not affect the scree slopes formed adjacent to the BCSC mine and there are no known scree slopes surrounding the perimeter of the 30yr quarry.

The proposed bunding and overburden emplacements will be designed to engineering specifications to ensure negligible risk of the emplacements collapsing into Barbers Creek gorge during blasting operations.

3.5.5 *Visual*

The visual impact of the quarry has been comprehensively assessed using 3D digital terrain modelling. The quarry has limited visibility from any nearby sensitive receivers and has incorporated mitigation to limit the visibility of active quarry areas.

Potential lighting impacts will be mitigated through appropriate placement of lights and screening.

3.6 *BD AND EL ARMITT*

ERM is unaware of any planned or permissible subdivision on the Armitt property. A recent plan to subdivide land near the Medway rail Junction has failed to proceed, presumable due to inappropriate zoning and landuse conflicts.

Boral has applied for a 30 year quarry life, but have identified that there is sufficient resource identified for 70 years.

The noise impact assessment considers the contribution of the increased train movements on the rail spur.

There is no definitive plan regarding the timing of the overburden stripping and therefore the emplacement construction. In general terms though, if 24 hour operations were feasible, safe and meet the appropriate noise criteria, it would occur. Conversely if it was unable to meet the night time criteria, stripping hours would be restricted.

The noise logger placed on Armitt's property was properly calibrated and maintained and collected data in accordance with the Australian standard. It is quite likely that a person is able to hear a development or item of plant, but this does not always substantially shape the local noise environment.

Boral chose in-pit crushing primarily to reduce noise impacts. There is little in the way of financial impacts either way, as the same volume of rock will be conveyed from the pit, whether it is crushed or not.

Mr Collucio's letter would appear to support Boral's intention to rail haul rather than road haul quarry products.

Annex A

Air Quality Report

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