

GR & AK Jones

Grants Road Sand Quarry Extension
Environmental Assessment
Project Application No 08_0099

August 2012



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Department of Planning
& Infrastructure

EXECUTIVE SUMMARY

Project Description

Grants Road Sand Quarry has been in operation since 2002. It currently has development approval for the quarrying of 2 hectares of the site with a maximum annual production of 200,000 tonnes per annum.

Project approval is being sought for the extension of the existing quarry located on Lot 1 DP 358717, 270 Grants Road Somersby. The proposed extension of the Grants Road Sand Quarry includes the extraction, processing and transporting by road of up to 250,000 tonnes of extractive material a year for a period of 30 years totaling 7,500,000 tonnes of sand product. The estimated total resource on site is estimated to be 9,433,000 tonnes. The existing quarry and quarry extension will incorporate approximately 20 hectares of the site.

The product to be extracted is estimated to be 50% dimension stone or retaining rock and 50% sand products of which 60% will be unwashed and 40% will be washed sand products.

Project Justification

Grants Road Sand Quarry has been in operation since 2002. Whilst the total limit of the resource as outlined in the current consent has not been exhausted, the remaining product is hard sandstone. This requires the product to be broken up to provide a soft sand product. This operation is timely and costly and therefore, extension of the quarry is sought to enable a range of products to be delivered to meet the demand.

Resources of construction sand close to the markets of Sydney, Central Coast and Newcastle metropolitan areas are diminishing. Expansion of the Grants Road Sand Quarry will assist in providing the additional sand resources to the Sydney, Central Coast and Newcastle markets. It is an existing operating quarry with infrastructure in place. Current monitoring of the existing quarry operations show that there has been little impact on the surrounding land uses. The environmental investigations undertaken as part of this Project Application also propose that there will be minimal impact on the surrounding land uses. The proposed monitoring of the expanded quarrying activities will assist in ensuring minimal impact.

Rehabilitation

Rehabilitation of the quarry will be undertaken upon exhaustion of the total resource. It is proposed that the final land form will be a non-free draining void. The topsoil material used for the acoustic earth mounds during the quarry operations will be used to reshape the quarry walls to provide a 1:2 batter and landscaped. Exposed areas will be revegetated with turf to minimise erosion.

The areas to be rehabilitated include all areas disturbed for the purposes of material extraction and management of the quarry. These areas and works include:

- Filling the batters of the excavation pit and extraction faces;
- Removal of temporary haul roads;
- Removal or upgrading of the culverts over drainage lines;
- Removal of storage and loading areas;
- Removal of the acoustic earth mounds;
- Removal of all infrastructure, including tailing ponds associated with the quarry; and
- Revegetation of all disturbed areas.

Groundwater Management

A Groundwater Impact Assessment including a Groundwater Modelling Study was undertaken. The results of the simulations undertaken in the groundwater model indicate the following:

- The drawdown radius of influence extends approximately 1km from the site. Maximum groundwater drawdown for the proposed quarry extension is 22 m.
- Maximum drawdown for the wetland area closest to the western site boundary is approximately 10m.
- Maximum drawdown for the quarry base (193 m AHD) is predicted to be 10 m.
- Maximum drawdown for the quarry base at the closest neighbouring production bore 50 m to the south (Brenda's bore GW056451) is predicted to be 8 m.
- Compared to the current case, the proposed quarry expansion flow budget results show that evapotranspiration for the wetland area west of the site decreases by approximately 50%, evapotranspiration for the rest of the area decreases by 13 % and flow to drainage channels decreases by 4 %.
- The assessed inflows into the final pit void are less than the evaporation potential and the water level in the void will be dependent on rainfall. Ponding of water may occur at the base of the pit during high rainfall events and subsequent evaporation processes would dry shallow ponded areas.

In the long term, the direction of the groundwater flow will still be to the south-west and the current recharge behaviour into the surrounding non-quarried areas will remain the same. The maximum drawdown for two neighbouring bores is predicted to be approximately 8 and 9 m. However, the proposed quarry extension is not predicted to impact on the chemistry of the groundwater quality of any neighbouring bore.

A Groundwater Management Plan is proposed, which incorporates the development of a water level and water quality monitoring program and the development of a set of trigger levels and mitigation measures if adverse impacts occur on the environmental and/or neighbouring water users.

Surface Water Management

The existing quarry operation operates under a closed system approach for water management. Water accumulating in the current quarry excavation is pumped into a sediment dam and then taken from the decant pond for use in the washing process and dust suppression. Fines extracted in the washing process are pumped to a series of primary silt ponds/tailings dams, which cascade to a final tailings dam. Sediment free water is recovered from the final tailings dam and decant pond and re-used in the wash plant.

All disturbed area/quarry pit runoff and process water is retained onsite and no contaminated runoff is released from the site.

The same system for 'in pit' water management is proposed to be carried forward into the expanded operation. A new 'out of pit' dam is also proposed to provide water supply security and nutrient control as its core function in the south-west corner of the property.

The proposed extended quarry operations managed in accordance with the existing environmental management measures and the construction of the 10ML pollution control dam results in the quarry never being without sufficient water to sustain day to day operational demand. Further, the current environmental management and mitigation measures undertaken for the current quarry operations appear to be enabling a high standard of environmental management.

Biodiversity

An assessment of significance (seven part test) identified that no threatened flora species, threatened or migratory fauna species or endangered ecological communities listed within the EPBC Act (1999) were observed within the subject site.

The proposed development is not likely to result in a significant effect on any threatened species, endangered ecological community or their habitats. A Species Impact Statement is not required for the proposed development and the proposal is not considered a proposed action that is a matter of National Environmental Significance and therefore a referral is not required to the Department of Sustainability, Environment, Water, Population and Communities.

Noise Assessment

Noise exceedances are predicted for a number of the assessment locations. However, these noise exceedances can be alleviated through the effective implementation of a number of mitigation measures including noise reducing mechanisms and maintenance of machinery, limiting the machinery on exposed areas, and provision of vegetated acoustic mounds in the southern and south-eastern boundaries.

Truck noise resulting from the proposal is predicted to satisfy the Environmental Criteria for Road Traffic Noise baseline assessment goal.

Air Quality

Dust emissions would arise from various activities of the proposed quarry extension. Modelling was undertaken based on the highest 24 hour average concentration that would occur at each location for the worst day in the year. Taking into consideration the existing ambient air quality and the worst case scenario, all of the actual predictions for each receptor are well below the criteria set by Department of Environment and Heritage.

The assessment also assessed the cumulative impacts from the nearby Hanson's quarrying operations. It is considered that the data used is conservatively high. Receptor 4, which is the closest residence to the proposed quarry operations, is predicted to have more than 5 days over the criteria. However, it should be noted that this prediction is conservatively high and likely to be lower during normal operations. Notwithstanding this, monitoring is recommended to be conducted at this receptor once the expanded quarry operations commence.

Further, onsite management of the quarry operations is to be undertaken to minimise dust impacts at sensitive residences including watering of unsealed roads, stockpiles and limiting the area of disturbed land and progressive rehabilitation of completed areas.

As assessment of respirable crystalline silica and greenhouse gas emissions were also undertaken. Both assessments conclude that there is not likely to be any measurable environmental effect due to respirable crystalline silica and greenhouse gas emissions.

Traffic Assessment

The increase of quarrying from 200,000 tonnes per annum to 250,000 tonnes per annum will increase existing traffic volumes by a proportional amount. Based on the current approval of 200,000 tonnes per annum, the average daily heavy vehicle generation from the Grants Road Sand Quarry would be 24 trucks per day. The average daily heavy vehicle generation from the Grants Road Sand Quarry for the proposed extraction of 250,000 per annum would be 30 trucks per day. The SIDRA simulations indicate that the proposed quarry expansion will not adversely impact on the operation of the intersections of Grants Road/Wisemans Ferry Road and Grants Road/Reservoir Road intersections.

The traffic assessment also concludes the extension of the quarry will not adversely affect the Somersby Public School as there may only be approximately one additional trip north past the school from the proposed quarry extensions.

Grants Road has the capacity in accordance with AUSTRROADS “Guide to Traffic Engineering Practice – Par 2, Roadway Capacity to cater for the additional truck movements.

Heritage

The Aboriginal archaeological survey identified two rock engravings on the site being:

1. An anthropomorphic figure on a sandstone exposure situated near the northern boundary of the property (Grants Rd RE 1); and
2. A small mound located in an access way outside of the area of the proposed extension (Grants Road RE 2).

The proposed quarry preserves both sites through a buffer zone around site RE1 and to ensure that traffic is directed around the small mound at the Grants Rd RE 2 site to ensure minimal disturbance. Site RE1 has been incorporated into the current archaeological monitoring.

Visual Impact

Visual impact by the proposed quarry extension is considered to be low, however the following mitigation measures are proposed to minimise future visual impacts:

- Vegetating all stockpiles and the acoustic earth mounds using appropriate species noting that the current conditions of consent requires the use of Kikuyu grass for the stabilisation of stockpiles. This will minimise the visual impact by reducing the contrast between the sandstone, bare earth and the surrounding vegetated areas.
- Maintain grass covered mounds.
- Maintain the site.
- Keep the site clean and tidy where possible.
- Progressively revegetate all areas where quarrying is completed.

Bushfire Risk Assessment

The site and adjoining areas contain land mapped as Bushfire Prone Land. The main bushfire threat is from the forest vegetation to the west and east of the site. Bushfire protection is to be achieved by the use of existing managed lands providing separation distance and defendable space to the bushfire hazard. These areas are to be regularly inspected and maintained by the landowners.

The existing and future water storage ponds associated with the quarry would provide an adequate water supply for a bushfire emergency. Additionally, the provision of an on-site mobile water pump and tank, with fire fighting hose connections, should be provided for protecting buildings from bushfire impacts from the adjoining forested lands.

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STATEMENT OF VALIDITY

Submission of Environmental Assessment for Grants Road Sand Quarry:
Prepared under Part 3A of the Environmental Planning and Assessment Act 1979.
Environmental Assessment prepared by:

Names:	Vanessa Colclough Director / Urban Planner
Qualifications:	BA BachURP MPropDev mpia aia (CPP)
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I certify that we have prepared the contents of this Environmental Assessment with specialist consultants and to the best of our knowledge, the information contained in this report is neither false nor misleading.

Signature:

Name:

Date:

Vanessa Colclough

30 August 2012

1.0 INTRODUCTION

Project approval is being sought for the extension of the existing quarry located on Lot 1 DP 358717, 270 Grants Road Somersby (Refer Figure 1 Locality Plan and Figure 2 – Aerial Photograph). The proposed extension of the Grants Road Sand Quarry includes the extraction, processing and transporting by road of up to 250,000 tonnes of extractive material a year for a period of 30 years totaling 7,500,000 tonnes of sand product. The estimated total resource on site is estimated to be 9,433,000 tonnes. The existing quarry and quarry extension will incorporate approximately 20 hectares of the site.

A Preliminary Environmental Assessment was lodged to seek the Director General's Requirements for the extension of the quarry site. Modified Director General's Requirements were then issued on 26 August 2010 and are attached in Appendix 1.

Grants Road Sand Quarry has been in operation since 2002. It currently has development approval for the quarrying of 2 hectares of the site with a maximum annual production of 200,000 tonnes (refer Figures 3 and 4 and Appendix 2 – Existing Site Plans). The extent of these quarrying operations is now limited with only hard sandstone product being extracted.

The total area of the property is approximately 35 hectares. The proposed extended quarry will cover an area of approximately 20 hectares and range in depth from 15m in the south-west quadrant to 33m in the eastern quadrant of the site (refer Figure 5 and Appendix 3 - Plan and Cross Sections of Proposed Quarry). Quarrying of the site is proposed in two stages. This is generally so that the product from the quarry can be a mix of hard and soft sand products to meet the market demand. The quarry area has been further divided into seven precincts taking into consideration environmental issues and location of the sand product types.

This Environmental Assessment has been prepared to justify the extension of the existing quarry and provide information to address the Director General's Requirements. The study team for the Environmental Assessment included:

Table 1 – Project Team

Tasks	Entity
Environmental Assessment	Peter Andrews + Associates Pty Ltd
Existing and Proposed Quarry Surveys	Stephen Thorne & Associates Pty Ltd
Assessment of Inferred Sandstone Resource	Larry Cook and Associates Pty Ltd
Groundwater Assessment	Larry Cook and Associates Pty Ltd
Groundwater Modelling Study	Coffey Geotechnics Pty Ltd
Surface Water	JP Environmental
Noise Impact Assessment	Atkins Acoustics
Air Quality Impact Assessment	Paeholmes
Traffic Assessment	BJ Bradley and Associates
Visual Impact Assessment	Peter Andrews + Associates Pty Ltd
Archaeological Assessment	Insite Heritage
Flora and Fauna Assessment	Conacher Environmental Group
Rehabilitation	Conacher Environmental Group
Bushfire	Conacher Environmental Group

2.0 BACKGROUND

Grants Road Sand Quarry currently has a development consent number 22952/1998 from Gosford City Council for extraction of 200,000 tonnes of material per annum from an area of 2 hectares. A summary of the consent and approved amendments to the consent are as follows.

Table 2 – Summary of Consent

Type of Consent	Date	Amendment
Deferred Commencement Consent	11 May 1999	<p>Consent for the proposed extractive industry subject to the preparation of a Plan of Management to be prepared within 12 months. The Plan of Management is to address:</p> <ul style="list-style-type: none"> • Extraction • Water Management • Water Quality Monitoring (including groundwater) • Soil Management and Erosion Control • Rehabilitation • Noise Control • Fuel Storage • Transportation • Contamination/Oil spills • Tailings Management
Operative consent	5 July 2000	Operative consent subject to the ongoing management of the Plan of Management and the conditions of consent.
Section 96(2)	14 April 2004	Consent to include the installation of a sand washing plant and fines residue management infrastructure. Additional conditions of consent included in relation to access to the water supply easement and management controls for the above infrastructure.
Section 96(2)	19 December 2006	<p>Consent to increase the hours of operation to:</p> <p>7.00am to 6.00pm Monday to Friday; and 8.00am to 11.00am Saturday</p> <p>To allow the two yearly reviews of the Environmental Management Plan to be undertaken every five years.</p> <p>Site rehabilitation bond was also increased to \$20,000/hectare.</p>

The following table provides a summary of the quarry operations under the existing consent:

Table 3 – Summary of Existing Consent

Consent DA 22952	
Property area to be quarried	2 hectares
Total resource extracted	Limit of resource
Maximum annual production	200,000 tonnes
Depth of extraction	20m
Hours of operation	7.00am to 6.00pm Mon-Fri 8.00am to 11.00am Sat
Number employed	5
Machinery and plan	1 loader 1 dozer 1 dump truck 1 water cart Diesel operated screen and wash plant
Average return truck trips per operational day	24
Area cleared	2ha
Area regrowth bushland cleared	0ha
Area rehabilitated	2ha
Site rehabilitation bond	\$20,000/hectare

Current monitoring of the extractive industry required by the consent conditions are as follows:

Table 4 – Existing Monitoring Requirements

Item	Timing	Monitoring
Water	Quarterly	Groundwater quality is monitored at two bores, one above and one below the quarry floor, for pH, nitrogen, phosphorus, Total Dissolved Solids and Total Suspended Solids
Water	Annual	Monitored for hydrocarbons and heavy metals
Surface Water	Quarterly	Monitored at two locations, from the process water dam and from a culvert on the western side of the quarry for pH, nitrogen, phosphorus, Total Dissolved Solids and heavy metals.
Soil erosion	Biannual	Inspections of weed populations, regrowth and revegetation on rehabilitated areas and erosion.
Noise	Annual	Monitoring conducted at three neighbouring properties. Project noise goals have been established based on DECC and INP criteria.
Environmental Report	Annual	Consolidation of all monitoring.
Howes Aboriginal Reserve	Five yearly	Monitoring of the rock engraving.
Somersby Mint Bush	Five yearly	Monitoring of the Somersby Mintbush located in the Brisbane Water National Park.
Plan of Management	Updated every five years	To ensure monitoring results are satisfactory.

The consent also required onsite and offsite improvements, which were undertaken at the commencement of the quarry operations and included:

- Fencing around the defined quarry area prior to quarrying of material;
- Incorporation of appropriate quarry and truck signage;
- The eastern boundary of Council's easement for water supply to be fenced prior to the commencement of any work on site.
- All vegetation between the proposed quarry and the western boundary of the Howe Aboriginal Reserve and the Great North Walk is to be retained and supplemented with further plantings.
- Additional native trees (preferably fast growing and those which are specifically native to the Somersby area) are to be planted to supplement the existing and retained vegetation between the western and northern boundaries of the Howe Aboriginal Reserve, the Great North Walk and the quarry.
- Kikuyu grass is to be used in the stabilisation of the proposed stockpiles.
- The upgrading of Grants Road from the proposed entry/exit of the subject site to the intersection of Reservoir Road.
- Construction of the access crossover between the edge of bitumen in Grants Road and the property boundary.
- Implementation of adequate sedimentation and erosion measures.
- Installation of a wheel washing facility to remove sediment from truck tyres before a truck exits the site.

Extraction of the sand resources is carried out by a Caterpillar dozer (or equivalent), ripping the resource progressively to a maximum quarry depth of 20m. A Caterpillar loader (or equivalent) loads the raw material into the screening plant. Screened product is conveyed to stockpiles and then loaded into trucks. Screened product, which is to be washed is conveyed to the washing plant.

The screening and washing plant is located on the floor of the quarry. The washing plant has a vibrating screen with a 4mm mesh size and a constant density tank for the separation of fines.

Raw sand is moved from the stockpile within the quarry to a raw sand dump hopper by front end loader. Sand is transported by conveyor to an elevation vibrating screen, which separates out the coarse material. The coarse reject material is stockpiled for sale or used on site.

Raw sand from the vibrating screen discharges directly into the constant density tank where the primary clay and silt separation takes place. Overflow water carrying clay and silt residues from the tank discharges directly through a pipeline to one of the primary settling ponds. Product sand is pumped from the tank to a cyclone, which discharges sand to the stockpile and return residual water to the tank. The main water feed for the tank is supplied from the tertiary storage pond. Residual water draining from the washed sand stockpile is drained into an existing sump and then to one of the settling ponds.

Fines residue remains in a damp state from the time of processing until rehabilitation. Regular inspections and a maintenance program have been adopted for the fines residue to maintain and modify the controls to suit conditions. This includes dust emissions and erosion control.

Subcontractors undertake the transport of washed and unwashed sand and dimension stone. All trucks enter the wheel wash prior to leaving the site onto Grants Road.

Hazardous materials on site are limited to hydrocarbons (fuel and oil). The quarry has implemented work practices and procedures to minimise the effects of using and storing hazardous materials on the site. A spill response kit is located on site. The quarry also operates in accordance with the Waste Management Plan prepared for the quarry.

The owners of the Grants Road Sand Quarry liaise with adjoining residents. Grants Road Sand Quarry maintain a complaints handling and management process.



Source : Google Maps

Legend

The Site



Figure 1 - Locality Plan



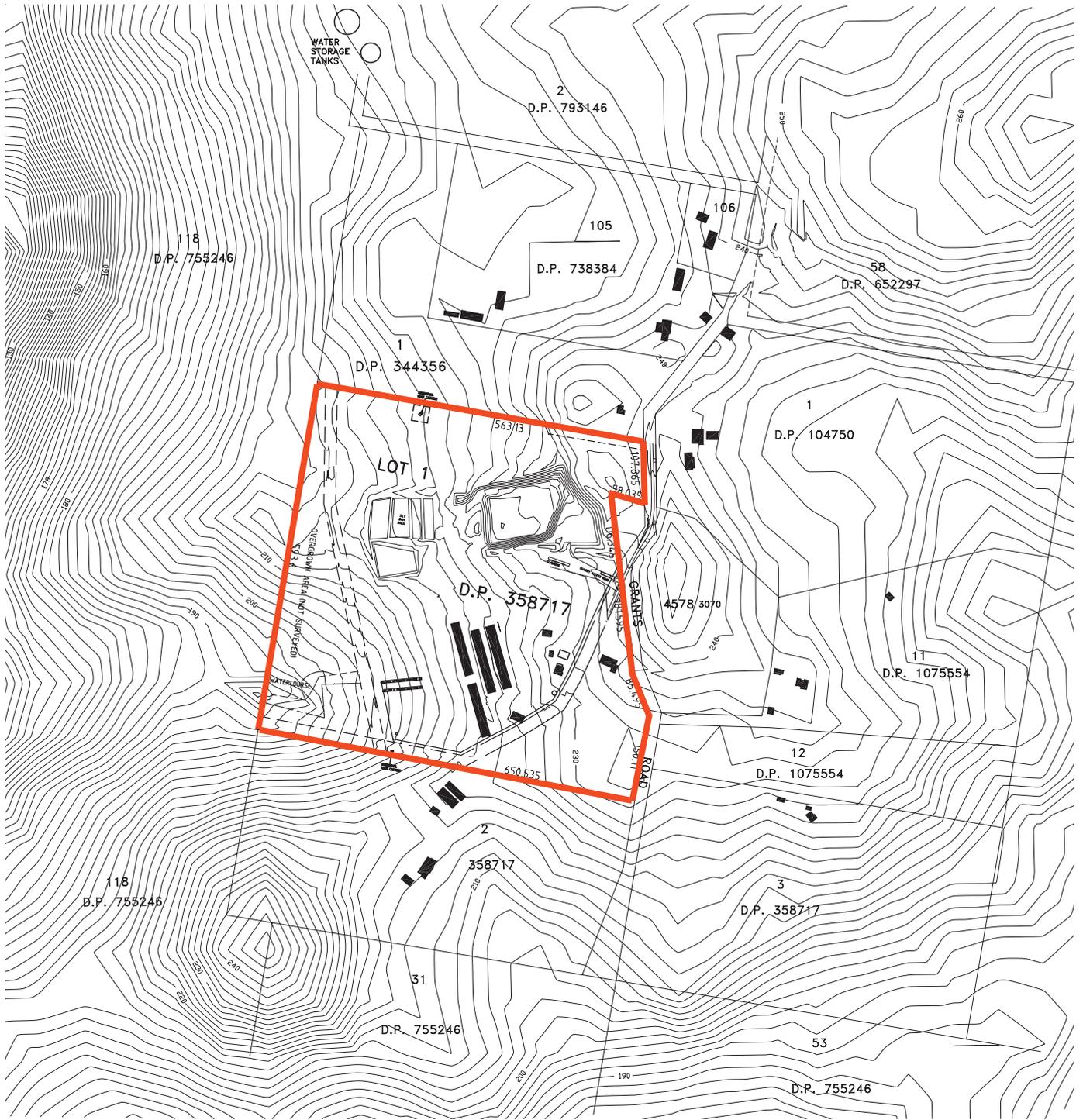
Source : Google Earth

Legend

 The Site



Figure 2 - Aerial Photograph



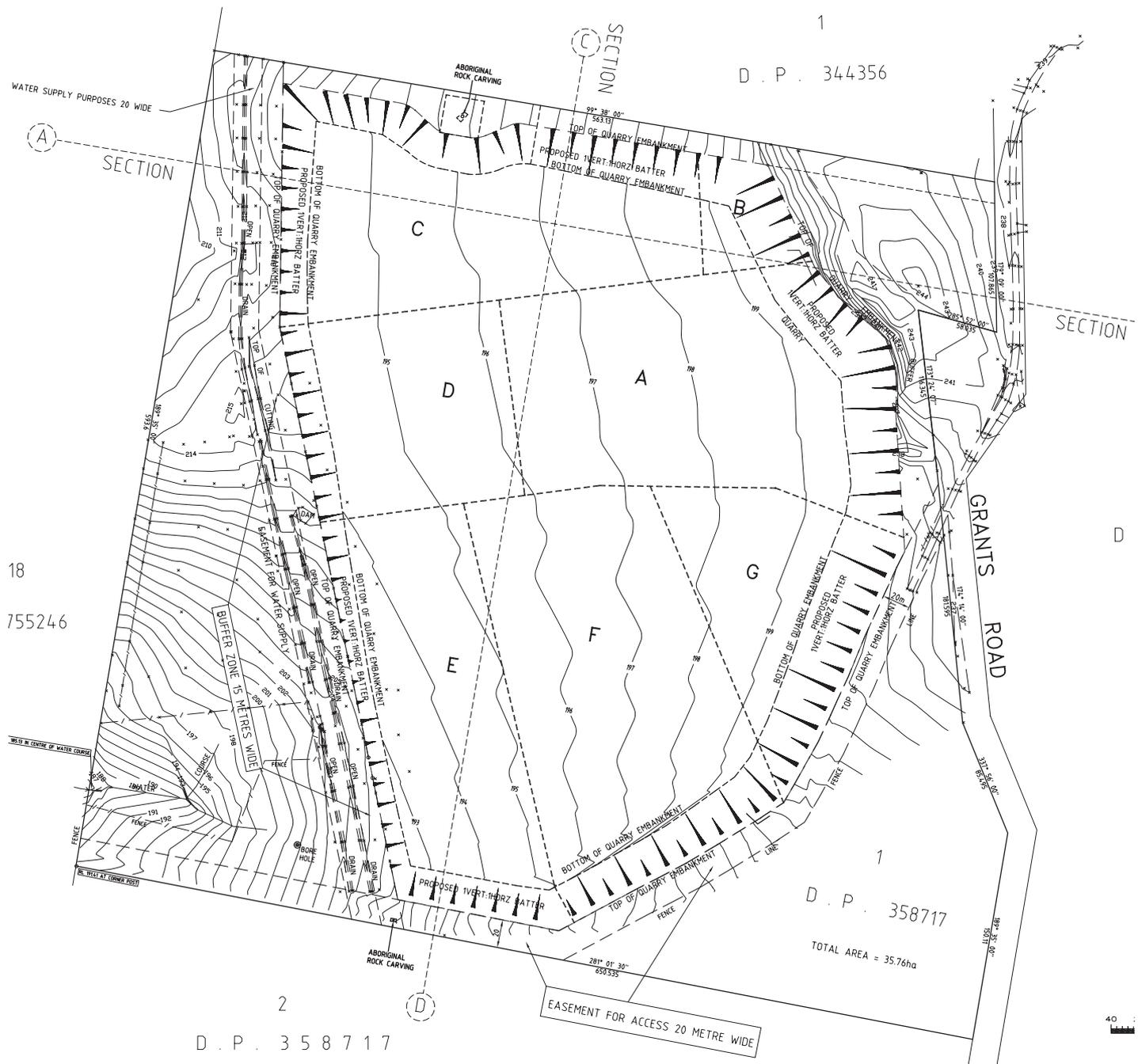
Source : Stephen Thorne and Associates Pty Ltd

Legend

 The Site



Figure 3 - Quarry Site and Surrounding Area



Source : Stephen Thorne and Associates Pty Ltd



Figure 5 - Proposed Quarry Site

3.0 DIRECTOR GENERAL’S REQUIREMENTS

This Environmental Assessment addresses the issues outlined in the DG’s Requirements and a summary is presented in Table 5. The DG’s Requirements are attached in Appendix 1.

Table 5 – Environmental Assessment Requirements

Requirement	Chapter of Environmental Assessment
General Requirements	
1.1 Executive Summary	Executive Summary
1.2 A detailed description of the following: <ul style="list-style-type: none"> ▪ Historical sand extraction operations on the site; ▪ Existing and approved operations, including the statutory approvals that apply to these operations; and ▪ The existing environmental management and monitoring regime; 	Section 2.0 Background
1.3 A detailed description of the project, including the: <ul style="list-style-type: none"> ▪ Need for the project, including a detailed resource and land use assessment; ▪ Alternatives considered, including a justification for the project on economic, social and environmental grounds; ▪ Likely staging of the project; and ▪ Plans of any proposed building works 	Section 6.0 Project Description and Appendix 4 Assessment of Inferred Sandstone Resource
1.4 A risk assessment of the potential environmental impacts of the project, identifying the key issues for further assessment;	Section 9.0, the relevant specialist studies in the appendices and Section 10.0 Draft Statement of Commitments.
1.5 A detailed assessment of the key issues specified below and any other significant issues identified in the risk assessment (see above), which includes: <ul style="list-style-type: none"> ▪ a description of the existing environment, using sufficient baseline data; ▪ an assessment of the potential impacts of all stages of the project, including cumulative impacts, taking into consideration any relevant guidelines, policies, plans and statutory provisions; ▪ a description of the measures that would be implemented to avoid, minimise, mitigate, rehabilitate/remediate, monitor and/or offset the potential impacts of the project, including detailed contingency plans for managing any potentially significant risks to the environment 	Section 4.0 Site Description, Section 5.0 Regional and Local Context, Section 9.0 Key Assessment Requirements and the relevant specialist studies in the appendices. Section 9.0, the relevant specialist studies in the appendices and Section 10.0 Draft Statement of Commitments.
1.6 A statement of commitments, outlining all the proposed environmental management, mitigation and monitoring measures;	Section 10.0 Draft Statement of Commitments
1.7 A conclusion justifying the project on economic, social and environmental grounds, taking into consideration whether the project is consistent with the objects of the Environmental Planning and Assessment Act 1979; and	Section 12.0 Conclusion
1.8 A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading.	Validation Statement Page 3
Key Issues	
2.1 Soil & Water including; <ul style="list-style-type: none"> ▪ a detailed assessment of the potential impacts of the project on the quantity, quality and long term integrity of surface and ground water resources in the area, including the potential impacts on local landowners’ water supply, Council’s water supplies, and groundwater dependant ecosystems; ▪ A site water balance, including a detailed description of the measures that would be implemented on site to minimise water use. 	Section 9.1 Groundwater, Section 9.2 Surface Water and Appendices 6 and 7.
2.2 Biodiversity – including; <ul style="list-style-type: none"> ▪ Accurate estimates of vegetation clearing associated with the project; ▪ A detailed assessment of the potential impacts of the project on threatened species, populations, endangered ecological communities and their habitats, groundwater dependent ecosystems, native vegetation, and the adjacent Brisbane Water National Park; and ▪ A detailed description of the measures, including a comprehensive offset strategy, that would be implemented to maintain or improve biodiversity values in the surrounding region in the medium to long term. 	Section 9.3 Biodiversity and Appendix 8.

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Requirement	Chapter of Environmental Assessment
2.3 Noise - Including construction, operational and off-site road noise impacts.	Section 9.4 Noise and Appendix 9.
2.4 Air Quality - Including a detailed analysis and modelling of the potential dust deposition, particulate matter and silica impacts of the project.	Section 9.5 Air Quality and Appendix 10.
2.5 Greenhouse Gas – including a detailed description of the measures that would be implemented on site to minimise energy use and greenhouse gas emissions;	Section 9.5.3 and Appendix 10.
2.6 Transport – including a detailed assessment of the potential impacts of the project on the safety and performance of the road network, and in particular the measures that would be implemented to minimise the potential transport impacts of the project on the Somersby Public School;	Section 9.6 Transport and Appendix 11.
2.7 Heritage – both aboriginal and non-Aboriginal;	Section 9.7 Heritage and Appendix 12.
2.8 Visual – concentrating on minimising the visibility of the site from accessible areas and walking trails within the Brisbane Water National Park;	Section 9.8 Visual Impact and Appendix 13.
2.9 Hazards;	Section 9.9 Bushfire Risk Assessment and Appendix 14.
2.10 Rehabilitation – including; <ul style="list-style-type: none"> ~ A detailed description of how the site would be progressively rehabilitated, revegetated, and integrated into the surrounding landscape; ~ A justification for the proposed final land form and use, taking into consideration any relevant strategic land use planning or resource management plans or policies; ~ A detailed description of the measures that would be put in place to ensure sufficient resources are available to implement the proposed rehabilitation measures, and the ongoing management of the site following the cessation of quarrying activities. 	Section 6.8 Rehabilitation
2.11 References	
Whilst not exhaustive, the following attachment contains a list of the guidelines, policies and plans that may be relevant to the environmental assessment of the project.	References and appendices
2.12 Consultation	
During the preparation of the Environmental Assessment, you should consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with the: <ul style="list-style-type: none"> • Department of Environment and climate Change; • Department of Primary Industry; • Department of Water and Energy; • Roads and Traffic Authority; and • Gosford Council. <p>The consultation process and issues raised during this process must be described in the Environmental assessment.</p>	Section 8.0 Consultation and Appendix 5.

4.0 SITE DESCRIPTION

4.1 Ownership and Legal Description

The land that is the subject of this application is Lot 1 DP 358717 No 270 Grants Road Somersby (refer Figures 3 and 4) and is owned by Mr and Mrs G.R. and A.K. Jones. This landholding has been in the Jones' ownership since 1966.

4.2 Zoning

The site is currently zoned 1(a) Rural (Agriculture) under the Gosford City Council Interim Development Order No. 122 (Gosford IDO 122) (Figure 6). Permissible uses within the 1(a) Rural (Agriculture) zone include:

1 DEVELOPMENT THAT DOES NOT REQUIRE CONSENT

Development (other than exempt development) for the purpose of: agriculture; home occupations; recreation areas. Exempt development.

2 DEVELOPMENT THAT NEEDS CONSENT

Development (other than exempt development) for the purpose of: animal establishments; bed and breakfast accommodation; child care centres; dams; dual occupancies-attached; dwelling-houses; educational establishments; extractive industries; forestry; home businesses; horse establishments; intensive agriculture; mines; places of public worship; plant nurseries; roads; roadside stalls; rural industries; rural tourist facilities; rural tourist units; stock and sale yards; utility installations; veterinary hospitals. Subdivision.

Extractive industries are permissible with consent under the Gosford IDO 122.

4.3 Existing Land Uses

Current development on the site include the existing quarry approved under DA 22952/1998 as outlined in Section 2.0 Background, which is approximately 2 hectares in size located to the north of the site, four chicken sheds located to the south of the site and dwellings for the owners of the site and the managers of the quarry. Cattle grazing has also been undertaken on the site from time to time. Refer Figures 2 and 4.

A water supply easement is located towards the west of the site. This easement runs in a south to north direction. It also dissects the site with the majority of the landholding located to the east of the easement (refer Figure 4).

4.4 Topography

The site is gently sloping from the eastern boundary towards the south western boundary. Refer Appendix 2 for the survey plan of the existing site and surrounding area.

4.5 Geology

The Assessment of Inferred Sandstone Resource (Appendix 4) outlines that the property is located in the northern central part of the Sydney Basin where the upper part of the Triassic sedimentary sequence is exposed. The Gosford Local Government Area is largely underlain by Triassic-age Hawkesbury Sandstone, which consists of a thick sequence of interbedded massive and cross-bedded medium to coarse grained quartz sandstone with occasional interbeds and lenses of shale. The sandstone unit has a recorded maximum thickness of approximately 130m beneath the property.

Further assessment through interpretation of geophysical bore logs run in several district water bores shows that the property is underlain by approximately 160m of relatively flat-lying Triassic Hawkesbury Sandstone.

4.6 Hydrology

Surface water flow on the site is dominated by overland flow. Two first order westerly-flowing drainages are noted on the western boundary, on the edge of the escarpment of the Mooney Mooney Creek system. A third first order drainage is located immediately north of the north-western corner. These creeks join with tributaries before discharging into Mooney Mooney Creek approximately 1.6 km downstream of the site.

The northernmost of the two drainages is not well defined on the site but is developed on the western side of Council's water supply easement. The headwater of the southern drainage line is well defined west and downstream of the water pipe line easement.

Groundwater field investigations reveal that overland flow discharging from this feature is effectively intercepted by a Council drain that runs parallel to and immediately upslope of the water supply easement along the whole length of the easement. Overland flow in the south-western part of the site is captured by the abovementioned drain and directed to a set of three adjoining large-diameter steel culvert pipes that discharge into the southern drainage west of the pipeline easement.

5.0 REGIONAL AND LOCAL CONTEXT

Grants Road Sand Quarry is located on the Somersby Plateau. The Somersby Plateau is identified in the Central Coast Regional Strategy as a major source of fine to medium grain sand for the Sydney Regional and Central Coast areas.

Access to the quarry is via Grants Road from Wisemans Ferry Road. This provides direct access to the F3 Freeway to the south.

Surrounding existing land uses of the site include small hobby farms, chicken sheds, orchards and the Hansons Quarry to the north.

Brisbane Water National Park adjoins the site to the west, Grants Road and Howe Aboriginal Reserve to the east and privately owned rural properties to the north and south. The Great North Walk adjoins part of the site to the north-west. Refer Figure 7 – Local Context.



Source : Gosford Intrim Order No 122

Existing Zoning

Legend

- 1(a) Rural (Agriculture)
- 6(a) Open Space (Recreation)
- 6(b) Open Space (Special Purpose)
- 7(a) Conservation and Scenic Protection
- The Site



Source : Gosford Draft 2009 Local Environmental Plan

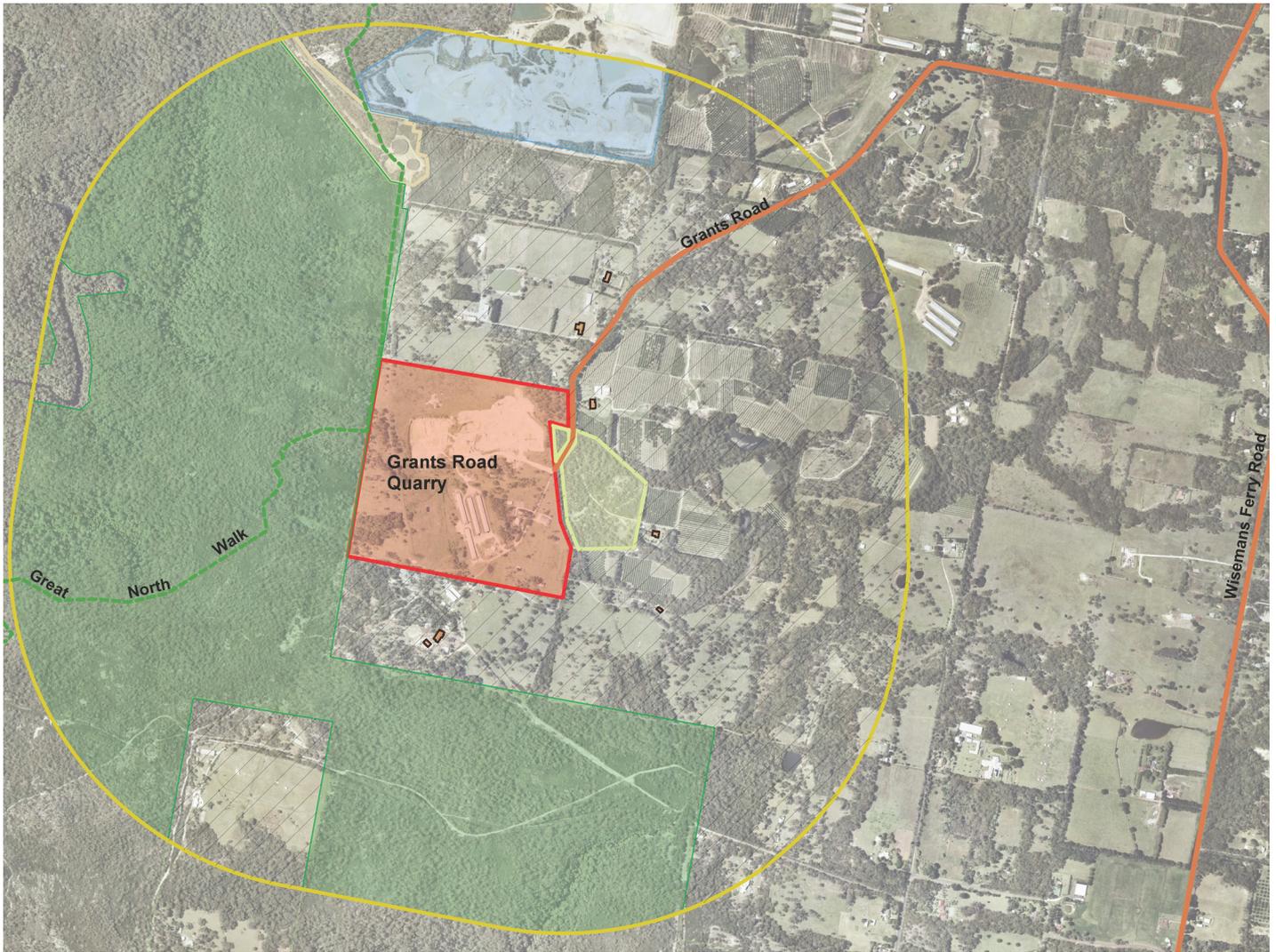
Draft LEP Zoning

Legend

- RE1 - Public Recreation
- RU1 - Primary Production
- E1 - National Parks and Nature Reserves
- The Site



Figure 6 - Zone Plan



Source : Google Earth

Legend

- Subject Site
- 1km Radius form edge of Site
- Existing Dwellings
- Brisbane Water National Park
- Hanson's Quarry
- Howes Aboriginal Reserve
- Infrastructure
- Rural Lands



Figure 7 - Local Context

6.0 PROJECT DESCRIPTION

6.1 Introduction

In accordance with clause 2A of the State Environmental Planning Policy (Major Development) 2005 and Schedule 6A of the Environment Protection & Assessment Act 1979 (EP&A Act), the project is a transitional Part 3A project.

A Preliminary Environmental Assessment was prepared in January 2008 for the extension of the Grants Road Sand Quarry to seek the NSW Department of Planning's Director General's Requirements (DG's Requirements). The DG's Requirements were issued on 31 July 2008 for the proposed extension of the Grants Road Sand Quarry, including the extraction, processing and transporting by road of up to 250,000 tonnes of extractive materials a year for a period of 30 years.

Modified DG's Requirements were issued on 26 August 2010 for the proposed extension as outlined above, however excludes the requirement for the final void to be free draining (Refer Appendix 1).

The proposed expansion of the quarry is located to the west of the water supply easement and to the west of Grants Road. Refer Appendix 3 for the proposed quarry site and cross sections.

6.2 Resource

An assessment has been undertaken of the inferred sandstone resource by Larry Cook & Associates Pty Ltd and is attached in Appendix 4. The exploration method used in the delineation of the sandstone resource was diamond (core) drilling, which was carried out in 1993 and 2010. The report identifies that the site is underlain by Hawkesbury Sandstone up to a depth of approximately 160m. The Hawkesbury Sandstone beneath the property within the proposed extraction depth range comprises:

- Interbedded massive and cross-bedded medium to coarse grained quartz sandstone with occasional interbeds and lenses of shale;
- Interbeds of very fine to medium-grained sandstone;
- Pebbly sandstone; and
- Conglomerate sandstone.

The upper part of the sandstone sequence is variably weathered varying between approximately 3.5m to 7.5m with an average of approximately 4.5m. The Hawkesbury Sandstone is exposed as horizontal sheet-like outcrops across many parts of the site. In other parts, the sandstone is covered by a relatively thin layer of sandy loam topsoil. This layer is approximately 0.1 and 0.4m.

The total resource estimate has been determined from geological investigations carried out for the Assessment of Inferred Sandstone Resource. It identifies that the average thickness of the topsoil is approximately 0.2 to 0.3m. In addition, no significant shale beds were intersected. Therefore, the estimated extraction volume is 4,300,000 cubic metres, which is based on the proposed quarry plan attached in Appendix 3 prepared by Stephen Thorne & Associates Pty Ltd. This takes into account the soil cover, batters, haul roads and extracted material to date.

Further assessment of the resource is undertaken to determine the bulk specific gravity for the proposed extractive material to identify the approximate total tonnage to be extracted. The resource is split into two categories reflecting the lower density weathered zone and the bulk of the resource comprising relatively unweathered sandstone. A rate of 2.22 tonnes/m³ is adopted and therefore the total tonnage of the quarry extension is approximately 9,433,000 tonnes (Appendix 4 Assessment of Inferred Sandstone Resource). The quarry will have a life of approximately 38 years based on an annual extraction of 250,000 tonnes per annum.

The product to be extracted is estimated to be 50% dimension stone or retaining rock and 50% sand products of which 60% will be unwashed and 40% will be washed sand products.

6.3 Quarry Extent

The total proposed area of extraction is approximately 20 hectares and is shown on Figure 5 and Appendix 3. This is based on quarrying to a maximum depth of 33m in the east to RL 200 and to a maximum depth of 15m in the south-west corner to RL193. This will result in a quarry floor with an approximate gradient of 2% (refer cross sections in Appendix 3). This incorporates the area of the existing quarry.

The external limits of the quarry have generally been determined as follows:

- A 10m setback around the Aboriginal engraving site in the north, which is identified in the *Archaeological Assessment for Proposed Quarry Extension*;
- Retention of a buffer knoll in the north east corner supporting approximately 2ha of bushland regrowth;
- The water supply easement located towards the western side of the property; and
- Provision of access corridors for infrastructure around the quarry.

Plans showing the extent of the proposed quarry and sections are included in Appendix 3.

6.4 Extraction Operations

Quarrying of the site will occur in two stages as shown on Figure 8. This is generally so that the product from the quarry can be a mix of hard and soft sand products to meet the market demand. The area has been further divided into seven Precincts taking into consideration environmental issues and location of the sand product types (also refer Figure 8). The following outlines the various Precincts.

Table 6 – Quarry Precincts

Precinct	Staging
A	<p>This is the current quarry site subject to DA 22952. The total resource has not been quarried to date, however the remaining product is dimension stone and therefore is required to be crushed to provide any soft sand product. The remainder of the material will be extracted as part of Stage 1.</p> <p>This area also includes the current ancillary infrastructure for the operation of the quarry including the quarry access road, weighbridge, wheel wash facility and the screen and wash plant.</p>
B	<p>The quarrying of Precinct B will generally be undertaken at the same time as Precinct C in stage 1. However, extraction of material within exposed locations in Precinct B is to be undertaken in periods of high winds >5m/s (particularly east and south-east winds) and/or rain with elevated background noise levels in accordance with the Noise Assessment. Further, quarrying in Precinct B is to maximise site shielding and minimise the number of plant and equipment on exposed locations. The hard sandstone is approximately 10 metres below the surface due to the topography of the site.</p>

Precinct	Staging
C	Precinct C is included in the first stage. Precinct C contains a good source of coloured dimension stone and includes the soft sand product, which will assist in meeting current demand and therefore the quarry is not reliant solely on the crushing of the hard stone in Precinct A. Quarrying in Precinct C is to maximise site shielding and minimise the number of plant and equipment on exposed locations particularly towards the east. The dimension stone is approximately 5 metres below the surface.
D	Precinct D contains the existing water management and silt dams for the quarry operations. Precinct D will continue to provide water management and silt dams for Stage 1. The quarrying of this precinct will form part of Stage 2 once the silt dams and water management areas are relocated.
E	<p>The lowest part of the site is located in the southern section of Precinct E. The southern portion of Precinct E will be quarried to its full depth and will be quarried as part of Stage 1. This area will then be managed for water and drainage for the whole of the quarry site.</p> <p>The northern section of Precinct E will be quarried as part of Stage 2.</p>
F	<p>Precinct F forms part of Stage 2. This will require the relocation of the chicken operations.</p> <p>Extraction of material within exposed locations in Precinct F is to be undertaken in periods of high winds >5m/s (particularly east and south-east winds) and/or rain with elevated background noise levels in accordance with the Noise Assessment. Further, quarrying in Precinct F is to maximise site shielding and minimise the number of plant and equipment on exposed locations.</p>
G	<p>Precinct G forms part of Stage 2. This will require the relocation of the dwelling on the site.</p> <p>Extraction of material within exposed locations in Precinct G is to be undertaken in periods of high winds >5m/s (particularly east and south-east winds) and/or rain with elevated background noise levels in accordance with the Noise Assessment. Further, quarrying in Precinct G is to maximise site shielding and minimise the number of plant and equipment on exposed locations.</p>

6.5 Processing Operations

6.5.1 General

- Extract, process and transport up to approximately 250,000 tonnes per annum of various grades of washed sand, mortar sand, sandstone blocks and retaining wall rocks for a period of approximately thirty years;
- Extraction will be undertaken by dozer and excavator.
- Sand will be screened and washed as required.
- Dimension stone will be cut using a tungsten saw attachment on an excavator as required.
- Top soils are stripped and put into mounds and used for acoustic barriers. The mounds naturally revegetate and are covered in Kikuyu grass within 3 to 4 weeks.

- The machinery and plant used on site includes:
 - 4 loaders
 - 1 dozer
 - 1 excavator
 - 1 rock saw
 - 1 dump truck
 - 1 water cart
 - Diesel operated screen and wash plant
- The dozer is operational two weeks on and then two weeks off.
- The rock saw is operational for four weeks per annum.
- The dozer and rock saw will work within the relevant precinct. Materials will be loaded onto the trucks to bring back to store the retaining wall rocks or for sand to be washed and loaded within Precinct.

Currently, fine residues are removed during the sand washing process, collected and channeled to a series of settling/tailing ponds located downslope and west of the pit in the central western part of the property. The first pond is regularly 'mucked out' and the clay fines stockpiled for dewatering. The retained clean water in the lower ponds is recycled back to the washing plant as required. These operations will continue for the expansion of the quarry, however the ponds will be relocated for stage 2 as required.

The following procedures are used on site to minimise dust emissions:

- Oversized products are placed onto the haulage routes within the quarry. This is eventually broken down further by the machinery;
- A 10,000 litre water cart is located on site and is used to spray bare ground to reduce dust.

6.5.2 Staging

6.5.2.1 Stage 1

Stage 1 comprises Precinct A being the existing quarry site, and Precincts B and C and part of Precinct E. Figure 9 Proposed Stage 1 Operations Plan provides an indication of the quarrying operations and is generally proposed as follows:

- The topsoil, which ranges in depth up to approximately 60cm is pushed towards the boundary of the quarry site, revegetated and used as sound mounds.
- The precincts are sectioned into approximately 60m² areas. Two sections within the Precinct are ripped concurrently. Each section is ripped to an approximate depth of 1 metre.
- The McLoskey Screen is relocated to the area that is being ripped. This will be used for screening of material only and then the sand is loaded straight onto the trucks for transportation.
- Material that is to be screened and washed will be transported to Precinct A and will utilise the existing infrastructure. The material will then be loaded onto trucks within Precinct A and then transported.
- Existing infrastructure including the access roads, weigh bridge, wheel wash and wash plant will be retained in its existing location in Precinct A.
- Additional access roads will be developed using the onsite materials to provide access to the precincts generally in accordance with Figure 9.
- The harder sandstone product is located at depths in the precincts as follows:
 - Precinct B – approximately 10 metres depth;
 - Precinct C - approximately 5 metres depth; and
 - Precinct E – approximately 15 – 20 metres depth.
- The dozer will be used approximately 10% of the time in Precinct A and approximately 90% of the time in Precinct B/C. Once the softer sand material has been ripped within Precinct B (subject to requirements of the noise assessment) and Precinct C, the dozer will be used in the southern portion of Precinct E to commence the ripping of the soft sand product.
- Precinct E will be used for the management of clean water upon the completion of quarrying of the southern section of Precinct E.

6.5.2.2 Stage 2

Stage 2 comprises Precincts D, F and G and the northern part of Precinct E (refer Figure 10). The quarrying of Stage 2 will be similar to the operations described for Stage 1 and as shown on Figure 10 Stage 2 Operations Plan and as follows:

- Silt dams will be located in Precincts A and C to allow quarrying of Precinct D.
- Relocation of the chicken sheds and existing dwelling will be undertaken prior to the quarrying of Precincts F and G.
- Existing infrastructure including the wash plant, weigh bridge and wheel wash may be relocated to land within Stage 2 to allow the remainder of Precinct A to be quarried.
- The topsoil will be pushed to the quarry boundary, revegetated and used as sound mounds as per Stage 1.
- The soft sand will be ripped in approximate 60m², screened and washed where required and transported similar to Stage 1.

6.6 Extraction Period

The Sandstone Resource Assessment estimates the total resource as 9,433,435 tonnes. Based on the area of the precincts and the resource volumes the time to extract the material in the two stages based on 250,000 tonnes per annum is outlined in Table 7. The quarry life will extend to 38 years based on a total resource of 9,433,435 tonnes and quarrying of 250,000 tonnes per annum.

Table 7 – Estimated Time Period for Extraction

Stage	Tonnage (tonnes)	Years	Estimated Period (years)
1	4,885,602	0-20	19.5
2	4,547,833	20-30	> 10 years

6.7 Operations

• Roads, Traffic and Transport

Current approvals for the site allow up to 24 return truck trips for the quarry site. It is proposed that up to 30 return truck trips will occur for the proposed quarry extension. Transportation is along Grants Road and then Wisemans Ferry Road to the F3 Freeway. The haulage trucks consist of 33 ton truck and dog (approximately 85%) and 12 ton bogies (approximately 15%). Generally, the trucks are 100% full when transporting materials.

• Hours of Operation

The proposed hours of operation for the quarry expansion are:

- Monday to Friday 6.00am to 6.00pm; and
- Saturdays from 7.00am to 1.00pm.

6.8 Rehabilitation

A Soil and Rehabilitation Management Plan is incorporated in the Environmental Plan of Management for the current quarry approval. The objectives of that plan are also generally proposed for the extension to the quarry and include:

- To ensure topsoil is stripped from the site prior to construction works;
- To ensure topsoil is stockpiled in stable structures and remains in a viable state;
- To ensure topsoil is reused during rehabilitation of the site;
- To ensure rehabilitation of the site is progressed throughout the life of the operation and results in a stable and erosion free landform;
- To rehabilitate the site with a viable mixture of indigenous plants, which results in a diverse and sustainable ecosystem; and
- To monitor the effectiveness of rehabilitation and to modify the program when and where necessary.

It is proposed that the final land form will be a non-free draining void. The topsoil material used for the acoustic earth mounds during the quarry operations will be used to reshape the quarry walls to provide a 1:2 batter and landscaped. Exposed area will be vegetated with turf to minimise erosion.

Ongoing rehabilitation and revegetation has been undertaken on a regular basis to reduce the extent of disturbed areas and subsequent dust and sediment movement. As part of the initial consent for the quarry operations, additional vegetation was planted as follows:

- In excess of 600 tube stock were planted during September 2002, along the western boundary in two rows at about 1.5m spacings, in fulfillment of the requirement of the Plan of Management. The tube stock plants comprise species that occur within this locality.
- Additional planting of tube stock was undertaken in August 2002, along the eastern boundary and within the south-eastern corner in fulfillment of the Plan of Management.

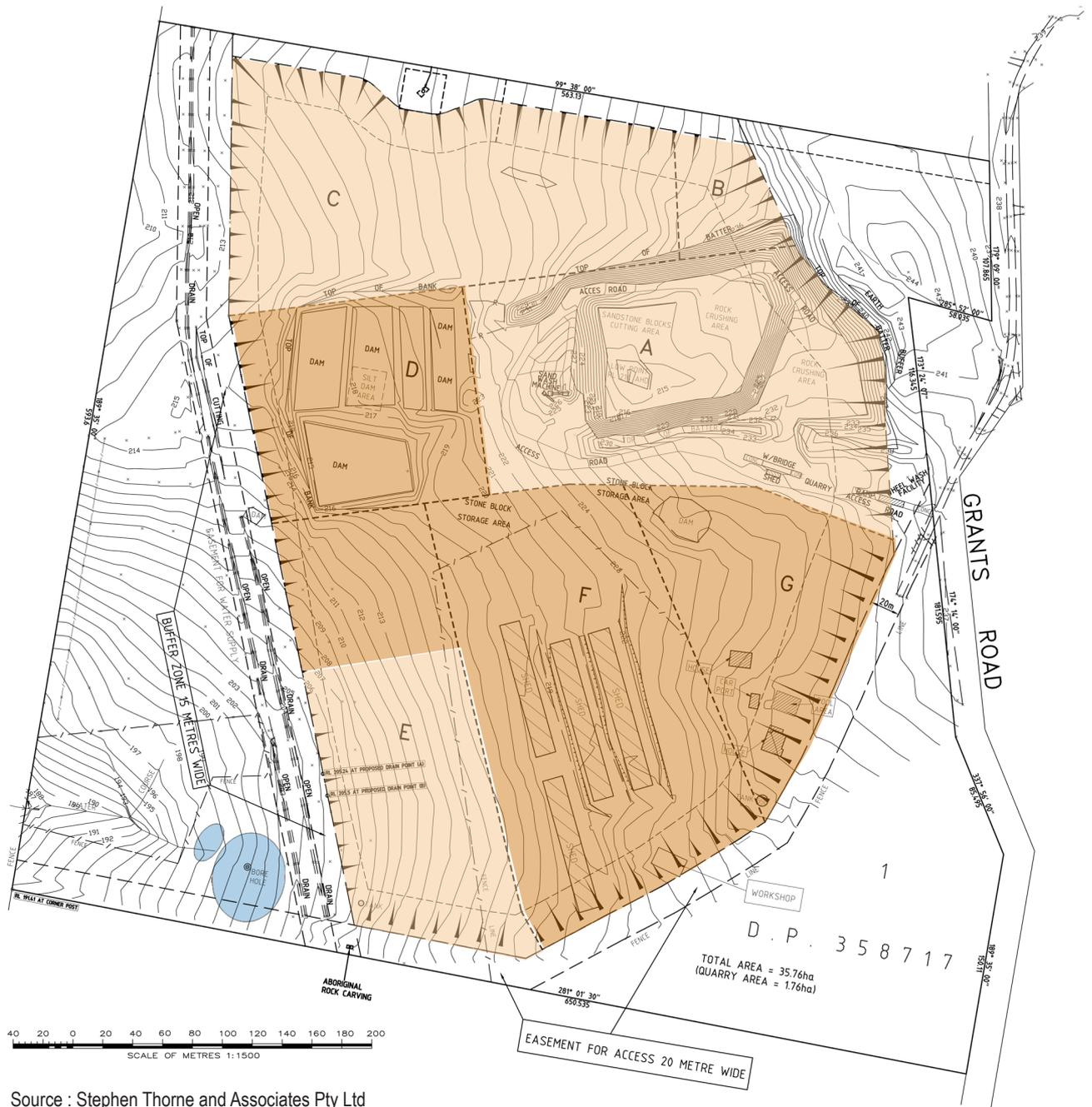
The earth mounds have also been revegetated with Kikuyu in accordance with the conditions of consent.

It is proposed that areas of the quarry will be revegetated once the resource has been exhausted in that particular area. This will assist in minimisation of dust.

The areas to be rehabilitated include all areas disturbed for the purposes of material extraction and management of the quarry. These areas and works include:

- Filling the batters of the excavation pit and extraction faces;
- Removal of temporary haul roads;
- Removal or upgrading of the culverts over drainage lines;
- Removal of storage and loading areas;
- Removal of the acoustic earth mounds;
- Removal of all infrastructure, including tailing ponds associated with the quarry; and
- Revegetation of all disturbed areas.

Rehabilitation of the quarry will be undertaken upon exhaustion of the total resource. It is proposed that material on site, which generally consists of top soil, will be used to reshape and stabilise the quarry sides to form 2:1 batters and will then be landscaped. The final batters will be certified by engineers. The final land use will be in accordance with the permissible uses for the site and will be determined in consultation between the landowners and Council. An indicative plan and cross section for the rehabilitation of the final void is shown on Figure 11.



Source : Stephen Thorne and Associates Pty Ltd and JP Environmental

Legend

- Stage 1
- Stage 2
- E Precinct
- Nutrient Control Pond



Figure 8 - Staging Plan



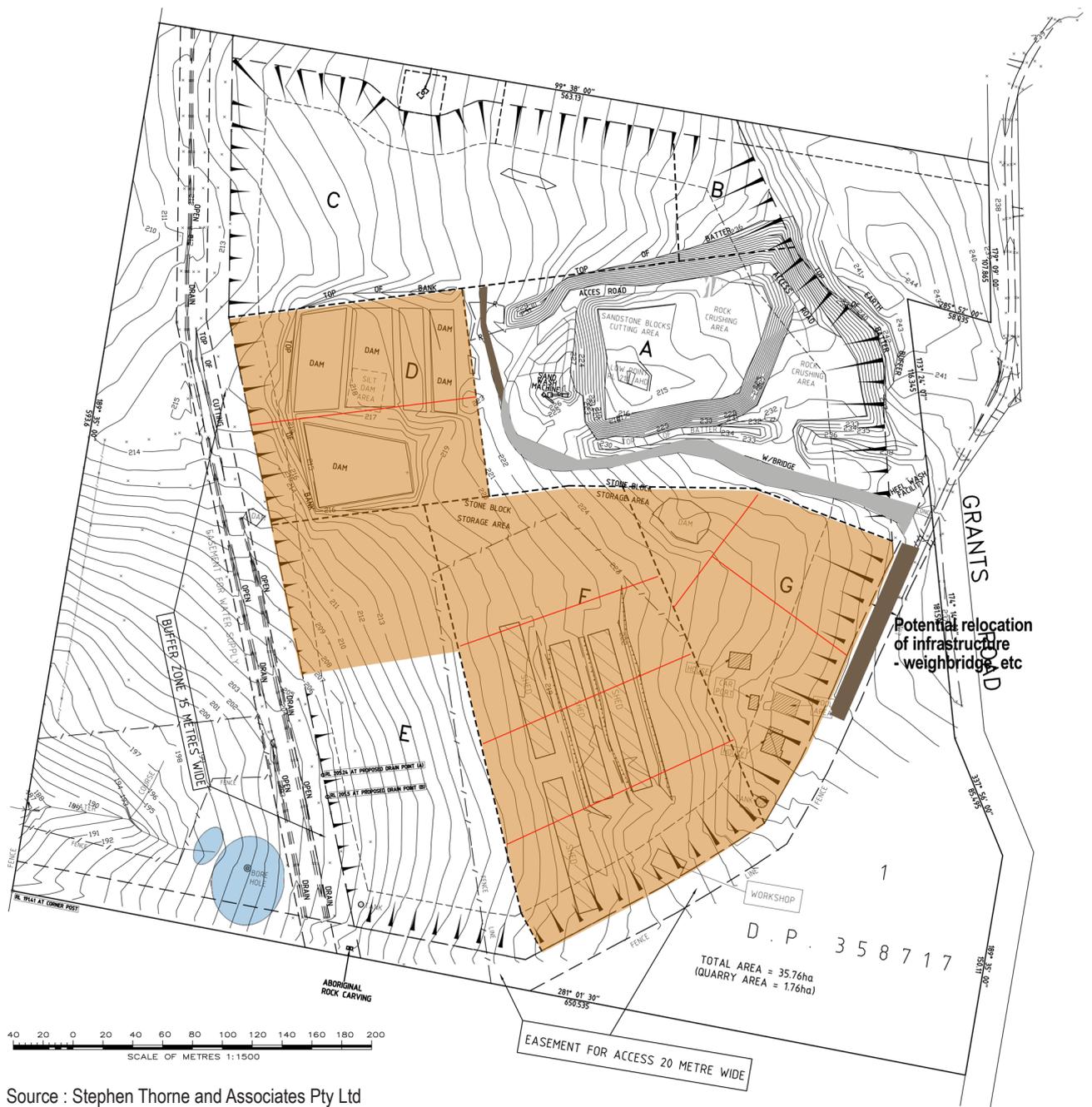
Source : Stephen Thorne and Associates Pty Ltd and JP Environmental

Legend

- Stage 1
- Existing Access Road
- New Access Road
- Quarrying Sections
- Nutrient Control Pond



Figure 9 - Proposed Stage 1 Operations



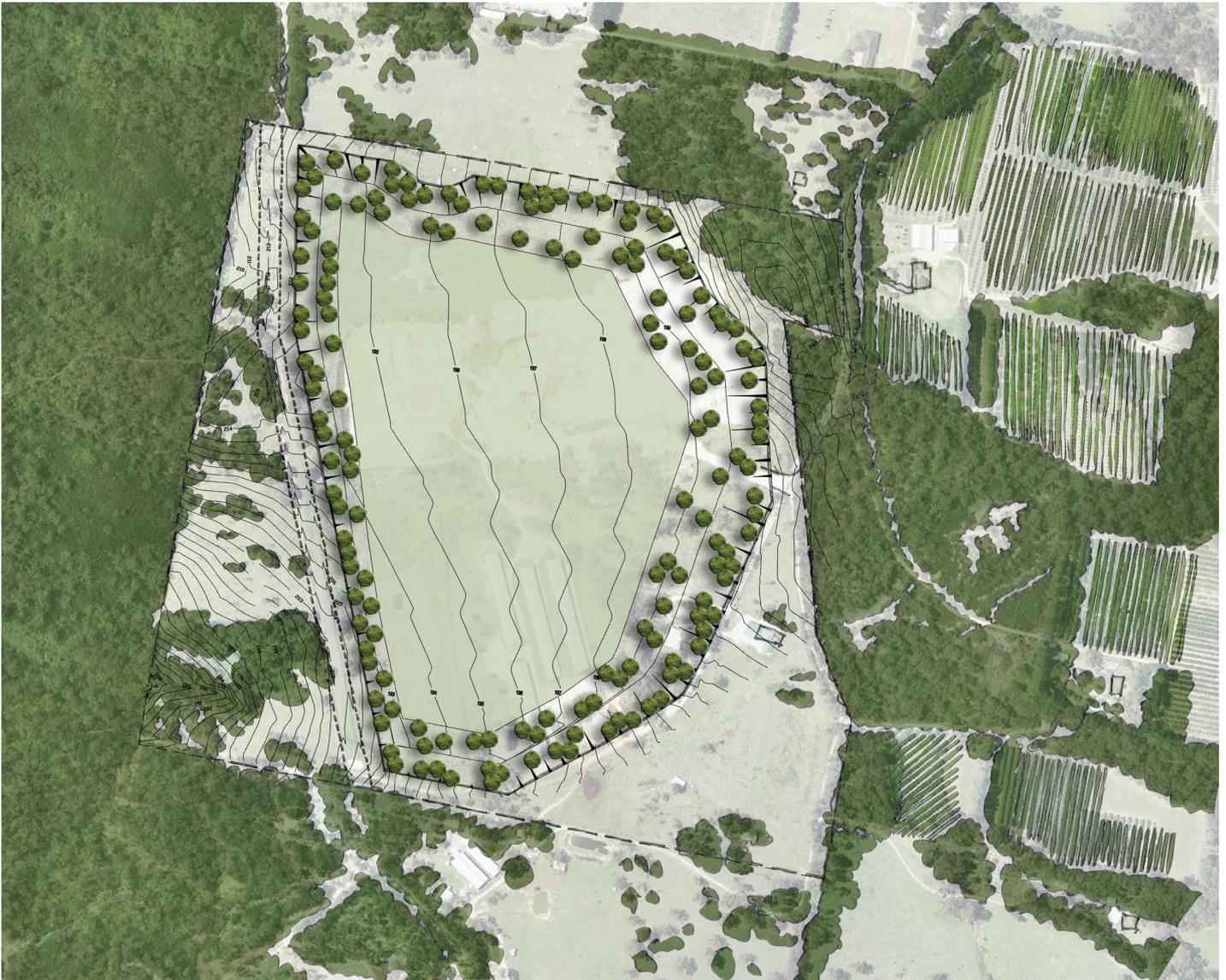
Source : Stephen Thorne and Associates Pty Ltd and JP Environmental

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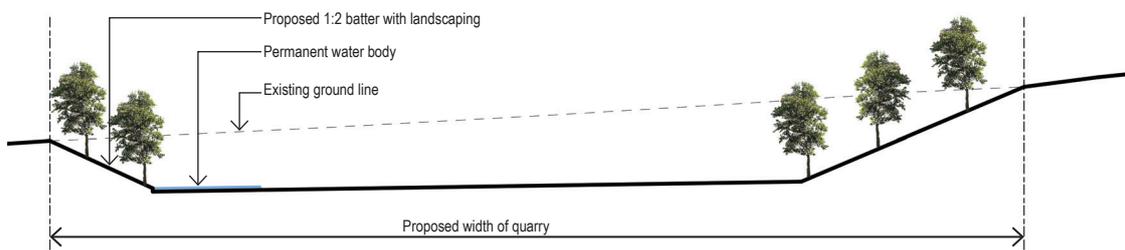
- Stage 2
- Existing Access Road
- New Access Road
- Quarrying Sections
- Nutrient Control Pond



Figure 10 - Proposed Stage 2 Operations



Plan of Indicative Rehabilitation



Cross Section of Indicative Rehabilitation

Source : Stephen Thorne and Associates Pty Ltd



Figure 11 - Indicative Rehabilitation Plan

7.0 PLANNING CONSIDERATIONS

7.1 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act, 1997* relates to pollution management and waste disposal in NSW. It establishes the licensing of certain activities. A licence is required for the quarry as extractive industry is listed under Schedule 1 of the Act. The current quarry has a licence as required. The licence will be required to be updated to include the expansion of the quarry operations.

7.2 Central Coast Regional Strategy

The Central Coast Regional Strategy identifies creation of job opportunities as a major objective. The Strategy proposes the creation of over 45,000 new jobs between 2006 and 2031 to ensure a robust and adaptable economy. It states that the region's resource base attracting investment in agriculture, fisheries, forestry, minerals/mining and energy sectors is one of the drivers for employment growth on the Central Coast. The Grants Road Sand Quarry currently has five (5) employees and provides indirect employment such as truck drivers of the sand product.

It also states that rural and resource lands are an important element of the Central Coast environment. These lands contribute to employment, tourism, cultural and regional identity, character, biodiversity and catchment protection. The Central Coast contributes significant extractive resources such as coal, clay for brick and tile manufacture, construction sand and sandstone.

The Central Coast Strategy identifies that a large resource of friable sandstone occurs on the Somersby Plateau. The Somersby Plateau is a major source of fine to medium grain sand for the Sydney Regional and Central Coast areas. The Grants Road Sand Quarry currently assists in providing this resource, however the resource subject to the current development approval is now limited. The proposal subject to this Environmental Assessment will allow the further production of sand and sandstone and continue to contribute to the economic environment providing employment and a valuable resource where the infrastructure and monitoring systems are already in place.

7.3 State Environmental Planning Policies

7.3.1 State Environmental Planning Policy (Major Development) 2005

In accordance with clause 2A of the Major Development SEPP, the project is a transitional Part 3A project as it is identified in Schedule 6A of the Environmental Planning & Assessment Act 1979 (EP&A Act). Clause 2 of Schedule 6A of the EP&A Act states transitional Part 3A projects include 'a project for which environmental assessment requirements for approval to carry out the project, or for approval of a concept plan for the project, were last notified or adopted within 2 years before the relevant Part 3A repeal date (unless the environmental assessment is not duly submitted within 2 years after the repeal of Part 3A or such further period or periods as the Director-General may allow by notice in writing to the proponent)'. The Director General's Requirements were issued within this timeframe. The Department of Planning & Infrastructure has requested the Environmental Assessment to be lodged by 30 August 2012.

7.3.2 State Environmental Planning Policy No 44 – Koala Habitat Assessment

An assessment for the activity of Koalas on the subject site was carried out as part of the Flora and Fauna Assessment by Conacher Environmental (refer Section 9.3) in accordance with State Environmental Planning Policy No 44 – Koala Habitat Assessment (SEPP 44). The assessment included:

- Identification of records of Koalas on the Atlas of NSW Wildlife (NPWS 2011);
- Inspection of any Koala food trees on the site for signs of Koala presence;
- Spotlight surveys; and
- Identification and assessment of the density of Koala food tree across the site.

Two Koala tree species are present on the site and both species constitute more than 15% of the total number of trees. Therefore, the subject site is considered to form potential koala habitat as defined by SEPP 44. However, no Koalas or Koala scats were located on the site and therefore the subject site is considered to not form core Koala habitat as defined by SEPP 44.

7.3.3 State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The aims of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 are:

- (a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and*
- (b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and*
- (c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.*

Extractive industry is permissible in accordance with clause 7(3) of the SEPP. The matters for consideration for development applications for extractive industry under the SEPP are addressed in the following table.

Table 8 – Matters for Consideration under the SEPP (Mining, Petroleum Production and Extractive Industries)

Criteria	Comments
Clause 12	
Compatibility of proposed mine, petroleum production or extractive industry with other land uses	
(a) consider:	Surrounding land uses include rural industry including sand quarries, chicken sheds, orchards, horse agistment and animal grazing.
(i) the existing uses and approved uses of land in the vicinity of the development, and	
(ii) whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and	The quarry is an existing use. The monitoring of the existing quarry operations has shown that there has not been a significant impact on the surrounding land uses. Monitoring will continue for the quarry extension.
(iii) any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and	The Grants Road Sand Quarry is an existing use and has been in operation since 2002. As stated above, a monitoring system is in place to determine and rectify any impacts on other land uses within the area.
(b) evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a) (i) and (ii), and	The site has been operating since 2002 without significant impact on the surrounding land uses. Further, the infrastructure for the sand quarry is already in place and therefore appropriate for the expansion of the existing quarry.

(c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii).	The existing monitoring evaluates any impact on adjoining land uses. Monitoring will continue for the proposed quarry expansion. Additional monitoring and measures are also proposed for the quarry expansion to reduce impacts.
Clause 14 Natural resource management and environmental management	
(1) the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following: (a) that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,	Groundwater and Surface Water Impact Assessments have been undertaken. Refer Sections 9.1 and 9.2 for further information. Mitigation measures are proposed to minimise impacts. Further, specific monitoring is also proposed during the life of the quarry to minimise surface water and groundwater impacts.
(b) that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,	A Flora and Fauna Assessment has been undertaken. It concludes that the proposed development is not likely to result in a significant effect on any threatened species, endangered ecological community or their habitats. Refer Section 9.3 for further information.
(c) that greenhouse gas emissions are minimised to the greatest extent practicable.	An assessment of greenhouse gas emissions has been undertaken. It concludes that there is not likely to be any measureable environmental effect due to the emissions of greenhouse gases from the project. Refer to Section 9.5.3 for further information.
(2) Without limiting subclause (1), the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programs or guidelines concerning greenhouse gas emissions.	As outlined above.
Clause 15 Resource recovery	
(1) The consent authority must consider the efficiency or otherwise of the development in terms of resource recovery.	<p>The assessment of the sandstone resource present on the site consisted of surface geological mapping, two exploration drilling campaigns, assessment of the existing quarry exposures, production statistics and chemical and physical laboratory testing.</p> <p>The product to be extracted will include dimension stone or retaining rock and unwashed and washed sand products.</p> <p>Topsoil is stockpiled and/or used for acoustic earth mounds. These stockpiles will assist in reducing noise and visual impact. The topsoil will then be reused in the rehabilitation of the quarry site.</p> <p>Currently, fine residues are removed during the sand washing process and collected and channeled to a series of ponds. These fine residues are then stockpiled and will be also used for rehabilitation of the site. The retained clean water in the lower ponds is recycled back to the washing plant as required.</p>
(2) The consent authority must consider whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.	As outlined above, the resource is quarried to provide a range of product. Other materials used to process and wash the sand are also recycled and left over material will assist in the rehabilitation of the quarry site.

<p>(3) The consent authority may refuse to grant consent to development if it is not satisfied that the development will be carried out in such a way as to optimise the efficiency of recovery of minerals, petroleum or extractive materials and to minimise the creation of waste in association with the extraction, recovery or processing of minerals, petroleum or extractive materials.</p>	<p>The existing quarry optimises the resources by providing several different kinds of the product. Further recycling is also carried out. These operations will continue for the proposed quarry expansion.</p>
<p>Clause 16 Transport</p>	
<p>(1) Before granting consent for development for the purposes of mining or extractive industry that involves the transport of materials, the consent authority must consider whether or not the consent should be issued subject to conditions that do any one or more of the following: (a) require that some or all of the transport of materials in connection with the development is not to be by public road,</p>	<p>Transport of the material is via Grants Road. The Traffic Assessment carried out for the project concludes that the additional traffic will not impact on the public road system. Refer Section 9.6 for further information.</p>
<p>(b) limit or preclude truck movements, in connection with the development, that occur on roads in residential areas or on roads near to schools,</p>	<p>The Traffic Assessment concludes that the quarry expansion will only result in one additional trip north and south in the peak traffic period. Whilst most trips will be to the south, it may be likely that one additional trip will be north, however this will not adversely affect the Somersby Public School.</p>
<p>(c) require the preparation and implementation, in relation to the development, of a code of conduct relating to the transport of materials on public roads.</p>	<p>The existing quarry currently has in place a procedure for the transportation of the materials including exiting the site via a wheel wash and all loads to be covered prior to leaving the site.</p>
<p>(2) If the consent authority considers that the development involves the transport of materials on a public road, the consent authority must, within 7 days after receiving the development application, provide a copy of the application to: (a) each roads authority for the road, and</p>	<p>Consultation has been sought with NSW Roads & Maritime Services and Gosford City Council. The Environmental Assessment will also be provided to both agencies.</p>
<p>(b) the Roads and Traffic Authority (if it is not a roads authority for the road).</p>	<p>As outlined above.</p>
<p>Clause 17 Rehabilitation</p>	
<p>(1) The consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development.</p>	<p>An indicative plan of rehabilitation has been prepared for the site.</p>
<p>(2) In particular, the consent authority must consider whether conditions of the consent should: (a) require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or</p>	<p>Potential end land uses will be in accordance with permissible uses as required by Gosford Council.</p>
<p>(b) require waste generated by the development or the rehabilitation to be dealt with appropriately, or</p>	<p>It is proposed that most earth material will be recycled and used for the rehabilitation of the site. A waste management plan will be prepared for any demolition of structures or materials that cannot be used in the rehabilitation of the site.</p>
<p>(c) require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under section 145C of the Act and the <i>Contaminated Land Management Act 1997</i>), or</p>	<p>It is not anticipated that soil will be contaminated from the proposal.</p>
<p>(d) require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.</p>	<p>It is proposed that the quarry sides will be reshaped to form 1:2 batters with landscaping. The quarry will also be fenced for public safety.</p>

7.3.4 Sydney Regional Environmental Plan No 8 – Central Coast Plateau Areas

The general aims of this plan are:

- (a) to provide for the environmental protection of the Central Coast plateau areas and to provide a basis for evaluating competing land uses,*
- (b) to encourage the use of land having a high agricultural capability for that purpose and, as much as possible, to direct development for non-agricultural purposes to land of lesser agricultural capability,*
- (c) (Repealed)*
- (d) to protect regionally significant mining resources and extractive materials from sterilization,*
- (e) to enable development for the purposes of extractive industries in specified locations,*
- (f) (Repealed)*
- (g) to protect the natural ecosystems of the region, and*
- (h) to maintain opportunities for wildlife movement across the region, and*
- (i) to discourage the preparation of draft local environmental plans designed to permit rural residential development, and*
- (j) to encourage the preparation of draft local environmental plans based on merits.*

The specialist studies undertaken as part of this Environmental Assessment and further discussed in Section 9.0 and the current monitoring identifies that the quarry is operating with little impact on the surrounding land uses. The existing monitoring along with additional monitoring and mitigation measures are proposed for the expansion to the existing quarry operations to minimise any conflicts.

Buffers have been incorporated around the proposed quarry with a minimum of a 20m buffer along part of the northern and southern boundaries. Retention of a buffer knoll in the north eastern corner supporting approximately 2ha of bushland regrowth is also proposed. Land west of the water supply easement and in the south eastern corner of the site will not be quarried. Further, acoustic earth mounds will also be used in the south and south eastern areas of the quarry to reduce noise impacts.

The quarry will be rehabilitated after the resource has been extracted.

7.3.5 Sydney Regional Environmental Plan (SREP) 9 – Extractive Industry (no 2 – 1985)

This plan aims:

- (a) to facilitate the development of extractive resources in proximity to the population of the Sydney Metropolitan Area by identifying land which contains extractive material of regional significance, and*
- (b) to permit, with the consent of the council, development for the purpose of extractive industries on land described in Schedule 1 or 2, and*
- (c) to ensure consideration is given to the impact of encroaching development on the ability of extractive industries to realise their full potential, and*
- (d) to promote the carrying out of development for the purpose of extractive industries in an environmentally acceptable manner, and*
- (e) to prohibit development for the purpose of extractive industry on the land described in Schedule 3 in the Macdonald, Colo, Hawkesbury and Nepean Rivers, being land which is environmentally sensitive.*

The Draft Report *Supply and Demand of Construction and Industrial Sand for the Sydney Market* prepared by the then Department of Infrastructure, Planning and Natural Resources in 2004 identified that key sources of sand for the Sydney construction market are expected to be exhausted within the next 10 years and that there is a shortage of industrial sand for the manufacture of glass. Construction materials including sand are an essential natural resource for the construction industry.

The report identifies that large resources of friable fine-medium grained sandstone occur on the Somersby Plateau, including the Calga area. The Somersby Plateau is a major source of fine to medium-grained sand for northern Sydney and the Central Coast.

Somersby has future potential as the total sand resources are considered to be much larger, as the area covered by friable sandstone is approximately 300 km², although it would be unrealistic to consider that all would be suitable for extraction. However, the report identifies that the potential for large-scale development of this resource is constrained by a variety of factors including:

- The highly fragmented nature of existing land ownership.
- Growth of rural-residential development.
- Conflicts with land described as prime agricultural land identified in SREP 8.
- The proximity of national parks.
- The high clay content of the sand, making tailings management a key issue.
- The growth in demand in the Central Coast region, which will leave little excess capacity for supplying Sydney.
- Unsuitable local road network.

As the deposits of sand are large, situated relatively close to the centre of the region and along, or close to, a major transport corridor, the report states that Somersby has the potential to supply a large proportion of the future sand demand in the region. However, the future of the Somersby Plateau as a long-term sand resource for Sydney would be dependent upon satisfactory management of the above issues.

The extension of the Grants Road Sand Quarry provides an opportunity for the additional supply of construction sand and sandstone. It is an existing quarry where monitoring has shown that it has not had a significant impact on the surrounding land uses. The site is in one ownership and is in close proximity to the major road network with good access to the Central Coast and the Sydney and Newcastle markets.

7.4 Gosford City Council Interim Development Order No 122

The subject site is zoned 1(a) Rural (Agriculture) under the Gosford City Council Interim Development Order No 122. Extractive Industry is permissible development with consent. The objectives of the 1(a) zone are:

- to identify and provide suitable land for agricultural use; and*
- to protect the agricultural potential of land identified as suitable for agricultural use; and*
- to prevent the fragmentation of prime agricultural land; and*
- to enable uses which are complementary to, and compatible with, the use of land for agriculture; and*
- to protect the rural landscape quality of the area; and*
- to protect water catchments, water quality, soil conditions, and important eco-systems such as streams, estuaries, and wetlands, from inappropriate development and land management practices.*

An existing quarry of 2 hectares in area has been approved on the site and has been in operation since 2002. The land has not been used extensively for agricultural land uses in the past. Currently, apart from the quarry operations, chicken sheds are also located on the site. Poultry will continue to be raised on the site until the quarrying of precinct F or sooner if the industry is not viable. Grazing of cattle has previously been undertaken on the site.

The specialist studies undertaken as part of this Environmental Assessment and further discussed in Section 9.0 and the monitoring regime identifies that the quarry is operating with little impact on the surrounding land uses. The existing monitoring along with additional monitoring is proposed for the expansion to the existing quarry operations. This will continue to monitor any impacts on the surrounding land uses. Mitigation measures are also proposed for some scenarios for the proposed quarry expansion, which will also reduce any potential land use conflicts.

The rural landscape quality of the area is also protected due to the topography and the existing vegetation located on and off site including roadside vegetation, which screens the quarry from many areas.

7.5 Draft Gosford Local Environmental Plan 2009

The Draft Gosford Local Environmental Plan 2009 was publicly exhibited from March 2010 to 5 May 2010. Council received over 1,500 submissions in relation to its draft LEP. The Department of Planning required Council to undertake further strategic investigations before the plan was returned to the Department of Planning. Council further considered the draft LEP in May 2011. The draft LEP has not been adopted to date.

Gosford Council has previously stated that its draft LEP is not imminent. The relevant clauses of the exhibited draft LEP are addressed for this proposal.

The draft LEP proposes to zone the subject site RU1 Primary Production. Extractive Industries are permissible with consent in the proposed RU1 zone. The objectives of the RU1 Primary Production zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within the zone and within adjoining zones.*
- *To ensure development is compatible with the desired future character of the area covered by this zone.*
- *To protect biodiversity, water catchments, water quality, soil conditions and important ecosystems such as streams (and associated riparian areas), sedgeland, estuaries and wetlands from inappropriate development and land management practices.*
- *To ensure the plateau remains free from landuses that may sterilize sustainable primary production and natural resource use and minimise potential incompatible landuses.*

A valuable natural resource will continue to be provided with the proposed extension of the quarry. The mitigation measures proposed will assist in minimising potential land conflicts and assists in protecting the environment.

7.6 Gosford Development Control Plan

Gosford Development Control Plan Chapter No 89 Scenic Quality

The objectives of the Development Control Plan are:

- i to provide a detailed assessment of Gosford's landscape character, which highlights the diversity between and within landscape units;*
- ii to detail the components of that landscape character;*
- iii to provide a comparative ranking of the landscapes; and*
- iv to develop appropriate guidelines for the management of the landscape character.*

The site is identified as part of the Geographic Unit: Plateau under DCP Chapter 89. The landscape character in the area near the site identified in the DCP consists of gently rolling plateau landscapes on moderately fertile sandy loam soils derived from shale and sandstone, which is mainly cleared of vegetation for agriculture. The main scenic conservation issues in relation to extractive industries in this Unit is that extraction sites are prominent in the area and frequently have extensive impacts because of their ridge top locations and lack of screening. The DCP provides development objectives for extractive industry as follows:

- Particular attention be paid to visual screening in the determination of development applications for extractive industries.
- Recognise importance of wind row tree planting, natural forest verges and remnant native forest stands to the landscape character of the agricultural areas and retain wherever possible particularly when viewed from major roads in area.

The Grants Road Sand Quarry is visually screened from the surrounding area due to topography and vegetation located along road edges and property boundaries. The Grants Road Sand Quarry is bounded by the Brisbane Water National Park to the west and the Howes Aboriginal Reserve to the east. Both are largely vegetated providing further screening of the quarry site. The visual impact of the expanded quarry site is considered low, however visual screening in the form of vegetated earth mounds is also proposed as part of the mitigation measures for visual impact. This is further discussed in Section 9.8.

7.7 Gosford Draft Development Control Plan 2009

The Gosford Draft Development Control Plan 2009 has introduced existing and the desired character for the Somersby area. It identifies that the existing character as follows.

Flanking major tourist routes as well as local roads, these areas were substantially cleared of their original vegetation to accommodate a variety of rural activities that originally included traditional horticulture and livestocking.

Situated upon gentle to moderate slopes, these areas are part of larger private land holdings which also include areas of bushland located on steeper slopes that are not suitable for agricultural uses.

Along the boundaries of many properties and paddock fencelines, narrow rows of bushland remnants contribute to the distinctive rural character of these areas. These remnants include tall trees as well as clusters of scenically-distinctive gymea lilies. However, some properties are no longer actively managed for agriculture, and their scenic landscape character has begun to deteriorate as cleared paddocks are overrun by environmental weeds.

Over recent years, many properties have been converted to capital-intensive uses such as shedbased poultry farms, hot-house flower growing, mineral water-wells and large rural dwellings. The traditional rural character of some open landscapes is being transformed by large sheds and elaborate front fences that are associated with these new uses. In addition to these uses, there is considerable interest in tourist-related developments which currently are not a permissible landuse, and there remains the possibility that State Government planning policies will permit future development of quarries.

Typically, dwellings in these areas are not visually or scenically intrusive. Although buildings vary widely in size and style from mid-Twentieth Century timber-framed cottages to large one and two storey brick houses, they tend to be sited well back from road frontages, or are screened by substantial bands of bushland remnants or by planted front gardens.

Quarrying of hard rock and sands occurs on a number of former agricultural properties according to state government planning policies and regulations. Visual effects of these intensive developments appear to be associated with impacts upon the natural environment.

Part of the desired character for the Somersby plateau in relation to extractive industry is as follows.

These areas should remain productive rural landscapes that accommodate broad-hectare agricultural or livestock activities, together with a scattering of residential and small-scale tourist activities that do not interfere with the preferred primary-productive uses. Future development and land management, including major developments such as extractive industries, should not compromise scenically-distinctive qualities of backdrops to Gosford City's major tourist routes. Conserve scenic qualities and habitat values by retaining natural slopes and visible rock outcrops, as well as by preventing further fragmentation of the existing bushland canopy. Conserve existing bushland remnants that provide scenically-prominent backdrops to any road or nearby property, particularly trees that are located along road verges and frontages, as well as along the side and rear boundaries to each property. Screen any large existing structures as well as restoring the desired pattern of "green" boundaries by planting new trees that are predominantly-indigenous.

Grants Road Sand Quarry is located at the end of a Grants Road, which is a no through road. The Great North Walk adjoins part of the north western boundary of the site. The Great North Walk identifies quarries and sand depots in this area as a point of interest for the walkers. However, mitigation measures are proposed that will minimise the visual impact of the quarry including locating vegetated earth mounds along the quarry boundaries. Refer Section 9.8 for further information.

8.0 CONSULTATION

The following Government agencies were consulted in the preparation of this Environmental Assessment as requested under the DG’s Requirements:

- Department of Environment, Climate Change and Water;
- NSW Industry & Investment;
- NSW Office of Water;
- Roads and Traffic Authority; and
- Gosford City Council

The following table outlines the additional matters raised by the agencies and the chapter that addresses the matters in this Environmental Assessment. The submissions received from the agencies are included in Appendix 5.

Table 9 – Additional Matters from Agencies

Issues	Chapter of Environmental Assessment and comments
<i>Soil, water, biodiversity, noise and air quality. An environmental monitoring and reporting schedule should be included to ensure any adverse impacts and compliance with required standards are adhered to, and if necessary, actions to be taken if problems are identified during the life of the Quarry</i>	Section 9.0 Key Assessment Requirements and Section 10.0 Draft Statement of Commitments.
<p><i>Transport. The current standard of Grants Road up to and including the intersection with Wisemans Ferry Road and the capacity to deal with the additional traffic for the life of the Quarry.</i></p> <p><i>A dilapidation report of the condition of Grants Road between the site and Wisemans Ferry Road.</i></p>	<p>The Traffic Assessment outlined in Section 9.6 concludes that Grants Road is suitable for the proposed additional truck movements for the expansion to the quarry. Therefore, a dilapidation report for Grants Road should not be required.</p> <p>It should also be noted that truck movements also occur along Grants Road to Wisemans Ferry Road from the Hanson’s Quarry.</p>
<i>Impact/displacement on agricultural land use on the site and in the locality.</i>	Sections 7.3.3, 7.3.4 and 7.3.5.
<i>A plan showing all dwelling-houses, schools, etc and land used within at least a one kilometre radius of the site.</i>	Refer Figure 7
<i>The cumulative impact of this proposal with the proposal to expand/intensity the nearby Quarry in Reservoir Road (Refer DG requirements MP08-0173 dated 22 October 2008 for Central Coast Sands)</i>	The various studies and the EA has addressed the expansion of the Hanson’s Quarry. However, it should be noted that the proposed Hanson’s Quarry expansion does not intensify the quarry operations on a day to day basis but increases the quarry life.
<i>The provisions of the draft Gosford LEP 2009</i>	Refer Section 7.0
<i>Risk assessment to include bushfire risk/bushfire prone land.</i>	Refer Section 9.9 and Appendix 14.
<i>Impact on the Great North Walk, which is located near the site.</i>	Refer Section 9.8 and Appendix 13.
Mineral Resource Issues – The EA to address the size and quality of the resource. Assessment of the resource.	Refer Section 6.0 and Appendix 4.
Agricultural Issues – The EA should address groundwater impacts particularly in relation to poultry farms and horticulture in the locality.	Refer Section 9.1 and Appendix 6.
Rehabilitation options for the site should aim to provide an asset for sustainable agricultural development.	Refer Section 6.8.
Fisheries Issues – Management of stormwater should be carefully considered to minimise any negative impacts on the surrounding environment	Refer Section 9.2 and Appendix 7.

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Community consultation was also undertaken with Aboriginal groups in accordance with the then Department of Environment & Climate Change's community consultation guidelines by Insite Heritage. This involved notification in writing to Gosford City Council, DECC, the Registrar of Aboriginal Owners, Darkinjung Local Aboriginal Land Council and Native Title as part of the archaeological assessment. The project was advertised in the Central Coast Express Advocate on 29 September 2007. The following groups registered their interest in the project:

- Darkinjung Local Aboriginal Land Council
- Guringai Tribal Link
- Darkinyung Language Group

Field investigations for the archaeological assessment were also undertaken with the Aboriginal groups. The archaeological assessment is further discussed in Section 9.7.

Ongoing consultation has occurred between the quarry operators, land owners and the adjoining landowners.

9.0 KEY ASSESSMENT REQUIREMENTS

Specialist investigations have been undertaken to address the key issues identified in the DG's Requirements and are addressed below.

9.1 Ground Water

A Groundwater Impact Assessment has been prepared by Larry Cook & Associates Pty Ltd and is attached in Appendix 6. This also includes a Groundwater Modelling Study undertaken by Coffey Geotechnics Pty Ltd and is included as an appendix to the Groundwater Impact Assessment. The aims of the modelling study were to:

- Assess the amount of future groundwater drawdown at neighbouring groundwater bores and groundwater dependent ecosystems due to expansion of sand quarrying operations;
- Assess future groundwater inflows to the pit; and
- Assess the post-quarrying groundwater regime and long-term impacts.

The site is located within the Water Sharing Plan for the Kulnura Mangrove Mountain Groundwater Sources and is located in Zone 8 – Mooney Mooney and Mullet Creeks. The current operations on the site has an annual entitlement of 18ML/year comprising 14ML for industrial purposes and 4ML for stock and domestic purposes.

Two springs are located on the Site. The first water feature appears to be a shallow, low-flow likely 'perched' spring located in the northern central part coincident with a flat sheet-like sandstone outcrop. The second is an intermittent low-flow discharge in the southern central part of the site at the head of an amphitheatre like feature. Site observations reveal that any runoff and/or shallow groundwater discharge in the south-western part of the site is directed into this low area, through the southwest corner of the site and into a westerly-flowing tributary of Mooney Mooney Creek.

The importance of spring systems is that they can support Groundwater Dependent Ecosystems, which are often established at these groundwater discharge points and commonly referred to as 'hanging swamps'.

There are two registered production bores located on the site. Bore GW101915 is located in the south-western corner of the property and GW 49244 located in the south-eastern area of the site. The bores were drilled to depths of between 38.1 and 61.0 m. The main use of the groundwater is stock and domestic with one of these bores also licensed for industrial purposes (GW101915).

There are a total of nine groundwater bores located on the site and three off site registered groundwater bores that are used for water supply. Baseline measurements of water levels have been and continue to be collected.

In summary, the hydrographs for the nine onsite monitoring bores reveal a generally small fall in the piezometric surface (water level) from the commencement of monitoring in July 2008 through to about May 2010. A rise in water levels is noted in mid 2010 followed by a general fall, which was still observed during the last monitoring round in February 2011. An increase in the water level is noted between about February 2011 and May 2011, which correlates with increased frequency and intensity of rainfall events due to the then active 'La Nina' conditions. The increased water levels recorded between about mid November 2011 and the end of March 2012 again correlate with frequent and intense rainfall events. Water levels collected in July 2010 from the monitoring bores were used for input into the computer groundwater model.

The direction of groundwater flow beneath the site is interpreted to generally mimic the local topography. That is, the direction of groundwater flow is to the south-west towards the Mooney Mooney Creek valley system.

The hydraulic gradient is often described as the driving force for groundwater flow. It is essentially the difference in hydraulic head between two points, which implies a hydraulic gradient where the gradient is along the direction of the lower head and the gradient direction indicates the potential for groundwater to flow in that direction. The hydraulic gradient beneath the site, based on the water level measurements collected in July 2010, is interpreted to be between approximately 1 in 20 (5%) and 1 in 8 (12%). The steeper gradient appears to be associated with the edge of the escarpment of the Mooney Mooney Creek valley system. This observation is consistent with groundwater flow behaviour predicted in close proximity to steeply dissected topography.

Aquifer testing was also undertaken to provide representative estimates of sandstone permeability beneath the project site for the groundwater modelling.

Baseline groundwater sampling and water quality testing was carried out to establish a baseline set of water quality data for the sandstone aquifer system. Test results show that:

- The pH measurements of the groundwater samples measured in the laboratory are all similar. The measurements indicate that the groundwater is acidic which may be associated with the generation of carbonic acid. This likely reflects the proximity of the sandstone-hosted aquifers in the Mangrove Mountain area to the coastal climate.
- The groundwater in all bores has a low salinity.
- Concentrations of ammonia were generally less than the limit of detection.
- Concentrations of other cations (Ca, K and Mg) were unremarkable. The relatively low levels of calcium and magnesium suggest that the groundwater is 'soft'.
- Sulphate concentrations were generally low.
- Low levels of bicarbonate were recorded in all bores.
- Low concentrations of nitrate were recorded in the majority of monitoring bores.
- Concentrations of phosphate were generally less than the limit of detection.
- Concentrations of total phosphorus were generally less than the limit of detection.
- Dissolved iron was detected at trace levels in the majority of samples.
- Trace concentrations of copper, lead and zinc were recorded in the majority of samples. All other metal concentrations with the exception of dissolved iron, manganese and one low concentration of aluminium were less than the Method Detection Limit (MDL).

The Groundwater modelling identifies impacts associated with the existing sand extraction operations and the proposed quarry expansion on the sandstone-hosted groundwater system beneath the site and surrounding area.

According to the model, the flow budgets for the current (existing) case and the proposed quarry extension indicate the following:

- Based on volumes for the proposed extension, the increase in groundwater inflow into the pit is balanced by a reduction in groundwater flow to drainage channels and the decrease in evapotranspiration, which results in approximately 50 % of the volume lost from the groundwater system.
- Compared to the current case, the flow budget results for the proposed extension show that evapotranspiration for the wetland area west of the site decreases by approximately 50 %, evapotranspiration for the rest of the area decreases by 13 % and flow to drainage channels decreases by 4 %.

The groundwater model assessed inflows into the final pit void indicated that it is less than the evaporation potential and the water level in the void will be dependent on rainfall. Ponding of water may occur at the base of the pit during high rainfall events and subsequent evaporation processes would dry shallow ponded areas.

The results of the simulations undertaken in the groundwater model indicate the following:

- The drawdown radius of influence extends approximately 1km from the site. Maximum groundwater drawdown for the proposed quarry extension is 22 m.
- Maximum drawdown for the wetland area closest to the western site boundary is approximately 10m.
- Maximum drawdown for the quarry base (193 m AHD) is predicted to be 10 m.
- Maximum drawdown for the quarry base at the closest neighbouring production bore 50 m to the south (Brenda's bore GW056451) is predicted to be 8 m.
- Compared to the current case, the proposed quarry expansion flow budget results show that evapotranspiration for the wetland area west of the site decreases by approximately 50%, evapotranspiration for the rest of the area decreases by 13 % and flow to drainage channels decreases by 4 %.
- The assessed inflows into the final pit void are less than the evaporation potential and the water level in the void will be dependent on rainfall. Ponding of water may occur at the base of the pit during high rainfall events and subsequent evaporation processes would dry shallow ponded areas.

In the long term, the direction of the groundwater flow will still be to the south-west and the current recharge behaviour into the surrounding non-quarried areas will remain the same. The maximum drawdown for two neighbouring bores is predicted to be approximately 8 and 9 m. However, the proposed quarry extension is not predicted to impact on the chemistry of the groundwater quality of any neighbouring bore.

A Groundwater Management Plan is proposed, which incorporates the development of a water level and water quality monitoring program and the development of a set of trigger levels and mitigation measures if adverse impacts occur on the environmental and/or neighbouring water users. This would be incorporated into the Environmental Management Plan. The Groundwater Management Plan incorporates:

- All water level data and any groundwater quality monitoring results to be recorded, collated and reported in-house on a six-monthly basis for the first 12 months then on an annual basis. The data should be reviewed by the consulting hydrogeologist. The aim is to assess any changes in water levels or groundwater chemistry and identify reasons for the changes if they occur. The monitoring schedule should be reviewed annually and changed if deemed appropriate by the hydrogeologist.
- Annual review of the results of the statistical analysis of monitoring data in order to detect any imminent or occurring impacts.
- A complete set of results of the production and monitoring program including a review and assessment of the statistical analysis should be reported to the *Senior Hydrogeologist NOW* on an annual basis. The report should include but not necessarily be limited to:
 - A progressive record of the water level measurements in the monitoring bores
 - A figure showing the locations of the monitoring bore network
 - A set of hydrographs
 - Rainfall data correlations
 - Progressive assessment of any trends in water level fluctuations
 - Analytical results and progressive assessment of any trends in geochemistry
 - Progressive assessment of any statistical trends (impacts)
 - Conclusions and recommendations

The current water entitlement for the property is 18 ML. It is estimated that groundwater licenses may need to be increased to 35 ML/year for industrial use. Therefore, an additional 21 ML is required.

9.2 Surface Water

A Surface Water Impact Assessment and Management Study has been prepared by JP Environmental and is attached in Appendix 7.

The existing quarry operation operates under a closed system approach for water management. Water accumulating in the current quarry excavation is pumped into a sediment dam and then taken from the decant pond for use in the washing process and dust suppression. Fines extracted in the washing process are pumped to a series of primary silt ponds / tailings dams which cascade to a final tailings dam. Sediment free water is recovered from the final tailings dam and decant pond and re-used in the wash plant.

All disturbed area/quarry pit runoff and process water is retained onsite and no contaminated runoff is released from the site.

The decant or return water pond is sized such that it can contain a 1:100ARI_{24hr} storm event. Only under periods of prolonged, heavy rainfall it is possible that discharge could occur, however as quarrying progresses and the pit depends, discharge will be back into the quarry pit. This system ensures that no contaminated runoff can leave the site without adequate retention or treatment if required. Environmental protection is currently achieved through 'in pit' retention designed to accommodate run-off from a 1:10ARI_{1hr} storm followed by a 1:100ARI_{24hr} storm all within a 24 hour period.

Diversion drains located on the eastern perimeters of the site divert any clean run off water around the northern and southern sides of the operational areas and offsite towards the west.

The same system for 'in pit' water management is proposed to be carried forward into the expanded operation. The expansion of the quarry would continue under a similar approach including:

- Containment of in-pit flows of a 1:100ARI_{24hr} storm event;
- Sand washing;
- Bunding;
- Diversion drains;
- Silt and tailings dams;
- Decant / return water pond;
- Storage of 'in pit' rainfall runoff; and
- Pumps and transfer lines (washplant, wash-down, dust suppression).

A new 'out of pit' dam is also proposed to provide water supply security and nutrient control as its core function in the south-west corner of the property and will consist of:

- A 10ML capacity dam to capture polluted runoff in addition to containment of a 1:20ARI_{24hr} storm event;
- Pump and transfer pipeline line into the quarry for operational water security;
- Polishing ponds; and
- Bunding and surface water diversion drains.

A water balance model was developed for the proposed quarry extension. It is based on the following parameters:

- The proposed staging of the quarry.
- Bunding will be developed progressively around the quarry.
- Offsite drainage/flow paths down the western boundary of the property were changed with the installation of the pipeline trench and bund by Council many years ago.
- 'Clean' water catchment diversion structures are required down the north, east and south-east boundaries and directly off site.

Clean surface water diverted across the northern section of the site will not be impacted by the quarry operation. This water can be directed off site to maximise 'normal' environmental flows using offsite drainage paths on the western property boundary.

The southern catchment is broken up into 2 classes, contaminated and clean. Runoff originating from zones F and G on which residences, chicken growing operations and sheds are located is classed contaminated and characterised by elevated nitrogen and phosphorus levels. This runoff is to be intercepted by drains and channels and directed into the pollution control dam and polishing ponds. Drainage structures between unmined areas of zoned F and G and the rest of the quarry are required to direct runoff and prevent pit flooding.

All other runoff from the remainder of the south catchment not impacted by mining is classed as clean. This water will be directed offsite via existing natural flow paths to maximise normal environmental flows along the western property boundary.

The surface water modelling concludes that the proposed extended quarry operations managed in accordance with the existing environmental management measures and the construction of the 10ML pollution control dam that the quarry would never be without sufficient water to sustain day to day operational demand. Further, the current environmental management and mitigation measures undertaken for the current quarry operations appear to be enabling a high standard of environmental management. Current monitoring results generally demonstrate an improvement in water quality since the commencement of monitoring.

The objectives of the current water management system are to:

- Minimise erosion and sedimentation of undisturbed areas, watercourses and water bodies;
- Maximise returns/natural flow of clean waters (undisturbed by the quarry operation) to the environment;
- Optimise the system for water security focusing upon surface / rainfall runoff;
- Minimise dependence on other water sources such as groundwater bores and creeks as permitted under existing Water Access Licences;
- Minimise the loss of topsoil through pre-stripping and reuse in the construction of bunding to control noise, visual amenity, surface water and public safety; and
- Protect surface and ground water quality and comply with statutory requirements and conditions.

The Surface Water Impact Assessment recommends the following to be undertaken as part of the extension to the quarry operations to ensure minimal impact to the surrounding environment:

1. Construct earthen bunding and surface water diversion banks and drains around the perimeter of the entire quarry pit void. Bunding and/or diversion drains will require ongoing minor realignments as the quarry pit develops and advances especially through zone 'C'.

Bunding can be designed as 'multi-purpose' to provide additional public 'Highwall' safety in addition to surface water flow management.

2. Construct 'out of pit' containment infrastructure in the south-eastern most section of the property boundary adjacent to Zone E to capture and passively treat contaminated surface water runoff whilst simultaneously providing additional water security. Infrastructure to consist of:
 - a. One 10 Megalitres (ML) Pollution Control Dam (PC Dam) to receive nitrogen rich runoff from Zones F and G where the existing chicken and machinery sheds are located. This dam will gravity flow via a spillway into a shallow polishing pond. Control structures such as rock 'rip rap' or similar will be required to control water runoff velocity prior to entering the PC Dam.
 - b. Broad shallow polishing ponds will receive any water spilled or transferred from the PC Dam and provide passive treatment through suitable wetland plant species.

- c. Pipeline and pumps for transfer of water each way between the in-pit decant pond and out of pit PC Dam.
 - d. A floating siphon in the PC Dam to maintain a 5 ML operating level.
3. As mining progresses through zones F and G, the chicken sheds and residences will have been removed and the PC Dam and polishing pond can then be decommissioned.
4. Continuation of the current environmental management and mitigation measures for the mine expansion as the monitoring results generally demonstrate an improvement in water quality.

9.3 Biodiversity

An assessment of significance (seven part test) was carried out as part of the Flora and Fauna Assessment (Conacher Environmental Group Appendix 8) to determine whether or not the proposal will have a significant effect on threatened species, population or ecological communities or their habitats. It identified that no threatened flora species, threatened or migratory fauna species or endangered ecological communities listed within the EPBC Act (1999) were observed within the subject site.

The Flora and Fauna Assessment concludes that the proposed development is not likely to result in a significant effect on any threatened species, endangered ecological community or their habitats. A Species Impact Statement is not required for the proposed development and the proposal is not considered a proposed action that is a matter of National Environmental Significance and therefore a referral is not required to the Department of Sustainability, Environment, Water, Population and Communities.

9.3.1 Flora

Two vegetation communities are located on the site consisting of:

- Disturbed Scribbly Gum Woodland, approximately 0.7 hectares of the site; and
- Cleared land with Remnant Trees, approximately 34.6 hectares of the site.

The vegetation on the site is further described as being similar to a disturbed remnant of Map Unity E26 Exposed Hawkesbury Woodland, of which there are approximately 17195.23 hectares within the Gosford LGA.

The Disturbed Scribbly Gum Woodland occurs within the south-western section of the site. It has been disturbed by weed invasion and feral Rusa Deer, however contains some intact native vegetation.

Two threatened flora species *Hibbertia procumbens* and *Prostanthera junonis* were observed in the Brisbane Water National Park adjoining the site. Four sub-populations of *Prostanthera junonis* have been previously observed adjacent to the western boundary of the site. Ongoing monitoring of these sub-populations was required as a condition of consent for the current operations and a five yearly monitoring regime of *Prostanthera junonis* was implemented.

9.3.2 Groundwater Dependent Ecosystems

The Groundwater Impact Assessment (Appendix 6) and the Flora and Fauna Assessment (Appendix 8) has addressed Groundwater Dependent Ecosystems. It states that the following Groundwater Dependent Ecosystems are present within the immediate catchment area of the site or within 2 kilometres of the site:

- Sheltered Rough-barked Apple Forest;
- Hawkesbury Coastal Banksia Woodland; and
- Sandstone Hanging Swamps.

The approximate extent of these three Groundwater Dependent Ecosystems within the locality (5km) are:

- Sheltered Rough-barked Apple Forest – 14,500ha
- Hawkesbury Coastal Banksia Woodland – 4,100ha
- Sandstone Hanging Swamps – 258ha

As identified above, the amount of the Sheltered Rough-barked Apple Forest and the Hawkesbury Coastal Banksia Woodland is extensive and significantly larger in area than the aerial extent of predicted impacts. Although the Sandstone Hanging Swamps in the immediate area are of a relatively smaller size, these particular vegetation communities are also not unique and occur widely in the area.

The groundwater modelling identifies that the influence of groundwater drawdown extends approximately one kilometre radius from the quarry site with the area of Sandstone Hanging Swamp Wetland to the west of the site being impacted by an estimated 10 m drawdown.

The amended Groundwater Sharing Plan (2009) identifies that at least 82% of the average annual recharge is reserved for the environment, including groundwater dependent ecosystems in Zone 8 (that is, 17% is available for extraction). Therefore, the cumulative impact of the interruption to (or extraction of) groundwater to achieve sustainable environmental/biodiversity impacts is set at 1,540 ML/year for this zone with 7,467 ML reserved for environmental purposes.

The Flora and Fauna Assessment and the Groundwater Impact Assessment concludes that a significant impact on groundwater dependent ecosystems is not likely to result from the proposed development.

9.3.3 Fauna

The detailed fauna survey of the site incorporated:

- Targeted amphibian searches;
- Targeted reptile searches;
- Diurnal and nocturnal bird surveys;
- Recorded call playback for threatened amphibian, nocturnal bird and mammal species;
- Spotlighting;
- Bat echolocation call detection;
- Arboreal Elliott trapping;
- Terrestrial Elliot trapping;
- Terrestrial wire cage trapping;
- Hollow bearing tree survey;
- “Spot Assessment Technique” to determine Koala habitation; and
- Habitat searches and opportunistic observations during the completion of specific fauna surveys.

Suitable foraging and shelter habitat is provided for amphibian species within the tributary of Mooney Mooney Creek within the south-western section of the site and within the dams and detention ponds present. The hollow bearing trees and groundcover vegetation within the site also provides suitable shelter habitat for amphibian species. There is also suitable ground and arboreal foraging habitats for reptiles. Suitable shelter habitat is also available within hollow bearing trees and amongst leaf litter.

A range of habitats are present within the site for bird species, including large canopy trees which provide a flower and nectar resource, dense shrub cover and fallen timber within the Disturbed Scribbly Gum Woodland, which provides suitable shelter for small birds and ground dwelling species, and cleared areas which contain grasses for foraging. Suitable nesting habitat is also provided within the tree hollows within the site.

The site provides vegetation cover and shelter habitat within exotic grassland areas, fallen timber and debris for terrestrial mammal species. The canopy trees and shrubs within the site provide a sap and nectar resource for arboreal mammals and tree hollows observed provide potential denning sites for arboreal mammals.

Suitable foraging habitat for microchiropterran bat species is provided above the tree canopy and also within the cleared areas and gaps between vegetation. Hollows that provide suitable shelter habitat for microchiropteran bats were observed within the site.

The site is adjoined to the east by Howes Aboriginal Reserve and the Brisbane Water National Park, which both contain native vegetation similar to that present within the subject site.

A total of 228 hollow bearing trees are present on the site with 18 hollow bearing trees located within the proposed quarry area. The hollow bearing trees within or within close proximity to the proposed quarry area were subjected to a detailed assessment.

The 7 part test found that whilst 22 hectares of Cleared Land with Remnant Trees vegetation community and 18 hollow-bearing trees will be removed there are extensive areas of suitable foraging and roosting habitat for species within the local area in the Brisbane Water National Park, which adjoins the western boundary of the site. Further, it is recommended that all hollow-bearing trees are to be inspected and sectionally dismantled by an arborist, under the supervision and direction of an ecologist.

One threatened fauna species, the Little Bentwing-bat was observed within the subject site during surveys. Other species observed are considered relatively common within the local area. The Little Bentwing bat is considered to be nomadic within its range and therefore the local population comprises those individuals that are likely to occur in the study area from time to time. There are extensive areas of suitable foraging and roosting habitat for this species within the local area and the adjoining Brisbane Water National Park and therefore it is considered that the proposed development is not likely to have an adverse effect on the species.

9.4 Noise

A Noise Impact Assessment has been prepared by Atkins Acoustics and is attached in Appendix 9. The assessment included:

- Site inspections and identification of existing residential dwellings and other sensitive receiver areas;
- The measurement and review of the existing ambient background noise levels prevailing in the vicinity;
- The measurement of sound power levels;
- Determination of project specific noise assessment goals for the quarry based on the existing noise levels and the noise assessment goals documented in the *Office of Environment and Heritage Industrial Noise Policy* and the *Environmental Criteria for Road Traffic Noise*; and
- Identification and quantification of the main noise sources associated with the proposal taking into consideration the stages and the equipment to be used in the quarry operations.

Four scenarios were developed for the proposed quarry extension to take into account the staging and the type, frequency and location of the equipment. The four scenarios have been developed to represent typical worst case scenarios in the proposed extension of the quarry operations.

The noise modelling shows that there are noise exceedances predicted for a number of the assessment locations. However, these noise exceedances can be alleviated through the effective implementation of a number of measures including:

- Incorporate noise reducing mechanisms for the Dozer, Trencor, McCloskey and Sandwash Plant through upgrading of the exhaust systems and enclosure/panels to the engines;
- Plant and equipment to be maintained to ensure acoustic performance is not de-rated and complies with the recommended limits;
- Reversing alarms replaced with level varying or 'quacker' type alarms;
- Limit the number of simultaneously operating plant, particularly the dozer, Trencor and McCloskey;
- Maximise site shielding and minimise number of plant and equipment on exposed locations, particularly on the eastern and southern portions of the quarry (areas B, C, F and G);
- Cease operations within Precinct F and G during north-north-west wind conditions up to 3m/s with respect to the operation of the dozer, Trencor and McCloskey in exposed locations;
- Utilise periods of high winds >5m/s (particularly east and south-east winds) and/or rain with elevated background noise levels to extract material within exposed locations (Areas B, F and G); and
- Provision of an earth mound 3-4 metres high along the southern and south-eastern quarry boundaries.

Further, as the quarry operates, mechanisms should be put in place to deal with any noise complaints as follows:

- Procedures for residents to contact site management in regard to noise complaints or additional information;
- Follow-up procedures to inform residents of actions implemented following any noise complaints;
- Regular inspections of all site plant including trucks to ensure that the installed noise suppression units are functioning and require no maintenance; and
- Audits at sensitive receiver locations to identify additional procedures or controls to minimise noise from the site.

Truck noise resulting from the proposal has also been modelled on the forecast truck movements and is predicted to satisfy the Environmental Criteria for Road Traffic Noise (ECRTN) baseline assessment goal at a residential façade setback of 30 metres from Grants Road. Taking into account existing truck movements on Grants Road, the assessment has demonstrated that the ECRTN allowance goal of 2dB is satisfied for all other residential receivers.

9.5 Air Quality

9.5.1 Air Quality Modelling

PAEHolmes prepared the Air Quality Impact Assessment (Appendix 10) in accordance with the NSW Office of Environment and Heritage (formerly DECCW) *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* and includes:

- Quantifying emissions to air for the proposed quarry;
- Describing the ambient receiving environment, including prevailing meteorological conditions, nearby sensitive receptors and other sources of dust and particulate matter;
- Assessment of the impact from respirable Crystalline Silica
- Assessment of greenhouse gas emissions; and
- Assessment of the impacts on dispersion model predictions including cumulative impacts.

The air quality standards used for the assessment are in accordance with the Department of Environment and Heritage standard criteria as outlined in Tables 10 and 11 following.

Table 10 – Air Quality Impact Assessment Criteria for Particulate Matter

Pollutant	Standard/Criteria	Averaging Period
Total suspended particulate matter (TSP)	90µg/m ³	Annual mean
Particulate matter < 10µm (PM ₁₀)	50µg/m ³	24-hour maximum
Particulate matter < 10µm (PM ₁₀)	30µg/m ³	Annual mean

Table 11 – Criteria for Dust (insoluble solids) Fallout

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited Dust	Annual	2g/m ² /month	4g/m ² /month

Dust emissions would arise from various activities of the proposed quarry extension. The total dust emissions used in the air quality modelling has been based on analysing the activities taking place for two of the representative stages being precincts C and F. These stages are considered to be the worst case scenarios as the quarry activities in these stages will be occurring the closest to the sensitive receptors.

The modelling is based on the highest predicted 24 hour average concentration that would occur at each location for the worst day in the year. Taking into consideration the existing ambient air quality and the worst case scenario, all of the actual predictions for each receptor for both scenarios are well below the criteria set out above. The following tables provide the actual predictions for each receptor.

Table 12 – Summary of Dispersion Model Predictions – Precinct C

Sensitive receptors ID	Precinct C			
	PM ₁₀ 24-hour (µg/m ³)	PM ₁₀ Annual (µg/m ³)	TSP Annual (µg/m ³)	Dust Deposition g/m ² /month
1	17	2	6	0.2
2	21	2	5	0.1
3	26	2	6	0.1
4	44	3	8	0.2
5	37	2	5	0.1
6	28	1	3	0.1
7	11	0	1	0.0

Table 13 – Summary of Dispersion Model Predictions – Precinct F

Sensitive receptors ID	Precinct F			
	PM ₁₀ 24-hour (µg/m ³)	PM ₁₀ Annual (µg/m ³)	TSP Annual (µg/m ³)	Dust Deposition g/m ² /month
1	34	5	13	0.4
2	32	3	7	0.2
3	39	3	7	0.2
4	39	2	5	0.1
5	26	1	3	0.1
6	18	1	2	0.0
7	11	0	1	0.0

Further consideration was undertaken in relation to the cumulative impacts for the proposed operations, and in particular the nearby Hanson’s quarrying operations. PAEHolmes has made assumptions for the Hanson’s quarry based on the proposed extension of the Grants Road Sand Quarry and assigning a higher concentration for its higher throughput. This data is conservatively high due to emission estimates, operational scenarios and contributions from background data and it is expected that the actual impacts are expected to be lower.

Predictions for the annual average PM₁₀, TSP and dust deposition indicates no exceedance of the relevant goals at the sensitive receptors. Predictions for cumulative 24-hour average PM₁₀ impact show exceedances of the relevant goals at some of the sensitive receptors for both stages. Further analysis was undertaken for each of the receptors above the standard to identify the number of days that the exceedance is likely to occur. Only receptor 4, which is the closest residence to the proposed quarry operations is predicted to have more than 5 days over the criteria. However, again it should be noted that the predictions presented in the Air Quality Assessment are conservatively high and likely to be lower during normal operations. Notwithstanding this, PAEHolmes recommends that PM₁₀ monitoring is conducted at the most impact resident (receptor 4) once expanded operations are occurring.

The recommended monitoring is to be by a high volume air sampler (HVAS) with a size selective PM₁₀ head. The HVAS should be deployed, initially for a period of 3 months, and run on a one-day-in-six run cycle. After a period of 3 months, the data should be reviewed and if there is no discernable impact from the quarry, the monitoring requirement can be reviewed and discontinued if appropriate.

Further, the onsite management of the quarry operations is to undertake the following to minimise dust impacts at sensitive residences:

- Water of unsealed roads;
- Use of wheel-wash and operation of sealed road from wheel-wash to the front gate;
- Covering of loads during hauling;
- Water of stockpiles when necessary;
- Limiting vehicle speed onsite; and
- Limiting the area of disturbed land and progressive rehabilitation of completed areas.

9.5.2 Respirable Crystalline Silica

PAEHolmes undertook an assessment of the predicted concentrations of crystalline silica in the ambient air from the proposed quarry extension and the Hanson’s quarry as part of the Air Quality Assessment. The annual average concentration of respirable crystalline silica for the existing background and both quarries is expected to be 1.32µg/m³, which is for the worst case scenario. Therefore, the respirable crystalline silica exposure for the total operation of the quarry (38years) will be 50.16 µg/m³. years.

The United State EPA concluded that the cumulative risk of developing silicosis is zero for cumulative exposures of less than 1000 µg/m³. years. The estimated lifetime cumulative exposure for the proposed project is significantly lower than this.

9.5.3 Greenhouse Gas Emissions

The assessment of greenhouse gas emissions (Appendix 11) states that emissions of CO₂ will be the most significant greenhouse gas for the project released during the combustion of fuels used on the site. The identified project related greenhouse gas sources are as follows:

- Fuel consumption (diesel) during operations;
- Indirect emissions resulting from the consumption of purchased electricity;
- Indirect emissions associated with the production and transport of fuels;
- Indirect emissions associated with transmission and distribution losses from electricity supply; and
- Emissions from production transportation.

The assessment concludes that the calculations for the above could lead to an annual increase in global temperature of 0.000002% of 2.5°C and there is not likely to be any measurable environmental effect due to the emissions of greenhouse gases from the project.

9.6 Transport Issues

9.6.1 Traffic Assessment

Access to the Grants Road Sand Quarry is via Grants Road from Wisemans Ferry Road. Wisemans Ferry Road provides direct access onto the F3 Freeway to the south and Peats Ridge Road to the north and then the F3 Freeway. Grants Road and Wisemans Ferry Road are both local roads.

A Traffic Assessment was undertaken by BJ Bradley & Associates and is attached in Appendix 11. It identifies that the increase of quarrying to 250,000 tonnes per annum will increase existing traffic volumes by a proportional amount. Determination of the traffic generation from the existing approval and the proposal is outlined below. The following assumptions are used in the determination of the traffic generation rates.

- The average truck capacity will be 30 tonnes per load.
- The traffic generation rate in the evening peak will be lower as generally demand for deliveries late in the working day is significantly reduced.

Existing Approval (200,000 tonnes / annum):

Average weekly traffic generation for the approved extraction rate is:

$$200,000 \text{ tonnes} / 50 \text{ weeks} = 4,000 \text{ tonnes per week}$$

Assuming that 90% of the average extraction will be Monday to Friday inclusive, the average weekday traffic generation would be:

$$3,600 \text{ tonnes} / 5 \text{ days} = 720 \text{ tonnes per day, or approximately 24 trucks per day.}$$

Assuming that 90% of sand extraction occurs between 7am and 3pm, with an average rate of 81 tonnes per hour over that period.

This rate translates to $81 / 30 = 2.7$ trucks
Say 3 trucks
That is 3 trucks in and 3 trucks out.

In the unlikely event that maximum demand may be greater than the average demand, the estimated maximum generation rate has been increased by 66% to 5 trucks in and 5 trucks out during the morning peak hour on Wisemans Ferry Road for the purposes of the intersection analysis.

Therefore, the additional traffic generation to be utilised for the SIDRA analyses for the approved extraction rate is:

AM Peak 5 trucks inwards 5 trucks outwards
 PM Peak 1 truck inwards 1 truck outwards

Proposed extraction (250,000 tonnes/annum):

Average weekly traffic generation for the proposed extraction rate is:

250,000 tonnes / 50 weeks = 5,000 tonnes per week

Assuming that 90% of the average extraction will be Monday to Friday inclusive, the average weekday traffic generation would be:

4,500 tonnes / 5 days = 900 tonnes per day, or approximately 30 trucks per day.

Assuming that 90% of sand extraction occurs between 7am and 3pm, with an average rate of 101 tonnes per hour over that period.

This rate translates to $101 / 30 = 3.4$ trucks
 Say 4 trucks
 That is 4 trucks in and 4 trucks out.

In the unlikely event that maximum demand may be greater than the average demand, the estimated maximum generation rate has been increased by 50% to 6 trucks in and 6 trucks out during the morning peak hour on Wisemans Ferry Road for the purposes of the intersection analysis.

Therefore, the additional traffic generation to be utilised for the SIDRA analyses for the proposed extraction rate is:

AM Peak 6 trucks inwards 6 trucks outwards
 PM Peak 2 truck inwards 2 truck outwards

The peak hourly traffic volumes at the Grants Road / Wisemans Ferry Road/ Lutana Road were found to be between 7.45am and 8.45am and between 3.15pm and 4.15pm.

Table 14 – Estimated increase in traffic generation

Annual output (tonnes per annum)	Average daily truck movements (trips)	Proportion of daily traffic generation (am peak)	Number of trips (am peak)	Proportion of daily traffic generation (pm peak)	Number of trips (pm peak)
200,000 (current approved output)	48	20%	10	5%	2
250,000 (current approved output)	60	20%	12	5%	4

The increase in truck volumes per day will be from 24 trucks to 30 trucks, i.e. 60 truck movements and therefore an increase of 12 trips per day.

The 7-day traffic surveys on Grants Road during June 2008 when the Grants Road Sand Quarry was closed indicated that the Hansons Sand Quarry produced an average of 82 truck trips per working day, or 41 trucks per working day.

If the Grants Road Sand Quarry operated at the currently approved extraction level of 200,000 tonnes per annum, the average daily heavy vehicle generation from the Grants Road Sand Quarry would be 24 trucks per day. The total heavy vehicle traffic generation on Grants Road associated with the Hansons Sand Quarry and the Grants Road Sand Quarry would be 65 trucks per day, and the Grants Road Sand Quarry contribution to the heavy vehicle volume on Grants Road would be 37%.

If the Grants Road Sand Quarry operated at the proposed extraction level of 250,000 tonnes per annum, the average daily heavy vehicle generation from the Grants Road Sand Quarry would be 30 trucks per day. The total heavy vehicle traffic generation on Grants Road associated with the Hansons Sand Quarry and the Grants Road Sand Quarry would be 71 trucks per day, and the Grants Road Sand Quarry contribution to the heavy vehicle volume on Grants Road would be 43%.

SIDRA simulations were undertaken for the intersections of Grants Road/Wisemans Ferry Road and Grants Road/Reservoir Road using the above increases in truck movements. It was assumed that there is no increase in traffic from Hansons Quarry. It is noted that Hansons Quarry proposes an extension to its existing operations, however the extension will not increase annual output but extend the life of the quarry.

The SIDRA simulations indicate that the operation of the Grants Road Sand Quarry at its currently approved annual extraction rate of 200,000 tonnes and the proposed 250,000 tonnes per annum will not adversely impact on the operation of the intersections of Grants Road/Wisemans Ferry Road and Grants Road/Reservoir Road in the morning or afternoon peak periods as at 2010 or 2020.

The traffic assessment also concludes the extension of the quarry will not adversely affect the Somersby Public School as there will only be approximately one (1) additional trip north and south in each peak traffic period. It states that the demand will generally be derived from the Gosford and Sydney areas, although there may be some demand to the north. It has therefore determined that the distribution of truck movements is approximately the same in either direction from Grants Road and therefore the increase in the extraction rate would only create 1 truck trip north and 1 truck trip south past the school in each peak period.

9.6.2 Grants Road Assessment

As stated in the Traffic Assessment, Grants Road was upgraded in conjunction with DA approval 22952/1998 and the proposed extensions subject to this report will only result in an increase in traffic volumes on Grants Road of approximately 12 trips per day.

Further, the capacity of the roadway has been determined from the AUSTRROADS publication "Guide to Traffic Engineering Practice – Part 2, Roadway Capacity". Based on this assessment, the traffic assessment concludes that the projected traffic volumes on Grants Road are significantly less than the capacity of Grants Road.

9.7 Heritage

9.7.1 Aboriginal Heritage

Previous archaeological surveys were undertaken as part of the development application for the current quarry operations and no sites were identified within the quarry area. Further surveys were then undertaken of the proposed widening of the road corridor of Grants Road on the sandstone outcrops within the nearby Howes Aboriginal Reserve in 1995. No areas of engraving were identified by the survey however an area of exposed sandstone suitable for engraving offsite was proposed for monitoring.

Monitoring of this rock exposure as well as an additional area to the east of Grants Road opposite the quarry, which was known to contain rock engravings occurred prior to the road widening and six (6) months later. The monitoring did not identify any damage caused by the road widening process. A five year monitoring plan was implemented to monitor for potential impacts from the Grants Road Sand Quarry.

An Archaeological investigation has been undertaken of the site for the expansion of the quarry in November 2007 by Insite Heritage Pty Ltd and is attached in Appendix 12.

A search of the Aboriginal Heritage Information Management System (AHIMS) for recorded sites within a 30km² area surrounding the quarry identified a total of 72 recorded sites. No recorded sites were located within the study area.

As outlined in Section 8.0, community consultation was carried out under the then Department of Environment & Climate Change's community consultation guidelines. The survey undertaken by Insite Heritage was also attended by the Darkinjung Local Aboriginal Land Council, the Guringai Tribal Link and the Darkinyung Language Group. Foot surveys were concentrated in areas of sandstone exposures.

The survey identified two rock engravings on the site being:

3. An anthropomorphic figure on a sandstone exposure situated near the northern boundary of the property (Grants Rd RE 1); and
4. A small mundoe located in an access way outside of the area of the proposed extension (Grants Road RE 2).

Both sites are to be preserved. The extent of the proposed quarry site has been amended to incorporate a ten (10) metre buffer around the anthropomorphic figure. The report further recommends that the bund wall for the quarry extension in this location be constructed of block wall rather than earth in between the engraving and the boundary and that a perimeter fence be erected around the site during construction of the bund wall. It also recommends that this engraving be incorporated into the five yearly monitoring programme currently in place for the adjacent Howes Aboriginal Reserve.

Traffic is also to be directed around the small mundoe at the Grants Rd RE 2 site to ensure minimal disturbance.

9.7.2 Non-Aboriginal Heritage

A review of the State and local listed heritage items for the Gosford Local Government Area was undertaken and there are no heritage items located in the near vicinity of the proposed quarry.

9.8 Visual Impact Assessment

A Visual Impact Assessment of the proposed quarry extension was undertaken and is included in Appendix 13. It concludes that there will be minimal visual impact from the surrounding areas of the proposed quarry extension.

Grants Road Sand Quarry is situated at the end of Grants Road, which is a no through road. The site is bounded by the Brisbane Water National Park to the west, Howes Aboriginal Reserve and privately owned rural properties to the east and privately owned rural properties to the north and south.

Surrounding vegetation and the topography obscures the site from most of the adjoining rural dwellings and the road network.

The expanded quarry will only be visible from a very limited number of areas because of topography and vegetation. These areas are located to the west of the Brisbane Water National Park off Peats Ridge Road. The existing quarry is also visible from these areas. However, due to the distance between these properties and the proposed extended quarry, the percentage of the quarry in the field of view is considerably small and therefore the visual impact is considered to be low.

The Great North Walk adjoins part of the north western boundary of the site. The existing quarry is visible from part of the Great North Walk in this area. The quarry expansion is also likely to be visible from this section of the Great North Walk. This section of the walk is part of the Somersby to Staples Lookout of the Great North Walk. The guide for this section of walk identifies Quarries and Sand Depots within the vicinity as a point of interest (The Great North Walk, 2012). With the implementation of mitigation measures, it is considered that the visual impact from the proposed quarry extension on the Great North Walk is also low.

Whilst the visual impact from the proposed quarry extension is considered to be low, the following mitigation measures are proposed to minimise future visual impacts:

- Vegetating all stockpiles and the acoustic earth mounds using appropriate species noting that the current conditions of consent requires the use of Kikuyu grass for the stabilisation of stockpiles. This will minimise the visual impact by reducing the contrast between the sandstone, bare earth and the surrounding vegetated areas.
- Maintain grass covered mounds.
- Maintain the site.
- Keep the site clean and tidy where possible.
- Progressively revegetate all areas where quarrying is completed.

Additional vegetation was planted in 2002 along the western boundary and in the north eastern corner of the site as part of the conditions of approval for the existing quarry. Whilst some of this vegetation has survived a number of the plants were destroyed by the feral deer. The Visual Impact Assessment concludes that grassed and maintained vegetated mounds are successful in reducing the visual impact of the quarry. Therefore, it is not proposed that additional vegetation be planted along the western boundary due to the potential of destruction by the feral deer.

9.9 Bushfire Risk Assessment

The site and adjoining areas contain land mapped as Bushfire Prone Land. Therefore, a Bushfire Assessment has been carried out by Conacher Environmental Group and is attached in Appendix 14. The Bushfire Assessment states that the main bushfire threat is from the forest vegetation to the west and east of the site. Bushfire protection is to be achieved by the use of existing managed lands providing separation distance and defendable space to the bushfire hazard. These areas are to be regularly inspected and maintained by the landowners.

The existing and future water storage ponds associated with the quarry would provide an adequate water supply for a bushfire emergency. Additionally, the provision of an on-site mobile water pump and tank, with fire fighting hose connections, should be provided for protecting buildings from bushfire impacts from the adjoining forested lands. The current quarry operations already has a water cart located on site.

10.0 DRAFT STATEMENT OF COMMITMENTS

The following table outlines the Draft Statement of Commitments for the Project Approval for the extension of the Grants Road Sand Quarry. These Draft Statement of Commitments have incorporated the relevant requirements from the specialist investigations undertaken and the requirements for the current quarry operations.

Table 15 – Draft Statement of Commitments

Subject	Commitments	Timing
1. General Arrangements	The development shall be carried out in accordance with this Environmental Assessment (August 2012) prepared by Peter Andrews + Associates Pty Ltd.	Ongoing
2. Staging	Staging of the development will be in accordance with the staging of works set out in this Environmental Assessment (August 2012).	Ongoing
3. Statutory Requirements	Obtain and maintain all relevant approvals and licences.	As required and continuous
	Comply with all conditional requirements in all approvals and licences.	As required
4. Hours of Operation	6.00am to 6.00pm Monday to Friday 7.00am to 1.00pm Saturday	Ongoing
5. Reporting Requirements	Undertake monitoring for the key areas as identified below.	As required
	Incorporate relevant data/monitoring information in the Annual Reports.	Annually
	Incorporate the management measures into the existing Environmental Management Plan. The development is to operate at all times within the terms and conditions of the Environmental Management Plan.	Prior to commencement and subject to five yearly reviews
	Update procedures manual for the operation of the quarry with regards to the quarry expansion including the following and ensure all staff are aware of procedures. <ul style="list-style-type: none"> • Operation of plant and equipment • Environmental monitoring • Restrictions imposed on quarrying • Vegetation removal • Sedimentation and erosion • Transportation 	Prior to commencement of the operations
6. Soils and Land capability	Locate areas for acoustic earth mounds.	Prior to topsoil stripping operations
	Maintain topsoil for rehabilitation and minimise soil loss through erosion.	Ongoing
	Vegetate all mounds with Kikuyu grass	As required
	Implement downslope sedimentation controls as required	Until the surface of the mounds are vegetated
7. Groundwater	Undertake automatic water level measurements in water level data logger in monitoring bores	Initially 4-hourly samples. Assess data after 12 months and depending on the results, decrease frequency to 8-hourly samples
	Undertake groundwater sampling in representative monitoring bores	Initially 3 monthly. Assess data after 12 months and depending on the results, decrease frequency to 6 monthly samples
	Undertake automatic rainfall measurements in tipping bucket rain gauge data logger on site	Continuous logging at every 0.2mm tip with time/date stamps.

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Subject	Commitments	Timing
	<p>Preparation of the Groundwater Management Plan, which incorporates the development of a water level and water quality monitoring program and the development of a set of trigger levels and mitigation measures if adverse impacts occur on the environmental and/or neighbouring water users. The Groundwater Management Plan to incorporate:</p> <ul style="list-style-type: none"> All water level data and any groundwater quality monitoring results to be recorded, collated and duly reported in-house. The data should be reviewed by the consulting hydrogeologist. The aim is to assess any changes in water levels or groundwater chemistry and identify reasons for the changes if they occur. The monitoring schedule should be reviewed annually and changed if deemed appropriate by the hydrogeological consultant. Review of the results of the statistical analysis of monitoring data in order to detect any imminent or occurring impacts 	<p>Within 6 months of the project approval</p> <p>Six-monthly basis for the first 12 months than on an annual basis</p> <p>Annually</p>
	<p>Provide a complete set of results of the production and monitoring program including a review and assessment of the statistical analysis to the <i>Senior Hydrogeologist NOW</i> and the quarry owner.</p>	Annually
	<p>Communicate with any landowner if there is a scientifically and independently demonstrated significant impact on any neighbouring water users surrounding the site.</p>	As required
8. Surface Water	<p>Preparation of an Environmental Management Plan for quarry extension based on a continuation of the current environmental management and mitigation measures for the mine expansion as outlined in the current EMP.</p>	Prior to the commencement of the quarry operations
	<p>Construct earthen bunding and surface water diversion banks and drains around the perimeter of the entire quarry pit void. Bunding and/or diversion drains will require ongoing minor realignments as the quarry pit develops and advances especially through zone 'C'.</p>	Prior to the commencement of the quarry operations and ongoing
	<p>Construct 'out of pit' containment infrastructure in the south-eastern most section of the property boundary adjacent to Zone E to capture and passively treat contaminated surface water runoff whilst simultaneously providing additional water security. Infrastructure to consist of:</p> <ol style="list-style-type: none"> One 10 Megalitres (ML) Pollution Control Dam (PC Dam) to receive nitrogen rich runoff from Zones F&G where the existing chicken and machinery sheds are located. This dam will gravity flow via a spillway into a shallow polishing pond. Control structures such as rock 'rip rap' or similar will be required to control water runoff velocity prior to entering the PC Dam. Broad shallow polishing pond/s will receive any water spilled or transferred from PC Dam and provide passive treatment through suitable wetland plant species. Pipeline and pumps for transfer of water each way between the in-pit decant pond and out of pit PC Dam. A floating siphon in the PC Dam to maintain a 5 ML operating level. <p>Ensure PC Dam and pond are located outside of the water pipeline easement and located generally as shown on the plans. Access to the ponds will be along the southern boundary across the water pipeline easement.</p>	Prior to the commencement of the quarry operations and ongoing
	<p>As mining progresses through zones 'F & G' the chicken sheds and residences will have been removed and the PC Dam and polishing pond can then be decommissioned.</p>	Upon removal of the chicken sheds and residences
9. Biodiversity and Environmental Management	<p>Identify the boundaries of the quarry.</p>	Prior to clearing of vegetation
	<p>All hollow-bearing trees to be removed are to be inspected and sectionally dismantled by an arborist, under the supervision and direction of an ecologist. Where possible, escaped fauna is to be caught by the consulting ecologist and transported to a suitable release area. If juvenile or injured fauna are encountered they are to be captured and transported to a wildlife carer or a veterinary surgeon as required. In the case where the arborist declares a tree or stag unsafe to climb, machine removal with a rotating grab or similar will be required.</p>	Prior to removal of the hollow-bearing trees

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Subject	Commitments	Timing
10. Noise	Incorporate noise reducing mechanisms as follows: <ul style="list-style-type: none"> Upgrade the exhaust systems and enclosure/panels to the engines of the Dozer, Trencor, McCloskey and Sandwash Plant; Reversing alarms replaced with level varying or 'quacker' type alarms; 	Prior to the use of the plant equipment.
	Plant and equipment to be maintained to ensure acoustic performance is not derated and complies with the recommended limits.	Throughout the life of the quarry.
	Limit the number of simultaneously operating plant, particularly the dozer, Trencor and McCloskey;	Throughout the life of the quarry.
	Provision of an earth mound 3-4 metres high along the southern and south-eastern quarry boundaries	Prior to quarrying of the relevant stages.
	Maximise site shielding and minimise number of plant and equipment on exposed locations, particularly on the eastern and southern portions of the quarry (areas B, C, F and G);	During quarrying of the relevant stages.
	Cease operations within Precinct F and G during north-north-west wind conditions up to 3m/s with respect to the operation of the dozer, Trencor and McCloskey in exposed locations	During quarrying of the relevant stages.
	Utilise periods of high winds >5m/s (particularly east and south-east winds) and/or rain with elevated background noise levels to extract material within exposed locations (Areas B, F and G);	During quarrying of the relevant stages.
	Put in mechanisms in place to deal with any noise complaints as follows: <ul style="list-style-type: none"> Procedures for residents to contact site management in regard to noise complaints or additional information; Follow-up procedures to inform residents of actions implemented following any noise complaints; Regular inspections of all site plant including trucks to ensure that the installed noise suppression units are functioning and require no maintenance; and Audits at sensitive receiver locations to identify additional procedures or controls to minimise noise from the site. 	Prior to the commencement of the quarry extensions.
11.0 Air Quality	Undertake air quality monitoring with a high volume air sampler (HVAS) with a size selective PM ₁₀ head. The HVAS should be deployed, initially for a period of 3 months, and run on a one-day-in-six run cycle. After a period of 3 months, the data should be reviewed and if there is no discernable impact from the quarry, the monitoring requirement can be reviewed and discontinued if appropriate.	First three months of the quarry extension and further reporting subject to a review of the data.
	Minimise dust impacts at sensitive residences: <ul style="list-style-type: none"> Water of unsealed roads; Use of wheel-wash and operation of sealed road from wheel-wash to the front gate; Covering of loads during hauling; Water of stockpiles when necessary; Limiting vehicle speed onsite; and Limiting the area of disturbed land and progressive rehabilitation of completed areas. 	Throughout the life of the quarry
12. Roadworks and Traffic Management	All vehicles leaving the site with loads of extracted material are to be sufficiently covered to prevent windblown dust.	Ongoing
13. Heritage	Grants Rd RE1 and RE2 sites are to be preserved.	Continuous
	Incorporate a ten (10) metre buffer around the anthropomorphic figure (RE1).	For the life of the quarry
	The bund wall for the quarry extension in the area of RE1 to be constructed of block wall rather than earth in between the graving and the boundary and that a perimeter fence be erected around the site during construction of the bund wall.	Prior to the quarrying of Precinct C
	The engraving (RE1) be incorporated into the monitoring programme currently in place for the adjacent Howes Aboriginal Reserve.	Five yearly
	Traffic is to be directed around the small mound at the Grants Rd RE 2 site to ensure minimal disturbance.	Continuous
	Should any materials suspected of being of Aboriginal occupation origin be located during the quarry operations that work cease in that location immediately and that the Office of Environment & Heritage be contacted immediately	For the life of the quarry

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Subject	Commitments	Timing
14. Visual Impact	Vegetate all stockpiles and the acoustic earth mounds using appropriate species noting that the current conditions of consent requires the use of Kikuyu grass for the stabilisation of stockpiles.	For the life of the quarry
	Maintain grass covered mounds.	For the life of the quarry
	Maintain the site.	For the life of the quarry
	Keep the site clean and tidy where possible.	Continuous
	Progressively revegetate all areas where quarrying is completed.	Upon completion of quarrying in a precinct
15. Bushfire Protection	Provision of an on-site mobile water pump and tank, with fire fighting hose connections to be located on site.	For the life of the quarry
	Management of the site to provide a defensible space to the bushfire hazard. These areas are to be regularly inspected and maintained by the landowners.	For the life of the quarry
16. Waste Management	Keep the site clean and tidy where possible	For the life of the quarry
	Ensure all general waste / garbage is removed by a licensed waste collection contractor at least on a weekly basis.	Continuous
	Preparation of a waste management plan for the demolition of any structures.	Prior to demolition.
17. Mine Rehabilitation	Ensure completed areas of the quarry are revegetated to reduce sedimentation and erosion and dust emissions and visual impact.	As required
	Preparation of a quarry rehabilitation plan to identify staging for rehabilitation and consider the best end use for the quarry site.	Within five years of commencement of the quarry extension

11.0 JUSTIFICATION FOR THE PROJECT

Grants Road Sand Quarry has been in operation since 2002. Whilst the total limit of the resource as outlined in this consent has not been exhausted, the remaining product is hard sandstone. This requires the product to be broken up to provide a soft sand product. This operation is timely and costly and therefore, extension of the quarry is sought to enable a range of products to be delivered to meet the demand.

The draft *Supply and Demand of Construction and Industrial Sand for the Sydney Market*, (2004), acknowledges that resources of construction sand close to the markets of the Greater Sydney, Central Coast and Newcastle metropolitan areas are diminishing and a viable market for all grades of sand, dimension stone and retaining wall rock exists in these areas. It notes that the two key construction sand supplies to the Sydney market will be exhausted in approximately 10 years. The report identifies the Somersby Plateau as an area that is possible of providing additional resources.

Expansion of the Grants Road Sand Quarry will assist in providing the additional sand resources to the Sydney, Central Coast and Newcastle markets. It is an existing operating quarry with infrastructure in place. Current monitoring of the existing quarry operations show that there has been little impact on the surrounding land uses. The environmental investigations undertaken as part of this Project Application also propose that there will be minimal impact on the surrounding land uses. The proposed monitoring of the expanded quarrying activities will assist in ensuring minimal impact.

12.0 CONCLUSION

Expansion of the Grants Road Sand Quarry, the subject to this Environmental Assessment will allow the further production of sand and sandstone and continue to contribute to the economic environment providing employment and a valuable resource for the construction industry. Infrastructure and monitoring systems are already in place for the existing quarry, which has demonstrated responsible environmental management for the current quarrying operations.

The supporting documentation provided with the Environmental Assessment indicates that the project can proceed with appropriate controls to meet environmental requirements.

REFERENCES

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Gosford City Council 2012 *Gosford Planning Scheme Ordinance* Gazetted 24 May 1968

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NSW Government 1979 *Environmental Planning and Assessment Act 1979*. Last modified 24 August 2012

NSW Government 1995 *Sydney Regional Environmental Plan No 9—Extractive Industry (No 2—1995)*.
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