

# *Environmental Assessment*

Part 3A – EP&A Act, 1979



Dunloe Sands – Ramtech P/L

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## Certification

Submission of  
Environmental Assessment (EA)

Under Section 75H of the Environmental Planning and Assessment  
Act 1979

**Submission of  
environmental assessment (EA)**  
under Section 75H of the Environmental Planning and  
Assessment Act 1979

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### EA prepared by

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In respect of:

Proposed Sand Quarry – Dunloe Park, Pottsville

Applicant Name:  
Applicant Address:

Ramtech Pty Ltd  
C/- Planit Consulting Pty Ltd  
PO Box 1623  
KINGSCLIFF NSW 2487

Land to be developed:  
(lot no, DP/MPS, vol/fol etc)

Lot 162 Deposited Plan 755721.  
Lot 1 Deposited Plan 780199.  
Lot 2 Deposited Plan 780199  
Lot 2 Deposited Plan 785895  
Lot 1 Deposited Plan 208249  
Lot 183 Deposited Plan 755721  
Lot 44 Deposited Plan 755721  
Lot 81 Deposited Plan 755721

Proposed Development:

Proposed Sand Quarry – Dunloe Park, Pottsville

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**Environmental assessment**

**An Environmental Assessment is attached**

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### Certification

I certify that I have prepared the contents of this  
environmental assessment and to the best of my  
knowledge

- It is in accordance with Section 75E and 75F of the  
*Environmental Planning and Assessment Act 1979*,  
and
- It is true in all material particulars and does not, by  
its presentation or omission of information,

materially mislead.

Signature  
Name  
Date

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Adam Smith  
17<sup>th</sup> September 2007

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**Review and Amendments Schedule – PLANIT CONSULTING PTY LTD**

		Date
Authors	AS	October 2006
Reviewer		December 2006

Amendments

The content of this report was prepared for the exclusive use of the proponent for the purposes of seeking the consent of the Minister to establish and operate an extractive industry (sand quarry) on the subject site and is not to be used for any other purpose or by any other person or corporation.

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Planit Consulting Pty Ltd declares that it does not have, nor expects to have, a beneficial interest in the subject project.

**PLANIT CONSULTING PTY LTD<sup>®</sup>**  
**August 2007**

Section

**EA i**

## **Executive Summary**

### **The Proposal**

This Environmental Assessment (EA) accompanies an application under Part 3A of the EP&A Act 1979 for a proposed sand quarry by Ramtech Pty Ltd on farmland to the south of Pottsville within the Tweed Shire. The subject development site comprises 10 properties in total and is legally described as:

Lot Number	Plan Number
Lot 1	Deposited Plan 208249
Lot 182	Deposited Plan 755721
Lot 183	Deposited Plan 755721
Lot 44	Deposited Plan 755721
Lot 81	Deposited Plan 755721
Lot 162	Deposited Plan 755721.
Lot 2	Deposited Plan 780199
Lot 1	Deposited Plan 780199.
Lot 1	Deposited Plan 780200
Lot 2	Deposited Plan 785895

The site is locally and informally known as 'Dunloe Park'. The site is depicted in the plan extract on the following page.

Access to the site is primarily provided from Pottsville Mooball Road and Kelleher's Road. Various unconstructed road reserves and dirt/gravel tracks provide access within the property. A dedicated ingress and egress facility is proposed on Pottsville Mooball Road.

*In situ* Indicated Mineral Resources within the two proposed pits total 6.88 Mm<sup>3</sup>, including approximately 0.22 Mm<sup>3</sup> of overburden. Computer modelling of a proposed pit design indicated that up to 6 Mm<sup>3</sup> of sand products could be extracted from the proposed pits; processing of the sand would result in < 100 000 m<sup>3</sup> of fines requiring re-internment in the pits.

The proposal will ultimately yield approximately 230,000 cubic metres or 300,000 tonnes of sand per annum, with an anticipated lifespan of 26 years.

The proposed development involves the staged extraction of sand from two proposed pond areas comprising at total of 56.7 hectares. The northern extraction pond (31.7ha) will form Stage 1 of the proposal; and Stage 2 will involve the extraction of sand from the southern pond (25ha). The extraction areas will be progressively rehabilitated (on the riparian fringe) to a naturalised water body.



A relatively small works area will be established adjacent to the western edge of each extraction pond, which will contain the work plant and machinery, stockpiled material and a small building housing workers amenities and an administration area.

Results of soil testing have indicated that the sand resource is of a quality that is in line with Australian Standard 2758.1-1998 (Aggregates and Rock for Engineering Purposes) and is suitable for use in the manufacture of concrete. Calculations indicate that the *in situ* sand resource volume present within the proposed extraction areas, assuming 35% batters is approximately 6,000,000m<sup>3</sup>. The volume of overburden has been calculated at approximately 220,000m<sup>3</sup>. Of the estimated 6,000,000m<sup>3</sup> of extractable material, 90,000 tonnes has been identified as being suitable for brickies loam. However the latter was estimated from an area of only 4ha subject to investigations in this regard.

The proposed quarry layout and extraction ponds are confined to areas containing mainly pastoral grasses, thereby avoiding disturbance to surrounding areas of wetlands and littoral rainforest. Approximately 15 hectares of the site will undergo revegetation to



increase the flora and fauna links between the existing areas of vegetation on and adjacent to the site.

The proposal will see unwanted material and potential acid sulfate soils strategically re-inturned within the extraction ponds to limit chances for oxidation (below the watertable).

### **Land Use and Capability**

The site is currently used for agriculture, primarily focused on livestock grazing. The site contains scattered and fringe areas of native vegetation bordering the site to the east and north and sugar cane fields to the south and west. The site contains a majority of Class 3 & 4 agricultural lands with small areas of class 5 agricultural lands. The class 3 and 4 lands have been identified as generally suitable for grazing and pasture improvement only.

### **Hydrogeology and Ground Water Quality**

Existing and proposed ground water levels and quality have been modelled within the evolution of the development proposal. The modelling undertaken has predicted that groundwater quality or levels will not be affected by the proposal.

On going groundwater depth and quality monitoring will continue throughout and beyond the life of the operation.

### **Surface Water**

The site is located within the Mooball Creek catchment and Sheens Creek sub-catchment areas. Detailed flood modelling confirms that the proposal will have no significant impact upon existing drainage regimes within the catchment.

Extraction operations have been designed in conformity with best practice environmental management procedures, including the use of appropriate sediment and water quality devices and the retention of ground cover in areas outside of the extraction ponds.

Sub stage top soil stripping is used to ensure the potential for erosion and sediment problems are limited. On going surface water monitoring will provide a safety net which will be present throughout and beyond the life of the operation.

### **Noise**

Modelling of noise levels likely to originate from the proposal indicate that operations within the south west corner of the southern extraction pond (stage 2) may generate levels which exceed the relevant noise impact requirements.

To mitigate this minor impact, the dredge is to have acoustical treatment when operating within the southern extraction pond. In addition, strategically placed earth mounds are to be constructed, all trucks on and off the site are to be fitted with residential mufflers and on site speed limits are to be restricted to 25-30km/h.

### **Air Quality**

Airborne particulate matter concentrations and dust deposition from the proposed development have been predicted to exceed the relevant requirements prescribed by the Department of Environment and Conservation at three of the eight monitoring locations. In particular, exceedances are expected as a result of dust generated from the use of unsealed access roads by haul vehicles.

In order to meet prescribed requirements, proposed dust controls include sealing of the entire internal roadway length, planting of a vegetated buffer along the southern boundary adjoining Warwick Park Road and the proposed outbound internal road.

### **Flora and Fauna**

A number of threatened species have been identified within the surrounding vegetated areas of the site with none being found, or expected to occur, within the previously disturbed areas of the site (including proposed extraction areas).

Rehabilitation and revegetation measures proposed will provide improved flora and fauna links, additional food resources for identified threatened species, improved opportunities for breeding through the installation of breeding boxes and other benefits associated with visual screening and the like.

No clearing of vegetation is required in respect of the proposal, inclusive of haulage routes and operational areas.

### **Archaeology**

A heritage assessment focusing on both Aboriginal and non-Aboriginal heritage has been carried out, with no areas of concern identified. Recommendations stemming from the investigations undertaken include that in the unlikely event that any cultural material is exposed during quarrying operations, works that disturb soil or subsoils will cease immediately and government representatives from the Department of Environment and Conservation are to be invited to the site.

### **Traffic and Access**

Entry and exit from the site will occur via a single route. Entrance to the extraction areas will be gained via a dedicated 'haulage track' which is to be constructed, before turning to the south along an unnamed road. The proposed exit route will follow the same path. The proposed haulage track will connect with Pottsville Mooball Road for travel to and from the Pacific Highway. Connection to Pottsville Mooball Road will be towards the northern extent of the site.

Traffic travelling to and from the site will make use of the Pacific Highway, via the Cudgera Creek interchange.

The proposal will rely on the use of Council road reserves adjacent to the extraction areas. It is expected that upgrading works will be required in relation to these roads, with the majority limited at present to gravel roads predominantly used by the current landowner.

All roads utilised within the proposal will be sealed in accord with the recommendations of the air quality assessment undertaken. It is anticipated that this component will be

subject to a separate application under Section 138 of the Roads Act upon issue of development consent.

All internal road ways will be signed to 25-30km/h speed limits.

### Visual

A Visual Impact Assessment has been carried out in relation to the existing visual catchment. The site is located on low lying lands at the coastal end of the Mooball Creek catchment and Sheens Creek sub-catchment areas. Accordingly, on face value that appears to be potential for the site to be visually intrusive.

In particular, properties fronting the northern side of Warwick Park Road and the eastern side of Pottsville Mooball Road have been identified as being within a visual catchment that may be impacted upon by the proposal.

The closest dwelling house to the proposed extraction areas is located at a distance of approximately 500m to the south west. Due to the undulating topography and the presence of existing vegetation surrounding Warwick Park Road, very few direct or unimpeded view lines are available to the proposed extraction area. Where direct views are available, it is considered that the ameliorating benefits of significant spatial separation and the inclusion of extensive screen and buffer plantings will be sufficient to ensure that no unacceptable visual impacts are created.

### Waste

Solid waste generated on site will be disposed of by licensed contractor and disposed of or recycled accordingly.

Effluent generated by staff employed upon the site will be pumped off site for treatment at a Council facility.

Bunding of existing on site fuel supplies will be carried out as a condition of consent.

### Socio-Economic Aspects

A Socio Economic Impact Assessment has been prepared for the proposed Sand Quarry. The sand quarry will produce quality sand over a 26 year period which is suitable for use in the manufacture of concrete, filling and brickies loam. The size and location of the sand quarry will enable the quarry to service the growth areas of not only the Tweed Shire, but also the Gold Coast Local Government Area to the north and Byron, Ballina and Lismore City Local Government area's to the south. It is anticipated that the population of the region will continue to grow over the life of the quarry.

It has been found that the proposed Sand Quarry would have a positive economic impact upon the local economy extending over a twenty six year period. Total revenues have been estimated at \$117 million based on an assumed sales price of \$15 per tonne for processed sand. The proposal will have a measurable contribution to the local economy of \$47 million with an economy multiplier effect (2.7 X) of \$126 million on direct costs over the life of the quarry. The Sand quarry will also provide healthy competition and enable concrete batchers, landscapers and builders to source material from a second quarry within Tweed Shire.

As the quarry is located to the south of the Pottsville township, and as suitable mitigation measures are proposed to manage potential environmental impacts, no adverse impacts are anticipated upon surrounding residential areas.

Haulage of material is to be directed westwards to the Pacific Highway for destinations to the north and south of the quarry, and no traffic will be directed through the Pottsville Village.

In summary, the potential socio economic impacts arising from the proposal are of a positive nature and provide strong justification for the proposed development to proceed.

### **ESD and Cumulative Aspects**

The principles of Ecologically Sustainable Development have been considered and underpin the evolution of this proposal. Ramtech Pty Ltd strongly support the requirements to limit cumulative impacts, support the precautionary principle, support social and intergenerational equity and the conservation of biological diversity and ecological integrity.

The proposal demonstrates adherence to these principles via the retention and regeneration of extensive, previously disturbed areas, the assurance of no impacts upon adjacent sensitive areas, the maintenance of existing groundwater quality and the adoption of management measures relating to air quality, acoustic management and traffic efficiency.

### **Mitigation Measures and Environmental Management**

A summary of the proposed mitigation measures is contained within section 8 of this EA and a draft Environmental Management Plan is contained within Appendix G.

Section

# EA 1

## Introduction

### 1.1 Brief

Planit Consulting has been commissioned by Ramtech Pty Ltd to prepare and submit an Environmental Assessment (EA) pursuant Part 3A of the EP&A Act, 1979 to accompany an application to establish and operate an extractive industry (sand quarry) on the subject site.

The following Environmental Assessment has been prepared in accordance with the requirements of the Department of Planning as outlined within the Director General's requirements contained within Appendix B to this submission. Further consultation has been undertaken in relation to the project after the preliminary lodgement of the proposal, during which a number of matters have been raised requiring further detail and refinement. This compiled EA addresses those issues raised by the various Government Departments.

### 1.2 Project Team

The project team commissioned for this EA includes the following firms and / or individuals:

**Table 1: Project Team**

Firm/Individual	Role
<b>Planit Consulting Pty Ltd</b>	Town Planning Project Management Flora & Fauna Assessment Landscape & Visual Assessment Rehabilitation Environmental Assessment Production Environmental Management Plan Production Socio - Economic Assessment
<b>John Siemon Geologist</b>	Revised Resource Assessment
<b>Coffey Mining (Alan Robertson)</b>	Economic Assessment & Response to DOP & DPI matters
<b>Gilbert and Sutherland Pty Ltd</b>	Soil Survey Original Resource Assessment Acid Sulfate Soil Assessment Preliminary Contamination Assessment Agricultural Land Capability Assessment Hydrological Assessment Soil & Water Management Plan

<b>Simmonds &amp; Bristow Pty Ltd</b>	Air Quality Assessment
<b>CRG Group</b>	Traffic Impact Assessment Noise Impact Assessment
<b>NCW</b>	Survey
<b>Blueland Engineers</b>	Flooding & Drainage
<b>Adrian Piper / Everick Consulting</b>	Archaeology / Cultural Heritage

### 1.3 Consultation

Preliminary and ongoing consultation has been formally undertaken with the following relevant Government and Regulatory Authorities.

- Tweed Shire Council
- Department of Planning, inclusive of attendance at a Planning Focus Meeting and the sourcing of Director General's Requirements
- Department of Lands
- Pottsville Community Group

Two (2) informal community meetings were convened on the following dates:-

1. Friday 8<sup>th</sup> August 2006 at Rundles Corner, Pottsville Village Centre
2. Tuesday 26<sup>th</sup> September at Pottsville Community Hall

The latter meeting was held in conjunction with the Pottsville Progress Association and was attended by approximately 40 community members. At each of the meetings convened, information sheets were handed out (refer Appendix C for copies) and questions invited. It was clear from the meetings held that concerns exist in relation to the following key points:-

1. Traffic Capacity of Pottsville Mooball Road
2. Acid Sulfate Soils
3. Visual impact
4. Noise generation
5. Impacts on adjacent wetlands
6. Loss of property value
7. Ownership of land and end use

These matters, amongst others, have been addressed within the body of this submission.

### 1.4 Justification

The Tweed Shire has undergone significant population growth over the past 20 years with the population increasing by close to 2.0% per year between the 1996 and the 2001 census, to approximately 74,000. Accordingly, it is estimated that by 2016 the population of Tweed Shire will be approximately 100,000 people. This rate of growth has, in actual fact, been more pronounced at the local level, with Pottsville experiencing close to double the shire wide growth rate.

In addition, there is substantial urban and resort development being undertaken in other parts of Tweed Shire, particularly on the Tweed Coast. This growth, coupled with additional commercial and employment generating development in both the Tweed and South East Queensland, indicates that demand for fine quality sand will increase substantially.

The demand for the full range of high quality sand products is likely to continue with anticipated future urban development and also major infrastructure projects associated with the Pacific Highway Upgrade and other potential major projects such as the Pottsville Industrial Estate as recently mooted by Council.

## 1.5 The Proponent

Ramtech Pty Ltd is a private company incorporated in 1981. Its Registered Office is located at No. 11-15 Quarry Road, Murwillumbah. The company operates storage operations and has also been heavily involved in the construction and commissioning of sailing and motor boats. Ramtech Pty Ltd has also in the past and present been involved in agricultural pursuits, including on the subject site.

## 1.6 Objectives of the Proposal

The objectives of the proposal are:

- to identify viable fine sand reserves to supply local and regional markets;
- to ensure that quarry operations have the capacity to produce up to 300,000 tonnes per annum (tpa) of sand product to enable the short and long term demands generated by major infrastructure projects and continued development to be met;
- to produce high quality quarry product in an environmentally acceptable and efficient manner;
- to ensure noise, extraction, visual and traffic impacts on surrounding residences and land uses are at an acceptable level whilst maintaining the economic viability of the proposed development;
- to provide for the ongoing rehabilitation of future extraction and surrounding areas and to develop appropriate decommissioning strategies for the site at the end of the life of the quarry.

## 1.7 Key Elements

- Extraction of quality sand from the site by way of suction dredges to an annual limit of 230,000m<sup>3</sup> or 300,000 tonnes per annum. Extraction will be undertaken in two (2) stages. The 1<sup>st</sup> stage representing the northern extraction pond and the 2<sup>nd</sup> stage being the southern pond parallel to the eastern extremity of Kelleher's Road. Operational works will be carried out in various 'sub stages' (for site management purposes only).
- *In situ* Indicated Mineral Resources within the two proposed pits total 6.88 Mm<sup>3</sup>, including approximately 0.22 Mm<sup>3</sup> of overburden. Computer modelling of a proposed pit design indicated that up to 6 Mm<sup>3</sup> of sand products could be extracted from the proposed pits, inclusive of approximately 90,000 tonnes of brickeys loam. Please note however that the latter figure (relating to brickeys loam) is relative to a sampling area of only 4ha and therefore could be much greater over the site. Processing of the sand would result in < 100 000 m<sup>3</sup> of fines requiring re-internment in the pits.

- 'Life' of the quarry is anticipated to be 26 years. Please note that the proposal had originally catered for a time frame of 20 years, however the revised resource assessment carried out subsequent to concerns raised by the Department of Primary Industries identified additional sand resources for extraction. This compiled report reflects the proposed amendments.
- Extraction of initial overburden for use in both staged rehabilitation of the site and sale for use in Brickies Loam. This component is known to incorporate a volume of 90,000 tonnes based on a preliminary sampling area of 4ha.
- Provision of visual buffers surrounding the extraction area and haulage routes.
- Bunding of extraction and operation areas to a Q<sup>3</sup>month level (2.75m AHD).
- Rehabilitation of 15ha of existing degraded vegetation and creation of improved wildlife corridors. No clearing is required in order to facilitate the proposal.
- Sealing of the inbound and outbound access route and upgrade of new entry / exit point to Pottsville Mooball Road.
- Creation of up to eighteen (18) equivalent full time positions.
- Partial rehabilitation of extraction areas (Lake Fringe) to naturalised waterway.
- Adherence to detailed environmental and operational management plans.
- Provision of acoustical buffers to machinery within southern extraction area.

## 1.8 Land Tenure

All lands associated with the operation of the proposal are in private ownership (Ramtech Pty Ltd). These lots are described as follows:-

**Table 2: Land Tenure**

Lot Number	Plan Number	Registered Owner
Lot 1	Deposited Plan 208249	Ramtech Pty Ltd
Lot 182	Deposited Plan 755721	Ramtech Pty Ltd
Lot 183	Deposited Plan 755721	Ramtech Pty Ltd
Lot 44	Deposited Plan 755721	Ramtech Pty Ltd
Lot 81	Deposited Plan 755721	Ramtech Pty Ltd
Lot 162	Deposited Plan 755721.	Ramtech Pty Ltd
Lot 2	Deposited Plan 780199	Ramtech Pty Ltd
Lot 1	Deposited Plan 780199.	Ramtech Pty Ltd
Lot 1	Deposited Plan 780200	Ramtech Pty Ltd
Lot 2	Deposited Plan 785895	Ramtech Pty Ltd

Council road reserves are to be utilised in the haulage of material, although it is noted that utilisation is only in part as the existing road does not follow the specific route of the reserve proper.

A land tenure plan has been prepared and is attached at Appendix D to this submission.

Copies of each relevant Deposited Plan are attached at Appendix E to this submission.



## 1.9 The Planning & Approval Process

The proposed development is identified as a Major Project / State Significant as defined by State Environmental Planning Policy (Major Projects). As such the relevant consent authority will be the Minister for Planning.

A Planning Focus Meeting was held, with participation from all relevant Government Agencies, in June 2003. Subsequent to the Planning Focus Meeting and their attendance at a community meeting, the Department of Infrastructure, Planning and Natural Resources (DIPNR) (now Department of Planning) considered the issues raised by the government agencies and the community in providing the Director-General's requirements for preparation of the Environmental Assessment (EA).

On 1 August 2005, the provisions of Part 3A (Major Projects) of the EP&A Act commenced, and under these provisions this project continues to be defined as State Significant development and is to be determined by the Minister for Planning. In accordance with the requirements of the Part 3A process, the Department of Planning issued their requirements for the Environmental Assessment, which confirmed the key issues to be addressed and the level of assessment required. The Director-General's requirements identified the key issues as being:

- Transport;
- Noise;
- Air;
- Soil and Water (inc groundwater);
- Visual;
- Flora and Fauna; and
- Aboriginal Heritage.

## 1.10 Statement of Commitments and Mitigation Measures

The following sections summaries the commitments by Ramtech Pty Ltd regarding mitigations and control measures to be implemented for the proposal:

### Sand Extraction

- Extraction of marine clay will not be undertaken
- Sand extraction below the watertable will be by suction dredge only. No dry extraction of sand will occur on site, with the exception of the initial overburden and brickies loam.
- Prior to commencement of extraction, the extent of the approved extraction areas shall be clearly and permanently marked by a licensed surveyor with survey posts.
- Fines will be re-interred approximately below the watertable at approximately 10m below NSL.

### Sediment and Erosion Control

- A perimeter bund and catch drain shall be constructed around each dredge pond and processing areas. The bund is to be vegetated.

- Installation of sediment control fences at the downslope perimeter of cleared or disturbed land. These are to be functional before clearing commences.
- A negative grade will be maintained around the dredge ponds within the bunded perimeter.
- Additional Erosion and sediment control devices shall be installed on an 'as required' basis. Such measures will be installed in accordance with the "Soils and Construction Guidelines - Managing Urban Stormwater".
- Where practical, surface waters from undisturbed areas shall be diverted away from extraction/works areas.
- All processing areas will drain towards the onsite water bodies. No discharge of processing waters from the site shall occur under normal conditions (ie. Not flooded).
- Topsoil stripping will be undertaken in sub-stages of 1 hectare or less
- All existing ground cover around the site is to remain and be maintained to limit sediment and erosion.
- Any on-site stockpiles of commercial sand shall remain damp and will have appropriate sediment and erosion control devices installed at all times.
- Stockpiled topsoil shall be seeded so as to achieve adequate vegetation cover and sediment and erosion devices will be installed around all stockpiles at all times.
- No discharge of processing water from the site shall occur under normal conditions (ie. not flooded)

#### Surface Water Control & Quality

- Installation of surface and ground water monitoring devices as located on figure GJ0400.9.2 (Appendix Q)
- Surface water monitoring shall be undertaken in accordance with requirements as outlined with the draft EMP under Appendix G.
- All processing areas will drain towards the onsite water bodies. No discharge of processing waters from the site shall occur under normal conditions (ie. not flooded).
- Provision of reliable *in situ* monitoring equipment at all times for use by Quarry staff. This equipment will be calibrated at least monthly.
- All effluent generated will be pumped off site for treatment at Council facility.

#### Groundwater Movement and Quality

- Installation of ground water monitoring devices as located on figure GJ0400.8.1 (Appendix Q)
- Ground water monitoring shall be undertaken in accordance with the requirements as outlined within the draft EMP under Appendix G.
- Provision of reliable *in situ* monitoring equipment at all times for use by Quarry staff. This equipment will be calibrated at least monthly.
- All groundwater bores will be licensed by DIPNR.
- Dewatering from on site water bodies will not be undertaken
- Contour profiling of groundwater head data will be undertaken as part of site monitoring and reporting procedures.

### Fuel Management and Land Contamination

- Fuel storage is to be contained within a bund area, and protected from the elements. Bunding will be sufficient to contain 110% of the volume of fuel storage.
- Operating procedures for containing and cleaning up oil spills on water to be established and implemented on site, with all staff to be trained in these procedures.
- Products designed to contain and absorb oil spills on water will be available on site. Quantity and type of product will be monitored and will be available in sufficient quantities to deal with any potential spill on site.
- Materials stored on site will be limited to
  - One (1) month supply of diesel
  - Machine and equipment oils and grease
  - limited quantities of petrol
  - Welding and workshop gases.

### Air Quality

- The full length of internal haulage roadways will be sealed.
- A vegetation barrier for dust control along the southern boundary adjoining Warwick Park Road will be established (species and planting in accordance with rehabilitation plan, Appendix H).
- Topsoil stripping will be undertaken in sub-stages of 1 hectare or less.
- Topsoil stripping will not be undertaken on day with excess winds.
- All trucks entering/leaving the site shall be covered.
- Stockpiled topsoil shall be seeded so as to achieve adequate vegetation cover and sediment and erosion devices will be installed around all stockpiles.
- Any disturbed or unsealed movement areas will be watered by an onsite cart to ensure that such areas remain damp. Watering rates shall not be less than 2.5l/m<sup>2</sup>/hour.

### Noise

- Construction of a 4m high earth mound shielding the operational areas
- The earth mound is to be constructed between 7.30am and 5pm. The occupants of the nearest dwellings to the site be notified as to the hours of operation for the mound construction, and be provided with a contact telephone number should they have concerns regarding noise from this stage of the operation;
- The bulldozer used to construct the earth barriers should be well maintained, and fitted with residential mufflers;
- Upon plant dredge pump selection, noise levels should be less than or equal to 88dB(A) at 1m from the plant. If this level is not achievable, further acoustic treatment in the form of a semi enclosure will be required to reduce source noise levels to within the acceptable range;

- Upon sand screening plant selection, noise levels should be less than or equal to 80dB(A) at 1m from the plant. If this level is not achievable, further acoustic treatment in the form of a semi enclosure will be required to reduce source noise levels to within the acceptable range;
- Haulage trucks and the wheeled loader should be well maintained, and fitted with residential mufflers;
- Internal haulage route and the crossover to Pottsville Road be as smooth as possible, and well maintained;
- Prior to commencement of operations, an acoustic test be conducted to ensure compliance with the noise limit criteria;
- All operations to be limited to 7am to 6pm, Monday to Friday, and 7am to midday, Saturdays.

### Flora & Fauna

- Removal of existing weed species (particularly infestations of Bitou Bush and Lantana).
- Revegetation of disturbed areas within existing native vegetation communities with plants endemic to the locality. Revegetation areas will total approximately 15ha in area. No clearing of vegetation is required.
- Revegetation of nominated areas within the rehabilitation plan as attached under Appendix H to strengthen potential habitat corridors, extend the distribution of Swamp Sclerophyll and Littoral Rainforest environments and to extend the perimeter of the narrowest portions of the eastern forest to provide long-term mitigation against potential edge effects.
- Incorporation of potential foraging resources for threatened fauna species within landscaping/revegetation areas including:
  - *Allocasuarina littoralis*, *A. torulosa* for Glossy Black Cockatoos
  - Flowering species (Eucalypts, Corymbians, Melaleuca, Banksia) for flying fox/bat species
  - Littoral Rainforest fruiting species for Fruit-doves/Rainforest Pigeons
  - Favoured Eucalypts for Koalas
- Installation of nest boxes within the existing vegetation communities.

### Waste

- All soil waste will be disposed of by licensed contractor in accordance with the *Protection of Environmental Operations Act 1997* (POEO Act 1997) & *Waste Minimisation Act 1995*.
- Effluent will be pumped off site for treatment within an appropriate Council facility

### Flooding

- Adoption of a Q<sup>3</sup>month bunding level of 2.75m AHD around each lake.

## Views and Landscapes

- 5m to 10m vegetated buffers will be established in accordance with the rehabilitation plan attached under Appendix H.

## Monitoring, Reporting and Consultation

- Reporting and consultation measures will be implemented as outlined with the draft EMP under Appendix G.

### 1.11 Structure of Submission

This EA has been prepared in accordance with the Director-General's requirements provided in accordance with Section 75F of the EP&A Act and addresses the relevant government agency requirements which are provided in Appendix B. An overview of the layout of this document is provided below.

The **Executive Summary** provides a brief overview of the project, key environmental assessment results and an outline of proposed environmental management procedures.

**Section 1: Introduction** - provides background to and sets the context for the project. It consists of a brief introduction to the project, the project objectives, an overview of the approvals and consultation process, the key elements of the proposal and an outline of the structure of the EA.

**Section 2: The Site & its Surrounds** - provides a detailed description of the site and surrounding context in terms of zonings, land uses and existing improvements.

**Section 3: Description of Proposal** - contains a detailed description of the proposed development.

**Section 4: Existing Agricultural Land Use Assessment** - provides an assessment of the sites potential agricultural capabilities and agricultural land use classifications.

**Section 5: Statutory Framework** - provides an assessment and discussion of requirements as outlined within all relevant Commonwealth, State and Local legislation and planning controls.

**Section 6: Environmental Considerations & Impacts** - contains a description of the existing environment and a comprehensive analysis and assessment of the environmental impacts of the project. Environmental management and monitoring measures are also described in this section.

**Section 7: Socio / Economic Considerations & Impacts** - Contains an assessment of the potential social and economic impacts associated within the proposal. This section also assesses alternative uses of the site and the advantages and disadvantages associated with each.

**Section 8: Environmental Management** - summarises key commitments made by Ramtech Pty Ltd in relation to the project design, environmental and community management measures, and monitoring to be implemented for the life of the project.

**The Appendices** of the EA - include the technical reports and information which provide further detail regarding many of the key environmental issues addressed in the main text.

## The Site & its Surrounds

### 2.1 Property Description

The following table identifies the allotments which comprise the total site area of the property. As described within table 3 below, the subject lots are considered to constitute 'the site' for this application.

**Table 3: Property Description**

Lot Number	Plan Number	Registered Owner	Area
Lot 162	Deposited Plan 755721.	Ramtech Pty Ltd	81.03 ha
Lot 1	Deposited Plan 780199.	Ramtech Pty Ltd	36.49 ha
Lot 2	Deposited Plan 780199	Ramtech Pty Ltd	40.11 ha
Lot 2	Deposited Plan 785895	Ramtech Pty Ltd	122.9 ha
Lot 1	Deposited Plan 208249	Ramtech Pty Ltd	31.98 ha
Lot 183	Deposited Plan 755721	Ramtech Pty Ltd	85.99 ha
Lot 44	Deposited Plan 755721	Ramtech Pty Ltd	32.37 ha
Lot 81	Deposited Plan 755721	Ramtech Pty Ltd	24.58 ha
Lot 1	Deposited Plan 780200	Ramtech Pty Ltd	55.84 ha
Lot 182	Deposited Plan 755721	Ramtech Pty Ltd	40.46 ha
<b>Total Area</b>			<b>551.75 hectares</b>

The property is informally known and referred to as, 'Dunloe Park'.

### 2.2 Subject Site and Existing Improvements

The site is currently used for agricultural purposes (grazing of livestock) and is partially leased for sugar cane cultivation.

All existing site improvements are associated with these agricultural uses, with the exception of existing dwelling houses as depicted in the following aerial excerpt under section 2.6.

In addition, the site currently contains the following:

- Maintained and intact boundary and paddock fencing
- Agricultural drainage lines running predominantly east west
- Small live stock water dams
- Internal access tracks for farm machinery movement.

Large agricultural sheds are located as shown within the operational plans attached under appendix A. These sheds will be utilised for the purpose of storage and ancillary maintenance of machinery and plant equipment associated with the proposal.

## 2.3 Roads and Access

The wider Dunloe Park property is accessible via formed access points off Kelleher's Road and Warwick Park Road. The property also fronts reserves, many of which are unformed. The extent of road reserves within and surrounding the site is best depicted in the Land Tenure plan attached to this submission (refer appendix D).

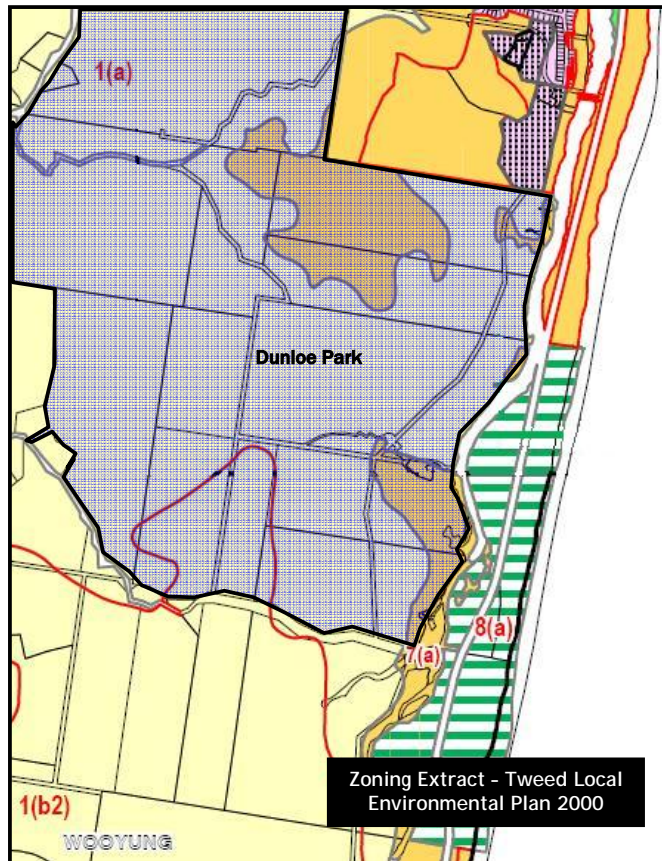
## 2.4 Statutory Zoning

The site is subject to a number of statutory zonings under the Tweed Local Environmental Plan 2000 (TLEP 2000). As identified within the TLEP 2000 the site contains the following zones:

- 1(a) Rural;
- 1(b2) Agricultural Protection; and
- 7(a) Environmental Protection (Wetland and Littoral Rainforest)

A zoning plan to the right of text demonstrates the zoning of the land.

The extraction ponds and operation areas have been located such that they are contained within the Land zoned 1(a) Rural. Pursuant to the TLEP 2000 extractive industries are allowable with consent in the Rural 1(a) zone.



## 2.5 Location/Context

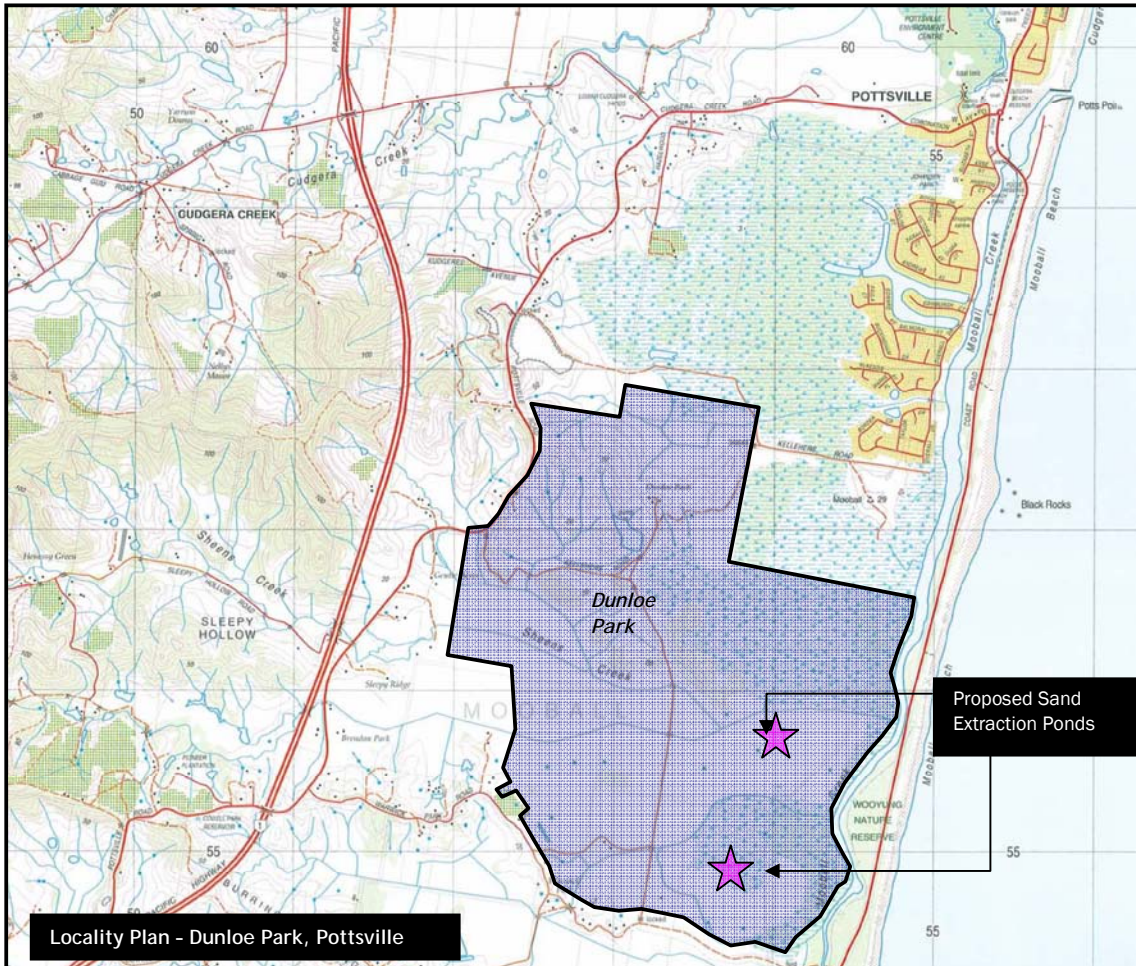
The subject site is located within the Shire of Tweed at Mooball, approximately 3km south of the northern New South Wales coastal town of Pottsville. Within the immediate vicinity, the following elements frame the context of the site:

- Existing quarry (Tagget's Quarry) is located approximately 2km to the North West.
- National park and nature reserve is located to the east, between Mooball Creek and the Coast Road.
- Black Rocks residential estate is located approximately 1.1km to the north.
- Mooball Creek runs adjacent to the eastern boundary, with the site being located approximately 4km up stream of the mouth of the creek.



- Extensive sugar cane farming and live stock grazing exists to the south, west and North West of the site.

The Regional, Local & Immediate context of the 'site' is depicted in the following diagram.



## 2.6 Surrounding Land Uses and Surrounding Zonings

The surrounding area includes a number of land uses and zonings. In the immediate vicinity the following land use zonings are present:

- 1(a) Rural
- 1(b2) Agricultural Protection
- 2(a) Low Density Residential
- 7(a) Environmental Protection (Wetland and Littoral Forest)
- 7(l) Environmental Protection (habitat); and
- 8(a) National Parks and Nature Reserve

The zoning plan attached under Appendix F demonstrates the locations and nature of the subject zonings.

Within the surrounding 'Rural' zoned areas, the dominate land uses include sugarcane farming and livestock grazing. Additional uses present include an existing quarry located to the north west of the site and scattered residential dwellings.

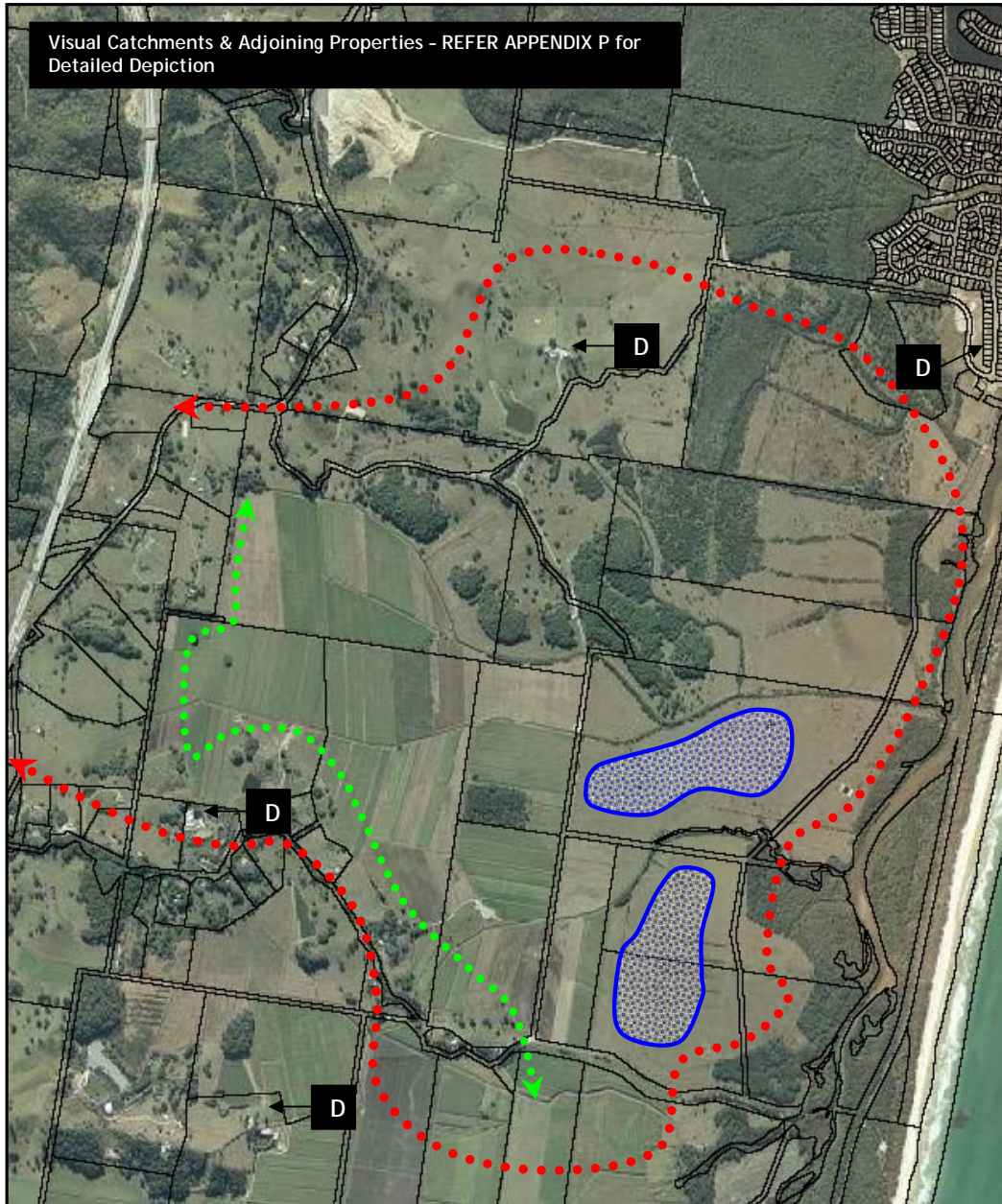
Areas identified under the Environmental Protection zoning contain a combination of remnant and regrowth vegetation. Aerial imagery available indicates many of these areas have unconsolidated vegetation present, with cleared open areas and some disturbance visible.

With regard to urban uses the closest residentially zoned area is located approximately 600m to the North of the site within the Black Rocks residential estate area. The estate comprises low density dwellings with no major commercial and retail facilities present. The full extent of the estate is yet to be developed with the closest developed areas are approximately 1.2km from the northern boundary of the site.

Existing rural and rural residential properties adjoin the western and southern perimeter of the Dunloe Park property. These properties are considered to be the most closely related to the proposed development, with other surrounding properties largely isolated from the proposal by way of either significant vegetation or topography.

These properties are depicted in the following diagram and within the diagrams provided within the visual assessment (refer Appendix P).

*Continues next page.....*



- Available Visual Catchment
- Restricted Visual Catchment
- D** Adjacent Dwelling/s

## 2.7 Adjoining Properties

The Immediately adjoining properties are summarised within the following table. In general the adjoining properties are used for the production of sugar cane or grazing of livestock. Structures on these properties are limited to single rural dwellings and farm sheds.

**Table 4: Adjoining Properties & Description**

Dwelling No.	Property Description	Location	Description of Property
1	Lot 1 in DP 329216	On northern side of Warwick Park Road – adjoining southern boundary of Dunloe Park.	<p>The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 600m southwest of the stage 2 extraction pond.</p> <p>This property contains the closest dwelling house to the extraction areas.</p> <p>Direct views are available from this property to the proposal.</p>
2	Lot 2 in DP 184972	On northern side of Warwick Park Road – adjoining southern boundary of Dunloe Park.	<p>The property is a small rural residential allotment. The property contains a dwelling house, which is located approximately 750m southwest of the stage 2 extraction pond. A larger portion of this allotment is located on the southern side of Warwick Park Road.</p> <p>This property contains the second closest dwelling house to the extraction areas.</p> <p>No direct vies are available from this property to the proposal due to the presence of a small ridge.</p>
3	Lot 12 in DP 734517	On northern side of Warwick Park Road – adjoining southern boundary of Dunloe Park.	<p>The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 930m southwest of the stage 1 extraction pond.</p> <p>This property contains the third closest dwelling house to the extraction areas.</p> <p>No direct views are available to the proposal from this property.</p>
4	Lot 7 in DP 262229	On northern side of Warwick Park Road – adjoining southern boundary of Dunloe Park.	<p>The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 1100m southwest of the stage 1 extraction pond.</p> <p>This property contains the fourth closest</p>

5			<p>dwelling house to the extraction areas.</p> <p>Indirect views are available to the proposal from this property, although these are partially screened by a large stand of existing remnant vegetation within the Dunloe Park boundaries.</p>
	<b>Lot 10 in DP 262229</b>	<p>On northern side of Warwick Park Road – adjoining western boundary of Dunloe Park.</p>	<p>The property is a larger rural allotment. The site contains a dwelling house, which is located approximately 1200m west of the stage 1 extraction pond.</p> <p>This property contains the fifth closest dwelling house to the extraction areas.</p> <p>Indirect views are available to the proposal from this property, although these are partially screened by a large stand of existing remnant vegetation within the Dunloe Park boundaries. This property is at a similar grade to the proposed extraction areas.</p>
6	<b>Lot 9 in DP 262229</b>	<p>On northern side of Warwick Park Road – adjoining Lot 10 in DP 262229. Does not adjoin Dunloe Park.</p>	<p>The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 1390m southwest of the stage 1 extraction pond.</p> <p>This property contains the sixth closest dwelling house to the extraction areas.</p> <p>No direct views are available to the proposal from this property.</p>
7	<b>Lot 8 in DP 262229</b>	<p>On northern side of Warwick Park Road – adjoining Lot 10 in DP 262229. Does not adjoin Dunloe Park.</p>	<p>The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 1600m southwest of the stage 1 extraction pond.</p> <p>This property contains the seventh closest dwelling house to the extraction areas.</p> <p>No direct views are available to the proposal from this property due to topographical barriers.</p>
8	<b>Lot 42 in DP 870680</b>	<p>On eastern side of Pottsville-Mooball Road. Adjoins western boundary of Dunloe Park.</p>	<p>The property is a rural residential allotment. The site contains a dwelling house, which is located approximately 1800m north west of the stage 1 extraction pond.</p> <p>This property contains the eighth closest dwelling house to the extraction areas.</p>

9			Indirect views are available to the proposal from this property; however they are partially obscured by vegetated barriers.
	<b>Lot 3 in DP 845662</b>	On northern side of Warwick Park Road – adjoining southern boundary of Lot 5 in DP 845662. Does not adjoin Dunloe Park.	<p>The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 1810m southwest of the stage 1 extraction pond.</p> <p>This property contains the ninth closest dwelling house to the extraction areas.</p> <p>No direct views are available to the proposal from this property due to topographical barriers.</p>
10			
	<b>Lot 2 in DP 845662</b>	On northern side of Warwick Park Road – adjoining southern boundary of Lot 5 in DP 845662. Does not adjoin Dunloe Park.	<p>The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 2050m southwest of the stage 1 extraction pond.</p> <p>This property contains the tenth closest dwelling house to the extraction areas.</p> <p>No direct views are available to the proposal from this property due to topographical and vegetated barriers.</p>
11			
	<b>Lot 1 in DP 845662</b>	On northern side of Warwick Park Road – adjoining southern boundary of Lot 5 in DP 845662. Does not adjoin Dunloe Park. Located in close proximity to intersection of Warwick Park Road and Pottsville-Mooball Road.	<p>The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 2180m southwest of the stage 1 extraction pond.</p> <p>This property contains the eleventh closest dwelling house to the extraction areas.</p> <p>No direct views are available to the proposal from this property due to topographical and vegetated barriers.</p>
12			
	<b>Lot 5 in DP 845662</b>	On eastern side of Pottsville – Mooball Road.	<p>The property is a larger rural allotment. The site contains a dwelling house, which is located approximately 2200m west of the stage 1 extraction pond.</p> <p>This property contains the twelfth closest dwelling house to the extraction areas.</p> <p>Indirect views are available to the proposal from this property, although these are predominantly screened by both topographical and vegetated</p>

<b>13</b>			barriers. This property is at a similar grade to the proposed extraction areas.
	<b>13</b>	<b>Lot 3 in DP 580351</b>	On eastern side of Pottsville - Mooball Road.
			The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 2200m west of the stage 1 extraction pond.  This property contains the thirteenth closest dwelling house to the extraction areas.  Indirect views are available to the proposal from this property, however they are partially obscured by vegetated barriers.
<b>14</b>	<b>14</b>	<b>Lot 2 in DP 580351</b>	On eastern side of Pottsville - Mooball Road.
			The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 2200m west of the stage 1 extraction pond.  This property contains the fourteenth closest dwelling house to the extraction areas.  Some elevated views are available to the extraction area from this property.
<b>15</b>	<b>15</b>	<b>Lot 1 in DP 580351</b>	On eastern side of Pottsville - Mooball Road.
			The property is a small rural residential allotment. The site contains a dwelling house, which is located approximately 2200m west of the stage 1 extraction pond.  This property contains the fifteenth closest dwelling house to the extraction areas.  Indirect views are available to the proposal from this property, however they are partially obscured by vegetated barriers.
<b>NB. Dwelling Numbers to be read in conjunction with Appendix P</b>			

## 2.8 Climate

The local area is described as sub-tropical with a climate of cool dry winters, with most of the rainfall occurring (seasonally) in the summer months.

Meteorological data for the site was collected from the Bureau of Meteorology records held for the Condong Sugar Mill. This station is located at latitude (deg S) -23.3167 and Longitude (deg E) 153.4333. Data available for this area spanned from 1887 to 1972. The below tables demonstrates the monthly averages calculated from the available data:

**Table 5: Monthly Average Climatic Data**

Month	Avg. daily max temp (°C)	Avg. daily min temp (°C)	Avg. 3pm relative humidity %	Avg. monthly rainfall (mm)	Avg. no. rain days
Jan	29.2	18.5	-	219.8	14.7
Feb	28.8	18.6	-	249.7	15.9
Mar	28	17.2	-	264.2	18.3
Apr	26.2	13.8	67	147.9	13.8
May	23.5	10.2	57	138.5	12.2
June	21.3	7.8	-	122.8	9.4
July	21.1	6.4	-	93.5	8.3
Aug	22.3	6.7	-	73.4	8.5
Sept	24.4	9.6	-	66	9
Oct	26.4	12.1	-	87.9	9.8
Nov	28	15.7	-	105.5	10.5
Dec	29.2	17.7	-	150.9	12.5



# EA 3

## Description of the Proposal

### 3.1 Proposed Development – General Summary

The proposal is for the extraction of sand from the subject site by means of both suction dredge (wet extraction) and dry extraction (initial overburden and brickies loam extraction).

The following table summarises the proposed developments physical parameters.

**Table 6: Physical Parameters**

<b>Extraction Method</b>	Suction Dredge (quality sands) and Dry Excavation (overburden)
<b>Extraction Area</b>	Pond 1 – 31.7 hectares Pond 2 – 25.0 hectares <b>Total – 56.7 hectares</b>
<b>Extraction Depth</b>	Nominal maximum of 12m (average 11m)
<b>Resource</b>	6,000,000m <sup>3</sup> , inclusive of 90,000 tonnes of brickies loam (known loam resource based on 4ha sampling area)
<b>Processing</b>	Hydraulic separation (initial dry excavation)
<b>Haulage Route</b>	Dedicated 'haulage track' & Pottsville Road to Pacific Highway via the Cudgera Creek interchange
<b>Buffer Zones</b>	5-10 metre naturalised buffer around extraction lakes
<b>Rehabilitation</b>	Environmental rehabilitation of external degraded areas (15ha)
<b>Quarry Operational Life</b>	26 years
<b>Resource Usage</b>	Concrete, Brickies Loam, Fill Sands, Ancillary Uses
<b>Pit Batters</b>	35%

### 3.2 Description of Resource

#### 'Extract from John Siemon Resource Assessment – Appendix R'

Diverse logging styles for the drilling programs have complicated the assessment of the sand resources at Dunloe Park. Although the Border-Tech logs indicate that most of the sequence is silty sand, particle size analyses (Appendix 4) show that the material is generally fine to medium sand with < 5 % -150 micron.

The G&S preliminary resource assessment referred to extraction of near surface materials as brickies loam. Unfortunately there is insufficient data to accurately identify the distribution of surface materials or even confirm the presence of units shown in Figure 2.

Loam *per se* was recorded in only 3 holes where the colour was dark brown, brownish black or dark reddish brown. The surface layer in the majority of holes was logged as fine grained silty sand; this material averages 0.4 m and ranges in colour from black to light and dark shades of grey, yellow and brown. Unfortunately there are no particle size analyses of this material. An inspection of three pits (A to C - Figure 3) indicated that the surface layers were unlikely to contain material suitable for use as brickies loam.

Testing of samples from hand auger holes drilled above the water table (Coffey Geotechnics, 2007) in the area proposed for initial development (Figure 5) indicated that premium grade brickies loam was unlikely to be present due to colour and the presence of organics which may impede the acceptance of the product in the marketplace" (Appendix 6). It is not clear whether these comments translate to the remainder of the surface materials within the proposed development.

The potential sand extraction sequence ranges in thickness from 7 to about 15 m (average about 11 m) with colours varying from shades of grey and yellow to brown; the upper surface lies at an average depth of about 0.4 m below the surface. Fine shell fragments occur in trace amounts within the sand.

Sand described as brownish black was excluded from the interval except for thin (< 0.5 m) layers and the interval in DL02 (2.0 - 9.5 m) which was described as containing occasional charcoal and wood with fine shell.

Particle size analyses for the Border-Tech holes (Appendix 4) indicate that the Nominal Top Size of the sand (95% Passing) is about 425 microns. In holes BH04, 05 and 09 the analyses show a nominal top size closer to 300 microns. The average content of < 75 micron material was less than 2 percent.

In holes BH01, 02, 03, 07 and 08 the particle size distribution increases with depth with the introduction of a coarse sand - fine gravel component. The drill logs report the presence of angular to rounded, fine to coarse grained gravel, generally in the deeper parts of the deposit. Unfortunately no descriptions of the gravel composition or photographs can be located. Particle size analyses (Appendices 4 and 5) indicate that the gravel in the potential sand extraction sequence comprises 12 to 20% in the 4.75 x 2.36 mm fraction in holes BH 03 (8.0 to 8.45 m - 13%), BH 07 (6.0 to 7.0 m - 12%) and BH 08 (12.0 to 12.45 m - 20%); the interval in BH07 is not logged as containing gravel. Consequently some additional drilling is required within the potential sand sequence to determine the quality, extent and significance of the reported gravel.

The base of the potential sand extraction sequence is marked by:

- Brownish black sand and silty sand in the northeast and southwest of the North Pit, and south of South Pit, and
- Clay (silty and sandy) in the central parts of both pits.

The basement to the potential sand resource comprises interbedded silty, clayey and / or gravely sand (often brownish black and probably coffee rock) with silty and sandy clay; the underlying "Clayey Rock" was intersected at 21.6 m in DL11. In this hole greyish yellow indurated silty sand was intersected from 6.9 to 8.6 m underlying the sand. It is possible that this layer may be cemented by carbonate and be similar to the hard indurated sands reported to have caused problems in mineral sands mining. Wood, charcoal and shell fragments commonly occur in the basement sediments. In some logs gravel was reported in the coffee rock, unfortunately it is not clear if it was true gravel (commonly quartz pebbles) or indurated coffee rock fragments

Guidelines to the 2004 edition of the JORC Code (JORC, 2004) suggest that “Confidence in the estimate is sufficient to allow the application of technical and economic parameters, and to enable an evaluation of economic viability”.

The drill hole spacings within the site do not give complete coverage of the potential extraction pits. However, the particle size analyses, while largely from disturbed samples and not available for all holes or continuous down hole, show broad agreement in the. On the basis of the above definitions, hole spacing, quality and distribution of analytical data, Resources (see below) have been estimated as *in situ* **Indicated Mineral Resources** (JORC, 2004).

#### Dunloe Park *in situ* Indicated Mineral Resources

Pit	Overburden Mm3	Sand Mm3	Total Mm3
North Pit	0.14	3.70	3.84
South Pit	0.08	2.96	3.04
<b>Total</b>	<b>0.22</b>	<b>6.66</b>	<b>6.88</b>

### 3.3 Quarry Layout

Australian Mine Design & Development Pty Ltd (AMDAD) was commissioned to undertake the development of a conceptual pit design, based on the following parameters:

- Pit and bund boundaries as originally identified by G&S,
- Final pit slope to RL -1 of 3H: 1V,
- Final pit slope from RL -1 to base of pit of 5H: 3V (approximately 30° )\*\*\*,
- Bunds built to RL 2.75 with slope of 1H: 1V

\*\*\* Note: Angle of repose of sand is approximately 35°.

The quarry layout comprises two extraction ponds consisting of 25 hectares and 31.7 hectares respectively. Extraction Area 1 is located approximately 200m north of pond 2 or 1100m north of the southern boundary, whilst Extraction Area 2 is located in the south east corner approximately 100m from the southern boundary. Both areas are located adjacent to the eastern boundary, with Mooball Creek at distances ranging from 300m to 500m.

Operational Plans under Appendix A depicts the proposed quarry layout over the staged quarry operations.

The proposal will provide for a vegetated buffer zone (5m-10m) around the edges of both extraction ponds. The buffer zone will be complimented with revegetated landscaped areas along the eastern boundary of all lots to Mooball Creek (15ha).

Road access will be provided to the site from Pottsville Road via a dedicated ‘haulage track’. A separate egress point to Pottsville Road is proposed from Lot 2 in DP 785895.

Bunding will be provided to both extraction ponds and operational areas to ensure capacity to contain the runoff from a 3 month rainfall event. The bunding height has been identified as 2.75m AHD (see appendix O for detailed discussion).

The wash plant will be located within the processing area identified on the operational plans provided (refer Appendix A).

### 3.4 Extraction, Processing & Haulage

#### 3.4.1 Extraction Plan and Operational Life

Extraction is to be undertaken in two (2) stages.

Initial extraction will be undertaken within the northern extraction area (Stage 1), with Stage 2 being the southern extraction area.

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

An initial 'sub stage' of wet dredged excavation will be undertaken, which will then be banded from the large body of the extraction area. This initial area of excavation will then be utilised as a fines return pond (see appendix A for detailed operational plans).

**Extraction rates are proposed at 300,000 tonnes/230,000m<sup>3</sup> per annum. This will see an operational life of approximately 26 years.**

#### 3.4.2 Processing

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

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

No chemical processing or mineral extraction is proposed.

#### 3.4.3 Haulage Routes & Procedures

The proposed development will be accessed by way of a 'haulage track' and the north south road reserve adjacent to the proposed extraction areas. The suitability of this entrance is discussed in detail within the attached Traffic Impact Assessment (appendix N). Upgrading is to be carried out in accordance with Council requirements.

The inward and outward route will utilise the same 'haulage track' and will discharge on to Pottsville Mooball Road at the northern extent of the property. The access point has been chosen primarily so as to limit acoustic impacts upon existing residents on the western side of Pottsville Mooball Road (namely Lots 3, 4 & 5 in DP 801404 and Lot 6 & 7 in DP 85611.1) and also to take advantage of suitable sight distances. Please note that Council has issued approval under S.138 of the Roads Act for this crossover arrangement.

In accord with the recommendations contained within the attached air quality assessment (appendix K), all access routes will be sealed for the entire length.

### 3.4.4 Equipment

The following table presents a breakdown on the equipment that will be required to facilitate the proposed operational level. The proposed development will result in an initial capital investment in equipment of approximately \$1.8 million to \$3 million.

**Table 7: Equipment**

Equipment	Brand & Model Number	Quantity	Cost (total Est.)
Dredge	n/a	1	\$50,000 - \$100,000
30 Tonne Excavator	n/a	1	\$200,000 - \$300,000
Sand Separator	n/a	1	\$100,000 - \$200,000
Screening Plant	n/a	1	\$250,000 - \$450,000
Front End Loader	n/a	1	\$400,000 - \$800,000
25 Tonne Dump Truck	n/a	1	\$300,000 - \$600,000
Onsite facilities – Staff Amenities, office facilities and Access Roads	n/a	n/a	\$500,000 - \$1,000,000

### 3.4.5 Work Force, Operational Times & Truck Movements

Hours, periods & times of operation are as outline in Table 8. Operating times and the volume of material within the resource will see the requirement for 18 full time employees plus additional contract maintenance personnel as may be required. Operations will be conducted Monday to Saturday. No operations are to be undertaken on Sunday or public holidays.

**Table 8: Operation Times, Periods & Truck Movements**

Yearly Operation	Days Per Week	Hours Per Week	Daily Operating Times	Truck Movements Per Hour
50 weeks a year	5.5	46	Mon – Fri: 7:30am to 5:00pm Sat: 7:30am to 12:30pm	4

\*\*NB. Based on 34 tonnes per truckload.

## 3.5 Rehabilitation & Final Land Use

### 3.5.1 Rehabilitation Plan

It is proposed as part of the development to plant a partially vegetated buffer around the two extraction ponds and to also rehabilitate part of the site with native vegetation. The lake can then be used for recreation purposes by the landowner or in the future, for purposes associated with the future residential development of the land as per the provisions of the Far North Coast Strategy, details of which will not be finalised for another four years.

This landscaping will be carried out for the following reasons:

- To provide an effective, aesthetically appealing and practical vegetation buffer to the perimeter of the development and in particular the extraction ponds; and
- To Rehabilitate selected areas within the overall Dunloe Park Land holding to consolidate and enhance the existing flora and fauna corridors to the north and east of the extraction areas.

A detailed Revegetation Plan has been prepared by Planit Consulting Pty Ltd and is attached at Appendix H.

The plan identifies various 'zones' of rehabilitation works.

### 3.5.2 Rehabilitation Process

Emphasis will be placed initially on establishing the vegetation buffers around the sand extraction pond and working areas, primarily so as to fast track visual amelioration. Planting will begin on the western side of the development site, concentrated around the stockpiling locations and haulage routes and will gradually progress to the east and south over the life of development. This will provide an effective way of maintaining and enhancing the visual amenity of the area.

A 5m to 10m vegetated buffer is proposed around the extraction pond areas.

The rehabilitation process will be preceded by an extensive seed collection propagation program sourcing from seed reservoirs within the surrounding vegetation communities to the north and south.

### 3.5.3 Rehabilitation Species

A wide range of native species endemic to the area will be selected for the rehabilitation and buffer areas. In this regard Rehabilitation Zone No.1 will be planted out with eucalypts and melaleuca species with an understorey of littoral rainforest species. The Rehabilitation Zones No. 2 and 3 will be based on a melaleuca forest with a littoral rainforest understorey.

The species list and vegetation communities have been derived from the Flora and Fauna Assessment undertaken for the site and surrounding areas (appendix L).

## 3.6 Utilities

### 3.6.1 Water

Water usage associated with the proposal will be minimal and restricted primarily to the amenities building shown within the submitted development layout and to a lesser extent the cleaning and maintenance of plant.

Water associated with this component of the proposal will be harvested on site.

A Drinking Water Management Plan will be prepared as a condition of consent.

Water trucks will also be located on site in order to suppress dust generated from within the stockpile and extraction area; however water utilised for this purpose will generally be sourced external from the site by contractors.

### 3.6.2 Sewage

Sewage generated by the development will also be minimal and will effectively be associated with staff located on the site at any one time. The proposed staff amenities and office building will be accompanied by a proposed effluent 'pump out' facility, thereby limiting the need for disposal areas within a flood plain.

### 3.6.3 Electricity

Electricity supply will be provided by way of augmenting the existing supply from Warwick Park Road. Power will be brought to the site by aboveground mains.

### 3.6.4 Fuel

Diesel will be stored on site in an above ground tank with sufficient capacity for a one (1) month supply. The tank will be contained within a bunded area sized to be at least 110% of the storage volume.

Minimal amounts of oil will be stored onsite and contained within 205 litre drums.

## 3.7 Waste Management

### 3.7.1 Solid Wastes

Waste materials produced by the operation will comprise mainly solid waste, in the form of paper and plastics associated with the operation of the administration office and materials relating to maintenance and repair of equipment. All solid waste will be collected and disposed of by licensed contractor and disposed of at an approved landfill site.

Waste oils, oil filters and batteries from service operations are to be collected and periodically removed by licensed contractor to an approved waste facility or recycling and treatment facility before disposal. While on site, above materials are to be stored to ensure that contamination of the surrounding environment cannot occur.

All waste management will be undertaken in accordance with the requirements of the *Protection of Environmental Operations Act 1997* (PEEO Act 1997) & *Waste Minimisation Act 1995*.

## 3.8 Monitoring

### 3.8.1 Groundwater

A Network of sixteen (16) Piezometers has been installed on site. Installation was undertaken as part of the hydrogeological assessment. The location of the meters was chosen to ensure that disturbance during the operational phase of the works was avoided. This will ensure a continuity of data which can be referenced to pre-disturbance groundwater conditions.

Figure GJ0400.8.1 (Appendix 10 of Appendix Q) demonstrates groundwater monitoring locations for the proposal.

### 3.8.2 Surface water

Surface water monitoring locations have been implemented within all major agriculture and collection drains traversing the site. Additional points have been located where potential flows may enter surrounding sensitive environments. These locations have been utilised to provide the best possible snap shot of the water quality across the site.

Figure GJ0400.9.2 (Appendix Q) demonstrates proposed surface water monitoring locations for the proposal.

### 3.8.3 Air Quality

Eight (8) air quality monitoring points will be established on site. These locations will be as per the recommendations of the Air Quality Assessment contained within Appendix K.

Preliminary analysis indicates that the proposal has potential to exceed prescriptive requirements in relation to air borne pollutant generation. Accordingly, ameliorative measures are required, particularly the sealing of access roads to/from the works site.

Detailed analysis in relation to Air Quality Assessment and recommendations is provided at Appendix K.

### 3.8.4 Noise

Noise levels have been calculated with appropriate acoustical treatments recommended for the dredge operations, truck engine noise and site operational parameters.

The proposal will be subject to further acoustical testing prior to commencement of operations to ensure compliance with noise impact requirements.

### 3.8.5 Flora and Fauna

Flora and fauna monitoring is to be undertaken on rehabilitated and revegetated areas. The locations of these will be as per the Rehabilitation Plan attached as appendix H. Monitoring of nesting boxes is also proposed. The location of these monitoring points will be contingent on the locations of nesting boxes. At this time locations for nesting boxes have not been finalised.

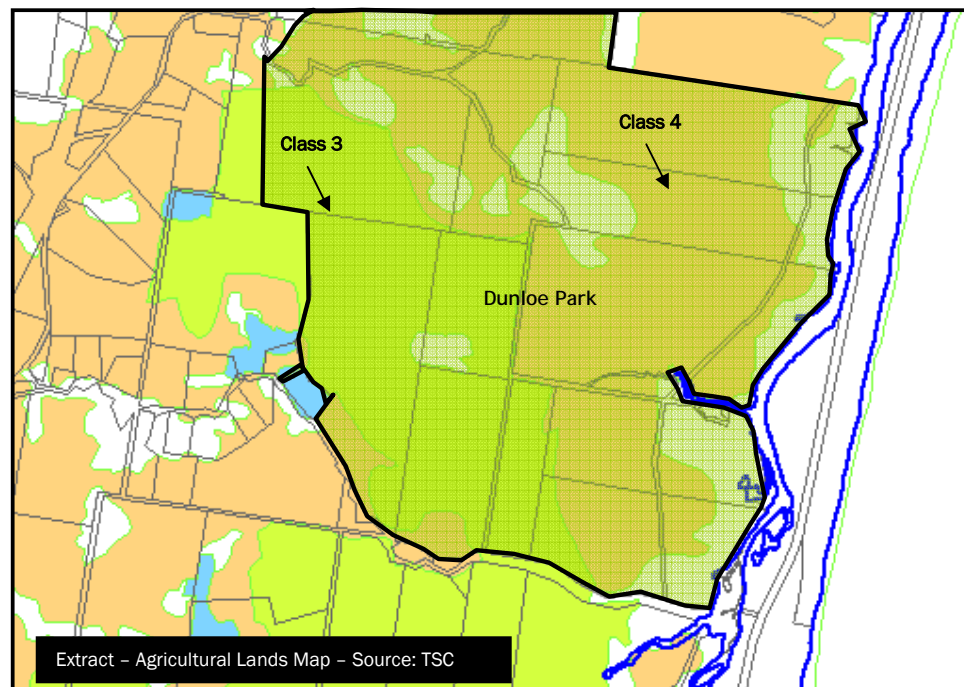


## **Existing Agricultural Land Use Assessment**

### **4.1 Introduction**

The existing agricultural use of the property is predominately the grazing of cattle upon improved pastures and to a lesser extent sugar cane cultivation on a leasehold basis.

As identified within Tweed Council mapping, the site is considered to constitute class 3 and 4 (see figure below) agricultural lands. Pursuant to the requirements of Clause 12 of the North Coast Regional Environmental Plan, a detailed Agricultural Land Assessment has been undertaken to assess the proposals potential to impact upon or result in the loss of good quality agricultural land.



The following sections summarise the findings and comments as outlined within the Agricultural Land Capability Assessment, undertaken by Gilbert & Sutherland Pty Ltd. For detailed discussions of findings, methodology or guidelines/requirements adhered to, refer to Appendix Q.

## 4.2 Agricultural Land Assessment

The Agricultural Land Assessment has identified that the subject site is currently being used to its highest agricultural potential and is consistent with the class of soils indicated on the Council mapping.

The majority of the site, 134.4ha, is considered to contribute a Class 3 to Class 4 classification. This indicates that the site is generally only suitable for pasture improvement and grazing activities. The remaining area of 17.9ha is considered to fall within a Class 5 classification due to its zoning under the Tweed Local Environmental Plan (TLEP 2000) of 7(a) Environmental Protection. As such this area is not considered appropriate for any type of agricultural use.

These findings demonstrate the proposal will not impact upon high quality or importantly viable agricultural land. Accordingly, it is considered that the change from the existing land use to a sand quarry represents what could be classed as a higher and better use of the sites resources and potential.

### 4.2.1 Summary Findings

The Biophysical Constraints Analysis undertaken to assess the site's Agricultural Land Quality can be broken down into three areas. First, soil characteristics; secondly, nutrient assessment; and finally soil features. The following tables summarise the findings and general comments of the Biophysical Constraints Analysis.

**Table 9: Soil Characteristics**

Characteristic	Level Found	Summary Comment
Topography	<3% to 3% to 8%	Based on the slope of the site, the majority of land would be considered as class 1 agricultural land, with some class 2 in the north-western corner.
pH	pH 3 to pH 5.4	It can be generalised that soils with pH's in the encountered ranges are low fertility, weathered mineral soils and acid sulphate soils which are difficult to ameliorate.
Salinity	0.01dS/m to 0.42dS/m	Existing salinity of the site soils is only a slightly limiting factor, however the potential for increased salinity due to the required fertiliser would suggest a greater limiting factor
Organic Matter	0.02% to 7.3%	Nutrient holding capacity of the soil is highly variable through out the site
Cation exchange capacity	0.4 to 4.1	A very low CEC was exhibited throughout the soil profile; this would indicate that soils within the investigation area would be prone to leaching of nutrients.
Ca:Mg ratio	1:1 to 5:1	Generally the ratio of Ca cations to Mg cations in soils within the investigation would not contribute to Ca or Mg deficiencies
Soil structure and dispersion	0.1meq/100g to 0.6meq/100g	Slightly sodic conditions were exhibited throughout the soils profile

**Table 10: Nutrient Assessment**

Macro-Nutrients		
	Required	Found on site
Nitrogen (N)	15 ppm	< 5 ppm
Phosphorus (P)	20 ppm to 30 ppm	< 10 ppm
Potassium (K)	0.2meq/100g to 0.5meq/100g	<0.1ppm to 0.2ppm
Calcium (Ca)	3meq/100g to 6meq/100g	<1meq/100g
Magnesium (Mg)	0.5meq/100g to 1meq/100g	<0.1meq/100g to 0.5meq/100g
Sulfur (S)	4ppm to 8ppm	>8ppm
Micro-Nutrients		
Boron (B)	0.5ppm to 1ppm	<0.1ppm to 0.5ppm
Copper (Cu)	1ppm to 2.5ppm	<0.5ppm to 0.5ppm
Magnesium (Mn)	2.5ppm to 5ppm	<1ppm
Zinc (Zn)	2.5ppm to 5ppm	<1ppm
Aluminium (Al)	0.5meq/100g to 1meq/100g	With levels to 2.37meq/100g
Iron (Fe)	2.5ppm to 5ppm	29ppm to 139ppm
Summary Comment		
<p>Deficiencies of all macro-nutrients, with the exception of sulfur; and all micro-nutrients except Aluminium and Iron were identified in soils throughout the investigation area. Potentially toxic levels of Iron for grazing animals and Aluminium were identified at some locations throughout the subject site.</p> <p>These results suggest a very low fertility status of soils within the site area. As such the majority of the site is considered to fall within the Agricultural Land Class 4 based on nutrient levels.</p>		

**Table 11: Soil Features**

Feature	Found	Summary Comment
Soil depth	No impermeable hardpans were encountered at a depth which would impede root development of improved pastures or sugarcane	Site soils would be considered to be agricultural land class 1 with regard to this constraint, however due to other limiting factors these soils are not considered to be good quality agricultural soils.
Rockiness	No cobbles or gravel were identified within the investigation area in any sizeable quantity.	Sufficient quantities were not found to impede the use of machinery or root development.
Current erosion	Minor rill erosion was observed during site investigations, good ground cover of improved pastures has seen erosion kept to negligible levels	Existing conditions on site have kept erosion to a minimum.
SOILOSS modelling	A potential maximum soil loss rate of 4.5t/ha/yr was calculated on worse case scenarios	The investigation area is not expected to suffer significantly from loss of soil as long as best practice measures such as minimum tillage, direct drilling and maintaining adequate ground cover are employed for agricultural operations.

#### 4.2.2 Agricultural Land Classification

Based on the results of the Biophysical Constraints Analysis, the following agricultural land classes have been assigned to the site.

The results have been averaged to give a general indication of the sites agricultural production ability. The following table outlines the attributes of the site and soil, the averaged score of each attribute and the general percentage of area achieving the classification score.

Figure GJ400.7.4 (Appendix Q) demonstrates the general locations of each class on site.

**Table 12: Agricultural Land Class Percent Summary**

Land Class (approximate % of investigation area)						
Constraints	1	2	3	4	5	Other
Slope %	97.6% (148.4ha)	2.6% (3.9ha)				
Soil Depth	97.6% (148.4ha)					2.6% (3.9ha)
Drainage (permeability)	97.6% (148.4ha)					2.6% (3.9ha)
Soil pH			97.6% (148.4ha)			2.6% (3.9ha)
Salinity		97.6% (148.4ha)				2.6% (3.9ha)
Sodicity		97.6% (148.4ha)				2.6% (3.9ha)
Rockiness or rock outcrops	97.6% (148.4ha)					2.6% (3.9ha)
Soil Type			97.6% (148.4ha)			2.6% (3.9ha)
Soil nutrient deficiency				97.6% (148.4ha)		2.6% (3.9ha)
Nutrient leaching				97.6% (148.4ha)		2.6% (3.9ha)
Wetness & flooding			97.6% (148.4ha)			2.6% (3.9ha)
Toxicity				97.6% (148.4ha)		2.6% (3.9ha)
Vegetation	85% (130.5ha)			14.3% (21.8ha)		
Soil erosion present	97.6% (148.4ha)					2.6% (3.9ha)
Soil erosion hazard	97.6% (148.4ha)					2.6% (3.9ha)

In conclusion it has been found that the land can support relatively low intensity pasture operations and is not suitable for continuous cultivation from crop production and appears incapable of sustained sugar cane production.

Section

## EA 5

# Statutory Framework

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### 5.1 Commonwealth Legislation

#### 5.1.1 Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999)

The Commonwealth *Environment Protection and Biodiversity Act, 1999* (EPBC Act) requires that the following matters of national environmental significance must be considered:

- World Heritage Properties;
- RAMSAR wetlands of international importance;
- Commonwealth listed threatened species and ecological communities;
- Commonwealth listed migratory species;
- Nuclear actions; and
- Commonwealth marine areas.

In addition, the impact on Commonwealth land should also be considered. An assessment of the impacts was undertaken through a search of the EPBC database and detailed on site Flora and Fauna Assessment.

The Flora and Fauna Assessment is contained under Appendix L.

This assessment has revealed that no World Heritage properties, National Heritage places, RAMSAR wetlands or Commonwealth marine areas are within 10 kilometres of the site. However a number of flora and fauna elements classed as threatened or endangered were recorded.

Two (2) threatened ecological communities (reflective of Swamp Sclerophyll forest and Littoral rainforest), three (3) threatened flora species listed in the EPBC Act 1999 and three (3) threatened fauna species under the TSC Act 1995 have been identified on site.

These results and others contained within the Flora and Fauna Assessment assisted in providing guidance to the evolution of the proposal so as to ensure that no significant impact are likely to threatened species or endangered ecological communities.

As it is considered that the proposed development will not have a significant impact on matters of national environmental significance, approval from the Commonwealth Minister for Environment under the EPBC Act is not required.

## 5.2 State Legislation

### 5.2.1 Environmental Planning and Assessment Act 1979 (EP&A Act 1979)

The EP&A Act 1979 outlines the requirements for development applications within the state of New South Wales.

The relevant objectives of the Act with regard to the proposal are as follows:

- *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment;*
- *The promotion and co-ordination of the orderly and economic use and development of land;*
- *Ecologically Sustainable Development; and*
- *The protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats*

The above objectives have been used to guide the development of the proposal, associated operational management plans and rehabilitation plans as included within the EA.

As defined by section 75(B) of the EP&A Act 1979 and listed under schedule 1 of State Environmental Planning Policy (Major Projects) 2005, Part 3A of EP&A Act 1979 applies to the proposal. As such the Minister is the consent authority for the development.

Section 5.7 below outlines the additional approvals and licences required.

## 5.3 State Environmental Planning Policies

The following State Environmental Planning Policies are applicable to the proposal:

- State Environmental Planning Policy No. 11 – Traffic Generating Development
- State Environmental Planning Policy No. 14 – Coastal Wetlands
- State Environmental Planning Policy No. 44 – Koala Habitat Protection
- State Environmental Planning Policy No. 71 – Coastal Protection
- State Environmental Planning Policy – Major Projects

### 5.3.1 State Environmental Planning Policy No. 11 – Traffic Generating Development (SEPP 11)

State Environmental Planning Policy No. 11 requires that applications for uses listed under schedule 1 of the Policy be referred to the Road Traffic Authority for review and comment.

Extractive industries are listed under schedule 1 and as such, the application will need to be forwarded to Road Traffic Authority as required under Section 7(3).

To meet the relevant requirements and demonstrate the potential impacts on road capacity from the proposal, a Traffic Impact Assessment is included under Appendix N.

### 5.3.2 State Environmental Planning Policy No. 14 – Coastal Wetlands (SEPP 14)

As outlined below under section 6.9 of this report, the site contains areas of remanent vegetation identified as significant coastal wetlands under SEPP 14. As required by section 8 of this Policy the development is required to be forwarded to the Director of National Parks and Wildlife

It is stated under section 7(1) that consideration is to be given to the following:

1. *the environmental effects of the proposed development, including the effect of the proposed development on:*
  - (i) *the growth of native plant communities,*
  - (ii) *the survival of native wildlife populations,*
  - (iii) *the provision and quality of habitats for both indigenous and migratory species,*
  - (iv) *the surface and groundwater characteristics of the site on which the development is proposed to be carried out and of the surrounding area, including salinity and water quality,*
2. *whether adequate safeguards and rehabilitation measures have been, or will be, made to protect the environment,*
3. *whether carrying out the development would be consistent with the aim of this policy,*
4. *the objectives and major goals of the "National Conservation Strategy for Australia" (as set forth in the second edition of a paper prepared by the Commonwealth Department of Home Affairs and Environment for comment at the National Conference on Conservation held in June, 1983, and published in 1984 by the Australian Government Publishing Service) in so far as they relate to wetlands and the conservation of "living resources" generally, copies of which are deposited in the office of the Department,*
5. *whether consideration has been given to establish whether any feasible alternatives exist to the carrying out of the proposed development (either on other land or by other methods) and if so, the reasons given for choosing the proposed development,*
6. *any representations made by the Director of National Parks and Wildlife in relation to the development application, and*
7. *any wetlands surrounding the land to which the development application relates and appropriateness of imposing conditions requiring the carrying out of works to preserve or enhance the value of those surrounding wetlands.*

It is considered that all of the above elements have been satisfactorily assessed or appropriate information included in the Flora & Fauna Assessment (appendix L), thereby assessing the above elements of SEPP 14.

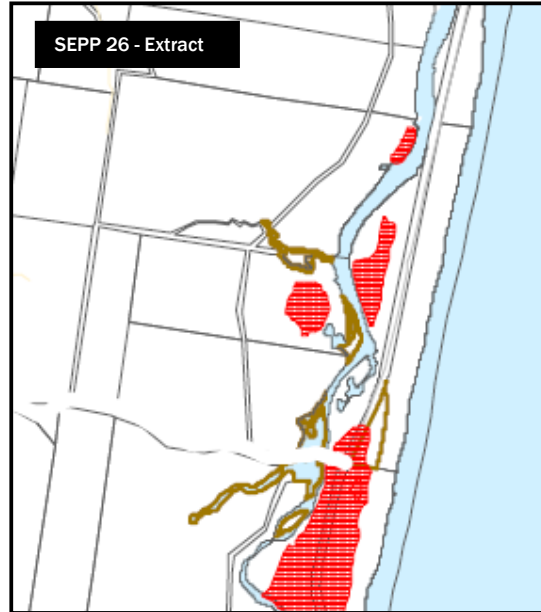
It is noted that that the proposal incorporates a commitment to regenerate and rehabilitate large areas of land outside of, but contiguous with, the identified SEPP 14 lands. This element can only be seen as a benefit to the local area. Conceptual Details relating to same are shown within the attached Rehabilitation Plans contained within Appendix H.

As such it is considered that the proposal is consistent with the requirements of SEPP 14.

### 5.3.3 State Environmental Planning Policy No.26 - Littoral Rainforests

The site is affected by the provisions of SEPP 26. In this regard, the proposed extraction areas are in excess of 200m of the prescribed SEPP 26 areas and therefore on face value, the proposal is not relevant to the policy.

It is however evident that the proposal incorporates revegetation in areas directly relevant to the prescriptive SEPP 26 mapping. These works, which can be described as development or works, will remain consistent with the intent of the policy in that those works are of a complimentary and environmentally sustainable nature.



### 5.3.4 State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)

As the site is contained within the Local Shire of Tweed and exceeds the triggers as listed under Clause 6, SEPP 44 Koala Habitat Protection is applicable to the site. As stated:

*This Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline:*

- (a) *by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and*
- (b) *by encouraging the identification of areas of core koala habitat, and*
- (c) *by encouraging the inclusion of areas of core koala habitat in environment protection zones.*

SEPP 44 states with regard to granting development consent that:

#### Clause 7

*(1) Before a council may grant consent to an application for consent to carry out development on land to which this Part applies, it must satisfy itself whether or not the land is a potential koala habitat.*

#### Clause 8

*(1) Before a council may grant consent to an application for consent to carry out development on land to which this Part applies that it is satisfied is a potential koala habitat, it must satisfy itself whether or not the land is a core koala habitat.*

A detailed Flora and Fauna assessment has been undertaken as part of this assessment, included under appendix L. The flora and fauna assessment includes an assessment of the site with regard to its classification as Potential Koala Habitat and Core Koala Habitat, stating as follows:

#### 2. Is the land potential koala habitat?



The SEPP defines 'potential koala habitat' as 'areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.'

Whilst trees from the above list (*E. tereticornis*, *E. robusta*) do occur on site they do not represent 15% or greater of the total number of trees present within the upper and lower strata of noted vegetation communities.

As such it is considered that the land does not represent potential koala habitat as defined.

### 3. Is the land core koala habitat?

The SEPP definition of 'core koala habitat' means 'an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.

Whilst sightings of the Koala were made during survey it is considered that the proposal with respect to its definition under SEPP 44 is not located within land that is core koala habitat.

### 4. Is there a requirement to prepare a Plan of Management for land containing core koala habitat?

No. It is considered that the site does not contain core Koala habitat as described

As such it is considered that the requirements of SEPP 44 have been adequately addressed as part of this submission.

## 5.3.5 State Environmental Planning Policy No. 71 – Coastal Protection (SEPP 71)

The subject site is within the coastal zone and therefore relevant provisions of this policy apply. The matters for consideration under Clause 8 of the Policy are addressed below:

a) *The aims of this policy set out in Clause 2.*

The development is not inconsistent with the aims of the policy.

b) *Existing public access to and along the coastal foreshore for pedestrians or persons with a disability should be retained and, where possible, public access to and along the coastal foreshore for pedestrians or persons with a disability should be improved.*

The development site does not have access to the foreshore, and hence access to the foreshore will not be impacted upon by the proposal.

c) *Opportunities to provide new public access to an along the coastal foreshore for pedestrians or persons with a disability.*

As the site does not adjoin the foreshore, no new opportunities exist to provide access to the foreshore.

d) *The suitability of development and its type, location and design and its relationship with the surrounding area.*

The sand quarry is relatively isolated from any incompatible development and hence it is considered that the site is suitable for such a use.

- e) *Any detrimental impact that the development may have on the amenity of the coastal foreshore, including any significant overshadowing of the coastal foreshore and any significant loss of views from a public place to the coastal foreshore.*

The development will not cause any overshadowing of the coastal foreshore and will not impede any views to the foreshore.

- f) *The scenic qualities of the NSW coast, and means to protect and improve these qualities.*

The site will be progressively rehabilitated and regenerated. This will ensure that, ultimately, there is no detrimental impact on the scenic quality of the area. As detailed in the Environmental Assessment, views to and from the site are highly limited, and accordingly minimal potential exists for impact on the scenic quality of the area.

- g) *Measures to conserve animals (within the meaning of the Threatened Species Conservation Act, 1995) and plants (within the meaning of that Act) and their habitats.*

A detailed flora and fauna investigations have been undertaken and no threatened species exist in the location of the proposed excavation works. For detailed discussion on these issues refer to Section 6.8 of this report.

- h) *Measures to conserve fish (within the meaning of Part 7A of the Fisheries Management Act, 1994 and marine vegetation within the meaning of that part) and their habitats.*

Marine vegetation or fish habitat will not be affected by the proposal.

- i) *Existing wildlife corridors and the impact of development on these corridors.*

The proposal will involve the planting of substantial buffer areas and rehabilitation works, which will improve connections between vegetation areas and enhance their functioning as wildlife corridors.

- j) *The likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards.*

The site is not adjacent to the beach front and is not located in an area that is at high risk from coastal processes.

- k) *Measures to reduce the potential for conflict between land based and water based coastal activities.*

Due to the relative isolation of the site, conflict between uses is unlikely.

- l) *Measures to protect the cultural places, values, customs, beliefs and traditional knowledge of aboriginals.*

A heritage evaluation has been undertaken as part of the background research for the proposal. No items or sites of heritage value were identified.

- m) *Likely impacts of development on the water quality of coastal water bodies.*

Detailed investigations have been undertaken into the existing water quality of the site and groundwater. The development has been designed to avoid any adverse impact on the quality of groundwater or surface water at the site.

- n) *The conservation and preservation of items of heritage, archaeological or historic significance.*

No items of heritage, archaeological or historic significance are present on the site.

- o) *Only in cases in which a Council prepares a draft Local Environmental Plan that applies to land to which this policy applies, the means to encourage compact towns and cities.*

Not applicable.

- p) *Only in cases in which development application in relation to proposed development is determined;*
- i) *The cumulative impacts on the proposed development on the environment;*
  - ii) *Measures to ensure that water and energy usage by the proposed development is efficient.*

Cumulative impacts are unlikely, as surrounding and nearby sites do not possess the qualities of the subject site which make it highly suitable for a sand quarry. The operation of the quarry will not rely on substantial energy use.

### 5.3.6 State Environmental Planning Policy – Major Projects

The proposed quarry operation falls under the definition of extractive industry under schedule 1 of State Environmental Planning Policy (Major Projects) 2005. As stated within the Clause 6 of SEPP Major Projects

- (1) *Development that, in the opinion of the Minister, is development of a kind:*
- (a) *that is described in Schedule 1 or 2, or*
  - (b) *that is described in Schedule 3 as a project to which Part 3A of the Act applies, or*
  - (c) *to the extent that it is not otherwise described in Schedules 1–3, that is described in Schedule 5,*

*is declared to be a project to which Part 3A of the Act applies*

As such Part 3A of EP&A Act 1979 applies to the proposal with the Minister for planning the consent authority for the development.

### 5.4 North Coast Regional Environmental Plan 1988 (NCREP)

The North Coast Regional Environmental Plan encompasses all of the North Coast Local Government areas, inclusive of the Tweed Shire LGA.

The aim of the NCREP is:

*To provide a basis for the co-ordination of activities related to growth in the region and encourage optimum economic and social benefit to the local community and visitors to the region*

The site's location, features and zonings require assessment and consideration of a number of provisions and requirements contained in the NCREP. With regard to the proposal the following Clauses are applicable:

- Clause 12 – impact of development on agricultural activities
- Clause 18 – extractive industry
- Clause 29 A - natural areas and water catchment
- Clause 32B – coastal lands
- Clause 33 – coastal hazard areas

### Clause 12

As the site and adjacent sites are zoned for agricultural purposes under the Tweed Local Environmental Plan 2000, Clause 12 of the NCREP is applicable.

Clause 12 of the NCREP states:

*"The council shall not consent to an application to carry out development on rural land unless it has first considered the likely impact of the proposed development on the use of adjoining or adjacent agricultural land and whether or not the development will cause a loss of prime crop or pasture land."*

A detailed Agricultural Land Assessment has been undertaken (Appendix Q) findings indicate that the site is not of a high quality or represents important agricultural land (section 3.2).

### Clause 18

With regard to the establishment of extractive industries the NCREP states the following development consent requirement:

*"The council shall not consent to a development application for an extractive industry unless it includes any necessary conditions of consent to require implementation both during and after extractive operations of an erosion and sediment control plan and rehabilitation plan."*

It is considered that the proposal is in keeping with the over arching and specific aims of the NCREP as outlined above. Although Council is not the consent authority for the development, management plans for erosion and sediment control and site rehabilitation are included with this EIS and comment from Tweed Shire Council will be sought.

The Erosion and Sediment Control and Rehabilitation Plans have been prepared with consideration given to Tweed Shire Councils requirements for such plans and are considered to meet or exceed these. Tweed Shire Council will be forwarded a copy of this EA for consideration and comment.

### Clause 29A

Clause 29A applies to the site. However as no works or vegetation removal is proposed within the area affected by the Environmental Protection zoning, the Clause is not relevant to the proposed development.

### Clause 32B & Clause 33

As identified within figure 4 of the NSW Coastal Policy 1997, the subject site falls within the policy boundary. As such, Clauses 32B and 33 apply to the proposal.

Clause 32B states as follows:

*In determining an application for consent to carry out development on such land, the council must take into account:*

- (a) the NSW Coastal Policy 1997,*
- (b) the Coastline Management Manual, and*
- (c) the North Coast: Design Guidelines.*

Clause 33 states as follows:

*Before granting consent to development on land affected or likely to be affected by coastal processes, the council shall:*

- (a) take into account the Coastline Management Manual,*
- (b) require as a condition of development consent that disturbed foreshore areas be rehabilitated, and*
- (c) require as a condition of development consent that access across foreshore areas be confined to specified points*

It is considered that the detailed assessments undertaken within this EA demonstrate that the proposed sand quarry has been developed in accordance with current best practice principles relating to environmental management, sand quarry operations and site rehabilitation. Due attention has been given to the above manuals and guidelines throughout preparation of the detailed environmental assessments (section 6) and environmental management measures (section 8) contained in this report and accompanying documentation.

## 5.5 Tweed Local Environmental Plan 2000 (TLEP 2000)

The site falls within the legislative boundary of the Tweed Local Environmental Plan 2000 (TLEP 2000). Pursuant to the TLEP 2000, the site is subject to a number of zoning classifications as follows:-

- Rural 1(a) Zone
- Rural 1(b2) Zone Agricultural Protection; and
- Environmental Protection 7(a) Zone (Wetland and Littoral Rainforest)

With regard to the layout of the quarry it has been demonstrated that the proposed extraction ponds are located wholly on land zoned as Rural 1(a).

Within the Rural 1(a) zone 'extractive industries' are allowable with development consent.

The TLEP 2000 outlines the following objective for the **Rural 1(a) zone**:

### Primary objectives

- to enable the ecologically sustainable development of land that is suitable primarily for agricultural or **natural resource utilisation purposes** and associated development.
- to protect rural character and amenity.

### Secondary objectives

- to enable other types of development that rely on the rural or natural values of the land such as agri- and eco-tourism.
- to provide for development that is not suitable in or near urban areas.
- to prevent the unnecessary fragmentation or development of land which may be needed for long-term urban expansion.
- to provide non-urban breaks between settlements to give a physical and community identity to each settlement.

With regard to the remaining applicable zones the following objectives are stated:

### Rural 1(b) Agricultural Protection:

#### Primary objective

- to protect identified prime agricultural land from fragmentation and the economic pressure of competing land uses.

**Secondary objective**

- to allow other development that is compatible with agricultural activities.

**Environmental Protection 7(a) (Wetland & Littoral Rainforest):**

**Primary objectives**

- to identify, protect and conserve significant wetlands and littoral rainforests.
- to prohibit development which could destroy or damage a wetland or littoral rainforest ecosystem.

**Secondary objectives**

- to protect the scenic values of wetlands and littoral rainforests.
- to allow other development that is compatible with the primary function of the zone.

The proposal has been designed with regard to the above primary and secondary objectives and is considered to be complimentary in form.

In addition to the zoning provisions of the Tweed Local Environmental Plan 2000, the following Clauses of the Plan are relevant to the site and the proposed development:

**Clause 22 & 23 – Development near Designated Roads**

Clause 22 of the TLEP 2000 applies to land that has frontage to, or relies on a 'designated' road as its sole means of access. This Clause may technically not apply to the development as the site has access for entry and exit along a private haulage track that intersects with Pottsville Mooball Road.

As the proposed development is not solely accessed from Pottsville Mooball Road, which is a Designated road, it could be argued that this Clause does not apply to the proposed development. However, it is considered that Council may have intended for the Clause to apply to development of this type and for the sake of completeness, the provisions of this Clause are addressed below:

- (a) *the development (because of its nature, appearance, cumulative effect or illumination, or the intensity or the volume or type of traffic likely to be generated, or for another similar reason) is unlikely to constitute a traffic hazard or materially reduce the capacity or efficiency of the designated road.*

The proposal will involve the construction of an entrance / exit haulage track which intersects with Pottsville Mooball Road. The details of this exit road intersection are addressed in the Traffic Impact Assessment at Appendix N. It was found that the capacity and efficiency of the road will not be significantly affected.

- (b) *the location, standard and design of access points, and on-site traffic movement and parking arrangements, would ensure that through traffic movement on the designated road is not impeded, and*

Refer to the comments for Subclause (a) above.

- (c) *the development, or proposed access to it, will not prejudice any future improvements to, or realignment of, the designated road, and*

Realignment or major road improvements to this part of the Pottsville Mooball Road are not anticipated, however, in any case, the construction of the intersection would not be an impediment to any future works.

- (d) *where the land is in Zone 1(a), 5(a), 7(a), 7(d), 7(f), or 7(l), the development is of a type that necessitates a location in proximity to the designated road for reasons other than only commercial advantage, and*

The sand quarry excavation area is not located in close proximity to the designated road. Access is required from the Pottsville Mooball Road as it is the most direct route to the Pacific Highway which will be relied upon for the transport of extracted material.

- (e) *the development is of a type that is not sensitive to traffic noise or, if it is, it is located or adequate measures are included to ameliorate any potential noise impact, and*

The development will not be sensitive to traffic noise. Amelioration measures are not required.

- (f) *the development would not detract from the scenic values of the locality, particularly from the point of view of road users, and*

The development is well removed from Pottsville Mooball Road and will therefore not impact on the scenic quality of the road.

- (g) *where practicable, access to the land is provided by a road other than the designated road, and*

Other options for road access to and from the site were considered, however, it was determined that other routes would potentially have negative impact on residents. Use of Pottsville Mooball Road minimizes potential impact and provides a more direct route to the Pacific Highway.

- (h) *in respect of any application for commercial or retail development near the Pacific Highway in Zone 1 (a), 7 (a), 7 (d), 7 (f) or 7 (l), the development:*
- (i) *would not compromise the Highway's function as the North Coast's primary inter- and intra-regional road traffic route, and*
  - (ii) *would not contribute to the need to expend public money on the Highway to overcome the effects of ribbon development, and*
  - (iii) *would not compromise highway safety and efficiency, and*
  - (iv) *would not cause or contribute to the shifting of the retail/commercial foci of any town from the town centre to a highway-orientated site.*

Subclause (h) is not applicable as the site does not front the Pacific Highway.

Clause 23 requires development consent to be obtained for any opening or a road or access that intersects with a designated road. Hence development approval is required for the proposed exit road that will intersect with the Pottsville Mooball Road.

### Clause 25 – Development in Zone 7(a) Environmental Protection

As the proposal is adjacent to land zoned 7(a) Environmental Protection, the requirements of part 6 of the TLEP 2000 are applicable.

Clause 25 states, inter alia:

3. *Consent must not be granted to the carrying out of development on land within Zone 7 (a) or on land adjacent to land within Zone 7 (a) unless the consent authority has taken into consideration:*
  - (a) *the likely effects of the development on the flora and fauna found in the wetlands or littoral rainforest, and*
  - (b) *the potential for disturbance of native flora and fauna as a result of intrusion by humans and domestic and feral animals, increased fire risk, rubbish dumping, weed invasion and vegetation clearing, and*
  - (c) *a plan of management showing how any adverse effects arising from the development can be mitigated, and*
  - (d) *the likely effects of the development on the water table, and*
  - (e) *the effect on the wetlands or littoral rainforest of any proposed clearing, draining, excavating or filling.*
4. *The consent authority must not grant consent to development (other than development for the purpose of agriculture or a home business) on land within Zone 7(a) or on land adjacent to land within Zone 7(a) without taking into consideration any representations made by NSW Fisheries or the Department of Environment and Conservation in respect of the development.*

A detailed assessment of all environmental risks has been undertaken in the preparation of this EA. With regard to Clause 25(3) listed above, the assessment has identified the likely impacts of the proposal on groundwater, adjacent and surrounding vegetation and native flora. Relevant recommendations have been arrived at in relation to the preservation of same.

With regard to Clause 25(4) the proposal requires an Environmental Protection Licence under the *Environment Operations Act 1997*. Under this Act, the relevant regulatory authority is the Department of Environment and Conservation (DEC). As such is it considered that appropriate consideration will be given to the representations from the DEC by the consent authority.

### **Clause 29 – Development Adjoining 8(a) National Parks & Nature Reserves**

Clause 29 states that Council must not grant consent to development adjoining land zoned 8(a) National Parks and Nature Reserves without first considering the likely effects of the development on flora and fauna found in the locality and the potential for disturbance of native flora and fauna as a result of the intrusion of humans, domestic and feral animals, increased fire risk, rubbish dumping, weed invasion and vegetation clearing.

Land to the east of the site, on the opposite side of Mooball Creek is zoned 8(a) National Parks and Nature Reserves, and hence Clause 29 of the LEP would apply to the proposed development.

No adverse impacts on the Nature Reserve are anticipated, and the development would have beneficial impacts through the rehabilitation and revegetation of buffer zones. The development is not of the type that would introduce potential risks such as domestic animals and rubbish dumping to the area, and as detailed in this Environmental Assessment, the sand extraction operation would be effectively managed to ensure surrounding land is not affected by the quarry.



### Clause 31 – Development Adjoining Waterbodies

Clause 31 of the TLEP 2000 applies to land adjoining the high water mark, or bank, or a waterbody. The subject site has frontage to Mooball Creek and although the proposed extraction areas are separated from the bank of the creek by a substantial buffer area and by an area of wetlands, Clause 31 is applicable to the development.

Clause 31 requires the following matters to be considered by Council before granting consent to a development:

- (a) *the development will not have a significant adverse effect on scenic quality, water quality, marine ecosystems, or the bio-diversity of the riverine or estuarine area or its function as a wildlife corridor or habitat, and*
- (b) *adequate arrangements for public access to and use of foreshore areas have been made in those cases where the consent authority considers that public access to and use of foreshore areas are appropriate and desirable requirements, and*
- (c) *the development is compatible with any coastal, estuary or river plan of management adopted by the Council under the Local Government Act 1993 that applies to the land or to land that may be affected by the development, and*
- (d) *the development addresses the impact of increased demand from domestic water supply on stream flow; and*
- (e) *the development addresses the likely impact of biting midge and mosquitoes on residents and tourists and the measures to be used to ameliorate the identified impact.*

In response to the above matters for consideration, the following comments are offered:

The development will not be highly visible from Mooball Creek due to the existence, and proposed enhancement of a substantial buffer, and hence will not affect the scenic quality of the area. Issues relating to the bio-diversity of the site and the potential affects of the development have been addressed throughout this Environmental Assessment and accompanying appendices. No adverse affects on bio-diversity or environmental qualities are anticipated.

In relation to Subclause 3(b), it is not considered appropriate to provide public access through the site of the proposed sand quarry to Mooball Creek.

In relation to Subclause 3(c), to our knowledge, there has not been a plan of Management adopted by Council that applies to the site.

With regard to Subclause 3(d), it is not proposed to use water in Mooball Creek for any part of the development, and Subclause 3(e) is not applicable to the proposal as it does not involve any tourist or residential development.

It is noted that Sub clauses 4 and 5 enable Council to require the rehabilitation of land adjoining the waterbed to create a vegetated riparian zone or wetland. These matters have been addressed in the Rehabilitation Management Plan (refer Appendix H).

### Clause 34 – Flooding

Where Council, if of the opinion that a site of a development is affected by flooding, the following matters are required to be addressed prior to development consent being granted:

- (a) *the extent and nature of the flooding hazard affecting the land, and*
- (b) *whether or not the development would increase the risk or severity of flooding of other land in the vicinity, and*
- (c) *whether the risk or severity of flooding affecting the development could be reasonably mitigated, and*
- (d) *the impact of the development on emergency services, and*
- (e) *the provisions of Tweed Development Control Plan No 5—Development of Flood Liable Land and any other relevant development control plan.*

A Flood Analysis has been carried out by BlueLAND Engineers. This report is attached as Appendix Q. The report concludes that the proposed development would result in a decrease in flood levels of up to 270mm at the upstream boundary of the site, which would have no significant adverse impact.

This report effectively addresses the requirements of Clause 34 of the LEP.

#### **Clause 35 – Acid Sulfate Soil**

This Clause of the LEP essentially requires that consent not be granted to a development on a site where acid sulfate soils are present, or are likely to be present, until such a time as an Acid Sulfate Soils Investigation be carried out and a Acid Sulfate Soils Management Plan has been prepared (if necessary) to demonstrate that the oxidation of acid sulfate soils and discharge of acid water from the area of the proposed works would not occur.

To address the requirements of Clause 35, Gilbert & Sutherland, Soil & Water Scientists, have prepared a report which is attached as Appendix Q. The report concludes that there was negligible to low acid producing potential within the sandy materials proposed for excavation and that the main potential for acid sulfate soils was in the basal mineral clay material which is not proposed for removal.

Some limited potential for acid sulfate soil occurred in the fine to medium grain sands at variable depths throughout the soil profile. To mitigate any adverse affects from the disturbance of these soils, acid sulfate soils management measures are contained within Section 10.8 of the 'Soil and Water Management Plan' contained within the report by Gilbert & Sutherland (Appendix Q).

#### **Clause 39A – Bushfire**

Part of the eastern edge of the site is identified as being potential bushfire prone land, and hence Clause 39A of the LEP applies to the development of the site.

Clause 39A requires the following matters to be addressed:

- (a) *whether the development is likely to have a significant adverse effect on the implementation of any strategies for bushfire control and fuel management adopted by the Bushfire Control Office established by the Council for the area, and*
- (b) *whether a significant threat to the lives of residents, visitors or emergency services personnel may be created or increased as a result of the development (including any threat created or increased by the access arrangements to and from the development), and*
- (c) *whether the increased demand for emergency services during bushfire events that is created by the development would lead to a significant decrease in the ability of the emergency services to effectively control major bushfires, and*

- (d) *the adequacy of measures proposed to avoid or mitigate the threat from bushfires including:*
- (i) *the siting of the development, and*
  - (ii) *the design of structures and the materials used, and*
  - (iii) *the importance of fuel-free and fuel-reduced areas, and*
  - (iv) *landscaping and fire control aids such as roads, reserves, access arrangements and on-site water supplies, and*
- (e) *the environmental and visual impacts of the clearing of vegetation for bushfire hazard reduction.*

With regard to the above requirements, it is submitted that the proposed development would not be affected by bushfire risk for the following reasons:

- The development is occurring in an area that is devoid of any substantial vegetation.
- The sand quarry is primarily a water based activity, with the majority of excavation being carried out below the water table.
- The vegetation on site that is mapped as 'bushfire hazard, is a 'wetland' which is considered to be a low bushfire risk vegetation community.
- The construction of sealed haul routes would aid access by firefighting vehicles and emergency services in the unlikely event that they are required.
- The operational works area containing equipment storage, site office, machinery etc is well removed from the bushfire hazard.
- Ample water supply would be available for firefighting purposes, if required.

For the above reasons it is considered that the development would not be at risk from bushfire and that the development meets the requirements of Clause 39A of the LEP.

## 5.6 Tweed Development Control Plans

### 5.6.1 Development Control Plan 5 – Flood Liable Land (DCP 5)

With regard to extractive industries, DCP 5 does not contain any specific requirements. It is noted, however that the proposal has been accompanied by detailed flood modelling, consistent with the siting of the proposed extraction areas within a floodplain.

Further detail in this regard is provided within the Flooding Assessment contained within Appendix O to this submission.

### 5.6.2 Development Control Plan 45 – Socio-Economic Impacts of Development (DCP 45)

Section 5.1 of DCP 45 states that '*any Development Application that is a Designated Development as identified under Section 77A of the Environmental Planning and Assessment Act 1979*' requires a Socio-Economic Impact to be undertaken. The proposal however is identified under SEPP Major Projects 2005 and is to be considered under Part 3A of the EPA Act 1979. Notwithstanding the different legislative processes, a detailed Socio-Economic Impact Assessment has been prepared and included within Appendix I to this EA.

It has been found that the proposal will generate positive economic impacts, while potential social impacts can be appropriately managed and mitigated.

## 5.7 Approvals and Licences

The following table outlines the required approvals and subsequent licences, the relating Act and relevant Regulatory Authority.

**Table 13: Statutory Approvals & Licences**

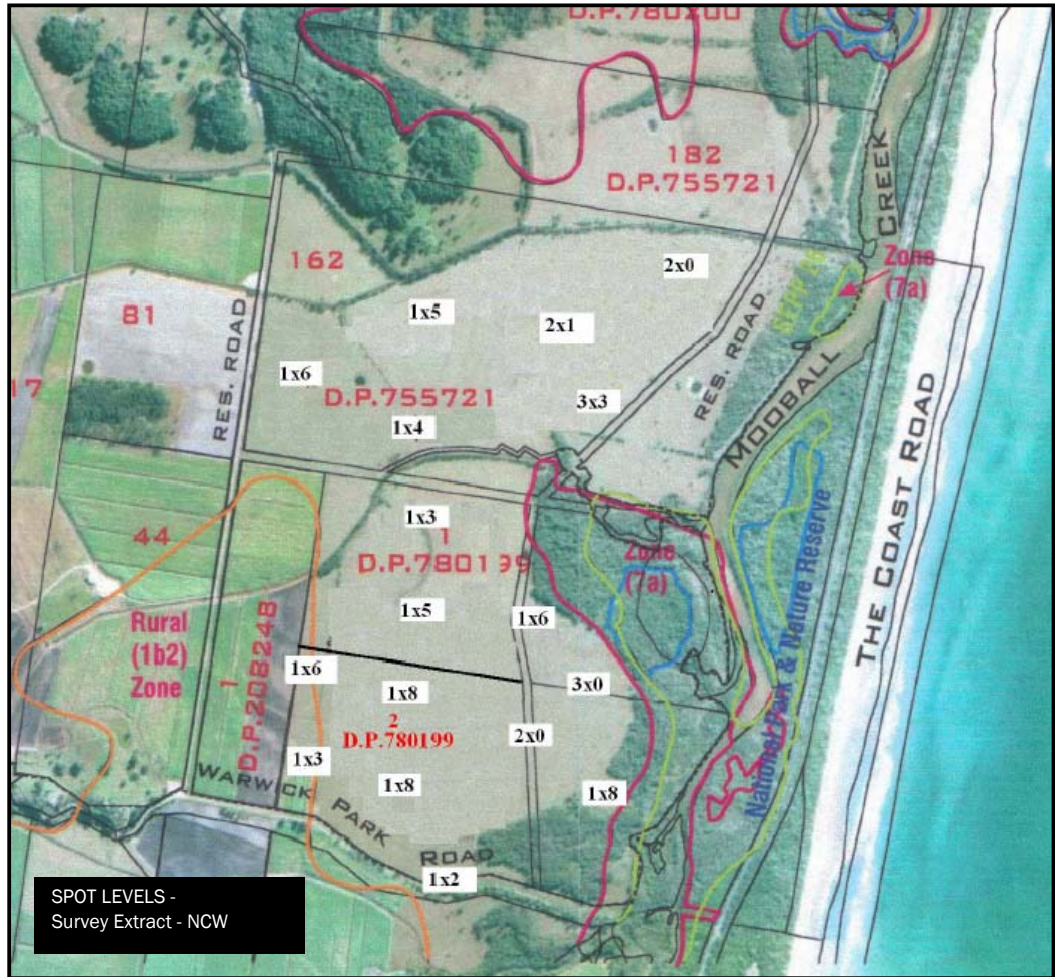
Approval/Licence	Relevant Act	Regulatory Authority
Environmental Protection Licence	Environment Operations Act 1997	Department of Environment & Conservation (Environmental Protection Authority)
Licence for quarry pond and groundwater monitoring bores	Water Act 1912	Department of Infrastructure, Planning and Natural Resources.

# EA 6

## Environmental Considerations & Impacts

### 6.1 Landform

The majority of the investigation area is generally low lying with elevations ranging from <1.3m AHD towards the south western boundary to only a few metres above sea level in the south eastern corner of the proposed Extraction Area No.1. The north western corner of the site has levels in the vicinity of 3.3m AHD



The extraction areas proper are generally limited in elevation to between 1.3m AHD and 2.0m AHD.

The subject site abuts elevated areas to the north (Kelleher's Road) and also to the south (Warwick Park Road). The Sheens Creek Catchment continues at a similar grade to the excavation area back to the Pacific Highway.

## 6.3 Geology and Soils

### 6.3.1 Site Geology

As indicated by the soil assessments undertaken, the dominate soil order within the site is Podzols. The site is generally underlain by a uniform soil profile consisting of a small amount of topsoil (a silty sand of less than 0.3m depth), overlaying the resource of fine to medium grained sand of average depth 12m. Marine clay of variable thickness (0.5m to 5m) generally underlies the sand resource located at an average depth of 13m.

Generally the topsoil materials are greyish brown to brownish black silty sands which grade gradually to very dark grey to yellowish grey, fine to medium sands. Top soil materials occasionally contained trace dark fine silt. Areas of brown/black indurated sands were encountered at depths between approximately 6m to 15m below natural ground level in sporadic location.

See Appendix R for further detailed discussion of soil geology and soil description.

### 6.3.2 Regional Geology

The Tweed 1:250,000 Geological Series Sheet identifies the topographically elevated ridgeline to the west and north of the site as outcrops of greywacke, slate, phyllite and quartzite (part of the regionally extensive Neranleigh Fernvale Group). The low-lying floodplain sections of the site generally consisted of unconsolidated deposits of river gravels, alluvium, sand and clay of Holocene age.

### 6.3.3 Soil Landscape

As classified under the Great Soil Group Classifications (GSGC), the soil landscapes in the local area are defined as Kingscliff (variant) and Pottsville soil landscapes. Descriptions of soil landscapes in the local area were conducted by Morand (1996), the following general descriptions were noted.

- Kingscliff soil landscape variant (Kib) – These soil landscapes were identified throughout most of Lot 1 in DP755721, in the western half of Lot 1 in DP780199 and throughout most of Lot 2 in DP780199. This soil landscape typically consists of extremely low, level to gentle undulating Pleistocene sand sheet overlaying peat and alluvium. Soils are described as Podzols, are non-cohesive, highly erodible, permeable, have low fertility and are prone to water logging with high water tables.
- Pottsville soil landscape (po) – These soil landscapes were identified in the eastern portions of Lot 1 in DP755721 and Lot 2 in DP780199, adjacent to Mooball Creek. This soil landscape typically consists of poorly drained depressions within Pleistocene sand sheets and dunes. Pondered surface water is common, as is shallow (0.1m below NSL) water tables. Soils are described as poorly drained Podzols, Humus Podzols, poorly drained Humic Gleys and Acid



due to the proposal exceeding 5.0m in depth, resulting also in the extraction of in excess of 1000 tonnes of sandy material.

Detailed discussion of sampling protocol, analytical procedures and results is contained within Appendix Q.

The assessment carried out encountered negligible to low acid producing potential within the sandy materials proposed for excavation. Using the van Beers method, 227 of the 713 samples tested exhibited a violent reaction within the parameters of potential acid sulphate soils. Most of the remaining samples exhibited nil to slight reactions. In addition 190 of the 713 samples were sent for further laboratory testing.

Generally, the potential acid sulfate soils were associated with the grey – dark grey fine to medium grained sands encountered at variable depths throughout the profile (but generally above 5.5m below NSL) and the basal mineral clay material. The later of which is not proposed for removal.

Given the relatively low levels of sulfidic materials in the sandy sediments identified for extraction, a processing methodology of hydraulic separation with reburial at 10m below water table is proposed. As required, a detailed site based Acid Sulfate Management Plan (ASMP) has been prepared and is contained within Appendix Q.

The ASMP demonstrates a level of contingency and management practices that are more than adequate to ensure sand extraction operations can be controlled without any short of short or long term adverse impacts.

## 6.5 Hydrogeological Assessment

The following regional hydrogeological assessment and background groundwater quality investigation has been performed with particular emphasis placed on the two proposed extraction pond areas. The proposal necessitates the assessment as groundwater has been encountered in close proximity to ground surface (generally 1.0m to 2.0m below NSL) and will be disturbed as part of site operations.

The Department of Infrastructure, Planning and Natural Resources (now DOP) have also indicated that given the proximity to wetland areas identified under SEPP 14 and the determination that groundwater quality in the locality is generally good, a hydrological assessment is necessary.

For detailed discussions relating to the piezometer installation program, Groundwater monitoring program, general methods used and assessment findings please refer to the more detailed provisions within Appendix Q.

### 6.5.1 Existing Groundwater Users

A number of groundwater users exist on and adjacent to the site. Artificial surface expressions comprise approximately four (4) small groundwater soaks (groundwater-fed dams) located across the site to facilitate the watering of cattle. In conjunction with this, natural surface expressions of groundwater are located generally within the topographically low points to the north of the site associated with the SEPP 14 wetland communities.

A groundwater bore search was undertaken within a 2.5km radius of Lot 1 in DP780199 to determine licensed users in the surrounding locality with a total of 10 bores located. Of



these ten (10) boreholes, one (1) was situated south of the site. All remaining bores are located to the west, generally within the low ridgeline that borders the western boundary of Mooball Creek Floodplain. Several bores were also observed approximately 3km north of the site adjacent to the township of Pottsville.

Available borehole installation records and location details suggest that the majority of the bores were not installed within the unconfined aquifer associated with the low-lying coastal section of the Mooball Floodplain, but installed within unconfined/semi-confined unconsolidated alluvium and fractured rock materials in the low ridgeline to the west of the site.

There is likely to only be minimal hydraulic connectivity between the unconsolidated sand aquifer and potential groundwater aquifers in the ridgeline. However, previous drilling in the location around the town of Pottsville suggest the bores located approximately 3km away are likely to be installed within the shallow unconfined coastal sand aquifer that would be likely to extend southward to include the Mooball Creek Floodplain section of the site.

### 6.5.2 Groundwater Occurrence

Conditions within the aquifer were unconfined across the site, with no discernable difference in groundwater head noted between the shallow and deep monitoring piezometers. Groundwater levels within this aquifer are generally at or near the topographical surface with variations in groundwater observed at the site following seasonal rainfall, which indicates that surface and groundwater within the site are closely associated.

The only significant occurrence of groundwater noted during the hydrogeological assessment was associated with the fine-medium grained unconsolidated quartzose sand stratum. As confirmed during the resource drilling assessment, the indurated sands and marine clay which generally formed the residual basement are considered to be of extremely limited aquifer potential due to the high content silt and clay.

### 6.5.3 Groundwater Movement

Given that ground water level is relatively uniform across the site, it is unlikely that any significant lateral groundwater movement currently occurs within the Mooball Creek Floodplain portion of the site

Significant increases in the level of groundwater following rainfall events suggests that the groundwater recharge response is closely related to precipitation and surface water run-in from upstream catchment areas. Groundwater levels are likely to subside relatively quickly following the cessation of rainfall with the most significant hydrological groundwater outputs likely to be associated with direct evapotranspiration from pasture areas and groundwater baseflow into the site's three major drainage lines and Mooball Creek.

**Table 14: Ground water level results (m AHD)**

Date	DLP 1	DLP 1A	DLP 2	DLP 3	DLP 3A	DLP 4	DLP 5	DLP 6
30/08/2004	0.30	0.26	0.23	0.31	0.21	0.29	0.33	0.33
06/09/2004	0.25	0.25	0.20	0.25	0.30	0.29	0.29	0.33
13/09/2004	0.28	0.23	0.18	0.13	0.30	0.28	0.21	0.34

17/12/2004	0.83	0.99	1.25	0.45	0.72	1.37	0.75	1.19
Date	DLP 7	DLP 7A	DLP 8	DLP 8A	DLP 9	DLP 10	DLP 10A	DLP 11
30/08/2004	0.29	0.23	0.43	0.41	0.31	0.42	0.24	0.24
06/09/2004	0.27	0.23	0.42	0.40	0.29	0.38	0.25	0.23
13/09/2004	0.25	0.21	0.38	0.37	-	0.37	0.24	0.21
17/12/2004	1.09	0.79	1.16	1.28	0.53	1.31	1.36	0.80

### 6.5.5 Water Balance Assessment

The final surface area of the proposed extractions ponds will be approximately 56.7ha. Based on an analysis of evaporation and rainfall statistics for a dry rainfall year and the proposed final pond size, it is likely that the net monthly evaporation rate would vary seasonally, ranging from a deficit of 1300l/sec in September to a surplus of 2500l/sec in March.

Precipitation was observed to generally exceed evaporation during most months of the year for all dry, median and wet years. As such it is considered unlikely that the excavation of the extraction ponds would result in the formation of any significant cone of depression around the proposed excavation areas.

Table 16 below presents a summary of net monthly water balance statistics.

**Table 15: Net Monthly Water Balance Statistics**

Month	Dry (mm)	Median (mm)	Wet (mm)
January	+84.2	+87.9	+24.9
February	+36.1	-29.2	+252.1
March	+7.5	+18.9	+606.7
April	+29.3	+293.4	+45
May	+39.9	+22.7	+158.1
June	-34.0	+82.8	+55.8
July	-7.1	+79.0	+34.7
August	-30.3	-71.1	-77.5
September	+145.8	+17.9	-31.0
October	+8.9	-57.7	-29.9
November	-108.4	+18.0	+67.1
December	-83.9	+91.8	-31.6
<b>Balance</b>	<b>+87.8</b>	<b>+554.4</b>	<b>+1074.3</b>

However, based on previous experience at similar sites in the locale, some localised drawdown within the immediate vicinity of the extraction ponds would be expected during extended dry conditions. Based on site soil assessments and observations at similar sites in the Tweed area, it is likely that the maximum cone of depression which may occur during dry conditions would extend approximately 25m to 100m from the lake edge. It is considered that the proposal is unlikely to have any impact on ground water quality or supply to the SEPP 14 wetlands areas.

It is anticipated that groundwater levels across the site and in the vicinity of the excavation areas would remain within the current seasonal range of variation and well within levels that would be expected under drought or flood conditions. With limited impact expected to groundwater levels, excavation of the extraction ponds is unlikely to impact upon the existing regional groundwater movement regime. As such, the existing

groundwater flow directions and quality are likely to remain unchanged during and after development at the site.

The potential for saline intrusion from the agricultural drainage lines and Mooball Creek into the unconfined aquifer is considered to be negligible. With changes to ground water level minor the opportunities for oxidation of PASS materials within any seasonal cone of depression are considered limited.

## 6.6 Groundwater Assessment

The results of the sampling and analysis program undertaken suggest that groundwater quality within the Mooball Creek Floodplain (near the site) is typically fresh and generally suitable for irrigation and domestic stock use in line with ANZECC 2000 requirements. Groundwater quality was generally consistent across the site, however, a slight increase in pH, EC, Cl:SO<sub>4</sub> and major cation concentrations were noted to occur with increased depth in the aquifer.

However these variations were generally slight, and are unlikely to result in any deleterious effects on groundwater quality should mixing of shallow and deep waters occur. It is expected that adequate neutralising of any slightly more acidic surface and/or groundwaters would occur during the operational phase of works due to abundance of shell through out the soil profile and the relative excess of alkalinity in solution.

The below table outlines the findings of the groundwater quality which will form the baseline water quality conditions for the site.

For detailed discussion of the groundwater quality assessment see Appendix Q.

Of note from the groundwater quality findings is the concentration of dissolved Iron, which is elevated relative to most natural water. As a result, some iron flocs and staining may occur around the perimeter of the excavation area during operational works at the site.

**Table 16: Groundwater Quality Findings Summary**

	DLP1	DLP1A	DLP2	DLP3	DLP3A	DLP4	DLP5	DLP6
pH	5.12	7.78	6.82	5.14	6.36	5.45	5.64	4.65
EC (mS/cm <sup>2</sup> )	0.198	2.260	0.253	4.770	6.550	0.339	0.186	0.122
DO (mg/l)	3.40	2.99	2.01	3.30	2.57	2.80	3.27	3.40
Temp °C	19.0	21.2	19.5	25.1	24.5	19.4	20.2	18.8
Alkalinity (mg/l as CaCO <sub>3</sub> )	1	520	42	3	162	3	7	<1
Chloride Sulfate Ratio (Cl:SO <sub>4</sub> )	0.71	1.21	3.36	5.89	12.70	8.00	1.43	2.33
Diss - Aluminium (mg/l)	0.46	<0.01	0.09	1.18	0.06	0.30	0.49	1.39
Diss - Iron (mg/l)	7.34	0.01	0.13	7.17	10.80	1.08	2.03	44.60
Diss - Manganese	0.084	0.0405	0.034	0.052	0.582	0.003	0.008	0.300

(mg/l)								
Arsenic (mg/l)	<0.001	<0.001	<0.001	0.006	<0.001	0.002	<0.001	<0.001

**MAJOR CATIONS**

Calcium (mg/l)	5	109	1	39	66	3	<1	12
Magnesium (mg/l)	2	55	7	86	107	4	<1	23
Sodium (mg/l)	20	301	19	801	1190	46	33	165
Potassium (mg/l)	2	18	2	37	54	<1	2	10

**Table 16 Cont: Groundwater Quality Findings Summary**

	DLP7	DLP7A	DLP8	DLP8A	DLP9	DLP10	DLP10A	DLP11
pH	5.25	7.30	5.74	8.50	5.83	5.57	7.79	6.20
EC (mS/cm <sup>2</sup> )	0.250	4.420	0.135	0.538	0.099	0.122	1.615	0.747
DO (mg/l)	2.93	3.38	6.16	7.93	4.14	4.40	3.23	2.59
Temp °C	20.3	19.6	18.6	22.5	21.2	18.5	18.0	19.7
Alkalinity (mg/l as CaCO <sub>3</sub> )	3	386	3	253	12	3	410	44
Chloride Sulfate Ratio (Cl:SO <sub>4</sub> )	1.14	3.67	2.00	3.68	0.94	0.79	1.03	1.03
Diss - Aluminium (mg/l)	0.20	0.22	0.13	0.06	0.08	0.14	<0.01	<0.01
Diss - Iron (mg/l)	5.42	1.37	1.82	0.12	8.83	3.67	<0.01	20.70
Diss - Manganese (mg/l)	0.076	0.092	0.011	0.014	0.100	0.031	0.152	0.184
Arsenic (mg/l)	0.001	<0.001	0.001	0.002	<0.001	0.002	<0.001	0.009

**MAJOR CATIONS**

Calcium (mg/l)	6	36	2	13	10	3	107	17
Magnesium (mg/l)	4	80	1	2	7	<1	42	18
Sodium (mg/l)	20	815	20	150	17	10	162	79
Potassium (mg/l)	1	45	1	4	2	4	15	10

**6.7 Surface Water Assessment**

The following surface water assessment has been performed with particular emphasis placed on establishing background level in nearby surface water features, prior to

construction of the extraction ponds. The following sections provide a summary of the assessment findings and describe the catchment areas and receiving water environment associated with the site.

These findings form the base requirements for surface water quality monitoring which will be undertaken during and after site operations.

For detailed discussions relating to the assessments monitoring methods, monitoring locations and findings please refer to Appendix Q.

### 6.7.1 Catchment Area

The site is located within the Mooball Creek catchment and Sheens Creek sub catchment area.

See figure GJ0400.9.1 (Appendix Q) for catchment areas and drainage paths.

The catchment for the Mooball Creek floodplain extends 25km inland along Burringbar Creek and has a total area of 103.9km<sup>2</sup>.

The Sheens Creek sub catchment to the west of the site drains directly into agricultural drains that traverse the site and drain into Mooball Creek. The Sheens Creek sub catchment has an area of 14km<sup>2</sup>.

A drainage assessment, inclusive of catchment flow modelling has been undertaken. Details relating to the latter are provided at Appendix Q to this submission.

### 6.7.2 Receiving Environment

Lands located within the Environmental protection Zone 7(a) (Wetlands and Littoral Rainforests) are located east of the subject site adjacent to Mooball Creek. The site is located approximately 4km up stream from the mouth of Mooball Creek. The site has a number of catch drains which merge into the main agricultural drains onsite.

Please refer to figure GJ0400.9.2 (Appendix Q) for locations of the agricultural drains

Consistent ground cover is evident throughout the site which creates significant buffer zones to Mooball Creek. In Addition, deep rooted native trees remain along each of the site boundaries. The topography of the site is mostly flat with an average level of RL 1.80m.

The relatively flat topography of the site suggests that most surface run off infiltrates into the soils or flows to Mooball Creek. Surface ponding does occur after rainfall when the infiltration rate for the sand has been exceeded or the shallow groundwater table reaches the surface.

Tidal flows enter the agricultural drains traversing the site and travel varying distances up steam dependant on individual tide height. Three flood gates are present on the site and are used to regulate the flow of tidal waters to agricultural land to the west of the site. The NSW Department of Primary Industries/Fisheries have requested these gates be left open for fish passage.

### 6.7.3 Surface Water Quality

On site surface water sampling was undertaken to determine the pH, turbidity, temperature and dissolved oxygen. External testing by qualified laboratory was undertaken for total suspended solids, electrical conductivity, redox potential, total nitrogen and total phosphorous.

Water quality over the site generally meets the relevant Tweed Shire Council or ANZECC guidelines or recommendations for each parameter measured. Detailed discussions of methodology and sample size and locations are contained within Appendix Q.

Of note, the electrical conductivity results support observations that the site is at least partially tidal up to the flood gates on the main agricultural drains traversing the site. Dissolved oxygen was recorded as being slightly low, with the slight depression most likely reflecting base flow from groundwater which is typically very low in dissolved oxygen.

Nutrients were slightly elevated in some locations and were expected to be so based on the surrounding agricultural activities. In general, the sites surface water quality was quite good and reflects conditions characteristic of agricultural drains in low lying floodplain environments. Table 17 provides a summary of the surface water quality results found for the site.

Table 17: Surface Water, Water Quality Results

Location	Date	Tide	Water level (AHD)	Redox mV	E.C. (ms)	Turbidity (NTU)	pH	Temp (°C)	DO (mg/L)	TSS (mg/L)	N (mg/L)	P (mg/L)
SW1	17/12/04	Incoming Mid tide	n/a	n/a	2.85	n/a	n/a	24.1	4.55	n/a	n/a	n/a
SW2	17/12/04	Incoming Mid tide	n/a	n/a	4.19	n/a	n/a	23.0	6.49	n/a	n/a	n/a
SW3	17/12/04	Incoming Mid tide	n/a	n/a	1.73	n/a	n/a	24.3	5.79	n/a	n/a	n/a
SW4	17/12/04	Incoming Mid tide	n/a	n/a	5.95	n/a	n/a	23.3	9.22	n/a	n/a	n/a
SW5	24/01/05	Outgoing High tide	0.566	244	39.6	5	8.07	28.9	6.23	24	0.3	0.11
SW6	24/01/05	Outgoing High tide	0.636	254	24.3	19	7.53	30.2	6.06	n/a	n/a	n/a
SW7	24/01/05	Outgoing High tide	0.507	221	9.32	11	7.44	29.7	4.76	n/a	n/a	n/a
SW8	24/01/05	Outgoing High tide	0.076	194	0.73	10	7.30	34.8	6.90	8	1.5	0.05
SW9	24/01/05	Outgoing High tide	0.354	240	18.8	15	7.50	31.6	5.47	22	0.4	0.04
SW10	24/01/05	Outgoing High tide	0.433	207	3.19	8	7.17	32.8	5.12	2	0.8	0.02
SW11	24/01/05	Outgoing High tide	n/a	212	27.8	1	7.81	30.8	6.04	n/a	n/a	n/a
SW12	24/01/05	Outgoing High tide	0.497	189	8.50	10	7.42	31.7	5.60	n/a	n/a	n/a

## 6.8 Site Contamination

A detailed aerial photography assessment and site survey was performed to establish site contamination. No previous uses, which may have contaminated the site were found and no visual signs of contamination were recorded. From the Preliminary Contamination Assessment the following conclusions have been drawn:

- Based on the information obtained from the site history investigation, it is understood that the subject lots have been used for low intensity grazing and sugar cane production.
- No potentially contaminating activities were identified during the site history investigation or the site investigation across the subject lots.

In relation to land contamination issues, the subject lots are considered to be suitable for the proposed development of a sand quarry.

For detailed discussion of methods and findings see Appendix Q.

As contamination of the site is clearly not a constraint, no further contamination assessment or contamination management plan is considered to be required.

## 6.9 Flora & Fauna

As part of the Environmental Assessment a detailed Flora and Fauna Assessment has been undertaken, a copy of the report is attached as Appendix L. The assessment has identified the vegetation communities on site; flora and fauna species present; and the mitigation measures proposed for the development. The following sections summarise the findings of the Flora and Fauna Assessment. Detailed discussions of findings are contained with Appendix L.

The development proposal is considered unlikely to significantly affect fauna and associated habitat; however the proposal will result in a very minor loss of local habitat for native species due to tree removal and construction of haulage roads. In this regard the following recommendations and comments are included within the Flora and Fauna Assessment:

It is considered that the development layout protects the significant habitats of the site. The following protection and avoidance measures were considered in the design phase of the project and subsequently incorporated into the final development proposal (Attachment 1).

- Siting of extraction zones, stockpile/machinery areas and haulage routes within areas of low ecological significance.
- Provision of suitable buffers from significant habitat areas, SEPP 14 Coastal Wetlands and SEPP 26 Littoral Rainforests.
- Restriction of construction machinery and other structures from areas of ecological significance.
- Utilisation of existing farm machinery tracks and formed tracks along road reserves for the proposed haulage routes.
- Management of potential groundwater and surface water impacts in accordance with Gilbert and Sutherland (2005) *Soil Survey, Resource Assessment, Acid Sulfate Soil Assessment, Preliminary Contamination Assessment, Agricultural Land Capability Assessment, Hydrological Assessment and Soil and Water Management*



*Plan for proposed Extractive Industry, Lot 1 on DP755721, Lots 1 & 2 on DP780199, Mooball.*

The following enhancement measures are proposed:

- Removal of existing weed species (particularly infestations of Bitou Bush and Lantana).
- Revegetation of disturbed areas within existing native vegetation communities with plants endemic to the locality.
- Revegetation of nominated areas within Attachment 7 to strengthen potential habitat corridors, extend the distribution of Swamp Sclerophyll and Littoral Rainforest environments and to extend the perimeter of the narrowest portions of the eastern forest to provide long-term mitigation against potential edge effects.
- Incorporation of potential foraging resources for threatened fauna species within landscaping/revegetation areas:
  - *Allocasuarina littoralis*, *A. torulosa* for Glossy Black Cockatoos
  - Flowering species (Eucalypts, Corymbians, Melaleuca, Banksia) for flying fox/bat species
  - Littoral Rainforest fruiting species for Fruit-doves/Rainforest Pigeons
  - Favoured Eucalypts for Koalas
- Although no hollow-bearing trees will be removed in association with the proposal it is recommended that nestboxes be installed within the existing vegetation communities as lack of hollows may currently be limiting arboreal fauna populations.

### 6.9.1 Vegetation Communities

The Flora and Fauna Assessment has identified, eleven (11) vegetation communities, as follows:

<b>Community 1:</b>	Tall Closed Forest (Littoral Rainforest)
<b>Community 2:</b>	Very Tall Open Forest/Woodland (Blackbutt)
<b>Community 3:</b>	Tall/Very Tall Closed Forest (Brushbox)
<b>Community 4:</b>	Tall Closed Forest (Coastal Swamp Box with Littoral Rainforest understorey)
<b>Community 5:</b>	Mid-High Woodland (Banksia)
<b>Community 6:</b>	Tall/Very Tall Closed Forest (Paperbark)
<b>Community 7:</b>	Mid-high/Tall Closed/Open Forest (Paperbark/Swamp Oak)
<b>Community 8:</b>	Mid-high/Tall Closed/Open Forest (Swamp Oak)
<b>Community 9:</b>	Low/Tall Open Forest (Mangrove)]
<b>Community 10:</b>	Low/Mid-high Closed Grassland (Pasture)/Open Paddock with scattered trees
<b>Community 11:</b>	Very Tall Closed Grassland (Sugarcane)

Detailed description and location of each community is provided within Appendix L.

Table 18 below shows the general breakdown of the areas of community on site.

**Table 18: Vegetation Community Areas**

Community	Area (hectare)
1, 4, 7 & 5	11
2 & 3	14
6, 7 & 8	23
9	<1
10 & 11	411

### 6.9.2 Fauna Species & Impacts

The fauna survey of the site (and immediately adjacent areas) resulted in the recording of 71 species of bird, 8 reptiles, 7 amphibians and 17 mammals (or evidence of their presence). The proposed development will result in a very minor loss (isolated trees / shrubs within paddocks).

The proposed vegetation removal/modification works are not considered to significantly impact upon the endemic fauna assemblage of the site or local/sub-regional populations. A relatively low diversity of fauna was recorded or predicted to occur within the areas to be disturbed.

The proposed haulage routes through the site (refer Appendix L) has the potential to increase fauna vehicle strike and subsequent fatality. In particular, the potential for vehicle strike of threatened species (Koalas) will be increased in the proximity of the northern Brushbox Forest (Community 3) which is traversed by the existing road reserve and will be utilized by haulage trucks.

### 6.9.3 Flora Species & Impacts

The flora survey of the site identified 152 species on site. The proposed development will result in the removal of vegetation contained within Community 10 (Grassland/pasture with scattered trees) as found within the nominated sand extraction areas. It is considered that the development of these areas will not have a significant environmental impact.

### 6.9.4 Threatened Species

From the Flora and Fauna Assessment six (6) species in total are identified as endangered under the *Threatened Species Conservation Act 1995* (TSCA 1995). Table 19 below outlines the threatened species found on site. It is considered that the proposal will not result in a significant adverse species, as identified within the Flora and Fauna Assessment.

**Table 19: Threatened Species**

FAUNA		
Species	Location	TSCA Status
Koala	NW corner of the site in association with Community 3 Brushbox Forest on Bedrock. Two individuals recorded via spotlighting.	Vulnerable
Grey Headed Flying-fox	All areas where melaleuca, Eucalypts and Banksias. Predominately eastern forests adjacent Mooball Creek.	Vulnerable
Little Bentwing Bat	Eastern forests on sand (predominately Littoral Rainforest, Swampbox Forest on sand, Paperbark Forest [Communities 1, 4, 6] and also NW Brushbox Forest on bedrock [Community 3]	Vulnerable
FLORA		
Species	Summary comment	TSCA Status
Cryptocarya foetida	Littoral rainforest, usually on sandy soils, but mature trees are also known on basalt soils. (NSW Dept. Env. & Cons., 2005)	Vulnerable
Syzygium moorei	Two planted specimens (~3m in height) recorded adjacent entry track to Lot 1 on DP208249. Both plants to be retained.	Vulnerable
Lepiderema pulchella	11-13 individuals (<3m in height) and 2 mature flowering individuals (<10m) recorded within Communities 1 and 4. As these communities will be retained and buffered in association with the development no impact is expected.	Vulnerable

## 6.10 Air Quality Assessment

Assessment of the potential impact of the development on the air quality in surrounding locations was undertaken by detailed air dispersion modeling. The modeling was based on a number of scenarios addressing the following activities:

- Topsoil removal,
- Surface soil removal by dry excavation,
- Stockpile erosion of excavated material,
- Sand washing,
- Stockpile erosion of washed sand,
- Load out of washed sand, and
- Wheel generated dusts from haul trucks on unsealed roads.

The modeling undertaken indicated that the main potential source of dust emissions would be wheel generated dust from truck movements on unsealed roads (i.e. haul trucks). The dust emission from the sand dredging operation is considered relatively low. This is based due to the materials handled during extraction and processing being wet or moist and containing low silt content.

As assessed, the air quality indicators of concern are airborne particulate matter (e.g. PM<sub>10</sub>) and dust deposition (i.e. dust fallout). Assessment of these indicators were undertaken against the DEC impact criteria.

See Appendix K for detailed discussions regarding Air Quality Assessment.

The modeling undertaken predicted airborne particle matter concentrations (PM<sub>10</sub> concentrations) and dust deposition rates above the impact assessment criteria as outlined by the NSW DEC at three of the eight monitoring locations (R1, R2 & R8 – see Appendix K). Results also indicate that even if the adopted PM<sub>10</sub> background concentration is conservative, the deposited dust levels were predicted to exceed the impact assessment criteria.

In this case Simmonds and Bristow have recommended that the control measures focus on controlling dust emissions from vehicle movements along the proposed in- and out-routes of the sand quarry. The control measures proposed include:

- Complete sealing of haulage routes and establish a vegetation barrier for dust control along the southern boundary adjoining Warwick Park Road.
- The establishment of a designed wind (vegetation) barrier along the southern boundary

Provided that the above measures are implemented it is considered that acceptable air quality levels would be achieved.

### 6.11 Traffic Engineering Assessment

A traffic engineering assessment was commissioned to evaluate the potential traffic impacts which could result from the proposal. The assessment focused on the following issues

- Traffic generation
- Access location and design

The findings, as discussed within the assessment, are summarised below, for detailed discussions of findings and methods used see Appendix N.

The assessment was based on the following elements:

- The sand quarry will operate between 7.30am and 5.00pm Monday to Friday and 7.30am to 12.30pm on Saturdays, with no work to be carried out on Sundays or Public Holidays.
- The proposed quarry will generate four (4) truck movements per hour based on an approximate 46 hour week.
- A haulage track will be constructed to provide vehicular access to Pottsville Road. Vehicles will enter and exit via a new stand alone intersection to be constructed on Pottsville Mooball Road.
- Trucks are to then access the Pacific Highway via the Cudgera Creek interchange. Trucks are not to be directed through Pottsville village
- Internal roads signposted to a 25-30km/h speed limit

#### 6.11.1 Summary of Findings

Based on the above elements an automatic count was undertaken on Pottsville Road to establish existing traffic volumes and average travel speeds at the proposed new intersection. As recorded, the two-way traffic volumes are typically less than 1,000 vehicles per day (weekdays) and 1100 vehicles per day (weekends) with the 85th percentile speed being approximately 85km/h. Traffic counted consisted of

approximately 4% heavy vehicle traffic. For detailed count results see Traffic Engineering Assessment Appendix N.

Based on the proposed elements above and the findings of the automatic count, the following conclusions were made:

- The available sight distance at the proposed access location is approximately 175m in both directions. This complies with the sight distance requirements specified by Standards Australia / AUSTRROADS for an 85km/h speed environment.
- In accordance with the requirements set out in the AUSTRROADS publication, Guide to Traffic Engineering Practice Part 5: Intersections at Grade, a 'Type A' access arrangement is appropriate on Pottsville Road to service the proposed development.

The following is recommended by Carter Rytenschild Group with regard to road improvement requirements:

- It is proposed that vehicles exit and enter via a new intersection to be constructed on Pottsville Mooball Road.
- Trucks will access the proposed extraction area via a new driveway off Pottsville Road, to the north of Kellehers Road. The haulage road will be constructed to provide vehicular access between the sand extraction area and Pottsville Road. The proposed one-way sections of road which form the entry and exit to the site will comprise a single 3.2m traffic lane with 1.0m paved shoulders. The two way section of road from the entry to the sand extraction area will comprise a 3.2m traffic lane in each direction with 1.0m gravel shoulders.
- The proposed sealed driveway to be used by trucks exiting the site has been designed in accordance with AS2890.2: 2002 - Commercial Vehicle Facilities.

## 6.12 Noise Assessment

Noise level modelling was undertaken to assess potential amenity impacts of noise generated to surrounding residential uses. The assessment focused on the two areas of site operations, site noise and road traffic noise. The below sections present a summary of findings and recommendations as contained within the assessment.

For detailed discussion of methods, equipment used and noise levels selected for site activities please refer to Appendix M.

The noise impact assessment has established that noise from most operations associated with construction and site operations will be below the daytime noise limit criteria; with exception of the 100-200kW loader activity, acoustically untreated dredge pumping at the nearest location to the dwellings to the south-west and sand screening plant operation.

The major factor in the mitigation of the potential noise impacts is distance separation, with the two (2) closest dwellings located to the southwest at a minimum distance of approximately 500m. The next nearest dwellings are within the Black Rocks Estate, which is over a kilometer from the subject worksite.

Of note, the noise levels exceed the noise limit criteria by a range of 1db(A) to 3 db(A). These levels above the noise limit criteria is generally not viewed as a serious exceedance of the criteria, as the average person cannot detect less than a 3 dB shift in sound pressure level.

With regard to noise from haulage trucks traversing Pottsville Road (of which there are 4 trips per hour anticipated) a rise of between 0.8 to 1.4 dB was found when assessed as a 1 hour Leq level. This is within the allowable 2 dB rise in noise levels as prescribed in NSW RTA's Environmental Criteria for Road Traffic Noise.

The following actions are recommended by Carter Rytenskiid Group (CRG) to mitigate the potential impact from increased noise levels generated by the proposal:

- Construction of the earth mound as per Acoustic Assessment
- Upon plant dredge pump selection, noise levels should be less than or equal to 88dB(A) at 1m from the plant. If this level is not achievable, further acoustic treatment in the form of a semi enclosure will be required to reduce source noise levels to within the acceptable range;
- Upon sand screening plant selection, noise levels should be less than or equal to 100dB(A) at 1m from the plant. If this level is not achievable, further acoustic treatment in the form of a semi enclosure will be required to reduce source noise levels to within the acceptable range;
- Haulage trucks should be well maintained, and fitted with residential mufflers;
- The internal haulage route and the crossover to Pottsville Road are to be as smooth as possible, and well maintained;
- Haulage truck speed be limited to 25-30km/hr on the internal haul routes;
- Prior to commencement of operations, an acoustic test be conducted to ensure compliance with the noise limit criteria;
- All operations be limited to 7:30am to 5pm, Monday to Friday, and 7:30am to 12:30pm, Saturdays.

### 6.12.1 Results Summary

To allow modelling of impacts of onsite operations on nearby residential dwellings, a data logger was positioned on the southern boundary of the site within proximity of the nearest potentially effected residential dwelling. This monitoring established a rating background noise level of 45db. Based on the requirements as prescribed within NSW Industrial Noise Policy a maximum noise level of 48dB (A) L10 (RBL + 5dB) is applicable to the proposal. The following predicted noise levels were calculated:

**Table 20: Noise Impact Summary – On Site Operations**

Location	Activity/Noise Source	Noise Level SPL dB(A)	
		Southern extraction pond	Northern extraction pond
S/W edge of Stage 1 Pond	100 kW Excavator	45	38
Stage 1 Plant Location	20t Dump truck movement	49	41
Stage 2 Plant Location	20t Dump truck movement	46	39
S/W edge of Stage 1 Pond	Dredge pump	45	38
N/E edge of Stage 1 Pond	100 kW Excavator	39	40
N/E edge of Stage 1 Pond	Dredge pump	39	40
S/W edge of Stage 2 Pond	100 kW Excavator	50	37
S/W edge of Stage 2 Pond	Dredge pump	51	35
N/E edge of Stage 2 Pond	100 kW Excavator Dredge pump	44	37
N/E edge of Stage 2 Pond	Dredge pump	45	37
Stage 1 plant location	Sand screening plant	48	43

Stage 2 plant location	Sand screening plant	49	41
Stage 1 plant location	100 to 200kW wheeled loader	49	43
Stage 2 plant location	100 to 200kW wheeled loader	50	42

With regard to noise from truck movements, noise prediction calculations were conducted using "Tnoise", a CoRTN based model produced by Main Roads Western Australia, and deemed acceptable by the RTA.

The extensive model input variables and results are presented at the rear of the noise impact assessment contained within Appendix M of this report.

### 6.13 Visual Assessment

The site is located within a very well defined visual catchment. In this regard, existing rural and rural residential properties adjoin the western and southern perimeter of the Dunloe Park property.

These properties are considered to be the most closely related to the proposed development, with other surrounding properties largely isolated from the proposal by way of either significant vegetation or topography. In particular, no direct visual or physical access is afforded to the extraction area from the northern perimeter of Black Rocks Estate, which is approximately 600m at its closest from the northern extraction pond.

These properties are depicted in the following diagram and within the diagrams provided within the submitted Visual Assessment prepared by Planit Consulting and attached under Appendix P.

Views to the extraction area from within the visual catchment are constrained by three (3) key features as follows:-

1. Elevated ridge running parallel with Kellehers Road and stretching to the north western extremity of the northern extraction pond;
2. Elevated ridge running distance of Warwick Park Road, inclusive of elevated sub ridge running north from Warwick Park Road and blocking visual access to extraction areas from properties on Warwick Park Road; and
3. Existing thick vegetated stand within central portion of the low lying areas and existing riparian vegetation running parallel to existing drainage lines in proximity to southern extraction area.

A detailed analysis of existing view points has been carried out in addition to an analysis of ameliorative measures available to the proponent to screen potential impacts.

View sheets following this page depict the view constraints identified above, in addition to identifying the view available from key points.

Some direct and indirect views will be available to each of the extraction ponds. Significant rehabilitation and visual screen plantings are proposed, commencing immediately upon commissioning of the proposal. Details relating to the progressive scale of the proposed screen plantings have been provided and highlighted in the following pages. Coupled with the significant distance between each affected property (refer table 4 section 2.7), no significant adverse visual impacts are considered likely.

The view sheets contained within Appendix P contain greater detail in relation to the view lines available.

#### 6.14 Cultural Heritage Assessment

As per the requirements of the Director General of the NSW Department of Planning, an Archaeological Assessment (Cultural Heritage Assessment) was undertaken to establish the extent of Aboriginal and non-Aboriginal heritage present on site.

Please refer to Appendix J for detailed discussion of both methods and results.

As found through the a search of DEC's AHIMS database, consultation and site survey, no areas within Lot 162 in DP 755721 or Lots 1 and 2 in DP 780199 were identified as containing any Aboriginal places of cultural heritage which would be destructively impacted upon by the proposal.

In conjunction to the above surveys no evidence in the form of buildings, equipment, 'springboard trees', artifacts or any other material which might be considered to be of European heritage value where identified.

As no Aboriginal sites or relics were found, neither an assessment of significance nor specific recommendations as to site management are required. The following recommendations were supplied in a precautionary nature in the event that Aboriginal or non-Aboriginal sites or relics were exposed during future works:

1. It is recommended that contractors engaged in earthworks associated with the sand extraction process be advised that under the terms of the N.S.W. National Parks and Wildlife Act (1974) it is an offence for any person to knowingly destroy, deface or damage or permit the destruction, defacement or damage to a relic or Aboriginal place without first obtaining the written consent of the Director General of the Department of Environment and Conservation.
2. In the event that future earthworks in relation to the proposed sand extraction proposal disturb Aboriginal cultural materials, works at or adjacent to the material must stop immediately. The Regional Archaeologist of the Cultural Heritage Unit of the Department of Environment and Conservation, Coffs Harbour and the Tweed Byron L.A.L.C. must be informed. They will advise as to the most appropriate course of action to follow. Works must not resume at the location without prior written consent of both the DEC and Tweed Byron L.A.L.C.



## ***Socio / Economic Considerations & Impacts***

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### **7.1 Socio - Economic Impact Assessment**

The proposed sand quarry will produce sand for the construction industry and material for the production of concrete products. The quality of sand has been investigated and it has been found to be a valuable resource and is a significant deposit. The size and location of the sand quarry will enable the quarry to service the growth areas of not only the Tweed Shire, but also the Gold Coast LGA to the north and Byron, Ballina and Lismore City LGA's to the south. A detailed Socio -Economic Impact Assessment Report has been prepared for the proposed Sand Quarry and is attached at Appendix I.

#### **7.1.1 Potential Impacts**

The Socio Economic Impact Assessment found that the proposed Sand Quarry would have a positive economic impact upon the local economy over a twenty year period with revenue of up to \$117 million dollars being generated and a measurable contribution to the local economy of \$47 million and an economy multiplier effect (2.7 X) of \$126 million on direct costs over the life of the quarry.

Other benefits will also accrue to the Construction Industry as the Sand Quarry will provide healthy competition and enable concrete batchers, landscapers and building suppliers to source material from a second quarry within Tweed Shire. It is also noted that the Tweed Shire and surrounding Local Government Areas will continue to grow in population over the next twenty to thirty years and the demand for sand as a necessary ingredient for concrete and other building products is likely to remain sound over this period and for the life of the quarry.

As the quarry is located to the south of the Pottsville Township, no adverse impacts are anticipated upon surrounding residential areas to the north. Haulage of material is to be directed westwards to the Pacific Highway for destination to the north and south of the quarry.

In summary, the potential socio economic impacts arising from the proposal are of a positive nature and provide strong justification for the proposed development to proceed.

### **7.2 Alternatives**

The subject site, although zoned 1(a) Rural, is situated in close proximity to the coast and Pottsville Beach. Its value as farm land is limited primarily due to the structure of the soil and poor drainage and the property is currently utilized for grazing of a limited number of livestock (cattle).

A number of alternatives for the site have been examined including:

- Not proceeding and using the land for agricultural purposes;
- Developing the quarry at a reduced extraction rate;
- Developing the quarry at an increased extraction rate;
- Developing the site for urban purposes (eg Residential/ tourism)

The advantages and disadvantages of these alternatives are summarised in the table below.

**Table 21: Alternative Use Assessment**

Alternatives	Advantages	Disadvantages
<b>Not Proceeding – The Do Nothing Option – Primarily grazing of livestock and possible sugar cane cultivation</b>	There would be no need for new property management measures over and above what is required for farming activities such as fencing, weed management and pest control including feral animals.	Soil is of poor quality for farming purposes and is not identified as prime crop or pasture land;  A known resource would not be realised and place increasing price pressures on existing sand sources resulting ultimately in increasing construction costs;  Loss of employment opportunities;  Loss of Income for the property owners;  The economic benefits including multiplier effects which would flow on to the region would not be realised.
<b>Reduced Extraction Rate</b>	Potential for less impacts in respect of noise, dust and traffic generation	Increase the number of years before the quarry would have exhausted the resource;  May not meet the growing demand from the Construction Industry;  Place upward price pressures on the cost of sand.
<b>Increased Extraction Rate</b>	The life of the quarry would be reduced and site rehabilitation will commence much earlier than proposed.	Potential to increase impacts associated with noise and dust emissions and traffic generation;  Additional set up costs in terms of plant and equipment required to meet increased extraction rates;  Increased extraction may lead to an oversupply of sand forcing the price down;  An oversupply may also result in the need to stockpile sand on the site impacting upon local flood patterns and flood storage areas.

<p>Utilising the site for residential/ tourism purposes</p>	<p>Short term windfall for the landowner</p>	<p>Not realising the known sand resource on the site;</p> <p>Expanding coastal strip development along the Eastern Seaboard;</p> <p>Not in accordance with Council's adopted residential strategies or the Pottsville Village Strategy;</p> <p>The site would require filling to mitigate potential flood impacts and require fill to be imported from elsewhere. This may have adverse impacts upon surrounding land including the Pottsville Village by the displacement flood water.</p> <p>More suitable residential sites have been identified by Council which is yet to be developed including Kings Forest, Seaside City and Cobaki Lakes.</p>
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In summary it is concluded that the alternatives are not socially or economically feasible, and that the proposal can occur with identified impacts being suitably mitigated and managed.

## Environmental Management

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### 8.1 Summary of Management / Mitigation Measures

The following sections summaries the commitments by Ramtech Pty Ltd regarding mitigations and control measures to be implemented for the proposal:

#### 8.1.1 Sand Extraction

- Extraction of marine clay will not be undertaken
- Sand extraction below the watertable will be by suction dredge only. No dry extraction of sand will occur on site, with the exception of initial overburden and builders loam (brickies loam).
- Prior to commencement of extraction, the extent of the approved extraction areas shall be clearly and permanently marked by a licensed surveyor with survey posts.
- Fines will be re-interred approximately below the watertable at approximately 10m below NSL.

#### 8.1.2 Sediment and Erosion Control

- A perimeter bund and catch drain shall be constructed around each dredge pond and processing areas. The bund is to be vegetated.
- Installation of sediment control fences at the downslope perimeter of cleared or disturbed land. These are to be functional before clearing commences.
- A negative grade will be maintained around the dredge ponds within the bunded perimeter.
- Additional Erosion and sediment control devices shall be installed on an 'as required' basis. Such measures will be installed in accordance with the "Soils and Construction Guidelines – Managing Urban Stormwater".
- Where practical, surface waters from undisturbed areas shall be diverted away from extraction/works areas.
- All processing areas will drain towards the onsite water bodies. No discharge of processing waters from the site shall occur under normal conditions (ie. Not flooded).
- Topsoil stripping will be undertaken in sub-stages of 1 hectare or less
- All existing ground cover around the site is to remain and be maintained to limit sediment and erosion.
- Any on-site stockpiles of commercial sand shall remain damp and will have appropriate sediment and erosion control devices installed at all times.

- Stockpiled topsoil shall be seeded so as to achieve adequate vegetation cover and sediment and erosion devices will be installed around all stockpiles at all times.
- No discharge of processing water from the site shall occur under normal conditions (ie. not flooded)

### 8.1.3 Surface Water Control & Quality

- Installation of surface and ground water monitoring devices as located on figure GJ0400.9.2 (Appendix Q)
- Surface water monitoring shall be undertaken in accordance with requirements as outlined with the draft EMP under Appendix G.
- All processing areas will drain towards the onsite water bodies. No discharge of processing waters from the site shall occur under normal conditions (ie. not flooded).
- Provision of reliable *in situ* monitoring equipment at all times for use by Quarry staff. This equipment will be calibrated at least monthly.
- All effluent generated will be pumped off site for treatment at Council facility.

### 8.1.4 Groundwater Movement and Quality

- Installation of ground water monitoring devices as located on figure GJ0400.8.1 (Appendix Q)
- Ground water monitoring shall be undertaken in accordance with the requirements as outlined within the draft EMP under Appendix G.
- Provision of reliable *in situ* monitoring equipment at all times for use by Quarry staff. This equipment will be calibrated at least monthly.
- All groundwater bores will be licensed by DIPNR.
- Dewatering from on site water bodies will not be undertaken
- Contour profiling of groundwater head data will be undertaken as part of site monitoring and reporting procedures.

### 8.1.5 Fuel Management and Land Contamination

- Fuel storage is to be contained within a bund area, and protected from the elements. Bunding will be sufficient to contain 110% of the volume of fuel storage.
- Operating procedures for containing and cleaning up oil spills on water to be established and implemented on site, with all staff to be trained in these procedures.
- Products designed to contain and absorb oil spills on water will be available on site. Quantity and type of product will be monitored and will be available in sufficient quantities to deal with any potential spill on site.
- Materials stored on site will be limited to
  - One (1) month supply of diesel
  - Machine and equipment oils and grease
  - limited quantities of petrol
  - Welding and workshop gases.

### 8.1.6 Air Quality

- The full length of internal haulage roadways will be sealed.
- A vegetation barrier for dust control along the southern boundary adjoining Warwick Park Road will be established (species and planting in accordance with rehabilitation plan, Appendix H).
- Topsoil stripping will be undertaken in sub-stages of 1 hectare or less.
- Topsoil stripping will not be undertaken on day with excess winds.
- All trucks entering/leaving the site shall be covered.
- Stockpiled topsoil shall be seeded so as to achieve adequate vegetation cover and sediment and erosion devices will be installed around all stockpiles.
- Any disturbed or unsealed movement areas will be watered by an onsite cart to ensure that such areas remain damp. Watering rates shall not be less than 2.5l/m<sup>2</sup>/hour.

### 8.1.7 Noise

- Acoustical treatment is to be applied to the dredge when operating within the south west corner of extraction pond 2.
- All haulage and onsite trucks are to be fitted with residential mufflers
- Speed is to be limited to 25-30km/h on site
- Operating hours are to be limited to 7.30am to 5.00pm Monday to Friday and 7am to 12:30pm Saturday.

### 8.1.8 Flora & Fauna

- Removal of existing weed species (particularly infestations of Bitou Bush and Lantana)
- Revegetation of disturbed areas within existing native vegetation communities with plants endemic to the locality.
- Revegetation of nominated areas within the rehabilitation plan as attached under Appendix H to strengthen potential habitat corridors, extend the distribution of Swamp Sclerophyll and Littoral Rainforest environments and to extend the perimeter of the narrowest portions of the eastern forest to provide long-term mitigation against potential edge effects.
- Incorporation of potential foraging resources for threatened fauna species within landscaping/revegetation areas including:
  - *Allocasuarina littoralis*, *A. torulosa* for Glossy Black Cockatoos
  - Flowering species (Eucalypts, Corymbians, Melaleuca, Banksia) for flying fox/bat species
  - Littoral Rainforest fruiting species for Fruit-doves/Rainforest Pigeons
  - Favoured Eucalypts for Koalas
- Installation of nest boxes within the existing vegetation communities.

### 8.1.9 Waste

- All soil waste will be disposed of by licensed contractor in accordance with the *Protection of Environmental Operations Act 1997* (POEO Act 1997) & *Waste Minimisation Act 1995*.
- Effluent will be pumped off site for treatment within an appropriate Council facility

### 8.1.10 Views and Landscapes

- 5m to 10m vegetated buffers will be established in accordance with the rehabilitation plan attached under Appendix H.

### 8.1.11 Monitoring, Reporting and Consultation

- Reporting and consultation measures will be implemented as outlined with the draft EMP under Appendix G.

## 8.2 Environmental Management Plan

The proposed development will require the establishment of an Environmental Management Plan (EMP). The EMP encompasses:

- All operating procedural requirements.
- All environmental management measures.
- All monitoring and reporting requirements.
- Protocols for identifying incidents or management failures.
- Corrective action to be undertaken if an incident or failure is identified.

A draft EMP, included under Appendix G has been prepared for consideration and comment. The plan includes extensive reporting, monitoring and evaluation and rehabilitation measures for the proposal.

## 8.3 Environmental Monitoring

A summary table of all monitoring on site is included within the draft Environmental Management Plan under Appendix G. The table outlines what is being monitored, monitoring intervals and submission requirements to the relevant regulatory authority.

Section

## EA 9

# Conclusion

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Ramtech Pty Ltd proposes to establish a 56.7 hectare sand quarry at Mooball. The proposal will see the staged extraction of good quality sand suitable for concrete manufacture over a period of 26 years.

Assessment of the potential environmental impacts within this Environmental Assessment has indicated that the proposal would have limited impacts which can be easily and effectively managed to ensure negligible environmental risk. As such the proposal is considered consistent with all of the relevant regulatory requirements and planning controls.

To ensure compliance with requirements as outlined by the Director General and to meet the objectives of the proposal, this Environmental Assessment has focused on and undertaken detailed assessments of the following issues:

- Air quality
- Surface and ground water
- Potential acid sulfate soils
- Surrounding amenity, both noise and visual
- Flora and fauna
- Traffic generation; and
- Potential social and economic impacts

Assessment of these areas indicates the proposals will result in negligible impacts which can easily and effectively mitigated through relevant best practice measures. Gains from the proposal will see the generation of employment opportunities and increases to income within the Tweed area over the life of the quarry and upon cessation of quarry activities.

The end use of the site, which will develop over the life of quarry operations through progressive rehabilitation, will establish improved environmental linkages and increase habitat areas within the site and surrounding areas. The end use will also see potential opportunities for some limited recreational uses to surrounding residential areas.

Overall the proposal demonstrates that effective management and mitigation measures are achievable onsite, environmental impacts are negligible, improved environmental outcomes will be achieved through site rehabilitation and revegetation; and positive social and economic outcomes will result for Tweed Shire.

**As such it is respectfully requested that the application be considered favourably and approved subject to reasonable and relevant conditions.**



Section

*EA ii*

## *Glossary*

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ALA	Agricultural Land Assessment
ANZECC	Australian and New Zealand Environment and Conservation Council
DEC	Department of Environment and Conservation
DIPNR	Department of Infrastructure, Planning and Natural Resources
EA	Environmental Assessment
EMP	Environmental Management Plan
EP& A Act 1979	Environmental Protection and Assessment Act 1979
GSGC	Great Soil Group Classifications
LGA	Local Government Area
NCREP	North Coast Regional Environmental Plan
NSL	Natural Site Level
PASS	Potential Acid Sulfate Soils
RTA	Road Traffic Authority
SEPP 11	State Environmental Planning Policy 11 - Traffic Generating Development
SEPP 14	State Environmental Planning Policy 14 - Coastal Wetlands
SEPP 44	State Environmental Planning Policy 44 - Koala Habitat Protection
SEPP 71	State Environmental Planning Policy - Coastal Protection
TLEP 2000	Tweed Local Environmental Plan 2000
TPA	Tonnes Per Annum
TSCA 1995	Threatened Species Conservation Act 1995

# *Appendix A*

## Operational Plans

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# *Appendix B*

## Director General Requirements

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# *Appendix C*

## Community Consultation Handout

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# *Appendix D*

## Land Tenure Plan

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# *Appendix E*

## Deposited Plans

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# *Appendix F*

## Zoning Plans

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# *Appendix G*

## Draft Environmental Management Plan

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# *Appendix H*

## Draft Rehabilitation & Revegetation Plan

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# *Appendix I*

## Socio – Economic Assessment

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# *Appendix J*

## Cultural Heritage Assessment

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# *Appendix K*

## Air Quality Assessment

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# *Appendix L*

## Flora & Fauna Assessment

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# *Appendix M*

## Noise Impact Assessment

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# *Appendix N*

## Traffic Impact Assessment

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# *Appendix O*

## Flooding Assessment

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# *Appendix P*

## Visual Impact Assessment

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## *Appendix Q*

### **Gilbert & Sutherland – Soil Survey, Acid Sulfate Soil, Preliminary Contamination, Agricultural Land Capability & Hydrological Assessments; Soil and Water Management Plan**

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# *Appendix R*

## Revised Resource Assessment – John Siemon

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# *Appendix S*

## Economic & End User Assessment (Coffey Mining)

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