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Deerubbin LALC

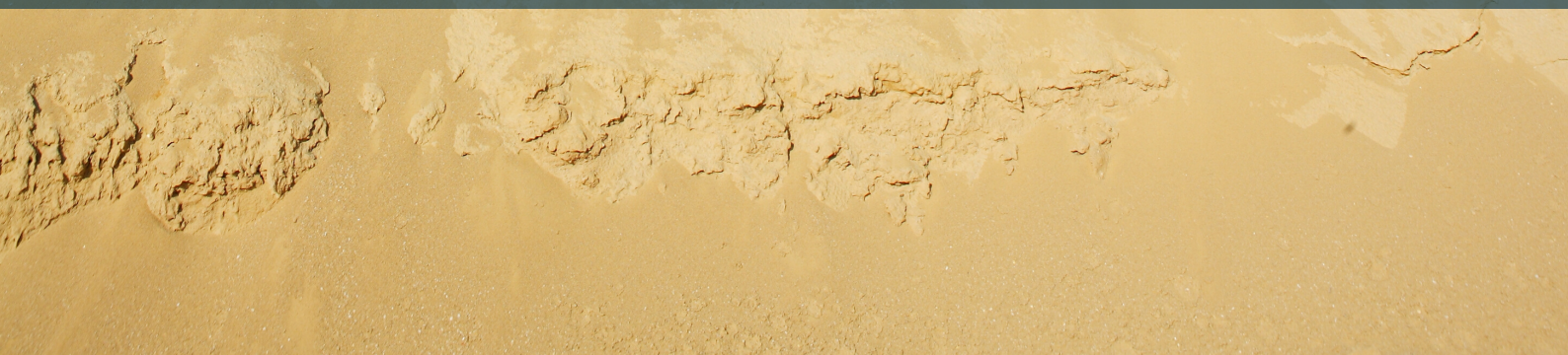


Scoping Report

Prepared for Department of Planning, Industry and Environment

PROPOSED FRIABLE SANDSTONE EXTRACTIVE INDUSTRY

Wisemans Ferry Road, Maroota





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Prepared for Department of Planning, Industry and Environment

PROPOSED FRIABLE SANDSTONE EXTRACTIVE INDUSTRY Wisemans Ferry Road, Maroota

Prepared by.

Design Collaborative Pty Ltd

On Behalf of the Applicant.

Deerubbin Local Aboriginal Land Council

ISSUE	DATE	DESCRIPTION	PREPARED	CHECKED
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ABBREVIATIONS

Conservation Act	Biodiversity Conservation Act 2016
District Plan	Central City District Plan
DLALC	Deerubbin Local Aboriginal Council
DPIE	Department of Planning, Industries and Environment
Draft Hills LSPS	Hills Shire Council's Draft Local Strategic Planning Statement
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
Extractive Industries SEPP	State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
GSC	Greater Sydney Commission
Hills LEP 2012	Hills Shire Local Environmental Plan 2012
POEO Act	Protection of the Environment Operations Act 1997
Regional Plan	Greater Sydney Regional Plan: A Metropolis of Three Cities
SEARs	Secretary's Environmental Assessment Requirements
State and Regional SEPP	State Environmental Planning Policy (State and Regional Development) 2011
WM Act	Water Management Act 2000

1. INTRODUCTION

1.1 EXECUTIVE SUMMARY

This Scoping Report (*the Report*) has been prepared by Design Collaborative Pty Ltd on behalf of the Deerubbin Local Aboriginal Land Council (*DLALC - the Applicant*) to accompany a request for the Secretary's Environmental Assessment Requirements (*SEARs*) for a proposed friable sandstone extraction industry (*the Project*) located at Wiseman's Ferry Road, Maroota (*the Subject Site*).

The Subject Site comprises 3 parcels of land described as Lot 7005 DP 1055724, Lot 202 DP 752025 and Lot 213 DP 752025 and occupies an area of some 180.7Ha. Preliminary studies indicate that approximately 20 million tonnes of readily exploitable friable sandstone is contained within the Subject Site. **Figure 1** provides an aerial photo of the Subject Site and **Figure 2** shows the location of the Subject Site within its regional context.

The Project envisions the use of some 50ha of the Subject Site for the extraction, processing and delivery of up to 500,000 tonnes of sand per annum to meet the increasing demands of the Sydney construction and building market. The total resource to be extracted exceeds the threshold of 5 million tonnes, making the development State significant.

This Report introduces the Applicant and the Project, outlines the key environmental and social issues to be considered in the design, assessment and operation of the Project, provides the strategic and statutory context for the Project and proposes a community engagement strategy.

Upon receipt of the SEARs, the information contained in this Report will form the basis of a comprehensive Environmental Impact Statement (*EIS*) prepared in accordance with Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*. That document will provide the detailed design of the Project and outline the proposed operational considerations to mitigate potential impacts on the Subject Site and surrounding community.



Figure 1: Aerial Photograph of Subject Site (Source: Nearmap, 2019)

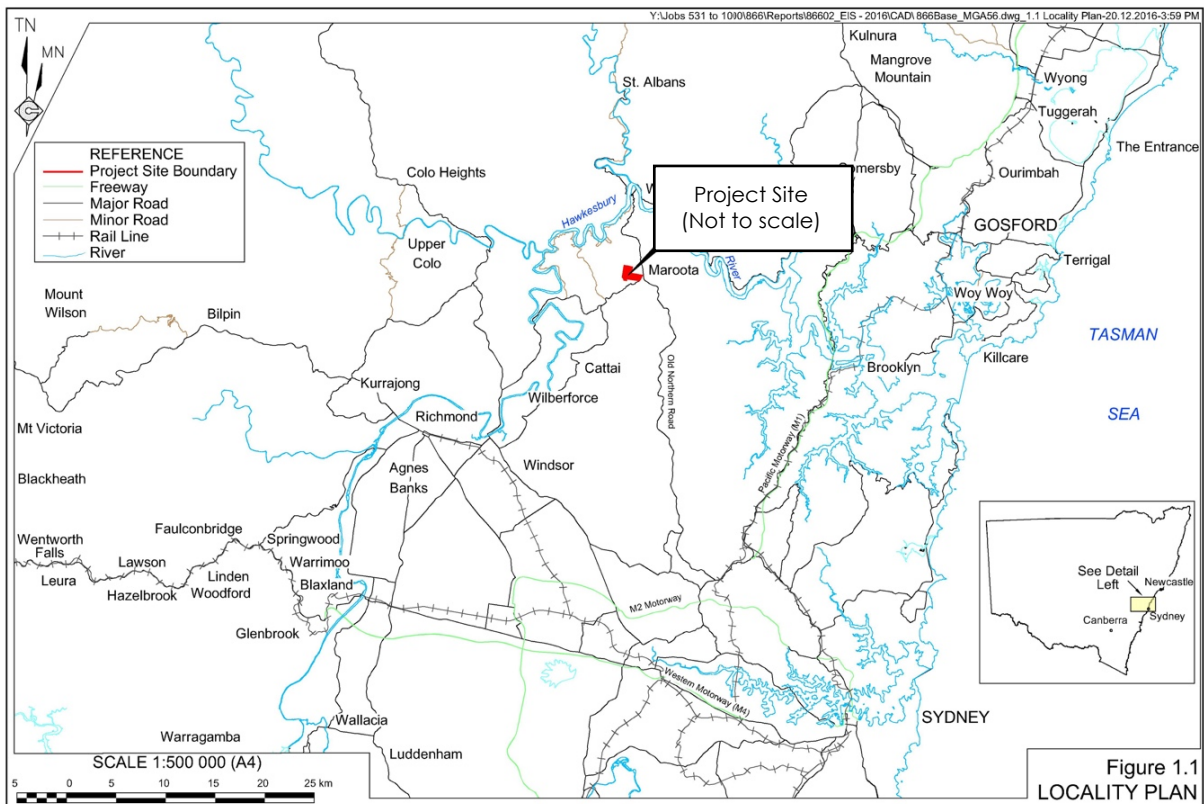


Figure 2: Regional Context (Source: R.W. Corkery & Co Ltd Pty, 2016)

1.2 APPLICANT

Table 1 – Proponent Details	
Proponent:	Deerubbin Local Aboriginal Land Council
Address	Level 1 Suite 3 291-295 High Street Penrith NSW 2750
ABN	ABN 41 303 129 586

1.3 PROPOSAL JUSTIFICATION

DLALC has acquired significant landholdings within the Sydney Basin under the *Aboriginal Land Rights Act 1983*, including the Subject Site. As an organisation, they seek to develop these landholdings, where appropriate, to fund housing, health, employment and educational programs that improve, protect and foster the interests of Aboriginal persons within the Deerubbin area.

The Subject Site contains a significant sandstone deposit that provides an opportunity for a revenue stream to fund these valuable programs whilst providing a local, cost-efficient supply of sand to the Sydney construction and building market.

The demand for sand within the Sydney market is approximately 7 million tonnes per annum. A growing proportion of which is sourced outside the Sydney Region (approximately 1 million tonne per year)¹. As the value of sand is highly sensitive to handling and transport costs, it is important to have local sources to assist with the cost-sensitive construction of major public and private infrastructure projects, including the Western Sydney Airport and the Sydney Metro Network.

The above point is acknowledged in the Greater Sydney Region Plan, the principal strategic document for Greater Sydney, which states “Access to construction materials from local sources within Greater Sydney is critical for continued growth and for minimising construction costs”.²

¹ NSW Government Trade & Investment, (2016), *NSW Offshore Sand Review*, NSW Government.

² Greater Sydney Commission, (2018), *Greater Sydney Region Plan: A Metropolis of three Cities*, NSW Government, pg. 163.

1.4 AUTHOR & NOMINATED CONTACT

The lead consultant for the Project and author of this Scoping Report is Mr David Rippingill of Design Collaborate. He holds a Bachelor of Environmental Planning (WSU), Juris Doctor (UNE) and is a Director of Design Collaborative. David and James Lidis are the nominated contacts for the Project and are contactable by phone on (02) 9262 32000 or by email at enquiries@designcollaborative.com.au.

2. THE SUBJECT SITE & SURROUNDING AREA

2.1 THE SUBJECT SITE

The Subject Site comprises three parcels of land described as:

- Lot 7005 DP 1055724;
- Lot 202 DP 752025; and
- Lot 213 DP 752025.

The Subject Site contains an access road between Wisemans Ferry Road and an existing sand extraction site located on an immediately adjoining site to the north operated by PF Formations (**Figure 3**). That access road is subject to a licence with the crown (no. 190301).

Otherwise, the Subject Site is vegetated with the exception of a number of tracks, smaller cleared areas and water storages.



Figure 3: Aerial Photograph Showing Access Road Licence No. 19031 (SIX Maps, 2014)

The Subject Site contains two creek lines which drain towards the north-west separated by ridgelines. There are five water storages on site, all located within the eastern section of the site. The location of four of these dams is shown in **Figure 4**. The Subject Site falls from around RL 200 near the Wisemans Ferry Road frontage to below RL 100 within the creek lines on the western boundary of the Subject Site. This is shown in **Figure 4** below.

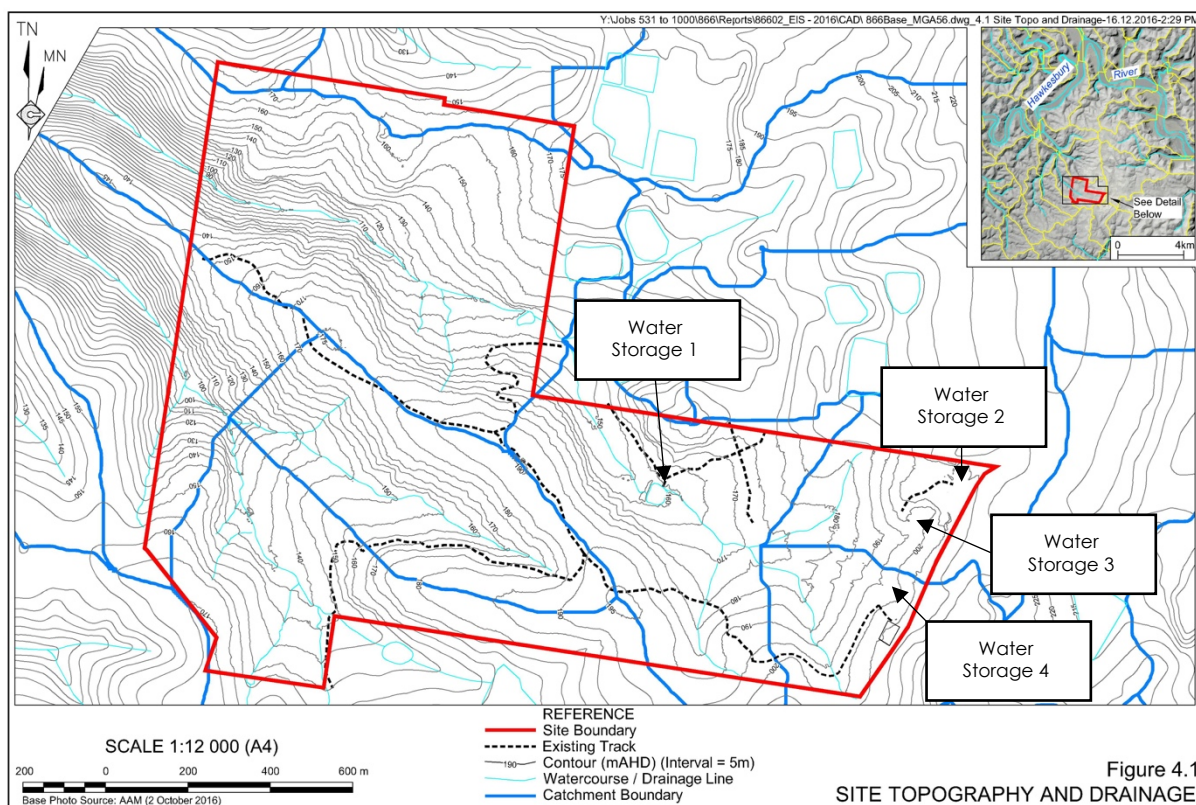


Figure 4: Site Topography and Drainage (Source: R.W. Corkery & Co Ltd Pty, 2016)

2.2 SITE GEOLOGY/EXTENT OF RESOURCE

Studies examining the potential sand resource on the Subject Site were carried out by Grahame Lee & Associates in 2008, 2009 and April 2017 (**Annexure A**). Those investigations uncovered two sand bearing deposits on the Subject Site. These being:

- Maroota Sand in a small area in the eastern part of the site containing in the order of 30,000 tonnes; and
- Hawkesbury Sandstone occurring over the whole of the site and underlying the Maroota Sand with a conservative estimate of 19 million tonnes of raw sandstone within a proposed extraction area of some 50 Ha.

The indicative extraction area, shown below in **Figure 5**, has been identified based on the significant presence of sandstone within the area, and the following criteria:

- 40m setback from road boundary and southern boundary;
- nil setback from boundaries where continuity of extraction may occur in conjunction with neighbouring properties;
- 20m setback from all other boundaries;
- extraction down to RL 150;

- maximum extraction thickness of 33m;
- exclusion of creek lines; and
- extraction areas have vertical sides.

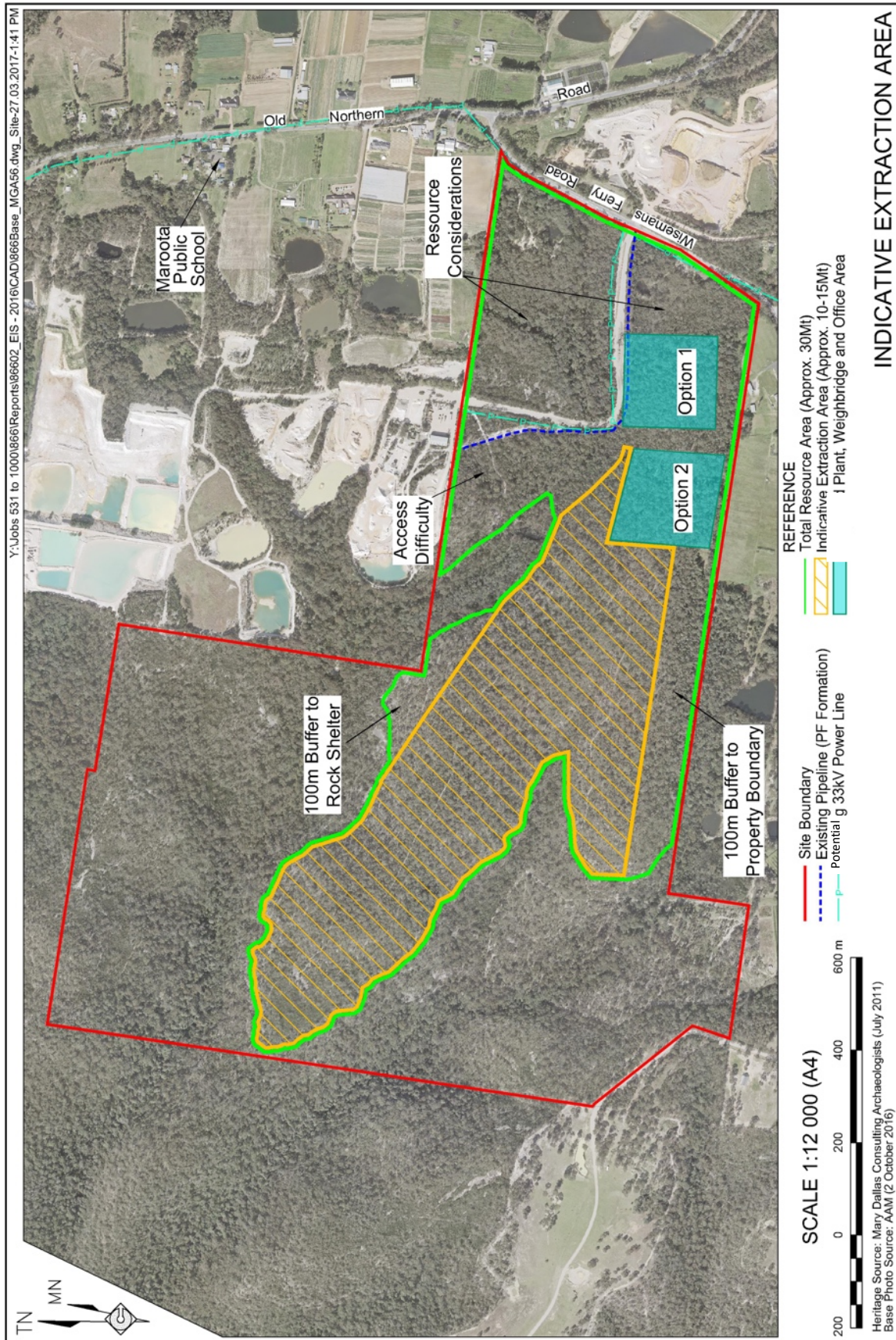


Figure 5: Indicative Extraction Area (Source: R.W. Corkery & Co Ltd Pty, 2016)

2.2 THE SURROUNDING AREA

The Subject Site is located in the suburb of Maroota close to the north-western edge of the Greater Sydney Region, at the southern border of the Hawkesbury River. Maroota is around 40kms to the north of the Parramatta CBD, 50kms to the north-west of the Sydney CBD and some 8kms to the south of Wisemans Ferry.

Old Northern Road and Wisemans Ferry Road provide main road links from the Subject Site to the Sydney metropolitan area. Both are classified roads under the control of RMS. Old Northern Road links Baulkham Hills to Wisemans Ferry via Castle Hill, Dural, Glenorie and Maroota and provides access to the Sydney Motorway system. Wisemans Ferry Road provides a strategic link to Windsor to the south-west and then Penrith to the south. (**Figure 16** and **17**)

As shown in **Figure 6**, the area surrounding the Subject Site contains a mix of land uses, including agriculture, extractive industries, rural residential and bushland areas.

The Subject Site adjoins an existing sand extraction site operated by PF Formations to the north and other land used for agricultural purposes. Other sand extraction sites operated by Dixon Sand, Hodgson Family Trust and PF Formation are located in the larger area as illustrated in **Figure 6**.

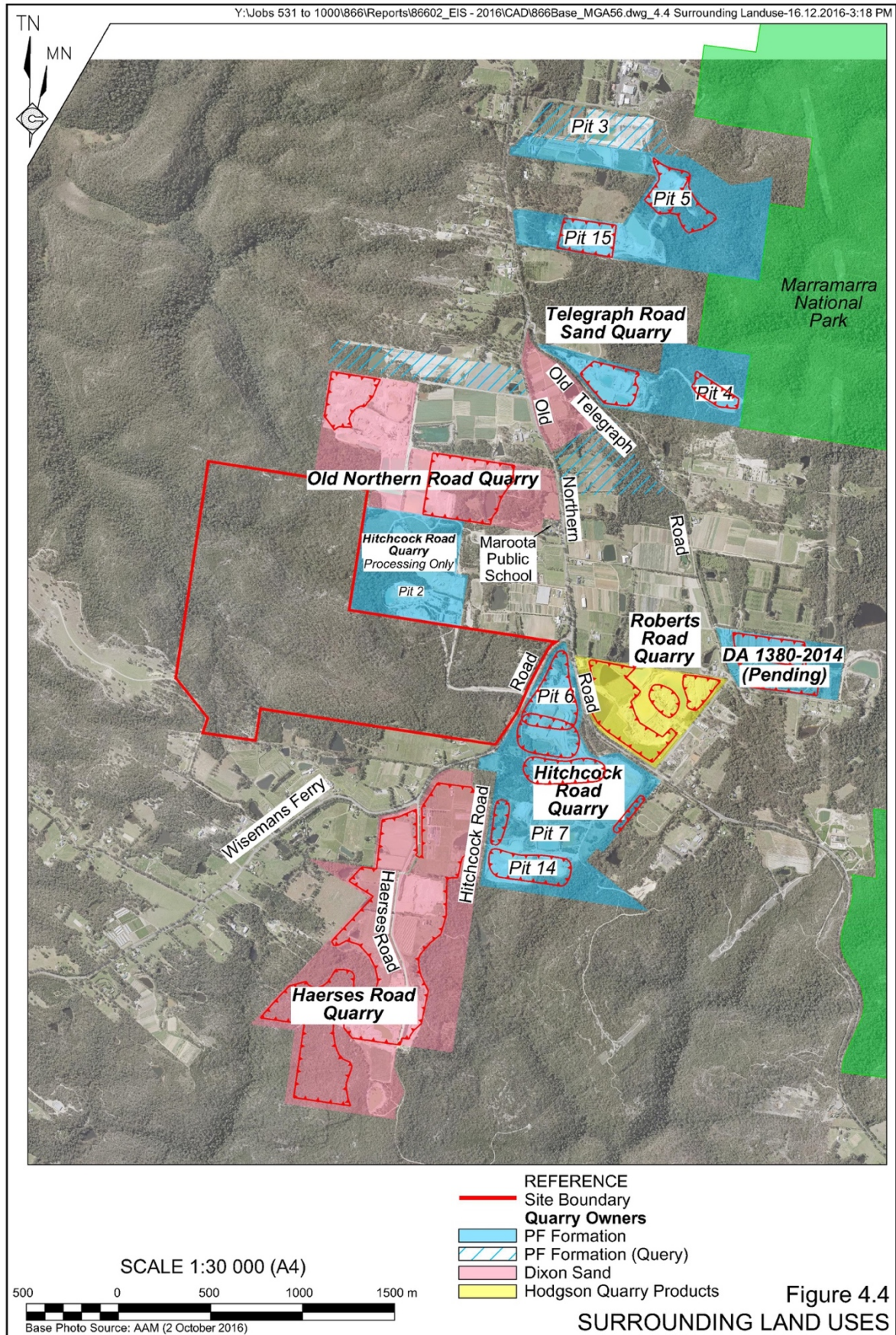


Figure 6: Surrounding Land Uses (Source: R.W. Corkery & Co Ltd Pty, 2016)

DLALC owns a significant landholding of approximately 1,100ha of potentially extractable land to the west of the Subject Site (**Figure 7**). This land provides long-term opportunities as a source of local, cost efficient construction sand for when other deposits become exhausted over time.

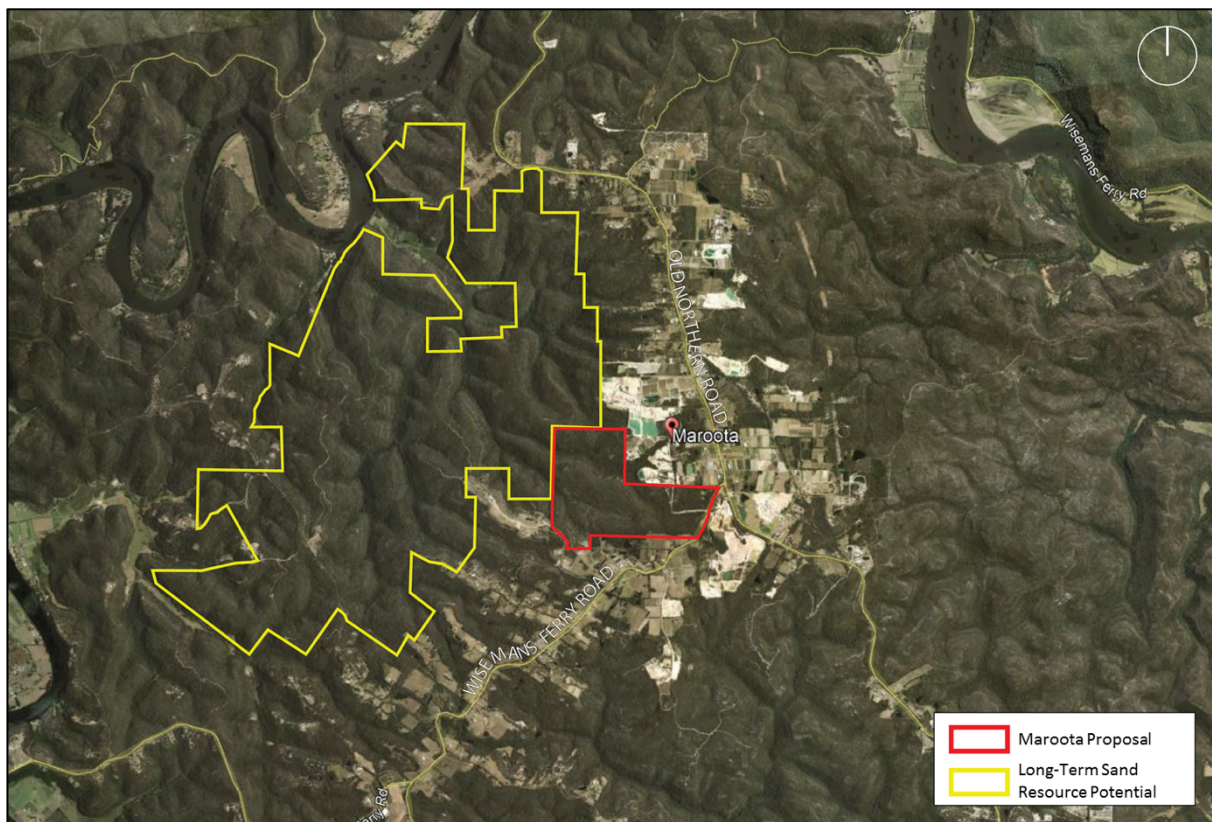


Figure 7: DLALC Adjoining Land (Source: Google Earth, 2019)

3. PROJECT DETAILS

3.1 PROPOSED DEVELOPMENT OVERVIEW

Development consent will be sought under 'Division 4.7 - Stage Significant Development' of the *Environmental Planning and Assessment Act 1979 (the EP&A Act)* for the use of the Subject Site as an extractive industry; being the extraction and processing of Hawkesbury and Maroota Sandstone into a fine-medium graded sand. Crushed sandstone, fine graded sand and a fine aggregate can also be produced as a by-product of the primary process.

The proposed development and its operations will be refined during the preparation of the EIS through engagement with community members, non-government and government stakeholders and professional consultants. The EIS will contain the findings of this engagement and provide a detailed Project proposal.

The following works are proposed based on a preliminary understanding of the Project and environmental constraints:

- the establishment of a processing plant and associated works such as a weighbridge, machinery sheds, office etc;
- the clearing of vegetation to expose working surfaces;
- the construction of haul roads, both temporary and permanent;
- the removal and storage of overburden;
- the extraction of Hawkesbury Sandstone within approved depths and setbacks;
- the haulage and delivery of extracted material to the processing plant;
- the establishment and operation of clean water supplies to the processing plant;
- the establishment and operation of a tailings disposal system;
- the stockpiling of processed sand;
- the loading and transport of processed sand for delivery to the metropolitan area via either the Old Northern Road or Wisemans Ferry Road;
- the construction of landforms within the extracted area in accordance with an approved rehabilitation plan, using the stored overburden; and
- the importation of clean material for the construction of landforms within the extracted area in accordance with approvals and an approved rehabilitation plan, and the revegetation of the constructed landforms.

The above works are explored in detail under the following relevant headings.

3.2 DETAILED DEVELOPMENT OVERVIEW

Having regard to the operating conditions of surrounding extractive industries, and the mechanics of the Sydney sand market it anticipated that the proposed development has the capability of supplying 500,000 tonnes of saleable product per annum.

3.2.1 CLEARING AND GRUBBING

Before the commencement of extraction, the resource bearing land will need to be cleared of vegetation, and the topsoil and overburden removed. Any removed topsoil and overburden will be stored on site for later use in accordance with any an approved rehabilitation plan.

3.2.2 EXTRACTION

A bulldozer equipped with ripped bars or equivalent excavator attachment will be used to excavate the sandstone. A front-end loader or equivalent vehicle would then be used to load a dump truck with the excavated material to be taken the processing plant. Approximately one hectare of land would be consumed per year based on an operational scenario of 500,000 tonnes of excavated product per year.

3.2.3 HAULAGE

Haul roads will need to be constructed as the extraction area progresses. These roads are typically 25 metres wide and will need to be regularly graded to maintain their profile and running surface. The location of these haul roads will be refined through the EIA process with consideration being given to impacts such as noise and dust on neighbouring residences.

3.2.4 PROCESSING

There are several options for sand processing, although the most likely configuration would consist of:

- A primary plant in which extracted sandstone is loaded into a hopper for crushing and the separation of sand. This sand is then conveyed to a secondary plant ready for washing.
- A secondary plant consisting of a sand washing unit and a conveying system to two stackers that deposit saleable product ready for collection by trucks. One stacker deposits a fine-grained sand, the other, a medium-grained sand.

Approximate sizes for the Project with an operational scenario of 500,000 tonnes per annum are:

- Hopper: 100 tonnes;
- Plant Capacity: 250 tonnes per hour; and
- Plant footprint: 1.5 hectares

The location of this plant equipment is to be determined through the EIA process and the findings of the EIS. Matters to consider when determining the location of these plants include:

- Location and access to the resource including primary haul road gradients;
- Proximity to services;
- Proximity to neighbours for noise and dust management; and
- Access to the external road network.

3.2.5 WATER SUPPLY AND TAILINGS MANAGEMENT

Water will be required for the sand washing process, dust suppression and rehabilitation work. Water management will be a fully integrated and recycled process. It will include:

- construction of a licensed surface water storage facility with contributions from surface runoff, discharges from tailings ponds and discharges from a licensed groundwater bore (when required);
- tailings from the processing plant would be discharged to small storage ponds then to the clean water supply pond;
- as the tailings dam nears capacity, the tailings are dried out to be used as part of the rehabilitated landform; and
- annual water usage estimated at 25ML per annum depending on climatic conditions and subject to system losses.

Figure 4 above shows there are four small water storages on the site, however, their origin and licensing status is unclear at this stage. Further investigations may reveal that these could be used for the initial start of operations until such time that a licensed storage facility is constructed.

3.2.6 SALES PERIODS, STOCKPILES MANAGEMENT & TRANSPORT

Sales delivery requires loading facilities. Stockpiles of saleable product up to six metres high will be created by the radial arms and cyclone stackers of the secondary processing plant. Road trucks will be loaded by a front-end loader and leave the site via a weighbridge to record the amount of volume sold.

Sales periods would likely be 10 hours per day between 7am and 5pm, Monday to Friday with limited trading on weekends. Trucks would leave the site via Wisemans Ferry Road and proceed down that road or alternatively proceed south down Old Northern Road. There would be approximately 50 truck movements from the plant each day on the basis of 500,000 tonnes of product per annum. Transport routes will be determined through the EIA process with consideration given to potential impacts on public roads and their users.

3.2.7 REHABILITATION

Following depletion of the sand resource, the most likely end land use for the Subject Site would be an agricultural use similar to that occurring on neighbouring lands. This ensures the land continues to provide benefit to the region in the form of employment opportunities and the securing of the future cost-efficient food needs of the Sydney metropolitan market.

A rehabilitation plan will be prepared as part of the EIA process.

Importing certified fill may be required, if necessary, to produce the desired landforms. This is not a priority of the project but will be examined further during the assessment phase to determine its practicality and commercial viability. If proved suitable, then it will be included in the assessment and application.

3.2.8 ADMINISTRATION, MANAGEMENT AND EMPLOYMENT

The site will include a small administration office and associated buildings to house support equipment and provide maintenance facilities. The site will be managed by a suitably qualified and experienced manager.

Approximate employee numbers to supply 500,000 tonnes per annum is 20 full time employees.

4. STRATEGIC FRAMEWORK

Government plans, policies and guidelines relevant to the proposed development include:

- Greater Sydney Region Plan – A Metropolis of Three Cities 2018 (*Regional Plan*);
- Central City District Plan 2018(*District Plan*);
- Draft Hills Local Strategic Planning Statement 2019 (*Draft Hills LSPS*);
- NSW Offshore Sand Review 2016.

4.1 GREATER SYDNEY REGION PLAN – A METROPOLIS OF THREE CITIES

The Greater Sydney Region Plan, *A Metropolis of Three Cities (Regional Plan)* was released by the Greater Sydney Commission in March 2018 to provide a 40-year vision and establish a 20-year plan to manage growth for Greater Sydney.

4.1.1 GREATER SYDNEY STRUCTURE PLAN

The Regional Plan includes a geographical depiction of the 40-year vision for the Greater Sydney Region (**Figure 8**). In that plan, the Subject Site is located in the Metropolitan Rural Area to the north of Greater Parramatta. Resource extraction is identified as one of the primary rural industries for the Metropolitan Rural Area. The proposed use of the Subject Site for resource extraction is therefore consistent with the 40-year vision for Sydney.

Table 2 – Regional Plan Strategies and Actions (Source: Greater Sydney Commission 2018)

Objective	Strategy	Comment
Productivity		
Objective 24 Economic sectors are targeted for success.	Strategy 24.3 Protect and support agricultural production and mineral resources (in particular construction materials) by preventing inappropriately dispersed urban activities in rural areas.	The Project provides a source of construction sand for the Sydney market in a location where extractive industries have existed for some 30 years.
Sustainability		
Objective 27 Biodiversity is protected; urban bushland and remnant vegetation is enhanced.	Strategy 27.1 Protect and enhance biodiversity by: <ul style="list-style-type: none"> • supporting landscape-scale biodiversity conservation and the restoration of bushland corridors • managing urban bushland and remnant vegetation as green infrastructure • managing urban development and urban bushland to reduce edge-effect impacts. 	<ul style="list-style-type: none"> • A Flora and Fauna Assessment will be undertaken as part of the EIA process to assist with the refinement of the project design and the implementation of measures to protect biodiversity. • Consideration to biodiversity corridors is to be given in the rehabilitation plan with inputs from the Flora and Fauna Assessment.
Objective 28 Scenic and cultural landscapes are protected.	Strategy 28.1 Identify and protect scenic and cultural landscapes. Strategy 28.2	A visual assessment of the site will be undertaken as part of a rehabilitation plan to recommend measures to mitigate the visual impact of the proposed development during operation and enhance the

Table 2 – Regional Plan Strategies and Actions (Source: Greater Sydney Commission 2018)

Objective	Strategy	Comment
	Enhance and protect views of scenic and cultural landscapes from the public realm.	scenic landscape of the Subject Site following rehabilitation.
<p>Objective 29</p> <p>Environmental, social and economic values in rural areas are protected and enhanced.</p>	<p>Strategy 29.1</p> <p>Maintain or enhance the values of the Metropolitan Rural Area using place-based planning to deliver targeted environmental, social and economic outcomes.</p> <p>Strategy 29.2</p> <p>Limit urban development to within the Urban Area, except for the investigation areas at Horsley Park, Orchard Hills, and east of The Northern Road, Luddenham.</p>	<p>The Project will deliver economic and social benefits through the provision of cost-efficient sand to the Sydney market and local employment opportunities. A Social and Economic Assessment will be undertaken to ensure the social and economic values of the Project are enhanced, while the Fauna and Flora Assessment will ensure that environmental values are protected.</p>

The Regional Plan also notes that consideration should be given to odour, noise, pollutants, biodiversity and rehabilitation to determine the appropriate locating of extractive industries. All these issues are identified as matters of consideration to be assessed in an EIS.

4.2 CENTRAL CITY DISTRICT PLAN

The *Central City District Plan (District Plan)* was released by the Greater Sydney Commission in March 2018. It is a 20-year plan that builds on the directions, objectives, strategies and actions contained in the Regional Plan to identify planning priorities and actions at the district level to achieve the 40-year vision for Greater Sydney.

The location of the Subject Site within the Central River City District is shown below.

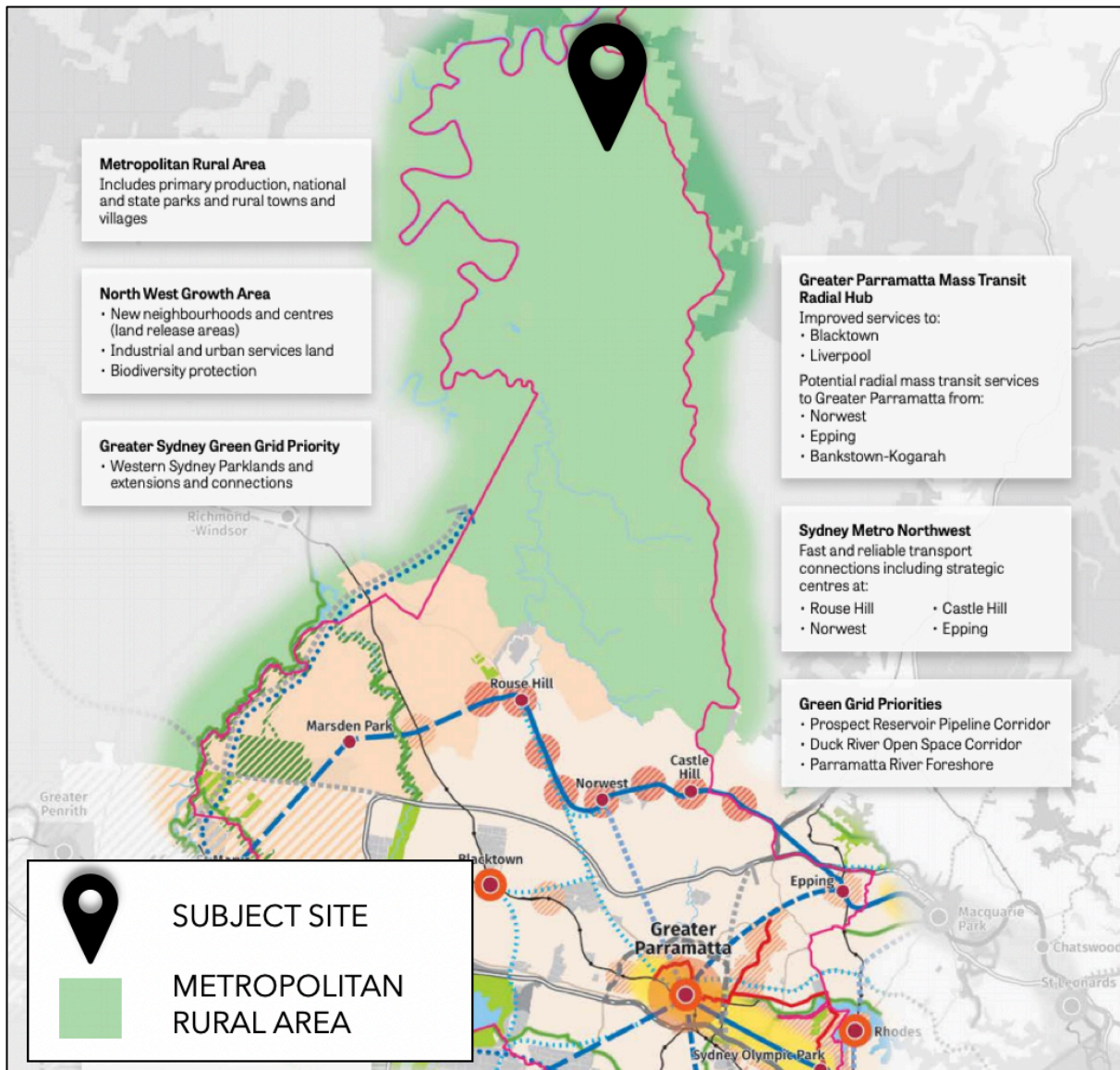


Figure 9: Central River District Structure Plan (Greater Sydney Commission, 2018)

The District Plan echoes the Regional Plan concerning consideration of the Metropolitan Rural Area and mineral resources. It notes that the area to which the District plan applies has mineral and extractive resources at Maroota which produce construction materials such as sand and that “maintaining local supplies of construction materials will support the growth of the District and Greater Sydney”.³

4.2.1 PLANNING PRIORITIES FOR THE CENTRAL RIVER CITY

Planning priorities and actions contained in the District Plan which are relevant to the Project are set out in **Table 3** below.

³ Greater Sydney Commission, (2018), Central City District Plan, NSW Government, pg. 114.

Table 3 – District Plan Priorities and Actions (Source Greater Sydney Commission, 2018)

Planning Priorities	Actions	Comment
Productivity		
Planning Priority C12 Supporting growth of targeted industry sectors.	Action 56 Protect and support agricultural production and mineral resources (in particular construction materials) by preventing inappropriately dispersed urban activities in rural areas.	The Project provides a long-term local source of construction sand for the Sydney market in a location where extractive industries have existed for some 30 years.
Sustainability		
Planning Priority C15 Protecting and enhancing bushland, biodiversity and scenic and cultural landscapes.	Action 65 Protect and enhance biodiversity by: a. supporting landscape-scale biodiversity conservation and the restoration of bushland corridors b. managing urban bushland and remnant vegetation as green infrastructure c. managing urban development and urban bushland to reduce edge effect impacts. Action 66 Identify and protect scenic and cultural landscapes. Action 67 Enhance and protect views of scenic and cultural landscapes from the public realm.	<ul style="list-style-type: none"> • A Flora and Fauna Assessment will be undertaken as part of the EIA process to assist with the refinement of the project design and the implementation of measures to protect biodiversity. • A visual assessment will also be undertaken to identify and recommend measures to protect scenic landscapes.

Table 3 – District Plan Priorities and Actions (Source Greater Sydney Commission, 2018)

Planning Priorities	Actions	Comment
<p>Planning Priority C18</p> <p>Better managing rural areas.</p>	<p>Action 73</p> <p>Maintain or enhance the values of the Metropolitan Rural Area using place-based planning to deliver targeted environmental, social and economic outcomes.</p> <p>Action 74</p> <p>Limit urban development to within the Urban Area.</p>	<p>The proposed Project will deliver economic and social benefits through the provision of cost-efficient sand to the Sydney market and local employment opportunities. A Social and Economic Assessment will be undertaken during the EIA process to ensure the social and economic values of the land are enhanced, while the Fauna and Flora Assessment will ensure that environmental values are protected.</p>

4.3 DRAFT HILLS LOCAL STRATEGIC PLANNING STATEMENT

The Draft Hills Local Strategic Planning Statement titled ‘Hills Future 2036’ (Draft Hills LSPS) is a 20-year plan for the Hills LGA that realises the aims and objectives of the Metropolitan and District plans. The Draft Rural Strategy accompanies the Hills LSPS and provides the basis for strategic planning of rural lands in the Shire. These documents were placed on public exhibition from 1 July 2019 to 9 August 2019.

The Draft Rural Strategy and Hills LSPS both recognise the important contribution of agricultural and mining/extractive industries to the economy of the Hills. The Rural Strategy states “As well as contributing to the identity of the Shire, agriculture and extractive industries are important contributors to the local economy.”⁴ In 2018, mining and extractive

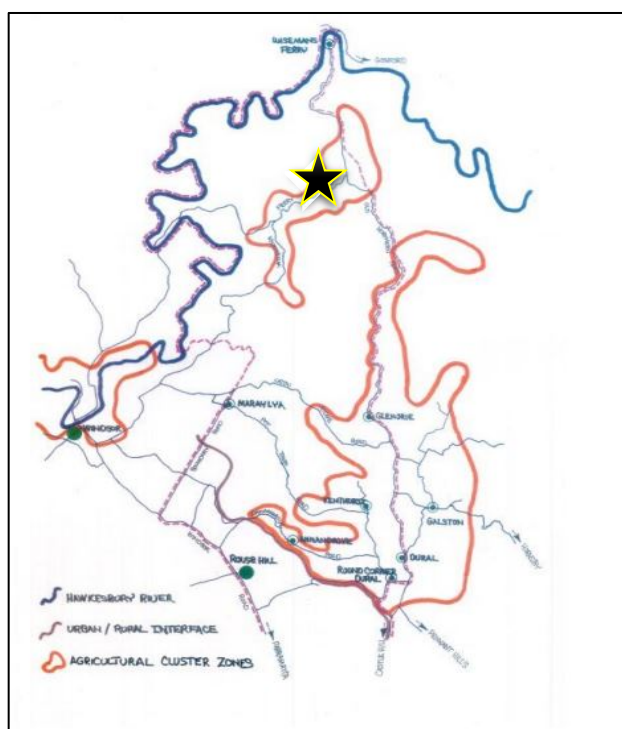


Figure 10: Agricultural and Extractive Clusters (Source: Draft Hills LSPS, 2019)

⁴ The Hills Shire Council, (2019), Draft Hills Rural Strategy 2019, The Hills Shire Council, pg. 18

industries contributed \$70.1M to the Hills economy.

Figure 10 shows that the Subject Site is located within an area identified in the LSPS as an agricultural and extractive cluster.

The Draft Hills LSPS notes that “Development in the Metropolitan Rural Area is limited by environmental characteristics, bushfire hazard and flooding as well as the capacity of utility services and the regional transport network.”⁵ These issues are listed as matters of consideration to be assessed in the EIS.

4.3.1 PLANNING PRIORITIES FOR THE HILLS LGA

The draft Hills LSPS sets out the planning priorities to guide planning decisions in the Hills LGA over the next 5 years. Those planning priorities relevant to the Project are tabled and addressed below.

Table 4 – Draft Hills LSPS Planning Priorities (Source: Hills Shire Council, 2019)	
Planning Priorities	Comment
<i>A Vibrant and Prosperous Community</i>	
<p>Planning Priority 4</p> <p><i>Retain and manage the Shire’s rural productive capacity.</i></p>	<p>The Project builds upon the established productive capacity of extractive industries located at Maroota, in an area identified as an existing location for primary production and extractive industry.</p>
<p>Planning Priority 5</p> <p><i>Encourage support activities & tourism in rural areas.</i></p>	<p>The Project proposes the use of an un-utilised piece of rural land for an extractive industry.</p>
<i>Delivering and Maintaining Infrastructure</i>	
<p>Planning Priority 14</p> <p><i>Plan for a safe and efficient road network.</i></p>	<p>Planning priority 14 acknowledges the benefit of the planned Outer Sydney Orbital for opening up markets for established extractive industries and facilitating the growth of the extractive industries sector within the Hills.</p>
<i>Sustainability</i>	

⁵ The Hills Shire Council, (2019), *Draft Hills Future 2036 Local Strategic Planning Statement*, The Hills Shire Council, pg. 3

Table 4 – Draft Hills LSPS Planning Priorities (Source: Hills Shire Council, 2019)

Planning Priorities	Comment
<p>Planning Priority 17</p> <p><i>Protect high environmental value and significance.</i></p>	<p>As noted, a Flora and Fauna Assessment will be undertaken as part of the EIA process to identify ecological communities of high value and recommend measures to mitigate harm to those communities.</p>
<p>Planning Priority 19</p> <p>Manage natural resources and waste responsibly.</p>	<p>Waste management is noted as a matter of consideration to be assessed in the EIS. A waste management plan will be produced as part of that assessment to ensure the responsible management of waste.</p>

4.4 NSW OFFSHORE SAND REVIEW 2016

The NSW Offshore Sand Review (*the Review*) was completed in 2016 to explore offshore solutions to the current and anticipated shortages of construction sand for the Sydney market. The Review provides an overview of the Sydney sand market and highlights the need for local sources of construction sand.

The Review notes that the Sydney region consumes approximately 7 million tonnes of construction sand annually, of which 1 million tonnes was imported from outside Greater Sydney. This figure is anticipated to grow given the significant infrastructure projects laid out in the State Infrastructure Strategy for Sydney, and (the then) expected closure of Sydney's two most significant sources of construction sand at Kurnell and Penrith Lakes. Penrith Lake sand extraction ceased in 2015.

To address the demand for sand, the Review acknowledges the importance of increasing production from existing sources, including operations at Maroota. An area which the Review identifies as a major source of Sydney's construction sand. The Project complements this recommendation and would ensure the supply of up to 500,000 tonnes per year of much-needed local construction sand to the Sydney market, or just over 7% of the anticipated market needs.

4.5 SUMMARY OF KEY OPPORTUNITIES

The following is a summary of the key benefits and opportunities identified when reviewing the strategic context for the Project.

- The location of the Subject Site within the Metropolitan Rural Area (as identified in the Regional and District Plans and the draft Hills LSPS), in which extractive industries are identified as an appropriate land-use;
- The identification of Maroota as an agricultural & extractive industry cluster in which the extraction of sand is an established and supported industry;
- Building on the existing economic benefits of extractive industries to the Hills Shire local economy and maintenance and expansion of employment opportunities for the LGA in this established community; and
- The opportunity to address the current and anticipated shortages of local, cost-efficient construction sand to the Sydney market.

4.6 SUMMARY OF KEY ISSUES AND CONSIDERATIONS

The following is a summary of the key issues identified when reviewing the strategic context for the Project.

- The importance of identifying, protecting and enhancing ecological communities of high environmental value and biodiversity;
- The importance to appropriately manage waste and resources;
- The visual impacts of the Project during operation and following rehabilitation should be assessed; and
- Consideration should be given to odour, traffic impacts, bushfire risk, noise, pollutants and rehabilitation when determining the appropriate location for an Extractive industry.

The above issues are listed as matters to be assessed in the EIS. Specialised consultants will be engaged to assist with the assessment of the above issues.

4.7 SUMMARY OF STRATEGIC NON-COMPLIANCES

The proposed development does not contravene any provision contained within the reviewed strategic plans relating to the Subject Site. Instead, these plans provided the key issues and considerations, listed above in Section 4.6, to address in the design and assessment of the Project.

5. STATUTORY CONTEXT

State Significant approval is being sought for the Project under Part 4 of the *EP&A Act*. This Section outlines the statutory context for the proposal, including

- The definition of an **extractive industry** under NSW legislation;
- the declaration of the Project as a State Significant Development under the
 - *EP&A Act*; and
 - *State Environmental Planning Policy (State and Regional Development 2011) (State and Regional SEPP)*.
- The approval pathway for a State Significant Development as outlined in the:
 - *EP&A Act*;
 - *Environmental Planning and Assessment Regulation 2000 (EP&A Regulations)*;
 - *State and Regional SEPP*;
 - *Hills Shire Local Environment Plan 2012 (Hills Shire LEP)*.
- Other legislation and instruments relevant to the proposal:
 - *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*;
 - *Biodiversity Conservation Act 2016 (Conservation Act)*;
 - *Water Management Act 2000 (WM Act)*;
 - *Water Sharing Plan for the Greater Metropolitan Region*
 - *Protection of the Environment Operations Act 1997 (POEO Act)*;
 - *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*;
 - *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development*;
 - *Voluntary Land Acquisition and Mitigation Policy 15 December 2014*
 - *State Environmental Planning Policy No. 55 – Remediation of Land*;
 - *State Environmental Planning Policy (Infrastructure) 2007*;
 - *Sydney Regional Environmental Plan – Hawkesbury-Nepean River (No. 2 – 1997)*;
 - *Sydney Regional Environmental Plan No. 9 – Extractive Industry (No. 2 – 1995)*.

5.1 DEFINITION

The proposed development is defined under the standard instrument as an **extractive industry** which means:

“the winning or removal of extractive materials (otherwise than from a mine) by methods such as excavating, dredging, tunnelling or quarrying, including the storing, stockpiling or processing extractive materials by methods such as recycling, washing, crushing, sawing or separating, but does not include turf farming”.

The proposed development is not defined as a **mine** under the Standard Instrument. The standard instrument defines a **mine** as:

*“any place (including any excavation) where an operation is carried on for mining of any **mineral** by any method and any place on which any mining related work is carried out but does not include a place used only for extractive industry.”*

Under the Mining Act 1993 **mineral** is defined as

“any substance prescribed by the regulations (Mining Regulations 2016) as a mineral for the purposes of this definition, and includes coal and oil shale, but does not include petroleum.”

In accordance with Clause 5 of the Mining Regulation 2016, Schedule 1 of the Regulation lists substances that are prescribed as minerals. Sand is not listed in that schedule. As the Project doesn't involve the extraction of a **mineral** defined under the Mining Act and Regulation, it does not constitute a **mine**.

5.2 DECLARATION OF STATE SIGNIFICANT DEVELOPMENT

Section 4.36(2) of the EP&A Act states that:

- (2) *A State environmental planning policy may declare any development, or any class or description of development, to be State significant development.*

Schedule 1 of the State and Regional SEPP lists development that is State Significant Development. Clause 7 of Schedule 1 states:

- (7) *Development for the purpose of extractive industry that:*
- (a) *extracts more than 500,000 tonnes of extractive materials per year, or*
 - (b) *extracts from a total resource (the subject of the development application) of more than 5 million tonnes, or*
 - (c) *extracts from an environmentally sensitive area of State significance.*

As the Project relates to a total resource of greater than 5 million tonnes, the Project is State Significant Development.

5.3 PATHWAY FOR APPROVAL – STATE SIGNIFICANT DEVELOPMENT

Legislation relevant to the State Significant Development approval process are:

- *Environmental Planning and Assessment Act 1979;*
- *Environmental Planning and Assessing Regulation 2000;* and
- *State Environmental Planning Policy (State and Regional Development).*

5.3.1 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Environmental Impact Assessment (EIA) is the process by which the environmental impacts of a State Significant Development are assessed before a decision is made by the Minister for Planning or a Minister's delegate on whether to approve the application. This process is displayed in **Figure 11** below, with the current step shown highlighted.

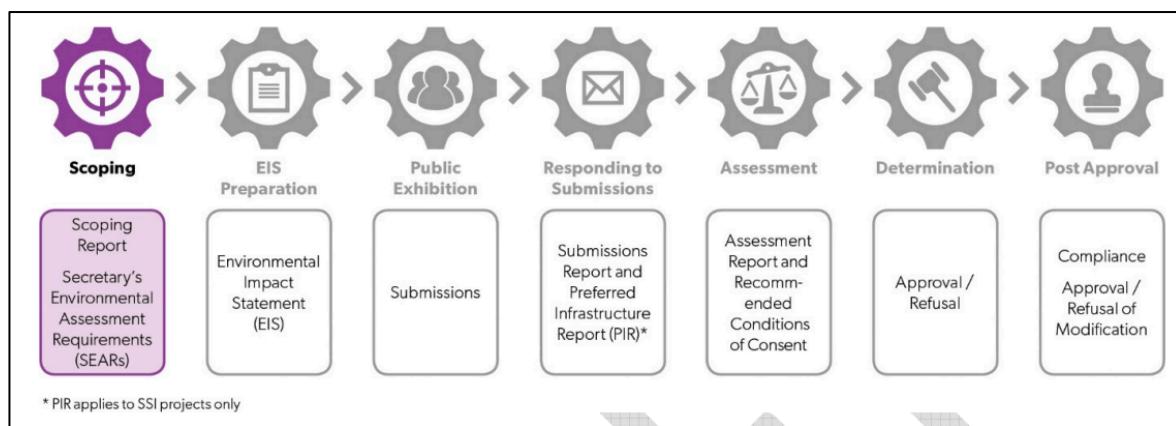


Figure 11: Environmental Impact Assessment Process (Source: DPIE, 2017)

An Environmental Impact Statement (*EIS*) is the principal document by which environmental impacts are assessed. Section 4.12(8) of the *EP&A Act* provides that a development application for State Significant Development is to be accompanied by an EIS, while Schedule 2 of the Regulations set out requirements for an EIS.

Before preparing an EIS, a Scoping Report is required to be prepared and submitted to the DPIE by the proponent that identifies potential environmental impacts. In response to a satisfactory Scoping Report, the DPIE will issue the SEARs outlining the environmental impacts required to be assessed in the EIS. This document serves as the Scoping Report.

5.3.2 CONSENT AUTHORITY

Section 4.5 of the *EP&A Act* and Section 8A of the *State and Regional SEPP* the consent authority for State significant development is:

- the Minister of Planning; or
- the Independent Planning Commission if sufficient community interest arises.

5.3.3 MATTERS FOR CONSIDERATION

When determining a DA for a State Significant Development, Section 4.40 of the EP&A Act provides that the consent authority is to consider the following matters listed under Section 4.15 of the EP&A Act:

4.15 Evaluation

(1) **Matters for consideration—general**

In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:

(a) the provisions of:

- (i) any environmental planning instrument; and*
- (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved); and*
- (iii) any development control plan; and*
- (iii a) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4; and*
- (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph);*

that apply to the land to which the development application relates,

- (b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,*
- (c) the suitability of the site for the development,*
- (d) any submissions made in accordance with this Act or the regulations,*
- (e) the public interest.*

Despite the above, Clause 11 of the *State and Regional SEPP* states that development control plans do not apply to a State Significant Development.

5.4 PERMISSIBILITY

5.4.1 STATE ENVIRONMENTAL PLANNING POLICY (MINING, PETROLEUM PRODUCTION AND EXTRACTIVE INDUSTRIES) 2007

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Extractive Industries SEPP) is the environmental planning instrument that determines the permissibility of the Project. Clause 7(3) and (4) of *Extractive Industries SEPP* states the following is development is permissible with consent:

(3) **Extractive industry** Development for any of the following purposes may be carried out with development consent—

- a) *extractive industry on land on which development for the purposes of agriculture or industry may be carried out (with or without development consent); and*
- b) *extractive industry in any part of a waterway, an estuary in the coastal zone or coastal waters of the State that is not in an environmental conservation zone*

(4) **Co-location of industry** If extractive industry is being carried out with development consent on any land, development for any of the following purposes may also be carried out with development consent on that land—

- a) *the processing of extractive material,*
- b) *the processing of construction and demolition waste or of other material that is to be used as a substitute for extractive material,*
- c) *facilities for the processing or transport of extractive material,*
- d) *concrete works that produce only pre-mixed concrete or bitumen pre-mix or hot-mix.*

The Subject Site is located within the Hills LGA. Therefore, *The Hills Local Environment Plan 2012 (Hills LEP 2012)* is the Local Environmental Plan for the site that regulates land-use.

As shown in **Figure 12**, the Subject Site is zoned RU1 and RU2 under the *Hills LEP 2012*. In these zones, **extractive industries** may be carried out with consent. Therefore, the development of the Subject Site as an **extractive industry** and associated activities is permissible under the *Extractive Industries SEPP*.

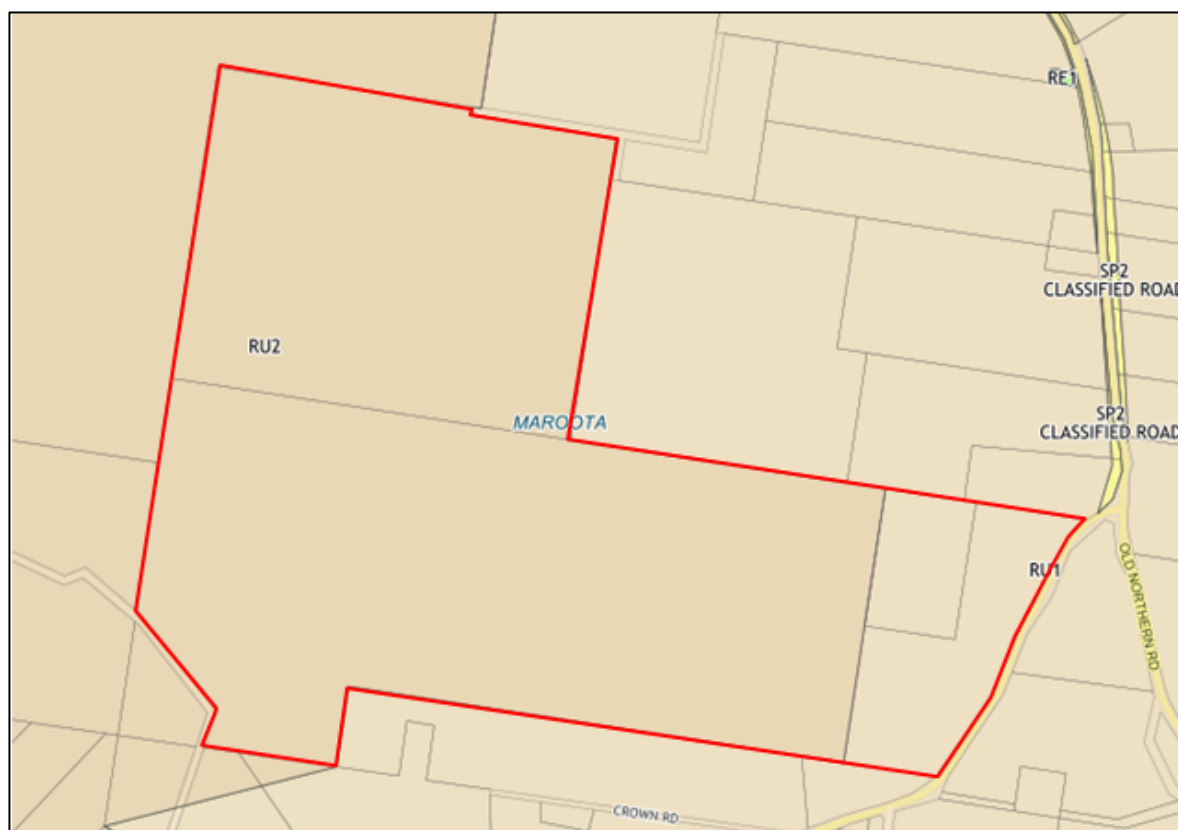


Figure 12: LEP Zoning Map (Source: The Hills Shire Local Environmental Plan, 2012)

Clause 8 of the *Extractive Industries SEPP* further states:

(1) If a local environmental plan provides that development for the purposes of mining, petroleum production or extractive industry may be carried out on land with development consent if provisions of the plan are satisfied—

- a) development for that purpose may be carried out on that land with development consent without those provisions having to be satisfied, and
- b) those provisions have no effect in determining whether or not development for that purpose may be carried out on that land or on the determination of a development application for consent to carry out development for that purpose on that land.

Therefore, the Project is not required to satisfy the provisions contained in the *Hills LEP 2012*, nor can these provisions influence the determination of the Project.

The *Extractive Industries SEPP* also contains matters for consideration in Part 3 which would be relevant to the Project:

- compatibility with other land uses;
- compatibility with other mining or extractive industries;
- natural resource management and environmental management;

- resource recovery;
- greenhouse gases;
- transport; and
- rehabilitation.

5.5 OTHER LEGISLATIVE APPROVALS

5.5.1 ENVIRONMENTAL PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (CTH)

The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. These are known as matters of National Environmental Significance. If the proposed development will, or is likely, to have an impact on a matter of National Environmental Significance then it is required to be referred to the Commonwealth Department of the Environment for assessment to determine if it constitutes a 'controlled action' requiring approval.

Presently, a bilateral agreement allows the Commonwealth Minister for the Environment to rely on the NSW environmental assessment processes when assessing a controlled action under the EPBC Act.

An ecological consultant is to be engaged as part of the EIA to determine if an approval is required under the EPBC Act.

5.5.2 INTEGRATED APPROVALS

Under Section 4.42 of the EP&A Act the following approvals must be issued (and cannot be refused) generally consistent with a State Significant Development consent.

- an environment protection licence under Chapter 3 of the Protection of the Environment Operations Act 1997;
- a consent under section 138 of the Roads Act 1993; or
- a licence under the Pipelines Act 1967.

5.5.3 NON-INTEGRATED APPROVALS

Other Approvals may be required under other State legislation including:

Table 5 – Non-integrated Approvals

Legislation	Description	Triggers
<i>Biodiversity Conservation Act 2016</i> (NSW)	<p>The biodiversity conservation legislation establishes a framework for assessing and offsetting biodiversity impacts from proposed development.</p> <p>Part 6 Establishes the biodiversity offsets scheme, including provisions for establishing a method to assess biodiversity; the creation of, and dealings with, biodiversity credits, scheme for accreditation and the Biodiversity Conservation Fund</p> <p>Part 7 of the Act sets out biodiversity assessment requirements for different activities, including state significant development or and when a Minister's concurrence is required</p>	<p>A biodiversity conservation licence may be required under Part 2, Division 3 of the <i>Conservation Act</i>. This point will be confirmed by an ecologist during the EIA process.</p> <p>A detailed Biodiversity Development Assessment Report assessing the biodiversity impacts of the Project is required under the <i>Conservation Act</i>.</p> <p>Any biodiversity offset scheme for the Project would be administered under the <i>Conservation Act</i>.</p>
<i>Protection of the Environment Operations Act 1997</i> (NSW)	<p>The <i>POEO Act</i> provides a single licensing arrangement for approvals relating to air pollution, water pollution, noise pollution and waste management.</p> <p>The <i>POEO Act</i> aims to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development.</p>	<p>S. 48 of the <i>POEO Act</i> requires an Environmental Protection Licence for any scheduled activities listed in Schedule 1 of the Act.</p> <p>Schedule 1, Clause 19 lists extractive activity involving extraction, processing, or storage of more than 30,000 tonnes of materials per annum as a scheduled activity.</p>

		Therefore, the Project will require licensing under the <i>POEO Act</i> .
<i>Water Management Act 2000 (NSW)</i>	<p>The objects of the <i>WM Act</i> are to provide for the sustainable and integrated management of the water sources of the state for the benefit of both present and future generations.</p> <p>Water sharing plans are prepared under the <i>WM Act</i>. They include rules for protecting the environment and administering water licencing and trading.</p> <p>The majority of water access licences are issued under the <i>WM Act</i>.</p>	<p>Under Section 4.41 of the <i>EP&A Act</i>, the Project does not require a water use approval under Section 89, a water management work approval under Section 90, or an activity approval (other than an aquifer interference approval) under Section 91 of the <i>WM Act</i>.</p> <p>Therefore, above water works undertaken may not require licensing under the <i>WM Act</i>. This point will be confirmed by a suitable hydro specialist during the EIA process.</p> <p>The Water Sharing Plan for the Greater Metropolitan Region is the water sharing plan that applies to Maroota. That plan is presently subject to review.</p>

5.5.4 APPROVALS THAT DO NOT APPLY

Under Section 4.41 of the *EP&A Act* the following approvals are not required because the Project is State Significant Development.

- an Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*;
- a bush fire safety authority under section 100B of the *Rural Fires Act 1997*; and
- a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000*.

5.6 OTHER ENVIRONMENTAL INSTRUMENTS

Table 6 – Other Environmental Instruments

Matter for Consideration	Key/Other Issue
<i>State Environmental Planning Policy No. 33 – Hazardous and Offensive Development</i>	<p>SEPP 33 relates to hazardous and offensive development. Part 2 provides that, in determining whether a proposal is hazardous or offensive, consideration must be given to current circulars or guidelines published by the Department of Planning. Under Part 2, the Project is defined as a potentially hazardous and offensive industry.</p> <p>Part 3 contains requirements for the Project including a preliminary hazard analysis, matters for consideration and advertising.</p> <p>If hazardous impacts, such as noise and dust, fail to comply with the relevant assessment criteria, the Voluntary Land Acquisition and Mitigation Policy dated 15 December 2014 outlines the process for voluntary mitigation and acquisition necessary for development consent.</p>
<i>State Environmental Planning Policy No. 55 – Remediation of Land</i>	SEPP 55 introduces State-wide planning controls for the remediation of contaminated land. It states that land must not be developed if it is unsuitable for a proposed use because it is contaminated.
<i>State Environmental Planning Policy (Infrastructure) 2007</i>	<p>The SEPP Infrastructure applies to the subject land as it has frontage to a classified road (Wisemans Ferry Road) and is therefore subject to the requirements of Clause 101.</p> <p>Clause 101 contains matters for consideration for proposals having frontage to a classified road.</p>
<i>Sydney Regional Environmental Plan – Hawkesbury-Nepean River No.20 (No. 2 – 1997)</i>	This SREP applies to the Hawkesbury-Nepean catchment. It contains planning considerations, policies and strategies for development within the catchment which are required to be taken

	into consideration in relation to development proposals.
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6. ENGAGEMENT DURING SCOPING

Relevant stakeholders and community members were engaged as part of the Scoping process to assist with the identification of matters to be assessed in the EIS. Those engaged were:

- Department of Planning, Industry and Environment;
 - Crown lands
 - Water
 - Biodiversity Conservation Division
 - Department of Primary industries
 - Natural Resources Access Regulator
- NSW Environment Protection Authority;
- Hills Shire Council;
- Hornsby Shire Council;
- Maroota Public School;
- Department of Education;
- Maroota Land Group; and
- All landowners adjoining the proposed quarry site.

Those stakeholders were provided with a letter outlining the Project and containing contact details to make comment. A copy of that letter forms **Annexure B**.

One written submission was received by a neighbour that raised matters to be addressed in the EIS. Matters raised in that submission include:

- Noise Impacts;
- Visual Impacts;
- Dust Impacts;
- Road vehicle Noise and Safety; and
- Privacy and Safety.

These issues are included as matters for consideration listed further in the Report. A relevant consultant will assess each of these impacts during the EIA process to recommend measures, and refinements to the Project were necessary to address the above concerns.

Two further queries were received, one by email and one by phone. These queries were general in nature and did not recommend potential impacts to be included in the Scoping Report.

Other submissions received by stakeholders indicated they would wait until they received notification by the DPIE following lodgement of the Scoping Report before providing comment. This included the Hills Shire Council and the NSW Environmental Protection Authority.

Section 8 of this Report outlines the proposed community engagement strategy for the EIA stage of this Project.

7. PROPOSED MATTERS TO ASSESS

As part of the scoping process, a DPIE Scoping worksheet (**Annexure C**) has been completed to identify all matters proposed to be assessed in an EIS. Community consultation, and preliminary studies undertaken by consultants during the scoping process has assisted in identifying those matters and determining the proposed level of assessment for each matter in an EIS.

The below Table lists all identified matters for consideration, whether each is matter is a 'key' or 'other' issue, and the proposed level of assessment for each matter. Following, a more detailed look at each of the issues and stakeholders affected is provided.

Table 7 – Matters for Consideration		
Matter for Consideration	Key/Other Issue*	Proposed Level of Assessment**
Ecology	Key	Detailed
Noise and Vibration	Key	Detailed
Bushfire	Key	Standard
Groundwater	Key	Detailed
Surface water	Key	Detailed
Traffic & Access	Key	Detailed
Visual Impacts	Key	Detailed
Air Quality	Key	Detailed
Aboriginal Archaeology	Other	Standard
Waste Management	Other	Standard
Soils	Other	Standard
Social and economic impacts	Key	Standard

Table 7 – Matters for Consideration		
Matter for Consideration	Key/Other Issue*	Proposed Level of Assessment**
Geotechnical	Key	Detailed

* Key issues are those matters that are likely to be significantly impacted without the implementation of mitigation methods. Other issues are those matters that are unlikely to be significantly impacted.

**Detailed assessment are assessments for significant matters that require the engagement of a professional consultant and the implementation of strategies specific to the Project. Standard assessments are assessments and mitigation measures that are well understood and routinely used on similar projects.

7.1 ECOLOGY

7.1.1 EXISTING CONDITION

A Preliminary Ecological Assessment undertaken by Cumberland Ecology in 2011 found five native vegetation communities present on the Subject Site, two of which are listed under the *Biodiversity Conservation Act 2016* and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*. These being the Maroota Sands Swamp Woodland and Shale Sandstone Transition Forest. Additionally, two threatened flora species, *Acacia Bynoeana* and *Tetratheca Glandulose*, and one threatened fauna species, the Grey-headed flying fox, were recorded onsite. The location of these are shown in the below figure.

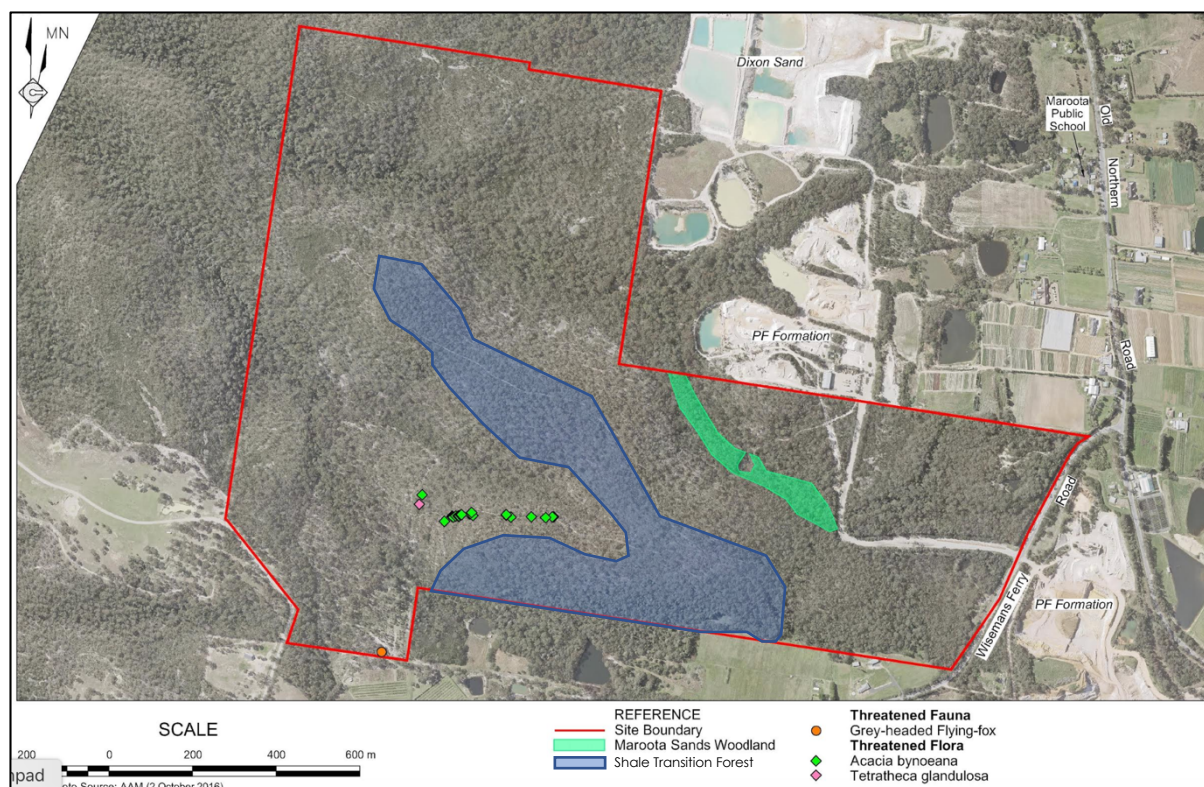


Figure 13: Ecological Sensitive Communities; (Source: R.W. Corkery & Co Ltd Pty, 2016)

7.1.2 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

Without the implementation of mitigation methods, the proposal would have significant implications for biodiversity and the threatened species located on the Subject Site due to:

- The clearing of flora and fauna to prepare lands for extraction;
- The potential disruption of groundwater water flows, which would have particular implications for the groundwater dependant Maroota Sands Swamp Woodland; and
- The adverse effects of indirect impacts, such as noise and dust.

7.1.3 POTENTIAL MITIGATION METHODS

Potential mitigation and management measures may include, but are not limited to, the following:

- A further Flora and Fauna Assessment;
- The conservation of the Maroota Sands Swamp Woodland; and
- Biodiversity offsets.

7.1.4 PROPOSED ASSESSMENT

A detailed assessment of Flora and Fauna is proposed over a 10-12-month period to determine the existence and location of any relevant communities, assess the ecological impacts and recommend mitigation methods to be incorporated into the Project's design. Particular consideration is to be given to the Maroota Sands Swamp Woodland, and this will require collaboration between a hydro specialist and ecology consultant. The detailed assessment is to take into account the requirements of the *Biodiversity Conservation Act 2016*.

As noted previously, approval may be required under the *EPBC Act*.

7.2 ACOUSTICS & VIBRATION

7.2.1 EXISTING CONDITION

Nearby sensitive receptors include the Maroota Public School, located 530m north of the Subject Site and dwellings situated along Wisemans Ferry Road and Old Northern Road.

7.2.2 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

Those sensitive receivers listed above are at most at risk of receiving excessive noise emissions from:

- Construction works associated with the Project;
- The operation of machinery, equipment, on-site processing plants;
- The extraction process; and
- On-site and off-site traffic

Vibration impacts are most likely to result from the construction and extraction process.

It is noted that wind and temperature inversions have the potential to increase noise at a receiver. Therefore, a Noise and Vibration Assessment will need to establish the (long-term) prevailing weather conditions for the subject area during the daytime and evening periods for use in the noise modelling.

7.2.3 POTENTIAL MITIGATION METHODS

In the event of exceedance of a Project specific noise criterion, potential mitigation and management measures may include, but are not limited to, the following:

- Noise monitoring on site and within the community;
- Physical mitigation and treatment of noise sources;
- Prompt response to any community issues of concern; and

- Refinement of on-site noise mitigation measures and quarry operating procedures, where practical; and
- Negotiated or voluntary acquisition as a last resort.

7.2.4 PROPOSED ASSESSMENT

A detailed Noise and Vibration Assessment will be undertaken as part of the EIA process to assess the potential noise and vibration impacts associated with the Project, including cumulative impacts associated with existing operations in the area. That assessment will be undertaken in accordance with the *NSW Industrial Noise Policy* and the SEARs.

As part of the Noise and Vibration Assessment, a Construction, Operation and Transportation Noise Management Plan and Blast Management Plan to support the Application will be prepared.

7.3 BUSHFIRE

7.3.1 EXISTING CONDITION

The Subject Site is generally open forest and is remote from any major urban area. As such the site is prone to bushfires. The potential risk of bushfire is shown in the Hills Shire Bush Fire Prone Map displayed as **Figure 15** below.

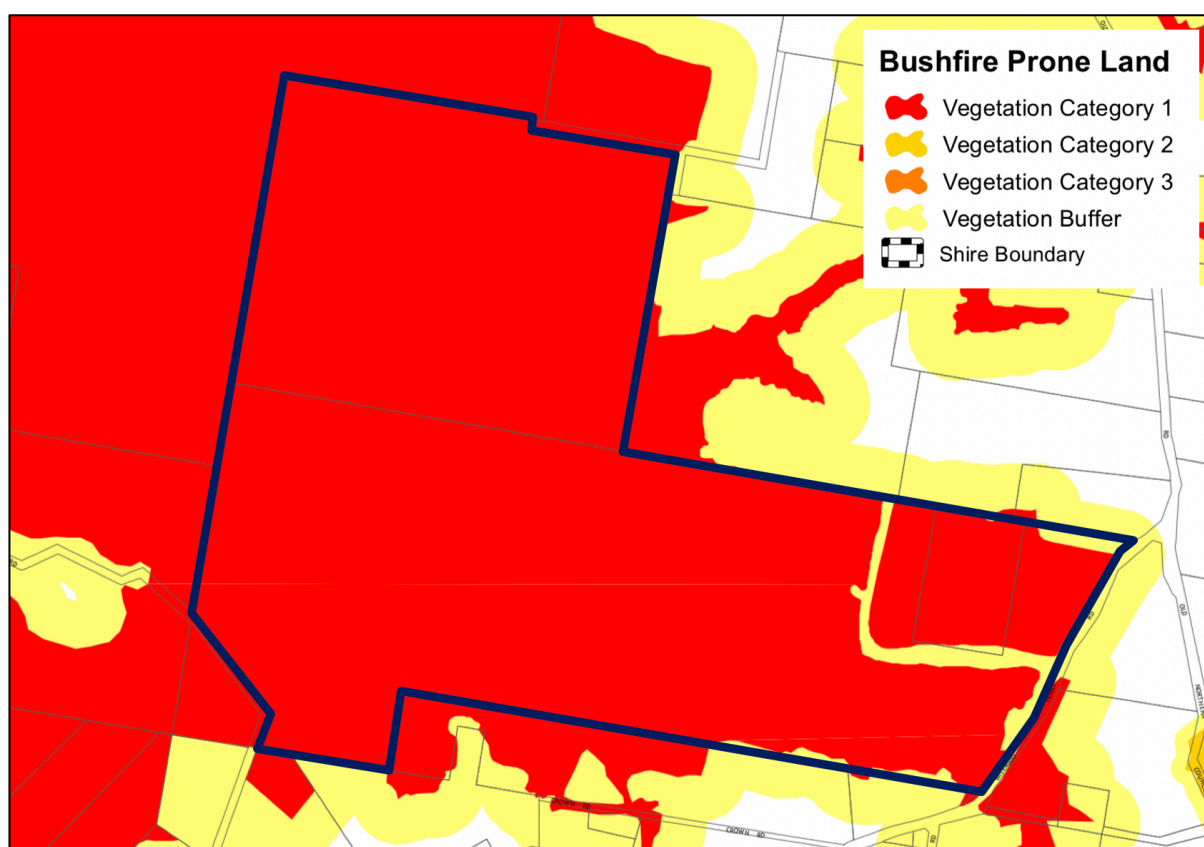


Figure 14: Bush Fire Prone Map (Source: Hills Shire Council, 2018)

7.3.2 POTENTIAL MITIGATION METHODS

Risk will lessen overtime due to land clearing. Appropriate setbacks as required will be constructed for initial operations to protect structures.

7.3.3 PROPOSED ASSESSMENT

An assessment will be made of any hazard and risk in accord with *State Environmental Planning Policy 33 – Hazardous and Offensive Development*. Where appropriate, any recommendations arising from that assessment will be integrated into the development.

7.4 GROUND & SURFACE WATER

7.4.1 EXISTING CONDITION

The development will require the construction of clear water dam(s) to provide water of appropriate quality to wash the extracted sand.

There are presently five constructed water storages onsite and it is not known as of yet if these are licensed. Water requirements for the Project are expected to be approximately 25 ML/annum. This figure is to be confirmed. This water will be sourced from:

- Overland flows from surrounding catchments;
- Supernatant flows from the tailing disposal ponds; and
- Pumped groundwater flows.

The above works will require licensing under the Water Act 2000. There are two primary sources of groundwater on the site:

- Sydney Central Basin groundwater source; and
- Maroota Tertiary Sands groundwater source.

Information from the Department of Industry – Water about controlled groundwater allocations indicates that there is more than sufficient unit shares available in the Sydney Basin central groundwater source to meet the Projects water requirements.

7.4.2 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

Potential surface water impacts are anticipated to be minor and will be adequately managed through the application of a Water Management Plan.

Potential groundwater impacts of the Project include:

- Reduced groundwater availability to users;
- Reduced flow to streams;

- Lowering of the water table;
- Impacts to groundwater dependant ecosystems, riparian ecosystems and natural habitats; and
- Disruption to downgradient drainage patterns including location, quantity and quality of waters.

Groundwater flow contributions will only be needed intermittently when water storage levels fall below a predetermined level, which is anticipated to happen infrequently.

7.4.3 PROPOSED ASSESSMENT

A detailed Groundwater and Surface Water Assessment will be prepared as part of the EIA process. That will involve the installation of a suitable network of groundwater monitoring wells into the Hawkesbury Sandstone of the proposed extraction area and other identified areas. Routine monitoring will occur to determine baseline dynamics. Also, the assessment will consider an appropriate depth of extraction so as to mitigate impacts to the water table.

A Water Management Plan and the operating system will also be prepared to detail how the washing plant will be operated, the amount of water to be used, how surface and groundwater will be conserved and how existing licensed users will be protected.

7.5 TRAFFIC & ACCESS

7.5.1 EXISTING CONDITION

Wisemans Ferry Road and Old Northern Road provide the two main haul truck routes that would be used to transport the sand product to the Sydney market. Those two routes are shown below.

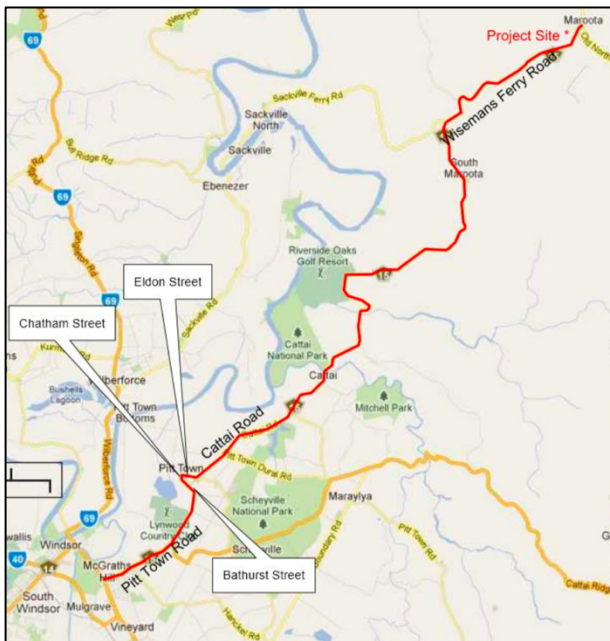


Figure 16: Route 1 - Wisemans Ferry Road (Source: Hyder, 2011)

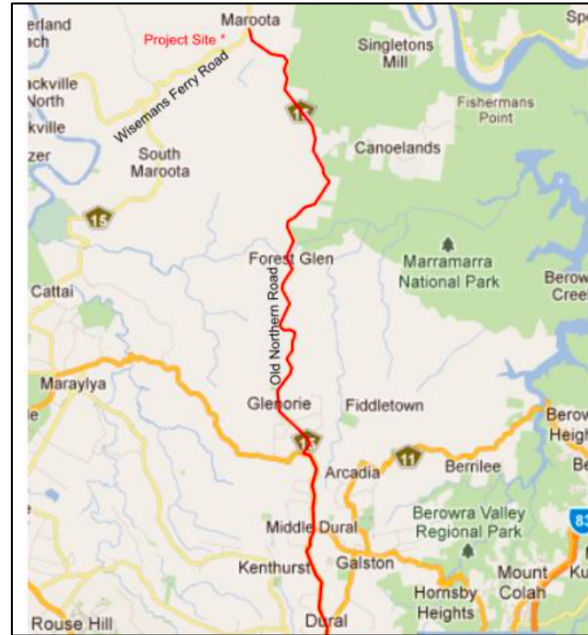


Figure 15: Route 2 - Old Northern Road (Source: Hyder, 2011)

The intersection of Wisemans Ferry Road and the access road (licence no. 19031) and Wisemans Ferry Road/Old Northern Road are the two intersections of most relevance to this Project. Traffic Surveys undertaken in 2011 suggest that both these intersections are performing at a good level of service.

All public authorities along their controlled road will be provided a copy of the development application when lodged by the consent authority per Section 16 Clause 2 of the *Extractive Industries SEPP*.

7.5.2 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

The cumulative impacts of existing sand extraction operations and the proposed Project on roads users who use the two identified main routes, and in particular, Wisemans Ferry Road/Old Northern Road will need to be considered. Potential impacts include:

- Traffic capacity impacts at the key intersections listed above;
- Midblock traffic impacts due to increased truck traffic on the haulage routes; and
- Road Safety impacts for road users due to haulage traffic along the two main routes.

7.5.3 POTENTIAL MITIGATION METHODS

Potential mitigation and management measures may include, but are not limited to, the following:

- Preparation of a Traffic Management Plan which should nominate approved vehicle haulage routes to and from the proposed extractive industry;

- The Traffic Management Plan should stipulate that haulage trucks are not to use Wisemans Ferry during Flood; and
- Truck hauls should ensure care around schools during school zone periods.

7.5.4 PROPOSED ASSESSMENT

A preliminary Traffic Assessment was prepared in 2011 by Hyder that indicated that there would be no significant impacts on key intersections and haulage routes. It is proposed that a further contemporary Traffic Impact Assessment be prepared to accompany an EIS. That assessment would also include a rigorous pavement residual life analysis to quantify the impact of generating more trucks on the road network.

A Traffic Management Plan is also proposed to accompany an EIS that nominates approved haulage routes to and from the Project and contains measure to mitigate traffic congestion and safety impacts for road users.

7.6 VISUAL IMPACTS

7.6.1 EXISTING CONDITION

At present, the site is mostly dense bushland. The majority of the site is not visible to immediate surrounding neighbours, and existing vegetation provides an opportunity as a buffer to preclude views to the proposed Project from external lands.

7.6.2 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

Due to the potential for setbacks and vegetation buffers it unlikely for the Project to have significant visual impacts. Nevertheless, without the implementation of mitigation methods, the proposed Project would have negative visual impacts, notably for those residents who live to the south of the Subject Site.

7.6.3 POTENTIAL MITIGATION METHODS

Potential mitigation and management measures may include, but are not limited to, the Implementation of setbacks and a vegetation buffer.

7.6.4 PROPOSED ASSESSMENT

A resident has noted their concern regarding visual impacts. As such, a Visual Impact Assessment is proposed to be prepared as part of the EIA Process to recommend mitigation measures to be incorporated into the proposed project.

The Rehabilitation Plan for the site will also include a visual assessment.

7.7 WASTE MANAGEMENT

7.7.1 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

The anticipated types of waste to be generated by the Project include:

- Vegetation from clearing operations;
- Tailings from the wash plant;
- Wastewater from the office/weighbridge facilities;
- General office waste; and
- Oils, lubricants and machinery parts from service areas.

7.7.2 POTENTIAL MITIGATION METHODS

Potential mitigation and management measures may include, but are not limited to, the following:

- Cleared Vegetation will be retained onsite and used for rehabilitation to provide organic matter to the soils, mulch or as fauna refuges;
- Tailings will be collected in settlement ponds to be dried and incorporated in landform construction as part of the rehabilitation plan;
- Wastewater to be managed by an onsite enviro-cycle type plant;
- General waste would manage with the separation of recyclables and periodically removed from site; and
- Oils, lubricants and machinery parts will be stored and removed by a contractor.

7.7.3 PROPOSED ASSESSMENT

A Waste Management Plan is proposed to be prepared as part of the EIA process that details what waste will be produced and how it will be managed.

7.8 AIR QUALITY

7.8.1 EXISTING CONDITION

The existence of neighbouring extractive industries that have operated for many years indicates that air quality criteria can be achieved.

The Nearest sensitive receptors include the Maroota Public School located approximately 530m north of Lot 202 and numerous residential properties situated along Wisemans Ferry Road

and Old Northern Road. Additional sensitive receptors include the surrounding National Parks (i.e. Marramarra National Park) and the Hawkesbury River.

7.8.2 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

Main activities likely to generate dust during the operation of the extraction areas include topsoil stripping, overburden removal, truck movements, unsealed surfaces, loading and unloading of raw materials to trucks and stockpiles, and wind erosion of unsealed surfaces and stockpiles.

The key issues in relation to Air Quality are as follows:

- Potential health impacts from suspended particulate on sensitive receptors including Maroota Public School, residences and the surrounding agriculture;
- Potential health impacts (i.e. silicosis) associated with exposure to respirable crystalline silica content within dust emissions;
- Nuisance dust impacts from sand extraction operations and site access road; and
- Increased truck movements leading to increased dust and exhaust impacts.

7.8.3 POTENTIAL MITIGATION METHODS

Potential mitigation and management measures may include, but are not limited to, the following:

- Windbreaks and windshields around stockpiles;
- Water spraying and /or chemical treatment on haul routes;
- Reducing drop heights to stockpiles;
- Reducing active faces;
- Controls on conveyors transfer points and conveyor belts
- Windbreaks along site boundaries between potentially major dust generating activities and identified sensitive receptor locations;
- Operation control - modifying work practices during adverse wind conditions;
- Negotiated or voluntary acquisition as last resort.

7.8.4 PROPOSED ASSESSMENT

A detailed assessment will be undertaken to accompany an EIS to assess the potential air quality impacts associated with the Project, including the cumulative impacts associated with existing and future operations in the area.

The requirements of the DPIE and the NSW "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW" will guide the air quality assessment procedures.

7.9 ABORIGINAL ARCHAEOLOGY

7.9.1 EXISTING CONDITION

Background research and a field inspection undertaken by Mary Dallas Consulting Archaeologists in 2011 uncovered two Aboriginal sites, a rock shelter with art (DM01) and an open stone artefact scatter (DM02) located on the Subject Site. **Figure 18** below shows the location of these sites. Records of these sites were forwarded to the AHIMS Register.

Not all areas of the Subject Site were inspected. However, it is likely that axe grinding groove sites, rock shelters and engravings and low-density stone artefact scatters are the main types of evidence of past Aboriginal occupation likely to occur elsewhere within the property. Therefore, further studies are required dependant on the scale of the proposed development.

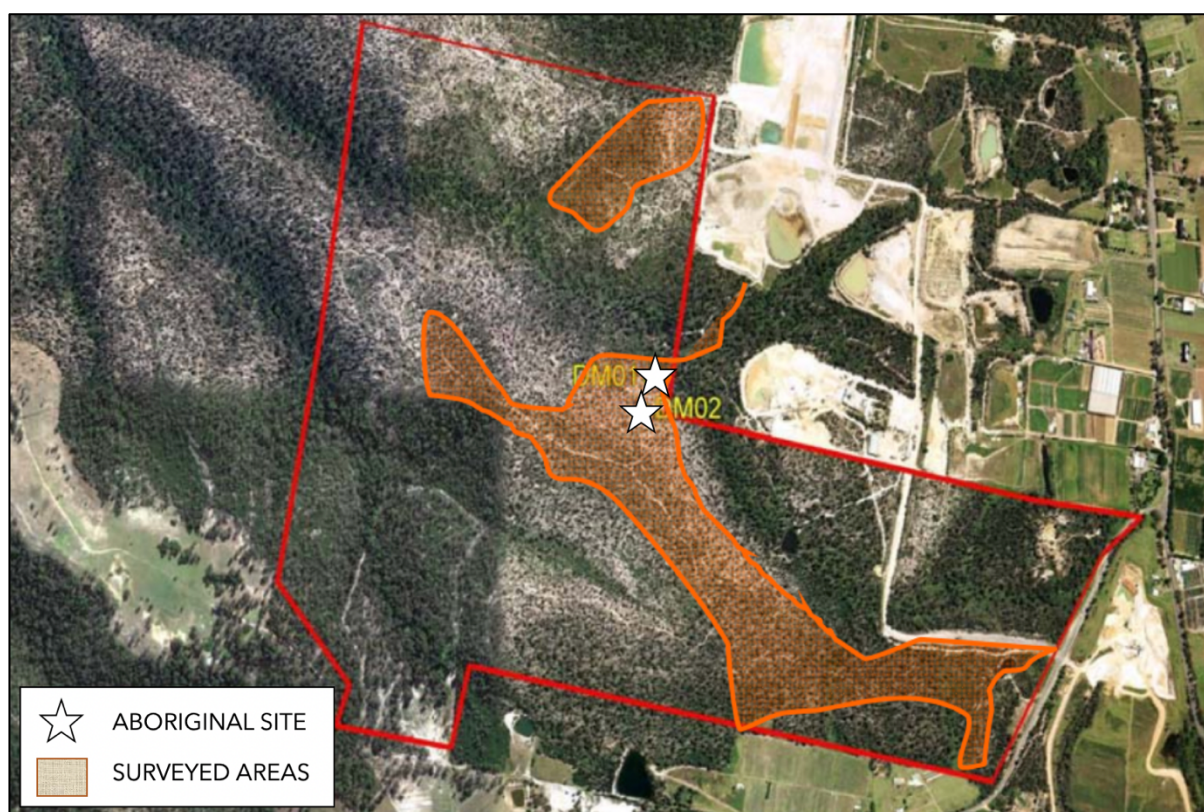


Figure 17: Aboriginal Sites (Source: Mary Dallas Consulting Archaeologists, 2011)

7.9.2 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

Aboriginal heritage is unlikely to form a significant constraint to future development within the Subject Site provided mitigation methods are implemented to protect aboriginal sites that are identified.

7.9.3 POTENTIAL MITIGATION METHODS

Potential mitigation and management measures may include, but are not limited to, the following:

- The preparation of management plan for the long-term protection of the site labelled as DM01; and
- A further survey.

7.9.4 PROPOSED ASSESSMENT

A comprehensive archaeological inspection is proposed for those areas on the Subject Site that will be impacted by the proposed development and are yet to be surveyed. This includes an inspection of all creek beds and their immediate banks wherever development impacts are proposed within 20m of the creek line as archaeological sites are most likely at these locations.

7.10 SOILS

7.10.1 EXISTING CONDITION

No assessment of soils has been made of the soils at the Subject Site as of yet.

7.10.2 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

The quality of soil located on-site is yet to be determined. The impact of the proposed Project for erosion will need to be considered as part of the EIA process

7.10.3 PROPOSED ASSESSMENT

A Soil Management Plan is proposed to accompany the EIS to implement erosion control measures and also examine ways to condition soil to enhance rehabilitation outcomes.

7.11 SOCIAL AND ECONOMIC IMPACTS

7.11.1 EXISTING CONDITION

An overview of key census data for Maroota, the Hills LGA and NSW is presented below.

Table 8 – Maroota, Hills Shire and NSW Census Data (Source: ABS, 2016)

	Maroota	Hills Shire	NSW
Population	617	157,243	7,480,228
Households	220	51,780	3,059,599
Industry of Employment	<ul style="list-style-type: none"> • Vegetable Growers (9.0%) • Road Freight Transport (6.3%) • Mineral Sand Mining (5.0%) 	<ul style="list-style-type: none"> • Hospitals (3.3%) • Computer System Design and Related Services (3.3%) • Banking (2.6%) 	<ul style="list-style-type: none"> • Hospitals (3.5%) • Cafes and Restaurants (2.4%) • Supermarkets and Grocery Stores (2.2%)
Unemployment	2.0%	4.6%	6.3%

The census data highlights the importance of sand extractive industries to the Maroota economy.

The majority of the Project's social impacts will be limited to the suburb of Maroota suburb. However, other impacts, such as traffic impacts can influence the broader Hills LGA. Meanwhile, the provision of construction sand to the Greater Sydney region has positive economic implications for the State.

7.11.2 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

Potential social and economic impacts for the community include:

- Increased local employment through an estimated 20 full time jobs during operation;
- The provision of local, cost-efficient construction sand to the undersupplied Sydney construction market;
- Health and Safety impacts relating to:
 - Haulage truck traffic
 - Particulate matter
 - Proximity to nearby residences
 - Acoustics

- Those other impacts listed Section 7 of the Report.

7.11.3 PROPOSED ASSESSMENT

A detailed Social Impact Assessment will be prepared to accompany an EIS in accordance with the 'Social Impact Guideline for State Significant Mining, Petroleum Production and Extractive Industry Development (2017)' provided by the DPIE. This will include an assessment of both negative and positive social impacts.

7.12 GEOTECHNICAL

7.12.1 NATURE OF IMPACT AND STAKEHOLDERS AFFECTED

The excavation process may lead to:

- Landslides;
- Landslips; and
- Changes to the hydrological processes due to the change of the Subject Sites Topography.

7.12.2 PROPOSED ASSESSMENT

A detailed Geotechnical assessment is proposed to be undertaken as part of the EIA to assess and recommend measure to mitigate the above listed potential impacts. A geotechnical specialist will also work with the hydro and ecological specialist to assess changes to hydrological flows and the resulting impacts.

8. COMMUNITY ENGAGEMENT

A proposed Community Engagement Strategy is included as **Annexure D** and is summarised in this section. Initial community engagement with a limited number of stakeholders and community members most likely to be affected by the proposal has already been undertaken to identify concerns to be included in this Scoping Report. A more extensive level of community engagement is proposed below that will encompass an area up to 2km from the Subject Site.

The proponent will work with the DPIE where necessary to facilitate the community participation outcomes sought in their Community Participation Plan dated November 2019.

8.1 COMMUNITY AND STAKEHOLDERS

The following list of community members and stakeholders have been identified as having an interest in the Project. As noted above, this list is more extensive than the community engagement undertaken for the Scoping Report.

Table 9 – Community Members and Stakeholders

Government Agencies*	Community Members and Stakeholders
<ul style="list-style-type: none"> • Hills Shire Council; • Hornsby Shire Council; • NSW Office of Heritage and Environment; • Department of Planning and Industry; • NSW Department of Primary Industries (Fisheries, Land and Natural Resources and Agriculture); • NSW Department of Primary Industries (Water); • NSW Department of Industry (Crown land in NSW); • Water NSW 	<ul style="list-style-type: none"> • Surrounding landowners (including residents and business owners) within 2km of the project site. • Sydney Hills Business Chamber; • Hornsby Chamber of Commerce; • Surrounding action groups including but not limited to: <ul style="list-style-type: none"> ○ Maroota Land Group; ○ Dural and District Historical Society • Maroota Public School; • Any sensitive uses along transport routes identified in a Traffic Report; and • Any other interested party identified through the EIA process.

<ul style="list-style-type: none"> • NSW Environmental Protection Agency; • Roads and Maritime Services; • NSW Rural Fire Service • State Local Member; and • Federal Local Member 	
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**These stakeholders will be contacted by the DPIE upon lodgement of the Application (for those relevant).*

8.2 APPROACH TO ENGAGEMENT

Using the draft *Community and Stakeholder Engagement Guidelines* provided by the DPIE, the following table lists the participation outcomes sought during the preparation of the EIS and engagement techniques to achieve these outcomes.

Table 10 – Community Members and Stakeholders	
Participation Outcome	Engagement Technique
Inform the Community and other Stakeholders about the Project	A Letter of Notification detailing the application and where further information about the Project can be located will be provided to those community members and stakeholders listed above at the time of lodgement of the EIS.
Seek the community and other stakeholder feedback	<ul style="list-style-type: none"> • The letter of Information will contain contact details for those seeking to provide feedback regarding the Project; and • Ongoing conversations will occur with those community members and stakeholders engaged during the Scoping phase.
Inform the community and other stakeholders about the approach to the assessment and how the SEARs will be addressed.	<ul style="list-style-type: none"> • The Scoping Letter of Notification provided during the Scoping phase outlined the EIA process; and • The EIS Letter of Notification will detail how the SEARs have been addressed.

Identify and inform affected community and other stakeholders, including those that are hard to reach to seek their perspectives and remove barriers to participation.	Those affected community members and stakeholders have been identified above. The EIS Letter of Notification will provide an opportunity to provide their perspectives on the EIS.
Inform the community and other stakeholders about the cumulative impacts and other concerns that have been identified.	Those community members who raised concerns during the Scoping phase or later will be informed about measures implemented to address their concerns and provided with a copy of the Scoping Report.

To summarise, the engagement techniques proposed to be employed during the EIS phase include:

- On-going conversations and where necessary meetings, with those community members and stakeholders notified during the Scoping Phase;
- The provision of a Scoping Report to those community members who raised matters for assessment during the Scoping Phase;
- Information provided to those Community members and Stakeholders who have/will raise matters for consideration on how those matters have been addressed; and
- Once all relevant consultants have finalised their reports (a 10-12-month process) and the full scope and detailed design is finalised and assessed, a Letter of Notification will be issued to the full list of community members and stakeholders at the time the EIS is lodged.

The outcomes of community engagement arising from the issuing of the Scoping Report to interested community members will be included in the EIS.



Design Collaborative
Pty Ltd



Deerubbin LALC

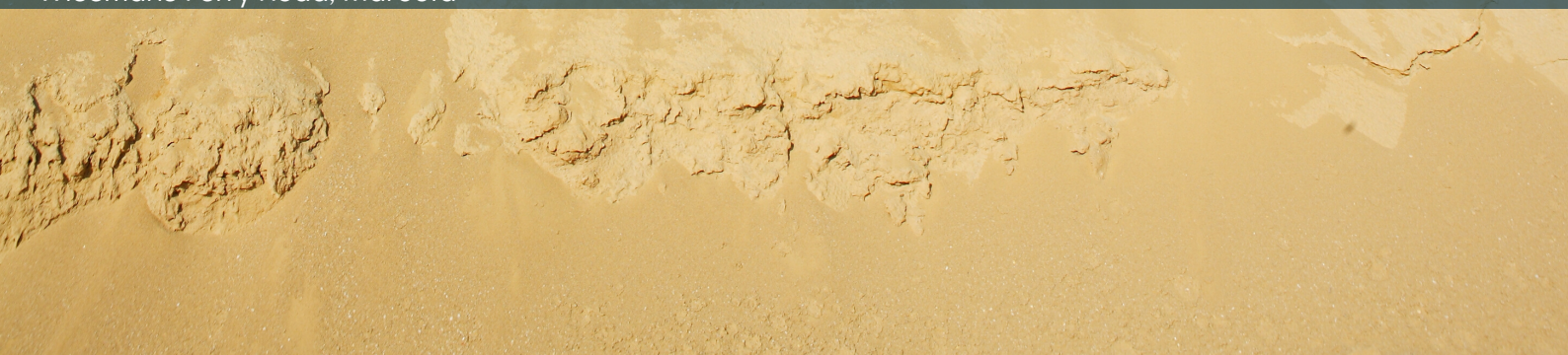


Annexure A

GEOLOGICAL REPORT

Proposed Friable Sandstone Extractive Industry

Wisemans Ferry Road, Maroota



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REPORT No GLA2017-01

INVESTIGATION OF SAND & SANDSTONE RESOURCES

MAROOKA

NSW

Report Prepared For Deerubbin Local Aboriginal Land Council

Graham Lee
BSc, FAusIMM, CP (Geo)

April 2017

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LIST OF DIGITAL FILES

Report	RGLA2017-01.pdf
Appendices	RGLA2017-01_App.pdf
Data	RGLA2017-01_Data-Files

EXECUTIVE SUMMARY

A ten hole drilling programme, comprising five diamond cored and five open holes, was completed during January-February 2017 on a proposed friable sandstone extraction site at Maroota, NSW owned by the Deerrubin Local Aboriginal Land Council.

Four of the diamond cored holes (DMDDH07, DMDDH09, DMDDH10 and DMDDH11) have been used for resource estimation, while all of the other holes were drilled for ground water studies and to examine areas that may be considered for resource potential at some later time. All of the four resource holes intersected the upper part of the Hawkesbury Sandstone unit with hole DMDDH07 intersecting the basal part of the overlying Ashfield Shale. Total drilled in the 10 holes was 327.2m, while the four resource estimation holes totalled 175.7m.

The core drilling gave satisfactory results, with good core recovery.

The aircore (AC) and reverse circulation percussion (RCP) open hole drilling methods were well suited to this deposit and generally gave consistent sample return. None of the open hole samples have been tested so far, but they have been retained in storage for later testing.

Geophysical logging of the holes accessible to the logging gear provided useful information, especially from the sonic and density logs. From the sonic logs the in situ bulk density of the sandstone within the extraction boundary was determined to be 2.2t/m³. The sonic log has shown the non-rippable sandstone (>3200m/s) within the extraction boundary is: DMDDH07 = 11%, DMDDH09 = 18.6%, and DMDDH11 = 35.1%. All other rock is considered rippable or marginally rippable as indicted in the Caterpillar Handbook for a D10R dozer.

The Maroota resource is contained within a proposed extraction area covering 49.9ha. Within this outline the sandstone resources have been classified as Indicated Resources. The raw sandstone estimates are presented in **Table 1** within the proposed pit.

**TABLE 1
TOTAL RAW SANDSTONE RESOURCE ESTIMATES**

Pit Area (m²)	498,882					
Ashfield Shale (m²)	23,380					
	RAW SANDSTONE (m³)	DENSITY (t/m³)	RAW SANDSTONE (t)	SANDSTONE Less Fe+C/Sh (%)	SANDSTONE Less Fe+C/Sh (t)	Wastes (t)
Pit Volume	9,273,673					
Less Ashfield Shale	73,250	2.2				161,150
Less Soil/unmined	237,751	2.2				523,052
TOTAL	8,962,672	2.2	19,717,878	95.4	18,810,856	907,022
SANDSTONE (Rounded)			20 Million		19 Million	1.6 Million

Based on the core drill hole lithology logs, after making allowances for rejection of ironstone and clay/shale (4.6%), the yield of sandstone = 95.4%. The Indicated Resource of raw sandstone is estimated to be **19 million tonnes**.

Washed size grading tests were completed on 27 samples of core from holes DMDDH07, DMDDH09, DMDDH10, and DMDDH11 after light crushing to liberate the grains.

From the core test data, both raw sand and ‘product’ sand mean size gradings are presented for the Indicated Resources in the deposit. Results are summarised in **Table 2**.

TABLE 2
AVERAGE RAW AND PRODUCT SIZE GRADINGS FOR CORE SAMPLES
(% PASSING – DATA USED FOR RESOURCE ESTIMATION)

APERTURE (mm)		2.36	1.18	0.600	0.425	0.300	0.150	0.075
RAW	Interval m							
DMDDH07, 3.73-34.61m	30.55	100.0	92.7	78.9	63.4	45.6	24.1	16.6
DMDDH09, 13.2-34.54m	32.65	100.0	93.2	76.3	54.1	34.5	18.5	13.6
DMDDH10, 0.40-29.81m	29.40	100.0	92.3	76.6	54.6	32.2	15.6	10.3
DMDDH11, 2.52-33.00m	30.48	100.0	95.4	80.0	58.9	39.4	19.6	11.5
Wtd Mean		100	93.4	77.9	57.7	37.9	19.5	13.0
‘PRODUCT’ (all -2.36 + 0.075mm)								
DMDDH07, 3.73-34.61m	30.55	100.0	91.2	74.6	56.0	34.7	9.0	0.0
DMDDH09, 13.2-34.54m	32.65	100.0	92.2	72.6	46.9	24.3	5.8	0.0
DMDDH10, 0.40-29.81m	29.40	100.0	91.5	73.9	49.5	24.6	5.9	0.0
DMDDH11, 2.52-33.00m	30.48	100.0	93.7	74.9	49.5	24.3	6.1	0.0
Wtd Mean		100.0	92.2	74.0	50.4	27.0	6.7	0.0

From the raw sandstone in **Table 2** the washing plant losses will be: 0% oversize (+2.36mm) and 13.0% fines (-0.075mm) for a total estimated recovery of 87% after screening and washing. Presented in **Table 3** is the expected product sand resource estimate.

TABLE 3
PRODUCT SAND RESOURCE ESTIMATE
(Assuming all +6.7mm and –0.075mm material is removed)

	RAW SANDSTONE (t)	EXPECTED WASH % YIELD	PRODUCT (million t)	SAND PRODUCT ROUNDED
Sand	18,810,856	87.0	16,365,445	16 Mt
Waste		13.0	2,445,411	
Total		100.0	18,810,856	

The DLALC Maroota sandstone resource within the defined proposed extraction pit area is well suited to the production of fine-grained concrete aggregates as defined by AS2758.1. From this investigation it is concluded that a raw sandstone resource comprising 20 million tonnes occurs within the proposed pit. After rejecting ironstone and other clay/shale materials the raw sandstone available for wash plant feed will be 19 million tonnes. With a wash plant yield of 87% the resources will produce in the order of 16 million tonnes of sand. Extraction waste and wash plant rejects will comprise a total of 4.0 million tonnes to be placed into the pit void as fill.

Further investigation work is suggested in **Section 8** of the report; however this can be delayed until the project has demonstrated economic feasibility and is closer to granting of extraction approvals.

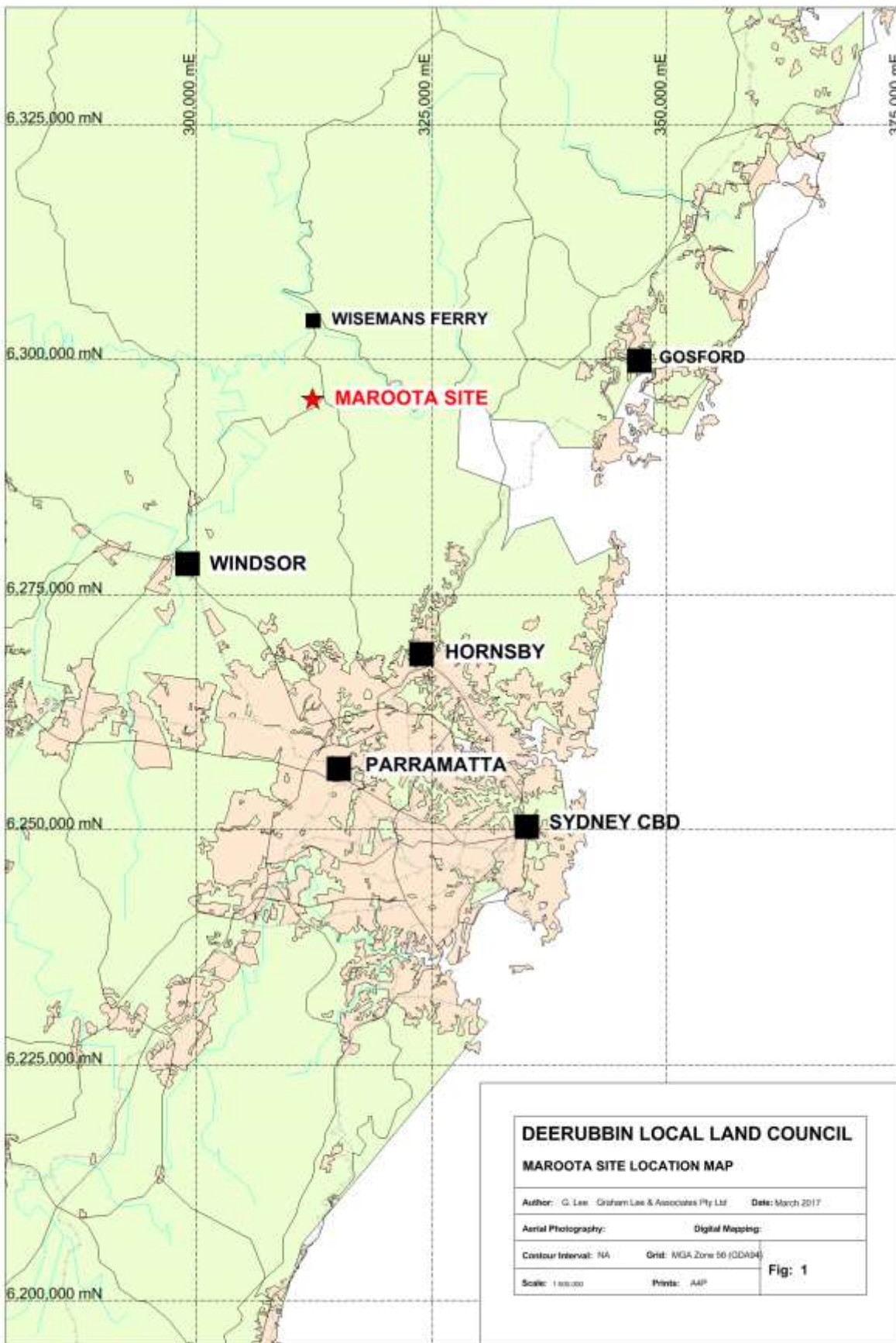


FIGURE 1. Maroota location map.

REPORT

1. INTRODUCTION

Deerubbin Local Aboriginal Land Council (DLALC) is investigating the feasibility of producing sand from a property at Maroota, NSW. The site is located about 65km to the north north-west of Sydney, near Wisemans Ferry, see **Figure 1**.

The property was formerly crown land, and fronts Wisemans Ferry Road about 500m south of the intersection with Old Northern Road. Drainage from the site is via un-named tributaries of Douglass Creek, flowing initially to the northwest and then north into the Nepean River upstream of Wisemans Ferry.

The proposed extraction area on the property is sited generally on the outcropping sandstone ridge system extending north westwards from near the frontage to Wisemans Ferry Road with proposed extraction generally above the 141m AHD contour.

Drilling investigations were conducted during January and February of 2017 and comprised both open holes and diamond core drilling to gain an understanding of the distribution and quality of both the Tertiary alluvial deposits in the eastern areas of the property and the friable Hawkesbury Sandstone along the ridges which form the main potential resource. **Figure 2** presents an aerial photograph showing the boundary of the property and the locations of the drill holes.

While sand resources occur in two separate geological units (Hawkesbury Sandstone and the overlying Tertiary alluvial deposits) on the property, the main resource is the Hawkesbury Sandstone and this unit forms the basis of resource estimates given later in this report.

This document is intended for company internal purposes, rather than for investment decision making. It aims to provide a complete project geological data compilation for: technical assessment, project planning, project approvals, project implementation, and other internal company operations.

The document has been prepared by a competent person with more than 5 years relevant experience in construction materials, and in similar styles of mineral occurrence to that encountered at Maroota.

2. GEOLOGY

2.1 Regional Geology

The resources on the property occur as two separate geological units. The older and larger resource is the sandstones belonging to the Hawkesbury Sandstone formation deposited during the Triassic Period (195 to 225 million years ago). Hawkesbury Sandstone is the predominant sandstone unit outcropping in the region surrounding Sydney. In some locations, the Hawkesbury Sandstone has lenses of pale to dark grey shale interbedded within the generally massive sandstone.

In the Maroota district some of the higher ridge lines are capped by shales of the Ashfield Shale which immediately overlies the Hawkesbury Sandstone, but the occurrence is restricted to the topographically higher areas.

The younger and smaller resource is the Tertiary sand (and other alluvial sediments) accumulated along the former course of the Nepean River. These Tertiary deposits overlie the Hawkesbury Sandstone and/or the shales of the Ashfield Shale unit, and are dated as being deposited between 65 and 45 million years ago. These are best observed in the extraction pits, such as PF Formation on the corner of Wisemans Ferry and Old Northern Roads, but parts of the unit also extend into the eastern part of the property along Wisemans Ferry Road.

2.2 Site Geology

Proposed sandstone extraction will be from the Hawkesbury Sandstone, along a relatively flat plateau and adjoining ridge line areas.

Figure 3 is a geological map of the property and surrounds. It is based on the geological map prepared by Etheridge (1980) from his detailed investigations of the Maroota Tertiary deposits. The modifications shown on **Figure 3** are based on the recent Deerrubin drilling, and show extensions of the units mapped as Ashfield Shale (which was intersected in the top of hole DMDDH07, **Photograph 1**) and the basal Tertiary “Clay/Silty Clay” unit overlain by the “Sand” unit (intersected in holes DMDDH03, DMDDH07, DMAC01, and DMAC02D). On the Deerrubin property, the unit that Etheridge describes as “Clay/Silty Clay” comprises mainly heavy mottled grey and red clay, while the “Sand” unit comprises interbedded thin sand beds, clayey sand, and clay; with core losses which are expected to be the thicker cleaner sand beds in the unit.

Based on the diamond drilling, the Hawkesbury Sandstone comprises variably friable to competent, fine to medium grained, moderate to poorly sorted, variously pale-coloured sandstones and clayey

sandstone, see **Photographs 2 and 3**. Based on bedding measurements in the core the sandstone is flat lying with cross bedded units showing dips generally of up to 20°. Thin pale greyish coloured clay, with darker grey shale is interbedded near the bottom of some of the drill holes (**Photograph 4**), but the depth varies sufficiently to suggest that these shales represent lenses rather than a single continuous bed. Cemented hard dark brown and red ironstone bands are distributed throughout the unit, both along bedding (**Photograph 5**) and as thickened lieegang bands (**Photograph 6**) through the body of the sandstone units.

It is interesting to note that at the bottom of DMDDH07 from 56.45m to 60.0m which is the end of the hole (i.e. from 136.65 to 133.2m AHD) a thickness of 3.55m, a massive, well sorted, fine-medium, pale grey flat lying sandstone bed was intersected (**Photograph 7**). On exposure to the air over a period of 2 weeks, this bed had changed colour from pale grey to pale brownish-yellow (**Photograph 8** after 6 weeks). The bed is believed to be “Yellow Block” sandstone which is the material used for colonial building construction in central Sydney. It represents a target for further investigations as this stone is in scarce supply and is highly sought after. None of the other drill holes in the project extended to sufficient depth to intersect this bed, and hole DMDDH07 did not determine the full thickness of the unit.



Photograph 1: Ashfield Shale from DMDDH07, sample shown is from 2.45 to 2.80m.



Photograph 2: Typical medium grained coloured sandstone from DMDDH07, sample shown is from 15.1 to 15.4m.



Photograph 3: Typical pale medium-coarse grained sandstone from DMDDH07, sample shown is from 24.15 to 24.5m.



Photograph 4: Shale lens overlying a shale rip up unit where shale fragments have been mixed with sandstone. DMDDH09, 35.0 to 35.4m. This shale occurs beneath the proposed pit bottom.



Photograph 5: Bedding conformable ironstone band in sandstone. DMDDH09, 41.4 to 41.55m. This is typical of most of the ironstone occurring on the site.



Photograph 6: Liesegang banded ironstone developed in sandstone. DMDDH09, 28.4 to 28.8m. Less often occurring form of ironstone, but often quite thick where it does occur.



Photograph 7: Yellow Block sandstone, medium grained, very well sorted, massive, photographed on 8 February 2017 just after being drilled. DMDDH07, sample shown is from 57.3 to 57.6m.



Photograph 8: The same core as in Photograph 7. Yellow Block sandstone photographed on 23 March 2017, six weeks after being drilled. The colour has changed from pale grey to brownish-yellow. DMDDH07, sample shown is from 57.3 to 57.6m.

3. PREVIOUS INVESTIGATIONS

There have been no previous published geological investigations conducted into the sandstone resources occurring on this property at Maroota. As a prelude to this current study the writer visited the site in 2009 and collected two surface outcrop samples of friable sandstone for determination of size grading. The results are recorded in Lee (2009).

The published work of Etheridge (1980) which was conducted by the Geological Survey of New South Wales, focussed on the Tertiary Maroota Sand, which overlies the Hawkesbury Sandstone.

Sand producers in the Maroota district utilise some of the Hawkesbury Sandstone as a feedstock. PF Formation is the closest operation and they access their wash plant site by traversing the property from the Wisemans Ferry Road within a corridor held under permissive occupancy lease titles.

4. INVESTIGATIONS

4.1 Survey

The approximate drill hole collar positions were located prior to drilling using a hand held GPS and the sites were marked on the ground with timber stakes. All collars were surveyed using Map Grid of Australia (MGA) co-ordinates and the GDA94 datum.

Prior to drilling, the sites were subjected to archaeological and flora studies, and where necessary they were shifted to avoid damage to anything sensitive.

Upon completion of all drilling, the actual collars were surveyed again using a hand held GPS with horizontal accuracy generally better than +/-10m, which based on past survey comparison data is mostly better than +/-5m. Collar elevations were taken from contoured project photogrammetry and contour mapping. Survey data is included in **Appendix 1**.

Collar locations and the total depth of the drill holes are listed in **Table 4.1**. **Figure 2** shows collar locations overlain onto an aerial image background.

**TABLE 4.1
DRILL HOLE COLLARS**

Hole ID	Method*	MGA Zone 56 mE	MGA Zone 56 mN	Collar AHD (m)	Total Depth (m)
DM01	AC	313340	6295812	204.6	12.0
DM02S	AC	313328	6295727	201.1	10.0
DM02D	AC/RCP	313322	6295723	200.1	31.0
DMDDH03	DDH	313044	6295428	192.7	45.5
DM04	RCP	313124	6295820	185.6	18.0
DMDDH05	AC/DDH	313277	6295625	192.0	27.0
DM06	AC	312814	6295833	165.0	8.0
DMDDH07	DDH	312608	6295585	193.2	60.0
DMDDH09	DDH	312355	6295918	187.9	45.5
DMDDH10	DDH	312368	6295606	173.8	35.1
DMDDH11	DDH	311882	6296206	172.3	35.1

- AC = aircore, RCP = reverse circulation percussion, DDH = diamond drill hole

4.2 Drilling

Drilling was undertaken by Blacklaws Drilling Pty Ltd from Elphinstone, Victoria. The drill used was a Mantis 300 rig, see **Photograph 9**. The same rig was used for diamond coring, and aircore and RC percussion drilling of open holes. The contractor was well known to the writer and had

been operating on other projects in NSW before this drilling. Operations commenced on 19 January and were completed on 10 February 2017.

Diamond coring was undertaken using an HQ3 bit and triple tube core barrel. All core recovered was boxed, logged, and photographed. Total length cored in six holes was 241.2m.

Open hole drilling comprised both aircore (AC) and reverse circulation percussion (RCP). Aircore with a 96mm diameter bit was used to drill to refusal when the sandstone was too hard for further penetration. For both AC and RCP the cuttings returned to the surface through a cyclone and the total sample was bagged. RCP drilling was used for holes that needed to penetrate into the hard sandstone (e.g. for piezometers) and used a 125mm diameter RC down hole hammer. Again cuttings returned to the surface through a cyclone and the whole sample was bagged. AC and RCP operate in the reverse circulation mode using a dual tube drill string, with the sample returning to the surface through the inner tube and thereby avoiding contamination from the outside of the hole as occurs using conventional circulation. Total length of AC and RCP was 86.0m.

The writer of this report supervised drilling and logged all samples recovered from the holes.



Photograph 9: Mantis 300 rig with air compressor during aircore drilling on DMAC01.



Photograph 10: Aircore bit used for drilling at Maroota.



Photograph 11: Reverse circulation down-hole-hammer bit used for percussion holes. The two airways on the bit face are partially blocked as the bit had just been retrieved from a wet ‘muddy’ hole where drill cuttings had pushed into the bit after the air flow had been stopped.

4.3 Down-Hole Geophysical Logging

Geophysical logging comprising density and sonic tools was run on all open holes by Groundsearch Australia Pty Ltd., from 178 Racecourse Rd, Rutherford NSW. The holes logged were:

DM02D-RCP
DDMDDH03
DM04-RCP
DMDDH07
DMDDH09
DMDDH11

The logs obtained from the tools employed comprised:

Sonic Tool: Velocity log

Density tool: Caliper, Natural gamma, Resistivity, Density (long spaced) Density (short spaced).

Geophysical data was made available as paper copies, LAS files on disc, and csv files by email.

4.4 Data Compilation

Data generated from the drilling was compiled into Excel spreadsheets comprising collar, survey, and lithological information; to enable generation of MapInfo files for producing the figures and plots presented in this report.

The geophysical csv logs were prepared into a form that allowed this data to be plotted as down-hole presentations, beside the graphic lithological plots.

4.5 Sample Testing

4.5.1 Bulk Density

Bulk density was determined from the geophysical density logs and no laboratory testing was undertaken to measure density.

4.5.2 Size Gradings on Drill Core Samples

Generally, only those samples of core that may have potential, based on the visual lithological logging, for future extraction and processing to yield a construction sand product were tested. These samples have been selected from drill holes within the resource area considered in **Section 6** later in the report. Core lithologies comprising thicker ironstone and the thicker mostly clay and shale were excluded. Core loss zones in the Hawkesbury Sandstone were mostly too small to be significant in testing and were ignored in preparing testing intervals.

Testing was conducted on sample intervals of the core generally representing up to 5m working sections in any future extraction pit. **Table 4.2** lists the 27 intervals tested from four of the diamond cored holes. Along with details of the lithology of the samples tested, **Table 4.2** also presents details on thickness and percentage of ironstone, clay (including shale and claystone), core losses, and sandstone in the interval tested.

TABLE 4.2
CORE TEST SAMPLES FOR WASHED SIEVE ANALYSIS

DRILL HOLE	From	To	Thickness	Fe Stone	Clay	Core Loss	SANDSTONE (m)
DMDDH07	3.73	8.98	5.25	0.25 (4.8%)	0 (0%)	0 (0%)	5.00 (95.2%)
DMDDH07	9.31	14.58	5.27	0.185 (3.5%)	0.05 (0.9%)	0 (0%)	5.035 (95.5%)
DMDDH07	14.58	19.95	5.37	0.06 (1.1%)	0.01 (0.2%)	0 (0%)	5.30 (98.7%)
DMDDH07	19.95	25.02	5.07	0.04 (0.8%)	0.005 (0.1%)	0 (0%)	5.025 (99.1%)
DMDDH07	25.02	30.40	5.38	0 (0%)	0.005 (0.1%)	0.20 (3.7%)	5.175 (96.2%)
DMDDH07	30.40	34.61	4.21	0.09 (2.1%)	0.01 (0.2%)	0.10 (2.4%)	4.01 (95.2%)
DMDDH09	1.32	3.58	2.26	0 (0%)	0 (0%)	0 (0%)	2.26 (100.0%)
DMDDH09	4.15	9.50	5.35	0 (0%)	0 (0%)	0 (0%)	5.355 (100.0%)
DMDDH09	9.50	15.08	5.58	0 (0%)	0.02 (0.4%)	0 (0%)	5.56 (99.6%)
DMDDH09	15.08	20.00	4.92	0.01 (0.2%)	0 (0%)	0.20 (4.1%)	4.71 (95.7%)
DMDDH09	20.00	23.89	3.89	0.01 (0.3%)	0 (0%)	0 (0%)	3.88 (99.7%)
DMDDH09	23.89	27.50	3.61	0.01 (0.3%)	0 (0%)	0 (0%)	3.60 (99.7%)
DMDDH09	27.50	34.10	3.90	0.43 (10.8%)	0 (0%)	0 (0%)	3.48 (89.2%)
DMDDH09	34.10	35.54	3.14	0.07 (2.2%)	0 (0%)	0 (0%)	3.07 (89.2%)
DMDDH10	0.40	5.39	4.99	0 (0%)	0 (0%)	0.54 (10.8%)	4.54 (89.2%)
DMDDH10	5.40	9.13	3.73	0.14 (3.8%)	0 (0%)	0 (0%)	3.59 (96.2%)
DMDDH10	9.13	15.15	6.02	0.235 (3.9%)	0 (0%)	0 (0%)	5.785 (96.1)
DMDDH10	15.15	20.04	4.89	0.05 (1.0%)	0 (0%)	0.20 (4.1%)	4.64 (94.9%)
DMDDH10	20.04	25.35	5.31	0 (0%)	0.04 (0.8%)	0 (0%)	5.27 (99.2%)
DMDDH10	25.35	29.81	4.46	0.645 (14.5%)	0 (0%)	0.05 (1.1%)	3.765 (84.4%)
DMDDH11	2.52	7.62	5.10	0 (0%)	0 (0%)	0 (0%)	5.1 (100.0%)
DMDDH11	7.62	12.62	5.00	0.015 (0.3%)	0.02 (0.4%)	0 (0%)	4.965 (99.3%)
DMDDH11	12.62	17.54	4.92	0.01 (0.2%)	0.06 (1.2%)	0 (0%)	4.85 (98.6%)
DMDDH11	17.54	22.42	4.88	0.005 (0.1%)	0 (0%)	0 (0%)	4.875 (99.9%)
DMDDH11	22.42	26.12	3.70	0.085 (2.3%)	0 (0%)	0 (0%)	3.615 (97.7%)
DMDDH11	26.12	31.31	5.19	0.005 (0.1%)	0 (0%)	0 (0%)	5.19 (99.9%)
DMDDH11	31.11	33.00	1.69	0.035 (2.1%)	0.46 (27.3%)	0.02 (1.2%)	1.17 (69.4%)

All core testing was conducted by the Coffey laboratory at Melrose Park. The testing procedure adopted was as follows:

1. Core was delivered to the laboratory in trays marked up into sample intervals.
1. Split the core representing each sample along the core axis. Ironstone bands and any clay/shale beds can be eliminated and left un-sampled and kept in the core tray. It may help in core splitting if the core is wet as this helps in breaking apart the rock by wetting the clay and other minerals between the quartz grains.
2. One half of the core is to be returned to the tray in the position and orientation from which it originally came. The other half can be placed into a container along with all other core halves for the sample interval for further testing.
3. Core trays when completed are to be retained for the client to collect.
4. The half core sample for testing is to be lightly crushed (a jaw crusher was used) taking care to minimize the breakage of quartz grains. Crush till the size of aggregated particles is suitable to representatively sub-sample for testing – say about 1.0 to 2.0kg. Re-bag the remainder of the sample not required for the following testing.
5. On the test sample disaggregate all remaining composite particles till they are liberated into individual sand grains, trying to minimise the breaking of quartz sand grains. This may best be achieved by allowing the sample to soak overnight in water and then agitating at about 30% solids in a suitable small drum (or other container) for about 10 minutes. Then decanting the water carrying clay and fine silt, followed by screening at about 2.36 or 1.0mm as appropriate and then inspecting for aggregated particles which may need further breaking by hand in a mortar and pestle. Note: that resistant hard ironstone aggregates are normally rejected as oversize during treatment of this type of sandstone and can be rejected during laboratory treatment. It is important to determine the quantity of clay and fine silt, by difference from the original sample treated.
6. Record the clay and fine silt rejected. Record any other material rejected and bag for later inspection by the client.
7. On the material passing 2.36mm, treat by washed sieve analysis according to AS1141.11.1.
8. Report results relative to the original raw sample.
9. Retain all sample remainders after completing the test work for collection.

5. RESULTS

5.1 Survey Data

Drill hole collar survey data is presented in **Appendix 1** of this report and **Figure 2** shows the locations of drill holes overlain onto the aerial photograph of the site. Two cross sections lines are also shown on **Figure 2**.

5.2 Drill Hole Lithology Logs

Detailed drill core lithology log information is presented in **Appendix 2** of this report along with graphic presentations, and photographs of the core from each of the six diamond cored holes.

For each of the six the aircore and percussion drill holes, **Appendix 2** contains lithological descriptions for the bagged cuttings, a graphic presentation for the hole, and photographs of a chip tray containing a small amount of the cuttings.

5.3 Down-Hole Geophysical Data

Geophysical logs are presented in **Appendix 2** beside the graphic log. The presentation shows the natural gamma, short spaced density, and velocity plots for holes DM02D, DMDDH03, DM04, DMDDH07, DMDDH09, and DMDDH11. Logs were not obtained for DM02S (since the deeper nearby hole DM02D was logged), DMDDH05 (hole was blocked 4m below the collar preventing safe entry to the hole for logging), DM06 (hole too shallow for any recording), and DMDDH10 (hole was being drilled at time of logging having been delayed due to rain).

The full geophysical data set is included into the data package accompanying this report. It includes PDF images of the plotted data as well as the LAS files.

5.3.1 *Bulk Density*

Using the density data from the geophysical logs an in situ rock bulk density has been calculated.

The csv data files contain compensated density log (CDL) results which are calculated density values determined from the long and short spaced density records and are reported at 0.01m intervals down the hole. These records were used to calculate the rock bulk density for the intervals representing the samples sent for laboratory testing, and also were calculated for the total hole intersection of Hawkesbury Sandstone. The results are presented in **Table 5.1**.

TABLE 5.1
BULK DENSITY CALCULATED VALUES FROM CDL DATA FILES

DRILL HOLE	FROM (m)	TO (m)	INTERVAL (m)	INTERVAL DENSITY (g/cc)	MEAN BULK DENSITY (t/m ³)
Sampled Intervals Only					
DMDDH07	3.73	34.61	30.88	2.279	
DMDDH09	1.32	27.50	26.18	2.202	
DMDDH11	2.52	26.13	23.61	2.229	
Total			80.67		2.24
All Available Data From Holes					
DMDDH03	18.07	44.80	26.73	2.335	
DMDDH07	3.73	59.50	55.77	2.324	
DMDDH09	1.32	41.88	40.56	2.248	
DMDDH11	2.52	34.62	32.10	2.228	
Total			155.16		2.29

From **Table 5.1** the mean bulk density for the sample intervals subjected to laboratory testing is 2.24t/m³. While samples from DMDDH10 were tested, no geophysical logs were obtained from this hole due to the delay in the program caused by wet weather.

For all of the Hawkesbury Sandstone, where geophysical logs were obtained, the density value is a little higher at 2.29t/m³. This higher result is partly due to a slightly greater content of ironstone and probably increased lithification in the rock beneath the tested intervals.

5.3.2 Sonic Logging (Velocity)

Sonic logs were obtained from holes DMDDH07, DMDDH09, and DMDDH11 within the extraction area. The sonic log can be used for prediction of sandstone rippability using a bulldozer fitted with rippers. According to the Caterpillar Handbook, sandstone is rippable using a D10R model with rock velocity up to 2,500m/s; and is marginally rippable between 2,500 –3,200m/s.

Appendix 2 presents plots of the sonic logs of all of the drill holes for which this information was obtained and the reader should refer to this appendix to view the sonic logs in detail. Sonic logs are also show on the cross sections in **Figures 4 and 5**, but these are not as detailed as in **Appendix 2**. From an examination of the sonic data files the information presented in **Table 5.2** is relevant to the extraction area of the Maroota project. Only those intervals of sonic data which fall within the extraction pit area and above the pit bottom have been utilised in creating **Table 5.2**.

TABLE 5.2
SUMMARY OF RIPPABILITY BASED ON SONIC LOG VELOCITY DATA

	DMDDH07		DMDDH09		DMDDH11	
From - To	10.96m	31.4m	8.8m	33.6m	8.41m	30.7m
	Sum Metres	%	Sum Metres	%	Sum Metres	%
Rippable	6.90	33.8%	9.66	39.0%	1.00	4.5%
Marginally Rippable	11.30	55.3%	10.52	42.4%	13.47	60.4%
Non-Rippable	2.24	11.0%	4.62	18.6%	7.82	35.1%
Total	20.44m	100%	24.80m	100%	22.29m	100%

Rippable = <2500m/s Marginally Rippable = 2500-3200m/s Non-Rippable = >3200m/s

From **Table 5.2** it can be seen that holes DMDDH 07 and DMDDH09 have similar rippability characteristics while DMDDH11 (closer to the NW end of the ridge line has a significantly higher content of non-rippable sandstone. Hole DMDDH11 may require the use of a rock breaker to remove the hardest sandstone.

5.4 Sample Test Results

5.4.1 *Size Gradings on Drill Core Samples*

The 27 sandstone intervals tested by washed size grading are listed in **Appendix 3**, together with the laboratory reports from Coffey.

Table 5.2 presents some statistical data for these washed size grading results obtained from the 27 composite core samples tested.

TABLE 5.2
CORE SAMPLES WASHED SIZE GRADING RESULTS
% Passing Aperture

Hole ID	2.36mm	1.18mm	0.600mm	0.425mm	0.300mm	0.150mm	0.075mm
<u>Raw Sand</u>							
No Samples	27	27	27	27	27	27	27
Min	100	90	66	42	24	12	8
Max	100	97	85	76	62	30	19
Mean	100	93.1	77.1	56.6	36.2	18.5	12.7
Median	100	93	77	55	35	17	12
<u>'Product' Sand</u>							
No Samples	27	27	27	27	27	27	27
Min	100.0	88.4	62.2	35.6	15.9	3.4	0
Max	100.0	96.4	83.1	71.1	54.2	15.7	0
Mean	100.0	92.1	73.9	50.4	27.1	6.7	0
Median	100.0	92.0	73.0	47.8	24.7	6.1	0

The mean weighted for drill hole interval length was also calculated, but was found to be almost identical to the arithmetic mean, and so is not included in **Table 5.2**.

The laboratory reported verbally to the writer that only trace amounts of +2.36mm were encountered and these have been treated as nil in their reports.

In **Table 5.2** the results shown for the ‘Product’ sand have been determined by re-calculation of the sand grading with all of the -0.075mm material removed.

Figures 7 and 8 show the **Table 5.2** data as graphs, where the envelope plotted is the maximum and minimum values for each sieve shown in the table. The mean value is also plotted onto these graphs.

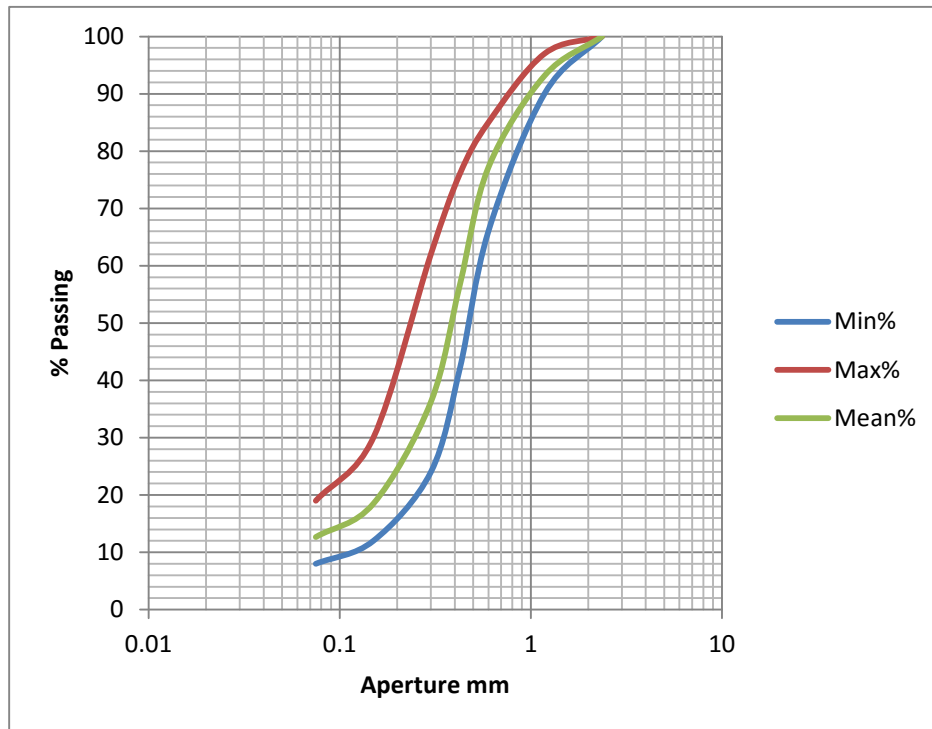


FIGURE 7. Raw sand size grading minimum, maximum, and mean data plotted for the 27 samples tested.

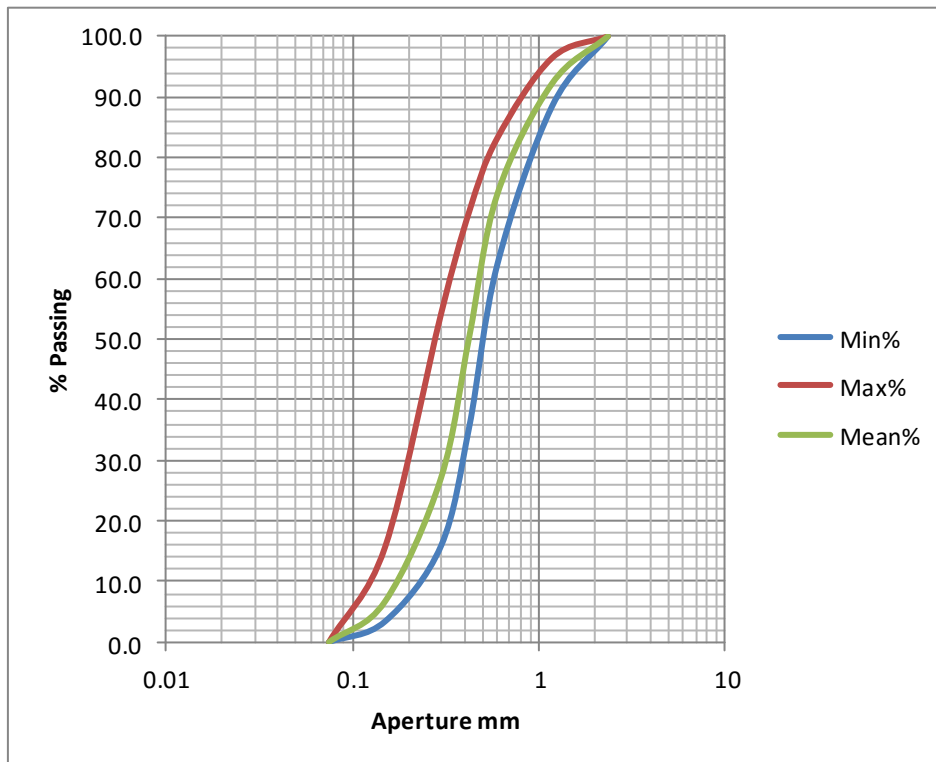


FIGURE 8. Calculated ‘Product’ sand size grading minimum, maximum, and mean data plotted for the 27 samples tested.

5.5 Cross Sections

Two cross sections presenting the geology through the sandstone resources have been prepared.

Figure 2 shows the locations of the two section lines on plan, while **Figure 4** is a NW-SE section through holes DMDDH11, DMDDH09, and DMDDH07, and **Figure 5** is a W-E section through holes DMDDH10, DMDDH07, and DMDDH03. Each section includes the stratigraphy of the site as recorded from the drill core, the topographic surface, and the proposed bottom to the extraction pit. Plotted to the right hand side the hole trace is the sonic geophysical log and to the left is the % passing 0.300mm aperture.

6. RESOURCE ESTIMATES

Resources have been estimated for a single Hawkesbury sandstone domain within the property which has been intersected by four diamond drill holes. There are another five drill holes that have intersected this sandstone unit but fall outside the boundary of the area selected for the estimates. Continuity of the main sandstone bearing unit located near the top of the Hawkesbury Sandstone has been demonstrated by the drilling.

The resource extraction area is shown on **Figure 6** as a solid coloured elevation model within the proposed pit. Typical E-W cross sections through parts of the resource are presented as **Figures 4 and 5**.

6.1 Resource Model

A model of the sandstone resources on the property was constructed taking into account the following:

Boundaries: The 141m AHD contour is the lowest level along the incised creek system on the lower (northern-western) side of the resource area. From the lowest level the elevation rises along the northern boundary to AHD 170m at the eastern end of the extraction area; and along the southwestern boundary to AHD 155m. Cut faces extend along the southern and eastern boundaries till they reach the natural contours at AHD 170m and AHD 155m.

Batters: A 1 in 1 (45°) batter has been used for all cut finished pit walls which are mainly along the southern and eastern boundary.

Floor: The extraction is to be taken down to 2m above the highest permanent water table as determined from piezometers in drill holes. This pit bottom surface generally slopes to the south-west. Control on the surface, 2m above the highest water table in the drill holes is: DMDDH03 = 175.6m, DMDDH07 = 161.8m, DMDDH09 = 154.3m, DMDDH10 = 154.7m, and DMDDH11 = 141.6m. To create the bottom surface, drill hole intercepts are projected at right angles to the topographic ridge axis to meet the valley sides and then the contour is used to delineate the boundary.

Shale lenses: No significant shale lenses were included in the pit volume; however some shale was encountered in some holes beneath the planned pit bottom.

Construction: For estimation, a pit shell was created. The upper surface is the natural surface for which a DEM was prepared at 1m cell size. A bottom surface was created being 2m above the highest water table and was projected to the valley sides where it intersected the natural surface. Along the cut southern and eastern boundaries a 1 in 1 batter was created. A DEM with 1m cell size was created for this bottom surface.

Lithology: **Table 6.1** summarises the diamond drill hole lithology data used in preparing the resource estimates.

Core loss zones, which are small, are interpreted as representing the most friable sandstone and have been treated as being 100% sand in the modelled quantity estimates.

Data is presented in **Table 6.1** for all the diamond cored Hawkesbury Sandstone intervals, and separately for only those holes within the proposed extraction area being DMDDH07, 09, 10, and 11.

TABLE 6.1
SUMMARY OF DDH LITHOLOGY DATA USED FOR RESOURCE ESTIMATES

Lithotype	DMDDH03	DMDDH05	DMDDH07	DMDDH09	DMDDH10	DMDDH11	Total
Hole Total Depth (m)	27.62	20.5	56.27	42.5	35.1	35.1	217.09
Fe Stone (m)	2.27	0.26	1.45	1.41	1.02	0.41	6.82
<i>Fe Stone (%)</i>	<i>8.2</i>	<i>1.3</i>	<i>2.6</i>	<i>3.3</i>	<i>2.9</i>	<i>1.2</i>	<i>3.1</i>
Clay+Shale (m)	0.23	1.55	1.00	1.45	0.34	0.64	5.21
<i>Clay+Shale (%)</i>	<i>0.8</i>	<i>7.6</i>	<i>1.8</i>	<i>3.4</i>	<i>1.0</i>	<i>1.8</i>	<i>2.4</i>
Core Loss (m)	0.5	1.11	0.47	0.57	0.79	0.42	3.86
<i>Core Loss (%)</i>	<i>1.8</i>	<i>5.4</i>	<i>0.8</i>	<i>1.3</i>	<i>2.3</i>	<i>1.2</i>	<i>1.8</i>
Sand+Sandstone (m)	24.63	17.59	53.35	39.07	32.95	33.64	201.22
<i>Sand+Sandstone (%)</i>	<i>89.2</i>	<i>85.8</i>	<i>94.8</i>	<i>91.9</i>	<i>93.9</i>	<i>95.8</i>	<i>92.7</i>
Core Loss+Sand+Sandstone (m)	25.13	18.70	53.82	39.64	33.74	34.06	205.08
<i>Core Loss+Sand+Sandstone (%)</i>	<i>91.0</i>	<i>91.2</i>	<i>95.6</i>	<i>93.3</i>	<i>96.1</i>	<i>97.0</i>	<i>94.5</i>
Holes DMDDH07, 09, 10, 11 only							
Core Loss+Sand+Sandstone (m)			53.82	39.64	33.74	34.06	161.26
Core Loss+Sand+Sandstone (%)			95.6	93.3	96.1	97.0	95.4

Table only includes Hawkesbury Sandstone DDH intervals

6.2 Limiting Criteria

In preparing resource estimates the following limits have been applied.

Depth: Based on drilling and the proposed extraction pit design. A deduction of 0.5m has been applied to allow for topsoil to be removed and for sandstone to be left un-mined on the floor of the pit. In order to simplify estimation, the 0.5m has been assumed to occur as overburden and is removed from the top surface in the calculations.

Overburden: Apart from the soil allowance, there is a small area surrounding DMDDH07 with Ashfield Shale and clay overburden. In DMDDH07 it is 3.73m thick. An estimate of the Ashfield Shale volume is given in **Section 6.3**. In addition some small quantities of Tertiary sediments (mostly clay) similar to that encountered in DMDDH03 may occur in the eastern end of the extraction area but are not included in these estimates.

Interburden: Within the mine section there is no interburden to be selectively removed.

Ironstone: Since most of the ironstone in the resource is competent and will report as screen oversize in the wash plant, it has been deducted from the resource estimates. The average value presented in **Table 6.1** of 3.1% for the six diamond cored drill holes within and near to the resource has been considered as representative of the whole resource and surrounding area.

In situ density: Is based on results from the density geophysical logs. Results are given in **Table 5.1** for all available data on the samples selected for testing (which closely represents the mine working sections in these holes) and for all of the Hawkesbury Sandstone diamond core from the holes geophysically logged. A value of 2.2t/m^3 has been used for resource estimation.

Block: The resource has been treated as a single block with both a Bottom surface and an Upper (natural) surface.

Lithology: Has been determined by visual inspection of the drill hole samples.

Recovery: After excluding ironstone and clay/shale/claystone intersections from the four diamond cored holes within the proposed pit a recovery value of 95.4% is used in the resource estimates being the core loss + sand + sandstone intersected.

6.3 Ashfield Shale Overburden

An estimate of the volume of Ashfield Shale within the extraction area boundary was determined, assuming:

- The bottom surface is a flat horizontal plane, and that
- The bottom surface is the projection of the elevation determined from drill hole DMDDH07.

Estimation of the volume was undertaken by creating a boundary to the shale occurrence and then creating within this boundary:

- A DEM of the upper surface (being the natural topographic surface), and
- A lower DEM of the bottom surface.

The lower DEM was subtracted from the upper DEM to give the volume between the two surfaces.

As a result the Ashfield Shale:

Covers an area = $23,380\text{m}^2$, and
has a volume = $73,250\text{m}^3$

6.4 Sandstone Estimation Method

Using the resource model limiting criteria listed above in **Section 6.2**, a volume has been determined for the proposed extraction void.

In preparing the volume estimates, the size grading data was reviewed to ensure that mainly sandstone material was included into the resources.

Estimates were produced using MapInfo Discovery software. The Upper DEM surface was constructed using 1m cell sizes and minimum curvature. The bottom DEM used 1m cell size and triangulation. Due to the small number of points available for the bottom surface a more realistic

DEM was produced using triangulation compared to minimum curvature. The upper and bottom DEMs were clipped to the boundary of the extraction area, and the bottom DEM surface was subtracted from the upper DEM surface to give the volume between the two surfaces. The volume was converted to tonnes using the density value of 2.2t/m³ determined from the geophysical logging.

6.5 Raw Sandstone Resource Estimates

Resource estimates are shown in **Table 6.2**. The raw sandstone resource estimates represent all the material within the pit shell. From **Table 6.1** the sandstone yield is 95.4% after allowing for removal of the ironstone and thin clay/shale and siltstone beds. Also removed is an allowance for 0.5m of topsoil over an area of 498,882m², being the surface area of the proposed extraction pit.

TABLE 6.2
TOTAL RAW SANDSTONE RESOURCE ESTIMATES

Pit Area (m ²)	498,882					
Ashfield Shale (m ²)	23,380					
	RAW SANDSTONE (m³)	DENSITY (t/m³)	RAW SANDSTONE (t)	SANDSTONE Less Fe+C/Sh (%)	SANDSTONE Less Fe+C/Sh (t)	Wastes (t)
Pit Volume	9,273,673					
Less Ashfield Shale	73,250	2.2				161,150
Less Soil/unmined	237,751	2.2				523,052
TOTAL	8,962,672	2.2	19,717,878	95.4	18,810,856	907,022
SANDSTONE (Rounded)			20 Million		19 Million	1.6 Million

From these estimates the allowances for materials that will not be processed are:

Ashfield Shale within pit area	=	161,150 tonnes
Top soil and extraction waste	=	523,052 tonnes
Total non-processed materials	=	684,202 tonnes
Ironstone & clay/shale/claystone	=	907,022 tonnes
Total Wastes	=	1,591,224 tonnes
Rounded	=	1.6 million tonnes

These materials will form part of the fill to be placed back into the completed extraction pit. The ironstone and clay/shale/claystone waste will be partly derived from the extraction operation where the larger and thick material will be rejected and partly from the screening at the front end of the washing plant; for simplicity it has all been accounted for at this pre-washing stage of the evaluation.

Material to be processed through the wash plant is therefore 18,810,856 tonnes which rounds to **19 million tonnes**.

The total estimates shown in **Table 6.2** are considered for reporting purposes as Indicated Resources, as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code (2004)).

Continuity of the horizontally bedded sandstone bearing unit within the bounds of the resource domain has been established by the 2017 drilling. Laboratory testing has shown the sand to be consistent both vertically and horizontally. The sandstone has been classed as “Resources” rather than “Reserves” because extraction approvals have not yet been obtained and it is yet to be determined if any part(s) of the resources will be subject to restrictions on extraction. As stated later in this report, further drilling on a closer grid would be appropriate as a part of any future upgrading of these Resource estimates to; Measured Resources, and/or Proved Reserves, and/or Probable Reserves ahead of extraction. For future Reserves, this could be done on a campaign basis as dictated by production, rather than attempting to upgrade the total Resource in one work program.

6.6 Resource Size Gradings

Table 6.3 shows raw sand size grading statistics for each drill hole within the Resource. In addition to the information shown, some calculations were conducted to weight each sample according to the sample interval but gave very similar results to the unweighted data presented.

Table 6.3 also presents weighted mean ‘product’ sand grading for the DDH core samples. This data is based on calculations to remove all of the -0.075mm material. These ‘product’ gradings give a guide to the likely product particle size grading and yield for whole of the Indicated Resource.

TABLE 6.3
AVERAGE RAW AND PRODUCT SAND SIZE GRADINGS FOR CORE SAMPLES
 (% PASSING – DATA USED FOR RESOURCE ESTIMATION)

APERTURE (mm)		2.36	1.18	0.600	0.425	0.300	0.150	0.075
RAW	Interval m							
DMDDH07, 3.73-34.61m	30.55	100.0	92.7	78.9	63.4	45.6	24.1	16.6
DMDDH09, 13.2-34.54m	32.65	100.0	93.2	76.3	54.1	34.5	18.5	13.6
DMDDH10, 0.40-29.81m	29.40	100.0	92.3	76.6	54.6	32.2	15.6	10.3
DMDDH11, 2.52-33.00m	30.48	100.0	95.4	80.0	58.9	39.4	19.6	11.5
Wtd Mean		100	93.4	77.9	57.7	37.9	19.5	13.0
'PRODUCT' (all -2.36 + 0.075mm)								
DMDDH07, 3.73-34.61m	30.55	100.0	91.2	74.6	56.0	34.7	9.0	0.0
DMDDH09, 13.2-34.54m	32.65	100.0	92.2	72.6	46.9	24.3	5.8	0.0
DMDDH10, 0.40-29.81m	29.40	100.0	91.5	73.9	49.5	24.6	5.9	0.0
DMDDH11, 2.52-33.00m	30.48	100.0	93.7	74.9	49.5	24.3	6.1	0.0
Wtd Mean		100.0	92.2	74.0	50.4	27.0	6.7	0.0

Reviewing **Table 6.3**, the material to be rejected by washing will be in the order of 13%, being the content of -0.075mm in the raw sand. While the washing process will remove some of the $+0.075\text{mm}$ fine sand to waste, this will to some extent be compensated by leaving a small portion (usually about 2%) of the -0.075mm fraction in the product sand.

6.7 Product Sand Resource Estimates

Table 6.4 below, sets out the estimated product sand quantities for the Resource based on the removal of all of the -0.075mm from the raw sandstone quantity presented in **Table 6.2**. **Table 6.3** includes the calculated product grading for the Resource listed in **Table 6.2**, and the average grading is presented in a graphic form as **Figure 8** earlier in this report.

TABLE 6.4
PRODUCT SAND RESOURCE ESTIMATES
 (Assuming -0.075mm material is removed)

	RAW SANDSTONE (t)	EXPECTED WASH % YIELD	PRODUCT (million t)	SAND PRODUCT ROUNDED
Sand	18,810,856	87.0	16,365,445	16 Mt
Waste		13.0	2,445,411	
Total		100.0	18,810,856	

6.8 Comments On Resource Estimates

The Resources defined by drilling cover 49.9ha. **Figure 6** shows the boundary to the resource area, while **Figures 4 and 5** present typical cross sections through the extraction area.

The Resource of sandstone (**Table 6.2**) is approximately 20 million tonnes of raw in situ sandstone. From this resource after rejecting 4.6% of ironstone + clay/shale/claystone, the feed to the wash plant is 95.4% or 18 million tonnes. During washing, a further 13.0% is rejected as –0.075mm fines (**Table 6.4**) and the Resource has a yield of 83%, for a **final yield of 16 million tonnes of sand product**.

Total waste materials comprise:

Extraction non processed materials	= 1.6 million tonnes
Wash plant fines	= 2.4 million tonnes
Total waste	= 4.0 million tonnes

Table 1 from the JORC Code 2012 has been completed in respect of the investigations conducted to date on the Deerubbin property at Maroota. The completed JORC Table 1 is included into this report as **Appendix 4**.

7. DISCUSSION

7.1 Drilling Investigations

7.1.1 DDH Core Samples

The diamond drilling technique is well suited to the harder more competent sandstone occurring at Maroota, but is not well suited to the unconsolidated Tertiary sands units. Sample recovery was mostly excellent (100%) with only small intervals lost during drilling. Details of the core recoveries are recorded in the lithological logs, and are also shown on the graphic sections as black intervals. Both lithology logs and graphic sections are presented in **Appendix 2** together with the core photographs.

In light of the lithological logging and sample test results on the core, it is apparent that the following drilling-related points need to be considered in reviewing the test results:

- i) In the core it was easy to identify and measure the changes in lithology.
- ii) For the core, the samples selected for testing were divided at lithological breaks.
- iii) For the core drilling the core losses associated with the most friable sandstone are minimal and have little impact on the test results.

Overall, the diamond core was of good quality and well suited to producing good test samples representing the full interval to the bottom of the planned extraction pit. The fact that the sandstone is highly consistent between the drill intersections helps to increase the confidence that the deposit has been sufficiently drilled to obtain representative samples of the material intended to be extracted.

7.1.2 Open Hole Samples

Open hole drilling comprised both aircore (AC) and reverse circulation percussion (RCP). It was well suited to the parts of the site drilled using these techniques and the samples are of suitable good quality, but all of these holes are located outside of the propose extraction area. Most samples had consistent sample volume and will be useful for later testing, if it is desired to consider extraction from the locations represented by these holes.

7.2 Sample Testing

Test results are presented in **Appendix 3** as size gradings for each of the samples tested. Significant points to note are:

- i) All ironstone and clay, claystone, shale and siltstone bands were excluded from the test samples on the basis that if they were not removed by selective extraction such materials would be easily discarded in the wash plant. In the case of the ironstone it would report as screen oversize at the front-end screening stage of processing.
- ii) There is a significant quantity of composite grains still remaining in all of the test samples after laboratory processing. The instruction given to the laboratory clearly requested that composites of quartz sand be disaggregated before the sieve analysis was undertaken. Upon examining the washed sand samples returned from the laboratory it was apparent that between 10% and 20% of aggregates were present in all samples. This will impact on the size gradings presented (especially for the coarser apertures), and on the quantity of fine sand in the samples, and the quantity of slimes to be discarded.
- iii) It has been assumed in **Table 6.3** that all of the -0.075mm fraction will be rejected in calculating the recovery for the product sand. In reality, a small part of this -0.075mm fraction will be acceptable into the product sand to give about 2% -0.075mm in the final product. Also, some of the finer sand fractions (coarser than 0.075mm) may be lost to waste due to wash plant inefficiencies. However, overall estimated losses of the -0.075mm fraction based on these laboratory results may be less than will actually occur in a sand wash plant, principally due to the possibility that some of the fine fraction was not sufficiently liberated during sample testing so that it could report to the -0.075mm fraction during testing.
- iv) Considering further, the possibility that some of the -0.075mm fraction has not been liberated from the core samples during testing, and that there is an under estimation of this size fraction with a resultant over estimation of the product sand quantity. The magnitude may be of the order of 5%.

7.3 Comparison With PF Formation Product Sands

Table 7.1 sets out a comparison between the DLALC expected average washed product sand and the ‘Fine Washed Sand’ currently produced by PF Formation who operated from a site adjoining the DLALC land. Also included in **Table 7.1** is the mean grading for the three unwashed initial surface samples reported in Lee (2009)

TABLE 7.1
COMPARISON BETWEEN PF FORMATION PRODUCTS AND DLALC SAND
% Passing

Aperture (mm)	PF Formation 5/4/2017 ‘Fine Washed Sand’	DLALC Washed Sand	Sample 2 (2009)
4.75	100	100	100
2.36	99	100	100
1.18	96	92	94
0.600	88	74	60
0.425	72	50	37
0.300	46	27	20
0.150	10	7	10
0.075	2	0	8

Examining **Table 7.1**, it is apparent that the DLALC sand is coarser than the PF Formation ‘Fine Washed Sand’. This is at least in part attributed to the quantity of composite particles in the DLALC sand, and it is expected that if the number of composites was reduced to a low level by using appropriate washing equipment then the two size gradings would be similar.

The DLALC sand has a slightly finer grading to the mean of the three samples from the 2009 surface sampling.

Therefore it would seem that when the DLALC sand is properly disaggregated and washed the sand product will be similar to the PF Formation ‘Fine Washed Sand’ or maybe a little coarser.

7.4 Potential Applications

Based on the drilling and testing findings currently available, the DLALC Maroota site should be capable of producing sandstone and sand products to meet the following applications:

- Crushed sandstone for fill applications
- Washed sand for concrete and construction (especially fine sand)
- Mortar sand
- Rendering sand
- Some specialty applications

7.5 Resource Estimates

The following points need to be made in relation to the Resources estimates:

- i) All estimates are based on an in situ bulk density of 2.2 tonnes/m³ determined from an analysis of the geophysical density log data. This bulk density value is considered to be close to the overall actual value for this type of deposit.
- ii) While Resource estimates presented in this report are based on a drill hole spacing of between approximately 250m to 500m; it is recommended that holes more closely spaced (approximately 200m apart) be drilled prior to extraction. This will allow detailed extraction plans to be prepared making full allowance for selective mining to blend any variation in grain size, and to reject any materials not suitable for processing.
- iii) It is strongly recommended that ahead of extraction these resource estimates should be upgraded to Proved Reserves status by drilling at approximately 200m centres, or closer) on a regular campaign basis.

7.6 Extraction and Utilisation

The DLALC Maroota sandstone resource within the defined proposed extraction pit area is well suited to the production of fine-grained concrete aggregates as defined by AS2758.1. From this investigation it is concluded that a raw sandstone resource comprising 20 million tonnes occurs within the proposed pit. After rejecting ironstone and other clay/shale materials the raw sandstone available for wash plant feed will be 19 million tonnes. With a wash plant yield of 87% the resources will produce in the order of 16 million tonnes of sand. Extraction waste and wash plant rejects will comprise a total of 4.0 million tonnes to be placed into the pit void as fill.

7.7 Other Potential Resources on DLALC Property

Figure 9 shows the location of three other sand and sandstone resources that have not formed part of the estimates given in the document. These resources comprise:

- Two other Hawkesbury Sandstone resource areas removed from the resource considered herein. One of these areas, labelled “1” on **Figure 9**, adjoins the PF Formation boundary and would ideally be best worked jointly with extraction by PF Formation in order to maximise resource recovery. The other area labelled “2” also adjoins the PF Formation boundary, but is affected by existing permissive occupancies which may restrict the size of the potential resource available for extraction.
- Tertiary sand deposits located in the eastern areas of the property are labelled “3” on **Figure 9**. The sands mostly occur in the upper parts of the sequence.
- Tertiary clay resources in the eastern areas of the property labelled “3” on **Figure 9**. The better quality clay occurs in the lower parts of the sequence and were intersected during drilling, e.g. DMDDH03 9.49 to 17.83m. Such clay could be suitable for brick making.

8. RECOMMENDATIONS FOR FURTHER INVESTIGATIONS

8.1 Future Drilling

As a result of the investigations completed to date, it is suggested that further work be conducted as follows:

- Further test work particularly aimed at upgrading the washing process, and assessing the breakdown of the coarser aggregated particles in the washed 'product' sand from the recent laboratory testing. A major outcome from this work will be a process flowsheet suited to this particular deposit. Sufficient sample material should be available without having to drill more holes for this work.
- Undertake a more comprehensive suite of tests on the final product sand from the upgraded process to assess suitability for concrete fine aggregate. Tests should at least include: water absorption, sodium sulphate soundness, and petrography on the sand.
- Undertake tests to determine suitability for mortar sand and other potential products.
- To upgrade the friable sandstone resources to Proved Reserves status, drill holes spaced approximately 200m apart, especially to test for the presence of any significant shale lenses within the sandstone and to check for particle size grading changes. This drilling could use open hole RCP to reduce expenditure.
- Undertake geophysical logging of the holes to provide more detail particularly with respect to the rippability determined from the sonic log.
- Examine in more detail the yellow block sandstone resources. Include: petrography on core currently available from DMDDH07, field mapping at about AHD 135m to see if the unit can be observed in out crop in the valleys near DMDDH07. Then prepare a work program specifically to assess the quality and potential to extract the yellow block sandstone.



Design Collaborative
Pty Ltd



Deerubbin LALC



Annexure B

LETTER OF NOTIFICATION

Proposed Friable Sandstone Extractive Industry

Wisemans Ferry Road, Maroota





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MIS Aust

24 October 2019
Ref: 099278.3L

Dear Sir / Madam,

Stakeholder and Community Engagement for a Proposed Friable Sandstone Extraction Industry at Wisemans Ferry Road, Maroota.

Our firm, Design Collaborative, is preparing a 'Scoping Report' on behalf of our client, the Deerubbin Local Aboriginal Land Council (*DLALC*), for a proposed friable sandstone extractive industry (*the Project*) at Wisemans Ferry Road, Maroota (*Subject Land*). **Figure 1** below provides a map showing the location of the Subject Land in its regional context.

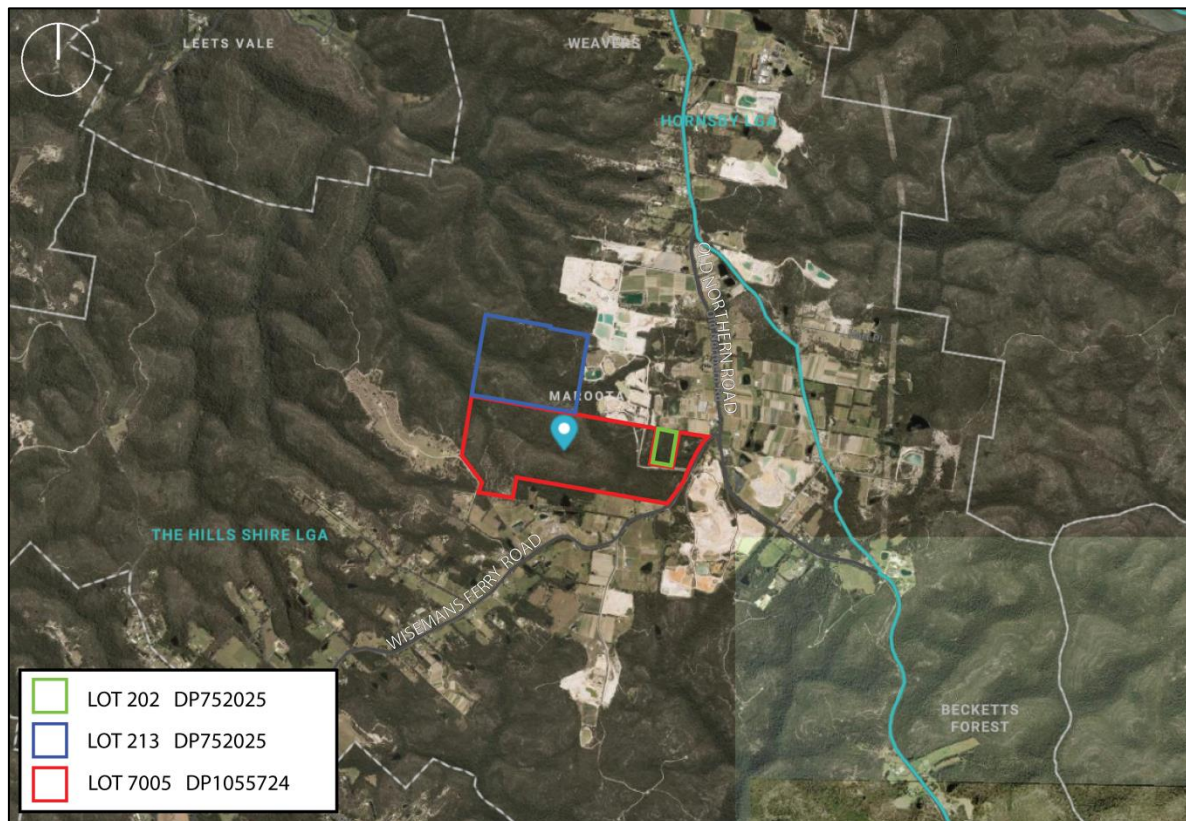


Figure 1: Regional Context (Source: Mecone, 2019)

We are writing to you on behalf of our client because you have been identified as a stakeholder with a potential interest in the Project and are invited to provide feedback and participate in stakeholder and community engagement.

This letter describes the proposed Project, discusses its rationale, outlines identified key matters to be assessed and provides a point of contact for feedback and future engagement.

The Project

The Subject Land comprises three parcels of land described as Lot 7005 DP 1055724, Lot 202 DP 752025 and Lot 213 DP 752025, occupying an area of some 180.7 ha shown in **Figure 1** above.

The proposed Project envisions the use of 49.9ha of the Subject Land as an extractive industry, primarily for the extraction and processing of Hawkesbury sandstone into a fine medium graded sand. Crushed sandstone, fine graded sand and a fine aggregate can also be produced as a by-product of the primary process. In total, approximately 500,000 tonnes of saleable product per annum would be supplied to the Sydney market over a period of 20 years.

The Project will involve the implementation of an extraction and rehabilitation plan simultaneously so that the Subject Land will be suitable for other uses in the future.

The Environmental Impact Assessment Process & Your Feedback

The Environmental Impact Assessment Process ensures the impacts of a State Significant Development are assessed before a decision is made by the Minister for Planning on whether to approve a development. This process is displayed in **Figure 2** below.

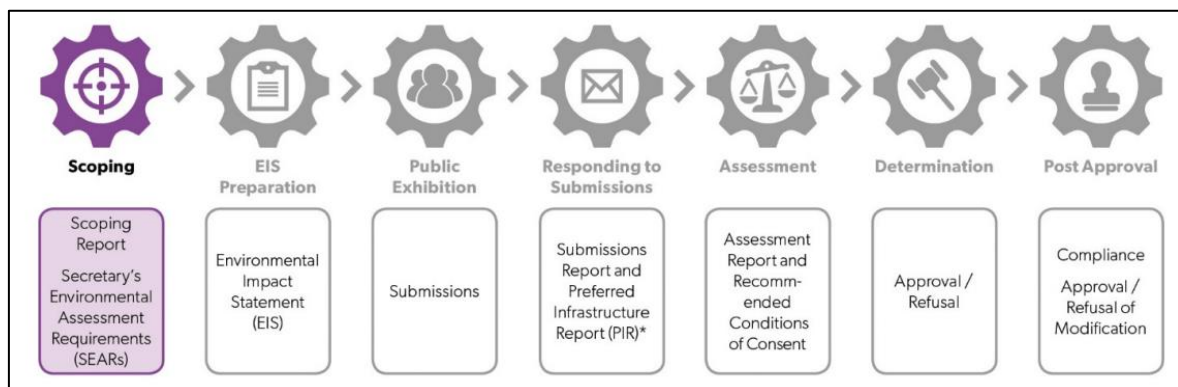


Figure 2: Environmental Impact Assessment Process (Source: Department of Planning and Industries, 2017)

An Environmental Impact Statement is the principal document by which impacts are assessed.

The purpose of a Scoping Report is to identify potential impacts to be assessed in the Environmental Impact Statement. Following a Scoping Report, the Department of Planning and Industries will issue key issues required to be assessed in the Environmental Impact Statement.

The purpose of engagement during the scoping is to identify perspectives of the community and other stakeholders on matters to be addressed in the Environmental Impact Statement in addition to a technical assessment of them. Thus, we are seeking feedback from stakeholder's recommending matters that should be assessed in the EIS to ensure that the full range of potential impacts are identified and later assessed.

Project Rationale

The DLALC has acquired landholdings within the Sydney Basin, and as an organisation, they seek to appropriately develop some of these holdings to support their housing, health,

employment and educational programs. The Subject Land's location on a significant sandstone deposit provides an opportunity to supply the Sydney construction and building industry market with local and therefore, reasonably priced construction sand. Maroota presently contains a number of extractive industries, some of which have co-existed with the local community for over 30 years.

The demand for sand within the Sydney market is approximately 7 million tonnes per annum, a growing proportion of which is sourced outside the Sydney Region. As the value of sand is highly sensitive to handling and transport costs, it is important to have local sources to assist with the cost-sensitive construction of major public and private infrastructure projects; including the Western Sydney Airport and the Sydney Metro Network.

The above point is acknowledged in the *Greater Sydney Region Plan (Metropolitan Plan)* which states "Access to construction materials from local sources within Greater Sydney is critical for continued growth and for minimising construction costs". To provide an opportunity for the development of local extractive sources, the Metropolitan Plan designates the Subject Land as appropriate for intensive agricultural production and resource extraction. The *Central City District Plan (District Plan)* echoes the Regional Plan. It reaffirms to the importance of local extractive sources for providing cost-competitive inputs into the region's growing infrastructure and construction needs.

Relevant Matters for Consideration

Presented below is a preliminary list of environmental and social matters proposed to be assessed in the Environmental Impact Statement:

- Social and economic impacts, including the provision of construction jobs and full-time operational jobs. A Social and Economic Impact Assessment will be prepared to assess the full range of social and economic impacts, some of which are listed below;
- Rehabilitation and use of the Subject Land post use as an extractive industry. A Rehabilitation Plan will be prepared to address this;
- Surface water and groundwater availability and associated impacts including reduced groundwater availability, the lowering of the water table, disruption to drainage patterns and implications to groundwater-dependent ecosystems. A Report assessing the impact of the proposed development on surface water and ground water will be prepared, as will a Water Management Plan;
- Traffic impacts, particularly along Wisemans Ferry Road and on the Wisemans Ferry Road/Old Northern Road Intersection. A preliminary Traffic Assessment undertaken in 2011 indicated that these impacts would be minimal, and a further up-to-date study will be undertaken;
- Ecological Impacts, particularly concerning the ecologically endangered Maroota Sands Swamp Forest and Shale/Sandstone Transition Forest identified onsite through a Preliminary Ecological Impact Assessment. The location of these species informed 49.9ha of land selected for extraction. These species will continue to be monitored, and a finalised Ecological Impact Statement will be prepared to provide mitigation measures;

- Noise and Vibration impacts on nearby sensitive uses resulting from the construction and operation of the Project. A detailed Noise Report will be prepared to assess these impacts and provide mitigation measures;
- Air quality impacts, particularly the potential for dust emissions to impact nearby sensitive uses. An Air Quality Assessment will be prepared to assess air quality-related impacts and provide mitigation measures;
- Archaeological impacts. A preliminary Aboriginal Archaeological Assessment indicates that impacts on Aboriginal heritage are unlikely to form significant constraint. A finalised report will be prepared for the EIS;
- Management of waste generated from the construction and operation of the Project including cleared vegetation, tailings from the wash plant, wastewater, general office waste and oils, lubricants and machinery parts from the service area. A Waste Management Plan will be prepared;
- Bushfire hazard and risk particularly as the Subject Land is open forest. An assessment will be made of any hazard and risk in accordance with *State Environmental Policy 33 – Hazardous and Offensive Development*;
- Visual impacts while the Project is operational and after the Subject land has been rehabilitated. A Visual Impact Assessment will be prepared to assess both these scenarios; and
- Soils impacts, including the potential for erosion. A Soil Management Plan will be required to implement erosion control measures.

Consultants with expertise relevant to the matters identified have and will continue to be engaged to assess impacts and recommend mitigation measures.

Contact Details

Should you wish to provide feedback or seek further information and engagement regarding the proposed Project, please contact either James Lidis or David Rippingill on (02) 9262 3200 or by email enquiries@designcollaborative.com.au.

Yours faithfully,

DESIGN COLLABORATIVE PTY LTD



J Lidis
Managing Director



Design Collaborative
Pty Ltd



Deerubbin LALC

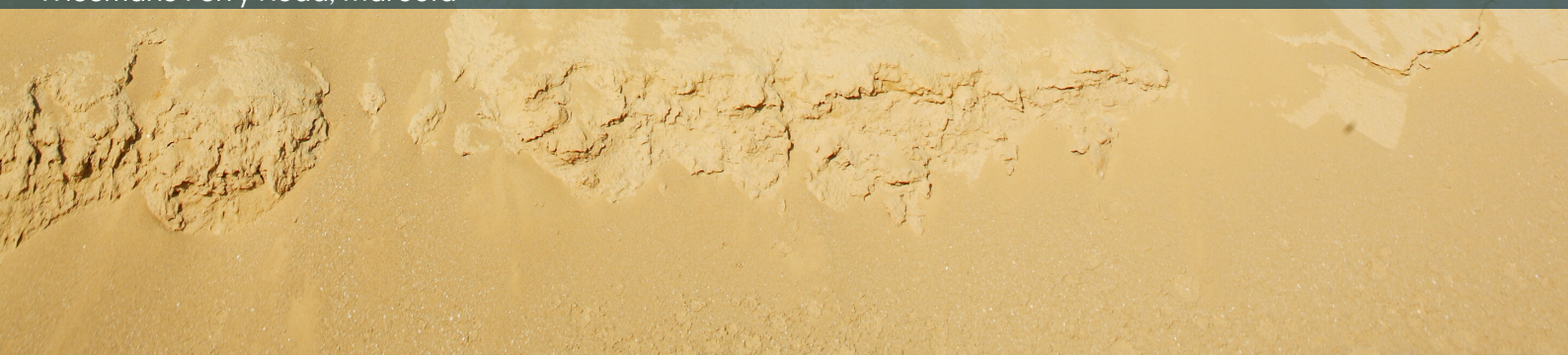


Annexure C

SCOPING WORKSHEET

Proposed Friable Sandstone Extractive Industry

Wisemans Ferry Road, Maroota



Project :		Maroota Proposed Friable Sandstone Extractive Industry						
MATTERS		IMPACTS	ASSESSMENT LEVEL	CUMULATIVE IMPACTS	COMMUNITY ISSUES	ASSESSMENT APPROACH	SCOPING REPORT	
Potential matters that could be affected by the project		Is the project (without mitigation) likely to cause an impact?	Are the impacts (without mitigation) likely to be significant based on the magnitude of the impacts and/or sensitivity of receivers?	What level of assessment is required to assess impacts and determine mitigation measures?	Will cumulative assessment be required?	Did the community raise any concerns about the impacts?	Indicative approach to assessment in EIS	Where was this addressed in the Scoping Report?
Group	Specific	Impact?	Significant Impact?	Assessment Level	Cumulative Impact?	Concerns?	Category	Section
ACCESS	access to property	Yes	Unlikely			No	Detailed Traffic and Access Assessment	Section 7.5
	parking	No				No		
	port / airport facilities	No				No		
	road / rail network	Yes	Likely	Detailed	Yes	No	Detailed Traffic and Access Assessment	Section 7.5
	other - please specify							
AIR	atmospheric emissions		Unknown	Standard	Yes	No	Detailed Air Quality Assessment	Section 7.8
	gases		Unknown	Standard	Yes	No	Detailed Air Quality Assessment	Section 7.8
	particulate matter	Yes	Likely	Detailed	Yes	Yes	Detailed Air Quality Assessment	Section 7.8
	other - please specify							
AMENITY	noise	Yes	Likely	Detailed	Yes	Yes	Detailed Acoustic and Vibration Assessment	Section 7.2
	odour	No				No		
	vibration	Yes	Likely	Detailed	Yes	No	Detailed Acoustic and Vibration Assessment	Section 7.2
	visual	Yes	Unlikely			Yes	Detailed Visual Impact Assessment	Section 7.2
	other - please specify							
BIODIVERSITY	conservation areas	Yes	Likely	Detailed	Yes	No	Detailed Fauna and Flora Assessment	Section 7.1
	native vegetation	Yes	Likely	Detailed	Yes	No	Detailed Fauna and Flora Assessment	Section 7.1
	native fauna	Yes	Likely	Detailed	Yes	No	Detailed Fauna and Flora Assessment	Section 7.1
	other - please specify							
BUILT ENVIRONMENT	private property	Yes	Likely	Detailed	Yes	Yes	An assessment of the impacts of the Project for surrounding land owners will be incorporated into the various studies undertaken.	Section 7
	public domain	No						
	public infrastructure	No						
	other - please specify							
ECONOMIC	livelihood	Yes	Likely	Detailed	No	No	Detailed Social and Economic Assessment	Section 7.11
	natural resource use	Yes	Likely	Detailed	No	No	Detailed Social and Economic Assessment	Section 7.11
	opportunity cost	Yes	Likely	Detailed	No	No	Detailed Social and Economic Assessment	Section 7.11
	other - please specify							
HAZARDS & RISKS	biosecurity	No				No		
	bush fire	Yes	Likely	Standard	No	No	Standard Bush Fire Hazard Assessment	Section 7.3
	coastal hazards	No				No		
	dams	No				No		
	dangerous goods	No				No		
	environmental hazards	No				No		
	floods	No				No		
	groundwater contamination	Yes	Likely	Standard	Yes	No	Detailed Groundwater and Surface Water Assessment	Section 7.4
	hazardous / offensive development	No				No		
	land contamination	No						
	land movement	Yes	Likely	Detailed	No	No	Detailed Geotechnical Assessment	Section 7.12
waste	Yes	Likely	Standard	No	No	Waste Management Plan	Section 7.7	
other - please specify								
HERITAGE	Aboriginal cultural	Yes	Likely	Standard	No	No	Archaeology Inspection and Assessment	Section 7.9
	historic	No				No		
	natural	No				No		
	other - please specify							
LAND	land capability	Yes	Likely	Standard	No	No	Soil Management Plan	Section 7.10
	soil chemistry	Yes	Likely	Standard	No	No	Soil Management Plan	Section 7.10
	stability / structure	Yes	Likely	Detailed	No	No	Detailed Geotechnical Assessment	Section 7.12
	topography	Yes	Likely	Detailed	No	No	Detailed Geotechnical Assessment	Section 7.12

MATTERS	IMPACTS	ASSESSMENT LEVEL	CUMULATIVE IMPACTS	COMMUNITY ISSUES	ASSESSMENT APPROACH	SCOPING REPORT		
Potential matters that could be affected by the project	Is the project (without mitigation) likely to cause an impact?	Are the impacts (without mitigation) likely to be significant based on the magnitude of the impacts and/or sensitivity of receivers?	What level of assessment is required to assess impacts and determine mitigation measures?	Will cumulative assessment be required?	Did the community raise any concerns about the impacts?	Indicative approach to assessment in EIS	Where was this addressed in the Scoping Report?	
other - please specify								
community services / facilities	No				No			
SOCIAL	health	Yes	Likely	Detailed				
	housing availability	No			No	Detailed Social and Economic Assessment and other assessment related to health (i.e. Air Quality Assessment)	Section 7 & Section 7.11	
	safety	Yes	Likely	Detailed				
	social cohesion	No			No	Detailed Social and Economic Assessment and other assessment related to safety (i.e. Traffic and Access Assessment)	Section 7 & Section 7.11	
	other - please specify							
WATER	ground water quality	Yes	Likely	Detailed	Yes	No	Detailed Groundwater and Surface Water Assessment	Section 7.4
	hydrological flows (including flooding)	Yes	Likely	Detailed	Yes	No	Detailed Groundwater and Surface Water Assessment	Section 7.4
	surface water quality	Yes	Likely	Detailed	Yes	No	Detailed Groundwater and Surface Water Assessment	Section 7.4
	water availability	Yes	Likely	Detailed	Yes	No	Detailed Groundwater and Surface Water Assessment	Section 7.4
	other - please specify							



Design Collaborative
Pty Ltd



Deerubbin LALC

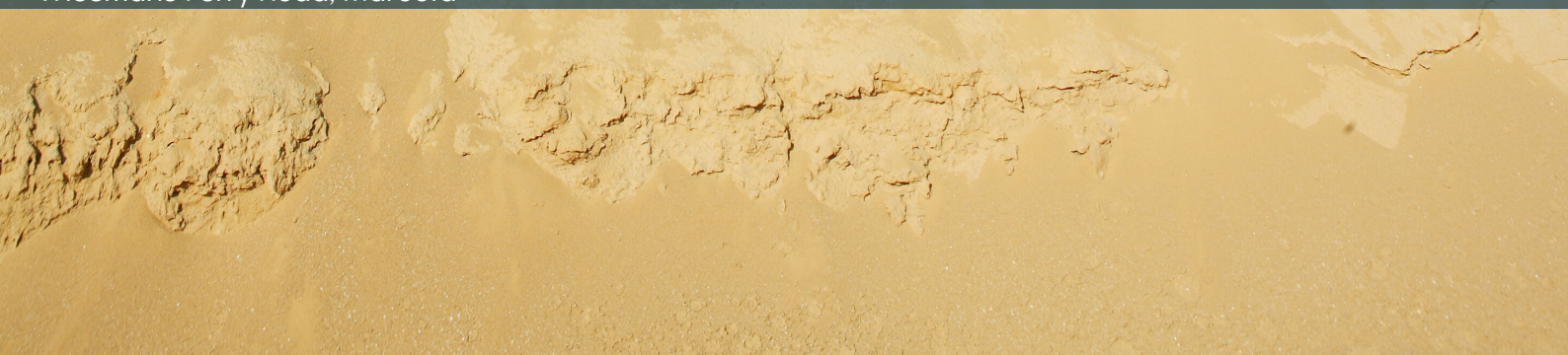


Annexure D

COMMUNITY ENGAGEMENT STRATEGY

Proposed Friable Sandstone Extractive Industry

Wisemans Ferry Road, Maroota



1. Introduction

This proposed Community Engagement Strategy (CES) accompanies a Scoping Report requesting the Secretary's Environmental Assessment Requirements (SEARs) for a proposed friable sandstone extraction industry (*the Project*) located at Wiseman's Ferry Road, Maroota (*the Subject Site*).

The CES has been prepared with consideration to the Department of Planning, Industry and Environment's (DPIE) '*Community and Stakeholder Engagement Guidelines*' and '*Social Impact Assessment Guidelines*' to outline how the proponent (Deerubbin Local Aboriginal Land Council) intends to engage with stakeholders during the Environmental Impact Assessment (EIA) Process.

The CES identifies community members and stakeholders with a potential interest in the Project, lists matters that the community have expressed an interest in through the scoping process and summarises the proposed engagement methods for the EIA process.

David Rippingill and James Lidis are the points of contact for the Project and are accessible by telephone on (02) 9262 3200 or by email at enquiries@designcollaborative.com.au.

2. Community Members and Stakeholders

The following list of community members and stakeholders have been identified as having an interest in the Project and will be engaged through the EIA process. This list is more extensive than the community engagement undertaken for the Scoping Report.

Table 1 – Community Members and Stakeholders

Government Agencies	Community Members and Stakeholders
<ul style="list-style-type: none"> • Hills Shire Council; • Hornsby Shire Council; • NSW Office of Heritage and Environment; • Department of Planning and Industry; • NSW Department of Primary Industries (Fisheries, Land and Natural Resources and Agriculture); • NSW Department of Primary Industries (Water); • NSW Department of Industry (Crown land in NSW); • Water NSW • NSW Environmental Protection Agency; • Roads and Maritime Services; • NSW Rural Fire Service • State Local Member; and • Federal Local Member 	<ul style="list-style-type: none"> • Surrounding landowners (including residents and business owners) within 2km of the project site. (see Figure 1) • Sydney Hills Business Chamber; • Hornsby Chamber of Commerce; • Surrounding action groups including but not limited to: <ul style="list-style-type: none"> ○ Maroota Land Group; ○ Dural and District Historical Society • Maroota Public School; • Any sensitive uses along transport routes identified in a Traffic Report; and • Any other interested party identified through the EIA process.

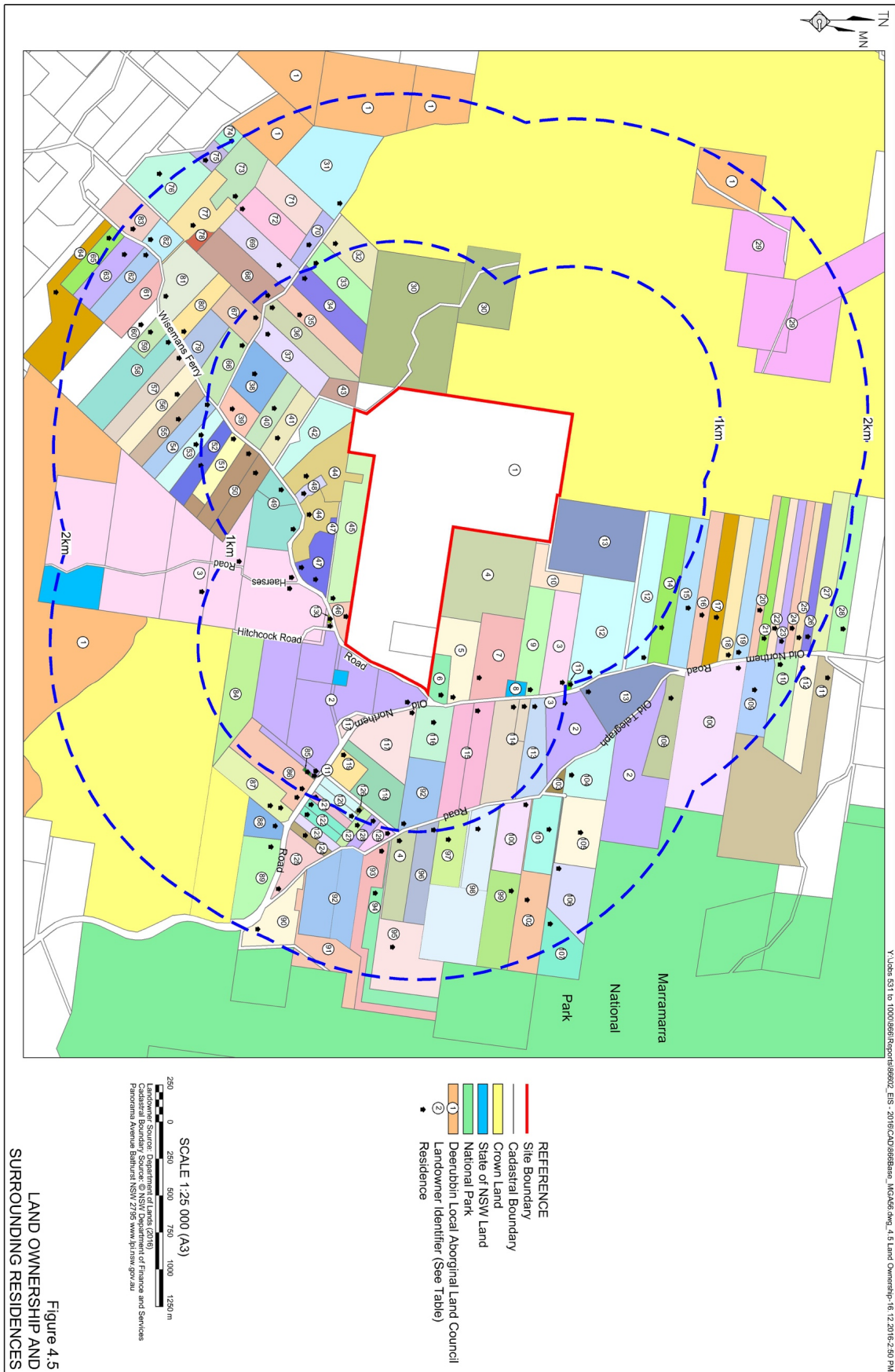


Figure 1: Surrounding Landowners (Source: R.W. Corkery & Co Ltd Pty, 2016)

3. Matters Identified During Scoping

Community consultation was undertaken during the scoping phase of the EIA with neighbours adjoining the Subject Site. That consultation process revealed that neighbours had a particular interest in the following matters.

- Noise Impacts;
- Visual Impacts;
- Dust Impacts;
- Road vehicle Noise and Safety; and
- Privacy and Safety.

Each of these is listed in the Scoping Report as a matter to be assessed in an Environmental Impact Statement.

Additionally, those community members who raised concerns during the Scoping phase will be informed about measures implemented to address their concerns and provided with a copy of the Scoping Report.

4. Engagement Methods

Using the draft 'Community and Stakeholder Engagement Guidelines' provided by the DPIE, the following table lists the participation outcomes sought during the preparation of the EIS and engagement techniques to achieve these outcomes.

Table 2 – Community Members and Stakeholders	
Participation Outcome	Engagement Technique
Inform the Community and other Stakeholders about the Project	<ul style="list-style-type: none"> A Letter of Notification detailing the application and where further information about the Project can be located will be provided to those community members and stakeholders listed above at the time of lodgement of the EIS.
Seek the community and other stakeholder feedback	<ul style="list-style-type: none"> The letter of Information will contain contact details for those seeking to provide feedback regarding the Project; and Ongoing conversations will occur with those community members and stakeholders engaged during the Scoping phase.
Inform the community and other stakeholders about the approach to the assessment and how the SEARs will be addressed.	<ul style="list-style-type: none"> The Scoping Letter of Notification provided during the Scoping phase outlined the Environmental Impact Assessment process; and The EIS Letter of Notification will detail how the SEARs have been addressed.
Identify and inform affected community and other stakeholders, including those that are hard to reach to seek their perspectives and remove barriers to participation.	<ul style="list-style-type: none"> Those affected community members and stakeholders have been identified above. The EIS Letter of Notification will provide an opportunity to provide their perspectives on the EIS.
Inform the community and other stakeholders about the cumulative impacts and other concerns that have been identified.	<ul style="list-style-type: none"> Those community members who raised concerns during the Scoping phase or later will be informed about measures implemented to address their concerns and provided with a copy of the Scoping Report.

To summarise, the engagement techniques proposed to be employed during the EIS phase include:

- On-going conversations and where necessary meetings, with those community members and stakeholders notified during the Scoping Phase;
- The provision of a Scoping Report to those community members who raised matters for assessment during the Scoping Phase;
- Information provided to those Community members and Stakeholders who have/will raise matters for consideration on how those matters have been addressed; and
- The provision of a Letter of Notification to the full list of community members and stakeholders at the time the EIS is lodged.

The outcomes of community engagement will be included in the EIS.