



LATE ITEMS ORDINARY MEETING

AGENDA

17 JULY 2018

Your attendance is required at an Ordinary meeting of Council to be held in the Council Chambers, 4 Lagoon Place, Yeppoon on 17 July 2018 commencing at 9:00am for transaction of the enclosed business.

A handwritten signature in dark ink, appearing to read "Steve Jackson", is positioned above the title of the Chief Executive Officer.

CHIEF EXECUTIVE OFFICER
16 July 2018

Next Meeting Date: 24.07.18

Please note:

In accordance with the *Local Government Regulation 2012*, please be advised that all discussion held during the meeting is recorded for the purpose of verifying the minutes. This will include any discussion involving a Councillor, staff member or a member of the public.

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12 REPORTS

12.13 DECISION ASSESSMENT FOR A DEVELOPMENT PERMIT FOR MAKING A MATERIAL CHANGE OF USE OF PREMISES FOR AN EXTRACTIVE INDUSTRY FOR SAND AND GRAVEL AND ASSOCIATED ACTIVITIES AND MAKING A MATERIAL CHANGE OF USE OF PREMISES FOR CONCURRENCE ENVIRONMENTALLY RELEVANT ACTIVITY AT LOT 5, LOT 6, LOT 8, AND LOT 10 MELDRUM ROAD AND 887 ETNA CREEK ROAD, ETNA CREEK

File No: D-174-2015

Attachments:

1. [Locality Plan](#)
2. [Proposal Plans](#)
3. [Environmental Management Plan](#)
4. [Environmental Assessment Report](#)
5. [Ecological Assessment Report](#)
6. [Bushfire Management Plan](#)
7. [Hydrology Assessment Report](#)
8. [Road Section Plan](#)
9. [State Response](#)
10. [Environmental Authority Permit](#)
11. [Passing Bay Proposal Plan](#)
12. [Second Carriageway Proposal Plan](#)

Responsible Officer: David Battese - Manager Strategy & Development

Author: Erin McCabe - Co-ordinator Development Assessment
Rhiannon Casey - Planning Officer

SUMMARY

Applicant:	Belmont Sands Pty Ltd (c/- Groundwork Plus)
Real Property Address:	Lot 5 on RP601603, Lot 6 on RP601603, Lot 8 on RP601603, Lot 10 on SP142291 and Lot 3 on RP601603
Common Property Address:	Lot 5, Lot 6, Lot 8 and Lot 10 Meldrum Road and 887 Etna Creek Road, Etna Creek
Area of Site:	1,524 hectares
Planning Scheme:	<i>Livingstone Shire Planning Scheme 2005</i> (Reprint 6, 9 June 2009)
Planning Scheme Zoning:	Rural Zone
Planning Scheme Overlays:	Overlay Map O2 - Drainage Problem; Overlay Map O3 - Wetlands and 1waterways Overlay Map O4 - Good Quality Agricultural Land Overlay Map O5 - Stormtide Hazard Overlay Map O5 - Bushfire Hazard Overlay Map O8 – Potential Acid Sulfate Soils (land below five (5) metres Australian Height Datum)
Planning Scheme Maps:	Planning Scheme Map 2A – Agricultural Land Classification Map – Shire Balance (Class C2,

	Class C1 and Class A1)
	Planning Scheme Map 10 – Locally Significant Vegetation
Existing Development:	Belmont Research Station Agriculture (grazing), Caretaker's Residence and Dwelling houses
Approval Sought:	Development permit for making a material change of use of premises for an extractive industry for sand and gravel and associated activities and making a material change of use of premises for concurrence environmentally relevant activity 16(3) 2(b) extracting and 3(b) screening sand and gravel (more than 100,000 tonnes but not more than 1,000,000 tonnes in a calendar year)
Level of Assessment:	Impact Assessable
Submissions:	Thirty-nine (39) submissions (Thirty-eight (38) properly made and one (1) not properly made)
Referral Agency(s):	Department of Infrastructure, Local Government and Planning
Adopted Infrastructure Charges Area:	Outside the Priority Infrastructure Area

Application Progress:

Application Lodged:	7 August 2015
Application Properly Made:	7 August 2015
Acknowledgement Notice sent:	14 August 2015 18 August 2015 (amended)
Application referred to State agency:	19 August 2015
State agency Information Request period extended: (until 16 September 2015)	27 August 2015
Information Request issued:	1 September 2015
State agency Information Request issued:	10 September 2015
Information Request Response received:	13 November 2015
State agency Information Response received:	13 November 2015
State Agency extension to decision stage: (until 18 January 2016)	10 December 2015
State Agency Response:	18 January 2016
Notice of Commencement received:	24 November 2015
Submission period commenced:	23 November 2015
Submission period end:	16 December 2015
Notice of Compliance received:	17 December 2015
Council extension to decision stage: (until 16 March 2016)	9 February 2016
Extension by agreement: (until 7 April 2016)	1 March 2016

Extension by agreement: (until 17 May 2016)	15 April 2016
Council Workshop: (applicant deputation)	19 April 2016
Extension by agreement: (until 1 July 2016)	17 May 2016
Extension by agreement: (until 26 August 2016)	30 June 2016
Extension by agreement: (until 26 October 2016)	26 August 2016
Extension by agreement: (until 23 December 2016)	24 October 2016
Extension by agreement: (until 23 February 2017)	21 December 2016
Extension by agreement: (until 24 April 2017)	23 February 2017
Extension by agreement: (until 30 June 2017)	21 April 2017
Extension by agreement: (until 18 August 2017)	29 June 2017
Extension by agreement: (until 29 September 2017)	11 August 2017
Extension by agreement: (until November 2017)	26 September 2017
Extension by agreement: (until 22 December 2017)	30 November 2017
Extension by agreement: (until 28 February 2018)	18 December 2017
Extension by agreement: (until 28 March 2018)	21 February 2018
Extension by agreement: (until 30 April 2018)	28 March 2018
Council Workshop (application update):	16 April 2018
Extension by agreement: (until 31 May 2018)	30 April 2018
Extension by agreement: (until 18 July 2018)	1 June 2018
Council Meeting Date:	17 July 2018
Statutory determination date:	18 July 2018

OFFICER'S RECOMMENDATION

RECOMMENDATION A

THAT in relation to the application for a development permit for making a material change of use of premises for an extractive industry for sand and gravel and associated activities and making a material change of use of premises for concurrence environmentally relevant activity 16(3) 2(b) extracting and 3(b) screening sand and gravel (more than 100,000 tonnes but not more than 1,000,000 tonnes in a calendar year), made by Belmont Sands Pty Ltd (c/- Groundwork Plus), on Lot 5, Lot 6 and Lot 8 on RP601603, Lot 10 on SP142291 and Lot 3 on RP601603 and located at Lot 5, Lot 6, Lot 8 and Lot 10 Meldrum Road and 887 Etna Creek Road, Etna Creek, Council resolves that it is satisfied under section 304 of the *Sustainable Planning Act 2009*, that the following non-compliance with notification procedures have not adversely affected the awareness of the public or restricted the opportunity of the public to make properly made submissions:

- (a) One (1) of the public notification signs had fallen down during the public notification period due to weather conditions. The applicant advised that they became aware of the matter on Friday 11 December 2015, and the sign was re-erected on the afternoon of Saturday 12 December 2015. As the applicant allowed eighteen (18) business days for the public notification period, it is considered that the requirements of section 297 (1) and 298 of the *Sustainable Planning Act 2009* in respect of placing a sign on the land for the minimum period of fifteen (15) business days were still met and the notification period occurred for a total of seventeen (17) business days.

RECOMMENDATION B

THAT in relation to the application for a development permit for making a material change of use of premises for an extractive industry for sand and gravel and associated activities and making a material change of use of premises for concurrence environmentally relevant activity 16(3) 2(b) extracting and 3(b) screening sand and gravel (more than 100,000 tonnes but not more than 1,000,000 tonnes in a calendar year), made by Belmont Sands Pty Ltd (c/- Groundwork Plus), on Lot 5, Lot 6 and Lot 8 on RP601603, Lot 10 on SP142291 and Lot 3 on RP601603 and located at Lot 5, Lot 6, Lot 8 and Lot 10 Meldrum Road and 887 Etna Creek Road, Etna Creek, Council resolves to approve the application despite its conflict with the planning scheme and provide the following grounds to justify the decision despite the conflict:

- (a) The approval includes conditions that require Etna Creek Road, as the haul route for the development, to be designed and constructed to a standard satisfactory to accommodate the traffic generated by the development, and without those conditions, the application would be refused.
- (b) The development will not hinder other current agricultural pursuits on site, and will not irreversibly affect the agricultural nature of the land for future agricultural pursuits.
- (c) The approval includes conditions imposed by Council and a State Department to reduce the potential for the use to have significant adverse impacts on the surrounding community in terms of traffic, noise and dust.
- (d) The development, provided that there is compliance with the conditions as imposed, will not conflict with:
- the *Livingstone Shire Planning Scheme 2005*; or
 - relevant aspects of the applicable State Planning Policies.

RECOMMENDATION C

THAT in relation to the application for a development permit for making a material change of use of premises for an extractive industry for sand and gravel and associated activities and making a material change of use of premises for concurrence environmentally relevant activity 16(3) 2(b) extracting and 3(b) screening sand and gravel (more than 100,000 tonnes but not more than 1,000,000 tonnes in a calendar year), made by Belmont Sands Pty Ltd (c/-

Groundwork Plus), on Lot 5, Lot 6 and Lot 8 on RP601603, Lot 10 on SP142291 and Lot 3 on RP601603 and located at Lot 5, Lot 6, Lot 8 and Lot 10 Meldrum Road and 887 Etna Creek Road, Etna Creek, Council resolves to state a relevant period of six (6) years in accordance with section 341 (1)(b) of the *Sustainable Planning Act 2009* for the development permit.

RECOMMENDATION D

THAT in relation to the application for a development permit for making a material change of use of premises for an extractive industry for sand and gravel and associated activities and making a material change of use of premises for concurrence environmentally relevant activity 16(3) 2(b) extracting and 3(b) screening sand and gravel (more than 100,000 tonnes but not more than 1,000,000 tonnes in a calendar year), made by Belmont Sands Pty Ltd (c/- Groundwork Plus), on Lot 5, Lot 6 and Lot 8 on RP601603, Lot 10 on SP142291 and Lot 3 on RP601603 and located at Lot 5, Lot 6, Lot 8 and Lot 10 Meldrum Road and 887 Etna Creek Road, Etna Creek, Council resolves to approve the application subject to the following conditions:

1.0 APPROVED DEVELOPMENT

1.1 The approved development is:

1.1.1 making a material change of use of premises for an extractive industry for sand and gravel, at an extraction rate of not more than 1,000,000 tonnes of sand and gravel (combined extraction limit) per calendar year, including the following associated activities:

- (a) screening extracted material (for this development, extracted material is the total material extracted, including sand, gravel, clay, silt and waste material);
- (b) washing extracted material;
- (c) stockpiling extracted material;
- (d) processing plant;
- (e) transporting sand and gravel off-site;
- (f) weighbridge facilities;
- (g) storage shed; and
- (h) office facilities;

and

1.1.2 making a material change of use of premises for concurrence ERA 16(3) 2(b) extracting and 3(b) screening sand and gravel (more than 100,000 tonnes but not more than 1,000,000 tonnes in a calendar year)),

on the subject premises, which must be in accordance with the endorsed plans (refer to condition 3.1).

1.2 The extraction rate limit of 1,000,000 tonnes per calendar year applies to the total amount of sand and gravel (combined) extracted. The extraction rate limit of 1,000,000 tonnes of sand and gravel (combined) per calendar year applies unless a lesser extraction rate limit is confirmed with Council as part of any development application for carrying out operational work for road works and that lesser extraction limit is the subject of a successful change application to vary this approval.

1.3 Extraction of material is limited to the locations identified as Resource Area 1 and Resource Area 2 on the approved conceptual site layout plan (refer to condition 3.1).

2.0 ADMINISTRATION

2.1 The Developer is responsible for ensuring compliance with this approval and the Conditions of the approval by an employee, agent, contractor or invitee of the

Developer.

- 2.2 Where these Conditions refer to "Council" in relation to requiring Council to approve or to be satisfied as to any matter, or conferring on the Council a function, power or discretion, that role of the Council may be fulfilled in whole or in part by a delegate appointed for that purpose by the Council.
- 2.3 All conditions of this approval must be undertaken and completed to the satisfaction of Council, at no cost to Council.
- 2.4 All conditions, works, or requirements of this approval must be undertaken and completed prior to the commencement of use, unless otherwise stated.
- 2.5 Where applicable, infrastructure requirements of this approval must be contributed to the relevant authorities, at no cost to Council prior, to the commencement of use, unless otherwise stated.
- 2.6 The following further Development Permits must be obtained prior to the commencement of any works associated with its purposes:
- 2.6.1 Operational Works:
- (i) Road Works;
 - (ii) Access works;
- 2.6.2 Plumbing and Drainage Work; and
- 2.6.3 Building Works.
- 2.7 Unless otherwise stated, all works must be designed, constructed and maintained in accordance with the relevant development permits, Council policies, guidelines and standards.
- 2.8 All engineering drawings/specifications, design and construction works must comply with the requirements of the relevant Australian Standards and must be approved, supervised and certified by a Registered Professional Engineer of Queensland (RPEQ).

3.0 APPROVED PLANS AND DOCUMENTS

- 3.1 The approved development must commence, and be maintained, operated and completed generally in accordance with the approved plans and documents, except where amended by the conditions of this permit:

<u>Plan/Document Name</u>	<u>Plan/Document Reference</u>	<u>Dated</u>
Conceptual Site Layout Plan	1810.026B Revision 9	28 October 2015
Example Site Office Layout	1810.035	6 July 2015
Example Storage Shed Layout	1810.036	6 July 2015
Road section plan	D-174-2015	1 July 2018
Environmental Management Plan	1810.610.001r1 Issue 1	12 November 2015
Bushfire Management Plan	15-059 Report	October 2015
Hydrology Assessment Report	1810.610.002 Issue 0	12 November 2015
Ecological Assessment	Not numbered	July 2015

- 3.2 Where there is any conflict between the conditions of this approval and the details

shown on the approved plans and documents, the conditions of approval must prevail.

- 3.3 Where conditions require the above plans or documents to be amended, the revised document(s) must be submitted for approval by Council prior to the submission of a Development Application for Operational Works.

4.0 ROAD WORKS

- 4.1 The haul route for the development is Etna Creek Road from the site access to the intersection of Etna Creek Road and the Bruce Highway. Vehicles associated with the development must not use any other route.

- 4.2 The developer must design and construct the haul route (Etna Creek Road), including pavement and road drainage works (cross drains and roadside drainage) in accordance with this condition 4.0.

This condition is imposed pursuant to section 665 of the *Sustainable Planning Act 2009*.

- 4.3 The haul route, except section E (refer to approved plan "road section plan"), must be designed and constructed to:

4.3.1 have a minimum formation width of eight (8) metres; and

4.3.2 have a minimum sealed width of 6.5 metres; and

4.3.3 a standard (including geometric, structural and drainage aspects) that is suitable for the traffic generated by the development operating at the maximum extraction rate of 1,000,000 tonnes of sand and gravel (combined) per calendar year; and

4.3.4 a standard supported by a pavement design report that is certified by a suitability qualified RPEQ experienced in pavement engineering that includes a geotechnical investigation certified by a suitability qualified RPEQ experienced in geotechnical engineering.

This condition is imposed pursuant to section 665 of the *Sustainable Planning Act 2009*.

Note: The minimum formation width (8 metres) and the minimum sealed width (6.5 metres) are formulated on the basis that the site may extract up to 1,000,000 tonnes of sand and gravel (combined) per calendar year. Accordingly the haul route referred to in condition 4.0 must be designed and constructed with a pavement appropriate for the 1,000,000 tonne maximum extraction rate of sand and gravel (combined) unless a lesser extraction rate is confirmed with Council as detailed in condition 1.2 and is the subject of a successful change application for this approval.

- 4.4 Section E of the haul route (refer to approved plan "road section plan"), must be designed and constructed to:

4.4.1 have a minimum formation width of eight (8) metres;

4.4.2 have, either:

(a) a minimum sealed width of 6.5 metres; or

(b) a minimum unsealed width of 6.5 metres;

and

4.4.3 a standard (including geometric, structural and drainage aspects) that is suitable for the traffic generated by the development operating at the maximum extraction rate of 1,000,000 tonnes of sand and gravel (combined) per calendar year; and

4.4.4 a standard supported by a pavement design report that is certified by a suitability qualified RPEQ experienced in pavement engineering that

includes a geotechnical investigation certified by a suitability qualified RPEQ experienced in geotechnical engineering.

This condition is imposed pursuant to section 665 of the *Sustainable Planning Act 2009*.

Note: The minimum formation width (8 metres) and the minimum sealed or unsealed width (6.5 metres) are formulated on the basis that the site may extract up to 1,000,000 tonnes of sand and gravel (combined) per calendar year. Accordingly the haul route referred to in condition 4.0 must be designed and constructed with a pavement appropriate for the 1,000,000 tonnes maximum extraction rate of sand and gravel (combined) unless a lesser extraction rate is confirmed with Council as detailed in condition 1.2 and is the subject of a successful change application for this approval.

- 4.5 A Development Permit for Operational works (road works) must be obtained prior to the commencement of any works on a Council controlled road.
- 4.6 All works must be designed and constructed in accordance with the approved plans (refer to condition 3.1), this condition 4.0, the *Capricorn Municipal Development Guidelines*, relevant Australian Standards and the provisions of a Development Permit for Operational Works (road works).
- 4.7 Ancillary road drainage works (for example, cross drains and roadside drainage) associated with any road works must be designed and constructed in accordance with the *Capricorn Municipal Development Guidelines* and the *Queensland Urban Drainage Manual*.

This condition is imposed pursuant to section 665 of the *Sustainable Planning Act 2009*.

- 4.8 Traffic signs and pavement markings including any alterations must be provided in accordance with the *Transport Operations (Road Use Management Act 1995)* and the *Manual of Uniform Traffic Control Devices (Queensland)*.

This condition is imposed pursuant to section 665 of the *Sustainable Planning Act 2009*.

5.0 ACCESS WORKS

- 5.1 Vehicle access to the subject site from Etna Creek Road must be designed and constructed to cater for the largest design vehicle associated with the development operating at the maximum extraction rate.

This condition is imposed pursuant to section 665 of the *Sustainable Planning Act 2009*.

- 5.2 Once constructed in accordance with this condition 5.0, the vehicle access must be maintained to comply with this condition 5.0 at all times while the extractive industry use (including the associated activities and the ERAs) is occurring.

This condition is imposed pursuant to section 665 of the *Sustainable Planning Act 2009*.

- 5.3 A Development Permit for Operational Works (access works) must be obtained prior to the commencement of any access works for the site.
- 5.4 All works must be designed and constructed in accordance with the approved plans (refer to condition 3.1), *Capricorn Municipal Development Guidelines* and the provisions of a Development Permit for Operational Works (access works).

6.0 PLUMBING AND DRAINAGE WORKS

- 6.1 On-site sewage treatment and disposal must be provided in accordance with the *Queensland Plumbing and Wastewater Code* and Council's Plumbing and Drainage Policies.

This condition is imposed pursuant to section 665 of the *Sustainable Planning Act 2009*.

- 6.2 On-site water supply for domestic (potable) and fire-fighting purposes must be provided and may include the provision of a bore, dams, water storage tanks or a combination of each.

This condition is imposed pursuant to section 665 of the *Sustainable Planning Act 2009*.

- 6.3 A Development Permit for Plumbing and Drainage Works must be obtained prior to the commencement of any plumbing and drainage work associated with the development.

- 6.4 All plumbing and sanitary drainage works must be in accordance with regulated work under the *Plumbing and Drainage Act*, any relevant development permit for carrying out plumbing or drainage work, and Council's Plumbing and Drainage Policies.

7.0 SITE WORKS

- 7.1 Site works must be undertaken such that they do not, at any time, in any way restrict, impair or change the natural flow of runoff water, or that cause an actionable nuisance or worsening to adjoining properties or infrastructure.

- 7.2 Any vegetation cleared or removed must be:

7.2.1 Mulched on-site and utilised on-site for landscaping purposes; or

7.2.2 Removed for disposal at a location approved by Council;

Within sixty (60) days of clearing. Any vegetation removed must not be burnt unless authorised by a relevant fire permit.

8.0 BUILDING WORKS

- 8.1 A Development Permit for Building Works must be obtained prior to the commencement of any building works on the site.

- 8.2 The minimum habitable floor height for new buildings must be 17.2 metres Australian Height Datum.

- 8.3 All electrical outlets and distribution boxes must be located above the predicted flood level of 16.9 metres Australian Height Datum.

9.0 ENVIRONMENTAL

- 9.1 All applications for a Development Permit for Operational Works (road works and access works) must be accompanied by a detailed Construction Environmental Management Plan prepared by a suitably qualified RPEQ (civil or environmental engineering), which addresses, but is not limited to, the following matters:

- (i) water quality and drainage;
- (ii) erosion and silt/sedimentation management;
- (iii) acid sulphate soils;
- (iv) fauna management;
- (v) vegetation management and clearing;
- (vi) top soil management;
- (vii) interim drainage plan during construction;
- (viii) construction programme;
- (ix) geotechnical issues;
- (x) weed control;
- (xi) bushfire management;
- (xii) emergency vehicle access;

- (xiii) noise and dust suppression; and
 - (xiv) waste management.
- 9.2 All applications for a Development Permit for Operational Works (road works and access works) must be accompanied by a detailed Erosion and Sediment Control Plan, which addresses, but is not limited to, the following:
- (i) site location/topography/soil type;
 - (ii) objectives;
 - (iii) concept;
 - (iv) design details;
 - (v) implementation procedures for construction and post construction phases;
 - (vi) vegetation;
 - (vii) interim drainage plan during construction;
 - (viii) dust suppression;
 - (ix) top soil management;
 - (x) acid sulphate soils; and
 - (xi) erosion susceptibility and risk.
- 9.3 The erosion and sediment control device(s) referenced in the Environmental Management Plan (refer condition 3.1), as approved and amended pursuant to this approval, must be installed and maintained at all times while the extractive industry use (including the associated activities and the ERAs) is occurring and for the duration of rehabilitation works.
- This condition is imposed pursuant to section 665 of the *Sustainable Planning Act 2009*.
- 9.4 Vegetation must not be cleared, removed or damaged unless it is in accordance with the approved plans (refer condition 3.1).
- 9.5 The development must include:
- 9.5.1 A storage area for hazardous contaminants that has a secondary containment system to prevent any release of contaminants from the system, or container within the system, to land, groundwater, or surface waters; and
 - 9.5.2 Containers for hazardous contaminants that are secured at all times to prevent movement and leaking during any flood event.
 - 9.5.3 A storage area for hazardous contaminants that is above the minimum two (2) per cent Annual Exceedance Probability (AEP) event flood level.
- 10.0 ASSET MANAGEMENT
- 10.1 Any alteration necessary to electricity, telephone, water mains, sewerage mains, and/or public utility installations resulting from the development or in connection with the development, must be at full cost to the Developer.
- 10.2 Any damage to existing kerb and channel, pathway or roadway (including removal of concrete slurry from public land, pathway, roads, kerb and channel and stormwater gullies and drainage lines) which may occur during any works carried out in association with the approved development must be repaired. This must include the reinstatement of the existing traffic signs and pavement markings which may have been removed.
- 10.3 'As constructed' information pertaining to assets to be handed over to Council and those which may have an impact on Council's existing and future assets must be provided prior to the commencement of use. This information must be provided in accordance with the Manual for Submission of Digital As Constructed Information.
- 11.0 OPERATING PROCEDURES
-

- 11.1 The hours of operations for the development must be limited to:
- 11.2 Prior to the commencement of use, the *Environmental Management Plan* (refer condition 3.1)
- (i) 0600 hours to 1800 hours Mondays to Saturdays (not including public holidays); and
 - (ii) No operations on Sundays or Public Holidays
- 11.3 Prior to the commencement of use, the *Environmental Management Plan* (refer condition 3.1) must be amended to, incorporate the recommendations of the *Bushfire Management Plan* (refer to condition 3.1); the *Hydrology Assessment Report* (refer to condition 3.1); include the conditions imposed by the Environmental Authority; and include the requirements of this development permit.
- 11.4 The amended *Environmental Management Plan* (refer condition 3.1), required by 11.3, must be given to Council prior to the commencement of use.
- 11.5 A detailed record of the extraction operations must be maintained on site at all times and must be available for inspection by Council. Records must be kept for a minimum of 5 years. The record of extraction operations must include the following information:
- 11.5.1 date of extraction;
 - 11.5.2 quantity of material extracted;
 - 11.5.3 quantity of sand and quantity of gravel extracted;
 - 11.5.4 quantity of sand and gravel transported from subject site; and
 - 11.5.5 quantity of extracted material screened.

ADVISORY NOTES

NOTE 1. Aboriginal Cultural Heritage

It is advised that under Section 23 of the *Aboriginal Cultural Heritage Act*, a person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal Cultural Heritage (the "cultural heritage duty of care"). Maximum penalties for breaching the duty of care are listed in the Aboriginal Cultural Heritage legislation. The information on Aboriginal Cultural Heritage is available on the Department of Aboriginal and Torres Strait Islander Partnerships website www.datsip.qld.gov.au

NOTE 2. General Environmental Duty

- a. General environmental duty under the *Environmental Protection Act 1994* prohibits unlawful environmental nuisance caused by noise, aerosols, particles dust, ash, fumes, light, odour or smoke beyond the boundaries of the property during all stages of the development including earthworks, construction and operation.
- b. The development must be undertaken in a manner that does not allow environmental nuisance or water contamination caused by construction material, noise, aerosols, particles dust, ash, fumes, light, odour and smoke, which must not go beyond the boundaries of the property during all stages of the development including earthworks, construction and operation as stated in the *Environmental Protection Act 1994* and subordinate legislation.

NOTE 3. General Safety Of Public During Construction

The *Workplace Health and Safety Act* and *Manual of Uniform Traffic Control Devices* must be complied with in carrying out any construction works, and to ensure safe traffic control and safe public access in respect of works being constructed on a road.

NOTE 4. Road

Council is not obliged at any stage in the future to open the road on the currently closed and unformed road reserve, or to form and construct the road to service the development.

NOTE 5. Flood Levels and Immunity

It is advised that the immunity from flood events shall be provided to a minimum of one (1) per cent Annual Exceedance Probability of 16.9 metres Australian Height Datum, plus a reasonable freeboard allowance (minimum 300 millimetres) for the finished floor levels of the site office, storage shed and for any electrical switchboard.

NOTE 6. Environmental

- a. The land subject to the above development application must be free of declared pest plants and animals; as declared at the date of development application in *Local Law No. 3 (Community & Environmental Management) 2011* and Schedule 1 of *Subordinate Local Law 3 (Community & Environmental Management) 2011* and in the *Land Protection (Pest and Stock Route Management) Act 2002* or as amended; to the satisfaction of Council's Pest Management Officer, prior to the commencement of any site works. Council will supply a free inspection and advice service on the request of the land owner.
- b. It is advised that part of the subject site is mapped by the Department of Environment and Heritage Protection as containing Regulated Vegetation. The *Vegetation Management Act 1999* has requirements with regard to the clearing of vegetation. Information on Vegetation Management is available at: <https://www.qld.gov.au/environment/land/vegetation/management/>

BACKGROUND

As detailed in the summary, the subject application was lodged with Council on 7 August 2015 and has been under extended assessment from March 2016 with negotiations focusing, primarily on the haul route, being Etna Creek Road.

COMMENTARY**PROPOSAL IN DETAIL**

The application is seeking a Development Permit for a sand and gravel quarry to operate over Lot 8, Lot 5, Lot 10 and Lot 6 Meldrum Road and 887 Etna Creek Road, Etna Creek. The proposed operation is for the extraction of sand and gravel and includes screening, washing, stockpiling and transportation of material off site, via Etna Creek Road.

The proposed activity will occur over 128 hectares and involves two (2) resource areas, a processing area and a stockpile area. Resource Area 1 is located within the north western portion of Lot 8 on RP601603 and Resource Area 2 is located within the southern portion of Lot 5 on RP601603 and involves the processing area. The stockpile area is located within Lot 10 on SP142291.

The proposal seeks to extract up to 1,000,000 tonnes of sand and gravel as per the environmentally relevant activity thresholds outlined below however the application details that an average annual extraction rate of 80,000 tonnes per calendar year is anticipated. The application goes on to detail that flexibility in the extraction rate is required to allow for project-based activities and variations in market demand and that fluctuations in extraction volumes can occur with such operations.

Machinery and equipment associated with the activities includes excavators, haulage vehicles, processing plant (inclusive of a hopper and feeding conveyor, static screen, density tank, sand pump, tower and hydrocyclone), spray bar, wash down pad and weighbridge.

Ancillary facilities will include an office and amenities building and storage shed. Quarry material will be transported by thirty-six (36) tonne capacity trucks with dog trailers

In addition, the application includes a concurrence referral for two (2) environmentally relevant activities under the *Environmental Protection Act 1994* being the following:

- 16(3) 2(b): extracting, other than by dredging, in a year, the following quantity of material – more than 100,000 tonnes but not more than 1,000,000 tonnes; and
- 16(3) (3)(b): screening, in a year, the following quantity of material – more than 100,000 tonnes but not more than 1,000,000 tonnes.

The operation will occur between 0600 hours and 1800 hours Monday to Saturday with no operations on Sundays and Public Holidays and will have a maximum of three (3) employees on the site per shift.

Haul route – Etna Creek Road

Given that all materials will be transported by road (Etna Creek Road initially) from the site, the application included a traffic and pavement assessment on lodgement. The findings of the assessment confirmed that the operation will have no notable operational impacts on the intersection of Etna Creek Road and the Bruce Highway (Yaamba Road). The assessment outlined that the operation was likely to bring forward upgrade requirements for the narrow section of Etna Creek Road and that the general maintenance costs for Etna Creek Road will increase and that negotiations with Council about a reasonable contribution would need to transpire.

Subsequent to the application material provided on lodgement, three other haul route proposals were presented to Council for consideration, with the first being a proposal for a road maintenance contribution. This proposal was given to Council in November 2015 as part of the response to the information request issued by Council and included a revised road impact assessment. Discussions then transpired around a possible road maintenance agreement and works occurring on sections of Etna Creek Road.

Council, in August 2016, then received correspondence from the applicant, which involved changing the haul route to traverse land not originally forming part of the application, south of the Etna Creek Road alignment, from the extractive industry site and connecting to Etna Creek Road approximately 2.3 kilometres from the intersection with the Bruce Highway.

Council advised that such a change to the haul route could not be considered a minor change because the change was substantially different development and the change would cause the application to be referred to a new referral agency, namely, Ergon Energy, and therefore, public notification of the proposed development would need to be repeated. The applicant advised Council they did not wish to pursue this option.

In April 2017 a passing bay proposal was presented to Council by the applicant and their traffic engineer as follows:

- a. Passing bays be constructed every 500 metres along Etna Creek Road. One (1) to three (3) passing bays to be constructed prior to and in conjunction with the commencement of the use. The remaining passing bays are to be constructed incrementally at a rate of one (1) for every 50,000 tonne of material extracted. The westbound traffic are to give way to the eastbound traffic and signage to this effect is to be erected. Deceleration and acceleration areas for the passing bays will not be provided.
- b. Based on the current state of Etna Creek Road, the current traffic on that road, and the expected vehicle and tonnage associated with the extractive industry use, the impact of the use on Etna Creek Road will be \$395,000.00 in today's dollars. This amount would be paid towards the maintenance and upgrade of Etna Creek Road at a rate of \$0.27 per tonne, with an expected total extraction being 1,480,000 tonne. The gravel portions of Etna Creek Road would be graded annually and the shoulders to be mowed fortnightly or as needed.

Following consideration of the proposal including consultation with consultant engineers engaged by Council it was determined that the proposal itself is not appropriate because it is not possible to control the traffic not associated with the extractive industry use to ensure that those vehicles stop in the passing bays to allow vehicles travelling in the opposite direction to remain on the sealed pavement. The proposal would likely exacerbate damage to the sealed pavement and the road edge which would in turn increase the maintenance and safety concerns. Ultimately officers could not recommend support for the proposal.

Further discussions with Council officers and the applicant occurred on 18 January 2018, and on 23 March 2018 Council received an updated proposal from the applicant which involved a revised haul route for the extractive industry comprising

- a. Construction of a new carriageway that is separate from, and immediately north of, the existing Etna Creek Road carriageway (refer second carriageway proposal attachment) intended to be used by both quarry-related vehicles and non-quarry related vehicles travelling east; and
- b. The use of the existing Etna Creek Road pavement for all western bound traffic.

Council considered the proposal in detail and advised on 11 May 2018 that it was not supportive of the proposed haul route due to, among other things:

1. The practicalities of managing (including maintaining), and ongoing safety concerns associated with, two carriageways within the same road reserve that are physically separated, including the potential for road users to cross between the old and new pavements.
2. Design factors, including issues associated with drainage, pavement structure, formation level, access for existing properties, bus stop locations and existing private infrastructure.
3. Potential adverse amenity impacts, including noise, dust and lighting impacts for properties on the northern side of Etna Creek Road.

As part of this correspondence, Council advised the applicant that it will not engage consultants to undertake any further review of the proposal or partake in further discussions on the matter and it wishes to proceed to a Council decision on the matter. The applicant was asked to confirm the final haul route for the proposed extractive industry for the development. The applicant provided confirmation on 12 June 2018 that the original proposed haul route is to be assessed. The applicant also requested Council consider imposing a condition which provides flexibility in the scale of works and/or the timing/staging for delivery of this infrastructure, being the haul route.

SITE AND LOCALITY

The site is currently owned by Agforce Queensland Farmers Ltd and is used as a cattle breeding facility (approximately 1,200 head of cattle), inclusive of research and education facilities. The property has been divided into numerous paddocks, varying in size and includes pasturing and cultivation activities. The site has a flat and low lying topography whereby the southern handle of the site is prone to flood waters from the Fitzroy River when peaking above thirteen (13) metres.

Vegetation of State and Local significance exist on site. The areas proposed for extraction avoid existing environmental values and have the ability to co-exist with the agricultural/pastoral activity on site.

The proposed operation is setback 100 metres from the Fitzroy River. The site contains four (4) water bores and enjoys an irrigation licence through Fitzroy River Water. There are 4 identified natural drainage lines that cross the site (on Lot 5 on RP601603 and Lot 8 on RP601603) from Fitzroy River on the west to the Boomerang Lagoon and overflow to the Fitzroy River on the east.

There are no immediate neighbouring dwellings to the proposed extraction resources areas. The closest residences are located across the Fitzroy River, approximately 1.5 kilometres

from the extraction area (Resource Area 1). A local community exists to the north of the subject site on Lindleys Road. The community on Lindleys Road comprises of approximately twenty (20) land parcels ranging between four (4) and seven (7) hectares in size. The closest residence to the extractive resource area is approximately four (4) kilometres and approximately 1.6 kilometres to the stockpile area. The site access to the premises is approximately 500 metres to the closest residence.

Etna Creek Road is a Council controlled road, measuring 8.65 kilometres in total length, varying in width and quality. The existing state of the road and associated drainage infrastructure demonstrates poor quality; however, Council considers that the road is servicing the needs of the existing community.

The related permits over the subject site are detailed in the following table:

Existing applications/development permit over the site	
Lot 5 Meldrum Road, Etna Creek Lot 5 on RP601603	B-1152-2012 – Building Works for a Retaining Wall - approved with conditions 23 May 2012
Lot 10 Meldrum Road, Etna Creek Lot 10 on SP142291	D-Y/2000-970 – Reconfiguring a Lot for a Boundary Realignment – approved with conditions 7 March 2001
887 Etna Creek Road, Etna Creek Lot 3 on RP603603	D-Y/2000-970 – Reconfiguring a Lot for a Boundary Realignment – approved with conditions 7 March 2001 72-2002-YPO – Building Works for a Class 8 – new building – research facility – approved with conditions 16 April 2002; D-Y/2002-95 – Development Permit for Operational Works – approved with conditions (not dated)

MATTERS FOR CONSIDERATION

This application has been assessed by relevant Council planning, engineering, environmental health, and other technical officers as required. The assessment has been in accordance with the Integrated Development Assessment System provisions of the *Sustainable Planning Act 2009*, based on consideration of the State Planning Policy; State Government guidelines; the Council's Town Planning Scheme, Planning Policies and other general policies and procedures, as well as other documents as considered relevant.

Internal advice and assessment

Infrastructure Operation Unit Comments – 13 July 2018

Support, subject to conditions, specifically, an upgrade of sections of Etna Creek Road to a sealed 6.5-metre-wide pavement. Infrastructure recommends that approval of the application can only occur provided an Infrastructure Agreement be entered in association with appropriate conditioning in order to facilitate works on the nominated sections of Etna Creek Road.

Environmental Health Comments – 11 August 2015

Support, subject to advice.

Natural Resource Management Comments – 3 November 2015

Support, subject to conditions.

External referral

The application was referred to the Department of Infrastructure, Local Government and Planning as a concurrence agency in accordance with Schedule 7, Table 2, Item 1—Environmentally relevant activity and Schedule 7, Table 3, Item 2—Development impacting on State transport infrastructure of the *Sustainable Planning Regulation 2009* on 19 August 2015.

The department assessed the application and requested further information on 10 September 2015. Following a response to the information request, the Department provided their State referral response including conditions on 18 January 2016.

Conditions including carrying out of the development in accordance with the relevant plans, development and implementation of a site-based pest management plan, heavy vehicle haul routes of state interest within the region, recording the quantity of product being transported and payment of an annual monetary contribution to the Department of Transport and Main Roads, which is based on the amount of material extracted per annum.

TOWN PLANNING COMMENTS

State Planning Policy – July 2014

Part E of the State Planning Policy provides for interim development assessment provisions for local government until such time as the State Planning Policy is reflected within the planning scheme. The state interests identified are listed below.

Liveable communities: Not applicable as the proposal does not involve community title.

Mining and extractive resources: Not applicable as the proposed Material Change of Use is not within a resource/processing area of a KRA or the separation area for the resource/processing area of a KRA.

Biodiversity: The purpose of the Biodiversity State Interest is to ensure matters of environmental significance are valued and protected, and the health and resilience of biodiversity is maintained or enhanced to support ecological integrity. The application triggers assessment against the state interest due to the site being mapped as containing matters of state environmental significance.

Development:	
(1) Enhances matters of state environmental significance where possible, and	The proposed development has been sited to avoid any clearing of mapped remnant vegetation.
(2) Identifies any potential significant adverse environmental impacts on matters of state environmental significance	The proposed development has been strategically sited to avoid any clearing of mapped remnant vegetation. High Ecological Significant Wetlands have been identified on site, however the proposed extraction, processing and stockpile areas are located more than 500 metres from these areas. This is evidence to suggest the proposed development has identified and avoided matters of state environmental significance.
(3) Manages the significant adverse environmental impacts on matters of state environmental significance from, or otherwise mitigating, those impacts.	The Environmental Management Plan includes a Water Quality Management Plan to support the application, with intention to manage and mitigate any matters of state environmental significance.

Coastal environment: Not applicable as the subject sites are not located within a coastal management district.

Water quality: The purpose of the Water Quality State Interest is to ensure that the planning, design, construction and operation of development should be undertaken in a manner that protects environmental values and maintains or enhances water quality. The site is mapped as containing 'MSES – Regulated vegetation', 'MSES – Regulated vegetation (intersecting a watercourse)', and 'MSES – High Ecological Significance wetlands', therefore assessment against this state interest is required.

Development:	
<p>(1) Avoids or otherwise minimises adverse impacts on the environmental values of receiving water arising from:</p> <ul style="list-style-type: none"> (a) altered stormwater quality or flow, and (b) water (other than contaminated stormwater and sewerage), and (c) the creation or expansion of non-tidal artificial waterways, and 	<p>In terms of potential acid sulfate soils, the applicant advised as part of their application that the resource investigation conducted in early 2015, found no acid sulfate soils or potential acid sulfate soils in the proposed resource areas.</p> <p>High Ecological Significant Wetlands and regulated vegetation associated with a watercourse have been avoided by the siting of the proposed development.</p> <p>The applicant has submitted an Environmental Management Plan that includes a Water Quality Management Plan to support the application and also a Hydrology Assessment Report which details how stormwater runoff and on site water will be managed appropriately with no impact on the nearby waterways and wetlands.</p> <p>Conditions are included in the recommendation requiring the development to commence, and be maintained, operated and completed generally in accordance with the approved plans and documents.</p> <p>The Environmental Authority and the ERA response issued by the State also impose conditions requiring compliance with supporting reports and operation of the activity to reduce the potential for the use to have significant adverse impacts.</p>
<p>(2) Complies with the SPP Code: Water quality.</p>	<p>The submitted Hydrology assessment report indicated that the development will ensure all captured runoff within the resources areas will be adequately treated onsite to meet the water quality objectives of the policy.</p> <p>Conditions are included in the recommendation requiring the development to commence, and be maintained, operated and completed generally in accordance with the</p>

	<p>approved plans and documents.</p> <p>The Environmental Authority and the ERA response issued by the State also impose conditions requiring compliance with supporting reports and operation of the activity to reduce the potential for the use to have significant adverse impacts.</p>
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Emissions and hazardous activities: Not applicable as the subject site is not located within a management area.

Natural hazards: The purpose of the Natural Hazards, Risk and Resilience State Interest is to ensure natural hazards are properly considered, community resilience is increased, and hazards are avoided or the risks are mitigated to an acceptable or tolerable level. The proposed development requires assessment against this state interest as the site is located within a flood hazard and bushfire hazard area.

Development:	
(1) Avoid natural hazard areas or mitigates the risks of the natural hazard to an acceptable or tolerable level, and	<p>The proposal is susceptible to flooding due to the low lying nature of the development and proximity to the Fitzroy River that is known to flood the subject site. In preparation to avoid and manage flooding of the proposed development, the applicant has advised it will utilise the Bureau of Meteorology flood warning system to ensure the site is appropriately evacuated prior to a flood event. The nature of the proposed development is considered resilient in a flood event and will not increase a risk to lives and property.</p> <p>In terms of bushfire risk, the applicant compiled a Bushfire Management Plan which identified the majority of the site being low hazard. This assessment takes into consideration slope, aspect and vegetation, and contributing mitigation characteristics include the site is flat and maintained by grazing. The risk of a bushfire internally to the property is low due to the site being bound by the Fitzroy River banks.</p>
(2) Supports, and does not unduly burden, disaster management response or recovery capacity and capabilities, and	<p>There are two (2) locations on Etna Creek Road that are subject to flooding at peak times and subsequently closed for access. Despite this, the applicant has prepared a pre and post Flood Management Plan that indicates all buildings and structures will be located within the northern stockpile area on a high point of the site.</p> <p>The proposed development includes one (1) internal access for ingress and egress from the site. According to the Bushfire Management Plan, it is not envisaged a high intensity fire is possible allowing time for safe</p>

	and unobstructed evacuation from the site.
(3) Directly, indirectly and cumulatively avoids an increase in the severity of the natural hazard and the potential for damage on the site or to other properties, and	The proposal will avoid an increase in the severity of bushfire and flood risk.
(4) Avoids risks to public safety and the environment from the location of hazardous materials and the release of these materials as a result of a natural hazard, and	Fuel storage will be located within the northern stockpile area which is located above the one (1) in fifty (50) year flood event level.
(5) Maintains or enhances natural processes and the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard	The proposed development has been strategically sited to avoid any clearing of mapped remnant vegetation, therefore considered to maintain natural processes and the protective function of the land.

State transport infrastructure: The State Assessment and Referral Agency response provides conditions relevant to State transport matters.

Strategic airports and aviation facilities: Not applicable as the subject site is not proximal to identified aviation facilities.

Planning Scheme Shire Wide Outcomes

The Shire Wide Desired Environmental Outcomes, as identified by section 2.2 of the *Livingstone Planning Scheme 2005* are as follows:

- (a) *Development does not adversely affect the values of the Shire's natural environment including coastal areas, wetlands, beaches, headlands, waterways, protected areas, undeveloped hillslopes, and areas of significant native vegetation, from any adverse effects accruing from clearing, soil degradation and pollution, due to erosion and contamination, acidification, salinity, waste disposal and any modifications to natural processes.*

Complies:

The Fitzroy River envelopes the subject site along the eastern, southern and western boundaries. The site also contains wetlands, remnant vegetation and locally significant vegetation. The siting of the resource, processing and stockpile areas is strategically placed outside mapped areas and positioned with a one hundred (100) metre buffer to the Fitzroy River.

The proposal is supported by an Environmental Management Plan that aims to support natural values of the Shire's environment and details measures to safeguard the surrounding environment including detailed plans in relation to environmental matters such as water and air quality, hydrocarbons and chemicals, waste and weeds, rehabilitation and flooding. Furthermore, the Environmental Management Plan is conditioned as an approved plan in the recommendation in addition to compliance with the *Environmental Protection Act 1994*.

- (b) *Development does not adversely affect the quality and quantum of water available for a range of consumptive uses throughout the Shire.*

Complies:

The proposed development will not affect the Shire's natural water supply. The site is not serviced by the reticulated water supply network and contains four (4) water bores on site and connection pipe from the Fitzroy River for irrigation.

Furthermore, the development is supported by a Water Quality Management Plan within the Environmental Management Plan which details measures to ensure any potential adverse impacts on water quality is mitigated appropriately.

- (c) *Risks to safety, property and the environment are not increased by the interaction of development and natural or other hazards, including flooding, bushfires, disturbance of acid sulfate soils, storm tide, cyclonic weather events and landslide.*

Complies:

The subject sites are susceptible to flooding, bushfire, stormtide hazard and are mapped for potential or known acid sulfate soils. The proposal is accompanied by an Environmental Management Plan which includes a Pre and Post Flood Management Plan, which aims to control potential environmental impacts occurring as a result of the site being mapped within a flood area. There are two (2) locations on Etna Creek Road that are subject to flooding at peak times and subsequently closed for access, however it is noted that local flood warnings are issued regularly in a potential flood event which would be utilised by operators to ensure the risk is minimised.

In terms of bushfire risk, the applicant compiled a Bushfire Management Plan which identified the majority of the site being low hazard. This assessment takes into consideration slope, aspect and vegetation, and concludes that the risk of a bushfire internally to the property is low due to the site being bound by the Fitzroy River banks.

- (d) *Development protects the economic values of natural resources, including good quality agricultural land, extractive and mineral resources, vegetation, and water.*

Complies:

The existing rural use will continue in synergy with the proposed development. The proposed development encompasses a total of area of 128 hectares and is not anticipated to hinder the agricultural and research activities on the site.

The site comprises a significant sand and gravel resource that is to be utilised by the local and regional community. The extractive industry will stimulate economic circulation and is anticipated to support the local building and construction industry. Supply will be used for roads, domestic, commercial and community wide infrastructure needs.

- (e) *Development provides a benefit to and satisfies an economic demand of residents of the area in which it is located.*

Complies:

There is no known benefit resulting from the extractive industry use. The site comprises a significant sand and gravel resource that is to be utilised by the local and regional community. The extractive industry will stimulate economic circulation and is anticipated to support the local building and construction industry. Supply will be used for roads, domestic, commercial and community wide infrastructure needs.

- (f) *Opportunities for maintaining and improving employment resulting from advancements in information technology and emerging business and industry trends are maximised.*

Complies:

The proposed development will have approximately two (2) to three (3) employees per shift however is not anticipated to provide significant advancements in information technology and emerging business.

- (g) *The Shire's tourism industry is strengthened and expanded based on the sustainable use of natural, cultural, and man-made assets, and the orderly provision of services and facilities.*

Not applicable:

The proposal is not linked to changes in the tourism industry.

- (h) *Yeppoon continues to function as the main business centre and administrative hub for the Shire.*

Complies:

The proposed development will not compromise the town centre functions of Yeppoon.

- (i) *Development promotes the efficient use, and provides for the orderly expansion of the Shire's movement system, including motorised and non-motorised modes.*

Compliance achieved through condition 4.0:

The haulage route (Etna Creek Road) must cater for the proposed development by design and construction to a standard that is suitable for the traffic generated by the development operating at the maximum extraction rate as imposed through condition 4.0 in the recommendation. The condition ensures the safe and efficient operation of the haulage route. The proposed haulage route from Etna Creek Road intersects the Bruce Highway, the main arterial road through the Shire.

- (j) *Development occurs in an area:*

- (i) *which is intended for the development as identified by the outcomes for zoned land; and*
- (ii) *in which services and facilities required in respect of the development are existing, planned or provided by the development.*

Compliance achieved through condition 4.0:

The proposed extractive industry is not a preferred use in the rural zone and could not be considered a consistent use but for the haul route road works condition 4.0 in the recommendation. Without the road works being designed and constructed to the minimum formation and width and to a standard (including geometric, structural and drainage aspects) that is suitable for the traffic generated by the development operating at the maximum extraction rate, the development would not be providing the services (haul route) required in response of the type of development. Further, without condition 4.0 the outcomes for the zone would be compromised as the development would create an adverse impact on the amenity of the locality in terms of haul vehicle movements on Etna Creek Road creating road and traffic safety impacts.

It is acknowledged that the reality of extractive activities is that the operation can only occur where the resource is present however the development must ensure services and facilities required in respect of the development are provided by the development where they are not existing or planned.

- (k) *Development does not adversely affect:*

- (i) *the community's health and safety; or*
- (ii) *the amenity enjoyed by people in different areas of the Shire.*

Partial compliance and where conflict exists, compliance achieved through condition 4.0:

It is considered that the impact of haul vehicle movements on Etna Creek Road will lead to traffic safety and road impacts which would affect the immediate community. Subsequently, in order for the development to be supported, suitable road works conditions have been included in condition 4.0 of the recommendation.

A detailed Environmental Management Plan has been provided and is recommended for approval including implementation of measures, to ensure the extractive activity reduces the potential for the use to have significant adverse impacts community health, safety, or amenity values. Mitigation strategies include dampening potential

dust generating areas by water spraying, maintaining road surfaces, covering loads and progressive rehabilitation. It is considered that the buffer to neighbouring residences, being in excess of one (1) kilometre, will reduce amenity concerns with the operation.

- (l) *Development reflects the community's reasonable expectations and harmonises with the natural environment and does not prejudice the Shire's existing scenic amenity, particularly along the Capricorn Coast.*

Complies:

The proposed development has been planned to co-exist with existing rural pursuits on the subject site. Further, all remnant vegetation mapped on site has been strategically avoided by the resource, processing and stockpiling areas. The proposal will also include progressive rehabilitation.

Further it is reasonable to expect the community to understand that extractive operations can only occur where the resource is present, however it is also considered to be a reasonable expectation of the community that a development ensures services and facilities required in respect of the development are provided by the development.

- (m) *The community values of places and landscapes reflecting the community's history and identity are not detrimentally affected by development.*

Complies:

There are no mapped cultural features identified on the site and subsequently, the proposed development is not anticipated to impact on the community's history and identity.

Summary of Desired Environmental Outcome assessment

The performance assessment of the proposal demonstrates that the development will not compromise the Planning Scheme Shire Wide Desired Environmental Outcomes. However, compliance with Desired Environmental Outcome (i), (j) and (k) is only achieved through road works conditions included in condition 4.0 of the recommendation and without for these conditions the development does not provide services (a haul route) required in respect of the development, inhibits the efficient use of the movement system (road) and has the potential to create significant adverse impacts on the surrounding community in terms of road impacts and traffic safety impacts.

Rural Zone Outcomes

The Overall Outcomes applicable to the Rural Zone are set out at section 3.3 of the scheme as follows:

(1) Purpose

- (a) *The purpose of the Rural Zone Code is the achievement of the overall outcomes sought for the Rural Zone.*
- (b) *The overall outcomes sought for the whole of the Rural Zone are:*
- (i) *Land used for rural activities such as grazing, agriculture and horticulture is protected from development, which in Council's opinion would significantly infringe on the landscape setting and rural amenity of the Shire;*
 - (ii) *Land with productive capacity is preserved for a range of existing and emerging agricultural activities significant to the economy of the Shire;*
 - (iii) *Large tracts of bushland identified as having significant environmental value are protected from development;*
 - (iv) *Agriculture, including both extensive and intensive activities is protected from land use conflicts resulting from the location of non-rural activities on rural land;*

- (v) *Uses and works are located and designed to maximise the efficient use and extension and safe operation of infrastructure;*
- (vi) *Residential purposes are ancillary to the primary rural purposes in the rural area; and*
- (vii) *Mineral and extractive resources and transport routes associated with resources are protected from incompatible development.*

The consistent and inconsistent land uses in the Rural zone are as follows:

- O1 (a) *Only uses consistent with the overall outcomes for, and preferred for development within the Rural zone are established in the zone.*
- (b) *The following uses and use classes are consistent with, and preferred within the Rural zone:*
- (i) *All Rural Purposes*
- O2 *Provided the following uses are developed:*
- *to be compatible with surrounding Rural Purposes by being of similar scale, intensity and character, and*
 - *to support preferred uses, and*
 - *to not adversely affect the amenity of the locality; or*
 - *to provide recreational or community facilities that are more appropriately located in the rural area;*
- they are consistent uses within the Rural zone:*
- (a) *Residential Purposes comprising:*
 - a. *a single dwelling house per lot,*
 - b. *Home-based business,*
 - c. *Host farm.*
 - (b) *Arts and craft centre,*
 - (c) *Extractive industry,*
 - (d) *Garden centre,*
 - (e) *Landscape supplies,*
 - (f) *Local utility,*
 - (g) *Major utility,*
 - (h) *Outdoor recreation, and*
 - (i) *Telecommunications facility (medium impact)*
- O3 *Uses other than:*
- *preferred uses nominated in O1, or*
 - *consistent uses developed to comply with the provisions set out in O2;*
- do not establish in the Rural Zone, do not comply with the overall outcomes sought for the Rural Zone and conflict with this code.*

The proposed extractive industry is not a preferred use in the rural zone and cannot be considered a consistent use without for the haul route road works condition 4.0 in the recommendation. Without the road works being designed and constructed to the minimum formation and width and to a standard (including geometric, structural and drainage aspects) that is suitable for the traffic generated by the development operating at the maximum extraction rate, the development would create an adverse impact on the amenity of the

locality in terms of haul vehicle movements on Etna Creek Road creating road and traffic safety impacts.

Without the road works condition 4.0 the development conflicts with the rural zone purpose in terms of a conflict with:

- overall outcome (1)(b)(v) in respect of being a use and including works (as proposed) that are not designed to ensure efficient use, extension and safe operation of infrastructure and instead have adverse impacts on the safe operation of infrastructure (being the haul route); and
- specific outcome O2 dot point 3 in respect of the amenity of the locality and the development of the use (as proposed) would have the potential to create significant adverse impacts on the surrounding community in terms of road impacts and traffic safety impacts.

In terms of the on-site operation of the extractive industry activity, the proposed development has been planned to co-exist with the existing rural activities on the site without impeding on their existing operation.

The large tracts of significant vegetation/bushland are proposed to be retained on site and the development site has been strategically sited to as avoid any clearing and protected from development by mitigation measures detailed within the Environmental Management Plan.

The closest residence to the extractive resource area is approximately four (4) kilometres and approximately 1.6 kilometres to the stockpile area. The site access to the premises is approximately 500 metres to the closest residence. No adverse noise impacts are anticipated as the development has been conditioned to comply with environmental standards. The Environmental Management Plan includes a Noise Management Plan for onsite operations and haulage vehicles. Subsequently, no adverse noise impacts are anticipated by the development.

Rural Zone Code Requirements

The following is an assessment of the proposal against the Rural Zone Code, which includes an assessment of the development against the relevant specific outcomes of the code.

Specific Outcomes		Response
Subdivision Design		
O4	Reconfigured lots are designed and developed with: sufficient area and suitable proportions for preferred or consistent uses; <ul style="list-style-type: none"> • adequate frontage for safe and convenient vehicular and pedestrian access; • suitable areas within each lot for the location of relevant activities and works, and: <ul style="list-style-type: none"> • do not expose people and works to unacceptable risks from flooding or other hazards. 	Not applicable The proposed development does not involve subdivision of land.
Character and Amenity		
O5	Uses and works are located, designed and operated to minimise adverse impacts on: <ul style="list-style-type: none"> • existing environmental conditions 	Complies The application has been accompanied by an Ecological Assessment, Environmental Assessment Report and Management Report

Specific Outcomes	Response
<p>relating to air, water and soil,</p> <ul style="list-style-type: none"> the amenity of adjacent properties and public spaces, visual quality of landscapes in terms of: <ul style="list-style-type: none"> reducing ribbon development and sprawl, loss of green break separations, obstructing significant local and distant views of prominent natural features and landmarks, and the health and safety of people using the premises and adjacent premises. 	<p>that are considered to address any on and offsite impacts of the proposed development on the natural environment and the adjacent properties. Furthermore, the siting of the resource, processing and stockpiling areas has been strategically sited to avoid remnant vegetation and have a buffer in excess of 100 metres to the Fitzroy River.</p> <p>The proposal will not have any impact on visual quality, considering the minor footprint, and flat topography. Furthermore, the proposal cannot be viewed from public places.</p> <p>In terms of on and offsite health and safety, it is considered there are adequate separation distances between the proposed extraction area and adjoining residential development, in excess of one (1) kilometre.</p> <p>In order to reduce impacts on the haulage route (Etna Creek Road) and ensure the health and safety of people using the premises and adjacent premises, suitable roadworks conditions have been included in condition 4.0 of the recommendation.</p>
<p>O6 Buildings and structures are:</p> <ul style="list-style-type: none"> of a type and scale which have an attractive, functional appearance; constructed of materials and finishes compatible with other development in the area; integrated with the physical attributes of the site, including appropriate provision for access to natural light and ventilation, privacy, noise attenuation, drainage, landscaping, outlook and off-street parking; and designed to adequately screen materials stored outside buildings when viewed from adjacent premises and public spaces 	<p>Complies</p> <p>A site office inclusive of amenities is proposed as a part of the application. The site office will be in the form of temporary demountable building and will not be visible from neighbouring premises.</p> <p>It is noted that the processing plant conveyors, may approach fifteen (15) to twenty (20) metres in height, however, it is not anticipated that the conveyors will be visible from public places and due to the large scale of the site and the setback distances, will not be intrusive when viewed from adjoining properties.</p>
<p>O7 For a noise sensitive place, activities are laid out and buildings are designed and constructed to mitigate to a level, that does not unreasonably adversely affect the health and safety of people using premises, the effects of noise from:</p> <ul style="list-style-type: none"> Traffic on major roads (including State-controlled Roads); or Operations within railway corridors. 	<p>Not applicable</p> <p>The subject sites are not mapped as being a noise sensitive place in accordance with Schedule 1 – Dictionary.</p>
Cultural Heritage Values	

Specific Outcomes		Response
O8	Cultural heritage values associated with the landscape features of a site and its surroundings or relics of past activities found during development of the site are respected and are not subjected to changes that would significantly reduce the capacity to appreciate those areas, places and sites, their character or the memories or history they represent, in terms of visual detracting, public accessibility or physical change, damage or removal.	Complies The subject site is not identified as containing any known cultural heritage values mapped in Schedule 3 of the scheme.
Flood Immunity		
O9	Development is immune to flood events which result in unacceptable risk to health and safety or unacceptable risk of property damage.	Complies. The proposal is susceptible to flooding due to the low lying nature of the subject sites and proximity to the Fitzroy River that is known to flood the subject site. In preparation to avoid flooding of the proposed development, the applicant has advised it will utilise the Bureau of Meteorology flood warning system to ensure the site is appropriately evacuated prior to a flood event. Furthermore, a Pre and Post Flood Water Quality Management Plan and a Water Quality Management Plan have been prepared as part of the Environmental Management Plan in addition to a Hydrology Assessment Report, which will be conditioned accordingly as part of the recommendation.
Vehicle Parking and Movement		
O1	Development is provided with an on-site parking and movement system designed and constructed to: <ul style="list-style-type: none"> • be integrated with the site layout including: <ul style="list-style-type: none"> – direct access to a road providing a level of service required to accommodate traffic generated by the use; and – appropriately designed footpath crossovers; and – provision for safe pedestrian movement between public footpath and facility entry points; and • accommodate all modes of transport (including motor vehicles and bicycles) generated by the use; and • facilitate non-discriminatory accessibility; and 	Complies All parking and vehicle movements are accommodated on site. The existing access to the site will be utilised by the proposed development.

Specific Outcomes	Response
<ul style="list-style-type: none"> • provide for safe and efficient loading and unloading of goods; and • allow for vehicle queuing necessary for the use; and • provide for passenger set down/pick up necessary for the use; and • facilitate public access to the foreshore and riparian open space networks. 	
Infrastructure	
<p>O1 Water supply, sewerage, drainage, roads, power and communications are provided to meet the appropriate standards of service and construction at least whole-of-life cost, which:</p> <ul style="list-style-type: none"> • comprise components and materials that are: <ul style="list-style-type: none"> – readily accessible and available; and – robust and reliable in terms of operational life and purpose; and – easily maintained without unnecessarily requiring specialist expertise or equipment; and • are integrated with the design, construction and operation of existing systems and facilitate orderly provision of future systems. 	<p>Partial compliance and where conflict exists, compliance achieved through condition 4.0:</p> <p>The site is not serviced by the reticulated water or sewerage supply networks.</p> <p>The operation of the Extractive industry will be largely self-sufficient utilising on-site water via existing water bores.</p> <p>The Planning Assessment Report also indicates that using pond water that will be formed within the extraction area. Used water will be returned to the pond where suspended particles will settle through sedimentation, and the water will be re-used.</p> <p>Wastewater from the toilet of the proposed site office must be disposed of on site and will be conditioned accordingly.</p> <p>Condition 4.0 in the recommendation requires road works to be designed and constructed to the minimum formation and width and to a standard (including geometric, structural and drainage aspects) that is suitable for the traffic generated by the development operating at the maximum extraction rate.</p> <p>But for the haul route road works condition 4.0, the development would not provide road infrastructure to meet the relevant standards and in terms of haul vehicle movements on Etna Creek Road, would create road and traffic safety impacts.</p>

As evident from the above assessment, the proposal generally complies with the various requirements of the Rural Zone Code. Where there are deviations from the Specific Outcomes, suitable justification and alternatives have been provided, in support of the proposal.

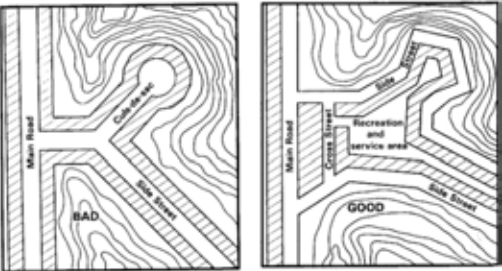
Special Management Areas Codes

The subject site is affected by seven (7) of the elements within the Natural Features Code:

- (i) Acid Sulfate Soils (land below five (5) metres Australian Height Datum) (Overlay Map O8);

- (ii) Bushfire Hazard (Overlay Map O5);
- (iii) Wetland (Overlay Map O3);
- (iv) Waterway (Overlay Map O3);
- (v) Drainage Problem (Overlay Map O2);
- (vi) Storm Tide Hazard (Overlay Map O5); and
- (vii) Good Quality Agricultural Land (Overlay Map O4).

Specific Outcomes		Response
Acid Sulfate Soils Special Management Area		
O4	<p>Natural or built environments and human health are not harmed by the production of acidic leachate resulting from development in areas of known and potential acid sulfate soils by:</p> <ul style="list-style-type: none"> (a) Avoiding disturbance to areas of acid sulfate soils that would produce or contribute to acidic leachate; (b) Treating and managing the disturbance of acid sulfate soils to minimise generation of acidic leachate within manageable levels; (c) Treating and managing surface and groundwater flows from areas of acid sulfate soils to minimise environmental harm. 	<p>Complies</p> <p>The applicant advised as part of their application that the resource investigation conducted in early 2015, found no acid sulfate soils or potential acid sulfate soils in the proposed resource areas.</p>
Bushfire Hazard Special Management Area		
O5	Public safety, lives and property are not placed at unacceptable levels of risk.	<p>Complies</p> <p>The application includes a Bushfire Management Plan which identified the majority of the site being low hazard. This assessment takes into consideration slope, aspect and vegetation, and concludes that the risk of a bushfire internally to the property is low due to the site being bound by the Fitzroy River banks. Therefore, it is considered that public safety, lives and property are not placed at unacceptable levels of risk.</p> <p>Furthermore, the Bushfire Management Plan will be conditioned as part of any approval.</p>
O6	The highest intensity of use occurs in those parts of the site which are least bushfire prone and limits the intensity of use elsewhere	<p>Complies</p> <p>The findings of the Bushfire Hazard Assessment determined the bushfire risk is low due to the site being bound by the Fitzroy River banks.</p> <p>Furthermore, the Bushfire Management Plan will be conditioned as part of any approval.</p>
O7	Purposes resulting in high concentrations of people on a site (including child care centre,	<p>Not applicable</p> <p>The proposed extractive industry will have</p>

	educational establishment, hospital, residential purposes comprising multi-unit long term accommodation and short term accommodation, commercial and industrial purposes) being exposed to unacceptable levels of risk are inconsistent with the outcomes sought for this special management area	approximately two (2) to three (3) employees on the site per shift and therefore not resulting in high concentrations of people.
O8	Development is sited and designed to minimise bushfire risk having regard to: (a) aspect, (b) elevation, (c) slope, and (d) vegetation	Complies The Bushfire Hazard Assessment and Management Plan takes into consideration the topography of the land, however considering it is relatively flat and cleared, it is considered the risk is minimal. Furthermore, the Bushfire Management Plan will be conditioned as part of any approval.
O9	Road layouts facilitate easy and safe movement in the event of encroaching fire and provides for alternative safe access if one direction is blocked in the event of fire (Refer Figure A below).  Figure A	Complies Safe evacuation via internal the access route is considered sufficient for employees due to the low risk of bushfire.
O10	A sufficient supply of water is available for firefighting purposes	Complies There is ample supply of water for firefighting purposes considering the four (4) existing bores and irrigation pump from the Fitzroy River.
Wetland Special Management Area		
O15	There are no significant adverse effects on identified wetlands in terms of: (a) habitat; (b) water quality; (c) landscape quality.	Complies The proposed development has been designed so that the operation areas avoid mapped wetlands and maintain a 100 metres buffer from the Fitzroy River. Furthermore, the Environmental Management Plan details appropriate actions to ensure the development does not impact on the wetlands, such as maintaining the water quality of nearby wetlands through the diversion of clean overland flow using a series of suitable bunds and/or diversion drains. The Environmental Management Plan will be

		conditioned as part of an approval.
Waterway Special Management Area		
O16	There are no significant adverse effects on identified waterways in terms of: (a) habitat; (b) riparian vegetation; (c) water quality; (d) water flow; (e) landscape quality and amenity; and (f) recreational value.	Complies The proposed development has been designed so that the operation areas avoid mapped wetlands and maintain a 100 metres buffer from the Fitzroy River. Furthermore, the Environmental Management Plan details appropriate actions to ensure the development does not impact on the waterway and will be conditioned as part of an approval.
O17	Riparian land is preserved for public use where the land is required for ecological, open space or recreation functions including: (a) public use; (b) access for maintenance; (c) linking core and remnant habitat areas (d) protecting water quality and ecological processes; and (e) other public benefit.	Not applicable The land is freehold and is not available for public use. Furthermore, the extraction site is setback 100 metres from the Fitzroy River.
Drainage Problem Special Management Area		
O18	Development levels are set above the design flood level to reduce property damage and, where applicable, ensure public safety.	Complies The subject sites are susceptible to flooding due to the low lying nature of the subject sites and proximity to the Fitzroy River that is known to flood the subject sites. In preparation to avoid flooding of the proposed development, the applicant has advised it will utilise the Bureau of Meteorology flood warning system to ensure the site is appropriately evacuated prior to a flood event. Furthermore, a Pre and Post Flood Water Quality Management Plan and a Water Quality Management Plan have been prepared as part of the Environmental Management Plan in addition to a Hydrology Assessment Report, which will be conditioned accordingly as part of the recommendation. Furthermore, Council's Infrastructure Unit have reviewed the proposal and are supportive of the measures detailed within the abovementioned reports.
Storm Tide Hazard Special Management Area		
O19	Development levels are set above the design flood level to reduce property damage and, where applicable, ensure public safety.	Complies The subject sites are susceptible to flooding due to the low lying nature of the subject sites and proximity to the Fitzroy River that is

		<p>known to flood the subject sites. In preparation to avoid flooding of the proposed development, the applicant has advised it will utilise the Bureau of Meteorology flood warning system to ensure the site is appropriately evacuated prior to a flood event.</p> <p>Furthermore, a Pre and Post Flood Water Quality Management Plan and a Water Quality Management Plan have been prepared as part of the Environmental Management Plan in addition to a Hydrology Assessment Report, which will be conditioned accordingly as part of the recommendation.</p> <p>Furthermore, Council's Infrastructure Unit have reviewed the proposal and are supportive of the measures detailed within the abovementioned reports.</p>
Good Quality Agricultural Land Special Management Area		
O24	<p>Good quality agricultural land is retained for rural purposes by:</p> <p>(a) conducting other uses only if they are not irreversible and do not reduce the productive capacity of the land or alienate its use for rural purposes or result in land use conflicts with adjacent existing rural uses;</p> <p>(b) avoiding the use of identified land for other uses unless it can be proven that:</p> <p>(i) the land is not actually good quality agricultural land; or</p> <p>(ii) there is an overriding need in terms of public benefit for the proposal and the proposal cannot be located on alternative sites that are not identified as good quality agricultural land, including if:</p> <ul style="list-style-type: none"> – the proposed location has features that make it desirable for the proposal; and – the features are not available in areas not identified as good quality agricultural land 	<p>Complies</p> <p>The proposed development has been planned to co-exist with the existing rural use on site without impeding on existing operation. The proposal will not involve blasting or crushing of material which may result in noise induced stress on animals.</p> <p>The proposed development will utilise an existing access track that bypasses existing cattle grazing.</p> <p>Considering the small development footprint of 128 hectares, it is not considered to impinge on the 1,524 hectare subject site.</p> <p>Subsequently, the proposal will not interfere with the productive capacity of the land, nor alienate existing or potential rural purposes.</p>
O25	Subdivision of good quality agricultural land does not reduce the productive capacity of the land	<p>Not applicable</p> <p>The proposal is not for the subdivision of land.</p>

HAUL ROUTE DETAILS

Etna Creek Road forms the haul route from the development site to the Bruce Highway (State-controlled road). Etna Creek Road is a Council controlled road, measuring approximately 8.65 kilometres in length and varies in formation and seal width. The haul route can be divided into five (5) sections based on the existing pavement and can be described as follows:

Section A:

This section commences from the Yaamba Road (Bruce Highway) intersection, measures approximately 1.3 kilometres in length, is sealed and is approximately 6.2 metres wide, however it is noted that this section extends to fourteen (14) metres wide at the intersection of Yaamba Road. This section is recently constructed.

Section B:

This section immediately adjoins Section A to the west and measures 1.6 kilometres in length, is sealed and is approximately 6.5 metres wide. This section has recently been reconditioned.

Section C:

This section immediately adjoins Section B to the west and measures 3.8 kilometres in length, is sealed and is approximately 3.5 metres wide. This section has been resealed a couple of times, is deteriorated by way of potholes, the pavement has rutting and shoving exhibited along the wheel tracks, there is fretting of the pavement edges, damage to the pavement shoulders and wheel tracks in the natural soil to the sides of the pavement due to vehicles having to leave the pavement to pass other vehicles travelling in the opposite direction.

This section was constructed, has been resealed and maintained, based on limited traffic movements and the surrounding land uses. It was not constructed or maintained to accommodate heavy vehicles, particularly those that would be generated by the proposed development.

Section D:

This section immediately adjoins Section C to the west and measures 1.7 kilometres in length, is sealed and is 6.5 metres wide. This section has recently been reconditioned.

Section E:

This section immediately adjoins Section D to the west and forms the final part of the haul route. This section measures 800 metres in length, is unsealed gravel and is approximately six (6) metres wide. This section is in a condition reflective of the currently low traffic volumes.

Summary

The proposed development will generate substantial additional traffic loads greater than the existing traffic. The proposed hauling trucks are proposed to have a carrying capacity of thirty-six (36) tonnes, are expected to be nineteen (19) metres in length (truck and dog), with a standard width of 2.5 metres and are anticipated to make up to twenty-two (22) movements per day (eleven (11) vehicles each way).

Section A, B and D:

For the current traffic volumes are adequate and have no apparent safety concerns at present. For the traffic volumes if the development is approved (as detailed above), will be adequate, with no apparent safety concerns at present, but such traffic volumes will generate additional maintenance and reduce the service life of those sections.

Section C:

For the current traffic volumes, is substandard and has a number of features that may be a safety concern (for example, pot holes, fretting, shoulder damage, and wheel tracks to the side). For the traffic volumes if the development is approved (whether at 20,000 tonnes per

annum or 80,000 tonnes per annum), would not be adequate and the safety concerns would be exacerbated.

Section E:

For the current traffic volumes, is, with regular maintenance equivalent to that for an unsealed gravel road, adequate and there are no apparent safety concerns at present. For the traffic values if the development is approved, would not be adequate, and given it is a school bus route, would likely involve safety concerns in the form of reduced visibility due to dust generated by heavy vehicles, and potholes and accelerated deterioration of the road, particularly during wet weather.

As detailed within this report, ongoing discussions between the applicant, Council and engaged consultants (by both the applicant and Council) have occurred throughout the extended assessment of the decision period and various options have been discussed, however Council was not supportive of the proposals.

The existing state of the road and associated drainage infrastructure demonstrates poor quality; however, the road is still functional to service the needs of the existing community. The current road maintenance approach at this stage is reactive. Etna Creek Road is not in the forward works program for upgrading works. Upgrading works on rural roads is covered by the Council '*Road- Upgrade of Unsealed Rural Roads to Sealed Standard Policy*'. While Etna Creek Road is approaching an average 150 vehicle per day movement (demonstrated by vehicle counts undertaken by Council), not all road sections reach the average 150 vehicles per day. Furthermore, the road is not experiencing high maintenance costs and the other criteria do not translate to a priority listing for upgrade works under the policy.

It is also noted that a total of thirty-nine (39) submissions were received by Council, objecting to the proposed development and all submissions did express concern in relation to the current state of the road and the proposed heavy vehicles exacerbating the existing issues with the road's condition and accelerating degradation of the road.

The recommendation includes conditions that require Etna Creek Road, as the haul route for the development to be designed and constructed to a standard satisfactory to accommodate the traffic generated by the development, and without those conditions, the application would be refused.

INFRASTRUCTURE CHARGES

Adopted Infrastructure Charges Resolution (No.2) 2015 for non-residential development applies to the application and it falls outside of the priority infrastructure area. Table 1 – Planning scheme use types to which the adopted infrastructure charges schedule apply, lists an Extractive industry as a Specialised use and in accordance with Table 7 – Adopted charge for non-residential development within the priority infrastructure area, the charges is to be decided by the Livingstone Shire Council at time of assessment as per section 3.2.

Council has not previously imposed an infrastructure charges on other extractive industry applications and proposed none in the case of this application.

CONSULTATION

The developer engaged stakeholder engagement consultants CPR Group to implement a stakeholder engagement program in addition to the prescribed requirements for public notification under the *Sustainable Planning Act 2009*. This was undertaken prior to the formal public notification period and recommendations were considered by the developer in finalising plans and technical reports for the application.

The proposal was the subject of public notification between 23 November 2015 and 16 December 2015, as per the requirements of the *Sustainable Planning Act 2009*, and thirty-nine (39) submissions of objection were received. From these submissions, thirty-eight (38) were properly made and one (1) was not properly made.

It was noted via a submission that one (1) of the public notification signs had fallen down during the public notification period due to weather conditions. The applicant advised that

they became aware of the matter on Friday 11 December 2015, and Real Property Signs re-erected the sign on the afternoon of Saturday 12 December 2015. As the applicant allowed eighteen (18) business days for the public notification period, it is considered that the requirements of section 297 (1) of the *Sustainable Planning Act 2009* were still met and the period occurred for a total of seventeen (17) business days.

The following is a summary of the submissions lodged, with Council officer comments:

Issue	Officer Comment
More public notification required and public notification not being undertaken correctly.	<p>As detailed above, the applicant has satisfied all public notification requirements in accordance with section 297 of the <i>Sustainable Planning Act 2009</i>, which includes:</p> <ul style="list-style-type: none"> • Publishing a notice at least once in a newspaper circulating generally in the locality of the land. The applicant placed a compliance notice in The Rockhampton Morning Bulletin Newspaper on 20 November 2015. • Placing a notice on the land in the way prescribed under a regulation. The applicant placed multiple notices on the land from 21 November 2015 until 17 December 2015. • Giving a notice to the owners of all land adjoining the land. The applicant notified all adjoining land owners as required. <p>Further, the applicant also undertook an additional stakeholder engagement process.</p>
Traffic count did not include boat ramp users in holiday period	<p>Noted. The traffic counts were made on between 26 August 2015 and 02 September 2015 and there were no public holidays or school holidays during those periods.</p> <p>It is not considered this traffic demographic is significant and regardless suitable conditions have been included in the recommendation requiring design and construction of the haul route.</p>
Vacant lots on Etna Creek Road that will increase traffic movements over time.	<p>Noted, however traffic growth resulting from population growth is considered throughout the above Council assessment. Furthermore, suitable roadworks conditions have been included in condition 4.0 of the recommendation.</p>
Variation in amount of material being transported in and out from the quarry	<p>Noted. The development is required to be undertaken in accordance with Council's conditions and the Environmental Authority. In particular the Environmental Authority has assessed the environmental impacts of the ultimate extraction based on the resources areas and the thresholds for the ERAs and the development has been supported and</p>

Issue	Officer Comment
	conditioned accordingly. Further Council has included road works conditions in condition 4.0 of the recommendation for the maximum extraction rate for the development.
Royalties	Council will not receive royalties.
Rural zoning of the land (development is not in local community's reasonable expectation).	<p>Under the zoning, an Extractive industry can be supported, subject to justification against the Desired Environmental Outcomes, Rural Zone Code and the Special Management Areas Code within the <i>Livingstone Shire Planning Scheme 2005</i>.</p> <p>The subject report addresses how the proposed development demonstrates compliance with the relevant criteria and can be supported subject to reasonable and relevant conditions.</p>
<p>Sand quarry oversupply (sixteen (16) quarries servicing the area).</p> <p>Other sand quarries are struggling with business.</p>	As part of Council's assessment, it was not identified that a needs analysis was not required. The proposal can demonstrate compliance with the various requirements of the <i>Livingstone Shire Planning Scheme 2005</i> , as detailed within the subject report.
<p>Endangered white throated snapping turtle is endangered species that nests along the Fitzroy River. This has not been addressed within the application</p>	<p>The subject site has confirmed occurrence of the vulnerable <i>Rheodytes leukops</i> (Fitzroy River Turtle) and the critically endangered <i>Elseya albagula</i> (White-Throated Snapping Turtle).</p> <p>The applicant has lodged a referral to the Federal Department of Environment in accordance with the <i>Environment Protection and Biodiversity Conversation Act 1999</i>, which is independent to this application process. Such matters of national significance are not dealt with specifically in the local government assessment under the <i>Sustainable Planning Act 2009</i>. However, it is noted that throughout the subject report, Council has undertaken a detailed assessment of environmental impacts given the proximity to the waterway and wetland areas.</p>
<p>Concerns pertaining to Etna Creek Road:</p> <ul style="list-style-type: none"> • Safety (for cyclists (children and recreational), users of the school bus, concerns pertaining to the proposed truck and dog movements – for all users of the road) • Current condition of the road (road width, non-sealed section, wheel rutting, black soil) • Additional traffic due to the development 	Condition 4.0 in the recommendation imposes a condition for the design and construction of the haul route to the relevant standard. The standard will be sufficient to allow for safe vehicle movements including the school bus. Council is aware that the whole lengths of Etna Creek Road consist of various widths and standards, as discussed in detail earlier in the report.

Issue	Officer Comment
<ul style="list-style-type: none"> • Flooding of the road (general flooding at 14 Mile Creek and Etna Creek crossing, flooding causes more pot holes) • School bus route (safety measures) 	
Discrepancies within the Road Impact assessment	<p>Council is aware of discrepancies stated in the Road Impact Report submitted by the applicant and notes that Council officers are not entirely relying on the Road Impact Assessment Report in the assessment.</p> <p>Other material such as independent advice from consultants engaged by Council and further updated reports from the applicant have been used as part of the assessment.</p>
<p>Intersection at the Bruce Highway:</p> <ul style="list-style-type: none"> • Semi blind corner at Rockhampton Correctional Centre • Recently upgraded • Stop sign (not enough acceleration time) 	<p>This issue is existing relative to the proposed development and should be raised with the Department of Transport and Main Roads as the road controlling authority over the Bruce Highway. The department has assessed the development and has provided conditions but does not require an upgrade to the intersection.</p>
Monitoring loads (weighbridge) and how will amount of product leaving per day be measured.	<p>Both Council's conditions as recommended below, and the Environmental Authority issued by the Department of Environment and Heritage Protection, require the operator to keep a detailed record of extraction operations, including the quantity of sand and gravel transported from the subject site.</p>
Dust, noise and air pollution concerns	<p>The submitted Environmental Management Plan which will be conditioned as part of an approval, specifically details how these concerns will be mitigated such as 'dampening down cleared areas, extraction working areas, haul roads, stockpiles and the like'.</p> <p>Furthermore, it will be conditioned that development occur in accordance with the <i>Environmental Protection Act 1994</i>.</p>
Loss of amenity	<p>As detailed within the subject report, the application has been accompanied by an Ecological Assessment, Environmental Assessment Report and Management Report that are considered to address any on and offsite impacts of the proposed development on the natural environment and the adjacent properties.</p> <p>It is considered there are adequate separation distances between the proposed extraction area and adjoining residential development, in excess of one (1) kilometre.</p> <p>In order to reduce impacts on the haulage</p>

Issue	Officer Comment
	route (Etna Creek Road), suitable roadworks conditions have been included in condition 4.0 of the recommendation.
Limited use for a number of years (use is unable to be regulated).	Any development approval will include reasonable and relevant conditions, which ensures development occurs in the appropriate manner.

SUMMARY OF ASSESSMENT

Etna Creek Road, at the current time, is satisfactory for current users of the road, however the current road cannot withstand the development traffic.

The proposed extractive industry conflicts with Desired Environmental Outcome (i), (j) and (k), is not a preferred use in the rural zone and conflicts with overall outcome (1)(b)(v), specific outcome O2 dot point 3 and specific outcome O5 and specific outcome O11 of the rural zone code.

The proposed extractive industry could not be considered a consistent use without the haul route road works condition 4.0 in the recommendation. Without the road works being designed and constructed to the minimum formation and width and to a standard (including geometric, structural and drainage aspects) that is suitable for the traffic generated by the development operating at the maximum extraction rate, the development would be refused as without the condition the conflict would be significant and serious.

By imposing condition 4.0 Council is mitigating the developments conflict such that it could be approved.

Pursuant to Section 326(1)(b) of the *Sustainable Planning Act 2009*, the assessment manager's decision may conflict with the Planning Scheme if there are sufficient grounds to justify the decision despite the conflict. The grounds applicable in this circumstance are:

- (a) The approval includes conditions that require Etna Creek Road, as the haulage route for the development, to be designed and constructed to a standard satisfactory to accommodate the traffic generated by the development, and without those conditions, the application would be refused.
- (b) The development will not hinder other current agricultural pursuits on site, and will not irreversibly affect the agricultural nature of the land for future agricultural pursuits.
- (c) The approval includes conditions imposed by Council and a State Department to reduce the potential for the use to have significant adverse impacts on the surrounding community in terms of traffic, noise and dust.
- (d) The development, provided that there is compliance with the conditions as imposed, will not conflict with:
 - the *Livingstone Shire Planning Scheme 2005*; or
 - relevant aspects of the applicable State Planning Policies.

Having regard to all of the above, it is recommended Council, from a land use perspective, consider the proposed development favourably as, pursuant to Section 326(1)(b) of *Sustainable Planning Act 2009*, there are considered to be sufficient grounds to justify a decision that favours the development proposed herein pursuant to conditions provided in recommendation D.

RELEVANT PERIOD

The applicant requested Council consider stating a relevant period of more than the four (4) years as provided for in section 341 (1)(a) of the *Sustainable Planning Act 2009* to allow for the necessary further applications to be prepared, made, assessed and decided and for the relevant works to be undertaken prior to the commencement of use. Section

341 (1)(a) of the *Sustainable Planning Act 2009* provides an opportunity for Council to state a relevant period (currency period) different to the standard four (4) year period. This is supported and a recommendation is included for resolution on the matter.

PREVIOUS DECISIONS

It is noted that Council has previously approved development applications for a Material Change of Use for an Extractive industry both within proximity to the site and elsewhere in the region.

Each decision is made on its merits at the time and with the best planning information available. There are instances above whereby there were sufficient grounds to support the proposals, subject to reasonable and relevant conditions

BUDGET IMPLICATIONS

Management of this application and assessment has been undertaken within existing operational budget allocations.

LEGISLATIVE CONTEXT

The application has been assessed pursuant to the *Sustainable Planning Act 2009* and all subordinate legislation and policies.

LEGAL IMPLICATIONS

A decision by Council contrary to the approval sought by the applicant may be appealed to the Planning and Environment Court. The legal implications of deciding this development application unfavourably is the risk of appeal from the developer and/or a submitter. These potential legal implications also bring unknown budget implications

STAFFING IMPLICATIONS

There are no significant staffing impacts relevant to a decision on the application however significant officer resources have been committed to the assessment since 2015 focusing primarily on traffic and road matters

RISK ASSESSMENT

The risks associated with this assessment have been appropriately addressed in the body of this report. Specifically, the risk of appeal to any decision made by Council and any financial/budget implications such action may have. It should be noted that these risks are difficult to quantify at the assessment stage.

CORPORATE/OPERATIONAL PLAN

Corporate Plan Strategy GO4: Provide transparent and accountable decision making reflecting positive leadership to the community.

LOCAL GOVERNMENT PRINCIPLES

The local government principles are –

- (a) Transparent and effective processes, and decision-making in the public interest; and
- (b) Sustainable development and management of assets and infrastructure, and delivery of effective services; and
- (c) Democratic representation, social inclusion and meaningful community engagement; and
- (d) Good governance of, and by, local government; and
- (e) Ethical and legal behaviour of councillors and local government employees.

CONCLUSION

The proposed extractive industry conflicts with Desired Environmental Outcome (i), (j) and (k), is not a preferred use in the rural zone and conflicts with overall outcome (1)(b)(v),

specific outcome O2 dot point 3 and specific outcome O5 and specific outcome O11 of the rural zone code.

The development is able to occur, subject to conditions, in terms of on-site operations in a manner that reduces the potential for the use to have impacts of noise, dust and environmental and visually amenity.

The proposed extractive industry could not be considered a consistent use in the rural zone without the haul route road works condition 4.0 in the recommendation. Without the road works being designed and constructed to the minimum formation and width and to a standard (including geometric, structural and drainage aspects) that is suitable for the traffic generated by the development operating at the maximum extraction rate, the development would be refused as without the condition the conflict would be significant and serious. By imposing condition 4.0 Council is mitigating the developments conflict such that it could be approved.

Having regard to all of the above, it is recommended Council, from a land use perspective, consider the proposed development favourably as, pursuant to Section 326(1)(b) of *Sustainable Planning Act 2009*, there are considered to be sufficient grounds to justify a decision that favours the development proposed herein pursuant to conditions provided in recommendation D.

**12.13 - DECISION ASSESSMENT FOR A
DEVELOPMENT PERMIT FOR MAKING
A MATERIAL CHANGE OF USE OF
PREMISES FOR AN EXTRACTIVE
INDUSTRY FOR SAND AND GRAVEL
AND ASSOCIATED ACTIVITIES AND
MAKING A MATERIAL CHANGE OF
USE OF PREMISES FOR
CONCURRENCE ENVIRONMENTALLY
RELEVANT ACTIVITY AT LOT 5, LOT 6,
LOT 8, AND LOT 10 MELDRUM ROAD
AND 887 ETNA CREEK ROAD, ETNA
CREEK**

Locality Plan

Meeting Date: 17 July 2018

Attachment No: 1



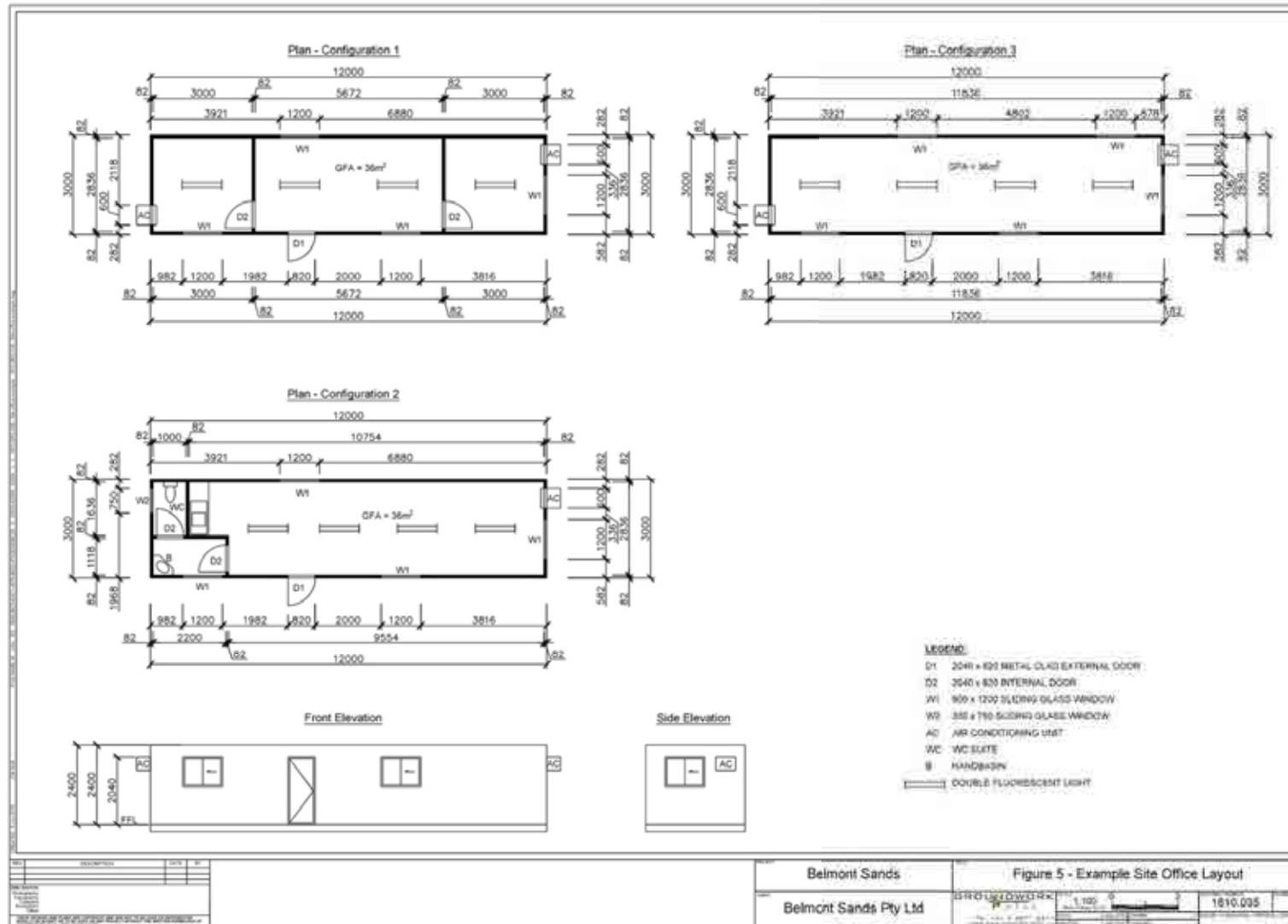
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DEVELOPMENT PERMIT FOR MAKING
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PREMISES FOR AN EXTRACTIVE
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CONCURRENCE ENVIRONMENTALLY
RELEVANT ACTIVITY AT LOT 5, LOT 6,
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AND 887 ETNA CREEK ROAD, ETNA
CREEK**

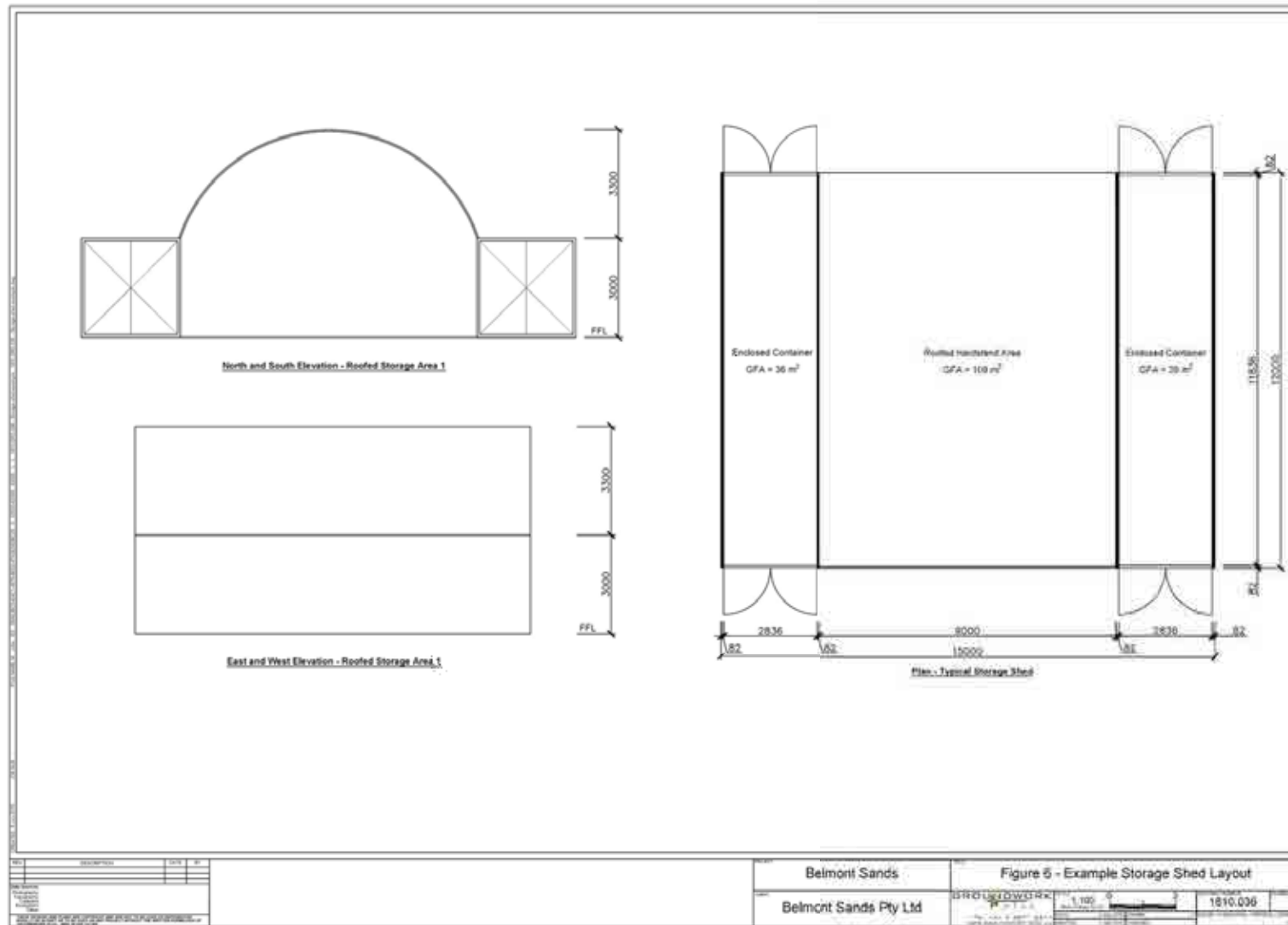
Proposal Plans

Meeting Date: 17 July 2018

Attachment No: 2







**12.13 - DECISION ASSESSMENT FOR A
DEVELOPMENT PERMIT FOR MAKING
A MATERIAL CHANGE OF USE OF
PREMISES FOR AN EXTRACTIVE
INDUSTRY FOR SAND AND GRAVEL
AND ASSOCIATED ACTIVITIES AND
MAKING A MATERIAL CHANGE OF
USE OF PREMISES FOR
CONCURRENCE ENVIRONMENTALLY
RELEVANT ACTIVITY AT LOT 5, LOT 6,
LOT 8, AND LOT 10 MELDRUM ROAD
AND 887 ETNA CREEK ROAD, ETNA
CREEK**

Environmental Management Plan

Meeting Date: 17 July 2018

Attachment No: 3



BELMONT SANDS ENVIRONMENTAL MANAGEMENT PLAN

Prepared for:
Belmont Sands Pty Ltd

Date:
12 November 2015

Reference:
1810.610.001r1

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1. Introduction

1.1 Project Overview

Belmont Sands Pty Ltd propose to develop an extractive resource ('Belmont Sands') in the Livingstone Shire Council (Council) area for the supply of sand and gravel to the building and construction industry (extractive industry). The site accessed by Etna Creek Road, Etna Creek QLD 4702 refer **Figure 1 – Site Location Plan** ('site'). The site comprises of the following lots:

- Lot 8 on RP601603
- Lot 5 on RP601603
- Lot 10 on SP142291
- Lot 6 on RP601603 (for road/access purposes only)
- Lot 3 on RP601603 (for road/access purposes only).

Groundwork Plus has been commissioned by Belmont Sands to prepare an Environmental Management Plan (EMP) to accompany a development application to the Livingstone Shire Council (Council) for *extractive industry*.

The development application will comprise the following components:

- Material Change of Use – Development Permit for *extractive industry* and associated activities
- Material Change of Use – Concurrence Environmentally Relevant Activities (ERAs)
- Environmental Authority for Environmentally Relevant Activities (ERAs):
 - ERA 16(2)(b) Extracting, other than by dredging, in a year, the following quantity of material – more than 100,000 tonnes but not more than 1,000,000 tonnes.
 - ERA 16(3)(b) Screening, in a year, the following quantity of material – more than 100,000 tonnes but not more than 1,000,000 tonnes.

Prior to commencement of extraction, access and haul roads will be developed to facilitate the movement of personnel, plant and equipment, and light vehicles around the site. Construction of site infrastructure including the stockpile/processing plant area, office/amenities (if required), weighbridge (if required), storage shed and processing plant will also occur at this juncture. Once the infrastructure is established, topsoil stripping and stockpiling will be completed in a logical sequence, to enable extraction to commence.

Sand will be extracted by excavator and transported to the processing plant by truck refer to **Diagram 1 – Sand Extraction Process**.

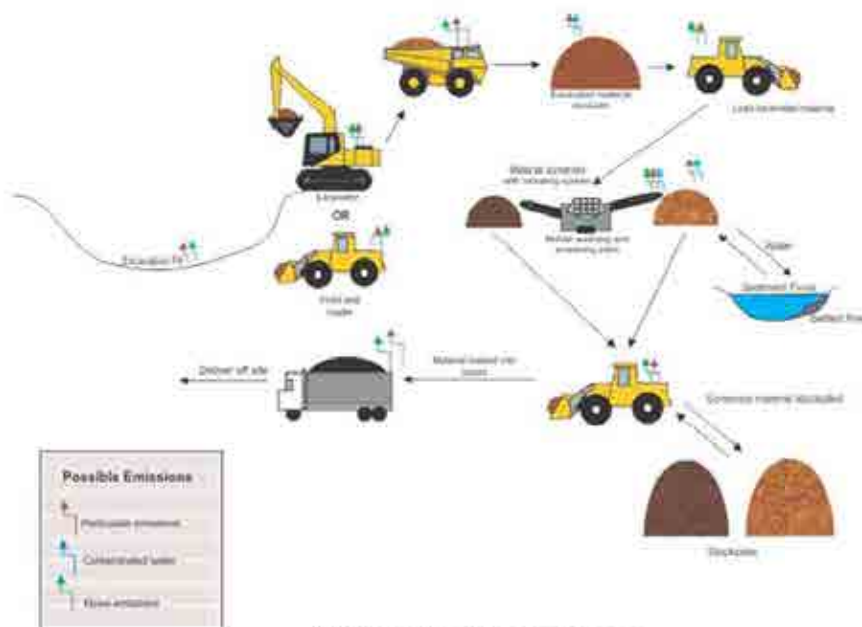


Diagram 1 – Sand Extraction Process

Processing will involve screening and washing to remove fine silt and clay particles and dewatering of the final product prior to stockpiling. No blasting or crushing is to occur as part of the process.

An existing groundwater bore on the site will be utilised by the proposed operation when needed. It is anticipated that longer-term, water for the washing of material (if required) will be sourced from a pond which will be formed within the extraction pit. Water will be returned to the pond, where suspended particles will settle through sedimentation, and the water reused. It is anticipated that the groundwater bore will be utilised primarily in the initial stages of extraction while the pond is still being formed and then on an as need basis.

Planning and design of the layout and sequence of the workings have considered deposit characteristics, overburden stripping ratios, initial development costs, processing and material transfer efficiencies, flooding, environmental values, surrounding land holders, visual amenity, early commencement of progressive rehabilitation, access, security and post extraction land use to ensure the layout and sequence of the development is optimum and effective to minimise land disturbances and other potential environmental impacts, maximise sand resource extraction.

Internal access roads will be necessary to facilitate the movement of personnel, plant and equipment, and light vehicles around the site. The location of these roads may change from time to time depending on the stage of development and access requirements.

Stockpiling of products will be necessary to meet customer requirements, schedules and for quality control testing. Stockpiling on site will be restricted to the minimum necessary by matching production to market requirements to the extent possible. Stockpiling will be arranged to provide ready access to different products.

Rehabilitation works will be undertaken progressively and in tandem with the extraction program. Profiling of the final landform shall be carried out to facilitate drainage.

Major plant and equipment to be used as part of the proposed development will include (but is not limited to):

- Excavator
- Haul truck
- Processing plant
 - Hopper and feeding conveyor
 - Static screen
 - Density tank
 - Sand pump
 - Tower
 - Hydrocyclone
- Spray bar
- Wash down pad
- Weighbridge (if required).

Ancillary facilities include (but are not limited to):

- Office/amenities
- Storage shed.

The general layout of the processing plant, stockpiles, ancillary facilities and proposed extent of extraction is shown on **Figure 2 – Conceptual Site Layout Plan**.

The principle objective of rehabilitation is to return the land to a stable, non-polluting and self-sustaining state capable of supporting grazing as a post extraction land use.

2. Site Details

Location:	The site is accessed via the Etna Creek Road, Etna Creek QLD 4702, approximately 20 kilometres north-west of Rockhampton (refer Figure 1 – Site Location Plan).								
Real Property Description:	<p>The site consists of the following lots:</p> <ul style="list-style-type: none"> • Lot 8 on RP601603 • Lot 5 on RP601603 • Lot 10 on SP142291 • Lot 6 on RP601603 (for road/access purposes only) • Lot 3 on RP601603 (for road/access purposes only). 								
Access:	The site will be accessed via a current access point from Etna Creek Road, which connects to the Bruce Highway.								
Site Area:	1,524 hectares.								
Tenure:	Freehold.								
Registered Proprietors:	<table border="1"> <thead> <tr> <th>Lot</th><th>Registered Proprietor</th></tr> </thead> <tbody> <tr> <td>Lot 8 on RP601603</td><td rowspan="5">AgForce Queensland Industrial Union of Employers</td></tr> <tr> <td>Lot 5 on RP601603</td></tr> <tr> <td>Lot 10 on SP142291</td></tr> <tr> <td>Lot 6 on RP601603</td></tr> <tr> <td>Lot 3 on RP601603</td></tr> </tbody> </table>	Lot	Registered Proprietor	Lot 8 on RP601603	AgForce Queensland Industrial Union of Employers	Lot 5 on RP601603	Lot 10 on SP142291	Lot 6 on RP601603	Lot 3 on RP601603
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Lot 8 on RP601603	AgForce Queensland Industrial Union of Employers								
Lot 5 on RP601603									
Lot 10 on SP142291									
Lot 6 on RP601603									
Lot 3 on RP601603									
Local Authority:	Livingstone Shire Council.								
Assessment Manager:	Livingstone Shire Council.								
Planning Scheme:	<i>Livingstone Shire Planning Scheme 2005.</i>								
Zoning:	Rural Zone.								
Existing Use:	Rural pursuits. Cattle grazing. Research.								

2.1 Potential Environmental Impacts

The identification of activities and impacts is fundamental to designing and implementing procedures and measures proposed in the EMP. Activities associated with carrying out extractive industry have been tabulated against potential environmental impacts to provide a focus for preparing the EMP, refer to **Table 1 – Identification of Potential Environmental Impacts**.

Table 1 – Identification of Environmental Impacts

ACTIVITY	POTENTIAL IMPACTS										
	Noise	Air Quality	Water Quality	Traffic	Visual Amenity	Social and Economic Factors	Land Contamination	Soils	Groundwater	Stormwater and soil erosion	Fauna and Flora
Vegetation Clearing	•	•	•			•		•		•	
Topsoil Stripping & Stockpiling	•	•	•					•		•	
Raw Material Extraction	•		•			•					
Raw Material Stockpiling and Loading	•		•		•					•	
Raw Material Hauling	•			•						•	
Raw Material Unloading	•		•							•	
Washing and Screening	•		•							•	•
Product Stockpiling	•	•	•							•	
Product Handling	•	•	•							•	
Maintenance Activities	•		•				•			•	•
Handling and storage of oils, greases, fuels and chemicals			•				•	•		•	•
Rehabilitation Activities	•	•	•		•	•		•		•	•
Stormwater Management			•							•	
Waste Management			•				•		•		
Equipment											
Front End Loader	•	•	•					•		•	
Screening Plant	•	•									
Excavator	•	•	•					•		•	
Haul Truck	•	•	•							•	
Product Delivery Trucks	•	•	•	•						•	
Light Vehicles	•	•	•	•						•	

• Potential Risk if inappropriately managed

A risk assessment of the potential environmental impacts for on-site activities has been provided in the Environmental Assessment report (Groundwork Plus 2015) submitted as part of the supporting documentation to the Development Application.

2.2 Relevant Legislation

In Queensland, the *Environmental Protection Act 1994* (EP Act) is the principal legislation for protecting the environment. The EP Act was assented on 1 December 1994 and was proclaimed on 1 March 1995. The object of the EP Act is to

"protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development)".

The EP Act imposes a General Environmental Duty on corporations, government departments and individuals, in order to meet the primary objective (s319 of the EP Act). The duty relates to the notion that everyone must take all reasonable and practicable measures to prevent or minimise environmental harm.

In addition, the EP Act states that it is an offence to cause environmental nuisance (s440 of EP Act), material environmental harm (s438 of EP Act), serious environmental harm (s437 of EP Act), and it is an offence to contravene a condition of an Environmental Authority (s430 of EP Act).

Schedule 2 of the *Environmental Protection Regulation 2008* (EP Reg) lists prescribed Environmentally Relevant Activities (ERAs). The proposed development is considered to comprise of the following ERA's:

- ERA 16(2)(b) Extracting, other than by dredging, in a year, the following quantity of material – more than 100,000 tonnes but not more than 1,000,000 tonnes.
- ERA 16(3)(b) Screening, in a year, the following quantity of material – more than 100,000 tonnes but not more than 1,000,000 tonnes.

2.3 Purpose of Environmental Management Plan

This EMP is a management document which links the potential environmental impacts with commitments and measures to safeguard the surrounding environment. It is the principal management tool for guiding environmental management at the site by providing the framework for environmental management at the operational level to prevent or minimise environmental impacts.

The structure of the EMP comprises a series of procedures for ease of implementation. The elements of the EMP are based on a standard format (that may be adapted for a particular issue or activity) as follows:

- purpose
- performance targets
- relevant conditions
- strategies/mitigation measures
- monitoring.

The objective of the EMP is to meet the requirements of the Development Approval issued by the Council and associated Environmental Authority (EA) issued by the Department of Environment and Heritage Protection (EHP).

3. Procedures and Policies

3.1 Environmental Policy

Site management is committed to being environmentally responsible, and to conducting activities in compliance with environmental legislation, and will strive to achieve leading practice environmental management. In the process of implementing this policy, management shall:

- implement work programs to protect the surrounding environment.
- meet the requirements of all laws, acts, regulations and standards relevant to its operations and activities.
- make the most efficient use of natural resources taking due regard of environmental issues and ensuring land maintains long term productivity.
- implement a program to train all Employees in general environmental issues and individual workplace environmental responsibilities.
- continually improve environmental practices to reflect changing legislation, new technology and scientific advances, lessons learned from environmental incidents and increasing knowledge and experience of site specific issues.
- allocate necessary resources to ensure the implementation of the environmental policy.

3.2 Implementation and Training

Implementation of the EMP will require:

- commitment by the Owners, Managers and Employees of the site.
- access to technical expertise for tasks such as environmental monitoring, modelling or assessment, as needed.

Management shall ensure that sufficient funding is provided to implement the EMP. All Employees and sub-contractors will be inducted on the environmental management procedures and practices to be carried out at the quarry and informed of the environmental management objectives and the specifics of the EMP including protection of buffer areas, impact minimisation measures, operational practices, maintenance measures, reporting measures, and individual responsibilities. They shall also be made aware of penalties if development conditions are breached and reporting requirements for incidents involving environmental harm and safety in accordance with the relevant environmental legislation.

A record of all Employee training/inductions will be maintained on-site. Each Employee shall be responsible for implementing environmental policies within the scope of their duty statement or job description.

The EMP should be checked regularly (at least every three years) or as a result of significant change(s) to operations to ensure up-to-date versions are available and ensuring accuracy of the information.

3.3 Incidents and Complaints Procedure

The objective of the Incident and Complaint Procedure is to ensure that incidents and complaints are reported, investigated and appropriate action is taken. A summary of the Incident and Complaint Procedure is provided below in **Diagram 2 – Incidents and Complaints Procedure Summary**. For further details regarding each element of the procedure refer to **Attachment 1 – Incident and Complaint Procedure**.



Diagram 2 – Incidents and Complaints Procedure Summary

3.4 Monitoring Requirements

The controls nominated in this EMP will require regular surveillance and review to ensure that performance aligns with design criteria and also reflects the dynamic nature and changing needs of the operation. The monitoring requirements are outlined in each management plan, refer to **Section 4. – Management Plans**.

All instruments used to measure or monitor parameters required under the relevant conditions of approval are to be calibrated, maintained and operated appropriately. All monitoring is to be undertaken by a person or body possessing appropriate experience and qualifications to perform the required measurements.

3.5 Records and Reporting

All environmentally relevant documentation, including policies, procedures, forms, records, and reports required to be kept as per this EMP shall be available at the approved/licensed premises for a period of at least five years and be available for inspection by an authorised person.

If monitoring is required following a complaint or incident, the report shall:

- record the date and time of sampling.
- be endorsed by a person or body possessing appropriate experience and qualifications to perform the required measurements on all records of analysis results.
- record the results of all analyses, measurements and observations and interpretations (if appropriate).
- be made available on request to any authorised person.

4. Management Plans

4.1 Water Quality Management Plan

Purpose	<p>This Water Quality Management Plan has been prepared to control potential environmental impacts occurring as a result of land disturbance necessary for the extractive industry operation.</p> <p>Sand extraction activities have the potential to impact on surface runoff water and groundwater quality if not managed appropriately. These activities include:</p> <ul style="list-style-type: none"> • vegetation clearing (principally grass) • topsoil stripping • overburden removals • excavation pit development • construction and maintenance of internal roads and hardstands • stockpiling of topsoil, raw feed and product • spillage during handling of materials • use and storage of oils, greases, fuels and other chemicals • exposing potential acid forming materials. <p>Under normal conditions discharge isn't envisioned as the water retained within the extraction pit will be reused for operational purposes including washing the sand and dust suppression. Refer to Section 4.8 Pre and Post Flood Management Plan for proposed water management after flood events.</p>
Performance Targets	<ul style="list-style-type: none"> • To ensure contaminants are not directly, or indirectly, released from the site to any waters, or the bed and banks of any waters. • To ensure no environmental nuisance complaints are received. • To ensure the quality of surface water discharged from the site meets the release and discharge limits outlined in the EA.
Relevant Conditions	<p>Refer to EA once issued.</p> <p>Proposed water quality limits:</p> <ul style="list-style-type: none"> • DO - 85 to 110% saturation, • Turbidity - maximum 50NTU, • Total Suspended Solids - maximum 85mg/L, • pH - between 6.5 to 8.5.
Strategies/mitigation measures	<p>Strategies and mitigation measures for the management of surface runoff, surface water and erosion and sediment transport from the site will be implemented in accordance the relevant conditions of approval and may include the following measures:</p> <p><u>Stormwater Management and Erosion and Sediment Control</u></p> <ul style="list-style-type: none"> • Divert clean catchment run off using a series of suitable banks and/or diversion drains in accordance with the Erosion and Sediment Control Plan (refer Figure 3 – Conceptual Erosion and Sediment Control Plan). • Stabilise permanent bunds with appropriate native grass species. • Minimise land disturbance to the maximum practicable extent. • Limit exposure time of unprotected batters and slopes.

4.1 Water Quality Management Plan

- Install stormwater bunding as soon as practical and in a logical progression.
- Rip rapped diversion or catch drain outlets will be installed.
- Construct stockpile areas with a cross fall of approximately 1 in 30 to direct runoff from the stockpiles to the extraction pit.
- Should water occur within the extraction pits following large storm events or flooding events, water quality will be monitored, treated if required then released using a pump at the locations shown in the Erosion and Sediment Control Plan (refer **Figure 3 – Erosion and Sediment Control Plan**). Alternatively, water may be irrigated to pasture where feasible.
- Design, construct and maintain bunded areas and roofed storage with holding capacities to conform to the appropriate regulatory requirement or the provisions of AS1940-2004 - *The Storage and Handling of Flammable and Combustible Liquids*.
- Induct and train staff on the prevention and control of erosion.
- Implement an action plan for the surveillance and maintenance of stormwater control devices to assess the effectiveness (refer **Table 2 – Action Plan for the Surveillance and Maintenance of Stormwater Control Devices**).

A summary schedule of the various inspections, performance criteria and responses that shall be performed on site is shown in **Table 2 – Action Plan for the Surveillance and Maintenance of Stormwater Control Devices**.

Monitoring

- Prior to any water release from the extraction pits, the quality of extraction pond water will be tested for turbidity, total suspended solids, pH, dissolved oxygen and visual oil & grease to ensure compliance with state regional Water Quality Objectivities (WQO) Criteria (*Queensland Water Quality Guidelines*, 2009).
- The Site Manager may engage the services of a suitably qualified and experienced person to conduct water quality sampling if required and review monitoring results to provide advice in relation to the water quality management.
- All surface water sampling will be undertaken in accordance with EHP's *Monitoring and Sampling Manual*, September 2009.
- Water pH, turbidity and dissolved oxygen levels will be measured in the field in-situ, whilst all laboratory analysis will be undertaken by a NATA certified laboratory.
- The Site Manager or delegate will undertake monthly inspections and as required after rainfall events of the extraction pits and the settling pond in the northern stockpile area and conduct any necessary maintenance.

Table 2 – Action Plan for the Surveillance and Maintenance of Stormwater Control Devices

Inspection	Minimum Frequency	Performance Criteria	Response
Inspect drainage lines including catch drains, contour drains and diversions	Quarterly	<ul style="list-style-type: none"> erosion in areas adjacent to water conveyancing structures overtopping of water conveyancing structures (identified by the scouring of the drain batters perpendicular to the direction of flow) 	<ul style="list-style-type: none"> eroded areas shall be treated appropriately (e.g. rock lined) as soon as practicable drains to be cleaned of sediments and retreated as necessary to original design specifications revegetation with grasses in the catchment of the drain may be required to reduce sediment loadings of runoff
Inspect potential sediment storage capacity of grit traps, sediment traps and excavation pit	Quarterly or following major rainfall events	<ul style="list-style-type: none"> storage capacity maintained 	<ul style="list-style-type: none"> sediment to be removed from the structure and reused on-site where possible recycle sediment basin waters to ensure adequate free storage is maintained for the collection and holding of runoff
Waste containers	Quarterly	<ul style="list-style-type: none"> waste to be stored in appropriate containers 	<ul style="list-style-type: none"> Ensure waste materials are stored and disposed of properly
Spill response stations	Quarterly and following use	<ul style="list-style-type: none"> equipment to be properly maintained and stocked 	<ul style="list-style-type: none"> maintain equipment replace / restock equipment as necessary
Maintenance / refuelling area	Quarterly	<ul style="list-style-type: none"> fuel, oil spills contractor maintenance fuel storage integrity maintained 	<ul style="list-style-type: none"> clean up spills and the investigate spill source maintain contractor maintenance records investigate and repair potential leaks

4.2 Air Quality (Dust) Management Plan

Purpose

This Air Quality (Dust) Management Plan has been prepared to control potential air quality impacts occurring as a result of land disturbance necessary for the extractive industry operation.

The *Environmental Protection Act 1994* and the associated *Environmental Protection (Air) Policy 2008* provide the legislation and regulatory controls for management of emissions to the atmosphere.

The potential for dust emissions from the proposed sand extraction is limited as no crushing will be conducted on the site and buffer areas will be maintained between the site and potential sensitive receptors (refer **Figure 4 – Location of Sensitive Receptors**) that include residents along Etna Creek Road to the north and to the east. Therefore, there is minimal potential for the proposed operations to cause dust amenity impacts. Nevertheless a wide range of mitigation measures has been proposed as outlined below.

Activities on site that may generate fugitive emissions include:

- trucks transporting raw material to the plant.
- exhaust emissions from motorised plant and equipment.
- wind action on conveyors, stockpiles and disturbed areas.
- topsoil/overburden stripping (earthmoving machinery ground interaction, materials digging, loading and dumping, haul truck tyre/unsealed road interaction, unsealed roads, material spillage from haul trucks).
- product stockpiling and dispatch (stockpiles and stockpile pads, product loading, truck tyre/road interaction, material spillage from trucks).
- rehabilitation works.

Performance Targets

- Dust and particulate matter not exceeding the following levels when measured at any sensitive receptor:
 - dust deposition of 120 mg/m²/day, when monitored in accordance with Australian Standard AS 3580.10.1 *Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter – Gravimetric method*; and
 - an aerodynamic diameter of less than 10 µm (PM10) suspended in the atmosphere of 50 µg/m³ over a 24 hour averaging time when monitored in accordance with Australian Standard AS 3580.9.6 *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 high volume sampler with size-selective inlet – Gravimetric method*.

Relevant Conditions

Refer to EA once issued.

Strategies/mitigation measures

Strategies/mitigation measures for the management of dust emissions from the site will be implemented in accordance with the relevant conditions of approval and may include the following:

4.2 Air Quality (Dust) Management Plan

Disturbed areas

- Dampen down cleared areas, extraction working areas, haul roads, stockpiles and other hardstand areas by water spraying when visual surveillance indicates excessive dust generation and propagation from point or mobile sources.
- Limit clearing, topsoil and overburden removal at any one time to that necessary whilst providing for effective production of the resource.
- Monitor meteorological conditions to time particular activities with favourable weather conditions.
- Restrict vehicle and mobile machinery movements to designated routes and standing areas.
- Restrict vehicle movements to designated tracks and areas to the extent practicable.
- Maintain buffers between operational areas and the site boundaries where possible.
- Install water sprays or dry dust collection systems at all major dust sources.
- Engage a water truck/cart to dampen access roads.

Processing Plant

- Dampen down work areas.
- Dampen materials prior to transport.
- Use water sprays and/or dust collection systems at transfer points.
- Use shielding and/or windbreaks where possible.
- Maintain vehicles and equipment in accordance with the original equipment manufacturers' specifications.

Stockpiles

- Use water sprays as required during winds likely to generate dust releases.
- Stabilise and revegetate topsoil and overburden stockpiles where possible.
- Use dust suppressants and shielding where possible.
- Limit the height and slope of stockpiles.

Trafficable Areas

- Enforce a maximum speed of 40 km/hr on unsealed haul and internal roads.
- Keep trafficable areas as clean as possible.
- Dampen down access roads.
- Maintain road surfaces in good condition.
- Implement a shaker access grid and wheel wash at the site exit (if required).
- Undertake a regular road inspection by the operator for deposited sediment from the Site.

Material Transport and Transport Vehicles

- Ensure signage is installed to advise drivers to contain and cover all loads of material prior to leaving the site.
- Ensure loads are appropriately contained and covered prior to leaving the site.
- Dampen down the load prior to transport where necessary and practicable.
- Clear spillages from side rails, tailgates and draw bars of trucks (following loading and tipping).
- Level loads prior to truck exit from the site where possible.
- Securely fix tailgates of all material transport vehicles prior to loading.

4.2 Air Quality (Dust) Management Plan

Screening Equipment

- Install windshields, enclosures and/or barriers where possible.
- Maintain material in moistened state.

Rehabilitation

- Progressively rehabilitate the site as areas become available.
- Minimise wind blown dust during any rehabilitation activities.
- Ensure vehicles use established roads and tracks where possible and limit access to any rehabilitated areas.

Other

- Employees and contractors are to be made aware of dust management practices.
- Ensure sufficient on-site water supply is available for dust suppression.
- Apply good housekeeping practices.

Monitoring

The controls nominated will require regular monitoring and review to ensure that performance accords with design criteria and also reflect the dynamic nature and changing needs of the operation. Daily visual surveillance will be undertaken by all employees to ensure dust generation on-site is controlled appropriately.

Dust and particulate monitoring will be undertaken as required in accordance with the relevant conditions of the EA. Monitoring will be carried out at a place relevant to the potentially affected, nuisance-sensitive place. Monitoring is to be undertaken by a suitably qualified person in accordance with Australian Standard AS3580.10.1 of 2003 – *Determination of particulate matter – Deposited mater – Gravimetric method* (or most recent edition).

When requested to undertake monitoring, monitoring results are to be provided to the administering authority following completion of the monitoring event. Monitoring shall be carried out at a place(s) relevant to the potentially affected dust sensitive place.

4.3 Noise Management Plan

Purpose

This Noise Management Plan has been prepared to control potential nuisance impacts occurring as a result of noise associated with the extractive industry operations.

Uncontrolled or unmitigated site noise has the potential to be a nuisance at neighbouring residences. Site equipment or activities that have potential to generate significant noise have been identified and include:

- excavators (clearing vegetation, stripping topsoil, raw product handling, rehabilitation)
- screening plant (processing of raw materials)
- front end loaders (product haulage, loading, feeding screening plant)
- off highway haul trucks (haulage of raw material to the screening plant and water carting)
- face loaders (raw product handling)
- road trucks (product delivery)
- light vehicles (employee vehicles, maintenance vehicles, service vehicles)
- maintenance activities
- ancillary plant and equipment (e.g. pumps, welders).

Performance Targets

- Noise from the site must not cause an environmental nuisance at any nuisance sensitive place or commercial place.
- Site operations shall comply with the noise criteria specified in the EA, which states that the emission of noise from the activity must not result in levels greater than those specified.

Relevant Conditions

Refer to EA once issued.

Strategies/mitigation measures

Strategies/mitigation measures for the management of noise emissions from the site will be implemented in accordance with the relevant conditions of approval and may include the following:

General

- Ensure sufficient buffers are maintained to sensitive receptors by operating in accordance with **Figure 2 – Conceptual Site Layout** which locates the processing and stockpile area away from rural residential receptors to the north and east.
- The proposed sand extraction and processing facility will incorporate best available technology where required to mitigate potential noise amenity impacts. This will include the following:
 - Use of modern mobile plant (e.g. front-end loaders, excavators, off-road trucks) with effective exhaust silencers.
 - Use of broadband reversing alarms for mobile plant (e.g. front-end loaders, excavators, off-road trucks, excavators) to mitigate potential nuisance from tonal characteristic of traditional beeper alarms.
- Operate and maintain well-maintained equipment.
- Avoid unnecessary revving of engines.
- Shut down equipment when not in use.
- Ensure that equipment at the site is used for the intended purpose.
- Ensure that any extraneous noises are rectified.
- Maintain haul roads and hardstand surfaces in good condition (e.g. free of potholes, rills and product spillages) and with suitable grades.

4.3 Noise Management Plan

Monitoring

- Avoid the use of compression braking on product delivery trucks in residential areas.

The Site Manager will:

- Ensure regular surveillance of the site to qualitatively assess noise generation from plant and machinery.
- Ensure all site plant and machinery and vehicles are serviced in accordance with, or more frequently than, manufacturers' specifications.
- Initiate a noise survey following when requested by the administering authority, or as otherwise deemed necessary, to investigate a noise complaint.

Methods for measurements and reporting of noise monitoring must comply with the current edition of the administering authority's *Noise Measurement Manual*. The measurement and reporting of noise levels will be undertaken by a person or body possessing both the qualifications and the experience appropriate to perform the required measurements. Monitoring must include:

- $L_{Aeq, 20}$ T
- Background noise (Background) as $L_{A, 50, 20}$ T or $L_{Aeq, 1}$
- the level and frequency of occurrence of any impulsive or tonal noise effects due to extraneous factors such as traffic noise
- atmospheric conditions including wind speed and direction
- effects due to extraneous factors such as traffic noise
- location, date and time of recording.

4.4 Hydrocarbons and Chemical Management Plan

Purpose	<p>The Hydrocarbons and Chemicals Management Plan has been prepared to control the potential for spills or leaks from chemicals and hydrocarbons associated with the extraction activities.</p> <p>Site operations have the potential to contaminate land and water in and surrounding the site by the release of various chemicals used and/or stored on-site. These chemicals could include:</p> <ul style="list-style-type: none"> • distillate (e.g. fuel for stationary and mobile engines) • oils and greases (e.g. lubricants and hydraulic oils for stationary and mobile equipment) • miscellaneous chemicals (e.g. weedicide, paint, solvents).
Performance Targets	<p>The following performance targets are relevant:</p> <ul style="list-style-type: none"> • No land contamination that would require registration on the Environmental Management Register (EMR) or Contaminated Land Register (CLR). (NB. there are notifiable activity reporting thresholds that may trigger listing on the EMR without any land contamination occurring). • No serious spills of oils, greases, fuels or other hazardous chemicals (for this purpose, hydrocarbon spill incidents have been classified as follows: minor spill ≤5 L, major spill 5 L to 20 L, and serious spill ≤20 L). • No preventable release of hydrocarbons and chemicals to the environment.
Relevant Conditions	Refer to EA once issued.
Strategies/mitigation measures	<p>Strategies/mitigation measures for the management of hydrocarbons and chemicals at the site will be implemented in accordance with the relevant conditions of approval and may include the following:</p> <p>General</p> <ul style="list-style-type: none"> • Spills are to be cleaned up immediately. • Undertake refuelling and equipment maintenance within designated areas that are hard stand or paved where practicable. • Maintain all material safety data sheets and information relating to the storage, use and handling of chemicals at the site office. • Prepare a spill containment and clean-up protocol. • Ensure employees are familiar with proper fuelling and spill clean-up procedures. • Induct all new employees on the use of handling of chemicals used on-site. • Maintain the site in a neat and tidy condition. • Discourage "topping off" of fuel tanks. • Use drip pans during refuelling and equipment maintenance. • Material Safety Data Sheets (MSDS) of chemicals used on site shall be kept in a register at the site Office. <p>Spill Kits</p> <ul style="list-style-type: none"> • Maintain appropriate spill kits at locations known to all employees (e.g. refuelling locations, chemical storage facilities, mobile equipment). • Ensure employees are familiar with proper spill clean-up procedures.

4.4 Hydrocarbons and Chemical Management Plan

Bunding and Storage

- All chemical storage facilities on-site must meet specifications of Australian Standard AS 1940 - *The storage and handling of flammable and combustible liquids*, as a minimum.
- All chemical drum storages must be banded to ensure that the capacity of the band is at least 25% of the maximum design storage volume.
- Bunding will be constructed of material which is impervious to the material stored and transferred therein.
- Bunds will be kept in good condition (e.g. no cracks, gaps or leaks).
- Roofed storage facilities will be provided where practicable.
- Stormwater captured within bunding is to be removed as soon as practicable and disposed of as contaminated water. Prior to removal the water is to be free from contaminants.
- Empty hydrocarbon and chemical containers are to be stored with closures in place on a concrete hardstand or within a banded area.
- A collection sump must be provided in the floor of the bunding to facilitate the removal of liquids.
- All pipe work in the banded area must be directed over the bund wall and not through it.
- Where vehicle access to the banded area is required, access must be by way of a rollover bund.
- Records will be kept on existing inventory, storage location, personnel training and disposal of waste for all hazardous materials used on site.
- Bunds and/or drains are to be in place to exclude surface waters from washing/degreasing areas.

Disposal

- Hydrocarbon contaminated materials are to be appropriately disposed of at a licensed facility.
- If the material is Regulated Waste, it will be transported and disposed of by a licensed contractor.
- Oily waste materials, including liquid hydrocarbons, should be segregated from general wastes for disposal off-site by a licensed contractor.
- Records are to be kept on disposal of waste for all regulated waste materials.

Monitoring

Areas where handling of hydrocarbons and chemicals occur (e.g. refuelling or minor on-site servicing) shall be regularly inspected by the Site Manager. All employees will be responsible for the safe day-to-day handling, use and temporary storage of chemicals being used on-site.

4.5 Waste Management Plan

Purpose	<p>This Waste Management Plan has been prepared to ensure wastes produced on-site are appropriately managed. Unmanaged wastes can detract from the amenity of the site and locality and can increase operational costs.</p> <p>The principal wastes that may be generated from the site operations may include, but are not necessary limited to:</p> <ul style="list-style-type: none"> • regulated wastes (e.g. batteries, oil filters, waste oil/hydrocarbons and containers, oil/water emulsions and tyres) • metal and used or faulty parts and equipment • food scraps, packaging and consumables (e.g. paper, cardboard) • green waste. <p>The <i>Waste Reduction and Recycling Act 2011</i> (WRR Act) nominates a waste management hierarchy in a preferred order of adoption. The hierarchy is as follows:</p> <p>(a) <i>AVOID unnecessary resource consumption;</i> (b) <i>REDUCE waste generation and disposal;</i> (c) <i>RE-USE waste resources without further manufacturing;</i> (d) <i>RECYCLE waste resources to make the same or different products;</i> (e) <i>RECOVER waste resources, including the recovery of energy;</i> (f) <i>TREAT waste before disposal, including reducing the hazardous nature of waste; and</i> (g) <i>DISPOSE of waste only if there is no viable alternative.</i></p>
Performance Targets	<p>The following performance targets are relevant:</p> <ul style="list-style-type: none"> • Implement the WRR Act waste management hierarchy. • Maintain a record of any disposal of trackable wastes in accordance with the <i>Environmental Protection Regulation 2008</i>, • No unlawful disposal of wastes on or off-site.
Relevant Conditions	<p>Refer to EA once issued.</p>
Strategies/mitigation measures	<p>Strategies/mitigation measures for the management of waste materials at the site will be implemented in accordance with the relevant conditions of approval and may include the following:</p> <p><u>Waste Avoidance</u></p> <p>Waste avoidance relates to preventing the generation of waste or reducing the amount of waste generated. Reasonable and practicable measures for achieving waste avoidance may include, but are not necessarily limited to:</p> <ul style="list-style-type: none"> • Input substitution (using recyclable materials instead of disposable materials, for example using oil delivered in recyclable steel drums instead of non-recyclable plastic containers). • Increased efficiency in the use of raw materials, energy, water or land (purchasing consumables in bulk (large containers) rather than in small quantities). • Improved maintenance and operation of equipment (keep equipment in good working order to reduce wear and overhaul). • Undertaking an assessment of waste minimisation opportunities from time to time.

4.5 Waste Management Plan

Waste Re-use

Waste re-use refers to re-using waste, without first substantially changing its form. Reasonable and practicable measures for reusing waste may include, but are not necessarily limited to:

- Recovering and separating solvents, metals, oil, or components or contaminants and reusing separated solvents for degreasing plant and equipment.
- Applying waste processing fines to land in a way that gives agricultural and ecological benefits (using fine sediments in rehabilitation activities).
- Using overburden for constructing bunds and landforming.
- Reusing silt/sediment on-site to the maximum practicable extent.

Waste Recycling

Waste recycling refers to treating waste that is no longer useable in its present form and using it to produce new products. Reasonable and practicable measures may include, but are not necessarily limited to:

- Recovering oils, greases and lubricants for collection by a licensed oil recycling contractor, recovering, separating and recycling packaging (including paper, cardboard, steel and recyclable plastics).
- Recycling used plant and equipment to the maximum practicable extent.
- Finding alternatives to disposal of non-recyclable materials (using conveyor belts for noise attenuation, mudflaps, ute tray liners).
- Providing suitable receptacles and storage areas for collection of materials for recycling.

Energy Recovery from Waste

This refers to recovering and using energy generated from waste. Due to the scale of the operation, energy recovery is not considered viable.

Waste Disposal

This refers to disposing of waste which cannot otherwise be reused, recycled or used for energy recovery. Reasonable and practicable measures may include, but are not necessarily limited to:

- Regulated wastes must be transported and disposed of in accordance with the *Environmental Protection Regulation 2008*.
- Disposal to a licensed waste disposal facility (i.e. landfill or transfer station).

Waste Storage

Waste storage containers or areas to be provided and located at safe and convenient locations at the site. Each container will be identified with the type of wastes which may be disposed of in each container. Each container or area will be designed to prevent the escape of materials.

Regulated Waste and Trackable Waste

Regulated waste is commercial or industrial waste, whether or not it has been immobilised or treated and is of a type or contains a constituent of a type listed in Schedule 7 of the

4.5 Waste Management Plan

Environmental Protection Regulation 2008 and is attached (refer to **Attachment 2 – Schedule 7 of the *Environmental Protection Regulation 2008***).

Schedule 2E of the *Environmental Protection Regulation 2008* sets out substances which are trackable waste and is reproduced as **Attachment 3 – Schedule 2E of the *Environmental Protection Regulation 2008***.

All regulated wastes will be transported by a licensed commercial transporter.

Regulated waste transport is an ERA if the load is non-commercial and exceeds 250 kilograms, of any quantity if the load is commercial. If regulated waste transport occurs, it must be undertaken by a licensed commercial transporter.

Monitoring

The Site Manager will undertake a monthly visual inspection to ensure the waste management hierarchy is being effectively implemented.

All Employees and contractors shall be responsible for ensuring wastes are stored and removed from the site on a regular basis (e.g. daily or weekly).

The Site Manager shall ensure that waste treatment measures are implemented at the site.

The Site Manager shall ensure waste receptacles are provided and the waste type identified and that temporary waste storage areas are signed, recycling bins are emptied when full and materials which may cause land contamination are not disposed of on the site.

The Site Manager shall keep a record of regulated waste generated at the site, treatment and disposal methods, approved contractors for transporting and disposing of waste and the location of the facility for accepting the waste.

4.6 Weed Management Plan

Purpose

This Weed Management Plan has been developed to ensure adequate control measures are implemented to control the spread and infestations of weeds and declared plant species within the site.

A 'weed' is a plant which, because of its characteristics and location, may result in economic, ecological, physical or aesthetic problems. Weeds can alter ecosystem functionality, reduce primary productivity and profitability, and limit long term sustainability of natural and agricultural resources if not appropriately controlled.

Weed impacts that may occur due to the extractive industry operations include:

- areas of exposed earth available for weed colonisation including topsoil stockpiles.
- spread of existing weed infestations due to disturbance and vehicle traffic.
- unsuccessful or weed-infested revegetated areas.

The primary legislation governing the management of weeds in Queensland is the *Land Protection (Pest and Stock Route Management) Act 2002* (LP Act).

The LP Act declares plants considered to be serious or potentially serious and imposes a legal responsibility for control of these plants by all landowners or land under management. Three classes of declared plants exist and are targeted for control because they have, or could have serious economic, environmental or social impacts:

- **Class 1** has the potential to become a serious pest and is subject to eradication from the State.
- **Class 2** has already spread over Queensland and gaining control is considered to be very important.
- **Class 3** is commonly found in Queensland and prevention of the sale of Class 3 declared plants is expected to reduce their spread, especially if land is adjacent to an environmentally significant area. Landowners are not expected to try to control them.

Performance Targets

Prevent the spread of weeds on the site.

Relevant Conditions

Refer to EA once issued.

Strategies/mitigation measures

Specific control measures to be implemented may include, but not necessarily be limited to the following strategies.

4.6 Weed Management Plan

General

- Weed infestations are to be controlled as soon as possible to prevent further spread of weeds.
- Maintain groundcover for as long as possible by minimising land disturbance at any one time, where practicable.
- Annual weed spraying campaigns should be implemented at the site, with additional spraying campaigns (e.g. spot spray, bi-annual sprays, etc) undertaken if necessary.
- Weeds identified on-site will be prioritised for weed management according to the class of weeds identified, and the cause of the weed establishment will be determined to prevent or minimise further introduction and spread.
- Weed plant materials and seed should be disposed of at a Council refuse station, or buried at an appropriate depth on-site, whenever possible.
- Employees should be trained appropriately to recognise existing and potential weeds present on-site and within the surrounding area to ensure they are not inadvertently brought onto the site via items contaminated by seed (e.g. vehicles, machinery, hand tools, soil, mulch or livestock).
- If areas containing weeds are encountered, clean all equipment, vehicles and machinery prior to leaving the area.

Access Roads/Hardstand areas

- All access routes and hard stand areas will be maintained in a weed-free or weed-reduced state to lessen the spread of weed seed by vehicle movements.
- Established roads and tracks should be used wherever possible and weed-infested areas / sites are to be avoided.

Topsoil Management

- Visual surveys will be undertaken prior to all topsoil stripping operations and, if necessary, control mechanisms will be undertaken to reduce the risk of the contamination of topsoil stockpiles with seed and vegetative weed material.
- Weed control mechanisms may include separate stockpiling, herbicide spraying of stripped soils, or disposal as fill of soil materials infested with weeds.
- Weed control mechanism strategies will be implemented to control weed infestation if required, both before and after use of top-dressing material in the rehabilitation program.
- All topsoil stockpiles will be regularly monitored and managed for weed infestation.

Rehabilitation

- Implement progressive rehabilitation as soon as practical as areas become available.
- Avoid importing topsoil onto the site where possible.
- Prior to the establishment of vegetation:
 - a spraying campaign may be required to prevent migration or establishment of weed species into the area under rehabilitation.
 - alternative methods for controlling both grasses and weeds may be used, including manual weeding, burning, slashing, weed matting and mulching, where practicable.

4.6 Weed Management Plan

Weed Control Methods

As a guide to assist in planning weed control, a summary of weed control options that may be implemented are presented in **Table 3 – General Weed Control Options**.

- Department of Agriculture, Fisheries and Forestry (DAFF) provides an A to Z listing of weeds including plants declared under the LP Act. This listing can be found at: <http://www.dpi.qld.gov.au>. Detailed information on controlling individual species is also provided in the A-Z listing along with fact sheets and information sheets.

Monitoring

All employees on-site shall carry out general daily visual surveillance for weeds within the quarry and ensure that vehicles leaving site are free of soil and vegetation.

The Site Manager shall:

- Conduct weekly inspections of all access routes on-site to ensure they are maintained weed free or in a reduced state to lessen the spread of weed seed by vehicle movements.
- Conduct inspection of any area/s and treat any weed infestations prior to topsoil removal.
- Carry out at least four thorough inspections per year of the quarry to identify:
 - effectiveness of weed control measures implemented and whether an amendment is required
 - new areas where weed control is required
 - infestations of new weed species
 - areas where rehabilitation should be carried out.

Note: The frequency of site inspections will vary depending on the identified weed species on-site and what management requirements are necessary for those species.

Table 3 – General Weed Control Options

Infestation Level	Biological	Chemical	Mechanical	Physical
Low (Canopy cover between 1% and 10%)	Not suitable.	Spot-spraying by hand with a registered herbicide.	Not suitable.	Hand grubbing (remove roots and burn plant).
Medium (Canopy cover between 11% and 50%)	Release of biological control agents.	Spot-spraying by hand with a registered herbicide.	Chaining, rolling, raking or back-ploughing, then burning.	Follow up control of seedlings – could include physical removal.
High (Over 50% canopy cover)	Inspect infestation to see if, and what, bio-control agents are already present. If necessary, release biological control agents and monitor their progress.	Aerial spraying with a registered herbicide.	Attach with chaining, rolling or raking. Use fire to kill any regrowth and break seed dormancy.	Follow up control of seedlings – could include physical removal.

4.7 Rehabilitation Management Plan

Purpose

This Rehabilitation Management Plan has been prepared to guide planning, landforming, revegetation, maintenance and environmental management associated with land disturbed by sand extraction activities at the site.

Extractive industry is a temporary land use. Designing and implementation of rehabilitation works is therefore an important element of an extractive industry. Integration of rehabilitation and extractive operations assists in cost control as well as minimising potential environmental impacts. Potential impacts resulting from extractive industry include:

- soil erosion
- pollution of storm water run off
- sedimentation of waterways
- increased nutrient loads in waterways
- introduction of weed species
- potential clearing of vegetation
- potential loss of habitat and biodiversity.

The main purpose of rehabilitation is to return the land to a stable, non-polluting and self-sustaining state capable of supporting grazing as a post extraction land use.

Performance Targets

Performance targets nominated for rehabilitation of the site are to:

- Maintain the general amenity (visual, air quality, water quality, etc) of the surrounding area.
- Prevent the degradation of non-operational areas.
- Limit land disturbance to that which is necessary at any one time.
- Identify any land contamination and implement appropriate remediation or management where necessary.
- Ensure progressive rehabilitation is carried out during the progression of quarry activities where practicable and commence progressive rehabilitation as areas become available.
- Select suitable plant species for revegetation (e.g. Regional Ecosystem species and/or local endemic species such as pasture grass).
- Reinststate stable drainage patterns.
- Prevent the introduction or spread of declared weeds and pest species.
- Ensure the post-extraction landform is safe, stable, non-polluting and suitable for the desired long-term land use.

Relevant Conditions

Refer to EA once issued.

Strategies/mitigation measures

Strategies/mitigation measures for the management of rehabilitation activities at the site will be implemented in accordance with the relevant conditions of approval and may include the following:

Final Land Use

- The subsequent land use is anticipated to be highest beneficial use consistent with the surrounding land use at the time of cessation, most likely grazing.

4.7 Rehabilitation Management Plan

Landform

- The practicalities, economics and the constraints imposed by environmental and amenity values shall determine the final landform. It is likely that the site will be used for cattle grazing as a post extraction land use.
- The following measures shall ensure that the landform created by extraction activities is stable and is connected into the surrounding landscape:
 - Using earthmoving equipment to progressively shape and trim the workings to the desired design profiles and flattening the gradients of selective batters to a stable angle of repose on reaching the terminal limits of extraction.
 - Rounding or marrying the contours into the natural ground surface.
 - Topsoiling and grassing of contours.
 - Designing landform and drainage to control erosion for the particular hydrological regime.

Topsoil Management

Topsoil supports and promotes plant growth, soil micro-organisms, organic matter and nutrients. Topsoil is defined as the organic rich, friable layer beneath the natural ground surface. The physical properties of topsoil are important for promoting and supporting plant growth.

The following measures should be implemented for topsoil stripping:

- Topsoil should not be stripped when it is too wet or too dry.
- Topsoil when stripped should be used directly for rehabilitation to the maximum practicable extent, or stockpiled and preserved for future use.
- Stockpiling of topsoil should not exceed a height of 2 to 3 m and should be shaped (i.e. batters no greater than 2:1) and revegetated to protect the soil from erosion and weed infestation.
- Stockpiles should be maintained in a free draining condition and long-term soil saturation should be avoided.
- Runoff waters external to the areas to be stripped should be diverted away from the working area.
- Stripping of topsoil should be limited to the minimum area necessary.

The following measures should be implemented for topsoil spreading:

- Whenever possible, stripped topsoil should be directly placed on an area undergoing rehabilitation.
- Areas to be topsoiled should be re-shaped prior to placing topsoil.
- Equipment used to spread topsoil should be scheduled to avoid compaction.
- Before resspreading the topsoil, loosen the subsoil to break up any compacted or surface sealing and to enable keying of the two soils.
- On slopes less than 3:1, loosen lightly compacted subsoil with a tined implement ensuring all ripping operations occur along the contour.
- Topsoil is to be removed from stockpiles in a manner that avoids vehicles travelling over the stockpiles.
- Topsoil is to be resspread in the reverse sequence to its removal so that the original upper soil layer is returned to the surface to re-establish the entrapped seed content of the soil.

4.7 Rehabilitation Management Plan

- Ensure all exposed subsoils are covered.
- Topsoil is to be respread over selected batters, contours, bunds and disturbed areas to a minimum thickness of 100 mm.
- After spreading topsoil, ensure the surface is left in a roughened state to assist moisture infiltration and inhibit soil erosion.
- Prior to any planting, cultivate any compacted or crusted topsoil surfaces (to a depth no greater than the depth of the topsoil).
- Soil spreading is to be immediately followed by seeding grass if applicable.
- Straw or organic mulch may be spread over the soil to minimise potential soil erosion until the area is revegetated.
- If erosion occurs on treated surfaces, the area is to be re-topsoiled and sown with cover grass.

Revegetation

There are a range of methods for establishing vegetation. As this site is likely to be returned to cattle grazing, the preferred method of establishing vegetation is natural regeneration of pasture followed by seed broadcasting if required.

All methods shall be accompanied by appropriate weed control to prevent rehabilitated areas from being overrun with weed species.

Weed and Pest Control

Any materials (e.g. earth, soil, mulch and straw) brought onto the site for rehabilitation shall be inspected to ensure the materials are free from weeds and pests.

Prior to the establishment of vegetation, a spraying campaign may be required to control weeds to prevent migration of weed species into areas under rehabilitation.

Alternative methods for controlling both grass and weeds include manual weeding, slashing, weed matting and mulching. Techniques best suited to the specific species of weeds being targeted for control shall be determined by consulting with the Department of Agriculture, Fisheries and Forestry weed control sheets.

Predation (e.g. grazing animals, birds, kangaroos, hares, and insects) are risks for revegetation. Depending on the situation, specific measures may be required to protect the works from predation such as fencing, barriers, etc.

Buffers

- Work areas to be clearly defined.
- Vehicles limited to defined tracks.

Monitoring

Rehabilitation works require time to establish during which maintenance and monitoring shall be required. Regular inspections shall be made to plan timely maintenance works in accordance with **Table 4 – Maintenance Schedule for Revegetation Works**. Maintenance works shall be required for fertilising and watering.

Table 4 – Maintenance Schedule for Revegetation Works

Item	Activity	Frequency
Weed Control		
Site Preparation (where necessary)	Application of herbicide and / or slashing	One (1) treatment at least two (2) weeks prior to seeding / planting
Ongoing Weed Management	Application of herbicide	Suggested biannually or as required
Supplementary Weeding	Application of herbicide	As required
Pasture Management		
Grass Height	Slashing	Biannually until established
Grass Vigour	Fertilise	Annually (if necessary)

4.8 Pre and Post Flood Management Plan

Purpose	<p>This Pre and Post Flood Management Plan has been prepared to control potential risks to safety, property and the environment as a result of flooding of the Fitzroy River which will result in inundation of some part of the Site as it is mapped as a flood area in State government mapping.</p> <p>It has also been prepared to outline contingency measures required prior to Site inundation and detail the post flood activities required to resume operation.</p>
Performance Targets	<ul style="list-style-type: none"> • To ensure site activities prior to and post inundation are managed to meet DA and EA requirements. • To ensure potential risks relating to safety, property and the environment are identified and appropriately managed. • To protect downstream water quality in the event of a release from the Site before, during or after a flood event.
Relevant Conditions	Refer to EA and DA once issued.
Strategies/mitigation measures	<p>Strategies/mitigation measures for the management of release water from the site will be implemented in accordance with the relevant conditions and include the following:</p> <p><u>Prior to Site Inundation</u></p> <ul style="list-style-type: none"> • A rainfall gauge will be installed on site to monitor local rainfall and the Site Manager will regularly monitor storm warnings from the Bureau of Meteorology. • The upstream Fitzroy River stream gauge will be monitored on a regular basis to assess whether the site will be inundated. Real time data is available at: http://www.bom.gov.au/cgi-bin/wrap_fwo.pl?IDQ60289.html#Fitzroy • Mitigation actions and monitoring will be undertaken in line with the Water Quality Management Plan and relevant conditions of the EA. • A pre-wet weather inspection of all erosion and sediment controls will be performed in accordance with Table 2 – Action Plan for the Surveillance and Maintenance of Stormwater Control Devices. • The northern stockpile area has been located to be immune from a Q2 (1 in 50 year) flood event. • The Site Office and storage shed will be located within the northern stockpile area. • Stockpiles will be moved to the northern stockpile area where feasible. • All mobile machinery and vehicles will be removed from the Site or stored at the northern stockpile area prior to flood events occurring. • Fuels and chemicals will be stored and banded within the northern stockpile area at all times in accordance with AS1940. • Evacuation of the Site will be undertaken prior to inundation. • The Site Manager will ensure the State Emergency Services Business Flood Plan template (refer to Attachment 4 – State Emergency Services Business Flood Plan Template) is complete and kept up to date, and a copy will be available at all times to the Site Manager.

4.8 Pre and Post Flood Management Plan

Post Site Inundation

- Post inundation, the Site Manager will inspect the site access to determine if safe to enter.
- Post inundation the stormwater control infrastructure on Site shall be inspected for signs of erosion and subsidence following the flood event as shown in **Table 2 – Action Plan for the Surveillance and Maintenance of Stormwater Control Devices**.
- The Site Manager will monitor the water quality of the pit water and the freeboard available.
- If stormwater is required to be released from the extraction pits post inundation to enable extraction to recommence, the water will be pumped from the pit and irrigated to surrounding pasture. Irrigation will be visually monitored by the Site Manager to ensure water isn't ponding or running off the irrigated pastured area into mapped waterways. Should this occur, irrigation will cease immediately.
- If settled stormwater is required to be released from the extraction pits post inundation, water quality monitoring will be undertaken to determine if it meets the water quality limits set in the EA. Should it meet these criteria, water will be released from the extraction ponds at the approved release point. If necessary, water may be treated using appropriate flocculants to reduce total suspended solids or turbidity if elevated. Monitoring will be undertaken post treatment to confirm the water quality is within the specified EA limits prior to release to a watercourse.

Corrective Actions

- Exceedance of the surface water quality release limits shall be reported immediately to the Site Manager.
- The Site Manager shall report the exceedance to the relevant administering authority (EHP Pollution Hotline telephone: 1300 130 372).

Monitoring

- Water quality within the pit following inundation shall be monitored in accordance with the conditions of the EA.
- Proactive monitoring of the Bureau of Meteorology reports, the site rainfall gauge, and the Fitzroy River stream gauge will be undertaken by the Site Manager to ensure that the Site is evacuated prior to inundation.

4.9 Ecological Management Plan

Purpose	<p>The Ecological Management Plan has been prepared to control the potential for impacts to local ecological values associated with the extraction activities.</p> <p>This management plan has incorporated the recommendations from the Ecological Assessment completed for the proposed extraction by Gondwana Ecology Group (refer to Attachment 1 – Ecological Assessment within the Environmental Assessment Report).</p>
Performance Targets	<p>The following performance targets are relevant:</p> <ul style="list-style-type: none"> • Avoid features of high ecology value on the Site. • Minimise potential impacts on local ecological values.
Relevant Conditions	Refer to DA and EA once issued.
Strategies/mitigation measures	<p>Strategies/mitigation measures to minimise potential impacts on the local ecology may include the following:</p> <p>General</p> <ul style="list-style-type: none"> • Minimise the extent of clearing within any of the nominated stages, to that which is necessary as a practical working area. • Avoid removal of large paddock trees, figs and stags on the edges of the nominated resource areas. • The final internal haul road location is to be determined in consultation with a qualified ecologist, to ensure that any resultant ecology impacts are minimised. • Implementation of sediment control and erosion control measures to ensure potential impacts to "wetlands" are avoided. • Provide a fauna spotter on the site during clearing operations, particularly for large trees (e.g. trees with girth greater than 300mm) and other trees with nests or obvious hollows. The spotter is to give particular consideration to nests and breeding periods. • Relocate/reuse hollow logs and woody debris for habitat. • Identify areas for progressive rehabilitation. • Identify (i.e. fencing/flagging) appropriate setbacks to remnant vegetation, wetlands and any other features of ecological value that are identified for retention/protection.
Monitoring	<p>All employees will be responsible for the identifying local ecological values on-site. Qualified spotter/catchers will be employed for monitoring in the event clearing of trees with a girth greater than 300mm and other trees with nests and obvious hollows.</p>

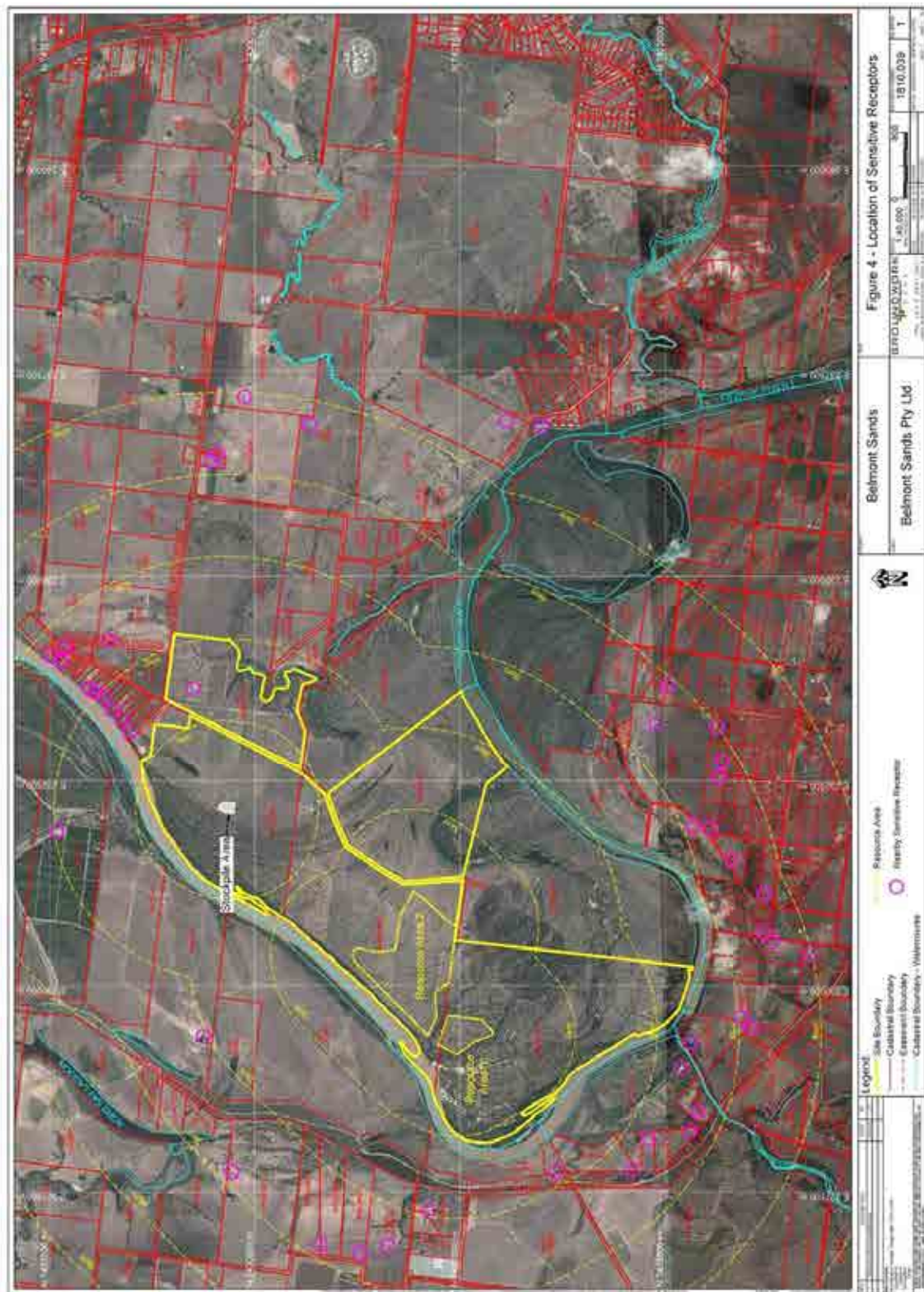
figures

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attachments

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Attachment 1

Incident and Complaint Procedure

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Incidents and Complaints Procedure

The objective of the Incident and Complaint Procedure is to ensure that incidents and complaints are reported, investigated and appropriate action is taken. A summary of the Incident and Complaint Procedure is provided below in **Diagram 2 – Incidents and Complaints Procedure Summary**. For further details regarding each element of the procedure refer to Attachment 3 – Complaint Procedure.



Diagram 2 – Incidents and Complaints Procedure Summary

Receiving Complaints/Recording Incidents

The Site Manager will be responsible for ensuring that all employees at the site are familiar with the procedure for incidents and complaint recording. The Site Manager will liaise personally with the complainant to discuss the nature of the complaint, identify possible causes and explain actions to prevent further complaints.

All complaints received or any employee involved in an incident having environmental implications or who becomes aware of any situation that develops into an incident, shall be reported to the Site Manager or delegate as soon as practicable. Employees are to show respect and understanding to complainants.

The following details shall be recorded at the receipt of an incident or complaint:

- date, time, location and nature of the incident or complaint
- type of communication (telephone, letter, email, personal, etc)
- name, contact address and contact telephone number of the person reporting the incident or complaint (i.e. note: if the complainant does not wish to be identified then 'not identified' is to be recorded)
- details of incident or complaint
- response and investigation undertaken as a result of the incident or complaint
- name of person responsible for receiving and/or investigating the complaint
- response and investigation undertaken as a result of the complaint
- action taken as a result of the complaint investigation and signature of responsible person.

Step 1. Notification

When an environmental incident/complaint occurs, the Site Manager will notify the administering authority via telephone on 1300 130 372 (Pollution Hotline) or local office as soon as practicable after becoming aware of any release of contaminants not in accordance with the conditions of the approval. A standard form for such notification is attached see below - **INITIAL NOTIFICATION FORM**.

Step 2. Investigation

All incidents and complaints should be investigated. The investigations should include:

- determining what activities (and equipment) were being carried out or operated at the time of the complaint/incident
- determining whether, at the time of the complaint, normal day to day activities were conducted
- identifying whether equipment or activities on site were the source of complaint (or whether other activities in the locality were the cause of the complaint)

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- determining what potential actions may be carried out to resolve complaint and/or minimise the likelihood of further complaint or release of contaminants to the environment.

Appropriate action is to be undertaken as soon as practical, but no longer than two days, to either determine the source of the complaint, and/or minimise further impact in the case of an incident. Corrective action is to be implemented and an assessment conducted to determine what, if any, preventative action can be implemented to prevent a similar incident from occurring again. All incidents and complaints reported shall be filed in a complaint/incident register available on the site.

The incident/complaint form shall be checked by the Site Manager two (2) weeks after receipt of complaint to ensure appropriate corrective action has been taken and that the issue has been resolved. If monitoring is undertaken to investigate a complaint the Site Manager, or the consultant commissioned to undertake the study/survey, an objective summary of the results of the study/survey shall be provided to the complainant.

Step 3. Reporting

Within 14 days of the incident/emergency, Hanson must, in addition to the information provided in the initial notification form, provide further information to the administering authority as shown in the attached form (see **FURTHER NOTIFICATION FORM**).

Within fourteen (14) days of the incident/emergency the written advice of the results of any environmental monitoring (not previously supplied) in relation to the incident/emergency shall be supplied to the relevant regulatory authority.

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EMERGENCY AND INCIDENT

Department of Environment and Heritage Protection Initial Notification Form

This form is to be completed when notifying the Department of Environmental and Heritage Protection (EHP) of any emergency or incident, which has or may cause environmental harm. The EHP is to be contacted by telephone or facsimile (of this form) within 24 hours after becoming aware of the emergency or incident.

Date:

Environmental Authority (EA) Number:

Operator's name:

Your name:

Site location:

Name and telephone number of contact person:

Location of emergency or incident within Site:

Time of the emergency / incident / event:

Time that operators became aware of the emergency / incident / event:

The suspected cause of the emergency / incident / event:

The environmental harm caused, threatened, or suspected to be caused by the emergency / incident / event:

Actions taken to prevent further environmental harm and mitigate any environmental harm caused by the emergency / incident / event:

Name: Signature:

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EMERGENCY AND INCIDENT

Department of Environment and Heritage Protection **Further Notification Form**

Not more than 14 days following the initial notification of an emergency or incident, the holder of the Environmental Authority must provide the following written advice along with the initial notification form.

This record must be kept for a period of five (5) years.

Environmental Authority (EA) Number

Designated contact person:

Date of Event:/...../..... Time of Event: am/pm

Proposed action to prevent a recurrence of the emergency / incident / event:

.....
.....
.....

Outcomes of actions taken at the time to prevent or minimise environmental harm and / or environmental nuisance:

.....
.....
.....

Results of any environmental monitoring performed:

.....
.....
.....

Further comments:

.....
.....
.....
.....
.....
.....
.....

Name: Signature:

Attachment 2

Schedule 7 of the *Environmental Protection Regulation* 2008

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Environmental Protection Regulation 2008

Schedule 7

Schedule 7 Regulated waste and waste that is not regulated waste

section 65

Part 1 Regulated waste

- 1 acidic solutions and acids in solid form
- 2 animal effluent and residues, including abattoir effluent and poultry and fish processing wastes
- 3 antimony and antimony compounds
- 4 arsenic and arsenic compounds
- 5 asbestos
- 6 barium compounds, other than barium sulfate
- 7 basic (alkaline) solutions and bases (alkalis) in solid form
- 8 beryllium and beryllium compounds
- 9 boron compounds
- 10 cadmium and cadmium compounds
- 11 chemical waste arising from a research and development or teaching activity, including new or unidentified material and material whose effects on human health or the environment are not known
- 12 chlorates
- 13 chromium compounds (hexavalent and trivalent)
- 14 clinical and related waste
- 15 containers contaminated with a regulated waste
- 16 copper compounds
- 17 cyanides (inorganic)
- 18 cyanides (organic)

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Environmental Protection Regulation 2008

Schedule 7

-
- 19 encapsulated, chemically-fixed, solidified or polymerised wastes
 - 20 ethers
 - 21 filter cake, other than filter cake waste generated from the treatment of raw water for the supply of drinking water
 - 22 fly ash
 - 23 food processing waste
 - 24 grease trap waste
 - 25 halogenated organic solvents
 - 26 highly odorous organic chemicals, including mercaptans and acrylates
 - 27 hydrocarbons and water mixtures or emulsions, including oil and water mixtures or emulsions
 - 28 inorganic fluorine compounds, other than calcium fluoride
 - 29 inorganic sulfides
 - 30 isocyanate compounds
 - 31 lead and lead compounds including lead-acid batteries
 - 32 material containing polychlorinated biphenyls (PCBs), polychlorinated naphthalenes (PCNs), polychlorinated terphenyls (PCTs) or polybrominated biphenyls (PBBs)
 - 33 mercury and mercury compounds
 - 34 metal carbonyls
 - 35 mineral oils
 - 36 nickel compounds
 - 37 non-toxic salts including, for example, saline effluent
 - 38 organic phosphorous compounds
 - 39 organic solvents, other than halogenated solvents, including, for example, ethanol
 - 40 organohalogen compounds, other than another substance stated in this schedule
 - 41 oxidising agents

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Schedule 7

- 42 perchlorates
- 43 pesticides, including organochlorine
- 44 pharmaceuticals, drugs and medicines
- 45 phenols and phenol compounds, including chlorophenols
- 46 phosphorus compounds, other than mineral phosphates
- 47 polychlorinated dibenzo-furan (any congener)
- 48 polychlorinated dibenzo-p-dioxin (any congener)
- 49 reactive chemicals
- 50 reducing agents
- 51 residues from industrial waste treatment or disposal operations
- 52 selenium and selenium compounds
- 53 sewage sludge and residues, including nightsoil and septic tank sludge
- 54 surface active agents (surfactants) containing principally organic constituents, whether or not also containing metals and other inorganic materials
- 55 tallow
- 56 tannery wastes, including leather dust, ash, sludges and flours
- 57 tarry residues arising from refining, distillation or any pyrolytic treatment
- 58 tellurium and tellurium compounds
- 59 thallium and thallium compounds
- 60 triethylamine catalysts for setting foundry sands
- 61 tyres
- 62 vanadium compounds
- 63 vegetable oils
- 64 waste containing peroxides other than hydrogen peroxide
- 65 waste from a heat treatment or tempering operation that uses cyanides

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Environmental Protection Regulation 2008

Schedule 7

-
- 66 waste from surface treatment of metals or plastics
 - 67 waste from the manufacture, formulation or use of the following—
 - biocides or phytopharmaceuticals
 - inks, dyes, pigments, paints, lacquers or varnish
 - organic solvents
 - photographic chemicals or processing materials
 - resins, latex, plasticisers, glues or other adhesives
 - wood-preserving chemicals
 - 68 waste from the manufacture or preparation of pharmaceutical products
 - 69 waste of an explosive nature, other than an explosive within the meaning of the *Explosives Act 1999*
 - 70 wool scouring wastes
 - 71 zinc compounds

Part 2 Waste that is not regulated waste under section 65(3)

- 1 intact or partly disassembled televisions
- 2 intact or partly disassembled electronic equipment designed to be used with a television, including video players, DVD players, games units and set-top boxes
- 3 intact or partly disassembled computers, including desktop computers, notebook computers, laptop computers and tablets
- 4 intact or partly disassembled equipment designed to be used with computers, including keyboards, mice, hard drives, scanners, printers, multi-function devices, speakers and web cameras

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Environmental Protection Regulation 2008

Schedule 7

- 5 intact or partly disassembled internal computer components, including network or graphics cards, motherboards and DVD drives
- 6 mobile phones and mobile phone accessories, including chargers
- 7 batteries typically used in small electronic devices or handheld devices such as mobile phones, digital cameras, keyboards, toys and torches
- 8 whitegoods
- 9 residue produced by the process of recycling treated timber products, for example power poles and bridge timbers, containing amounts of treatment chemicals
- 10 groundwater or treated groundwater necessarily or unavoidably brought to the surface of the earth as part of an industrial process, if the groundwater—
 - (a) has a pH of at least 6 but not more than 10.5; and
 - (b) has an electrical conductivity of less than 15,000 micro-siemens a centimetre
- 11 waste architectural and decorative paints collected, stored and transported in accordance with a product stewardship, unless the paint—
 - is a bagged render
 - is texture coating
 - contains isocyanates
 - is paint stripper
 - is an industrial paint
 - is anti-fouling paint
- 12 containers of waste architectural and decorative paints mentioned in item 11 that are collected, stored and transported in accordance with a product stewardship, unless the paint is in a spray pack

Attachment 3

Schedule 2E of the *Environmental Protection Regulation 2008*

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Environmental Protection Regulation 2008

Schedule 2E

Schedule 2E Trackable waste and waste codes

section 81C and schedule 12, part 2, definition *waste code*

Explanatory notes to sch 2E

- 1 A substance is trackable waste if it is regulated waste of a type mentioned in this schedule.
- 2 If a substance falls under more than 1 item in this list, and the code for one of the items is marked with an asterisk, the code for the substance is the code marked with an asterisk.

Type of waste	Waste code
acidic solutions and acids in solid form	B100
animal effluent and residues, including abattoir effluent and poultry and fish processing wastes.	K100
antimony and antimony compounds	D170
arsenic and arsenic compounds.	D130
asbestos	N220
barium compounds, other than barium sulphate.	D290
basic (alkaline) solutions and bases (alkalis) in solid form	C100
beryllium and beryllium compounds	D160
boron compounds	D310
cadmium and cadmium compounds	D150
chemical waste arising from a research and development or teaching activity, including new or unidentified material and material whose effects on human health or the environment are not known.	T100
chlorates	D350

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Schedule 2E

Type of waste	Waste code
chromium compounds (hexavalent and trivalent)	D140
clinical and related waste	R100*
copper compounds	D190
cyanides (inorganic)	A130
cyanides (organic)	M210
encapsulated, chemically fixed, solidified or polymerised wastes	N160*
ethers	G100
filter cake, other than filter cake waste generated from the treatment of raw water for the supply of drinking water . .	N190
fire debris and fire washwaters	N140*
fly ash	N150
grease trap waste	K110
halogenated organic solvents	G150
highly odorous organic chemicals, including mercaptans and acrylates	M260
inorganic fluorine compounds, other than calcium fluoride	D110
inorganic sulfides	D330
isocyanate compounds	M220
liquid food processing waste	K200
lead and lead compounds	D220
material containing polychlorinated biphenyls (PCBs), polychlorinated naphthalenes (PCNs), polychlorinated terphenyls (PCTs) or polybrominated biphenyls (PBBs) . .	M100
mercury and mercury compounds	D120
metal carbonyls	D100
mineral oils	J100

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Schedule 2E

Type of waste	Waste code
nickel compounds	D210
non-toxic salts	D300
oil and water mixtures or emulsions, or hydrocarbons and water mixtures or emulsions	J120
organic phosphorous compounds	H110
organic solvents, other than halogenated solvents	G110
organohalogen compounds, other than another substance stated in this schedule	M160
perchlorates	D340
pharmaceuticals, drugs and medicines	R120*
phenols and phenol compounds, including chlorophenols	M150
phosphorus compounds, other than mineral phosphates.	D360
polychlorinated dibenzo-furan (any congener).	M170
polychlorinated dibenzo-p-dioxin (any congener)	M180
residues from industrial waste treatment or disposal operations	N205
selenium and selenium compounds.	D240
sewage sludge and residues, including nightsoil and septic tank sludge	K130
surface active agents (surfactants) containing principally organic constituents, whether or not also containing metals and other inorganic materials	M250
tannery wastes, including leather dust, ash, sludges and flours	K140
tarry residues arising from refining, distillation or any pyrolytic treatment	J160
tellurium and tellurium compounds	D250
thallium and thallium compounds.	D180

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Environmental Protection Regulation 2008

Schedule 2E

Type of waste	Waste code
triethylamine catalysts for setting foundry sands	M230
tyres	T140
vanadium compounds	D270
waste containing peroxides other than hydrogen peroxide .	E100
waste from a heat treatment or tempering operation that uses cyanides	A110
waste from surface treatment of metals or plastics	A100
waste from the manufacture, formulation or use of—	
• biocides or phytopharmaceuticals	H100
• inks, dyes, pigments, paints, lacquers or varnish	F100
• organic solvents	G160
• photographic chemicals or processing materials	T120
• resins, latex, plasticisers, glues or other adhesives	F110
• wood-preserving chemicals	H170
waste from the manufacture or preparation of pharmaceutical products	R140
waste of an explosive nature, other than an explosive within the meaning of the <i>Explosives Act 1999</i>	E120
wool-scouring wastes	K190
zinc compounds	D230

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Attachment 4

State Emergency Services Business Flood Plan Template

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Flood Planning for your Business

This is a guide only, designed to assist you in the key areas of flood planning and to create minimise the effect of flood on your business.

If you are already experiencing some flood damage on a regular basis (every couple of years or so) you may benefit from looking at some of the documentation on [Flood-Proofing](#) or talking to the SES or local council in your region.

Each business is different and things such as number of employees, type of business, location, size of location, type of plant and equipment must be taken into consideration. With this in mind if you look at your existing business, policies and procedures, staffing and existing emergency plans then consider if you have planned appropriately in the event of a flood.

Things that you may want to consider are:

- *Security procedures - Who is responsible for locking windows, doors and setting the alarm. Would this person be available to do this task in the event of an emergency evacuation. Perhaps another person (or people, in the event that staff work various shifts) should be allocated this responsibility in the event of an emergency.*
- *Insurance policies - Are you insured for flood damage, business interruption and lost revenue?*
- *Contingency Plans – Are you able to negotiate a reciprocal (or other) deal so that you can continue to run your business temporarily should your premises be effected by flood or other disaster.*
- *Hazardous materials plan - You must ensure that chemicals, oils and other substances in your possession are kept safe and do not contaminate flood water. Who is responsible for securing these materials safely, either moving them to a higher place or water-proofing them? Remember garbage may also be included in hazardous materials.*
- *Occupational Health & Safety for Employees – Do you have emergency evacuation procedures included in staff information/orientation packs. Does each job description include emergency warden duties including flood procedures.*
- *Warning Systems - Do you have a warning system to alert staff?. Do staff understand the alert signals? Does everyone understand the Emergency Plan? Is this warning system checked regularly?*

Legislative Requirements

- Occupational health and safety regulations
- Environmental regulations
- Local Government regulations

Important contacts

- Make a list of important telephone numbers, including contacts for gas, electricity, water and telephone providers.

Staff

- Make a list of employees' contact details in the event of an evacuation. This might include mobile telephone numbers, or numbers for their home or the home of a friend or relative.
- Think about staff who may need special assistance in the event of a flood (e.g. elderly, deaf, blind etc.)

Key locations

- Know the location of cut-off points for gas, electricity and water. Ideally, these should be marked on a map that is stored with your flood plan.
- Know the location of chemicals, oils or other materials that could be dangerous or contaminate flood water. These should be stored safe from floods and other damage.

Protective actions

- Note key stock, equipment and possessions that may need special protection from flood waters.
- Consider things you may need during or after a flood (i.e. sandbags, plastic sheeting, loudspeaker etc.)
- See if it's possible to move key operations, such as shipping and receiving or customer services, to another building.

Suppliers and external links

- Identify products and services you won't need in the event of a flood, or which suppliers may not be able to provide. Make back-up plans or arrangements for short-notice cancellation of deliveries.
- Consider contracting in advance with companies whose help you may need after a flood. This avoids the frustration of finding help in an emergency, and puts you in a better position to negotiate costs.
- Identify people who can help you before, during and after a flood.

BUSINESS FLOOD PLAN

Date: _____

Company name _____

Registered address _____

Postcode _____

General contact list

	Company name	Contact name	Telephone	Mobile
State Emergency Service	General Contact No.: Emergency 24 hour contact:			
Electricity provider				
Gas provider				
Water company				
Telephone provider				
Local public transport				
Local council emergency services				
Insurance company				
Insurance agent				

Alternate office premises, contact details

Office / branch	Telephone	Fax	Address

Staff

Staff contact list - please continue on a separate sheet if necessary

Name	Job title	Home telephone & address	Mobile	Emergency contact	Emergency telephone & address

Note staff who may require assistance in the event of a flood.

Special needs staff member	Office location	Volunteer aide/s

Key locations

Service cut-off	Description of location
Electricity	
Gas	
Water	

Answer the following if applicable

Hazardous material	Description of location	How to protect from a flood (i.e. move, cover, tie down)
Chemicals (including cleaning products)		
Oil based products (gasoline, oil, cooking oil etc.)		
Other contaminants (i.e. asbestos insulation, lead-based paint)		

Protective actions

Identify stock, equipment and possessions that may need special protective measures, and describe the actions you will take to prevent their damage in the event of a flood. We have suggested items and ways to protect them, but make sure you follow through on your plans. For example, if you say you will move an item to a safer location, then do it!

Please continue on a separate sheet if necessary.

Items to consider

Computers	In-store stock	Chairs / stools	Computer files
Machinery	Warehouse stock	Tables / heavy furniture	Staff files
Vehicles	Fittings	Soft furnishings	Paper files
Electrical	Movable goods	Food	Databases

Ways to protect items

- Make a copy and store in safe location
- Raise above ground level
- Buy flood protection products
- Buy new flood-resistant item
- Move to safer location

Valuable item	Protective action	New location (if applicable)	Done

Page 4

Valuable item	Protective action	New location (if applicable)	Done

Note basic building materials required. If materials are not needed, leave the relevant section blank.

Materials	Used for	Items to protect / where to use	Storage Location	Done
Sand & sand bags (unfilled), shovel	Creating flood barriers (used with plastic sheeting)			
Tools - hammer, nails, saw	Boarding up doors, windows and openings, creating shelves			
Wood - plywood, blocks of wood	Boarding up doors, windows and openings, creating shelves			
Sturdy plastic sheeting	Sandbag barriers, pulling up around furniture and appliances			
Plastic bags	Putting around legs of tables and chairs			
Pallets	Raising stored stock above flood level			
Emergency power generator	Maintaining function of air conditioning units (can help dry out a building), running fridges & freezers			

Note options for moving key operations to another site in the event of a flood. If you are a small business and relocation is not an option, leave this section blank.

Function	Temporary relocation	Telephone	Fax
Shipping & receiving			
Production			
Customer services			
Payroll			
Information support systems			

Suppliers and external links

Identify back-up plans for disruption of deliveries, or arrangements for short-notice cancellation with suppliers. Suggested back-up arrangements are listed below. Make sure that you follow through on your plans. For example, if you say you will use an alternate delivery address, make sure you provide that delivery address to your supplier in advance.

Please continue on a separate sheet if necessary.

Possible contingency plans

- (1) Contact supplier immediately on evacuation
- (2) Use alternate supplier
- (3) Use alternate delivery address
- (4) Individual terms detailed in separate document (attach document to this plan)

Supplier	Contingency plan	1) Supplier contact & telephone	2) Alternate supplier contact & telephone	3) New delivery address	4) Own agreement (attached)

List companies whose help you may need after a flood. Make sure that you follow through on your plans, and get contracts in place, or know who to call for assistance. If help is not needed, you can leave this section blank. If you contract in advance, attach the contract to this flood plan.

Flood service company	Company name	Contact	Telephone / mobile	Contract agreed
Hazardous materials response team				
Security services				
Water pumping services				
Suppliers of emergency power / equipment				
Equipment repair				
Earthmoving or engineering				

Identify people who can help you before, during and after a flood, and what they can do. We have suggested ways they might be able to help, but you'll need to discuss this with them.

Please continue on a separate sheet if necessary.

Ways people can help

- Assistance with installing flood products
- Assistance with evacuation transport
- Able to use their property for shelter
- Able to use their property as assembly point
- Provision of emergency storage
- Provision of emergency supplies or medical support

Relationship	Name	Contact details	How they can help	Help agreed
Neighbour				
Neighbour				
Volunteer				
Volunteer				
Other				

**12.13 - DECISION ASSESSMENT FOR A
DEVELOPMENT PERMIT FOR MAKING
A MATERIAL CHANGE OF USE OF
PREMISES FOR AN EXTRACTIVE
INDUSTRY FOR SAND AND GRAVEL
AND ASSOCIATED ACTIVITIES AND
MAKING A MATERIAL CHANGE OF
USE OF PREMISES FOR
CONCURRENCE ENVIRONMENTALLY
RELEVANT ACTIVITY AT LOT 5, LOT 6,
LOT 8, AND LOT 10 MELDRUM ROAD
AND 887 ETNA CREEK ROAD, ETNA
CREEK**

Environmental Assessment Report

Meeting Date: 17 July 2018

Attachment No: 4



BELMONT SANDS ENVIRONMENTAL ASSESSMENT REPORT

Prepared for:
Belmont Sands Pty Ltd

Date:
17/07/2015

Reference:
1810.640.001

Resources Environment Planning Laboratories

www.groundwork.com.au

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FIGURES

Figure 1	Site Location Plan	(Drawing No. 1810.DRC.008r2)
Figure 2	Conceptual Site Layout Plan	(Drawing No. 1810.DRC.026Ar8)
Figure 3	Regulated Vegetation Management Map	(Drawing No. 1810.DRC.033A)
Figure 4	Location of Sensitive Receptors	(Drawing No. 1810.DRC.039)

ATTACHMENTS

Attachment 1	Ecological Assessment
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1. Introduction

1.1 General

Belmont Sands Pty Ltd propose to develop an extractive resource ('Belmont Sands') in the Livingstone Shire Council (Council) area for the supply of sand and gravel to the building and construction industry (extractive industry). The site is accessed by Etna Creek Road, Etna Creek QLD 4702 refer **Figure 1 – Site Location Plan** (the site). The site comprises the following lots:

- Lot 8 on RP601603
- Lot 5 on RP601603
- Lot 10 on SP142291
- Lot 6 on RP601603 (for road/access purposes only)
- Lot 3 on RP601603 (for road/access purposes only).

Groundwork Plus has been commissioned by Belmont Sands to prepare an Environmental Assessment Report (EAR) to accompany a development application to the Council for *extractive industry*.

The development application will comprise the following components:

- Material Change of Use – Development Permit for *extractive industry* and associated activities
- Material Change of Use – Concurrence Environmentally Relevant Activities (ERAs)
- Environmental Authority for Environmentally Relevant Activities (ERAs):
 - ERA 16(2)(b) Extracting, other than by dredging, in a year, the following quantity of material – more than 100,000 tonnes but not more than 1,000,000 tonnes.
 - ERA 16(3)(b) Screening, in a year, the following quantity of material – more than 100,000 tonnes but not more than 1,000,000 tonnes.

The EAR provides a description of the proposed activity and the existing environment, and identifies the potential environmental impacts associated with the proposed development. The purpose of the EAR is to provide a clear and concise description of the proposed activity, inform the appropriate design and implementation of measures proposed to safeguard the environment and surrounding amenity, and demonstrate compliance with the *Environmental Protection Act 1994* and associated regulations and guidelines. The findings of the EAR provide the basis for the preparation of the site Environmental Management Plan (EMP).

1.2 Site Details

Location: The site is accessed by Etna Creek Road, Etna Creek QLD 4702, approximately 20 kilometres north-west of Rockhampton (refer **Figure 1 – Site Location Plan**).

Real Property Description: The site consists of the following lots:

- Lot 8 on RP601603
- Lot 5 on RP601603
- Lot 10 on SP142291
- Lot 6 on RP601603 (for road/access purposes only)
- Lot 3 on RP601603 (for road/access purposes only).

Access:	The site will be accessed via a current access point from Etna Creek Road, which connects to the Bruce Highway.
Site Area:	1,524 hectares.
Tenure:	Freehold.
Registered Proprietors:	AgForce Queensland Industrial Union of Employers.
Local Authority:	Livingstone Shire Council.
Zoning:	Rural Zone.
Existing Use:	Rural pursuits. Cattle grazing. Research.

1.3 Project Overview

Prior to commencement of extraction, access and haul roads will be developed to facilitate the movement of personnel, plant and equipment, and light vehicles around the site. Construction of site infrastructure including the stockpile/processing plant area, office/amenities (if required), weighbridge (if required), storage shed and processing plant will also occur at this juncture. Once the infrastructure is established, topsoil stripping and stockpiling will be completed in a logical sequence, to enable extraction to commence.

Material will be extracted via conventional methods, which includes an excavator and then transported to the processing plant by truck. Processing will involve screening and washing (if required) to remove fine silt and clay particles and dewatering of the final product, prior to stockpiling. No blasting or crushing is to occur as part of the process.

An existing groundwater bore on the site will be primarily utilised by the proposed operation when needed. It is anticipated that longer-term water for the washing of material (if required) will be sourced from a pond which will be formed within the extraction pit. Water will be returned to the pond, where suspended particles will settle through sedimentation, and the water reused. It is anticipated that the groundwater bore will be utilised in the initial stages of extraction while the pond is still being formed and then on an as needed basis.

Stockpiling of products will be necessary to meet customer requirements and schedules and for quality control testing. Stockpiling on site will be restricted to the minimum necessary by matching production to market requirements to the extent possible. Stockpiling will be arranged to provide ready access to different products.

Rehabilitation works will be undertaken progressively and in tandem with the extraction program. Profiling of the final landform shall be carried out to facilitate drainage.

Major plant and equipment to be used as part of the proposed development will include (but is not limited to):

- Excavator
- Haul truck
- Processing plant
 - Hopper and feeding conveyor
 - Static screen
 - Density tank
 - Sand pump
 - Tower
 - Hydrocyclone
- Spray bar

- Wash down pad
- Weighbridge (if required).

Ancillary facilities include (but are not limited to):

- Office/amenities
- Storage shed.

The general layout of the processing plant, stockpiles, ancillary facilities and proposed extent of extraction is shown on **Figure 2 – Conceptual Site Layout Plan**.

The principle objective of rehabilitation is to return the land to a stable, non-polluting and self-sustaining state capable of supporting grazing as a post extraction land use.

1.4 Description of Existing Environment

Regional Climate:

The site is within the Fitzroy River Catchment on the Tropic of Capricorn and within the south east trade wind belt, too far south to experience regular north west monsoonal influence and too far north to benefit from higher latitude cold fronts. The region has a subtropical climate with a distinct dry winter season and wet summer with most rain falls between December and March. The driest month is September. The annual mean rainfall is about 798 mm.

Mean monthly maximum temperatures are highest in January (32°C) and lowest in July (about 23.1°C).

A summary of the Regional Climatic Statistics is as follows:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Rainfall (mm)													
Mean	132.2	140.7	96.7	46.9	49.6	34.7	28.1	24.8	21.3	39.3	64.7	117.3	798.3
Temperature (°C)													
Mean min.	22.1	22.1	20.8	17.9	14.2	11	9.6	10.7	13.7	17	19.5	21.2	16.6
Mean max.	32	31.2	30.5	28.8	26	23.5	23.1	24.8	27.4	29.7	31.2	32.1	28.4

Source: Bureau of Meteorology's Rockhampton (Station No. 39083) for temperature and Belmont Station (Station No.33229) for rainfall data.

Topography and Drainage:

The site is situated within the flood plains of the Fitzroy River and the majority of the site drains south towards the river.

Topography of the site ranges between 10m AHD at the northern end of the site to 2m AHD in the far eastern sector of the site.

Fitzroy River meanders for approximately 60 km in a south easterly direction before discharging into the Coral Sea.

Geology and Groundwater Hydrology:

The fluvial, lithic quartzose sands investigated at Belmont Station display well-established grain sorting and moderate chemical maturity. These features are the product of a consistent riverine depositional flow regime which has built up high sandy and vegetated levees which run sub-parallel to the Fitzroy River on Belmont's point bar bank. The large catchment area of the Fitzroy is represented by the variety of lithic grains observed in the sand which include volcanic, metamorphic and sedimentary grains. These are accompanied by trace free hornblende and mica grains which are relics of a granitic source rock. These diversely constituted sands are accompanied by fine, clay rich

fluvial deposits which are interbedded with the sand as lenses or have settled as vast sheets in adjacent flood plains.

The Groundwater Environmental Values for the local area prescribed by Fitzroy River Sub-Basin Environmental Values and Water Quality Objectives (WQOs) include stock watering, aquatic ecosystems, irrigation, farm supply/use, primary recreation, drinking water and cultural and spiritual values. Based on local groundwater information sourced from the Qld Globe interactive mapping system (supported by Google Earth), there are four registered groundwater bores on the site.

The majority of the site is mapped as Zone 22 for Groundwater within the Fitzroy River Sub-Basin Environmental values and Water Quality Objectives with the north west corner mapped as Zone 14.

The Water Quality Objectives for Zone 14 and Zone 22 for shallow (less than 30m) groundwater are provided below:

Zone	Depth	Perce ntile	EC (µScm)	Hardness (mg/L as CaCO ₃)	pH	Ca (mg/L ⁻³)	Mg (mg/L ⁻³)	Na (mg/L ⁻³)	Cl (mg/L ⁻³)	Fe (mg/L ⁻³)	Zn (mg/L ⁻³)	Cu (mg/L ⁻³)
22	<30m	20 th	1403	367	7.2	60	41	145	218	0.000	0.010	0.000
22	<30m	50 th	2220	591	7.7	105	76	240	475	0.000	0.020	0.010
22	<30m	80 th	3722	1001	8.0	175	145	420	979	0.050	0.080	0.037
14	<30m	20 th	1006	294	7.5	51	36	88	129	0.000	0.010	0.010
14	<30m	50 th	1619	458	7.9	80	61	164	260	0.005	0.030	0.020
14	<30m	80 th	2150	743	8.1	125	108	308	604	0.030	0.091	0.050

A representation of the closest existing registered bores to the site is provided below.

Bore Reg. No.	Bore Status	Property/ Description	Lat. (°) Long. (°)	Distance from quarry development area (km)	Bore Depth (m)	Standing Water Levels m AHD/date
RN151501	Existing	Lot 5 RP601603	-23.22460002 150.38303	1.8km NE	28	NR
RN88290	Existing	Lot 5 RP601603	-23.2236917 150.3840153	1.9km NE	29	NR
RN151494	Existing	Lot 10 SP142291	-23.2288 150.3839269	1.9km NNE	22	-10.4
RN88289	Existing	Lot 10 SP142291	-23.21378849 150.3827335	2km NNE	30	-11.63
RN111644	Existing	Lot 10 SP142291	-23.2052333 150.3881469	3.9km NNE	18	-13.0

Notes: NR = no records found

Contaminated Land: The site not listed on the Environmental Management Register or Contaminated Land Register.

Acid Sulphate Soil:

The site is located at or near an area where acid sulphate soils have previously been identified or within a prospective land zone containing acid sulphate soils as identified in the Livingstone Shire Council Planning Scheme 2015 Acid Sulfate Soils Overlay. The area of the site proposed in this application is not within the mapped acid sulfate soil area.

Erosion Risk: Erosion risk for the region based on monthly average rainfall depth:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
H	H	H	M	M	L	L	L	VL	M	M	H

Notes: E = Extreme, H = High, M = Medium, L = Low, VL = Very Low
Sourced from Table 4.4.2, p. 4.12 of IECA Best Practice Erosion and Sediment Control, Book 1.

Vegetation: The site is largely cleared and has been used for cattle grazing but does have pockets of 'Of Concern Regional Ecosystem' and 'Least Concern Regional Ecosystem', refer **Figure 3 – Regulated Vegetation Management Map and Attachment 1 – Ecological Assessment**.

These are as follows:

- **Remnant Vegetation Containing Of Concern Regional Ecosystems:**
 - 11.3.2 – Eucalyptus populnea woodland on alluvial plains.
 - 11.3.3 – Eucalyptus coolabah woodland on alluvial plains.
- **Remnant Vegetation Containing Of Least Concern Regional Ecosystems:**
 - 11.3.25 – Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines.

Waterways: There are a number of mapped waterways and wetland areas on the site (refer **Figure 3 – Regulated Vegetation Management Map**).

The site is adjacent to the freshwater Fitzroy main channel above the barrage. The *Queensland Water Quality Guideline (EHP 2009)*, outlines the Environmental Values for the Fitzroy main channel (freshwater) as aquatic ecosystems, irrigation, farm supply/use, stock water, aquaculture, human consumer, primary recreation, secondary recreation, visual recreation, drinking water, industrial use and cultural and spiritual values. The regional water quality objectives for the Fitzroy River are as follows:

Summary of Water Quality Objectives for Fitzroy River Sub-Basin fresh waters*											
Ammonia N (µg/L)	Oxid N (µg/L)	Org N (µg/L)	Total Nitrogen (N) (µg/L)	Total P (µg/L)	DO (%sat)		Turbidity (NTU)	Suspended Solids (mg/L)	pH		Conductivity (µs/cm)
					lower	upper			lower	upper	
20	60	420	500	50	85	110	<50	<85	6.5	8.5	<445 ^a

* Note: Physico-chemical indicator and guideline value for moderately disturbed systems.

^a during base flow.

Flooding: The site is mapped as containing Floodplains in accordance with the Qld Globe Flood Event Mapping.

Existing Land Use: Predominately cattle grazing.

Adjacent Land Use: North – rural farming and rural residential and Fitzroy River (north-west).
East – Rural farming and residential along Etna Creek Road.
South – Fitzroy River and wetland area adjoining the river.
West – Fitzroy River and rural residential.

Environmental Sensitive Receptors: The nearest external sensitive receptor to the development is a rural residence, approximately 1.6 km to the south west of the site boundary, which is rural residential south of Fitzroy River, refer to **Figure 4 – Location of Sensitive Receptors.**

Cultural Heritage: There are no known or registered matters of Aboriginal Cultural Heritage significance within the site.

Air Quality: The ambient air quality for the area is relatively pristine being a rural area. It is assumed that dust levels within the vicinity are relatively pristine (low) for the majority of the time.

Noise: The key influence on the existing background noise levels at the site is road traffic on Etna Creek Road. Background noise levels at residential areas to the north and along Etna Creek Road are currently affected by the existing traffic use of residents and trucks used for farming including moving cattle from the AgForce site.

The recommended outdoor background noise level for rural residential as outlined in the Department of Environment and Heritage Protection (EHP), Planning for Noise Control (2004) are as follows:

Receiver Land Use	Receiver Area Dominant Land Use (description of neighbourhood) Note 1	Background Noise Level, minLA90,1hour (dBA) Note 2		
		Day	Evening	Night
Residential	Rural residential, church, hospital	45	35	30

Note 1. The dominant land use is defined by a radius of 200m from the receiver location under consideration.

Note 2. LA90,1 hour, dBA The A-weighted sound pressure level of the residual noise (dB) exceeded for 90 percent of a given time interval, T, measured using time weighting 'F' and quoted to the nearest whole number of decibels.

Visual Amenity: Natural topography, buffer distances and surrounding vegetation provide effective visual safeguards from potential viewpoints.

1.5 Potential Environmental Impacts and Risks

The identification of activities and their potential environmental impacts is fundamental to designing and implementing procedures and measures proposed in the Environmental Management Plan (EMP). This section outlines the possible impacts on existing environmental values which may occur due to the extractive industry operations on-site. Activities associated with on-site operations have been tabulated against environmental issues to provide a focus for preparing the EMP, refer to **Table 1 – Identification of Potential Impacts on Surrounding Environmental Values**.

Table 1 – Identification of Potential Impacts on Surrounding Environmental Values

Item No.	Activity	Potential Environmental Impact
1	Topsoil Stripping and Stockpiling	Stormwater Quality and Soil Erosion, Air Quality (Dust), Noise Emissions, Weeds, Visual Amenity
2	Extraction of raw materials	Stormwater quality and Soil Erosion, Air Quality (Dust), Noise Emissions, Visual Amenity
3	Handling and Stockpiling of Raw Material	Stormwater Quality, Air Quality (Dust), Noise Emissions
4	Screening and washing of Raw Material	Stormwater Quality, Air Quality (Dust), Noise Emissions
5	Handling, Storage and Haulage of processed material	Stormwater Quality, Air Quality (Dust), Noise Emissions
6	Maintenance Activities	Stormwater Quality, Waste Generation and Land Contamination
7	Handling of Hydrocarbons and Chemicals on-site	Stormwater Quality, Waste Generation and Land Contamination
8	Site Rehabilitation	Stormwater Quality and Soil Erosion, Air Quality (Dust), Noise Emissions, Weeds, Visual Amenity
9	Stormwater Management	Stormwater Quality
10	Waste Management (i.e. paper, food packaging and scraps, waste oil/lubricates, oily rags, spilled raw material and packaging)	Stormwater Quality, Land Contamination, Fauna, Visual Amenity

The risk assessment adopted is a qualitative risk-based approach designed to assess risk based on:

- the likelihood of an environmental impact or event occurring.
- the consequences of the occurrence on the surrounding environment.

The likelihood and consequences are scored between 1 and 5 for each potential impact or event. **Table 2 – Definitions of Likelihood** and **Table 3 – Definitions of Consequence** outline the identifiers and scores used in the risk assessment.

Table 2 – Definitions of Likelihood

Rating	Descriptor	Score
Rare	May occur only in exceptional circumstances	1
Unlikely	Could occur but doubtful	2
Possible	Might occur at some time in the future	3
Likely	Will probably occur	4
Almost Certain	Is expected to occur in most circumstances	5

Table 3 – Definitions of Consequence

Rating	Descriptor	Score
Negligible	Impacts not requiring any treatment or management action	1
Minor	Nuisance or insignificant environmental harm requiring minor management action	2
Moderate	Serious environmental impacts, readily manageable at low cost	3
Major	Substantial environmental impacts, manageable but at considerable cost and some disruption	4
Catastrophic	Severe environmental impacts with major consequent disruption and heavy cost	5

The consequence and likelihood scores are then plotted on the Risk Assessment Matrix, refer to **Table 4 – Risk Assessment Matrix**. The final risk level assigned is a product of the likelihood and consequence scores. The higher the risk score, the higher the priority is for management.

Table 4 – Risk Assessment Matrix

Likelihood		Consequence				
		Negligible	Minor	Moderate	Major	Catastrophic
		1	2	3	4	5
Almost Certain	5	5 Medium	10 High	15 High	20 Extreme	25 Extreme
Likely	4	4 Low	8 Medium	12 High	16 High	20 Extreme
Possible	3	3 Low	6 Medium	9 Medium	12 High	15 High
Unlikely	2	2 Low	4 Low	6 Medium	8 Medium	10 High
Rare	1	1 Low	2 Low	3 Low	4 Low	5 Medium

Table 5 – Indicative Management Option for Each Risk Assessment Rating describes the possible actions required for each risk assessment rating.

Table 5 – Indicative Management Option for Each Risk Assessment Rating

Risk Rating	Risk Rating Scores	Indicative Management Option
Extreme	16 – 25	Manage by implementing site management and emergency procedures, plant design controls and regular monitoring
High	10 – 15	Manage by implementing site management and emergency procedures, specific monitoring and may require some operation/plant design controls
Medium	5 – 9	Manage by implementing specific monitoring or response procedures
Low	1 – 4	Manage by routine procedures, unlikely to need specific application of resources

Site activities have been tabulated against environmental risk to provide a focus for preparing the EMP, refer to **Table 6 – Identification of Environmental Impacts and Risks**.

Table 6 – Identification of Environmental Impacts and Risks

Activity	Impacts								
	Stormwater, Soil Erosion/Flood Inundation	Groundwater	Land Contamination	Air Quality (Dust)	Noise and Vibration	Waste	Fauna and Flora	Visual Amenity	Spread of Declared Plants
Vegetation Clearing	Medium 4x2=8	Low 2x1=2	Low 2x1=2	Medium 3x2=6	Medium 3x2=6	Low 4x1=4	Medium 3x3=9	Medium 3x2=6	Low 2x1=2
Topsoil Stripping & Stockpiling	Medium 4x2=8	Low 2x1=2	Low 1x1=1	Medium 3x2=6	Medium 3x2=6	Low 2x1=2	Low 2x1=2	Medium 3x2=6	Low 2x1=2
Raw Material Extraction including Dredging	Medium 4x2=8	Low 2x1=1	Low 2x1=2	Low 2x1=2	Medium 3x3=9	Low 2x1=2	Low 2x1=2	Medium 3x2=6	Low 2x1=2
Raw Material Stockpiling	Low 4x1=4	Low 1x1=1	Low 1x1=1	Low 3x1=3	Low 3x1=3	Low 1x1=1	Low 1x1=1	Low 2x1=2	Low 2x2=4
Raw Material Handling	Low 3x1=3	Low 1x1=1	Low 2x1=2	Low 3x1=3	Low 3x1=3	Low 1x1=1	Low 3x1=3	Low 2x1=2	Low 2x2=4
Screening	Low 3x1=3	Low 1x1=1	Low 2x1=2	Medium 3x3=9	Medium 3x3=9	Low 3x1=3	Low 2x1=2	Low 2x1=2	Low 1x1=1
Product Stockpiling & Handling	Low 3x1=3	Low 1x1=1	Low 1x1=1	Low 3x1=3	Medium 3x3=9	Low 2x1=2	Low 1x1=1	Low 2x1=2	Low 2x2=4
Product Haulage	Low 2x1=2	Low 1x1=1	Low 1x1=1	Medium 3x2=6	Medium 3x3=9	Low 1x1=1	Low 2x1=2	Low 2x1=2	Low 2x2=4
Maintenance Activities	Low 3x1=3	Low 2x1=2	Low 3x1=3	Low 1x1=1	Low 3x1=3	Low 4x1=4	Low 2x1=2	Low 1x1=1	Low 2x2=4
Handling of Hydrocarbons & Chemicals	Medium 3x2=6	Low 2x1=2	Medium 3x2=6	Low 1x1=1	Low 1x1=1	Low 3x1=3	Low 2x1=2	Low 1x1=1	Low 1x2=2
Rehabilitation Activities	Medium 4x2=8	Low 1x1=1	Low 1x1=1	Low 2x1=2	Low 3x1=3	Low 2x1=2	Low 2x1=2	Low 1x1=1	Low 3x1=3
Stormwater Management	Medium 4x2=8	Low 1x1=1	Low 1x1=1	Low 2x1=2	Low 2x1=2	Low 2x1=2	Low 2x1=2	Low 1x1=1	Low 2x2=4
Waste Management	Low 3x1=3	Low 1x2=2	Low 2x1=2	Low 3x1=3	Low 2x1=2	Low 2x1=2	Low 3x1=3	Low 2x1=2	Low 2x2=4
Front End Loader	Low 1x1=1	Low 1x1=1	Low 2x2=4	Low 3x1=3	Medium 3x2=6	Low 2x1=2	Low 2x1=2	Low 1x1=1	Low 2x2=4
Screening Plant	Low 2x1=2	Low 1x1=1	Low 2x2=4	Low 2x1=2	Medium 3x3=9	Low 2x1=2	Low 2x1=2	Low 1x1=1	Low 2x2=4
Excavator	Low 2x1=2	Low 1x1=1	Low 2x2=4	Low 3x1=3	Medium 3x3=9	Low 2x1=2	Low 2x1=2	Low 1x1=1	Low 2x2=4

Activity	Impacts								
	Stormwater, Soil Erosion/Flood inundation	Groundwater	Land Contamination	Air Quality (Dust)	Noise and Vibration	Waste	Fauna and Flora	Visual Amenity	Spread of Declared Plants
Haul Trucks and Product Delivery Truck	Low 2x1=2	Low 1x1=1	Low 1x2=1	Medium 3x3=9	Medium 3x3=9	Low 2x1=2	Low 2x1=2	Low 1x1=1	Low 2x2=4
Light Vehicles	Low 1x1=1	Low 1x1=1	Low 1x2=1	Low 3x1=3	Low 3x1=3	Low 2x1=2	Low 2x1=2	Low 1x1=1	Low 2x2=4

2 Environmental Assessments

2.1 Summary of Assessment Undertaken and Recommendations

A detailed Ecology Assessment (refer **Attachment 1 – Ecological Assessment**) has been undertaken by Gondwana Ecology Group which analysed the ecological features within the site and assessed the potential impact of proposed operations with consideration of the requirements identified in the State and Council prelodgement meetings. The report states that vegetation on the site is predominately grazing landscape of planted pasture and weed species with the valance generally conforming to that which has been mapped "regulated vegetation" by the State.

The proposed project has been designed to avoid all features considered "high ecological value" at a State and Commonwealth level and has avoided the Council's "significant local vegetation". The Ecological Assessment recommends a number of mitigation measures which include:

- Designing the haul road through remnant woodland to Resource Area 1 to avoid large eucalypts.
- Avoiding any tree with eagle nest during initial stages and only remove if necessary.
- Avoiding the removal of large paddock trees, figs and stags (particularly with design of haul road and on edge of Resource Areas).
- Retaining the Stockpile Area on higher ground (rather than on lower slopes).
- Avoiding the small swales/wetlands (particularly with haul road design).
- Minimising the erosion to "wetlands" through avoidance and implementation of sediment control, where necessary.
- Checking the fauna (with fauna catcher/ecologist) during clearing operations (particularly large trees).
- Relocate/reusing the hollow logs and woody debris for habitat.
- Retaining the Stockpile Area setback (approximately 30m) from remnant vegetation and above a flooding level.

Following implementation of the proposed project the report concludes it is unlikely there would be any significant impact on features of high ecological value. The report concludes that the project could be approved with reasonable and relevant conditions with respect to ecology.

3 Environmental Management Plan

The proposed extraction of sand and gravel is considered to be relatively small scale, however, where potential risks have been identified an applicable management plan has been prepared as part of the EMP to manage these potential impacts. The EMP is the principal management tool for guiding environmental management at the site by providing the framework for environmental management at the operational level to prevent or minimise environmental impacts. It sets out the purpose, relevant Environmental Authority (EA) and Development Approval (DA) conditions, performance targets, mitigation measures and strategies, and monitoring that will be undertaken for each environmental element that poses a risk.

The EMP will guide future activities on site and will need to incorporate the requirements of the DA once issued by the Council and the EA once issued by the EHP hence it will be updated to include all conditions once these approvals are finalised.

4 Environmental Objective Assessment

This Environmental Objective Assessment has been prepared to assist the administering authority in their environmental management decisions relating to the environmental relevant activity of this site-specific Environmental Authority Application. The Environmental Objective Assessment has been made against the environmental objective and performance outcomes prescribed in schedule 5, part 3, tables 1 and 2 of the *Environmental Protection Regulations 2008*.

The Environmental Objective Assessment has been split into an Operational Assessment, refer to **Table 7 – Operational Assessment** and a Land Use Assessment, refer to **Table 8 – Land Use Assessment**.

Table 7 – Operational Assessment

Environmental Objective	Performance Outcomes	Assessment x/✓/na	Comments
Air			
The activity will be operated in a way that protects the environmental values of air.	1. There is no discharge to air of contaminants that may cause an adverse effect on the environment from the operation of the activity.	x	The potential for dust emissions from the proposed sand extraction is limited due to the nature of the material being extracted having a large particle size (sand). Additionally, no crushing will be conducted on the site. While there is minimal potential for the proposed operations to cause dust amenity impacts, a range of mitigation measures will be implemented as detailed in the EMP.
	2. All of the following— (a) fugitive emissions of contaminants from storage, handling and processing of materials and transporting materials within the site are prevented or minimised;	✓	Strategies/mitigation measures implemented on-site are provided in Section 3.4 of the draft EMP.
	(b) contingency measures will prevent or minimise adverse effects on the environment from unplanned emissions and shut down and start up emissions of contaminants to air;	✓	The initial corrective actions are provided in Section 3.4 of the EMP.
	(c) releases of contaminants to the atmosphere for dispersion will be managed to prevent or minimise adverse effects on environmental values.	na	
Water			
The activity will be operated in a way that protects environmental values of waters.	1. There is no actual or potential discharge to waters of contaminants that may cause an adverse effect on an environmental value from the operation of the activity.	x	Site activities have the potential to impact on overland flow water quality that could cause an adverse effect on environmental values of the receiving environment.
	2. All of the following— (a) the storage and handling of contaminants will include effective means of secondary containment to prevent or minimise releases to the environment from spillage or leaks;	✓	Applicable strategies/mitigation measures implemented on-site are provided in Section 3.1 and Section 3.1 of the EMP for stormwater contamination management, and handling/storing of hydrocarbons and chemicals on-site respectively.
	(b) contingency measures will prevent or minimise adverse effects on the environment due to unplanned releases or discharges of contaminants to water;	✓	Applicable strategies/mitigation measures implemented on-site are provided in Section 3.1 of the EMP.
	(c) the activity will be managed so that stormwater contaminated by the activity that may cause an adverse effect on an environmental value will not leave the site without prior treatment;	✓	Site management protocol relating to Stormwater management (including management strategies/mitigation measures, monitoring and corrective actions) is provided in Section 3.1 of the EMP.
	(d) the disturbance of any acid sulphate soil, or potential acid sulphate soil, will be managed to prevent or minimise adverse effects on environmental values;	✓	As the area of the proposed extraction is outside of the mapping for Acid Sulphate Soils it is unlikely that disturbance of ASS or PASS will occur. Should it be identified site management will investigate the source further and undertake management strategies/mitigation measures, monitoring and corrective actions if necessary.

Environmental Objective	Performance Outcomes	Assessment x/✓/na	Comments
	(e) acid producing rock will be managed to ensure that the production and release of acidic waste is prevented or minimised, including impacts during operation and after the environmental authority has been surrendered;	na	The site is not located at or near an area where acid producing rock has previously been identified or within a prospective land zone containing acid producing rock.
	(f) any discharge to water or a watercourse or wetland will be managed so that there will be no adverse effects due to the altering of existing flow regimes for water or a watercourse or wetland;	✓	The waters within the extraction pits will be managed to meet license conditions and ensure no adverse effects occur downstream. The proposed operations should not alter the existing flow regimes within the Fitzroy River as clean overland flow will be directed around or through the site away from the operational area, refer to Section 3.1 of the EMP.
	(g) for a petroleum activity, the activity will be managed in a way that is consistent with the coal seam gas water management policy, including the prioritisation hierarchy for managing and using coal seam gas water and the prioritisation hierarchy for managing saline waste;	na	Site operations are not a petroleum activity.
	(h) the activity will be managed so that adverse effects on environmental values are prevented or minimised.	✓	Site management protocol relating to Stormwater, Erosion and Sediment Control (including management strategies/mitigation measures, monitoring and initial corrective actions) is provided in Section 3.1 of the EMP.
Wetlands			
The activity will be operated in a way that protects the environmental values of wetlands.	1. There will be no potential or actual adverse effect on a wetland as part of carrying out the activity.	x	Any potential for adverse impact on wetlands due to stormwater drainage will be mitigated and managed in accordance with Section 3.1 of the EMP.
	2. The activity will be managed in a way that prevents or minimises adverse effects on wetlands.	✓	Site management protocol relating to water quality management (including management strategies/mitigation measures, monitoring and corrective actions) is provided in Section 3.1 of the EMP. This will ensure the activity will be managed in a way that prevents or minimises adverse effects on the adjacent wetland.
Groundwater			
The activity will be operated in a way that protects the environmental values of groundwater and any associated surface ecological system.	1. Both of the following apply— (a) there will be no direct or indirect release of contaminants to groundwater from the operation of the activity; (b) there will be no actual or potential adverse effect on groundwater from the operation of the activity.	x	Groundwater may be encountered at depth during extraction. No actual or potential adverse effect on groundwater from the operation of the activity is anticipated. If managed in accordance with the EMP, it is expected that the proposed extraction activities will have no adverse impact on local groundwater quality.
	2. The activity will be managed to prevent or minimise adverse effects on groundwater or any associated surface ecological systems. <i>Note—Some activities involving direct releases to groundwater are prohibited under section 56 of this regulation.</i>	✓	The activity will be managed to prevent adverse effects on groundwater or any associated surface ecological systems. Site management protocol relating to water quality management (including management strategies/mitigation measures and monitoring) is provided in Section 3.1 of the EMP.
Noise			
The activity will be operated in a way that protects the environmental values of the acoustic environment.	1. Sound from the activity is not audible at a sensitive receptor.	x	The proposed development will incorporate appropriate noise control infrastructure and management measures as necessary to achieve the regulatory amenity guidelines for surrounding sensitive receptors.
	2. The release of sound to the environment from the activity is managed so that adverse effects on environmental values including health and wellbeing and sensitive ecosystems are prevented or minimised.	✓	Site management protocol relating to noise including management strategies/mitigation measures and monitoring is provided in Section 3.5 of the EMP.

Environmental Objective	Performance Outcomes	Assessment x/✓/na	Comments
Waste			
Any waste generated, transported, or received as part of carrying out the activity is managed in a way that protects all environmental values.	1. Both of the following apply— (a) waste generated, transported or received is managed in accordance with the waste and resource management hierarchy in the Waste Reduction and Recycling Act 2011; (b) if waste is disposed of, it is disposed of in a way that prevents or minimises adverse effects on environmental values.	✓	Site management protocol relating to waste (including management strategies/mitigation measures, monitoring and corrective actions) is provided in Section 3.6 of the EMP.
Land			
The activity is operated in a way that protects the environmental values of land including soils, subsoils, landforms and associated flora and fauna.	1. There is no actual or potential disturbance or adverse effect to the environmental values of land as part of carrying out the activity.	x	Site operations will predominately occur within pasture areas but may involve minor clearing of vegetation and the disturbance of land, soils, subsoils and landform. However, areas of high ecological value as identified by the ecological assessment will be retained (refer Attachment 1 – Ecological Assessment).
	2. All of the following— (a) activities that disturb land, soils, subsoils, landforms and associated flora and fauna will be managed in a way that prevents or minimises adverse effects on the environmental values of land;	✓	Site management protocol relating to site rehabilitation (including management strategies/mitigation measures, monitoring and corrective actions) is provided in Section 3.9 of the EMP.
	(b) areas disturbed will be rehabilitated or restored to achieve sites that are— (i) safe to humans and wildlife; and (ii) non-polluting; and (iii) stable; and (iv) able to sustain an appropriate land use after rehabilitation or restoration;	✓	The operator's 'Rehabilitation Policy' is to return the land to a safe, stable, non-polluting and self-sustaining state suitable for the desired long-term land use at the cessation of the quarrying operations.
	(c) the activity will be managed to prevent or minimise adverse effects on the environmental values of land due to unplanned releases or discharges, including spills and leaks of contaminants;	✓	The activity will be managed to prevent or minimise adverse effects on land including unplanned releases or discharges, including spills and leaks through the EMP, specifically through section 3.6 of the plan which specifies performance targets and strategies/mitigation measures and monitoring relating to hydrocarbons and chemical management.
	(d) the application of water or waste to the land is sustainable and is managed to prevent or minimise adverse effects on the composition or structure of soils and subsoils.	na	No application of contaminated water or waste likely to have adverse effects on the composition or structure of the soils and subsoils are proposed by the site operations.

Table 8 – Land Use Assessment

Environmental Objective	Performance Outcomes	Assessment x/✓/na	Comments
Site Suitability			
The choice of the site, at which the activity is to be carried out, minimises serious environmental harm on areas of high conservation value and special significance and sensitive land uses at adjacent places.	1. Both of the following apply— (a) areas of high conservation value and special significance likely to be affected by the proposal are identified and evaluated and any adverse effects on the areas are minimised, including any edge effects on the areas; (b) the activity does not have an adverse effect beyond the site.	✓	The proposed development is not anticipated to impact directly or indirectly upon any identified high conservation value areas on or adjacent to the site. A significant buffer shall be maintained in Fitzroy River to ensure the activities have no adverse effects to beyond the site.
	2. Both of the following apply— (a) areas of high conservation value and special significance likely to be affected by the proposal are identified and evaluated and any adverse effects on the areas are minimised, including any edge effects on the areas;	na	
	(b) critical design requirements will prevent emissions having an irreversible or widespread impact on adjacent areas.	na	
Location on Site			

Environmental Objective	Performance Outcomes	Assessment x/✓/na	Comments
The location for the activity on a site protects all environmental values relevant to adjacent sensitive uses.	1. The location for the activity means there will be no adverse effect on any environmental values.	x	The closest sensitive receptor is situated approximately 1.4 km north east of the northern stockpiling area and 1.6 km to the south of Resource Area 1. Any potential adverse impact on these sensitive uses will be minimal, due to the substantial buffer land of the Site and the additional buffers created by Fitzroy River and Etna Creek Road.
	2. Both of the following apply— (a) the activity, and components of the activity, are carried out on the site in a way that prevents or minimises adverse effects on the use of surrounding land and allows for effective management of the environmental impacts of the activity;	✓	The proposed extraction of sand from the site has been designed to ensure that the activity, and components of the activity is carried out in a way that prevent or minimises adverse effects on the use of surrounding land and the EMP identifies mitigation measures/strategies to ensure the effective management of potential environmental impacts of the activity.
	(b) areas used for storing environmentally hazardous materials in bulk are located taking into consideration the likelihood of flooding.	✓	Areas used for storing environmentally hazardous materials are located taking into consideration the likelihood of flooding.
Critical Design Requirements			
The design of the facility permits the operation of the site, at which the activity is to be carried out, in accordance with the best practice environmental management.	1. The activity does not involve the storage, production, treatment or release of hazardous contaminants, or involve a regulated structure.	✓	The activity does not involve the storage, production, treatment or release of hazardous contaminants, or involve a regulated structure.
	2. All of the following apply— (a) all storage provided for hazardous contaminants includes secondary containment to prevent or minimise releases to the environment from spillage or leaks;	na	
	(b) regulated structures comply with the 'Manual for Assessing Hazard Categories and Hydraulic Performance of Dams' published by the department;	na	
	(c) provide containers for the storage of hazardous contaminants that are secured to prevent the removal of the containers from the site by a flood event;	na	
	(d) the design of the facility prevents or minimises the production of hazardous contaminants and waste;	na	
	(e) if the production of hazardous contaminants and waste is not prevented or minimised under paragraph (d)—the design of the facility contains and treats hazardous contaminants rather than releasing them.	na	

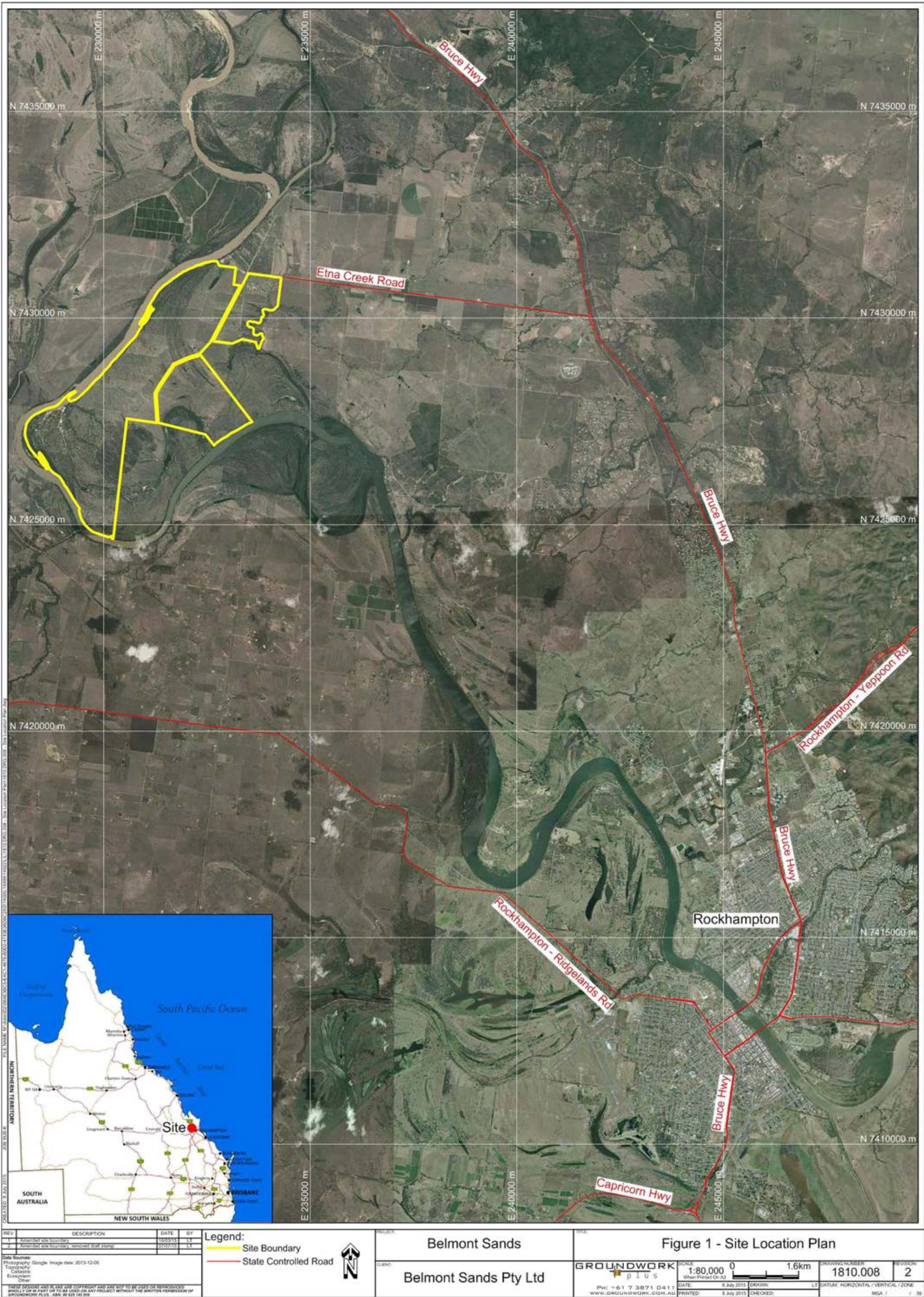
Notes:
 ✓ = Achieves performance outcome
 x = Does not achieve performance outcomes
 na = Not applicable

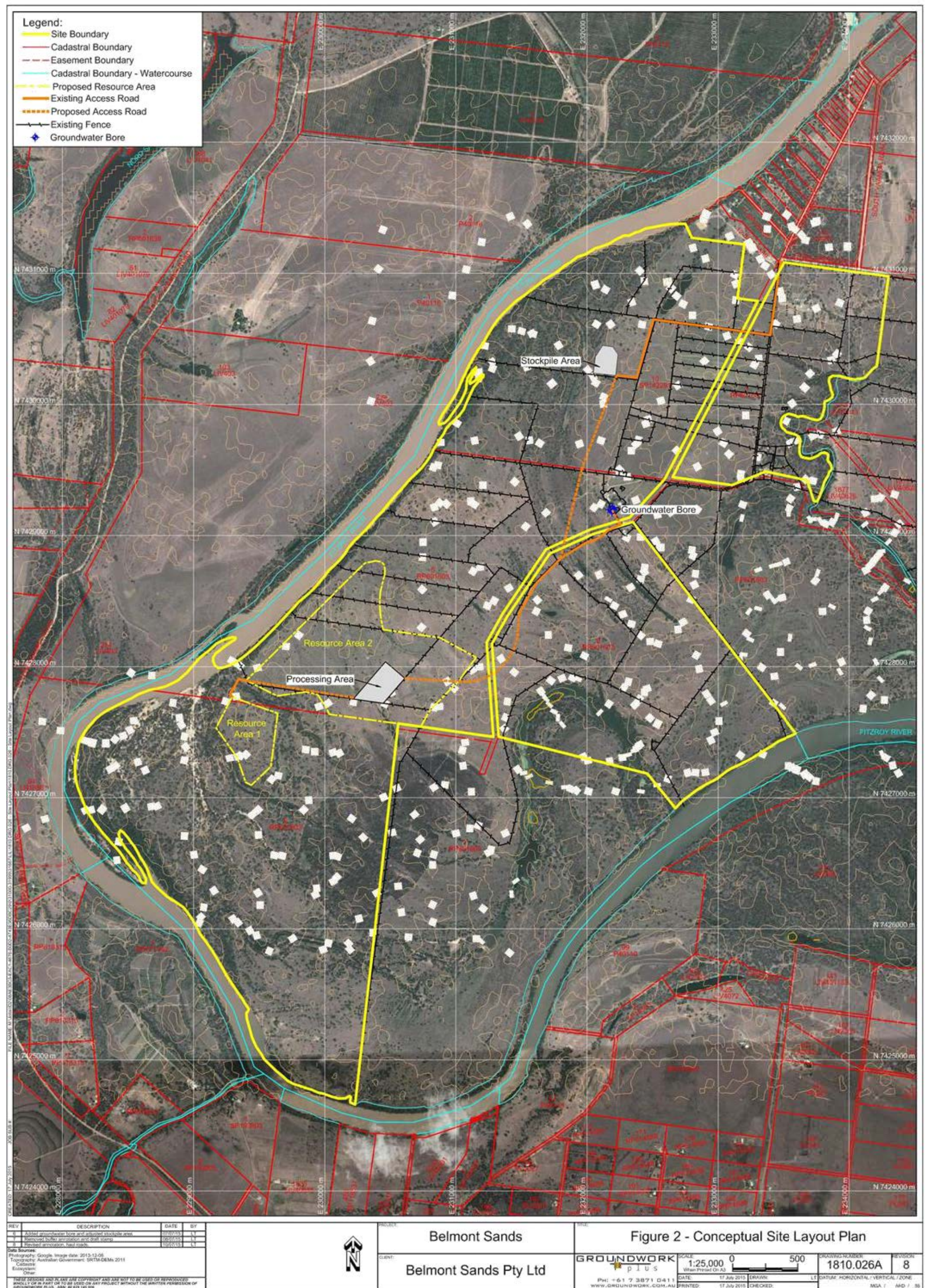
5 Conclusion

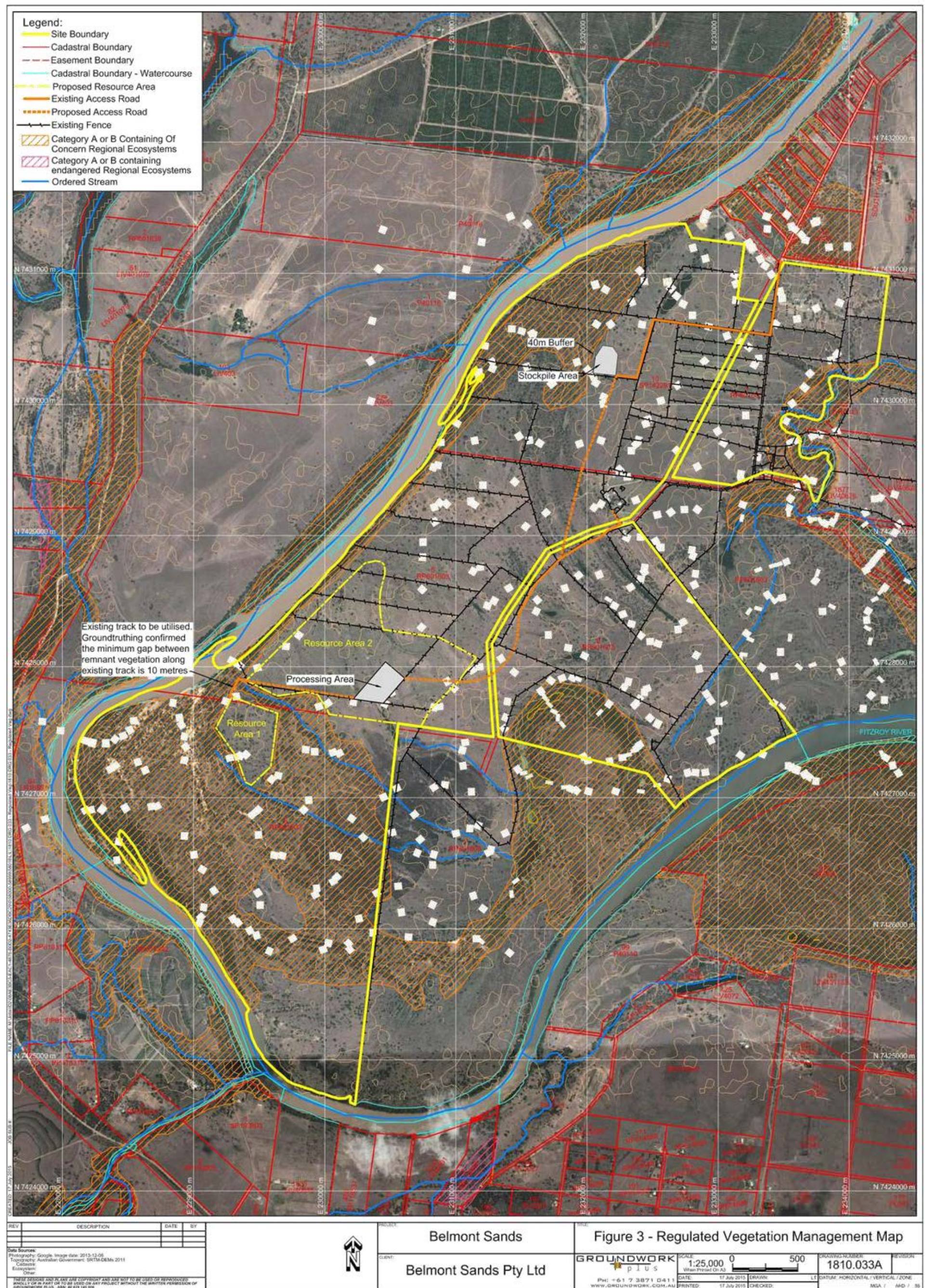
This report has provided a detailed assessment of the potential impacts for the proposed extraction of sand and gravel to be carried out by Belmont Sands on the site adjacent to Fitzroy River to ensure that the potential environmental impacts are identified and will be managed in accordance with best practice. An EMP has been prepared which is intended for use by site managers and will be updated to include DA and EA conditions upon approval.

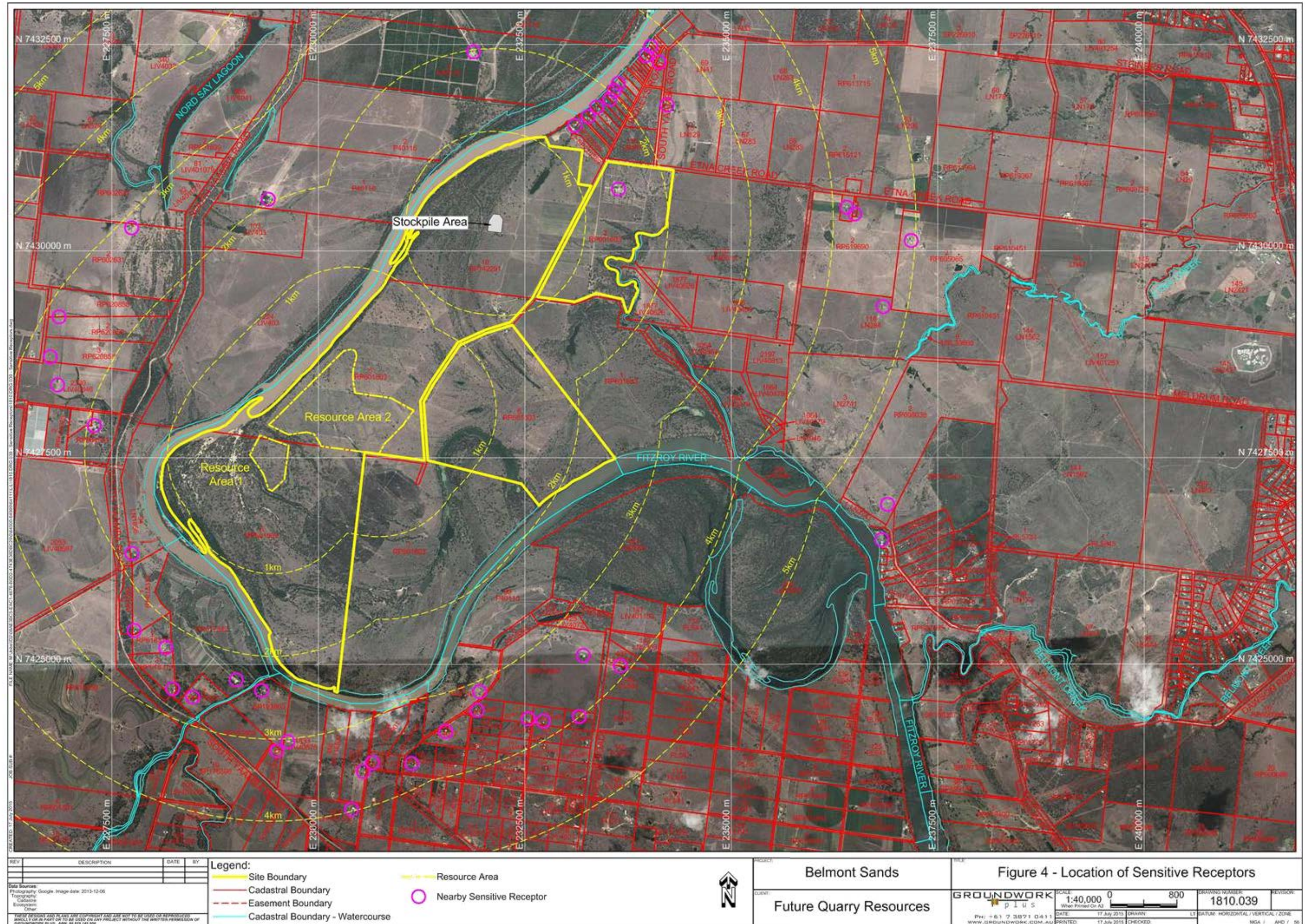
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figures









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attachments

Attachment 1

Ecological Assessment

17/07/2015
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Ecological Assessment

Belmont Sands Quarry

Etna Creek



Prepared for: Belmont Sands Pty Ltd
July 2015

Gondwana Ecology Group PO Box 535 Kenmore 4069



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QUALITY ASSURANCE

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Gondwana Ecology Group operates in accordance with the following approvals, permits and ethical principles:

- Scientific Use Registration (*Animal Care & Protection Act 2001*) – 508
- Animal Ethics Committee (DAFF Animal Ethics) – CA 2013/11/732
- Scientific Purposes Permit (*Nature Conservation Regulation 2006*) – WISP 13794613
- *Certified Environmental Practitioner (Environment Institute of Australia & New Zealand)

Ecology Assessment – Belmont Sands Quarry
Etna Creek



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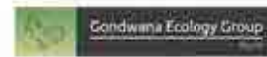


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EXECUTIVE SUMMARY

The subject site is located on a number of allotments (research station) in the Etna Creek locality, north of Rockhampton (within the Livingstone Shire) and is currently an agricultural operation. The Fitzroy River lies to the west with the surrounding landscape characterised by agricultural activities. An extractive operation of sand and gravel is proposed from two resource areas. Other infrastructure for the operation includes a northern stockpile, a processing area and a haul road. All project infrastructure and operations is located in existing grazing land. This report provides an analysis of ecological features within the subject site and assessment of potential impacts with consideration of the requirements identified by Council and the State during pre-lodgement meetings. The site vegetation is predominantly grazing landscape of planted pasture and weed species with the balance generally conforming to that which has been mapped "regulated vegetation" by the State. Riparian vegetation along the Fitzroy River comprises large forest red gums and Coolibah woodland. Isolated large paddock trees, stags and large figs are a characteristic feature across the landscape and provide some habitat for fauna and biodiversity foci. Wetlands and swales with water/wetland vegetation offer habitat for aquatic species, including wetland birds and occur primarily to the east of the subject site. No Commonwealth threatened ecological communities occur within the subject site or immediate surrounds. Council's "significant local vegetation" mapping needs to be refined to accurately reflect that which occurs in the landscape. The proposed project has been designed to avoid all features considered "high ecological significance" at a State or Commonwealth level. A number of management measures have been recommended to minimise potential impacts on general ecological values within (and adjacent to) the subject site. Following appropriate implementation of the proposed project, including detailed design and operation management, it is unlikely there would be any significant or residual impact on features of high ecological value. With respect to ecology, the proposed project could be approved with reasonable and relevant conditions.



1. INTRODUCTION

1.1 Background

Gondwana Ecology Group Pty Ltd has been engaged to provide an analysis of ecological values of the subject site. The level of assessment and subsequent reporting is based on an understanding of the proposed development, associated minimal disturbance to native vegetation and in response to relevant statutory requirements. Pre-lodgement meetings (25 March 2015) with Council and the State have assisted in forming the objectives for the ecological reporting.

1.2 Subject Site

The subject site is located on a number of allotments comprising more than 1500ha off Etna Creek Road as Lots 3, 5, 6 and 8 of RP601603 and Lot 10 on SP142291 (Etna Creek, north of Rockhampton) (Figure 1).

The subject site lies within the Livingstone Shire and is mapped in the *Rural* zone. The land was part of the CSIRO research station with current practices (operated by Agforce) for rural purposes.

The Fitzroy River lies to the west (and generally to the south) with the surrounding landscape characterised by agricultural activities. The subject site is on an alluvial plain (landzone 3) with a number of wetlands (including Boomerang Lagoon and Etna Creek to the east) and woodland patches throughout the local landscape. The Bruce Highway is less than 10km to the east with Mt Etna National Park a further few kilometres in a north-easterly direction.

1.3 Proposed Development

An extractive operation of sand and gravel is proposed from two resource areas (in the south) (Figure 2). A northern stockpile is proposed above the flood-line and a processing area is located in the south, associated with resource area 2. A haul road is proposed through the landscape to Etna Creek Road. All resource areas, roads, processing and stockpile areas are located in existing grazing land and comprise an area approximately 130ha.

1.4 Purpose of the Report

The objective of this report is to provide a technical assessment of ecological values for the subject site in accordance with statutory requirements within the context of the site values and proposed development and as identified during the pre-lodgement meetings. Specifically, the following:

- Locally significant vegetation mapping (Council)
- Northern wetland and adjacent stockpile (it is acknowledged that, subsequent to the meeting, the stockpile has been relocated away from this wetland)
- Ground-truthing of any watercourse crossings (with photographs), State-mapped vegetation (with tree heights near infrastructure), waterways and wetlands.

1.5 Site Inspections

Gondwana Ecology Group has completed site inspections in June 2015. Local ecological knowledge (e.g. the author, station manager and community/conservation organisations) has also assisted in informing the values within the site and locality.



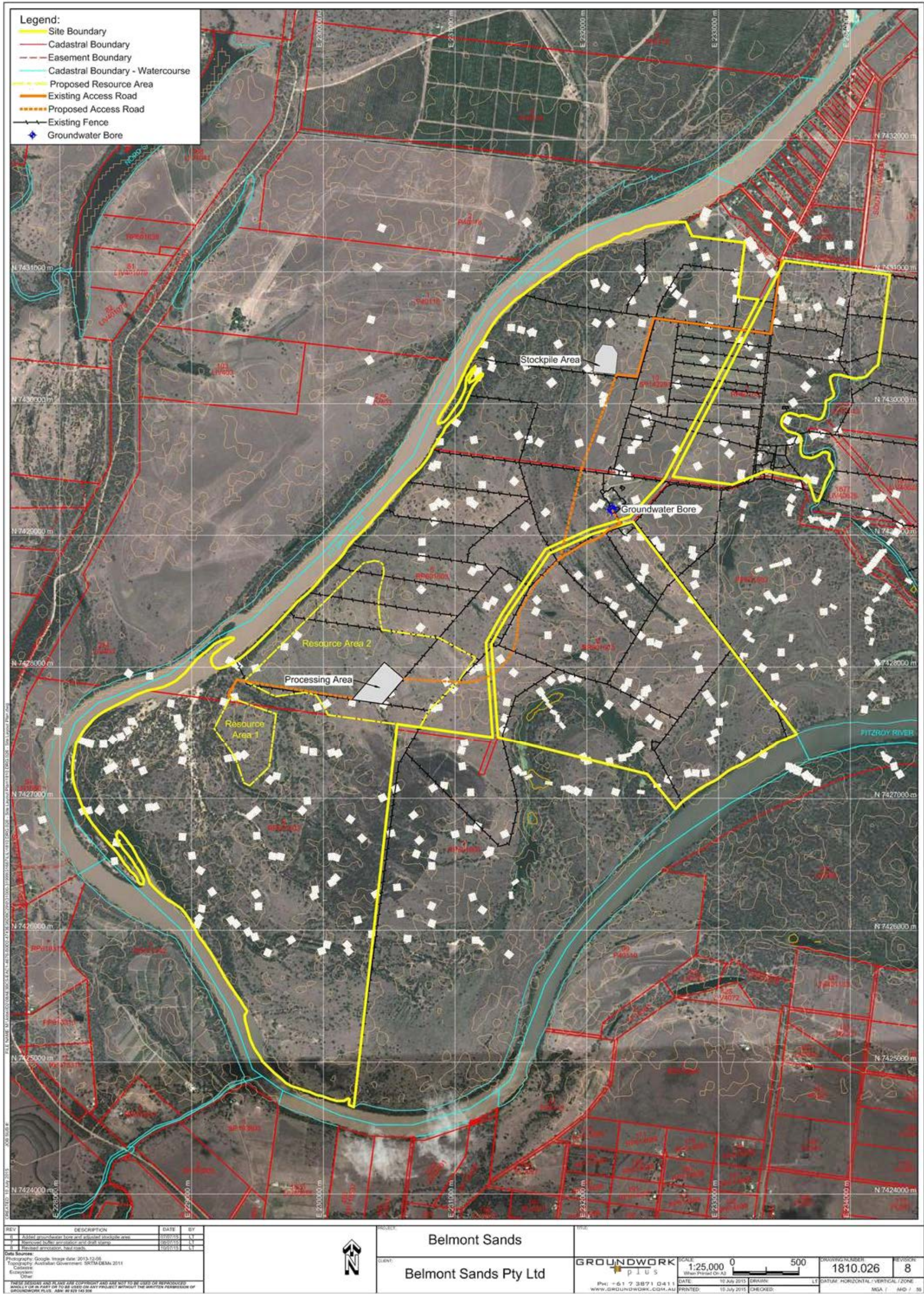


FIGURE 2 Conceptual Layout Plan



2. STATUTORY MAPPING AND POLICIES

2.1 Introduction

Available databases, mapping and aerial photography was reviewed to determine the potential for certain species and/or vegetation communities to occur within or adjacent to the site.

Threatened (or conservation significant) species are those which are listed under the schedules of the Commonwealth *Environment Protection and Biodiversity Conservation* (EPBC) Act 1999 and/or State *Nature Conservation Act* (NCA) 1992 as *critically endangered*, *endangered*, *vulnerable* or *near threatened*. The Commonwealth collectively identifies matters of significance as Matters of National Environmental Significance (MNES) while the State identifies ecological values as "State Significant Biodiversity Values" (SSBV) or Matters of State Environmental Significance (MSES). MSESs include flora and fauna, essential habitat and regulated vegetation.

2.2 Commonwealth

The database tool provided by the Commonwealth (Australian Government, 2015) is recognised as broad and general, often capturing species and communities that do not necessarily occur in the location. Confirmation with local databases and ground truthing is necessary to make accurate determinations of likelihood of occurrence. The database considers a number of MNES to occur within 5km of the site (**Appendix A**). This includes:

- three threatened ecological communities - TECs (Brigalow, Coolibah-Blackbox Woodlands, Weeping Myall)
- 29 threatened species (flora and fauna)
- 24 migratory species
- one nationally important wetland (Fitzroy River Floodplain)

Marine species are also listed, but not discussed in this document (i.e. lack of habitat and unlikely potential to occur).

2.3 State

The Department of State Development Infrastructure and Planning (DSDIP) provides a range of mapping to assist development planning. The State maps (DSDIP, 2015) MSES "regulated vegetation", MSES "high ecological significance wetlands and MSES "regulated vegetation intersecting a watercourse" (**Attachment B**).

The *Vegetation Management Act 1999* (VMA) regulates clearing of remnant vegetation on freehold and leasehold land within Queensland. This is achieved by preserving remnant regional ecosystems (RE's), preserving vegetation in areas of high nature conservation value, and protecting areas vulnerable to land degradation. A number of "ecological" layers are provided through the DNRM (2015) mapping database (**Appendix C**). Remnant vegetation is mapped along the Fitzroy River in the west and in the south (forest red gum woodland fringing drainage lines and coolibah woodland in south). There is no *essential habitat* mapped within the subject site. Essential habitat for the squatter pigeon (based on a point record) is mapped approximately 2km to the east (refer **Appendix C**).

One State-mapped (State of Queensland, 2015) wetland of *high ecological significance* is mapped in the north of the subject site (refer **extract** below) with other wetlands mapped to the east. Buffer (or trigger areas) extend from these wetlands into the subject site.

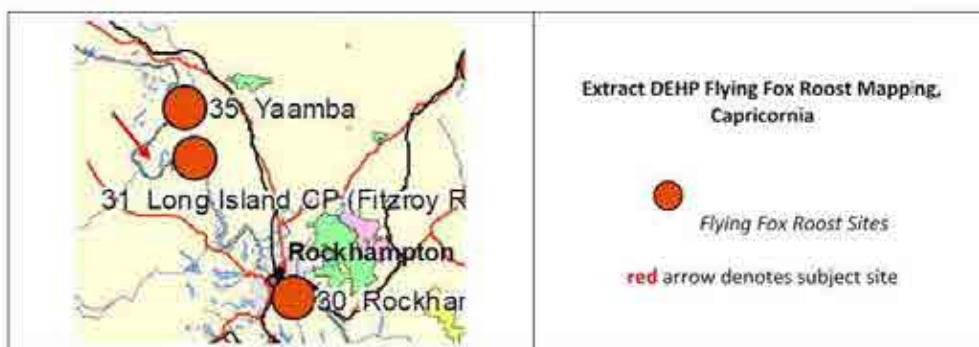


As per the Fish habitat DA Mapping (provided by DSDIP/SARA, June 2015 – refer extract), three waterways are mapped in south of site, one near Processing Area (low value), one associated with access to Resource Area 1 (moderate value) and the third south of Resource Area 1.



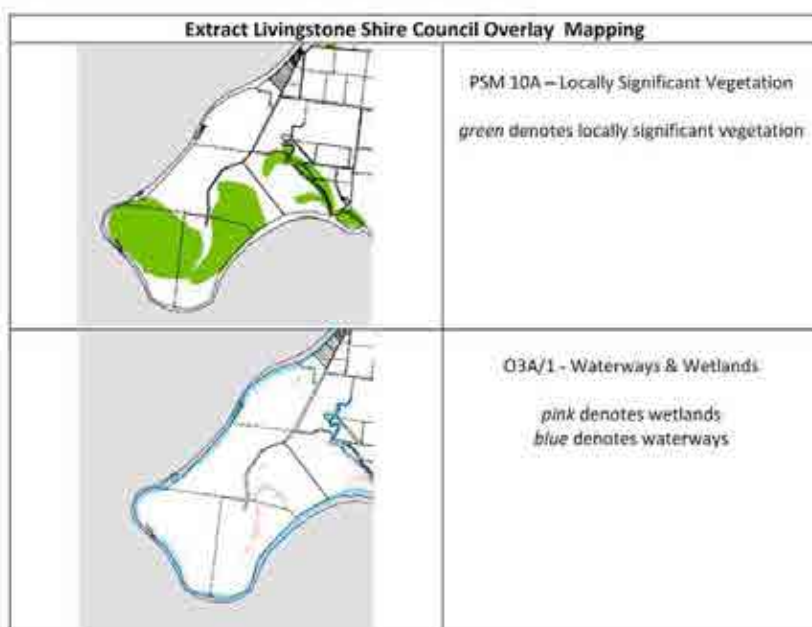
The *Nature Conservation Act 1992* (NCA) provides the framework for the protection of native flora and fauna, and provides a list of threatened flora and fauna at a state level (including endangered, vulnerable, near threatened and of least concern). The subject site **does not** fall within the *protected plants flora survey trigger area* (DEHP, 2015) which identifies knowledge of local protected plant records. The State wildlife database (DISITIA, 2015) indicates that there are confirmed records for listed (under the NCA) species, i.e. three fauna and nine flora (refer **Section 3**) which have been recorded within 10km of the subject site.

The Department of Environment and Heritage Protection has mapped the locations of flying-fox colonies within Southeast Queensland. There are a number of colonies mapped within the Capricornia region, including one at Long Island and another at Yaamba, east and north of the subject site, respectively (DEHP, 2011) (refer **Extract** below).



2.4 Livingstone Shire Council

The Livingstone Shire Council Strategic Map identifies the subject site as lying within the *Rural* zone. Two Council mapping overlays are relevant to ecology, i.e. O3A/1 - Waterways & Wetlands and PSM 10A – Locally Significant Vegetation (refer **Extract** below). No waterways or wetlands are mapped on the subject site, other than a wetland in north. Locally significant vegetation is mapped in the south (associated with Resource Area 1) and to the south east.



The Capricorn Conservation Council (CCC) website (<http://www.cccqld.org.au/>) provides information on "current issues" and fauna and flora for the region. It is noted that 49 frog species (included a number of threatened species) occur within Central Queensland. Koala, turtle, State vegetation and water bodies were identified by CCC as the key ecological matters for attention (M.McCabe pers.com.).

The Fitzroy Basin Association website (<http://www.fba.org.au/>) provides information for graziers, farmers, volunteers and community groups. Information on special plants and animals, pest species and the waterways is provided.



3. ECOLOGY VALUES

3.1 Introduction

Inspections have been undertaken in June 2015 to provide confirmation of the site values and to assist with the design of the extraction operations in order to minimise impacts on ecological values. Survey objectives were therefore as follows:

- Assess the site vegetation and consider State mapping;
- Searches for significant species listed (and habitats) under Council, EPBC and NC Act Schedules; and
- Inspection of ecological values in the immediate surrounds.

3.2 Survey Methodology

A field assessment of the vegetation of the subject property was conducted over two days from the 6th to 7th June 2015. The assessment specifically targeted the areas to be impacted by the proposed development as well as examining any adjacent remnant areas. Within each area of interest, information about the vegetation was recorded using a quaternary site assessment as per the method of Neldner *et al.* (2012). GPS location, major canopy, shrub and groundcover species, structural information including approximate stratum heights and past or ongoing disturbances were recorded at each quaternary site. Photos were also taken at each site facing the four cardinal points (north, south, east and west). The field survey also involved targeted searches for threatened flora species. One or more quaternary sites were assessed for each area. Targeted surveys were undertaken for threatened fauna and/or their habitats in suitable locations. The survey included identification and assessment of fauna habitats and a list of fauna recorded during the inspection.

3.2 Broad Vegetation Communities

Vegetation in the subject site generally comprised non-remnant, grazed pasture with varying densities of native trees and native woody regrowth (refer **Photo Plates**). A total of 96 plant species were recorded during the field assessment, 43 of which were introduced. Common remnant trees across the area included *Casuarina cunninghamiana* (river sheoak), *Corymbia tessellaris* (Moreton Bay ash), *Eucalyptus coolabah* (coolabah), *E. tereticornis* (forest red gum) and *Ficus obliqua* (small-leaved fig). The woody regrowth also featured these tree species as well as some native shrub species. The ground cover was dominated by introduced species, typically pasture grasses and legumes.

There is fairly extensive evidence across the landscape of damage and tree uprooting, primarily as a result of the recent cyclone (i.e. Cyclone Marcia - February 2015) (P.Orchard, Station Manager, pers.com.).

3.3 Remnant Vegetation

Regional Ecosystem (RE) mapping showed three remnant vegetation communities occurred in the area (refer **Attachment C**):

- RE 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains;
- RE 11.3.3 – *Eucalyptus coolabah* woodland on alluvial plains; and
- RE 11.3.25 – *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines.

The status of both RE 11.3.2 and RE 11.3.3 under the *Vegetation Management Act 1999* is 'Of Concern' whereas RE 11.3.25 is 'Least Concern'.

RE 11.3.3 formed the most extensive remnant vegetation in the surrounding area, occupying a large area to the south, east and west of the proposed development areas. RE 11.3.25 occupied a narrow



fringe along the bank of the nearby Fitzroy River and occurred in association with RE 11.3.3 to the east and north of the proposed development areas.

3.4 Vegetation Communities in Project Areas

The proposed resource areas, processing and stockpile areas and haul road have been located outside of the mapped remnant vegetation. The ground-truthing of the vegetation during the field assessment confirmed that these areas were located in non-remnant vegetation.

3.4.1 Resource Area 1

Resource Area 1 was surrounded on all sides by remnant vegetation mapped as RE 11.3.3 (*Eucalyptus coolabah* woodland on alluvial plains). The non-remnant vegetation within this area comprised pasture with scattered remnant native trees and woody regrowth. Common native trees included *Corymbia tessellaris* (Moreton Bay ash), *Eucalyptus coolabah* (coolabah) and *E. tereticornis* (forest red gum). *Planchonia careya* (cocky apple), *Casuarina cunninghamiana* (river she-oak) and *Acacia salicina* (sally wattle) were also widespread as a tall shrub/low tree component.

The ground layer was generally dominated by introduced pasture species including *Cenchrus ciliaris* (buffel grass), *Megathyrsus maximus* (green panic) and *Melinis repens* (red Natal grass). Native grasses included *Heteropogon contortus* (bunch spear grass) and *Themeda triandra* (kangaroo grass). Weeds were also prevalent including *Lantana camara* (lantana), *Xanthium occidentale* (noogoora burr) and *Stachytarpheta jamaicensis* (snake weed).

Large specimens of small-leaved figs (*Ficus obliqua*) were also scattered across RA1. One of the largest specimens was over 1m in diameter and up to 18m in height. It's widely spreading canopy, approximately 30m in diameter, created a micro-environment in which other closed forest species occurred. Associated with this large *F. obliqua* were the trees *Dysoxylum gaudichaudianum* (ivory mahogany) and *Mallotus philippinensis* (red kamala). Shrub species beneath the canopy of the fig included *Diospyros humilis* (small-leaved ebony), *Ficus opposita* (sandpaper fig) and *Trophis scandens* (burny vine). Elsewhere these figs occurred as isolated specimens but most of them appeared to have established as stranglers in host trees, usually eucalypts.

3.4.2 Resource Area 2

Resource Area 2, like Resource Area 1, supported non-remnant vegetation that comprised pasture with widely scattered trees and varying densities of native regrowth woody vegetation, however the remnant trees in this area were far more widely dispersed but included a similar suite of species including *Corymbia tessellaris* (Moreton Bay ash), *Eucalyptus coolabah* (coolabah) and *E. tereticornis* (forest red gum). Specimens of *Ficus obliqua* (small-leaved fig), *Dysoxylum gaudichaudianum* (ivory mahogany) and *Casuarina cunninghamiana* (river she-oak) were also present. A similar mix of shrub, small tree and groundcover species to that recorded in Resource Area 1 was observed.

Resource Area 2 occupied a greater area than Resource Area 1 and included some larger swales, representing abandoned channels of the Fitzroy River, some of which supported standing water and aquatic vegetation. One such swale, outside the southeast boundary of Resource Area 2, supported standing water and aquatic vegetation. Aquatic plant species included *Azolla pinnata* (fern, azolla), *Juncus polyanthemus*, the declared Class 2 weed *Hymenachne amplexicaulis* (hymenachne) and *Persicaria attenuata* (velvet knotweed).



3.4.3 Haul Road

The proposed haul road as far as possible traverses existing vehicle tracks and grazing areas, therefore the landscape associated with this infrastructure comprises primarily introduced pasture and weed species. South and west of the homestead small patches of eucalypt regrowth occurs in the vicinity of the proposed road.

3.4.4 Stockpile Area

The stockpile area featured a large *Ficus obliqua* (small-leaved fig) tree that had fallen over, presumably due to the recent cyclone. Although most of the tree's rootball had been exposed there was still live foliage in the canopy. The remainder of the stockpile area was pasture supporting predominantly introduced pasture grasses, legumes and weeds.

Remnant vegetation, mapped as RE 11.3.25, occurred approximately 90m to 100m to the west of the stockpile area and on lower ground. Ground-truthing confirmed this vegetation could be considered remnant although, as with other remnant vegetation within the property, the consequences of pasture species introduction and cattle was evident.

3.4.5 Waterbody in North

A relatively large waterbody was located approximately 500m northeast of the proposed stockpile area. It is understood this waterbody is man-made. Large, mature trees are located along the western bank (possibly the excavated material) included specimens of *Corymbia tessellaris* (Moreton Bay ash), *Eucalyptus tereticornis* (forest red gum) and *Melaleuca viridiflora* var. *viridiflora* (broad-leaved paperbark). The water body, although man-made, offers some natural elements and ecosystem functions.

3.5 Threatened Vegetation Communities

As mentioned in Section 2.2, the Commonwealth database identified three Threatened Ecological Communities (TECs) that may occur in the area (Brigalow, Black Box Woodland and Weeping Myall Woodland). Table 1 below lists the endangered TECs and their corresponding Regional Ecosystems.

Table 1. Threatened Ecological Communities that may occur in the area & equivalent Regional Ecosystems

TEC	Likelihood of occurrence in area*	Equivalent RE (Bioregion 11)
Brigalow (<i>Acacia harpophylla</i> dominant & co-dominant)	Community known to occur within area	11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.9.6, 11.11.14, 11.12.21
Coolibah - Black Box Woodlands of the Darling Riverine Plains & the Brigalow Belt South Bioregions	Community may occur within area	11.3.3 , 11.3.15, 11.3.16, 11.3.28, 11.3.37
Weeping Myall Woodlands	Community likely to occur within area	Not mapped as a stand-alone RE, occurs within 11.3.2 and 11.3.28

*Likelihood = as per database; RE bolded occur near or within subject site

No Regional Ecosystems equivalent to the Brigalow (*Acacia harpophylla* dominant and co-dominant) TEC occurred on the property. The Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions TEC was represented on the property by RE 11.3.3 (*Eucalyptus coolibah* woodland on alluvial plains). In addition, Regional Ecosystem 11.3.2 (*Eucalyptus populnea* woodland on alluvial plains), which may contain the Weeping Myall Woodlands TEC, occurred in the vicinity of the property. No specimens of weeping myall (*Acacia pendula*) were recorded within the broader area.



3.3 Significant Flora

A number of sources were used to determine known or likely occurrence of state and federally significant (threatened) flora species (i.e. species listed under the EPBC Act and/or the Regulations of the NC Act). The State and Commonwealth databases revealed eleven threatened species occurred within 10km of the subject site (Table 2). Based on reference to State RE mapping for the study area, known habitat information for each species and ground-truthing, it was determined that none of the eleven threatened species had more than a "low" likelihood of occurrence within the development areas on the subject site (refer also Appendix A for database records and Appendix D for site flora species list).

Table 2. Threatened flora potentially occurring in the local area

Scientific Name	Common Name	Status	Habitat	Likelihood of Occurrence
<i>Cycas megacarpa</i>		CE, QE	Habitat includes 11.3.25 - <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines, 11.3.4 - <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. tall woodland on alluvial plains.	Low Both regional ecosystems present or nearby to subject property but are outside of the impact area. Furthermore no specimens were observed during in the subject site.
<i>Cycas ophiolitica</i>	Marlborough blue	CE, QE	<i>Cycas ophiolitica</i> grows on hills and slopes in sparse, grassy open forest at altitude ranges from 80-400m above sea level. Although this species reaches its best development on red clay soils near Marlborough, it is more frequently found on shallow, stony, infertile soils, which are developed on sandstone and serpentinite, and is associated with species such as <i>Corymbia dallachiana</i> , <i>C. erythrophloia</i> , <i>C. xanthope</i> and <i>Eucalyptus fibrosa</i> . <i>Cycas ophiolitica</i> has also been found on mudstone in association with <i>Corymbia dallachiana</i> , <i>C. erythrophloia</i> and <i>Eucalyptus crebra</i> , and on alluvial loams with <i>Corymbia intermedia</i> , <i>Eucalyptus drepanophylla</i> and <i>E. tereticornis</i> .	Low Habitat is not present within or adjacent to subject site.
<i>Macraezania serpentina</i>		QE	<i>Macraezania serpentina</i> occurs in low eucalypt woodland with a mixed grassy understorey at altitudes between 80-160m above sea level. It grows on steep rocky slopes on red clay loams and serpentinite soils.	Low Suitable habitat is not present in the subject site.
<i>Tectaria devesa</i> var. <i>devesa</i>	Cave fern	CE, QE	The cave fern grows in narrow pockets of soil on the walls and floor near the entrance to limestone caves in situations where sufficient natural light and moisture are available to support plant growth.	Low Suitable habitat is not present in the subject site.
<i>Graptophyllum excelsum</i>		QNT	<i>Graptophyllum excelsum</i> occurs in semi-evergreen vine thickets, although near Chillagoe the species has also been recorded growing in grassy woodland in association with <i>Eucalyptus cullenii</i> and <i>Corymbia erythrophloia</i> .	Low Some suitable habitat is present but was highly disturbed, small and fragmented. No specimens were found in the subject site.
<i>Pultenaea setulosa</i>	Ragged bush pea	QV, CV	Grows on serpentinite substrates in <i>Eucalyptus fibrosa</i> and/or <i>Corymbia xanthope</i> woodlands or open forests.	Low Suitable habitat is not present on the subject site.
<i>Streblus pendulinus</i>	Siah's backbone	CE	Norfolk Island.	Low The taxonomy of this species is confused but recent published information indicates that <i>Streblus pendulinus</i> is confined to Norfolk Island while <i>S. brunonianus</i> is present on both the Australian mainland as well as on a number of Pacific Islands.



Scientific Name	Common Name	Status	Habitat	Likelihood of Occurrence
<i>Corymbia xanthope</i>	Glen Geddes bloodwood	QV, CV	<i>Corymbia xanthope</i> occurs in woodlands with <i>Eucalyptus fibrosa</i> on ridges or hill slopes on serpentinite geology with sandy soils. This community is recognised as a distinct regional ecosystem (RE 11.11.7 <i>E. fibrosa</i> subsp. (Glen Geddes), <i>C. xanthope</i> woodland on serpentinite).	Low. Suitable habitat is not present in the subject site.
<i>Eucalyptus raveretiana</i>	Black ironbox	CV	Black ironbox usually grows along watercourses, and sometimes on river flats or open woodland. Occurs in Regional Ecosystem 11.3.25a with <i>Melaleuca leucadendron</i> , <i>M. fluviatilis</i> , <i>Eucalyptus tereticornis</i> , <i>Corymbia tessellaris</i> .	Low. Suitable habitat occurs adjacent to the Fitzroy River but not within the development areas. Furthermore, no specimens were observed within the subject site.
<i>Corchorus hygrophilus</i>		QV	Grows on vine forest margins or in sclerophyll forests near vine forest, on soils derived from granite or limestone.	Low. Suitable habitat is not present in the subject site.
<i>Stockhousia tryonii</i>		QNT	Endemic to the serpentinite soils of the Port Curtis district, central Queensland.	Low. Suitable habitat is not present in the subject site.

*Status: C Commonwealth, Q Queensland; E endangered, V vulnerable, NT near threatened

3.5 Fauna & Habitat

As described above, the landscape is characterised by grazed and pasture lands with isolated trees/patches of vegetation and remnant woodland associated with the riparian community along the Fitzroy River. Small ephemeral waterbodies occur within the subject site and adjacent, particularly to the east. While the general landscape is typical of agricultural pursuits, habitats and resources potentially available to fauna include those for foraging, nesting and breeding and exist as follows:

- Riparian vegetation along Fitzroy comprises large blue gums and Coolibah woodland. Coolibah woodland associated with Resource Area 1.
- Isolated large paddock trees, stags and large figs across site – habitat for fauna and focus for biodiversity.
- Wetlands and swales with water/wetland vegetation offer habitat for aquatic species, including wetland birds.

During the survey, a number of fauna was recorded, including 70 bird species (**Appendix E**), a number of wallabies, grey kangaroo, dog, feral pig and fresh-water turtle. It is reported (P.Orchard, Station Manager, pers com.) that a number of fauna have been recorded over the years on or near the property, as follows:

- Sugar Gliders and Brushtail Possums
- Scrub Python, Carpet Snake, Black-headed Python, Spotted Python, Brown Snake and Red-bellied Black Snake
- Saltwater Crocodiles along the Fitzroy River
- Occasional fly-fox foraging in area but no roosts

A large nest (wedge-tailed eagle) was recorded within the paddock in the south and it is reported that historically, Black-necked Storks nested to the east of the subject site a number of years ago (P.Orchard, Station Manager, pers com.).



3.6 Threatened Fauna

A number of sources (including local knowledge) were used to determine known or likely occurrence of threatened fauna (i.e. species listed under the Commonwealth EPBC Act 1999 and/or the Regulations of the Queensland NC Act 1992). **Table 3** provides a list of known records for the locality.

Table 3. Threatened fauna occurring in the local area (known records since 1980)

Species	Common Name	Status*	10km	5km	1km
<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle	QSL	1	1	0
<i>Ardea ibis</i>	cattle egret	QSL	2	1	0
<i>Ardea modesta</i>	eastern great egret	QSL	3	1	0
<i>Rhipidura rufifrons</i>	rufous fantail	QSL	1	0	0
<i>Gallinago hardwickii</i>	Latham's snipe	QSL	1	1	0
<i>Ornithorhynchus anatinus</i>	platypus	QSL	1	1	0
<i>Calyptorhynchus lathami</i>	glossy black-cockatoo	QV	1	1	0
<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)	QV, CV	2	2	0
<i>Macroderma gigas</i>	ghost bat	QV	1	0	0

*Status: C Commonwealth, Q Queensland, V vulnerable, SL State special least concern

Other species listed as threatened and/or migratory, and identified in broad databases (e.g. Commonwealth, **Appendix A**) have also been considered and likelihood of occurrence discussed below:

- Squatter pigeon - habitat on subject site and all agricultural landscapes within Central Queensland, historical record to east and two known records within 10km
- Painted snipe - possible habitat in wetlands to the east of the subject site, species is nomadic and can occur in a range of wetland environments including in farming landscapes, 0 records within 10km
- Large pied bat - possible foraging habitat along riparian areas, 0 records within 10km
- South-eastern long-eared bat - possible habitat along riparian areas and possibly hollow bearing trees, 0 records within 10km
- Fitzroy River turtle - suitable habitat along Fitzroy River – 0 records within 10km, but expected to occur in river
- White bellied sea-eagle - **recorded on site** flying above riparian vegetation in west, likely to nest in large trees associated with large waterways
- Rainbow bee-eater - **recorded on site** flying over site and roosting on trees, not uncommon in this landscape and would forage (aerially) on insects
- Great egret - **recorded** in wetlands to the east of the subject site
- Cattle egret - **recorded on site** in paddocks with cattle, a common species associated with agricultural landscapes



4. IMPACT ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

The proposed development (project) footprint is relatively small and has been designed to avoid disturbance to features of ecological value. These features are summarised below with respect to each project component and the information requested by the State and Council as per the pre-lodgement meetings. **Figure 3** provides an overlay of the mapped ecological features and the project infrastructure. Refer also **Photo Plates** attached.

4.1 Ecological Features of Project Areas

4.1.1 Resource Area 1

- Non-remnant area confirmed, few large trees, including figs (one very large fig and associated vegetation in southwest of high value).
- Waterbody in east with some habitat lies beyond extractive area.

4.1.2 Access to Resource Area 1

- Existing track through eucalypt woodland, cleared understorey, shallow depression. Waterway/drainageline lies to the east of the existing access road.
- Area used by cattle.
- Narrowest area (gap between small eucalypt trees) approximately 10m.
- Gap between largest eucalypt trees approximately 20m.
- Road access/construction should be able to minimise tree clearing (i.e. avoid clearing of any large remnant trees).
- Photographs provided in **Photo Plates**.

4.1.3 Resource Area 2

- Generally open paddock landscape.
- Isolated large trees and figs.
- Patches of Moreton Bay ash woodland (regrowth) in northwest and in swales.
- Large nest (bird of prey) north of Processing Area.
- Wetland/swale immediately south of Processing Area (beyond disturbance footprint).
- Small swales north of Processing Area.

4.1.4 Waterbody in North

- Appears to have natural features and supports wetland/aquatic habitat.
- Understood to be artificial waterbody - as remnant trees are well established on "earthen mound" to west.
- Large stags in locality.

4.1.5 Stockpile Area

- Central point has large fig (blown over by recent Cyclone).
- General landscape is typical grazing paddock.
- Remnant vegetation (mapped, although may be questionable) with swale and waterbody to west.
- Tallest tree (generally at "edge" of remnant vegetation) is a forest red gum (*E. tereticornis*) approximately 22m in height.



- The landform drops to the west and the remnant vegetation is generally located on the lower slopes. A 40m setback is proposed from the edge of the "remnant", essentially locating the western boundary generally on the upper slopes.

4.1.6 Haul Road

- Based on mapping, haul road avoids major swales, all "wetlands", all remnant vegetation and most likely large habitat trees.
- The haul road follows an existing easement/reserve in the north which is devoid of woody vegetation.
- The haul road follows a ridgeline with a few isolated paddock trees in the central north (near the homestead).
- South of the homestead the haul road crosses some swales and regrowth Coolibah woodland.
- South (in the east) the haul road passes along a ridgeline where there are isolated large stags and figs with some wetlands and swales (the wetlands are to the east of the haul road).
- The haul road traverses typical grazing paddock landscape to access the Processing Area.

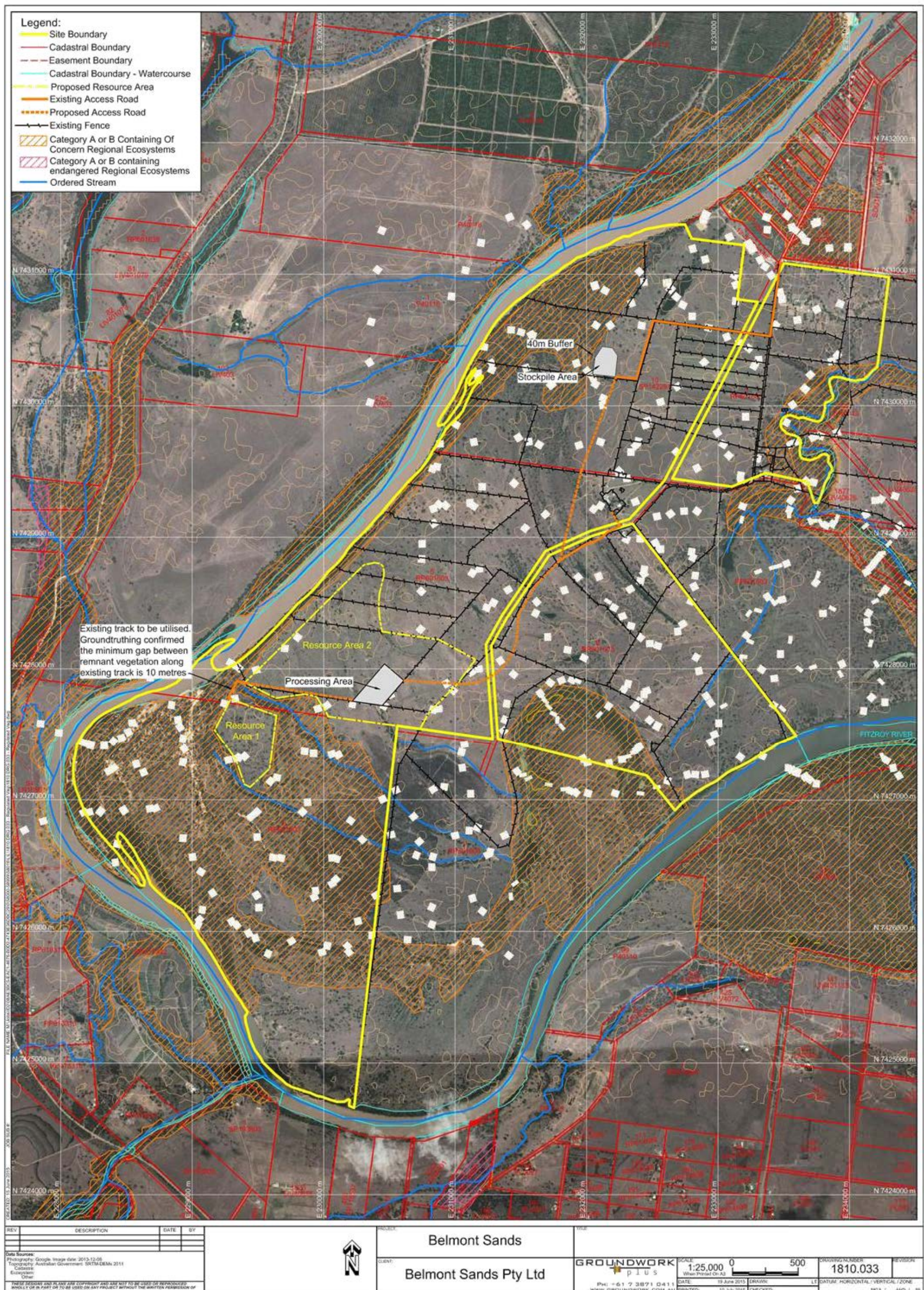
4.2 Potential Impacts on Ecological Values

The identified locations of project infrastructure and extractive areas (i.e. Resource Area 1 and 2, Processing Area, Stockpile Area and Haul Road) are unlikely to impact on any high ecological values. As stated previously, these areas have been specifically located away from features of high value. In summary these areas are:

- outside "actual" ground-truthed remnant vegetation
- in areas that do not support threatened plant species
- outside mapped wetlands and waterways (including access road to Resource Area 1)
- outside any wetlands of "general significance"

The few ecological values that may be potentially impacted (dependent on detailed design stage) are summarised as follows:

- isolated habitat trees within landscape (including large eucalypts, figs and stags)
- regrowth Coolibah woodland
- minor swales/wetlands
- potential habitat for threatened species (e.g. micro-bats, turtle)
- loss of nesting tree for wedge-tailed eagle
- loss of habitat for common fauna and flora





4.3 Management & Mitigation Measures

Upon consideration of the legislative and associated mapping requirements, it has been confirmed that the project has avoided the features on the larger site with any significant ecological values. The overall impacts on ecology from at a local and strategic perspective are considered minimal.

The following measures are suggested, as part of a 'best practice' approach to local ecology matters, and are therefore recommended as inclusions into any site-based Environmental Management Plan:

- Minimise the extent of clearing within any of the nominated stages, to that which is necessary as a practical working area.
- Avoid removal of large paddock trees, figs and stags on the edges of the nominated resource areas.
- The final internal haul road location is to be determined in consultation with a qualified ecologist, to ensure that any resultant ecology impacts are minimised.
- Implementation of sediment control and erosion control measures to ensure potential impacts to "wetlands" are avoided.
- Provide a fauna spotter on the site during clearing operations, particularly for large trees (e.g. trees with girth greater than 300mm) and other trees with nests or obvious hollows. The spotter is to give particular consideration to nests and breeding periods.
- Relocate/reuse hollow logs and woody debris for habitat.
- Identify areas for progressive rehabilitation.
- Identify (i.e. fencing/flagging) appropriate setbacks to remnant vegetation, wetlands and any other features of ecological value that are identified for retention/protection.
- Implementation of broader management measures to protect environmental values, which may include the following:
 - ecological management (including vegetation clearing and fauna/habitat management)
 - erosion and sediment control
 - air quality (dust) management
 - monitoring (as required by the relevant Authority).



5. STATUTORY CONSIDERATIONS

5.1 Council

Council's significant local vegetation mapping identifies a large area of vegetation in the south of the subject site. It is assumed this mapped is based on a high level mapping approach. Following ground-truthing and with reference to the State regulated mapping and aerial photography, it is evident that Council's mapping is inconsistent with that which occurs on the ground. Portions of the area mapped "locally significant" comprises grazing paddocks. Locally significant vegetation is unlikely to be disturbed as part of the project as the intention is to avoid all State mapped vegetation.

5.2 State

The design of the project has intentionally attempted to avoid MSES, including mapped regulated vegetation and wetlands. In particular, the site assessment confirmed that the vegetation associated with Resource Area 1 is not remnant and that the access to Resource Area 1 will not require the removal of regulated vegetation. Wetlands are to be retained with the proposed works setback from these areas in order to adequately buffer the feature. The proposed development is unlikely to have any significant residual impact on wetlands. It is understood that the SDAP Module 11 will be addressed by Groundwork Plus.

5.3 Commonwealth

As per the EPBC Act 1999 requirements, if an action has the potential to significantly impact on a MNES, consideration needs to be given to whether a referral to the Minister is necessary. An understanding of the site and surrounding habitats and potential for species to occur is necessary to determine the likelihood of an action having a direct or indirect impact on a MNES. Understanding the "action" and mitigation measures is necessary to determine level of impact. The proposed development for extractive industry (the "action") is likely to include a number of activities that may impact on the local ecology, ecosystems and potentially MNES, including:

- Earthworks
- Vegetation clearance
- Changes to hydrological regime
- Changes to local landscape (e.g. noise, traffic, dust etc.)

The Commonwealth Significant Impact Guidelines follow a process to ascertain referral requirements.

1. Are there MNES located in area of proposed action?
No MNES are considered to occur within or rely on the subject site.
2. Is there potential for impacts on MNES?
No potential for impact on site. Some low potential for offsite impacts.
3. Are there measures to avoid or reduce impacts?
Yes, measures to be implemented through design and management will avoid or minimise potential offsite impacts.
4. Are the impacts likely to be significant?
Impact (if any) will not be significant.

There is some low potential for the project to disturb offsite ecological values that may support MNES (i.e. within the waterbodies to the east). However, following appropriate design of project and implementation of management measures it is not expected that the proposed development would have any significant impact on any MNES. Based on these assumptions and an understanding of the proposed project, a referral to the Commonwealth is not considered necessary.



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PHOTO PLATES



Ecology Assessment - Belmont Sands Quarry
Etna Creek

PHOTO PLATES



Ecology Assessment - Belmont Sands Quarry
Etna Creek



Australian Government
Department of the Environment

APPENDIX A DATABASE RESULTS

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 02/06/15 16:48:55

[Summary](#)

[Details](#)

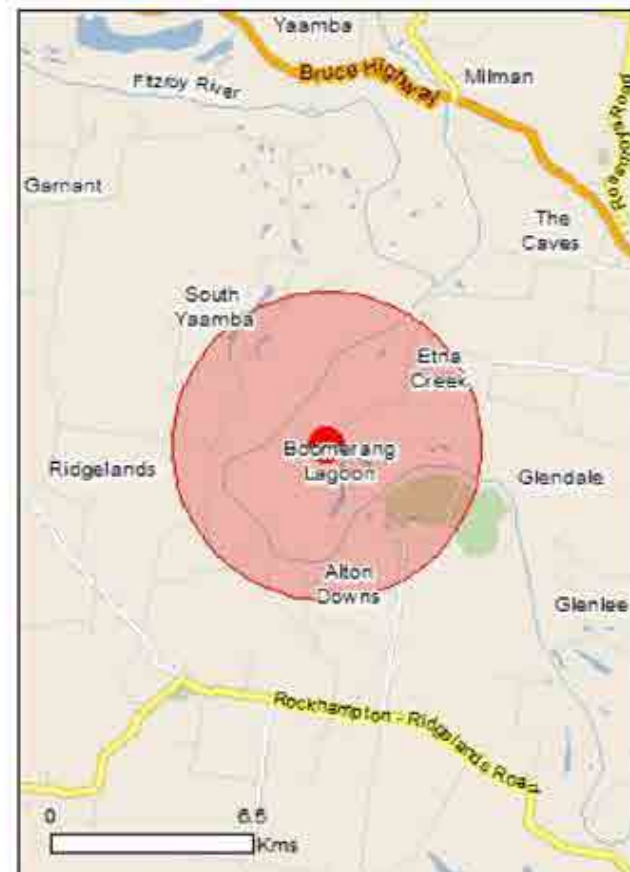
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



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Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	29
Listed Migratory Species:	24

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	24
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	33
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species

[\[Resource Information \]](#)

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Erythrorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Poephila cincta cincta Black-throated Finch (southern) [64447]	Endangered	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area

Mammals

Name	Status	Type of Presence
<u>Chalinolobus dwyeri</u> Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
<u>Dasyurus hallucatus</u> Northern Quoll [331]	Endangered	Species or species habitat may occur within area
<u>Nyctophilus corbeni</u> South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
<u>Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</u> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
Other		
<u>Cycas megacarpa</u> [55794]	Endangered	Species or species habitat may occur within area
<u>Cycas ophiolitica</u> [55797]	Endangered	Species or species habitat likely to occur within area
Plants		
<u>Eucalyptus raveretiana</u> Black Ironbox [16344]	Vulnerable	Species or species habitat known to occur within area
<u>Streblus pendulinus</u> Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat likely to occur within area
Reptiles		
<u>Caretta caretta</u> Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
<u>Chelonia mydas</u> Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
<u>Delma torquata</u> Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
<u>Denisonia maculata</u> Ornamental Snake [1193]	Vulnerable	Species or species habitat likely to occur within area
<u>Dermochelys coriacea</u> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
<u>Egernia rugosa</u> Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
<u>Elseya albagula</u> Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat known to occur within area
<u>Eretmochelys imbricata</u> Hawksbill Turtle [1766]	Vulnerable	Species or species habitat may occur within area
<u>Furina dunmalli</u> Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
<u>Lepidochelys olivacea</u> Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needle-tail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion cristatus Eastern Osprey [82411]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Long Island Bend	QLD

Invasive Species [\[Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur

Name	Status	Type of Presence
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		within area Species or species habitat likely to occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Nationally Important Wetlands		[Resource Information]
Name		State
Fitzroy River Floodplain		QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-23.235 150.37208

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Department of Environment, Climate Change and Water, New South Wales](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment and Natural Resources, South Australia](#)
- [Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [Environmental and Resource Management, Queensland](#)
- [Department of Environment and Conservation, Western Australia](#)
- [Department of the Environment, Climate Change, Energy and Water](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- [Natural history museums of Australia](#)
- [Museum Victoria](#)
- [Australian Museum](#)
- [SA Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [State Forests of NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -23.2283
Longitude: 150.3879
Distance: 10
Email: justin@gondwanaecology.com.au
Date submitted: Tuesday 02 Jun 2015 16:57:10
Date extracted: Tuesday 02 Jun 2015 17:00:11

The number of records retrieved = 12

Disclaimer

As the DSITIA is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

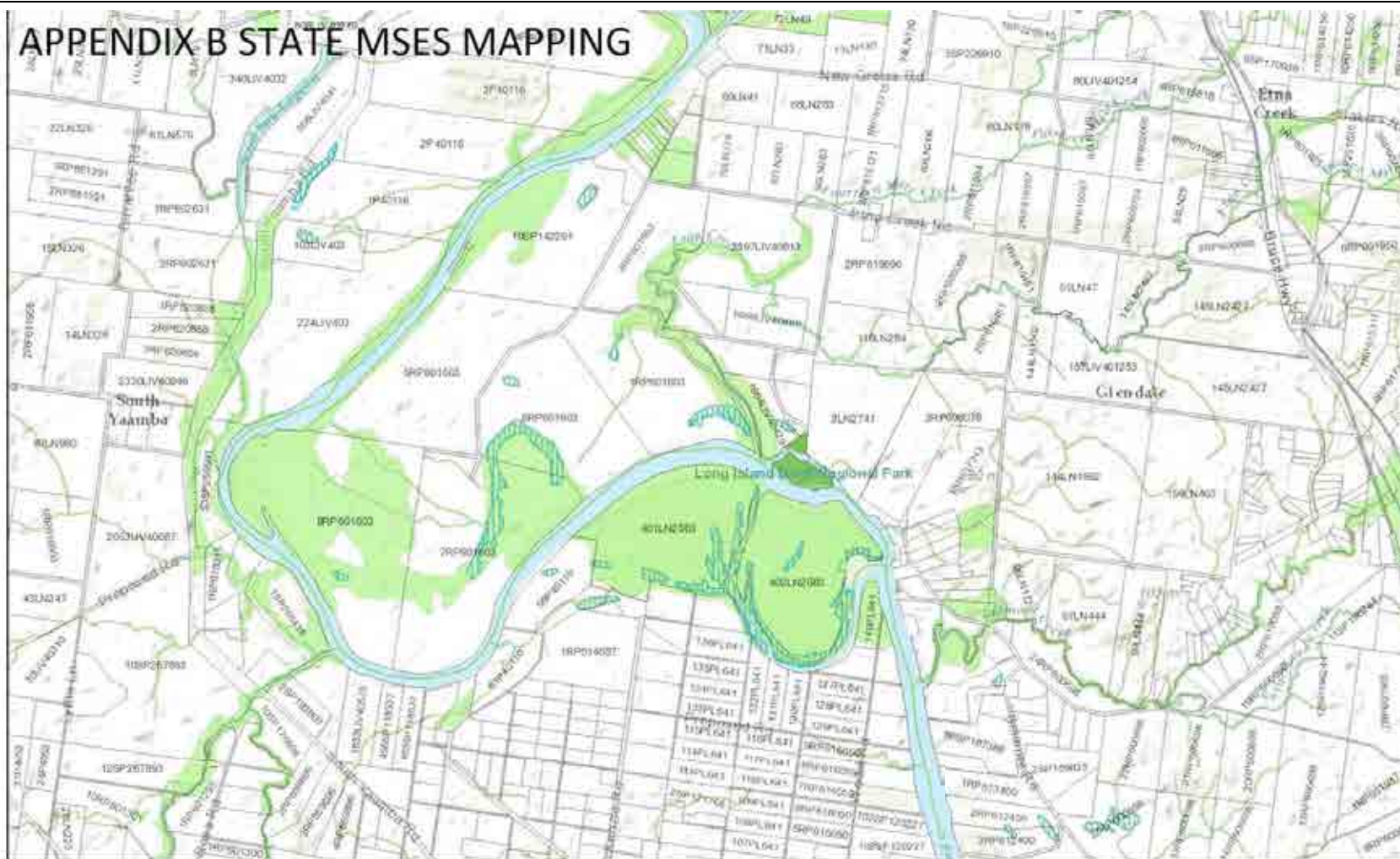
The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all

animals	birds	Cacatuidae	<i>Calyptrorhynchus lathamii</i>	glossy black-cockatoo	V		1
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)	V	V	2/2
animals	mammals	Megadermatidae	<i>Macroderma gigas</i>	ghost bat	V		1
plants	cycads	Cycadaceae	<i>Cycas megacarpa</i>		E	E	4
plants	cycads	Cycadaceae	<i>Cycas ophiolitica</i>	Marlborough blue	E	E	2/2
plants	cycads	Zamiaceae	<i>Macrozamia serpentina</i>		E		1/1
plants	ferns	Dryopteridaceae	<i>Tectaria devexa</i> var. <i>devexa</i>		E	E	1/1
plants	higher dicots	Acanthaceae	<i>Graptophyllum excelsum</i>		NT		5/5
plants	higher dicots	Fabaceae	<i>Pultenaea setulosa</i>		V	V	1/1
plants	higher dicots	Myrtaceae	<i>Corymbia xanthope</i>	Glen Geddes bloodwood	V	V	1/1
plants	higher dicots	Sparrmanniaceae	<i>Corchorus hygrophilus</i>		V		1/1
plants	higher dicots	Stackhousiaceae	<i>Stackhousia tryonii</i>		NT		1/1

CODES

- Y indicates that the taxon is introduced to Queensland and has naturalised.
 - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ().
 - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*. The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).
- Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
 This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
 This number is output as 999 if it equals or exceeds this value.



Department of
Infrastructure, Local
Government and Planning



State Planning Policy
Making or amending a local planning instrument
and designating land for community infrastructure

0 1,100 2,200 3,300 4,400

Date: 22/06/2015

Disclaimer:
This map has been prepared with due care based on the best available information at the time of publication. The State of Queensland holds no responsibility for any errors, inconsistencies or omissions within this document. This document is to be used as a guide only and does not constitute a contract.

Legend

- Cadastre (100k)
-  Cadastre (100k)
- MSES - High ecological value waters (watercourse)**
-  MSES - High ecological value waters (watercourse)
- MSES - Regulated vegetation (intersecting a watercourse)**
-  MSES - Regulated vegetation (intersecting a watercourse)
- MSES - High Ecological Significance wetlands**
-  MSES - High Ecological Significance wetlands
- MSES - High ecological value waters (wetland)**
-  MSES - High ecological value waters (wetland)
- MSES - Strategic Environmental Area (Designated Precinct)**
-  MSES - Strategic Environmental Area (Designated Precinct)
- MSES - Wildlife habitat**
-  MSES - Wildlife habitat
- MSES - Protected area**
-  MSES - Protected area
- MSES - Marine park**
-  MSES - Marine park
- MSES - Declared fish habitat area**
-  MSES - Declared fish habitat area
- MSES - Regulated vegetation**
-  MSES - Regulated vegetation
- MSES - Legally secured offset area**
-  MSES - Legally secured offset area



Department of
Infrastructure, Local
Government and Planning

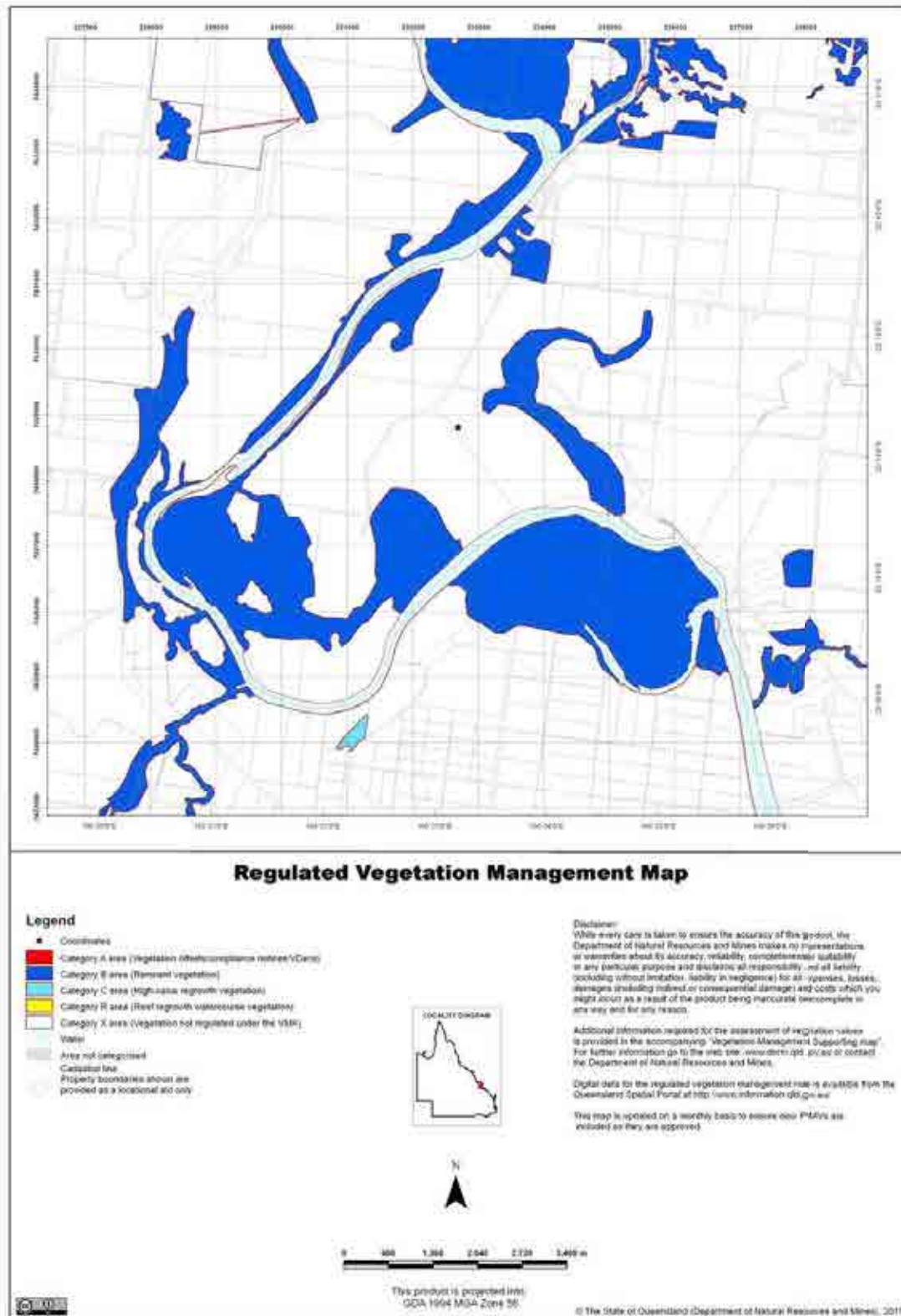
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State Planning Policy
Making or amending a local planning instrument
and designating land for community infrastructure

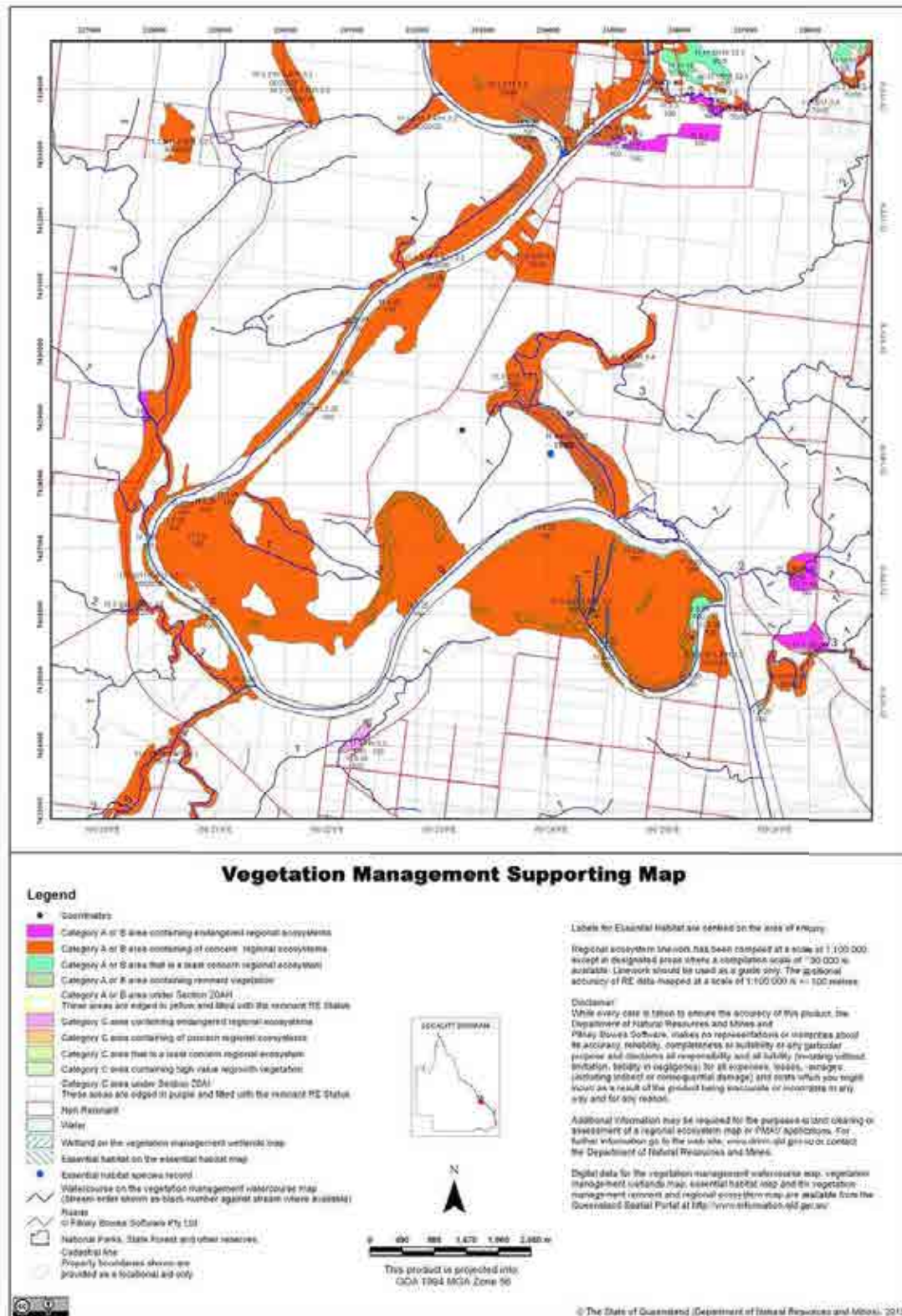
Date: 22/06/2015

Disclaimer:
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2/06/2015 16:54:51
longitude: 150.3879 Latitude: -23.2283



2/06/2015 16:54:51
longitude: 150.3879 Latitude: -23.2283



2/06/2015 16:54:51
longitude: 150.3879 Latitude: -23.2283

Vegetation Management Act 1999 - Extract from the essential habitat database - version 4.0

essential habitat is required for assessment under the:

- State Development Assessment Provisions - Module 8: Native vegetation clearing which sets out the matters of interest to the state for development assessment under the Sustainable Planning Act 2009; and
- Self-assessable vegetation clearing codes made under the Vegetation Management Act 1999

essential habitat for one or more of the following species is found on and within 1.1 km of the identified subject lot/s or on and within 2.2 km of an identified coordinate on the accompanying essential habitat map.

his report identifies essential habitat in Category A, B and Category C areas.

he numeric labels on the essential habitat map can be cross referenced with the database below to determine which essential habitat factors might exist for a particular species.

essential habitat is compiled from a combination of species habitat models and buffered species records.

he Department of Natural Resources and Mines website (<http://www.dnrm.qld.gov.au>) has more information on how the layer is applied under the State Development Assessment Provisions - Module 8:

ative vegetation clearing and the Vegetation Management Act 1999.

egional ecosystem is a mandatory essential habitat factor, unless otherwise stated.

essential habitat, for protected wildlife, means a category A area, a category B area or category C area shown on the regulated vegetation management map-

- 1) (a) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or
- 2) (b) in which the protected wildlife, at any stage of its life cycle, is located.

essential habitat identifies endangered or vulnerable native wildlife prescribed under the Nature Conservation Act 1994.

essential habitat in Category A and B (Remnant vegetation species record) areas:2200m Species Information

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
1785	<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern subsp.)	V	Dry eucalypt woodland (including poplar box, spotted gum, yellow box, acacia and callitris), with sparse short grass, often on sandy areas near to permanent water; grassy eucalypt woodlands. Nest on ground near or under grass tussock, log or low bush.	None	no soil information	Gravelly ridges, traprock and river flats.

essential habitat in Category A and B (Remnant vegetation species record) areas:2200m Regional Ecosystems Information

Label	Regional Ecosystem (this is a mandatory essential habitat factor, unless otherwise stated)
1785	8.1.5, 8.2.1, 8.2.7, 8.2.8, 8.2.12, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.13, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.8.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.12.6, 8.12.7, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.9, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.18, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.23, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.7.2, 9.7.3, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.4, 9.8.5, 9.8.6, 9.8.9, 9.8.10, 9.8.11, 9.10.1, 9.10.3, 9.10.6, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.11, 9.11.12, 9.11.13, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.23, 9.11.26, 9.11.28, 9.11.29, 9.11.31, 9.11.32, 9.12.1, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.26, 9.12.28, 9.12.30, 9.12.31, 9.12.33, 9.12.35, 9.12.37, 9.12.39, 10.3.1, 10.3.2, 10.3.3, 10.3.4, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.16, 10.3.18, 10.3.19, 10.3.20, 10.3.27, 10.3.28, 10.3.30, 10.3.31, 10.4.3, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.2, 10.7.3, 10.7.5, 10.7.11, 10.7.12, 10.9.1, 10.9.2, 10.9.3, 10.9.5, 10.9.11, 10.9.13, 10.9.14, 10.9.15, 10.9.17, 11.2.1, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.6, 11.3.7, 11.3.8, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.23, 11.3.25, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.5, 11.4.8, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.4, 11.7.8, 11.8.2, 11.8.4, 11.8.5, 11.8.6, 11.8.9, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.2, 11.9.3, 11.9.7, 11.9.9, 11.9.14, 11.10.1, 11.10.4, 11.10.6, 11.10.7, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.15, 11.11.16, 11.11.19, 11.11.20, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.11, 11.12.12, 11.12.13, 11.12.14, 11.12.17, 11.12.20, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.2.11, 12.2.3, 12.3.4, 12.3.10, 12.3.12, 12.3.14, 12.5.2, 12.5.4, 12.5.5, 12.5.7, 12.5.8, 12.5.11, 12.5.12, 12.7.1, 12.7.2, 12.8.14, 12.8.16, 12.8.17, 12.8.19, 12.9-10.7, 12.9-10.8, 12.9-10.12, 12.9-10.13, 12.11.5, 12.11.7, 12.11.8, 12.11.14, 12.11.15, 12.11.20, 12.11.21, 12.11.22, 12.12.7, 12.12.8, 12.12.9, 12.12.12, 12.12.14, 12.12.21, 12.12.22, 12.12.23, 12.12.24, 12.12.25, 12.12.27, 13.3.1, 13.3.4, 13.3.7, 13.11.1, 13.11.3, 13.11.4, 13.11.8, 13.12.2, 13.12.3, 13.12.5, 13.12.8, 13.12.9, 13.12.10

essential habitat in Category A and B (Remnant vegetation) areas:2200m Species Information

0 results)

essential habitat in Category A and B (Remnant vegetation) areas:2200m Regional Ecosystems Information

0 results)

essential habitat in Category C (High value regrowth vegetation) areas:2200m Species Information

0 results)

essential habitat in Category C (High value regrowth vegetation) areas:2200m Regional Ecosystems Information

0 results)



APPENDIX D FLORA SPECIES LIST (June 2015)

Family	Scientific Name	Common Name	Introduced	NCA Status
Malvaceae	<i>Abutilon guineense</i>		Y	
Mimosaceae	<i>Acacia holosericea</i>	soapbush wattle		C
Mimosaceae	<i>Acacia salicina</i>	sally wattle		C
Amaranthaceae	<i>Achyranthes aspera</i>	prickly chaff flower		C
Asteraceae	<i>Ageratum houstonianum</i>	blue billygoat weed	Y	
Mimosaceae	<i>Albizia canescens</i>	Belmont siris		C
Mimosaceae	<i>Albizia lebbek</i>	Indian siris		C
Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C
Araucariaceae	<i>Araucaria cunninghamii</i>	hoop pine		C
Papaveraceae	<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Mexican poppy	Y	
Poaceae	<i>Aristida</i> sp.	wiregrass		C
Poaceae	<i>Arundinella nepalensis</i>	reedgrass		C
Apocynaceae	<i>Asclepias curassavica</i>	red-head cottonbush	Y	
Azollaceae	<i>Azolla pinnata</i>	fern azolla		C
Poaceae	<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>	forest bluegrass		C
Capparaceae	<i>Capparis</i> sp.			C
Solanaceae	<i>Capsicum annuum</i>	chilli	Y	
Casuarinaceae	<i>Casuarina cunninghamiana</i>	river sheoak		C
Poaceae	<i>Cenchrus ciliaris</i>	buffel grass	Y	
Chenopodiaceae	<i>Chenopodium album</i>	fat-hen	Y	
Poaceae	<i>Chloris gayana</i>	rhodes grass	Y	
Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony		C
Poaceae	<i>Chrysopogon fallax</i>			C
Asteraceae	<i>Cirsium vulgare</i>	spear thistle	Y	
Lamiaceae	<i>Clerodendrum floribundum</i>	lolly bush		C
Asteraceae	<i>Conyza</i> sp.	fleabanes	Y	
Myrtaceae	<i>Corymbia intermedia</i>	pink bloodwood		C
Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C
Lecythidaceae	<i>Planchonia careya</i>	cockatoo apple		C
Myrtaceae	<i>Corymbia trachyphloia</i>	brown bloodwood		C
Fabaceae	<i>Crotalaria</i> sp.	a rattlepod		C
Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y	
Cucurbitaceae	<i>Cucumis althaeoides</i>			C
Cyperaceae	<i>Cyperus exaltatus</i>	tall flatsedge		C
Poaceae	<i>Digitaria didactyla</i>	Queensland blue couch	Y	
Meliaceae	<i>Dysoxylum gaudichaudianum</i>	ivory mahogany		C
Poaceae	<i>Eleusine indica</i>	crowsfoot grass	Y	
Myrtaceae	<i>Eucalyptus coolabah</i>	coolabah		C
Myrtaceae	<i>Eucalyptus platyphylla</i>	poplar gum		C
Myrtaceae	<i>Eucalyptus tereticornis</i>	forest red gum		C
Convolvulaceae	<i>Evolvulus alsinoides</i>			C

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Family	Scientific Name	Common Name	Introduced	NCA Status
Moraceae	<i>Ficus obliqua</i>	small-leaved fig		C
Moraceae	<i>Ficus opposita</i>	sandpaper fig		C
Apocynaceae	<i>Gomphocarpus physocarpus</i>	balloon cottonbush	Y	
Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant		C
Poaceae	<i>Heteropogon contortus</i>	black speargrass		C
Malvaceae	<i>Hibiscus diversifolius</i>	swamp hibiscus		C
Poaceae	<i>Hymenachne amplexicaulis</i>	hymenachne	Y	
Poaceae	<i>Hyparrhenia rufa</i>	thatch grass	Y	
Fabaceae	<i>Indigofera tinctoria</i>	Birdsville indigo		C
Juncaceae	<i>Juncus polyanthemus</i>			C
Verbenaceae	<i>Lantana camara</i>	lantana	Y	
Mimosaceae	<i>Leucaena leucocephala</i> subsp. <i>glabrata</i>	leucaena	Y	
Lamiaceae	<i>Lomandra longifolia</i>	matrush		C
Myrtaceae	<i>Lophostemon suaveolens</i>	swamp box		C
Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose		C
Onagraceae	<i>Ludwigia peploides</i>		Y	
Caesalpiniaceae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C
Fabaceae	<i>Macroptilium atropurpureum</i>	siratro	Y	
Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C
Anacardiaceae	<i>Mangifera indica</i>	mango	Y	
Poaceae	<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>	green panic	Y	
Myrtaceae	<i>Melaleuca bracteata</i>	river teatree		C
Myrtaceae	<i>Melaleuca fluviatilis</i>	weeping paperbark		C
Myrtaceae	<i>Melaleuca linariifolia</i>	snow-in summer		C
Myrtaceae	<i>Melaleuca viridiflora</i> var. <i>viridiflora</i>			C
Poaceae	<i>Melinis repens</i>	red natal grass	Y	
Nelumbonaceae	<i>Nelumbo nucifera</i>	pink waterlily		C
Menyanthaceae	<i>Nymphoides indica</i>	water snowflake		C
Lamiaceae	<i>Ocimum americanum</i>	hoary basil	Y	
Cactaceae	<i>Opuntia</i> sp.	prickly pear	Y	
Oxalidaceae	<i>Oxalis corniculata</i>	oxalis	Y	
Poaceae	<i>Panicum</i> sp.			C
Passifloraceae	<i>Passiflora foetida</i>	stinking passion flower	Y	
Polygonaceae	<i>Persicaria attenuata</i>	smartweed		C
Polygonaceae	<i>Persicaria orientalis</i>	princes feathers		C
Solanaceae	<i>Physalis angulata</i>	ground cherry	Y	
Myrtaceae	<i>Psidium guajava</i>	guava	Y	
Rubiaceae	<i>Richardia brasiliensis</i>	white eye	Y	
Caesalpiniaceae	<i>Senna barclayana</i>			C
Malvaceae	<i>Sida cordifolia</i>	flannel weed	Y	
Malvaceae	<i>Sida spinosa</i>	spiny sida	Y	
Solanaceae	<i>Solanum nigrum</i>	black nightshade	Y	

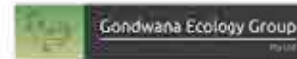
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Family	Scientific Name	Common Name	Introduced	NCA Status
Solanaceae	<i>Solanum seafortianum</i>	Brazilian nightshade	Y	
Solanaceae	<i>Solanum torvum</i>	devil's fig	Y	
Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	Y	
Fabaceae	<i>Stylosanthes</i> sp.	sylo	Y	
Poaceae	<i>Themeda triandra</i>	kangaroo grass		C
Moraceae	<i>Trophis scandens</i> subsp. <i>scandens</i>	bumy vine		C
Malvaceae	<i>Urena lobata</i>	urena weed	Y	
Poaceae	<i>Urochloa mosambicensis</i>	sabi grass	Y	
Mimosaceae	<i>Vachellia nilotica</i>	prickly acacia	Y	
Verbenaceae	<i>Verbena bonariensis</i>	purpletop	Y	
Campanulaceae	<i>Wahlenbergia</i> sp.			C
Asteraceae	<i>Xanthium occidentale</i>	Noogoora burr	Y	
Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	Y	

Y - Introduced = non-native, exotic species

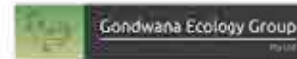
C - Nature Conservation Act 1992 = Common of least concern



APPENDIX E BIRD SPECIES LIST (June 2015)

Species	Scientific Name	Status*
Black Swan	<i>Cygnus atratus</i>	-
Australian Wood Duck	<i>Chenonetta jubata</i>	-
Cotton Pygmy-Goose	<i>Nettion coromandelianus</i>	-
Grey Teal	<i>Anas gracilis</i>	-
Pacific Black Duck	<i>Anas superciliosa</i>	-
Hardhead	<i>Aythya australis</i>	-
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	-
Crested Pigeon	<i>Ocyphaps lophotes</i>	-
Bar-shouldered Dove	<i>Geopelia humeralis</i>	-
Australasian Darter	<i>Anhinga novaehollandiae</i>	-
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	-
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	-
Australian Pelican	<i>Pelecanus conspicillatus</i>	-
White-necked Heron	<i>Ardea pacifica</i>	-
Eastern Great Egret	<i>Ardea modesta (alba)</i>	QSL, CMw, CMa
Intermediate Egret	<i>Ardea intermedia</i>	-
Cattle Egret	<i>Ardea ibis</i>	QSL, CMw, CMa
White-faced Heron	<i>Egretta novaehollandiae</i>	-
Little Egret	<i>Egretta garzetta</i>	-
Australian White Ibis	<i>Threskiornis molucca</i>	-
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	-
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	-
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	QSL, CMT, CMa
Whistling Kite	<i>Haliastur sphenurus</i>	-
Black Kite	<i>Milvus migrans</i>	-
Swamp Harrier	<i>Circus approximans</i>	-
Wedge-tailed Eagle	<i>Aquila audax</i>	-
Nankeen Kestrel	<i>Falco cenchroides</i>	-
Brown Falcon	<i>Falco berigora</i>	-
Brolga	<i>Grus rubicunda</i>	-
Purple Swamphen	<i>Porphyrio porphyrio</i>	-
Dusky Moorhen	<i>Gallinula tenebrosa</i>	-
Eurasian Coot	<i>Fulica atra</i>	-
Black-winged Stilt	<i>Himantopus himantopus</i>	-
Black-fronted Dotterel	<i>Elseyornis melanops</i>	-
Masked Lapwing	<i>Vanellus miles</i>	-
Comb-crested Jacana	<i>Irediparra gallinacea</i>	-
Red-tailed Black-Cockatoo	<i>Calyptrorhynchus banksii</i>	-
Red-winged Parrot	<i>Aprosmictus erythropterus</i>	-
Pale-headed Rosella	<i>Platycercus adscitus</i>	-
Budgerigar	<i>Melopsittacus undulatus</i>	-
Pheasant Coucal	<i>Centropus phasianinus</i>	-
Brush Cuckoo	<i>Cacomantis variolosus</i>	-
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	-
Blue-winged Kookaburra	<i>Dacelo leachii</i>	-
Rainbow Bee-eater	<i>Merops ornatus</i>	CMT, CMa
Red-backed Fairy-wren	<i>Malurus melanocephalus</i>	-

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Species	Scientific Name	Status*
White-throated Gerygone	<i>Gerygone albogularis</i>	-
Striated Pardalote	<i>Pardalotus striatus</i>	-
Noisy Miner	<i>Manorina melanocephala</i>	-
White-throated Honeyeater	<i>Melithreptus albogularis</i>	-
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>	-
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	-
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	-
Rufous Whistler	<i>Pachycephala rufiventris</i>	-
Australasian Figbird	<i>Sphecotheres vieilloti</i>	-
White-breasted Woodswallow	<i>Artamus leucorhynchus</i>	-
Pied Butcherbird	<i>Cracticus nigrogularis</i>	-
Australian Magpie	<i>Cracticus tibicen</i>	-
Spangled Drongo	<i>Dicrurus bracteatus</i>	-
Grey Fantail	<i>Rhipidura albiscapa</i>	-
Willie Wagtail	<i>Rhipidura leucophrys</i>	-
Torresian Crow	<i>Corvus orru</i>	-
Magpie-lark	<i>Grallina cyanoleuca</i>	-
Golden-headed Cisticola	<i>Cisticola exilis</i>	-
Australian Reed-warbler	<i>Acrocephalus australis</i>	-
Brown Songlark	<i>Cincloramphus cruralis</i>	-
Welcome Swallow	<i>Hirundo neoxena</i>	-
Tree Martin	<i>Petrochelidon nigricans</i>	-
Australasian Pipit	<i>Anthus novaeseelandiae</i>	-

*Status: Q = Queensland NC Act 1992; C = Commonwealth EPBC Act 1999

E = endangered, V=vulnerable, NT = near threatened, SL = special least concern,

Mt = migratory terrestrial, Mw = migratory wetland, Ma = marine,

unattributed = least concern

**12.13 - DECISION ASSESSMENT FOR A
DEVELOPMENT PERMIT FOR MAKING
A MATERIAL CHANGE OF USE OF
PREMISES FOR AN EXTRACTIVE
INDUSTRY FOR SAND AND GRAVEL
AND ASSOCIATED ACTIVITIES AND
MAKING A MATERIAL CHANGE OF
USE OF PREMISES FOR
CONCURRENCE ENVIRONMENTALLY
RELEVANT ACTIVITY AT LOT 5, LOT 6,
LOT 8, AND LOT 10 MELDRUM ROAD
AND 887 ETNA CREEK ROAD, ETNA
CREEK**

Ecological Assessment Report

Meeting Date: 17 July 2018

Attachment No: 5



Ecological Assessment
Belmont Sands Quarry
Etna Creek



Prepared for: **Belmont Sands Pty Ltd**
July 2015

Gondwana Ecology Group PO Box 535 Kenmore 4069



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QUALITY ASSURANCE

Report #	Author	Signature	Date
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Gondwana Ecology Group operates in accordance with the following approvals, permits and ethical principles:

- Scientific Use Registration (*Animal Care & Protection Act 2001*) – 508
- Animal Ethics Committee (DAFF Animal Ethics) – CA 2013/11/732
- Scientific Purposes Permit (*Nature Conservation Regulation 2006*) – WISP 13794613
- *Certified Environmental Practitioner (Environment Institute of Australia & New Zealand)

Ecology Assessment – Belmont Sands Quarry
Etna Creek



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*Ecology Assessment – Belmont Sands Quarry
Etna Creek*

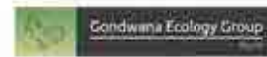


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EXECUTIVE SUMMARY

The subject site is located on a number of allotments (research station) in the Etna Creek locality, north of Rockhampton (within the Livingstone Shire) and is currently an agricultural operation. The Fitzroy River lies to the west with the surrounding landscape characterised by agricultural activities. An extractive operation of sand and gravel is proposed from two resource areas. Other infrastructure for the operation includes a northern stockpile, a processing area and a haul road. All project infrastructure and operations is located in existing grazing land. This report provides an analysis of ecological features within the subject site and assessment of potential impacts with consideration of the requirements identified by Council and the State during pre-lodgement meetings. The site vegetation is predominantly grazing landscape of planted pasture and weed species with the balance generally conforming to that which has been mapped "regulated vegetation" by the State. Riparian vegetation along the Fitzroy River comprises large forest red gums and Coolibah woodland. Isolated large paddock trees, stags and large figs are a characteristic feature across the landscape and provide some habitat for fauna and biodiversity foci. Wetlands and swales with water/wetland vegetation offer habitat for aquatic species, including wetland birds and occur primarily to the east of the subject site. No Commonwealth threatened ecological communities occur within the subject site or immediate surrounds. Council's "significant local vegetation" mapping needs to be refined to accurately reflect that which occurs in the landscape. The proposed project has been designed to avoid all features considered "high ecological significance" at a State or Commonwealth level. A number of management measures have been recommended to minimise potential impacts on general ecological values within (and adjacent to) the subject site. Following appropriate implementation of the proposed project, including detailed design and operation management, it is unlikely there would be any significant or residual impact on features of high ecological value. With respect to ecology, the proposed project could be approved with reasonable and relevant conditions.



1. INTRODUCTION

1.1 Background

Gondwana Ecology Group Pty Ltd has been engaged to provide an analysis of ecological values of the subject site. The level of assessment and subsequent reporting is based on an understanding of the proposed development, associated minimal disturbance to native vegetation and in response to relevant statutory requirements. Pre-lodgement meetings (25 March 2015) with Council and the State have assisted in forming the objectives for the ecological reporting.

1.2 Subject Site

The subject site is located on a number of allotments comprising more than 1500ha off Etna Creek Road as Lots 3, 5, 6 and 8 of RP601603 and Lot 10 on SP142291 (Etna Creek, north of Rockhampton) (Figure 1).

The subject site lies within the Livingstone Shire and is mapped in the *Rural* zone. The land was part of the CSIRO research station with current practices (operated by Agforce) for rural purposes.

The Fitzroy River lies to the west (and generally to the south) with the surrounding landscape characterised by agricultural activities. The subject site is on an alluvial plain (landzone 3) with a number of wetlands (including Boomerang Lagoon and Etna Creek to the east) and woodland patches throughout the local landscape. The Bruce Highway is less than 10km to the east with Mt Etna National Park a further few kilometres in a north-easterly direction.

1.3 Proposed Development

An extractive operation of sand and gravel is proposed from two resource areas (in the south) (Figure 2). A northern stockpile is proposed above the flood-line and a processing area is located in the south, associated with resource area 2. A haul road is proposed through the landscape to Etna Creek Road. All resource areas, roads, processing and stockpile areas are located in existing grazing land and comprise an area approximately 130ha.

1.4 Purpose of the Report

The objective of this report is to provide a technical assessment of ecological values for the subject site in accordance with statutory requirements within the context of the site values and proposed development and as identified during the pre-lodgement meetings. Specifically, the following:

- Locally significant vegetation mapping (Council)
- Northern wetland and adjacent stockpile (it is acknowledged that, subsequent to the meeting, the stockpile has been relocated away from this wetland)
- Ground-truthing of any watercourse crossings (with photographs), State-mapped vegetation (with tree heights near infrastructure), waterways and wetlands.

1.5 Site Inspections

Gondwana Ecology Group has completed site inspections in June 2015. Local ecological knowledge (e.g. the author, station manager and community/conservation organisations) has also assisted in informing the values within the site and locality.



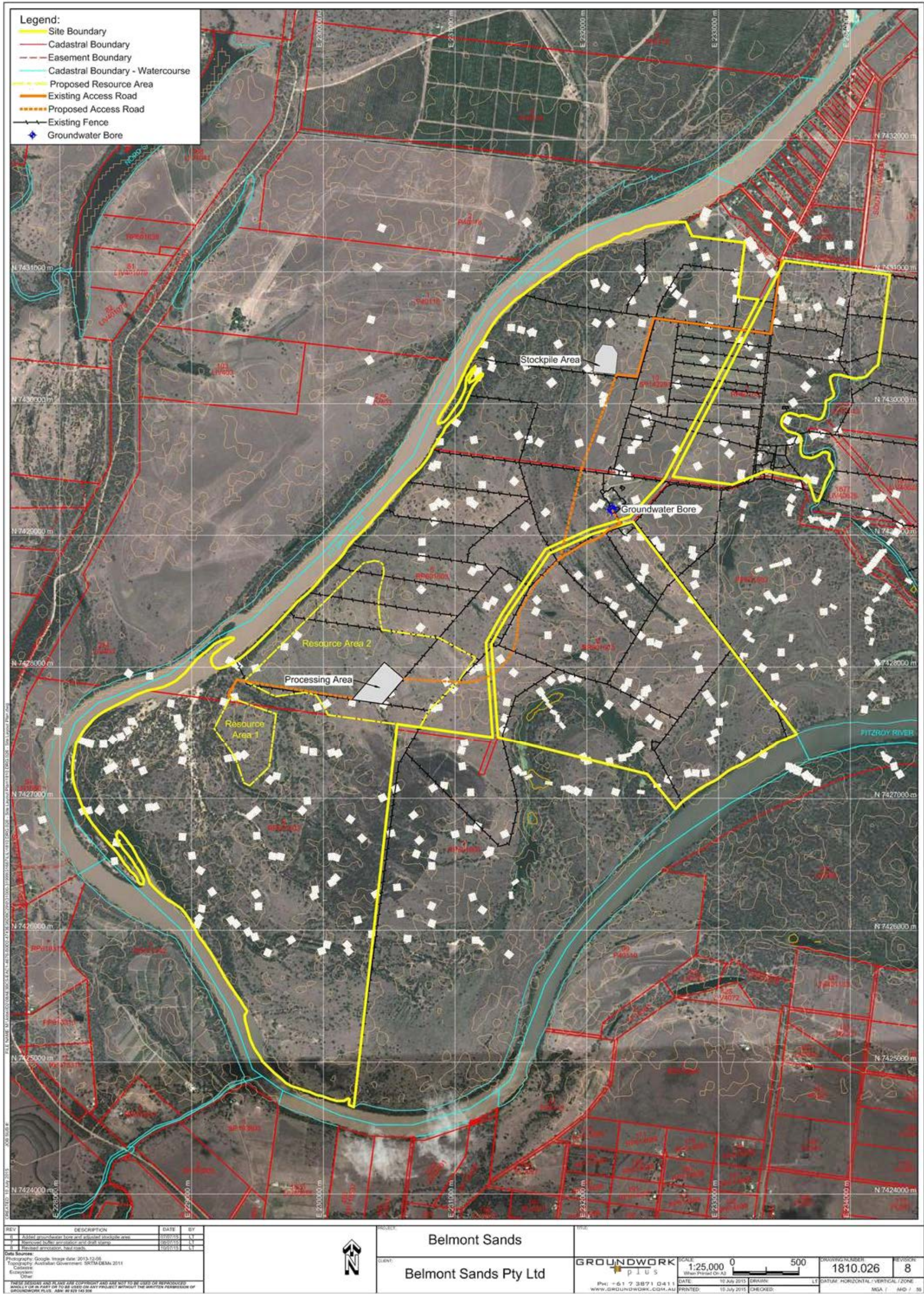


FIGURE 2 Conceptual Layout Plan



2. STATUTORY MAPPING AND POLICIES

2.1 Introduction

Available databases, mapping and aerial photography was reviewed to determine the potential for certain species and/or vegetation communities to occur within or adjacent to the site.

Threatened (or conservation significant) species are those which are listed under the schedules of the Commonwealth *Environment Protection and Biodiversity Conservation* (EPBC) Act 1999 and/or State *Nature Conservation Act* (NCA) 1992 as *critically endangered*, *endangered*, *vulnerable* or *near threatened*. The Commonwealth collectively identifies matters of significance as Matters of National Environmental Significance (MNES) while the State identifies ecological values as "State Significant Biodiversity Values" (SSBV) or Matters of State Environmental Significance (MSES). MSESs include flora and fauna, essential habitat and regulated vegetation.

2.2 Commonwealth

The database tool provided by the Commonwealth (Australian Government, 2015) is recognised as broad and general, often capturing species and communities that do not necessarily occur in the location. Confirmation with local databases and ground truthing is necessary to make accurate determinations of likelihood of occurrence. The database considers a number of MNES to occur within 5km of the site (**Appendix A**). This includes:

- three threatened ecological communities - TECs (Brigalow, Coolibah-Blackbox Woodlands, Weeping Myall)
- 29 threatened species (flora and fauna)
- 24 migratory species
- one nationally important wetland (Fitzroy River Floodplain)

Marine species are also listed, but not discussed in this document (i.e. lack of habitat and unlikely potential to occur).

2.3 State

The Department of State Development Infrastructure and Planning (DSDIP) provides a range of mapping to assist development planning. The State maps (DSDIP, 2015) MSES "regulated vegetation", MSES "high ecological significance wetlands and MSES "regulated vegetation intersecting a watercourse" (**Attachment B**).

The *Vegetation Management Act 1999* (VMA) regulates clearing of remnant vegetation on freehold and leasehold land within Queensland. This is achieved by preserving remnant regional ecosystems (RE's), preserving vegetation in areas of high nature conservation value, and protecting areas vulnerable to land degradation. A number of "ecological" layers are provided through the DNRM (2015) mapping database (**Appendix C**). Remnant vegetation is mapped along the Fitzroy River in the west and in the south (forest red gum woodland fringing drainage lines and coolibah woodland in south). There is no *essential habitat* mapped within the subject site. Essential habitat for the squatter pigeon (based on a point record) is mapped approximately 2km to the east (refer **Appendix C**).

One State-mapped (State of Queensland, 2015) wetland of *high ecological significance* is mapped in the north of the subject site (refer **extract** below) with other wetlands mapped to the east. Buffer (or trigger areas) extend from these wetlands into the subject site.

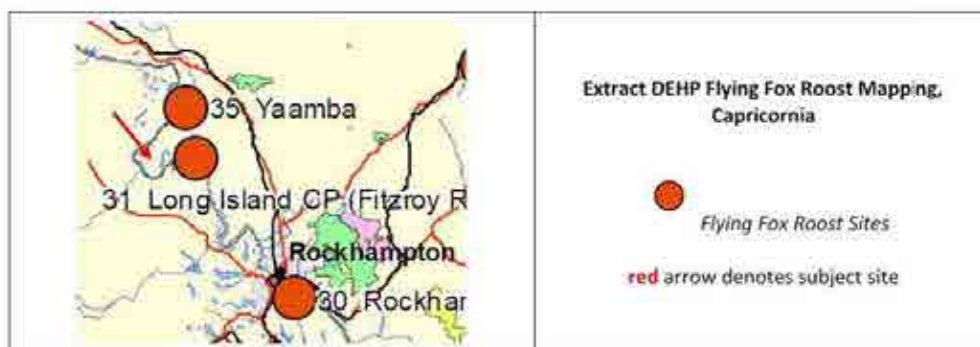


As per the Fish habitat DA Mapping (provided by DSDIP/SARA, June 2015 – refer extract), three waterways are mapped in south of site, one near Processing Area (low value), one associated with access to Resource Area 1 (moderate value) and the third south of Resource Area 1.



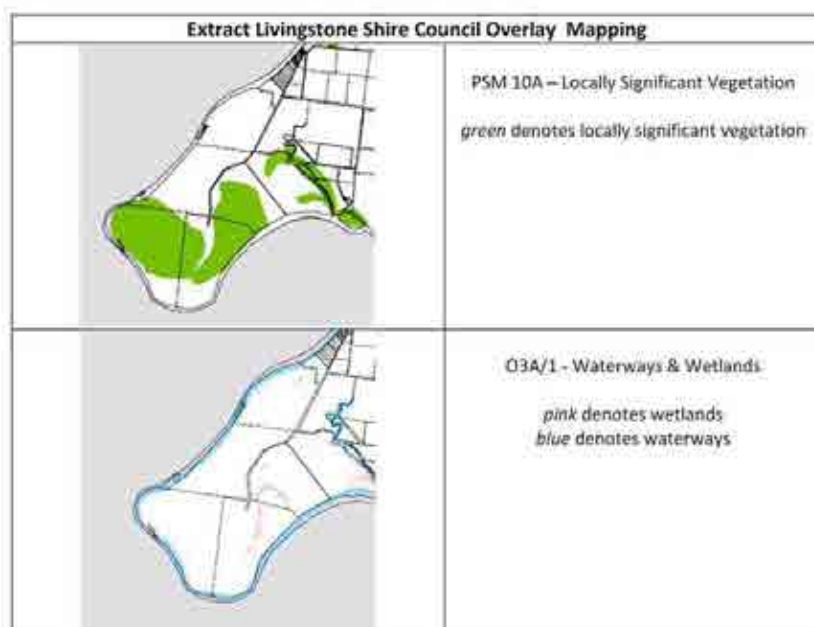
The *Nature Conservation Act 1992* (NCA) provides the framework for the protection of native flora and fauna, and provides a list of threatened flora and fauna at a state level (including endangered, vulnerable, near threatened and of least concern). The subject site **does not** fall within the *protected plants flora survey trigger area* (DEHP, 2015) which identifies knowledge of local protected plant records. The State wildlife database (DISITIA, 2015) indicates that there are confirmed records for listed (under the NCA) species, i.e. three fauna and nine flora (refer **Section 3**) which have been recorded within 10km of the subject site.

The Department of Environment and Heritage Protection has mapped the locations of flying-fox colonies within Southeast Queensland. There are a number of colonies mapped within the Capricornia region, including one at Long Island and another at Yaamba, east and north of the subject site, respectively (DEHP, 2011) (refer **Extract** below).



2.4 Livingstone Shire Council

The Livingstone Shire Council Strategic Map identifies the subject site as lying within the *Rural* zone. Two Council mapping overlays are relevant to ecology, i.e. O3A/1 - Waterways & Wetlands and PSM 10A – Locally Significant Vegetation (refer Extract below). No waterways or wetlands are mapped on the subject site, other than a wetland in north. Locally significant vegetation is mapped in the south (associated with Resource Area 1) and to the south east.



The Capricorn Conservation Council (CCC) website (<http://www.cccqld.org.au/>) provides information on "current issues" and fauna and flora for the region. It is noted that 49 frog species (included a number of threatened species) occur within Central Queensland. Koala, turtle, State vegetation and water bodies were identified by CCC as the key ecological matters for attention (M.McCabe pers.com.).

The Fitzroy Basin Association website (<http://www.fba.org.au/>) provides information for graziers, farmers, volunteers and community groups. Information on special plants and animals, pest species and the waterways is provided.



3. ECOLOGY VALUES

3.1 Introduction

Inspections have been undertaken in June 2015 to provide confirmation of the site values and to assist with the design of the extraction operations in order to minimise impacts on ecological values. Survey objectives were therefore as follows:

- Assess the site vegetation and consider State mapping;
- Searches for significant species listed (and habitats) under Council, EPBC and NC Act Schedules; and
- Inspection of ecological values in the immediate surrounds.

3.2 Survey Methodology

A field assessment of the vegetation of the subject property was conducted over two days from the 6th to 7th June 2015. The assessment specifically targeted the areas to be impacted by the proposed development as well as examining any adjacent remnant areas. Within each area of interest, information about the vegetation was recorded using a quaternary site assessment as per the method of Neldner *et al.* (2012). GPS location, major canopy, shrub and groundcover species, structural information including approximate stratum heights and past or ongoing disturbances were recorded at each quaternary site. Photos were also taken at each site facing the four cardinal points (north, south, east and west). The field survey also involved targeted searches for threatened flora species. One or more quaternary sites were assessed for each area. Targeted surveys were undertaken for threatened fauna and/or their habitats in suitable locations. The survey included identification and assessment of fauna habitats and a list of fauna recorded during the inspection.

3.2 Broad Vegetation Communities

Vegetation in the subject site generally comprised non-remnant, grazed pasture with varying densities of native trees and native woody regrowth (refer **Photo Plates**). A total of 96 plant species were recorded during the field assessment, 43 of which were introduced. Common remnant trees across the area included *Casuarina cunninghamiana* (river sheoak), *Corymbia tessellaris* (Moreton Bay ash), *Eucalyptus coolabah* (coolabah), *E. tereticornis* (forest red gum) and *Ficus obliqua* (small-leaved fig). The woody regrowth also featured these tree species as well as some native shrub species. The ground cover was dominated by introduced species, typically pasture grasses and legumes.

There is fairly extensive evidence across the landscape of damage and tree uprooting, primarily as a result of the recent cyclone (i.e. Cyclone Marcia - February 2015) (P.Orchard, Station Manager, pers.com.).

3.3 Remnant Vegetation

Regional Ecosystem (RE) mapping showed three remnant vegetation communities occurred in the area (refer **Attachment C**):

- RE 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains;
- RE 11.3.3 – *Eucalyptus coolabah* woodland on alluvial plains; and
- RE 11.3.25 – *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines.

The status of both RE 11.3.2 and RE 11.3.3 under the *Vegetation Management Act 1999* is 'Of Concern' whereas RE 11.3.25 is 'Least Concern'.

RE 11.3.3 formed the most extensive remnant vegetation in the surrounding area, occupying a large area to the south, east and west of the proposed development areas. RE 11.3.25 occupied a narrow



fringe along the bank of the nearby Fitzroy River and occurred in association with RE 11.3.3 to the east and north of the proposed development areas.

3.4 Vegetation Communities in Project Areas

The proposed resource areas, processing and stockpile areas and haul road have been located outside of the mapped remnant vegetation. The ground-truthing of the vegetation during the field assessment confirmed that these areas were located in non-remnant vegetation.

3.4.1 Resource Area 1

Resource Area 1 was surrounded on all sides by remnant vegetation mapped as RE 11.3.3 (*Eucalyptus coolabah* woodland on alluvial plains). The non-remnant vegetation within this area comprised pasture with scattered remnant native trees and woody regrowth. Common native trees included *Corymbia tessellaris* (Moreton Bay ash), *Eucalyptus coolabah* (coolabah) and *E. tereticornis* (forest red gum). *Planchonia careya* (cocky apple), *Casuarina cunninghamiana* (river she-oak) and *Acacia salicina* (sally wattle) were also widespread as a tall shrub/low tree component.

The ground layer was generally dominated by introduced pasture species including *Cenchrus ciliaris* (buffel grass), *Megathyrsus maximus* (green panic) and *Melinis repens* (red Natal grass). Native grasses included *Heteropogon contortus* (bunch spear grass) and *Themeda triandra* (kangaroo grass). Weeds were also prevalent including *Lantana camara* (lantana), *Xanthium occidentale* (noogoora burr) and *Stachytarpheta jamaicensis* (snake weed).

Large specimens of small-leaved figs (*Ficus obliqua*) were also scattered across RA1. One of the largest specimens was over 1m in diameter and up to 18m in height. It's widely spreading canopy, approximately 30m in diameter, created a micro-environment in which other closed forest species occurred. Associated with this large *F. obliqua* were the trees *Dysoxylum gaudichaudianum* (ivory mahogany) and *Mallotus philippinensis* (red kamala). Shrub species beneath the canopy of the fig included *Diospyros humilis* (small-leaved ebony), *Ficus opposita* (sandpaper fig) and *Trophis scandens* (burny vine). Elsewhere these figs occurred as isolated specimens but most of them appeared to have established as stranglers in host trees, usually eucalypts.

3.4.2 Resource Area 2

Resource Area 2, like Resource Area 1, supported non-remnant vegetation that comprised pasture with widely scattered trees and varying densities of native regrowth woody vegetation, however the remnant trees in this area were far more widely dispersed but included a similar suite of species including *Corymbia tessellaris* (Moreton Bay ash), *Eucalyptus coolabah* (coolabah) and *E. tereticornis* (forest red gum). Specimens of *Ficus obliqua* (small-leaved fig), *Dysoxylum gaudichaudianum* (ivory mahogany) and *Casuarina cunninghamiana* (river she-oak) were also present. A similar mix of shrub, small tree and groundcover species to that recorded in Resource Area 1 was observed.

Resource Area 2 occupied a greater area than Resource Area 1 and included some larger swales, representing abandoned channels of the Fitzroy River, some of which supported standing water and aquatic vegetation. One such swale, outside the southeast boundary of Resource Area 2, supported standing water and aquatic vegetation. Aquatic plant species included *Azolla pinnata* (fern, azolla), *Juncus polyanthemus*, the declared Class 2 weed *Hymenachne amplexicaulis* (hymenachne) and *Persicaria attenuata* (velvet knotweed).



3.4.3 Haul Road

The proposed haul road as far as possible traverses existing vehicle tracks and grazing areas, therefore the landscape associated with this infrastructure comprises primarily introduced pasture and weed species. South and west of the homestead small patches of eucalypt regrowth occurs in the vicinity of the proposed road.

3.4.4 Stockpile Area

The stockpile area featured a large *Ficus obliqua* (small-leaved fig) tree that had fallen over, presumably due to the recent cyclone. Although most of the tree's rootball had been exposed there was still live foliage in the canopy. The remainder of the stockpile area was pasture supporting predominantly introduced pasture grasses, legumes and weeds.

Remnant vegetation, mapped as RE 11.3.25, occurred approximately 90m to 100m to the west of the stockpile area and on lower ground. Ground-truthing confirmed this vegetation could be considered remnant although, as with other remnant vegetation within the property, the consequences of pasture species introduction and cattle was evident.

3.4.5 Waterbody in North

A relatively large waterbody was located approximately 500m northeast of the proposed stockpile area. It is understood this waterbody is man-made. Large, mature trees are located along the western bank (possibly the excavated material) included specimens of *Corymbia tessellaris* (Moreton Bay ash), *Eucalyptus tereticornis* (forest red gum) and *Melaleuca viridiflora* var. *viridiflora* (broad-leaved paperbark). The water body, although man-made, offers some natural elements and ecosystem functions.

3.5 Threatened Vegetation Communities

As mentioned in **Section 2.2**, the Commonwealth database identified three Threatened Ecological Communities (TECs) that may occur in the area (Brigalow, Black Box Woodland and Weeping Myall Woodland). **Table 1** below lists the endangered TECs and their corresponding Regional Ecosystems.

Table 1. Threatened Ecological Communities that may occur in the area & equivalent Regional Ecosystems

TEC	Likelihood of occurrence in area*	Equivalent RE (Bioregion 11)
Brigalow (<i>Acacia harpophylla</i> dominant & co-dominant)	Community known to occur within area	11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.9.6, 11.11.14, 11.12.21
Coolibah - Black Box Woodlands of the Darling Riverine Plains & the Brigalow Belt South Bioregions	Community may occur within area	11.3.3 , 11.3.15, 11.3.16, 11.3.28, 11.3.37
Weeping Myall Woodlands	Community likely to occur within area	Not mapped as a stand-alone RE, occurs within 11.3.2 and 11.3.28

*Likelihood = as per database; RE bolded occur near or within subject site

No Regional Ecosystems equivalent to the Brigalow (*Acacia harpophylla* dominant and co-dominant) TEC occurred on the property. The Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions TEC was represented on the property by RE 11.3.3 (*Eucalyptus coolibah* woodland on alluvial plains). In addition, Regional Ecosystem 11.3.2 (*Eucalyptus populnea* woodland on alluvial plains), which may contain the Weeping Myall Woodlands TEC, occurred in the vicinity of the property. No specimens of weeping myall (*Acacia pendula*) were recorded within the broader area.



3.3 Significant Flora

A number of sources were used to determine known or likely occurrence of state and federally significant (threatened) flora species (i.e. species listed under the EPBC Act and/or the Regulations of the NC Act). The State and Commonwealth databases revealed eleven threatened species occurred within 10km of the subject site (Table 2). Based on reference to State RE mapping for the study area, known habitat information for each species and ground-truthing, it was determined that none of the eleven threatened species had more than a "low" likelihood of occurrence within the development areas on the subject site (refer also Appendix A for database records and Appendix D for site flora species list).

Table 2. Threatened flora potentially occurring in the local area

Scientific Name	Common Name	Status	Habitat	Likelihood of Occurrence
<i>Cycas megacarpa</i>		CE, QE	Habitat includes 11.3.25 - <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines, 11.3.4 - <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. tall woodland on alluvial plains.	Low Both regional ecosystems present or nearby to subject property but are outside of the impact area. Furthermore no specimens were observed during in the subject site.
<i>Cycas ophiolitica</i>	Marlborough blue	CE, QE	<i>Cycas ophiolitica</i> grows on hills and slopes in sparse, grassy open forest at altitude ranges from 80-400m above sea level. Although this species reaches its best development on red clay soils near Marlborough, it is more frequently found on shallow, stony, infertile soils, which are developed on sandstone and serpentinite, and is associated with species such as <i>Corymbia dallachiana</i> , <i>C. erythrophloia</i> , <i>C. xanthope</i> and <i>Eucalyptus fibrosa</i> . <i>Cycas ophiolitica</i> has also been found on mudstone in association with <i>Corymbia dallachiana</i> , <i>C. erythrophloia</i> and <i>Eucalyptus crebra</i> , and on alluvial loams with <i>Corymbia intermedia</i> , <i>Eucalyptus drepanophylla</i> and <i>E. tereticornis</i> .	Low Habitat is not present within or adjacent to subject site.
<i>Macraezania serpentina</i>		QE	<i>Macraezania serpentina</i> occurs in low eucalypt woodland with a mixed grassy understorey at altitudes between 80-160m above sea level. It grows on steep rocky slopes on red clay loams and serpentinite soils.	Low Suitable habitat is not present in the subject site.
<i>Tectaria devesa</i> var. <i>devesa</i>	Cave fern	CE, QE	The cave fern grows in narrow pockets of soil on the walls and floor near the entrance to limestone caves in situations where sufficient natural light and moisture are available to support plant growth.	Low Suitable habitat is not present in the subject site.
<i>Graptophyllum excelsum</i>		QNT	<i>Graptophyllum excelsum</i> occurs in semi-evergreen vine thickets, although near Chillagoe the species has also been recorded growing in grassy woodland in association with <i>Eucalyptus cullenii</i> and <i>Corymbia erythrophloia</i> .	Low Some suitable habitat is present but was highly disturbed, small and fragmented. No specimens were found in the subject site.
<i>Pultenaea setulosa</i>	Ragged bush pea	QV, CV	Grows on serpentinite substrates in <i>Eucalyptus fibrosa</i> and/or <i>Corymbia xanthope</i> woodlands or open forests.	Low Suitable habitat is not present on the subject site.
<i>Streblus pendulinus</i>	Siah's backbone	CE	Norfolk Island.	Low The taxonomy of this species is confused but recent published information indicates that <i>Streblus pendulinus</i> is confined to Norfolk Island while <i>S. brunonianus</i> is present on both the Australian mainland as well as on a number of Pacific Islands.



Scientific Name	Common Name	Status	Habitat	Likelihood of Occurrence
<i>Corymbia xanthope</i>	Glen Geddes bloodwood	QV, CV	<i>Corymbia xanthope</i> occurs in woodlands with <i>Eucalyptus fibrosa</i> on ridges or hill slopes on serpentinite geology with sandy soils. This community is recognised as a distinct regional ecosystem (RE 11.11.7 <i>E. fibrosa</i> subsp. (Glen Geddes), <i>C. xanthope</i> woodland on serpentinite).	Low. Suitable habitat is not present in the subject site.
<i>Eucalyptus raveretiana</i>	Black ironbox	CV	Black ironbox usually grows along watercourses, and sometimes on river flats or open woodland. Occurs in Regional Ecosystem 11.3.25a with <i>Melaleuca leucadendron</i> , <i>M. fluviatilis</i> , <i>Eucalyptus tereticornis</i> , <i>Corymbia tessellaris</i> .	Low. Suitable habitat occurs adjacent to the Fitzroy River but not within the development areas. Furthermore, no specimens were observed within the subject site.
<i>Corchorus hygrophilus</i>		QV	Grows on vine forest margins or in sclerophyll forests near vine forest, on soils derived from granite or limestone.	Low. Suitable habitat is not present in the subject site.
<i>Stockhousia tryonii</i>		QNT	Endemic to the serpentinite soils of the Port Curtis district, central Queensland.	Low. Suitable habitat is not present in the subject site.

*Status: C Commonwealth, Q Queensland; E endangered, V vulnerable, NT near threatened

3.5 Fauna & Habitat

As described above, the landscape is characterised by grazed and pasture lands with isolated trees/patches of vegetation and remnant woodland associated with the riparian community along the Fitzroy River. Small ephemeral waterbodies occur within the subject site and adjacent, particularly to the east. While the general landscape is typical of agricultural pursuits, habitats and resources potentially available to fauna include those for foraging, nesting and breeding and exist as follows:

- Riparian vegetation along Fitzroy comprises large blue gums and Coolibah woodland. Coolibah woodland associated with Resource Area 1.
- Isolated large paddock trees, stags and large figs across site – habitat for fauna and focus for biodiversity.
- Wetlands and swales with water/wetland vegetation offer habitat for aquatic species, including wetland birds.

During the survey, a number of fauna was recorded, including 70 bird species (**Appendix E**), a number of wallabies, grey kangaroo, dog, feral pig and fresh-water turtle. It is reported (P.Orchard, Station Manager, pers com.) that a number of fauna have been recorded over the years on or near the property, as follows:

- Sugar Gliders and Brushtail Possums
- Scrub Python, Carpet Snake, Black-headed Python, Spotted Python, Brown Snake and Red-bellied Black Snake
- Saltwater Crocodiles along the Fitzroy River
- Occasional fly-fox foraging in area but no roosts

A large nest (wedge-tailed eagle) was recorded within the paddock in the south and it is reported that historically, Black-necked Storks nested to the east of the subject site a number of years ago (P.Orchard, Station Manager, pers com.).



3.6 Threatened Fauna

A number of sources (including local knowledge) were used to determine known or likely occurrence of threatened fauna (i.e. species listed under the Commonwealth EPBC Act 1999 and/or the Regulations of the Queensland NC Act 1992). **Table 3** provides a list of known records for the locality.

Table 3. Threatened fauna occurring in the local area (known records since 1980)

Species	Common Name	Status*	10km	5km	1km
<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle	QSL	1	1	0
<i>Ardea ibis</i>	cattle egret	QSL	2	1	0
<i>Ardea modesta</i>	eastern great egret	QSL	3	1	0
<i>Rhipidura rufifrons</i>	rufous fantail	QSL	1	0	0
<i>Gallinago hardwickii</i>	Latham's snipe	QSL	1	1	0
<i>Ornithorhynchus anatinus</i>	platypus	QSL	1	1	0
<i>Calyptorhynchus lathami</i>	glossy black-cockatoo	QV	1	1	0
<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)	QV, CV	2	2	0
<i>Macroderma gigas</i>	ghost bat	QV	1	0	0

*Status: C Commonwealth, Q Queensland, V vulnerable, SL State special least concern

Other species listed as threatened and/or migratory, and identified in broad databases (e.g. Commonwealth, **Appendix A**) have also been considered and likelihood of occurrence discussed below:

- Squatter pigeon - habitat on subject site and all agricultural landscapes within Central Queensland, historical record to east and two known records within 10km
- Painted snipe - possible habitat in wetlands to the east of the subject site, species is nomadic and can occur in a range of wetland environments including in farming landscapes, 0 records within 10km
- Large pied bat - possible foraging habitat along riparian areas, 0 records within 10km
- South-eastern long-eared bat - possible habitat along riparian areas and possibly hollow bearing trees, 0 records within 10km
- Fitzroy River turtle - suitable habitat along Fitzroy River – 0 records within 10km, but expected to occur in river
- White bellied sea-eagle - **recorded on site** flying above riparian vegetation in west, likely to nest in large trees associated with large waterways
- Rainbow bee-eater - **recorded on site** flying over site and roosting on trees, not uncommon in this landscape and would forage (aerially) on insects
- Great egret - **recorded** in wetlands to the east of the subject site
- Cattle egret - **recorded on site** in paddocks with cattle, a common species associated with agricultural landscapes



4. IMPACT ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

The proposed development (project) footprint is relatively small and has been designed to avoid disturbance to features of ecological value. These features are summarised below with respect to each project component and the information requested by the State and Council as per the pre-lodgement meetings. **Figure 3** provides an overlay of the mapped ecological features and the project infrastructure. Refer also **Photo Plates** attached.

4.1 Ecological Features of Project Areas

4.1.1 Resource Area 1

- Non-remnant area confirmed, few large trees, including figs (one very large fig and associated vegetation in southwest of high value).
- Waterbody in east with some habitat lies beyond extractive area.

4.1.2 Access to Resource Area 1

- Existing track through eucalypt woodland, cleared understorey, shallow depression. Waterway/drainageline lies to the east of the existing access road.
- Area used by cattle.
- Narrowest area (gap between small eucalypt trees) approximately 10m.
- Gap between largest eucalypt trees approximately 20m.
- Road access/construction should be able to minimise tree clearing (i.e. avoid clearing of any large remnant trees).
- Photographs provided in **Photo Plates**.

4.1.3 Resource Area 2

- Generally open paddock landscape.
- Isolated large trees and figs.
- Patches of Moreton Bay ash woodland (regrowth) in northwest and in swales.
- Large nest (bird of prey) north of Processing Area.
- Wetland/swale immediately south of Processing Area (beyond disturbance footprint).
- Small swales north of Processing Area.

4.1.4 Waterbody in North

- Appears to have natural features and supports wetland/aquatic habitat.
- Understood to be artificial waterbody - as remnant trees are well established on "earthen mound" to west.
- Large stags in locality.

4.1.5 Stockpile Area

- Central point has large fig (blown over by recent Cyclone).
- General landscape is typical grazing paddock.
- Remnant vegetation (mapped, although may be questionable) with swale and waterbody to west.
- Tallest tree (generally at "edge" of remnant vegetation) is a forest red gum (*E. tereticornis*) approximately 22m in height.



- The landform drops to the west and the remnant vegetation is generally located on the lower slopes. A 40m setback is proposed from the edge of the "remnant", essentially locating the western boundary generally on the upper slopes.

4.1.6 Haul Road

- Based on mapping, haul road avoids major swales, all "wetlands", all remnant vegetation and most likely large habitat trees.
- The haul road follows an existing easement/reserve in the north which is devoid of woody vegetation.
- The haul road follows a ridgeline with a few isolated paddock trees in the central north (near the homestead).
- South of the homestead the haul road crosses some swales and regrowth Coolibah woodland.
- South (in the east) the haul road passes along a ridgeline where there are isolated large stags and figs with some wetlands and swales (the wetlands are to the east of the haul road).
- The haul road traverses typical grazing paddock landscape to access the Processing Area.

4.2 Potential Impacts on Ecological Values

The identified locations of project infrastructure and extractive areas (i.e. Resource Area 1 and 2, Processing Area, Stockpile Area and Haul Road) are unlikely to impact on any high ecological values. As stated previously, these areas have been specifically located away from features of high value. In summary these areas are:

- outside "actual" ground-truthed remnant vegetation
- in areas that do not support threatened plant species
- outside mapped wetlands and waterways (including access road to Resource Area 1)
- outside any wetlands of "general significance"

The few ecological values that may be potentially impacted (dependent on detailed design stage) are summarised as follows:

- isolated habitat trees within landscape (including large eucalypts, figs and stags)
- regrowth Coolibah woodland
- minor swales/wetlands
- potential habitat for threatened species (e.g. micro-bats, turtle)
- loss of nesting tree for wedge-tailed eagle
- loss of habitat for common fauna and flora

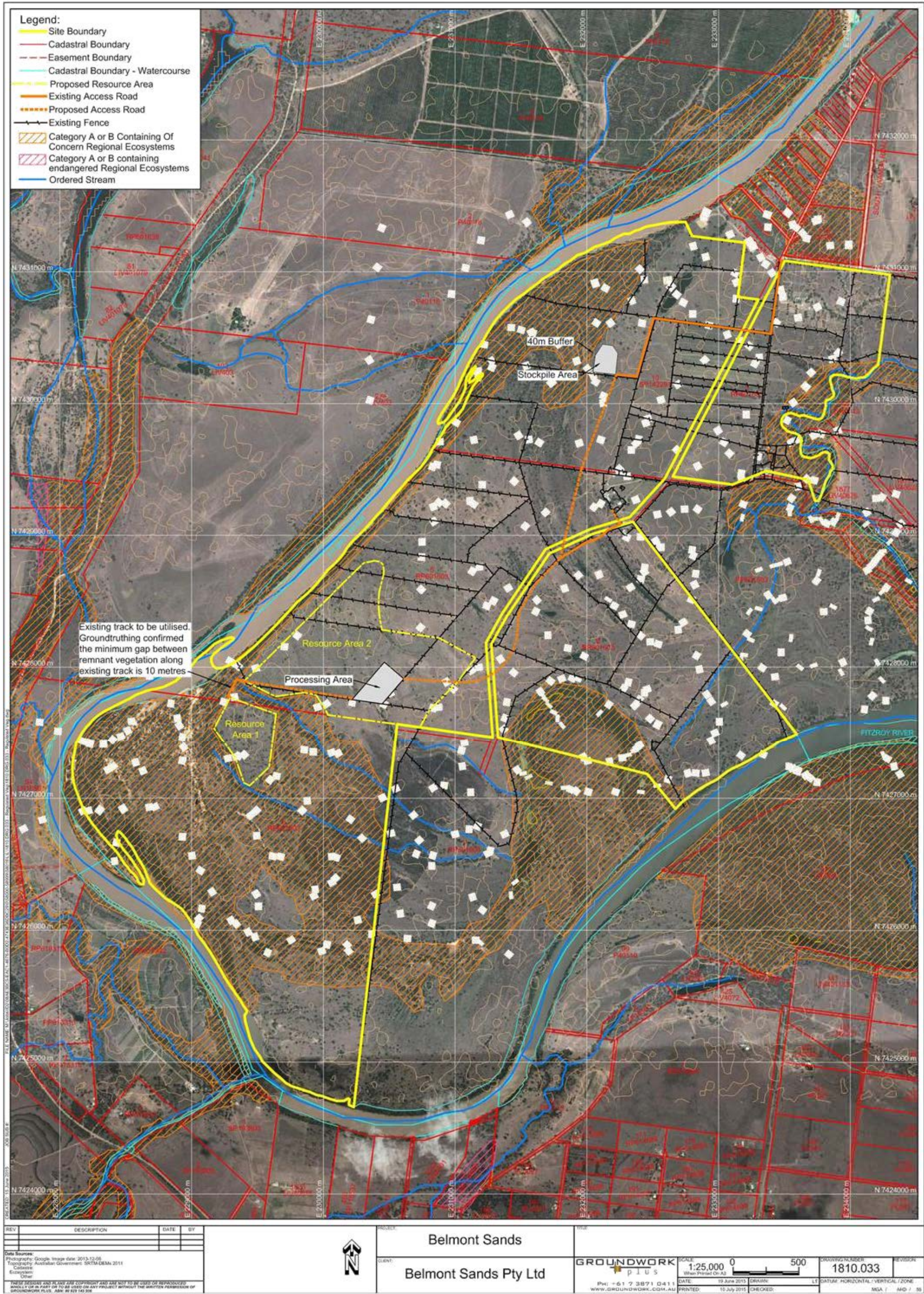


FIGURE 5-1: BELMONT SANDS PROPOSED RESOURCE AREAS



4.3 Management & Mitigation Measures

Upon consideration of the legislative and associated mapping requirements, it has been confirmed that the project has avoided the features on the larger site with any significant ecological values. The overall impacts on ecology from at a local and strategic perspective are considered minimal.

The following measures are suggested, as part of a 'best practice' approach to local ecology matters, and are therefore recommended as inclusions into any site-based Environmental Management Plan:

- Minimise the extent of clearing within any of the nominated stages, to that which is necessary as a practical working area.
- Avoid removal of large paddock trees, figs and stags on the edges of the nominated resource areas.
- The final internal haul road location is to be determined in consultation with a qualified ecologist, to ensure that any resultant ecology impacts are minimised.
- Implementation of sediment control and erosion control measures to ensure potential impacts to "wetlands" are avoided.
- Provide a fauna spotter on the site during clearing operations, particularly for large trees (e.g. trees with girth greater than 300mm) and other trees with nests or obvious hollows. The spotter is to give particular consideration to nests and breeding periods.
- Relocate/reuse hollow logs and woody debris for habitat.
- Identify areas for progressive rehabilitation.
- Identify (i.e. fencing/flagging) appropriate setbacks to remnant vegetation, wetlands and any other features of ecological value that are identified for retention/protection.
- Implementation of broader management measures to protect environmental values, which may include the following:
 - ecological management (including vegetation clearing and fauna/habitat management)
 - erosion and sediment control
 - air quality (dust) management
 - monitoring (as required by the relevant Authority).



5. STATUTORY CONSIDERATIONS

5.1 Council

Council's significant local vegetation mapping identifies a large area of vegetation in the south of the subject site. It is assumed this mapped is based on a high level mapping approach. Following ground-truthing and with reference to the State regulated mapping and aerial photography, it is evident that Council's mapping is inconsistent with that which occurs on the ground. Portions of the area mapped "locally significant" comprises grazing paddocks. Locally significant vegetation is unlikely to be disturbed as part of the project as the intention is to avoid all State mapped vegetation.

5.2 State

The design of the project has intentionally attempted to avoid MSES, including mapped regulated vegetation and wetlands. In particular, the site assessment confirmed that the vegetation associated with Resource Area 1 is not remnant and that the access to Resource Area 1 will not require the removal of regulated vegetation. Wetlands are to be retained with the proposed works setback from these areas in order to adequately buffer the feature. The proposed development is unlikely to have any significant residual impact on wetlands. It is understood that the SDAP Module 11 will be addressed by Groundwork Plus.

5.3 Commonwealth

As per the EPBC Act 1999 requirements, if an action has the potential to significantly impact on a MNES, consideration needs to be given to whether a referral to the Minister is necessary. An understanding of the site and surrounding habitats and potential for species to occur is necessary to determine the likelihood of an action having a direct or indirect impact on a MNES. Understanding the "action" and mitigation measures is necessary to determine level of impact. The proposed development for extractive industry (the "action") is likely to include a number of activities that may impact on the local ecology, ecosystems and potentially MNES, including:

- Earthworks
- Vegetation clearance
- Changes to hydrological regime
- Changes to local landscape (e.g. noise, traffic, dust etc.)

The Commonwealth Significant Impact Guidelines follow a process to ascertain referral requirements.

1. Are there MNES located in area of proposed action?
No MNES are considered to occur within or rely on the subject site.
2. Is there potential for impacts on MNES?
No potential for impact on site. Some low potential for offsite impacts.
3. Are there measures to avoid or reduce impacts?
Yes, measures to be implemented through design and management will avoid or minimise potential offsite impacts.
4. Are the impacts likely to be significant?
Impact (if any) will not be significant.

There is some low potential for the project to disturb offsite ecological values that may support MNES (i.e. within the waterbodies to the east). However, following appropriate design of project and implementation of management measures it is not expected that the proposed development would have any significant impact on any MNES. Based on these assumptions and an understanding of the proposed project, a referral to the Commonwealth is not considered necessary.



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1. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=55794#habitat *Cycas megacarpa* SPRAT Profile
 2. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=55797#habitat *Cycas ophiolitica* SP (AT Profile)
 3. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=16344#habitat *Eucalyptus royeretiana* SPRAT Profile
 4. <http://wetlandinfo.ehp.qld.gov.au/wetlands/ecology/components/species/7macrozamia-serpentina> Wetland Info: *Macrozamia serpentina*
 5. http://www.ehp.qld.gov.au/wildlife/threatened-species/endangered/endangered-plants/cave_fern.html Threatened Species: *Tectaria devexa*
 6. <http://wetlandinfo.ehp.qld.gov.au/wetlands/ecology/components/species/7graptophyllum-excelsum> Wetland Info: *Graptophyllum excelsum*
 7. <http://www.environment.gov.au/2Fbiodiversity%2Fthreatened%2Fspecies%2Fpubs%2F2705-conservation-advice.pdf> Approved Conservation Advice for *Pultenaea setulosa*
 8. <http://environment.gov.au/2Fbiodiversity%2Fthreatened%2Fspecies%2Fpubs%2F64021-conservation-advice.pdf> Approved Conservation Advice for *Corymbia xanthope*

PHOTO PLATES



Ecology Assessment - Belmont Sands Quarry
Etna Creek

PHOTO PLATES



Ecology Assessment - Belmont Sands Quarry
Etna Creek



Australian Government
Department of the Environment

APPENDIX A DATABASE RESULTS

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 02/06/15 16:48:55

[Summary](#)

[Details](#)

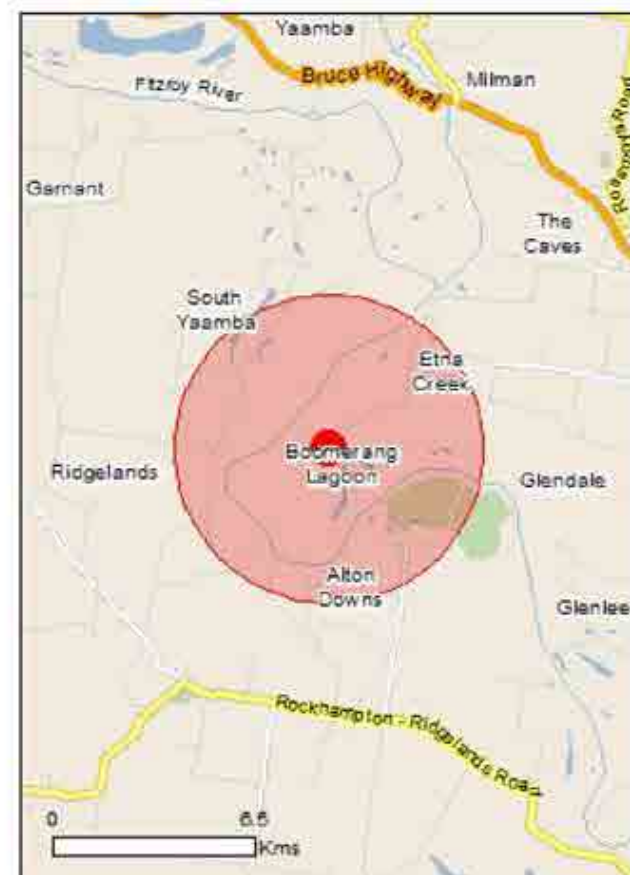
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	29
Listed Migratory Species:	24

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	24
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	33
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species

[\[Resource Information \]](#)

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Erythrorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Poephila cincta cincta Black-throated Finch (southern) [64447]	Endangered	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area

Mammals

Name	Status	Type of Presence
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus hallucatus Northern Quoll [331]	Endangered	Species or species habitat may occur within area
Nyctophilus corbeni South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
Other		
Cycas megacarpa [55794]	Endangered	Species or species habitat may occur within area
Cycas ophiolitica [55797]	Endangered	Species or species habitat likely to occur within area
Plants		
Eucalyptus raveretiana Black Ironbox [16344]	Vulnerable	Species or species habitat known to occur within area
Streblus pendulinus Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Delma torquata Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Denisonia maculata Ornamental Snake [1193]	Vulnerable	Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat may occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion cristatus Eastern Osprey [82411]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat may occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Long Island Bend	QLD

Invasive Species	[Resource Information]
Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.	

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur

Name	Status	Type of Presence
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		within area Species or species habitat likely to occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Nationally Important Wetlands		[Resource Information]
Name		State
Fitzroy River Floodplain		QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-23.235 150.37208

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Department of Environment, Climate Change and Water, New South Wales](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment and Natural Resources, South Australia](#)
- [Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [Environmental and Resource Management, Queensland](#)
- [Department of Environment and Conservation, Western Australia](#)
- [Department of the Environment, Climate Change, Energy and Water](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- [Natural history museums of Australia](#)
- [Museum Victoria](#)
- [Australian Museum](#)
- [SA Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [State Forests of NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -23.2283
Longitude: 150.3879
Distance: 10
Email: justin@gondwanaecology.com.au
Date submitted: Tuesday 02 Jun 2015 16:57:10
Date extracted: Tuesday 02 Jun 2015 17:00:11

The number of records retrieved = 12

Disclaimer

As the DSITIA is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all

animals	birds	Cacatuidae	<i>Calyptrorhynchus lathamii</i>	glossy black-cockatoo	V		1
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)	V	V	2/2
animals	mammals	Megadermatidae	<i>Macroderma gigas</i>	ghost bat	V		1
plants	cycads	Cycadaceae	<i>Cycas megacarpa</i>		E	E	4
plants	cycads	Cycadaceae	<i>Cycas ophiolitica</i>	Marlborough blue	E	E	2/2
plants	cycads	Zamiaceae	<i>Macrozamia serpentina</i>		E		1/1
plants	ferns	Dryopteridaceae	<i>Tectaria devexa</i> var. <i>devexa</i>		E	E	1/1
plants	higher dicots	Acanthaceae	<i>Graptophyllum excelsum</i>		NT		5/5
plants	higher dicots	Fabaceae	<i>Pultenaea setulosa</i>		V	V	1/1
plants	higher dicots	Myrtaceae	<i>Corymbia xanthope</i>	Glen Geddes bloodwood	V	V	1/1
plants	higher dicots	Sparrmanniaceae	<i>Corchorus hygrophilus</i>		V		1/1
plants	higher dicots	Stackhousiaceae	<i>Stackhousia tryonii</i>		NT		1/1

CODES

- Y indicates that the taxon is introduced to Queensland and has naturalised.
 - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ().
 - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*. The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).
- Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
 This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
 This number is output as 999 if it equals or exceeds this value.



Department of
Infrastructure, Local
Government and Planning

Making or amending a local planning instrument and designating land for community infrastructure

Disclaimer
This map has been prepared with due care based on the best available information at the time of publication. The State of Queensland holds no responsibility for any errors, inconsistencies or omissions within the document. Users should verify the data with the relevant authorities. This document is provided as a guide only and should not be used for legal or financial purposes.

Legend

Cadastral (100k)



Cadastral (100k)

MSES - High ecological value waters (watercourse)

MSES - High ecological value waters
(watercourse)

MSES - Regulated vegetation (intersecting a watercourse)

MSES - Regulated vegetation (intersecting a
watercourse)

MSES - High Ecological Significance wetlands

MSES - High Ecological Significance
wetlands

MSES - High ecological value waters (wetland)

MSES - High ecological value waters
(wetland)

MSES - Strategic Environmental Area (Designated Precinct)

MSES - Strategic Environmental Area
(Designated Precinct)

MSES - Wildlife habitat



MSES - Wildlife habitat

MSES - Protected area



MSES - Protected area

MSES - Marine park



MSES - Marine park

MSES - Declared fish habitat area



MSES - Declared fish habitat area

MSES - Regulated vegetation



MSES - Regulated vegetation

MSES - Legally secured offset area



MSES - Legally secured offset area



Department of
Infrastructure, Local
Government and Planning

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State Planning Policy

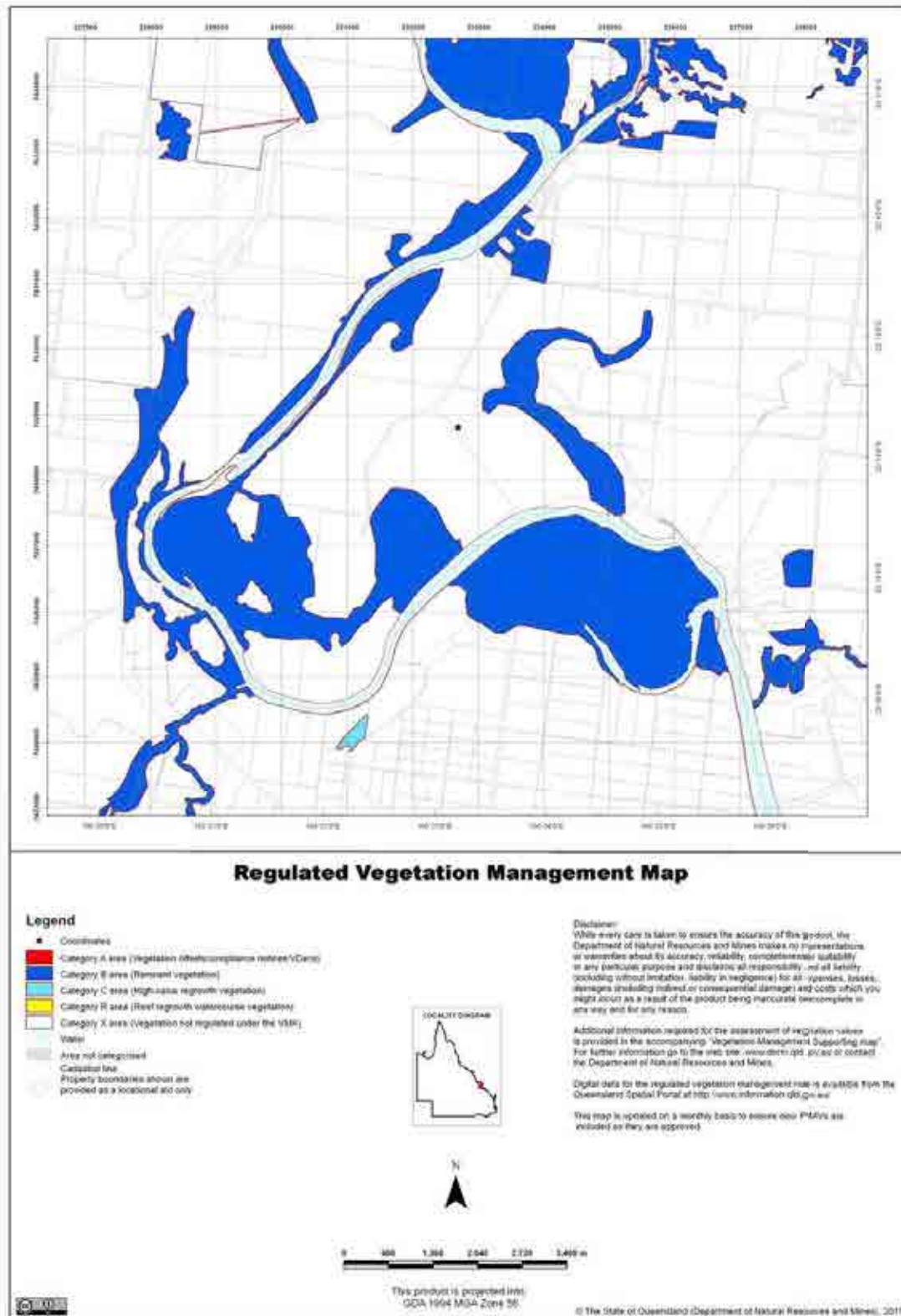
Making or amending a local planning instrument
and designating land for community infrastructure

Date: 22/06/2015

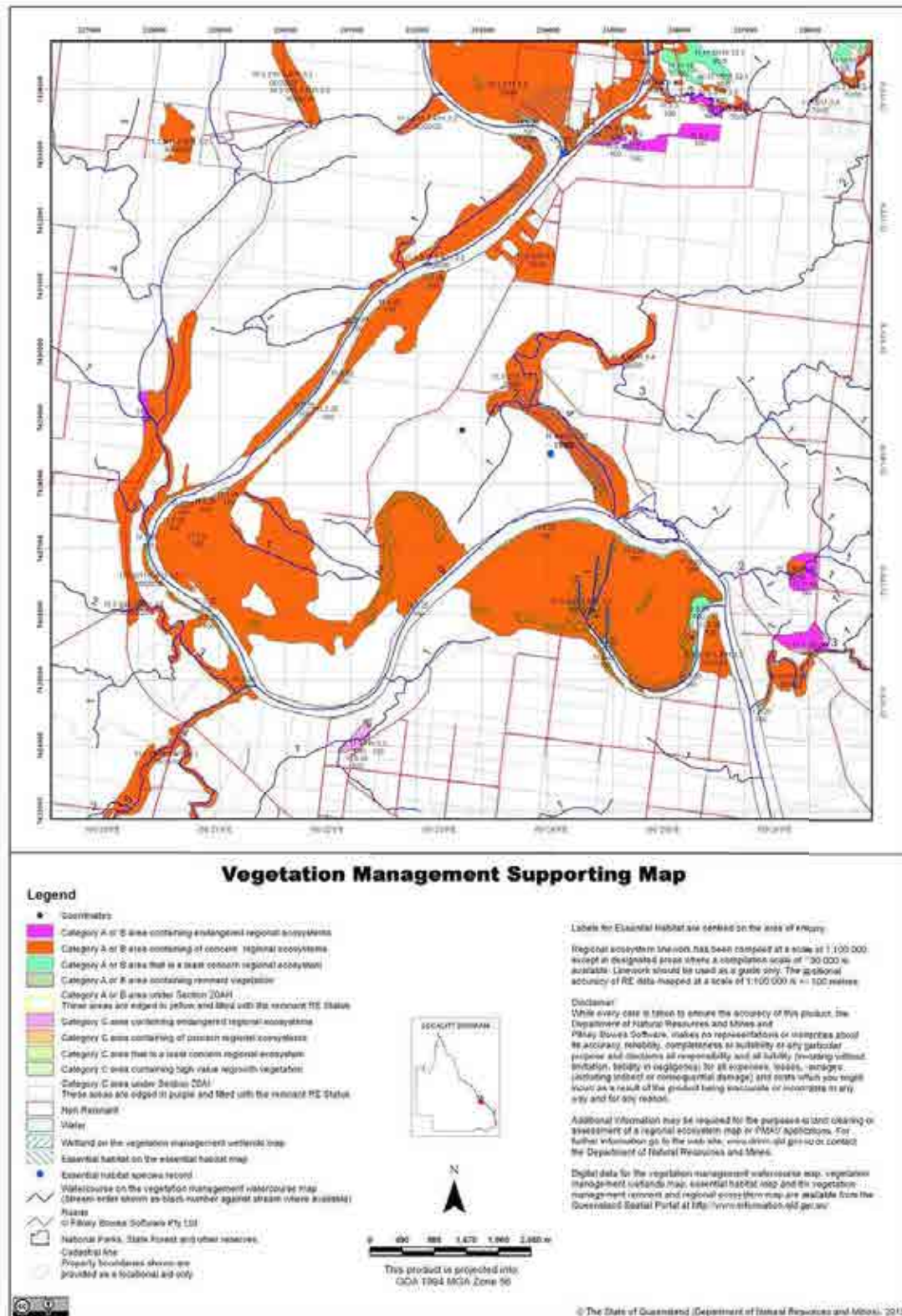
Disclaimer:

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2/06/2015 16:54:51
longitude: 150.3879 Latitude: -23.2283



2/06/2015 16:54:51
longitude: 150.3879 Latitude: -23.2283



2/06/2015 16:54:51
longitude: 150.3879 Latitude: -23.2283

Vegetation Management Act 1999 - Extract from the essential habitat database - version 4.0

essential habitat is required for assessment under the:

- State Development Assessment Provisions - Module 8: Native vegetation clearing which sets out the matters of interest to the state for development assessment under the Sustainable Planning Act 2009; and
- Self-assessable vegetation clearing codes made under the Vegetation Management Act 1999

essential habitat for one or more of the following species is found on and within 1.1 km of the identified subject lot/s or on and within 2.2 km of an identified coordinate on the accompanying essential habitat map.

his report identifies essential habitat in Category A, B and Category C areas.

he numeric labels on the essential habitat map can be cross referenced with the database below to determine which essential habitat factors might exist for a particular species.

essential habitat is compiled from a combination of species habitat models and buffered species records.

he Department of Natural Resources and Mines website (<http://www.dnrm.qld.gov.au>) has more information on how the layer is applied under the State Development Assessment Provisions - Module 8: native vegetation clearing and the Vegetation Management Act 1999.

egional ecosystem is a mandatory essential habitat factor, unless otherwise stated.

essential habitat, for protected wildlife, means a category A area, a category B area or category C area shown on the regulated vegetation management map-

- 1) (a) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or
- 2) (b) in which the protected wildlife, at any stage of its life cycle, is located.

essential habitat identifies endangered or vulnerable native wildlife prescribed under the Nature Conservation Act 1994.

essential habitat in Category A and B (Remnant vegetation species record) areas:2200m Species Information

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
1785	<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern subsp.)	V	Dry eucalypt woodland (including poplar box, spotted gum, yellow box, acacia and callitris), with sparse short grass, often on sandy areas near to permanent water; grassy eucalypt woodlands. Nest on ground near or under grass tussock, log or low bush.	None	no soil information	Gravelly ridges, traprock and river flats.

essential habitat in Category A and B (Remnant vegetation species record) areas:2200m Regional Ecosystems Information

Label	Regional Ecosystem (this is a mandatory essential habitat factor, unless otherwise stated)
1785	8.1.5, 8.2.1, 8.2.7, 8.2.8, 8.2.12, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.13, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.8.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.12.6, 8.12.7, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.9, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.18, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.23, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.7.2, 9.7.3, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.4, 9.8.5, 9.8.6, 9.8.9, 9.8.10, 9.8.11, 9.10.1, 9.10.3, 9.10.6, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.11, 9.11.12, 9.11.13, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.23, 9.11.26, 9.11.28, 9.11.29, 9.11.31, 9.11.32, 9.12.1, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.26, 9.12.28, 9.12.30, 9.12.31, 9.12.33, 9.12.35, 9.12.37, 9.12.39, 10.3.1, 10.3.2, 10.3.3, 10.3.4, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.16, 10.3.18, 10.3.19, 10.3.20, 10.3.27, 10.3.28, 10.3.30, 10.3.31, 10.4.3, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.2, 10.7.3, 10.7.5, 10.7.11, 10.7.12, 10.9.1, 10.9.2, 10.9.3, 10.9.5, 10.9.11, 10.9.13, 10.9.14, 10.9.15, 10.9.17, 11.2.1, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.6, 11.3.7, 11.3.8, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.23, 11.3.25, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.5, 11.4.8, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.4, 11.7.8, 11.8.2, 11.8.4, 11.8.5, 11.8.6, 11.8.9, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.2, 11.9.3, 11.9.7, 11.9.9, 11.9.14, 11.10.1, 11.10.4, 11.10.6, 11.10.7, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.15, 11.11.16, 11.11.19, 11.11.20, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.11, 11.12.12, 11.12.13, 11.12.14, 11.12.17, 11.12.20, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.2.11, 12.2.3, 12.3.4, 12.3.10, 12.3.12, 12.3.14, 12.5.2, 12.5.4, 12.5.5, 12.5.7, 12.5.8, 12.5.11, 12.5.12, 12.7.1, 12.7.2, 12.8.14, 12.8.16, 12.8.17, 12.8.19, 12.9-10.7, 12.9-10.8, 12.9-10.12, 12.9-10.13, 12.11.5, 12.11.7, 12.11.8, 12.11.14, 12.11.15, 12.11.20, 12.11.21, 12.11.22, 12.12.7, 12.12.8, 12.12.9, 12.12.12, 12.12.14, 12.12.21, 12.12.22, 12.12.23, 12.12.24, 12.12.25, 12.12.27, 13.3.1, 13.3.4, 13.3.7, 13.11.1, 13.11.3, 13.11.4, 13.11.8, 13.12.2, 13.12.3, 13.12.5, 13.12.8, 13.12.9, 13.12.10

essential habitat in Category A and B (Remnant vegetation) areas:2200m Species Information

0 results)

essential habitat in Category A and B (Remnant vegetation) areas:2200m Regional Ecosystems Information

0 results)

essential habitat in Category C (High value regrowth vegetation) areas:2200m Species Information

0 results)

essential habitat in Category C (High value regrowth vegetation) areas:2200m Regional Ecosystems Information

0 results)



APPENDIX D FLORA SPECIES LIST (June 2015)

Family	Scientific Name	Common Name	Introduced	NCA Status
Malvaceae	<i>Abutilon guineense</i>		Y	
Mimosaceae	<i>Acacia holosericea</i>	soapbush wattle		C
Mimosaceae	<i>Acacia salicina</i>	sally wattle		C
Amaranthaceae	<i>Achyranthes aspera</i>	prickly chaff flower		C
Asteraceae	<i>Ageratum houstonianum</i>	blue billygoat weed	Y	
Mimosaceae	<i>Albizia canescens</i>	Belmont siris		C
Mimosaceae	<i>Albizia lebbek</i>	Indian siris		C
Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C
Araucariaceae	<i>Araucaria cunninghamii</i>	hoop pine		C
Papaveraceae	<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Mexican poppy	Y	
Poaceae	<i>Aristida</i> sp.	wiregrass		C
Poaceae	<i>Arundinella nepalensis</i>	reedgrass		C
Apocynaceae	<i>Asclepias curassavica</i>	red-head cottonbush	Y	
Azollaceae	<i>Azolla pinnata</i>	fern azolla		C
Poaceae	<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>	forest bluegrass		C
Capparaceae	<i>Capparis</i> sp.			C
Solanaceae	<i>Capsicum annuum</i>	chilli	Y	
Casuarinaceae	<i>Casuarina cunninghamiana</i>	river sheoak		C
Poaceae	<i>Cenchrus ciliaris</i>	buffel grass	Y	
Chenopodiaceae	<i>Chenopodium album</i>	fat-hen	Y	
Poaceae	<i>Chloris gayana</i>	rhodes grass	Y	
Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony		C
Poaceae	<i>Chrysopogon fallax</i>			C
Asteraceae	<i>Cirsium vulgare</i>	spear thistle	Y	
Lamiaceae	<i>Clerodendrum floribundum</i>	lolly bush		C
Asteraceae	<i>Conyza</i> sp.	fleabanes	Y	
Myrtaceae	<i>Corymbia intermedia</i>	pink bloodwood		C
Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C
Lecythidaceae	<i>Planchonia careya</i>	cockatoo apple		C
Myrtaceae	<i>Corymbia trachyphloia</i>	brown bloodwood		C
Fabaceae	<i>Crotalaria</i> sp.	a rattlepod		C
Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y	
Cucurbitaceae	<i>Cucumis althaeoides</i>			C
Cyperaceae	<i>Cyperus exaltatus</i>	tall flatsedge		C
Poaceae	<i>Digitaria didactyla</i>	Queensland blue couch	Y	
Meliaceae	<i>Dysoxylum gaudichaudianum</i>	ivory mahogany		C
Poaceae	<i>Eleusine indica</i>	crowsfoot grass	Y	
Myrtaceae	<i>Eucalyptus coolabah</i>	coolabah		C
Myrtaceae	<i>Eucalyptus platyphylla</i>	poplar gum		C
Myrtaceae	<i>Eucalyptus tereticornis</i>	forest red gum		C
Convolvulaceae	<i>Evolvulus alsinoides</i>			C

Ecological Assessment – Belmont Sands



Family	Scientific Name	Common Name	Introduced	NCA Status
Moraceae	<i>Ficus obliqua</i>	small-leaved fig		C
Moraceae	<i>Ficus opposita</i>	sandpaper fig		C
Apocynaceae	<i>Gomphocarpus physocarpus</i>	balloon cottonbush	Y	
Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant		C
Poaceae	<i>Heteropogon contortus</i>	black speargrass		C
Malvaceae	<i>Hibiscus diversifolius</i>	swamp hibiscus		C
Poaceae	<i>Hymenachne amplexicaulis</i>	hymenachne	Y	
Poaceae	<i>Hyparrhenia rufa</i>	thatch grass	Y	
Fabaceae	<i>Indigofera tinctoria</i>	Birdsville indigo		C
Juncaceae	<i>Juncus polyanthemus</i>			C
Verbenaceae	<i>Lantana camara</i>	lantana	Y	
Mimosaceae	<i>Leucaena leucocephala</i> subsp. <i>glabrata</i>	leucaena	Y	
Lamiaceae	<i>Lomandra longifolia</i>	matrush		C
Myrtaceae	<i>Lophostemon suaveolens</i>	swamp box		C
Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose		C
Onagraceae	<i>Ludwigia peploides</i>		Y	
Caesalpiniaceae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C
Fabaceae	<i>Macroptilium atropurpureum</i>	siratro	Y	
Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C
Anacardiaceae	<i>Mangifera indica</i>	mango	Y	
Poaceae	<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>	green panic	Y	
Myrtaceae	<i>Melaleuca bracteata</i>	river teatree		C
Myrtaceae	<i>Melaleuca fluviatilis</i>	weeping paperbark		C
Myrtaceae	<i>Melaleuca linariifolia</i>	snow-in summer		C
Myrtaceae	<i>Melaleuca viridiflora</i> var. <i>viridiflora</i>			C
Poaceae	<i>Melinis repens</i>	red natal grass	Y	
Nelumbonaceae	<i>Nelumbo nucifera</i>	pink waterlily		C
Menyanthaceae	<i>Nymphoides indica</i>	water snowflake		C
Lamiaceae	<i>Ocimum americanum</i>	hoary basil	Y	
Cactaceae	<i>Opuntia</i> sp.	prickly pear	Y	
Oxalidaceae	<i>Oxalis corniculata</i>	oxalis	Y	
Poaceae	<i>Panicum</i> sp.			C
Passifloraceae	<i>Passiflora foetida</i>	stinking passion flower	Y	
Polygonaceae	<i>Persicaria attenuata</i>	smartweed		C
Polygonaceae	<i>Persicaria orientalis</i>	princes feathers		C
Solanaceae	<i>Physalis angulata</i>	ground cherry	Y	
Myrtaceae	<i>Psidium guajava</i>	guava	Y	
Rubiaceae	<i>Richardia brasiliensis</i>	white eye	Y	
Caesalpiniaceae	<i>Senna barclayana</i>			C
Malvaceae	<i>Sida cordifolia</i>	flannel weed	Y	
Malvaceae	<i>Sida spinosa</i>	spiny sida	Y	
Solanaceae	<i>Solanum nigrum</i>	black nightshade	Y	

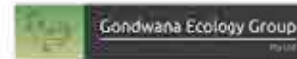
Ecological Assessment – Belmont Sands



Family	Scientific Name	Common Name	Introduced	NCA Status
Solanaceae	<i>Solanum seafortianum</i>	Brazilian nightshade	Y	
Solanaceae	<i>Solanum torvum</i>	devil's fig	Y	
Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	Y	
Fabaceae	<i>Stylosanthes</i> sp.	sylo	Y	
Poaceae	<i>Themeda triandra</i>	kangaroo grass		C
Moraceae	<i>Trophis scandens</i> subsp. <i>scandens</i>	burmy vine		C
Malvaceae	<i>Urena lobata</i>	urena weed	Y	
Poaceae	<i>Urochloa mosambicensis</i>	sabi grass	Y	
Mimosaceae	<i>Vachellia nilotica</i>	prickly acacia	Y	
Verbenaceae	<i>Verbena bonariensis</i>	purpletop	Y	
Campanulaceae	<i>Wahlenbergia</i> sp.			C
Asteraceae	<i>Xanthium occidentale</i>	Noogoora burr	Y	
Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	Y	

Y - Introduced = non-native, exotic species

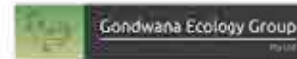
C - Nature Conservation Act 1992 = Common of least concern



APPENDIX E BIRD SPECIES LIST (June 2015)

Species	Scientific Name	Status*
Black Swan	<i>Cygnus atratus</i>	-
Australian Wood Duck	<i>Chenonetta jubata</i>	-
Cotton Pygmy-Goose	<i>Nettion coromandelianus</i>	-
Grey Teal	<i>Anas gracilis</i>	-
Pacific Black Duck	<i>Anas superciliosa</i>	-
Hardhead	<i>Aythya australis</i>	-
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	-
Crested Pigeon	<i>Ocyphaps lophotes</i>	-
Bar-shouldered Dove	<i>Geopelia humeralis</i>	-
Australasian Darter	<i>Anhinga novaehollandiae</i>	-
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	-
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	-
Australian Pelican	<i>Pelecanus conspicillatus</i>	-
White-necked Heron	<i>Ardea pacifica</i>	-
Eastern Great Egret	<i>Ardea modesta (alba)</i>	QSL, CMw, CMa
Intermediate Egret	<i>Ardea intermedia</i>	-
Cattle Egret	<i>Ardea ibis</i>	QSL, CMw, CMa
White-faced Heron	<i>Egretta novaehollandiae</i>	-
Little Egret	<i>Egretta garzetta</i>	-
Australian White Ibis	<i>Threskiornis molucca</i>	-
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	-
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	-
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	QSL, CMT, CMa
Whistling Kite	<i>Haliastur sphenurus</i>	-
Black Kite	<i>Milvus migrans</i>	-
Swamp Harrier	<i>Circus approximans</i>	-
Wedge-tailed Eagle	<i>Aquila audax</i>	-
Nankeen Kestrel	<i>Falco cenchroides</i>	-
Brown Falcon	<i>Falco berigora</i>	-
Brolga	<i>Grus rubicunda</i>	-
Purple Swamphen	<i>Porphyrio porphyrio</i>	-
Dusky Moorhen	<i>Gallinula tenebrosa</i>	-
Eurasian Coot	<i>Fulica atra</i>	-
Black-winged Stilt	<i>Himantopus himantopus</i>	-
Black-fronted Dotterel	<i>Elseyornis melanops</i>	-
Masked Lapwing	<i>Vanellus miles</i>	-
Comb-crested Jacana	<i>Irediparra gallinacea</i>	-
Red-tailed Black-Cockatoo	<i>Calyptrorhynchus banksii</i>	-
Red-winged Parrot	<i>Aprosmictus erythropterus</i>	-
Pale-headed Rosella	<i>Platycercus adscitus</i>	-
Budgerigar	<i>Melopsittacus undulatus</i>	-
Pheasant Coucal	<i>Centropus phasianinus</i>	-
Brush Cuckoo	<i>Cacomantis variolosus</i>	-
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	-
Blue-winged Kookaburra	<i>Dacelo leachii</i>	-
Rainbow Bee-eater	<i>Merops ornatus</i>	CMT, CMa
Red-backed Fairy-wren	<i>Malurus melanocephalus</i>	-

Ecological Assessment - Belmont Sands



Species	Scientific Name	Status*
White-throated Gerygone	<i>Gerygone albogularis</i>	-
Striated Pardalote	<i>Pardalotus striatus</i>	-
Noisy Miner	<i>Manorina melanocephala</i>	-
White-throated Honeyeater	<i>Melithreptus albogularis</i>	-
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>	-
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	-
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	-
Rufous Whistler	<i>Pachycephala rufiventris</i>	-
Australasian Figbird	<i>Sphecotheres vieilloti</i>	-
White-breasted Woodswallow	<i>Artamus leucorhynchus</i>	-
Pied Butcherbird	<i>Cracticus nigrogularis</i>	-
Australian Magpie	<i>Cracticus tibicen</i>	-
Spangled Drongo	<i>Dicrurus bracteatus</i>	-
Grey Fantail	<i>Rhipidura albiscapa</i>	-
Willie Wagtail	<i>Rhipidura leucophrys</i>	-
Torresian Crow	<i>Corvus orru</i>	-
Magpie-lark	<i>Grallina cyanoleuca</i>	-
Golden-headed Cisticola	<i>Cisticola exilis</i>	-
Australian Reed-warbler	<i>Acrocephalus australis</i>	-
Brown Songlark	<i>Cincloramphus cruralis</i>	-
Welcome Swallow	<i>Hirundo neoxena</i>	-
Tree Martin	<i>Petrochelidon nigricans</i>	-
Australasian Pipit	<i>Anthus novaeseelandiae</i>	-

*Status: Q = Queensland NC Act 1992; C = Commonwealth EPBC Act 1999

E = endangered, V = vulnerable, NT = near threatened, SL = special least concern,

Mt = migratory terrestrial, Mw = migratory wetland, Ma = marine,

unattributed = least concern

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LOT 8, AND LOT 10 MELDRUM ROAD
AND 887 ETNA CREEK ROAD, ETNA
CREEK**

Bushfire Management Plan

Meeting Date: 17 July 2018

Attachment No: 6



THE CONSULTANCY BUREAU

BUSHFIRE MANAGEMENT PLAN

FOR

**PROPOSED SAND QUARRY ON PART OF
BELMONT RESEARCH STATION**

by

L.S. Hawkes, B.Sc.(For), MIFA, MRFAQ
The Consultancy Bureau Pty Ltd
October 2015

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1. Introduction

A large cattle breeding station (3442 Ha) contains a significant sand resource in the southern section of the property (see Figure 2 – Site Layout Plan).

A proposed extraction area with separate processing and stockpile areas has been identified. These three sites are necessary to allow efficient extraction, washing and storage.

The Development Application to Livingstone Shire Council has resulted in an Information Request to provide a Bushfire Hazard Assessment along with a Bushfire Management Plan (see Appendix 1).

This requires the addressing of the Bushfire Code for Special Management Areas (see Appendix 2).



2. Description of the Site

The entire property of 3442 Ha includes a section of some 2000 Ha that is contained entirely by the Fitzroy River (see Photographs 1 & 2).

From the 1950s to early 2000s the property was a CSIRO Research Station. It is now owned by Agforce (an industry organisation) and is a cattle breeding property with a continuing research and education commitment.

The property enjoys extensive sub-division into small and large paddocks, four bores, a large irrigation licence out of the river, and improved pasture and cultivation (see Photographs 3 & 4).

There are three residences along with extensive equipment including Bushfire firefighting capacity. This includes a D4 dozer, grader and two slip-on firefighting pumps. Neighbours also have extensive capacity to assist with unplanned fires including large water tankers.

The site has a carrying capacity of some 1200 adult equivalent beasts and uses extensive rotational grazing along with fuel reduction burning as a component of its management.

Vegetation is largely restricted to isolated trees with many planted mature Fig Trees being a feature of the property (see Photograph 5). Along the river edge, especially in the southern section, there is a low tier of River Red Gums/Blue Gums (*E. tetricornis*) (see Photograph 6).

There are many wetland areas, many resulting from old river courses and overland flood paths (see Photographs 7 & 8).

The entire area is flat and much of the southern section below the station headquarters floods when the Fitzroy River peaks above 13m.



3. Potential Bushfire Hazard Assessment

State Planning Policy 12/13 does not have a methodology detailing the Bushfire Hazard assessment. Until an update is provided, it is appropriate to continue to use SPP 01/03 methodology (see Appendix 3). This methodology measures slope, aspect and vegetation type to provide a total score. These scores determine the indicative Potential Bushfire Hazard for any unit.

The subject site and surrounds has been divided into six units (see Aerial Photograph No. 1). The assessment of these units provides the following Hazard values.

Assessment Unit	Slope		Aspect		Vegetation		Total Score	Hazard Rating
	°	Score	NSEW	Score	Type	Score		
1	0-5	1	0-5	0	Grazed Pasture	4	5	LOW
2	0-5	1	0-5	0	Blue Gum Woodland	6	7	MEDIUM
3	0-5	1	0-5	0	Grazed Pasture	4	5	LOW
4	5-10	2	N	1	Woodland	6	8	MEDIUM
5	0-5	1	0-5	0	Grazed Pasture	4	5	LOW
6	5-10	2	N to NE	1	Woodland	6	8	MEDIUM

The majority of the property is a Low Hazard situation with the river flats moving into Medium by virtue of the vegetation. The fuel loads are low in these areas and grazing maintains this situation (see Photograph 6).

The external unit no. 4 is a National Park and is regularly burnt to maintain low fuel loads (burnt Winter 2015). Unit no. 6 is a small area of broken woodland with the river as a major separation.



4. Bushfire Risk Analysis

The assessment of the Potential Bushfire Hazard of an area is a measure of the physical attributes of the site. The risk of these hazards starting and developing into a threatening unplanned fire include sources of ignition, weather etc.

The risk of a fire internally on the property is very low because of the intensive management, grazing, use of fuel reduction burning and the ongoing monitoring of the situation.

Externally, the Fitzroy River provides an excellent separation that would halt most fires that could develop in the surroundings. It is possible for burning embers to reach the subject site and the proposed development nodes. This is a low risk but worthy of assessing the mitigating actions.

The proposed Development Nodes (3) represent a very small area of the overall property and the ongoing management of the property for cattle grazing reduces any risk of an unplanned fire.



5. Proposed Mitigating Actions

5.1 General Mitigating Action

It is not intended for the development nodes to have any permanent structures or residences and activities will be the extraction, washing and storage of sand products.

The fire fighting capacity of the greater property is available for the proposed project as ownership is the same. This includes the following equipment:-

- 4 water bores for water supply with tank storage at the homestead
- Major pumping capacity out of the river for large water tankers if needed
- 1 grader
- 1 D4 dozer
- 2 fire fighting units with slip-on water firefighting pumps
- Permanent on-site management with trained assistance.

Adjoining landholders are also well equipped, including rural fire fighting appliances and water tankers.

For a low risk situation, the fire fighting capacity is considerable and well maintained.

There is only one major access proposed from the resource out to the processing plant and onto the stockpile area. There will be adequate time for any evacuation and it is not envisaged that a high intensity fire is possible with the fuel loads available (see Aerial Photograph No 1).

It is proposed to confirm the existing station headquarters with its map room as the Emergency Assembly Point and operational hub in the case of any unplanned fire action.



5.2 The Extraction Site

This is an ex-cultivation site and will not be fenced. It is proposed to have excavation and loading machinery only on site. These can be quickly moved to the processing site if necessary.

This is a Low Hazard and Risk situation and no further action is required.

5.3 The Processing Site

This will be fenced and have a considerable water resource in as part of the washing of the product. It is proposed to have a 3m graded fire line on both sides of the fence to allow ongoing farm management in the surrounds and to separate the site. This provides a 6m separation.

5.4 The Storage Site

This is out of the flood line and will be fenced to protect the integrity of the produced products. It is proposed to have a 3m graded fire line on both sides of the fence to allow ongoing farm management in the surrounds and to provide a 6m separation.

These actions will ensure the safety of onsite employees and equipment.

This is a very low risk situation.



6. Compliance with Special Management Area Code Specific Outcome 05-010

(Livingstone Shire Planning Scheme 2005 – refer to Appendix 2)

O5	<p><i>"Public safety, lives and property are not placed at unacceptable levels of risk."</i></p> <p>There will be only workers on site in daylight hours and with no residential component. The risks of a threatening unplanned fire are very low and there is an evacuation plan in place to assemble at the station headquarters.</p>
O6	<p><i>"The highest intensity of use occurs in those parts of the site which are least bushfire prone and limits the intensity of use elsewhere."</i></p> <p>The highest intensity of use (2-4 machine operators) will be in a Low Hazard and Risk environment, while the only activities in the surrounds will be ongoing cattle grazing.</p>
O7	<p><i>"Purposes resulting in high concentrations of people on a site (including child care centre, educational establishment, hospital, residential purposes comprising multi-unit long term accommodation and short term accommodation, commercial and industrial purposes) being exposed to unacceptable levels of risk are inconsistent with the outcomes sought for this special management area."</i></p> <p>The level of risk is very low and for a very small number of part-time operators. Any risk will be managed as part of the overall Property Management.</p>
O8	<p><i>"Development is sited and designed to minimise bushfire risk having regard to:</i> <i>(a) aspect,</i> <i>(b) elevation,</i> <i>(c) slope, and</i> <i>(d) vegetation."</i></p> <p>The three development nodes are all on Low Hazard and Low Risk sites with additional actions in place to render them entirely safe.</p>
O9	<p><i>"Road layouts facilitate easy and safe movement in the event of encroaching fire and provides for alternative safe access if one direction is blocked in the event of fire."</i></p> <p>While this is not a residential situation, safe evacuation to the station headquarters will be accommodated by an Evacuation Plan and training.</p>
O10	<p><i>"A sufficient supply of water is available for firefighting purposes."</i></p> <p>With four bores and a major irrigation pumping licence out of the adjoining Fitzroy River, water is not in short supply on the proposed area. There is currently a generous storage system and ready access to water for firefighting appliances.</p>



*Bushfire Management Plan for Proposed Sand
Quarry on Part of Belmont Research Station*

Belmont Sands Pty Ltd

Overall, this proposal and the surrounding operational grazing property are well placed to comply with the Council's Code and to place the operation in an extremely bushfire safe environment for its operation.

Bushfire is not a limiting factor with this proposal.



**L.S. Hawkes, B.Sc.(For), MIFA, MRFAQ
Senior Associate**

cv attached



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CREEK**

Hydrology Assessment Report

Meeting Date: 17 July 2018

Attachment No: 7



BELMONT SANDS HYDROLOGY ASSESSMENT REPORT

Prepared for:
Belmont Sands Pty Ltd
Date:
12/11/2015

Reference:
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www.groundwork.com.au

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Attachment 3	Registered Groundwater Bore Logs

1. Introduction

1.1 Project Overview

Belmont Sands Pty Ltd ('Belmont Sands') propose to develop an extractive resource in the Livingstone Shire Council (Council) area for the supply of sand and gravel to the building and construction industry (extractive industry). The site accessed by Etna Creek Road, Etna Creek QLD 4702 refer **Figure 1 – Site Location Plan** ('site'). The site comprises of the following lots:

- Lot 8 on RP601603
- Lot 5 on RP601603
- Lot 10 on SP142291
- Lot 6 on RP601603 (for road/access purposes only)
- Lot 3 on RP601603 (for road/access purposes only).

Prior to commencement of extraction, access and haul roads will be developed. Construction of site infrastructure including the stockpile/processing plant area, office/amenities, weighbridge (if required), storage shed and processing plant will also occur at this juncture. Once the infrastructure is established, topsoil stripping and stockpiling will be completed in a logical sequence, to enable extraction to commence.

Material will be extracted via conventional methods, which includes an excavator and then transported to the processing plant by truck. Processing will involve screening and washing (if required) to remove fine silt and clay particles and dewatering of the final product, prior to stockpiling. No blasting or crushing is to occur as part of the process.

The extraction of material will be carried out in a sequential and logical manner to promote progressive rehabilitation where practicable. As batters reach their final form, they will be shaped, stabilised and revegetated with suitable pasture grasses. Where practicable, stripped topsoil from an area to be extracted will be directly placed on another area undergoing rehabilitation. Otherwise (e.g. in the initial stages of extraction), topsoil will be stockpiled, shaped and grassed until it can be used in rehabilitation activities.

1.2 Report Scope and Objectives

Groundwork Plus has been commissioned by Belmont Sands to prepare a Hydrology Assessment report as part of a response to an information request received from the Department of Infrastructure, Local Government and Planning (dated 10 September 2015) comprising additional information requested by the Department of Environment and Heritage Protection.

The additional information requested included:

Impacts on hydrology

1. *Disturbance to land as a result of the proposed activity is likely to alter overland flow paths of water. Please provide information using appropriate hydrological models or tools to demonstrate how the activity can be managed to mitigate or minimise impacts to the following:*
 - a. *Hydrology of the nearby drainage lines;*
 - b. *Hydrology of the nearby wetlands (particularly Boomerang Lagoon); and*
 - c. *Existing ecological corridors (likely impacts on flora and fauna inhabiting the local environment).*

Impacts on hydrology need to consider likely impacts upon flow frequency, flow volumes, changes in quality and timing of flows, changes in physical and biological quality of the nearby wetland, and likely

impacts on species inhabiting the wetland. Please refer to the Fitzroy River Sub-basin Environmental Values and Water Quality Objectives.

Impacts on groundwater

5. Please identify the risks the activity poses to the values of groundwater or any associated surface ecological systems, and how the activity will be managed to prevent or minimise adverse effects on these values. In particular, please provide information on the following:
- Groundwater resources (including depth to groundwater, quality of groundwater and connectivity of aquifers);
 - Impacts on the watertable as a result of proposed activity (including details of disruption and contamination of the aquifer).
 - Mitigation measures proposed to manage risks identified above.

This report includes a hydrology assessment of the following:

- Surface Water
 - Hydrology of the nearby drainage lines
 - Hydrology of the Boomerang Lagoon
 - Potential impact of the development on ecological corridors (flora / fauna)
 - Stormwater Management (Quality) constraints, locations of release points, water quality objectives and impacts on receiving environment.
- Groundwater
 - Existing groundwater resource including depth, quality and connectivity
 - Potential impact of the development on groundwater resources
 - Mitigation measures proposed to manage any risks identified.

The objectives of this report are to assess the existing surface and groundwater hydrology conditions and identify any mitigation measures required as a result of the proposed development.

2. Hydrology Assessment – Surface Water

2.1 Existing Surface Topography and Features

LIDAR survey data from 2009 was obtained from the Livingstone Shire Council in order to understand the existing surface topography and features, as shown in **Figure 2 – Existing Surface Topography**.

The site is situated on the floodplain of the Fitzroy River. The surrounding land is level, with a general gradient of 0.5-3.0%. Within the floodplain a number of drainage lines and natural ponds/wetlands are evident. The most prominent natural feature is the Boomerang Lagoon 700m southeast from the extent of "Resource Area 2".

2.2 Hydrology Assessment

Based on the available LIDAR survey information and aerial photography, there are a number of existing drainage lines in the vicinity of the site and surrounding area. These drainage lines were assessed in order to identify impacts of the proposed development, and how the development could be managed to mitigate or minimise impacts if necessary.

2.2.1 Drainage Line Channel Profiles

The longitudinal channel profiles of each drainage line presented in **Figure 3 – Drainage Catchment Plan (Existing Case)** were examined. A summary of the channel profile features is presented in **Table 1 – Drainage Line Channel Features**.

Table 1 – Drainage Line Channel Features

Drainage Line ID	Description	Length (m)	Average Gradient (%)
A	Locally significant vegetation area, defined channel, level, with a number of ponding areas forming natural lakes / wetlands	3282	0.00-0.20
B	Locally significant vegetation area, defined channel, level, with a number of ponding areas forming natural lakes / wetlands	2393	0.00-0.20
C	Cleared for grazing upstream, locally significant vegetation downstream, poorly defined channel, flat, with a number of ponding areas forming natural lakes / wetlands	2749	0.10-0.30
D	Cleared for grazing, no defined channel, broad sheet flow, floodplain characteristics	2060	0.10-0.50

As indicated, the drainage lines are level, and flow paths are either within a cleared grazing area or locally significant vegetation area.

2.2.2 Drainage Line Catchment Delineation

A catchment assessment was undertaken using the LIDAR survey in order to understand the extent of the local catchment influence of the nearby drainage lines. Catchments were delineated with reference to the channel profiles identified in **Section 2.2.1**.

Table 2 – Drainage Line Catchment Details

Catchment ID	Sub-catchment ID	Discharge Location	Area (ha)
A	A1	Fitzroy River	26.4
	A2	Junction with Drainage Line B	77.7
B	-	Boomerang Lagoon	98.2
C	-	Boomerang Lagoon	55.7
D	-	Boomerang Lagoon	98.7

The local surface topography indicates that the catchments are poorly defined, with surface gradients ranging from 0.00-3.00% in contributing runoff areas. In various areas the surface is observed to have undulating characteristics, localised natural ponds and lakes, and no clear direction of surface flow.

2.2.3 Drainage Line Catchment Hydrology

A hydrology assessment was undertaken based on the drainage line channel and catchment details. Time-area hydrologic modelling was undertaken using DRAINS (a computer simulation tool by Watercom) in order to generate runoff hydrographs from site based rainfall hyetograph input data. The DRAINS model was also developed to model rainfall infiltration losses, in order to examine the existing site conditions.

Site-based rainfall polynomial coefficients were obtained using the Intensity-Frequency-Duration (IFD) generation tool available on the Bureau of Meteorology's website. The IFD data is shown below in Table 3 – IFD Data (Source: BoM).

Table 3 – IFD Data (Source: BoM)

DURATION	ARI (year)						
	1	2	5	10	20	50	100
5Mins	105	136	176	200	233	278	314
6Mins	98.2	127	165	188	219	261	295
10Mins	81.2	105	135	154	179	214	241
20Mins	61	78.7	100	113	131	156	175
30Mins	50.2	64.6	82	92.6	107	127	142
1Hr	34.1	43.9	55.8	63	72.9	86.2	96.6
2Hrs	21.7	28.1	36.1	41.1	47.8	56.8	63.9
3Hrs	16.4	21.3	27.7	31.6	36.9	44.1	49.8
6Hrs	10	13.1	17.4	20.1	23.6	28.6	32.5
12Hrs	6.21	8.19	11.1	12.9	15.4	18.8	21.6
24Hrs	3.91	5.2	7.2	8.52	10.2	12.7	14.6
48Hrs	2.43	3.27	4.65	5.58	6.79	8.52	9.95
72Hrs	1.77	2.4	3.47	4.2	5.16	6.54	7.68

Design storm durations of 1 hour and 24 hours were simulated in DRAINS for the 1, 2, and 5 year Average Recurrence Interval (ARI) events, to determine the baseline hydrology for the minor storm events. Results are shown in Table 4 – Drainage Line Local Catchment Details and Table 5 – Drainage Line Local Catchment Hydrology – Existing Case (Minor Storm ARI Events).

Table 4 – Drainage Line Local Catchment Details

Catchment ID	Sub-catchment ID	Area (ha)	Time of Concentration (mins) ^a	Fraction Impervious (%)	Soil Hydrologic Group ^b
A	A1	26.4	48	0	B/C
	A2	77.7	134	0	B/C
B	-	98.2	133	0	B/C
C	-	55.7	152	0	B/C
D	-	98.7	114	0	B/C

^aTime of concentration based on assumed stream flow velocity of 0.3m/s Table 4.6.6 (QUDM)^bSoil with low/moderate to moderate/high infiltration capacity, based on QUDM and Groundwork assessment

Table 5 – Drainage Line Local Catchment Hydrology – Existing Case (Minor Storm ARI Events)

ARI	Peak Discharge (Q) and Runoff Volume (V)	Catchment ID				
		A1	A2	B	C	D
1yr (1h)	Q (m ³ /s)	0.498	0.525	0.669	0.332	0.784
	V (m ³)	1,053	1,120	1,426	708	1,672
1yr (24h)	Q (m ³ /s)	0 ^a	0 ^a	0 ^a	0 ^a	0 ^a
	V (m ³)	0 ^a	0 ^a	0 ^a	0 ^a	0 ^a
2yr (1h)	Q (m ³ /s)	1.280	1.350	1.710	0.850	2.010
	V (m ³)	3,264	4,967	6,324	3,139	7,416
2yr (24h)	Q (m ³ /s)	0.574	0.605	0.771	0.383	0.904
	V (m ³)	1,818	4,694	5,943	3,248	6,144
5yr (1h)	Q (m ³ /s)	2.270	2.390	3.050	1.510	3.580
	V (m ³)	6,112	13,107	16,640	8,418	18,148
5yr (24h)	Q (m ³ /s)	1.840	2.420	3.080	1.580	3.510
	V (m ³)	8,152	21,923	27,734	15,443	28,430

^a These ARI events produce no nett surface runoff, and rainfall is absorbed into the groundwater system.

Results of the DRAINS model simulation are presented in **Attachment 1 – DRAINS Model Results**. As shown in **Table 5 – Drainage Line Local Catchment Hydrology – Existing Case (Minor Storm ARI Events)**, it is estimated that no nett runoff is generated during the lower rainfall intensity 1 year ARI event (24 hour duration). This is representative of the capturing of surface water in the extensive ponding areas within the drainage lines, infiltration behaviour of the soil hydrologic conditions (considered to be "Group B" – moderate to high infiltration capacity (QUDM)), and the length of drainage lines with their relative time of concentrations.

2.2.4 Boomerang Lagoon Catchment Hydrology

The Boomerang Lagoon is situated approximately 700m southeast of "Resource Area 2". The nearby drainage lines convey rainfall runoff to the Boomerang Lagoon, with reference to the assessment in **Section 2.2.3**. The Boomerang Lagoon also receives surface runoff from additional drainage lines and surface topography as shown in **Figure 3 – Drainage Catchment Plan (Existing Case)**. The hydrology of the broader catchment is not affected by the development from a surface water perspective and as such only the nearby drainage lines that are directed towards the Boomerang Lagoon are examined as part of this study.

At the time of the LiDAR survey (2009), the standing water level in the Boomerang Lagoon was approximately RL3.500m, compared to the Fitzroy River level of RL4.000m. A profile of the river bank reveals that floodwater will overtop the bank crest and enter the lagoon at RL8.500m, at the locations indicated on **Figure 3 – Drainage Catchment Plan (Existing Case)**.

Water will overtop the river bank and enter the Boomerang Lagoon at higher flood frequencies than the drainage lines near to the development site, as the bank crest and extraction areas are at approximately RL 14.000m.

2.2.5 Proposed Development Catchment Hydrology and Stormwater Quality

The development will include impervious areas including bunding associated with fuel storage, roof areas of buildings, areas comprising screening machinery and to an extent, pavement haulage routes (gravel). The increase of impervious area is considered to be negligible with reference to the overall drainage line contributing catchments (less than 1% total area). It is noted that all access haul roads and cross drainage will be provided as close to existing surface levels as possible (i.e. no regional flood level immunity).

The development involves altering the surface topography through the process of sand extraction and stockpiling. Over the course of the extraction lease, the area subject to the development will increase. The result is a redirection and capture of the generated runoff in the proposed extraction area.

A DRAINS model was established for the developed case, with Resource Areas 1 and 2 treated as 'Basin' areas, effectively capturing 100% of generated runoff. The results are shown in Table 6 – Drainage Line Local Catchment Hydrology – Developed Case (Minor Storm ARI Events), and Table 7 – Drainage Line Runoff Volume Comparison (Existing VS Developed) details on the changes from the developed case on runoff being conveyed by the nearby drainage lines. The developed case catchment plan is shown in Figure 4 – Drainage Catchment Plan (Developed Case). DRAINS outputs are presented in Attachment 1 – DRAINS Model Results.

Table 6 – Drainage Line Local Catchment Hydrology – Developed Case (Minor Storm ARI Events)

ARI	Q(m ³ /s) V(m ³)	Catchment ID									
		A1	RA1(a)	A2	RA1(b)	B	RA2(B)	C	RA2(C)	D	RA2(D)
1yr (1h)	Q	0.291	0.856	0.472	0.641	0.467	1.070	0.286	1.060	0.425	1.860
	V	615	587	1,006	439	996	1,487	610	1,472	907	2,320
1yr (24h)	Q	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]
	V	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]	0 [#]
2yr (1h)	Q	0.744	1.780	1.210	1.330	1.200	2.690	0.732	2.660	1.090	4.590
	V	1,904	1,500	4,462	1,123	4,418	3,975	2,583	3,934	4,020	6,121
2yr (24h)	Q	0.335	0.477	0.544	0.357	0.538	1.220	0.329	1.210	0.490	1.900
	V	1,060	812	4,217	607	4,152	2,119	1,707	2,098	3,308	3,269
5yr (1h)	Q	1.320	2.610	2.150	1.950	2.130	4.530	1.300	4.490	1.940	7.620
	V	3,565	2,695	11,774	2,017	11,624	7,197	5,427	7,124	9,837	11,077
5yr (24h)	Q	1.070	0.829	2.180	0.620	2.150	2.200	1.170	2.180	1.900	3.39
	V	4,755	3,493	19,694	2,615	19,374	9,318	7,808	9,223	15,410	14,319

These ARI events produce no net surface runoff, and rainfall is absorbed into the groundwater system.

Table 7 – Drainage Line Runoff Volume Comparison (Existing VS Developed)

ARI	Runoff Volume (V) (m ³)	Drainage Line ID				
		A1	A2	B	C	D
1yr (1h)	Existing	1,053	1,120	1,426	708	1,672
	Developed (Conveyed)	615	1,006	996	610	907
	Developed (Captured)	587	439	1,487	1,472	2,320
1yr (24h)	Existing	0 ^a	0 ^a	0 ^a	0 ^a	0 ^a
	Developed (Conveyed)	0 ^a	0 ^a	0 ^a	0 ^a	0 ^a
	Developed (Captured)	0 ^a	0 ^a	0 ^a	0 ^a	0 ^a
2yr (1h)	Existing	3,264	4,967	6,324	3,139	7,416
	Developed (Conveyed)	1,904	4,462	4,418	2,583	4,020
	Developed (Captured)	1,500	1,123	3,975	3,934	6,121
2yr (24h)	Existing	1,818	4,694	5,943	3,248	6,144
	Developed (Conveyed)	1,060	4,217	4,152	1,707	3,308
	Developed (Captured)	812	607	2,119	2,098	3,269
5yr (1h)	Existing	6,112	13,107	16,640	8,418	18,148
	Developed (Conveyed)	3,565	11,774	11,624	5,427	9,837
	Developed (Captured)	2,695	2,017	7,197	7,124	11,077
5yr (24h)	Existing	8,152	21,923	27,734	15,443	28,430
	Developed (Conveyed)	4,755	19,694	19,374	7,808	15,410
	Developed (Captured)	3,493	2,615	9,318	9,223	14,319

^a These ARI events produce no net surface runoff, and rainfall is absorbed into the groundwater system.

As shown in **Table 5 – Drainage Line Local Catchment Hydrology – Existing Case (Minor Storm ARI Events)**, the development is expected to reduce the volume of direct runoff volume being conveyed into the nearby drainage lines, with a balance being captured within Resource Areas 1 and 2. These results have been based on the assumption of 100% capture in each resource area, and to the full extent of the extraction boundary. Hence, the results are only for indicative assessment purposes and are not likely to be reflective of the actual activity, as the extraction will be undertaken over the course of many years and the geology is predominately sand and gravel in which water is likely to infiltrate.

Furthermore, while the extraction areas result in redirecting a portion of runoff when compared to existing conditions, any captured surface water is able to be treated onsite through appropriate sediment control measures, and released back into the drainage system with reference to the applicable water quality objectives and targets, thus preserving hydrological conditions.

Therefore, in order to ensure the development does not adversely impact on the existing hydrology of the drainage lines and Boomerang Lagoon, the following mitigation measures are proposed:

- Ensure that all captured runoff within each Resource Area is adequately treated onsite to meet the water quality objectives of the *Environmental Protection (Water) Policy 2009 - Fitzroy River Sub-basin Environmental Values and Water Quality Objectives* and Environmental Authority (EA) requirements.
- Ensure that captured surface water is released at the approved water release points in accordance with the EA, to preserve the existing hydrological cycle of the drainage lines and Boomerang Lagoon. See indicative water release points proposed in **Figure 4 – Drainage Catchment Plan (Developed Case)** to correlate discharge points to the nearby drainage lines.
- Ensure that peak discharge is mitigated to ensure no increase or worsening from the existing discharge rates for the ARI events shown in **Table 5 – Drainage Line Local Catchment Hydrology – Existing Case (Minor Storm ARI Events)**.
- Ensure that the site Stormwater Management Plan (SMP) is regularly reviewed and updated to reflect the staged extraction extents, and ensure all upstream clean water is diverted around the disturbed catchment areas during non-flood events.

- Ensure that the site SMP is regularly reviewed and updated to reflect any changes to stormwater catchments resulting from the development.

In order to ensure that the impact on the surrounding ecological corridors are minimised, the following management and monitoring procedures are proposed to be adopted during the operational phase of the development:

- Prior to any water release from the extraction pits to drainage lines, the quality of extraction pond water will be tested for turbidity, total suspended solids, pH, dissolved oxygen and visual oil & grease to ensure compliance with state regional Water Quality Objectivities (WQOs) Criteria (*Environmental Protection (Water) Policy 2009 - Fitzroy River Sub-basin Environmental Values and Water Quality Objectives*).
- The Site Manager may engage the services of a suitably qualified and experienced person to conduct water quality sampling if required and review monitoring results to provide advice in relation to the water quality management.
- All surface water sampling will be undertaken in accordance with the Department of Environment and Heritage Protection (EHP) *Monitoring and Sampling Manual*, September 2009.
- Water pH, turbidity and dissolved oxygen levels will be measured in the field in-situ, whilst all laboratory analysis will be undertaken by a NATA certified laboratory.
- The Site Manager or delegate will undertake monthly, inspections, and as required after rainfall events, of the extraction pits and the settling pond in the northern stockpile area and conduct any necessary maintenance.

2.3 Regional Flooding

It is evident that the drainage lines have formed historically from scouring of the natural surface during flooding and rising flood waters of the Fitzroy River. This is made apparent as the drainage lines generally follow a flow path from the river bank toward the low point of the Boomerang Lagoon, and the local catchments are poorly defined. Hence the drainage lines are considered to be influenced by the regional river system hydrology as well as the local surface drainage.

A flood study was commissioned by the Queensland Reconstruction Authority (QRA) in 2013, and the study boundary includes the northern extents of the site. The results indicate that the nearby drainage lines become inundated during the 1%, and 2% Annual Exceedance Probability (AEP) events. Refer **Attachment 2 – Flood Hazard Assessment Report**, prepared by DHI Water and Environment Pty Ltd, for a record of the flood hazard assessment and inundation maps.

As discussed in **Section 2.2.4**, the Boomerang Lagoon is expected to flood more frequently than the development and extraction areas, with a river bank level of approximately RL8.50m, compared to a level of approximately RL14.0m for the development and extraction areas. Based on this observation, the flood frequency and regional catchment hydrology of the Boomerang Lagoon will not be altered by the development as the extraction area occurs above its inundation line. Hence the Boomerang Lagoon will be fully inundated before the nearby drainage lines receive break in flows from the Fitzroy River.

The development is not considered to be influential on the hydrology conditions of the Fitzroy River Basin, with a relative area of 1km² within a total basin catchment of 142,700km² (i.e 0.0001% of the catchment area). However, the changes in surface topography during the extractive process may result in water inundating the site during regional flooding. This will be dependent on the river flooding to levels above the river bank and nearby drainage lines at approximately RL14.0m.

Prior to any dewatering after a flood event, all releases must ensure compliance with the EA and/or approved SMP to return the site to operating conditions. Where feasible, it is proposed that excess water from the extraction pit post inundation will be irrigated to pasture.

This assessment is limited to a desktop analysis of the detailed LiDAR survey and reference to the QRA flood study. In order to confirm flood flow frequency, inundation depths and flow velocities pre/post development, a detailed flood modelling analysis would be required.

3. Hydrology Assessment – Groundwater

3.1 Existing Groundwater Resource

The geology of the proposed extraction area is fluvial, lithic quartzose sand giving rise to the Fitzroy River alluvium aquifer which is approximately 19 – 20m below surface level in the proposed extraction areas.

There are a number of registered groundwater bores that currently exist on the site which provide information regarding the depth and quality of the fluvial groundwater. This information is presented in **Section 3.1.1** below. In addition, a detailed drilling program was undertaken in February 2015 within the proposed extraction pits which also provides valuable information on the local groundwater depth. Details on groundwater and geology from the drilling program are provided in **Section 3.1.2** below.

3.1.1 Registered Groundwater Bores

A representation of the closest existing registered bores to the proposed extraction areas were provided in Environmental Assessment Report (Groundwork Plus), previously submitted to EHP. A summary of the closest bores that have standing water level recorded are summarised below for ease of reference in **Table 8 – Existing Registered Bores**.

Table 8 – Existing Registered Bores

Bore Reg. No.	Bore Status	Property/Description	Lat. (°) Long. (°)	Distance from quarry development area (m)	Bore Depth (m)	Standing Water Levels m / date
RN151494	Existing	Lot 10 SP14229 1	-23.2288 150.3839269	2.5km NNE	29	-10.4 / 2011
RN88289	Existing	Lot 10 SP14229 1	-23.21378649 150.3827335	2.5km NNE	30	-11.63 / 1984
RN111645	Existing	Lot 3 RP60160 3	-23.208419908 150.395759169	3.9km NNE	19.2	-11.0 / 2002
RN151501	Existing	Lot 5 RP60160 3	-23.22460002 150.383303	1.9kmNE	29.9	-10.4 / 2011

Figure 5 – Existing Groundwater Bore Locations shows the proximity of the groundwater bores to the proposed extraction pits. These bores are located approximately two (2) to three (3) kilometres to the north east and north, north east. Whilst these bores are some distance away, the information contained within the bore logs provides an indication of the likely depth and quality of groundwater at that time. The standing water levels recorded in **Table 8 – Existing Registered Bores** are assumed to be from the top of the casing.

Bore logs for the bores identified in **Table 8 – Existing Registered Bores** are attached (refer **Attachment 3 – Registered Groundwater Bore Logs**). Water quality results sampled when the bores were installed are presented below in **Table 9 – Water Quality of Existing Registered Bores**.

No water quality analysis was undertaken for Bore RN151494 which was drilled on 3 June 2011.

Bore RN88289 was drilled on 26 September 1984 and the relevant water quality analysis results are presented in Table 9 – Water Quality of Existing Registered Bores below.

Bore RN111645 was drilled on 21 January 2002 and the relevant water quality monitoring results are presented in Table 9 – Water Quality of Existing Registered Bores below.

Bore RN151501 was drilled on 11 June 2011 and only electrical conductivity was recorded at 365 μ S/cm.

Table 9 – Water Quality of Existing Registered Bores

Bore	Zone	EC (μ S/cm)	Hardness (mg/L as CaCO ₃)	pH	Ca (mg/L ⁻¹)	Mg (mg/L ⁻¹)	Na (mg/L ⁻¹)	Cl (mg/L ⁻¹)	Fe (mg/L ⁻¹)	Zn (mg/L ⁻¹)	Cu (mg/L ⁻¹)
11645	14	11890	7411.81	6.9	350	380	1800	3750	0.03	NA	NA
88289	22	1300	341	7.3	46	55	120	290	NA	NA	NA

As outlined in the Environmental Assessment Report (Groundwork Plus), the Groundwater Environmental Values for the local area are prescribed by Fitzroy River Sub-Basin Environmental Values and WQOs include stock watering, aquatic ecosystems, irrigation, farm supply/use, primary recreation, drinking water and cultural and spiritual values. The majority of the site is mapped as Zone 22 for Groundwater within the Fitzroy River Sub-Basin Environmental values and WQOs with the north west corner mapped as Zone 14.

The WQOs for Zone 14 and Zone 22 for shallow (less than 30m) groundwater are provided in Table 10 – Groundwater Water Quality Objectives below.

Table 10 – Groundwater Water Quality Objectives

Zone	Depth	Percentile	EC (μ S/cm)	Hardness (mg/L as CaCO ₃)	pH	Ca (mg/L ⁻¹)	Mg (mg/L ⁻¹)	Na (mg/L ⁻¹)	Cl (mg/L ⁻¹)	Fe (mg/L ⁻¹)	Zn (mg/L ⁻¹)	Cu (mg/L ⁻¹)
22	<30m	20 th	1403	367	7.2	60	41	145	218	0.000	0.010	0.000
22	<30m	50 th	2220	591	7.7	105	76	240	475	0.000	0.020	0.010
22	<30m	80 th	3722	1001	8.0	175	145	420	979	0.050	0.080	0.037
14	<30m	20 th	1006	294	7.5	51	36	88	129	0.000	0.010	0.010
14	<30m	50 th	1619	458	7.9	80	61	164	260	0.005	0.030	0.020
14	<30m	80 th	2150	743	8.1	125	108	308	604	0.030	0.091	0.050

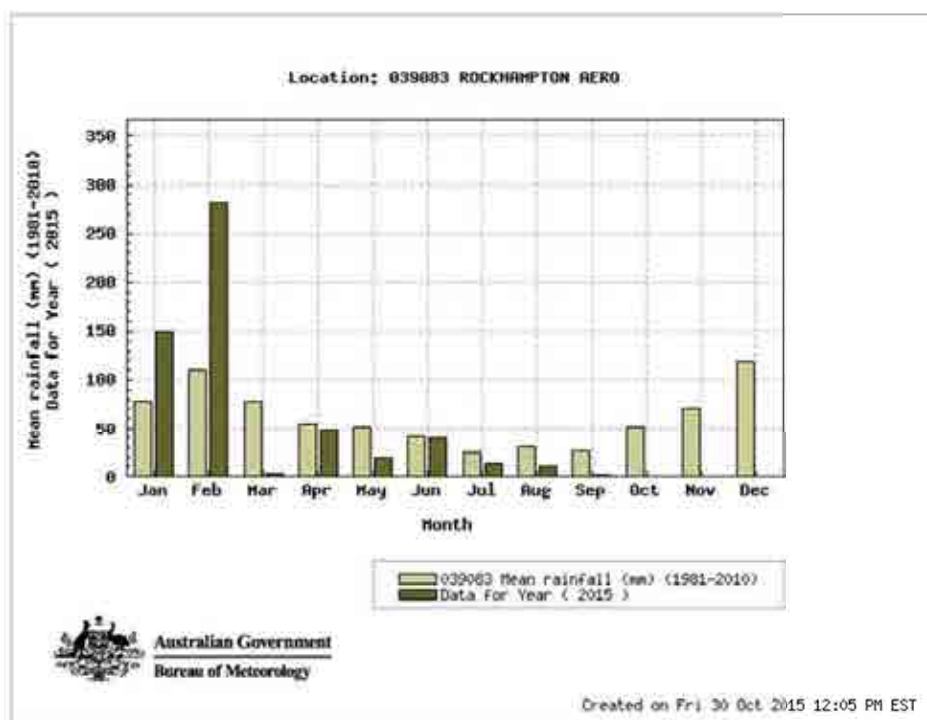
Of the two (2) bores that have been monitored for water quality, bore RN88289 is the closer of the two (2) to the proposed extraction located approximately 2.5km north, north east of Resource Area 2. The water quality results for this bore show that the groundwater is of a high quality, below the 20th percentile WQO's for electrical conductivity, hardness, calcium and sodium and below the 50th percentile WQO's for pH and magnesium.

Bore 11645 is approximately 3.9 km north, north east of Resource Area 2 and the water quality results indicate an exceedance of the WQOs which may indicate the impact of the drought being experienced within the monitoring period.

3.1.2 2015 Drill Logs

A detailed drilling program was undertaken within the proposed extraction areas at the site in February 2015. The results of the drill cores show that there is a small topsoil/overburden cap across the resource ranging from 0m to 3m of dark brown fluvial clay material. This material will be removed and stored by ensuring it is covered with grass, or used for bunding (also grassed) around the edge of the extraction pit to redirect clean overland flow around the pit. Below the topsoil the drill logs within the extraction area show medium to coarse grained lithic quartzose sand with minor gravel in Resource Area 1 and 2 ranging from the surface to 20m in depth. It is noted that the drill logs are commercial in confidence and as a result have not been included in this report. They drill logs can be provided to EHP upon request for assessment purposes only if required. During this drilling program, no groundwater was encountered despite it occurring within the wet season.

Rainfall data from the Bureau of Meteorology shows that January and February 2015 were particularly wet months, receiving well above the average rainfall, therefore, the expected height of the groundwater table was be shallowest (i.e. nearest to the surface) at this time of year (refer Graph 1 – Monthly Rainfall data for Rockhampton Aero BOM Station in Comparison to Mean Rainfall).



Graph 1 – Monthly Rainfall data for Rockhampton Aero BOM Station in Comparison to Mean Rainfall

A cross section of the ground level heights is provided in Figure 6 – Cross Section Location Plan and Figure 7 – Cross Section of Resource Areas which shows that the proposed extraction areas are elevated well above the Fitzroy River and indeed above the Boomerang Lagoon. Any recharge of groundwater from rainfall is therefore likely to replenish the river and lagoon well before having any impact on the groundwater within the proposed extraction areas.

3.2 Potential Impact to Groundwater

Given the depth of groundwater in the proposed extraction areas is 19-20m below the surface, it is unlikely that the proposed sand extraction will have an impact on groundwater level, quality or connectivity as it will not be interacting with it.

As the resource to be extracted is sand and gravel, groundwater will move through the substrate and will not be retained within the extraction void. As a result, the standing water level of groundwater is likely to change as the climate changes. Resource drilling on the site was undertaken at a time of year when the groundwater table is expected to be at its highest, therefore the depth of 19 – 20m is considered to be conservative and it may be lower than this during dryer periods.

The majority of the resource has less than 10% fine material. As the proposed extraction is of relatively clean sand with minimal fines, it is unlikely that any degradation of quality of the groundwater will be observed.

Nevertheless, a groundwater monitoring program has been proposed to ensure that if groundwater is encountered as part of the extraction activities, monitoring of the groundwater will occur to identify any potential down-gradient impacts as outlined in **Section 3.3** below.

In addition, a surface water monitoring program has also been proposed to ensure that the water quality within the extraction voids is maintained within the relevant surface water quality parameters as specified in the Environmental Management Plan.

3.3 Mitigation Measures

An appropriate mitigation measure, tailored to the low level of risk of interaction with groundwater, is for the operator to design and implement a groundwater monitoring program. It is proposed that quarterly monitoring is proposed at the five locations identified in **Figure 8 – Proposed Groundwater Monitoring Bore Locations**. These five locations have been selected to ensure that there is at least one up-gradient monitoring location for each proposed extraction area and one down-gradient. An additional down gradient bore has been proposed for Resource Area 2 as the proposed extraction area is relatively large.

It is proposed that the five groundwater monitoring bores are staged in line with the extraction of the two resource areas. Bore locations 1, 2, and 3 are proposed prior to commencement of extraction within Resource Area 2, and Bores 4 and 5 are proposed to be installed prior to commencement of extraction within Resource Area 1.

The proposed groundwater monitoring parameters will include standing groundwater level, EC and pH. Electrical conductivity has been selected as a monitoring parameter to ensure that there are no impacts to salinity as a result of the extraction and pH has been selected to ensure that there is no acidification of extracted material which may result in changes to pH. As the drill logs show the material to be extraction is relatively clean sand and gravel it is highly unlikely that any impact to the quality of groundwater will be observed.

The proposed limits for EC in accordance with the 80th percentile of the WQO's for Groundwater (Zone 22) is 3722 µScm. The proposed range to be maintained for pH is 7.2 (20th percentile) to 8.0 (80th percentile).

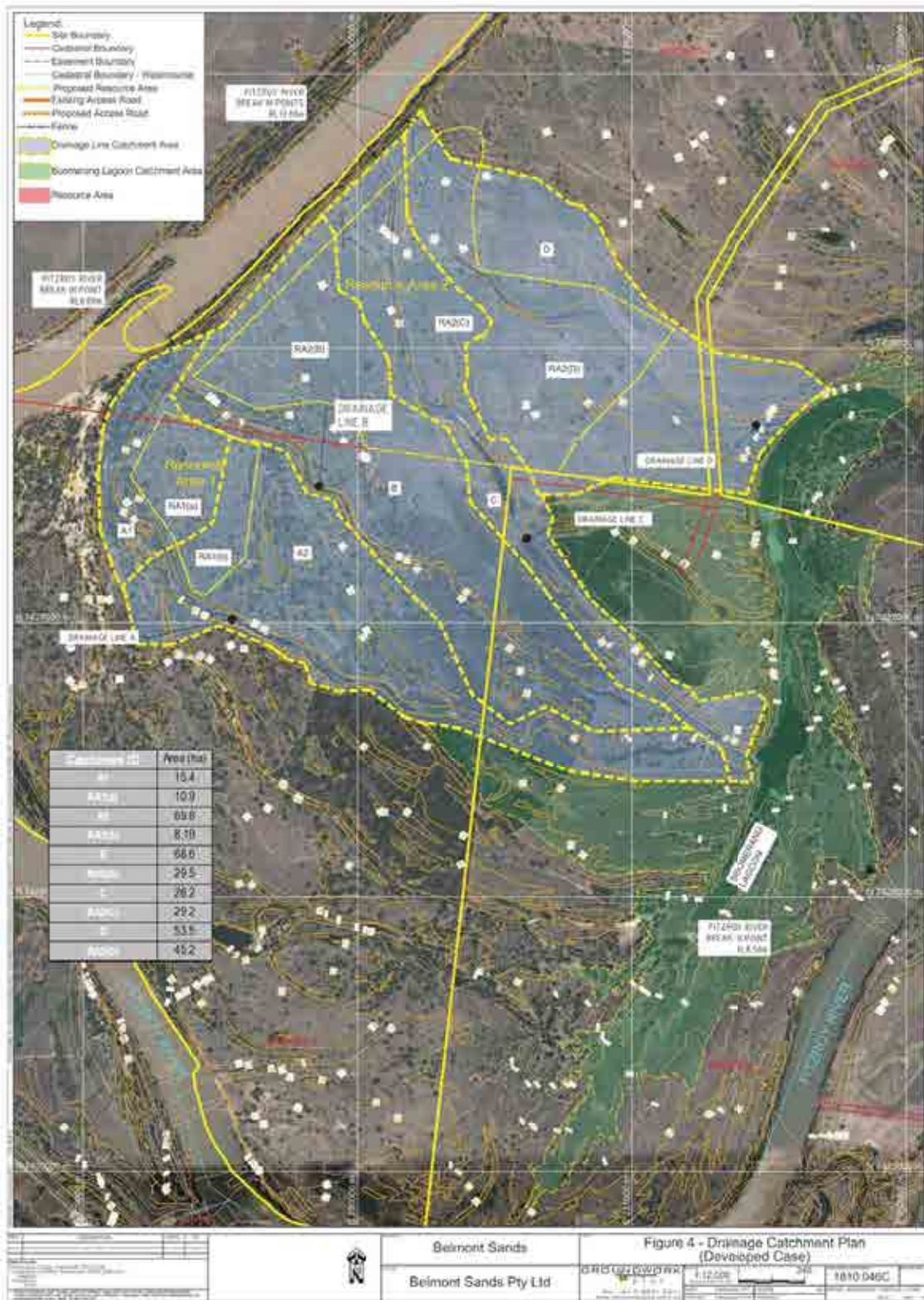
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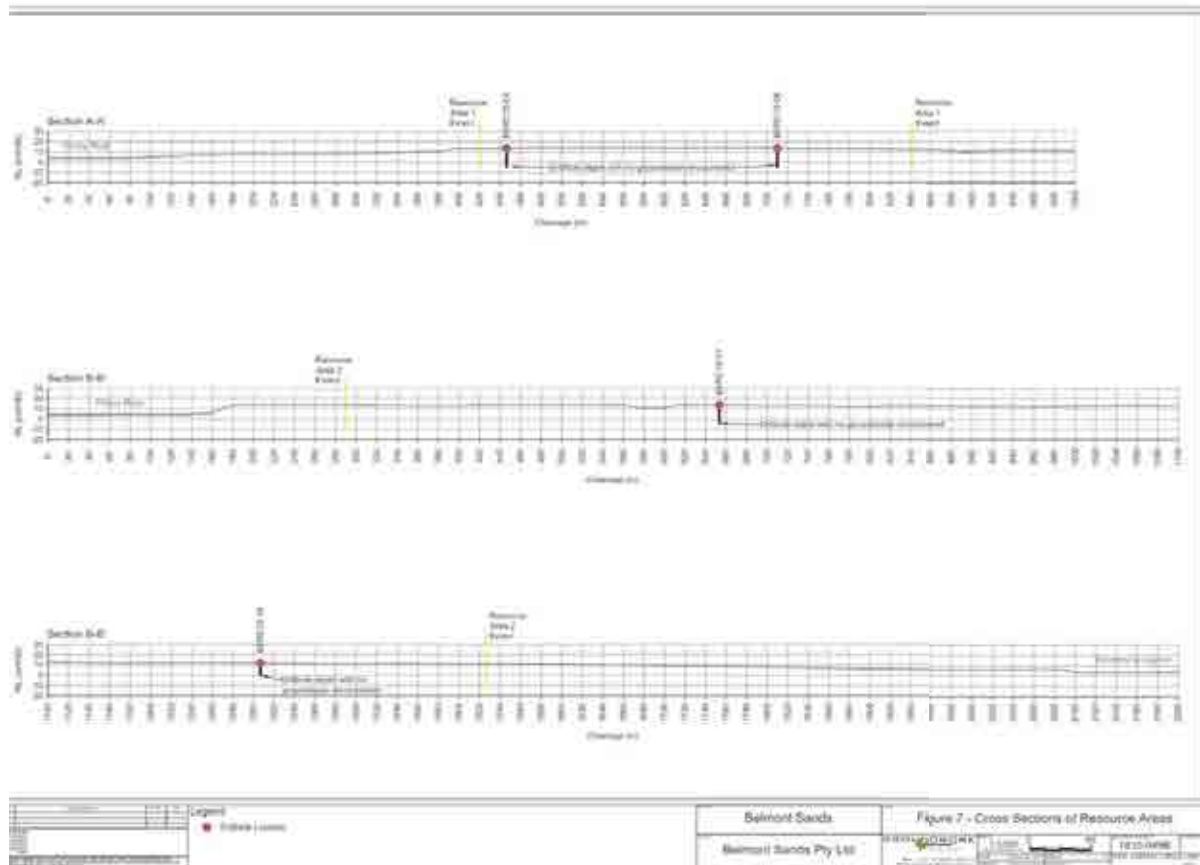














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attachments

Attachment 1

DRAINS Model Results

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GROUNDWORK plus

DRAINS results prepared 29 October, 2015 from Version 2015.11							
PIT / NODE DETAILS				Version 8			
Name	Max HGL	Max Pond	Max Surface	Max Pond	Min	Overflow	Constraint
		HGL	Flow Arriving	Volume	Freeboard	(cu.m/s)	
			(cu.m/s)	(cu.m)	(m)		
SUB-CATCHMENT DETAILS							
Name	Max	Paved	Grassed	Paved	Grassed	Supp.	Due to Storm
	Flow Q	Max Q	Max Q	Tc	Tc	Tc	
	(cu.m/s)	(cu.m/s)	(cu.m/s)	(min)	(min)	(min)	
B	11.467	0	11.467	0	133	0	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
D	12.629	0	12.629	0	114	0	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
A1	5.951	0	5.951	0	48	0	AR&R 100 year, 1 hour storm, average 97.4 mm/h, Zone 3
A2	9.026	0	9.026	0	134	0	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
C	5.899	0	5.899	0	152	0	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
Outflow Volumes for Total Catchment (0.00 impervious + 357 pervious = 357 total ha)							
Storm	Total Rainfall	Total Runoff	Impervious Runoff	Pervious Runoff			
	cu.m	cu.m (Runoff %)	cu.m (Runoff %)	cu.m (Runoff %)			
AR&R 1 year, 20 minutes storm, average 61.0 mm/h, Zone 3	72514.14	907.49 (1.3%)	0.00 (0.0%)	907.49 (1.3%)			

AR&R 1 year, 1 hour storm, average 34.1 mm/h, Zone 3	121560.39	5981.04 (4.9%)	0.00 (0.0%)	5981.04 (4.9%)				
AR&R 1 year, 3 hours storm, average 16.5 mm/h, Zone 3	176976.7	4169.43 (2.4%)	0.00 (0.0%)	4169.43 (2.4%)				
AR&R 1 year, 24 hours storm, average 4.0 mm/h, Zone 3	340363.19	0.00 (0.0%)	0.00 (0.0%)	0.00 (0.0%)				
AR&R 2 year, 20 minutes storm, average 78.7 mm/h, Zone 3	93633.75	4812.17 (5.1%)	0.00 (0.0%)	4812.17 (5.1%)				
AR&R 2 year, 1 hour storm, average 44.0 mm/h, Zone 3	156778.58	25111.89 (16.0%)	0.00 (0.0%)	25111.89 (16.0%)				
AR&R 2 year, 3 hours storm, average 21.5 mm/h, Zone 3	229768.31	43993.95 (19.1%)	0.00 (0.0%)	43993.95 (19.1%)				
AR&R 2 year, 24 hours storm, average 5.3 mm/h, Zone 3	452402.66	21845.91 (4.8%)	0.00 (0.0%)	21845.91 (4.8%)				
AR&R 5 year, 20 minutes storm, average 101 mm/h, Zone 3	119553.96	14272.50 (11.9%)	0.00 (0.0%)	14272.50 (11.9%)				
AR&R 5 year, 1 hour storm, average 56.0 mm/h, Zone 3	199713.36	62438.72 (31.3%)	0.00 (0.0%)	62438.72 (31.3%)				
AR&R 5 year, 3 hours storm, average 27.8 mm/h, Zone 3	298013.94	105495.41 (35.4%)	0.00 (0.0%)	105495.41 (35.4%)				
AR&R 5 year, 24 hours storm, average 7.3 mm/h, Zone 3	623047.88	101684.04 (16.3%)	0.00 (0.0%)	101684.04 (16.3%)				

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GROUNDWORK plus

AR&R 10 year, 20 minutes storm, average 114 mm/h, Zone 3	135427.11	22964.27 (17.0%)	0.00 (0.0%)	22964.27 (17.0%)				
AR&R 10 year, 1 hour storm, average 63.3 mm/h, Zone 3	225930.83	86794.39 (38.4%)	0.00 (0.0%)	86794.39 (38.4%)				
AR&R 10 year, 3 hours storm, average 31.8 mm/h, Zone 3	340407.75	144878.23 (42.6%)	0.00 (0.0%)	144878.23 (42.6%)				
AR&R 10 year, 24 hours storm, average 8.6 mm/h, Zone 3	736335.88	169674.17 (23.0%)	0.00 (0.0%)	169674.17 (23.0%)				
AR&R 20 year, 20 minutes storm, average 132 mm/h, Zone 3	156948	38812.37 (24.7%)	0.00 (0.0%)	38812.37 (24.7%)				
AR&R 20 year, 1 hour storm, average 73.3 mm/h, Zone 3	261487.84	120011.09 (45.9%)	0.00 (0.0%)	120011.09 (45.9%)				
AR&R 20 year, 3 hours storm, average 37.1 mm/h, Zone 3	397247.91	198458.97 (50.0%)	0.00 (0.0%)	198458.97 (50.0%)				
AR&R 20 year, 24 hours storm, average 10.3 mm/h, Zone 3	883474.56	268435.72 (30.4%)	0.00 (0.0%)	268435.72 (30.4%)				
AR&R 50 year, 20 minutes storm, average 157 mm/h, Zone 3	186090.39	62146.20 (33.4%)	0.00 (0.0%)	62146.20 (33.4%)				
AR&R 50 year, 1 hour storm, average 86.8 mm/h, Zone 3	309529.44	163700.55 (52.9%)	0.00 (0.0%)	163700.55 (52.9%)				
AR&R 50 year, 3 hours storm, average 44.4 mm/h, Zone 3	474821.19	269507.31 (56.8%)	0.00 (0.0%)	269507.31 (56.8%)				

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GROUNDWORK plus

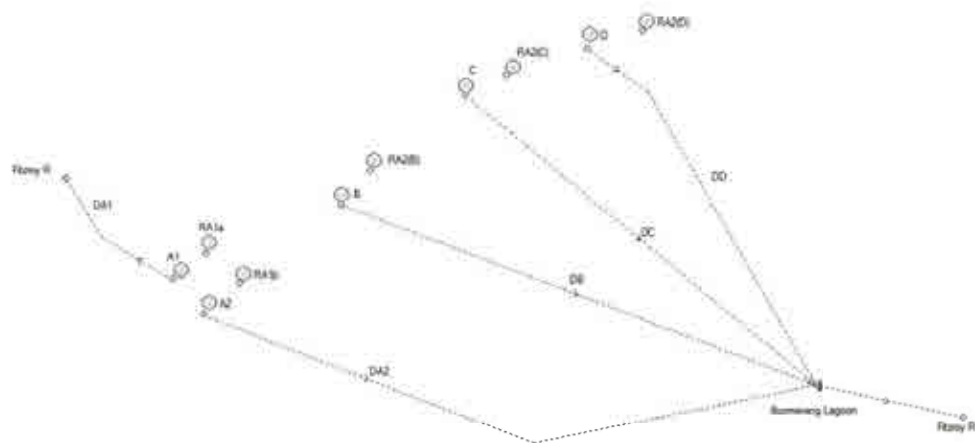
AR&R 50 year, 24 hours storm, average 12.7 mm/h, Zone 3	1090467.5	397366.50 (36.4%)	0.00 (0.0%)	397366.50 (36.4%)				
AR&R 100 year, 20 minutes storm, average 176 mm/h, Zone 3	208957.83	80682.00 (38.6%)	0.00 (0.0%)	80682.00 (38.6%)				
AR&R 100 year, 1 hour storm, average 97.4 mm/h, Zone 3	347298.03	199445.25 (57.4%)	0.00 (0.0%)	199445.25 (57.4%)				
AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3	536253.94	328782.28 (61.3%)	0.00 (0.0%)	328782.28 (61.3%)				
AR&R 100 year, 24 hours storm, average 14.7 mm/h, Zone 3	1258972.63	533551.94 (42.4%)	0.00 (0.0%)	533551.94 (42.4%)				
PIPE DETAILS								
Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm			
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)				
CHANNEL DETAILS								
Name	Max Q	Max V			Due to Storm			
	(cu.m/s)	(m/s)						
OVERFLOW ROUTE DETAILS								
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
DB	11.467	11.467	3.101	0.458	1.61	10.11	3.52	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
Lagoon	0	0	0.159	0	0	0	0	
DD	12.629	12.629	1.201	0.536	2.07	8.85	3.85	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3

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GROUNDWORK plus

DA1	5.951	5.951	1.484	0.366	1.06	8.86	2.9	AR&R 100 year, 1 hour storm, average 97.4 mm/h, Zone 3
DA2	9.026	9.026	1.201	0.467	1.58	8.85	3.39	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
DC	5.899	5.899	1.484	0.365	1.05	8.86	2.88	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
DETENTION BASIN DETAILS								
Name	Max WL	MaxVol	Max Q	Max Q	Max Q			
			Total	Low Level	High Level			
Boomerang	6.76	493016.6	0	0	0			
CONTINUITY CHECK for AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3								
Node	Inflow	Outflow	Storage Change	Difference				
	(cu.m)	(cu.m)	(cu.m)	%				
Fitzroy R	0	0	0	0				
	90119.48	90119.48	0	0				
Boomerang	284634.88	0	284304.5	0.1				
	91549.83	91549.83	0	0				
	25297.89	25297.89	0	0				
Fitzroy R	25297.89	25297.89	0	0				
	71265.66	71265.66	0	0				
	50549.71	50549.71	0	0				
Run Log for 1810_DRAINS v3.dm run at 15:15:40 on 29/10/2015								

DRAINS SCHEMATIC AND RESULTS - DEVELOPED CASE



1626_610_002

GROUNDWORK plus

DRAINS results prepared 29 October, 2015 from Version 2015.11							
PIT / NODE DETAILS							
Name	Max HGL	Max Pond	Max Surface	Max Pond	Min	Overflow	Constraint
		HGL	Flow Arriving	Volume	Freeboard	(cu.m/s)	
			(cu.m/s)	(cu.m)	(m)		
SUB-CATCHMENT DETAILS							
Name	Max	Paved	Grassed	Paved	Grassed	Supp.	Due to Storm
	Flow Q	Max Q	Max Q	Tc	Tc	Tc	
	(cu.m/s)	(cu.m/s)	(cu.m/s)	(min)	(min)	(min)	
B	8.011	0	8.011	0	133	0	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
D	6.846	0	6.846	0	114	0	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
A1	3.471	0	3.471	0	48	0	AR&R 100 year, 1 hour storm, average 97.4 mm/h, Zone 3
A2	8.108	0	8.108	0	134	0	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
C	3.921	0	3.921	0	83	0	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
RA1a	6.277	0	6.277	0	10	0	AR&R 100 year, 20 minutes storm, average 176 mm/h, Zone 3
RA1b	4.699	0	4.699	0	10	0	AR&R 100 year, 20 minutes storm, average 176 mm/h, Zone 3
RA2(B)	10.496	0	10.496	0	25	0	AR&R 100 year, 1 hour storm, average 97.4 mm/h, Zone 3
RA2(C)	10.389	0	10.389	0	25	0	AR&R 100 year, 1 hour storm, average 97.4 mm/h, Zone 3
RA2(D)	16.865	0	16.865	0	22	0	AR&R 100 year, 1 hour storm, average 97.4 mm/h, Zone 3

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GROUNDWORK plus

Outflow Volumes for Total Catchment (0.00 impervious + 356 pervious = 356 total ha)								
Storm	Total Rainfall	Total Runoff	Impervious Runoff	Pervious Runoff				
	cu.m	cu.m (Runoff %)	cu.m (Runoff %)	cu.m (Runoff %)				
AR&R 1 year, 20 minutes storm, average 61.0 mm/h, Zone 3	72465.35	2399.44 (3.3%)	0.00 (0.0%)	2399.44 (3.3%)				
AR&R 1 year, 1 hour storm, average 34.1 mm/h, Zone 3	121478.6	10440.89 (8.6%)	0.00 (0.0%)	10440.89 (8.6%)				
AR&R 1 year, 3 hours storm, average 16.5 mm/h, Zone 3	176857.63	5155.57 (2.9%)	0.00 (0.0%)	5155.57 (2.9%)				
AR&R 1 year, 24 hours storm, average 4.0 mm/h, Zone 3	340134.19	0.00 (0.0%)	0.00 (0.0%)	0.00 (0.0%)				
AR&R 2 year, 20 minutes storm, average 78.7 mm/h, Zone 3	93570.76	11184.67 (12.0%)	0.00 (0.0%)	11184.67 (12.0%)				
AR&R 2 year, 1 hour storm, average 44.0 mm/h, Zone 3	156673.11	34043.55 (21.7%)	0.00 (0.0%)	34043.55 (21.7%)				
AR&R 2 year, 3 hours storm, average 21.5 mm/h, Zone 3	229613.72	46349.13 (20.2%)	0.00 (0.0%)	46349.13 (20.2%)				
AR&R 2 year, 24 hours storm, average 5.3 mm/h, Zone 3	452098.28	23375.02 (5.2%)	0.00 (0.0%)	23375.02 (5.2%)				
AR&R 5 year, 20 minutes storm, average 101 mm/h, Zone 3	119473.52	26161.92 (21.9%)	0.00 (0.0%)	26161.92 (21.9%)				
AR&R 5 year, 1 hour storm, average 56.0 mm/h, Zone 3	199579	72341.45 (36.2%)	0.00 (0.0%)	72341.45 (36.2%)				
AR&R 5 year, 3 hours storm, average 27.8 mm/h, Zone 3	297813.44	108947.04 (36.6%)	0.00 (0.0%)	108947.0 (36.6%)				
AR&R 5 year, 24 hours storm, average 7.3 mm/h, Zone 3	622628.69	106013.68 (17.0%)	0.00 (0.0%)	106013.6 (17.0%)				

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GROUNDWORK plus

AR&R 10 year, 20 minutes storm, average 114 mm/h, Zone 3	135335.98	37471.74 (27.7%)	0.00 (0.0%)	37471.74 (27.7%)				
AR&R 10 year, 1 hour storm, average 63.3 mm/h, Zone 3	225778.81	97079.72 (43.0%)	0.00 (0.0%)	97079.72 (43.0%)				
AR&R 10 year, 3 hours storm, average 31.8 mm/h, Zone 3	340178.72	148927.84 (43.8%)	0.00 (0.0%)	148927.84 (43.8%)				
AR&R 10 year, 24 hours storm, average 8.6 mm/h, Zone 3	735840.5	174987.11 (23.8%)	0.00 (0.0%)	174987.11 (23.8%)				
AR&R 20 year, 20 minutes storm, average 132 mm/h, Zone 3	156842.41	55520.24 (35.4%)	0.00 (0.0%)	55520.24 (35.4%)				
AR&R 20 year, 1 hour storm, average 73.3 mm/h, Zone 3	261311.91	130886.72 (50.1%)	0.00 (0.0%)	130886.72 (50.1%)				
AR&R 20 year, 3 hours storm, average 37.1 mm/h, Zone 3	396980.63	203207.27 (51.2%)	0.00 (0.0%)	203207.27 (51.2%)				
AR&R 20 year, 24 hours storm, average 10.3 mm/h, Zone 3	882880.19	274874.41 (31.1%)	0.00 (0.0%)	274874.41 (31.1%)				
AR&R 50 year, 20 minutes storm, average 157 mm/h, Zone 3	185965.19	80866.55 (43.5%)	0.00 (0.0%)	80866.55 (43.5%)				
AR&R 50 year, 1 hour storm, average 86.8 mm/h, Zone 3	309321.19	175463.08 (56.7%)	0.00 (0.0%)	175463.08 (56.7%)				
AR&R 50 year, 3 hours storm, average 44.4 mm/h, Zone 3	474501.72	275500.28 (58.1%)	0.00 (0.0%)	275500.28 (58.1%)				
AR&R 50 year, 24 hours storm, average 12.7 mm/h, Zone 3	1089733.8	403931.88 (37.1%)	0.00 (0.0%)	403931.88 (37.1%)				
AR&R 100 year, 20 minutes storm, average 176 mm/h, Zone 3	208817.25	101166.52 (48.4%)	0.00 (0.0%)	101166.52 (48.4%)				
AR&R 100 year, 1 hour storm, average 97.4 mm/h, Zone 3	347064.34	211987.75 (61.1%)	0.00 (0.0%)	211987.75 (61.1%)				
AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3	535893.13	335150.88 (62.5%)	0.00 (0.0%)	335150.88 (62.5%)				
AR&R 100 year, 24 hours storm, average 14.7 mm/h, Zone 3	1258125.6	540535.75 (43.0%)	0.00 (0.0%)	540535.75 (43.0%)				
PIPE DETAILS								

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GROUNDWORK plus

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm			
CHANNEL DETAILS								
Name	Max Q (cu.m/s)	Max V (m/s)			Due to Storm			
OVERFLOW ROUTE DETAILS								
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
DB	8.011	8.011	0	0.395	1.21	10.11	3.07	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
Lagoon	0	0	-999	0	0	0	0	
DD	6.846	6.846	0	0.419	1.28	8.85	3.06	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
DA1	3.471	3.471	0	0.3	0.71	8.86	2.37	AR&R 100 year, 1 hour storm, average 97.4 mm/h, Zone 3
DA2	8.108	8.108	0	0.447	1.46	8.85	3.26	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
DC	3.921	3.921	0	0.313	0.77	8.86	2.47	AR&R 100 year, 3 hours storm, average 50.1 mm/h, Zone 3
DETENTION BASIN DETAILS								
Name	Max WL	MaxVol	Max Q	Max Q	Max Q			
			Total	Low Level	High Level			
Boomerang	6.2	326521.9	0	0	0			
CONTINUITY CHECK for AR&R 100 year, 1 hour storm, average 97.4 mm/h, Zone 3								

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GROUNDWORK plus

Node	Inflow	Outflow	Storage Change	Difference				
	(cu.m)	(cu.m)	(cu.m)	%				
Fitzroy R	0	0	0	0				
	38341.39	38341.39	0	0				
Boomerang	44495.27	0	44197.32	0.7				
	30742.55	30742.55	0	0				
	9588.5	9588.5	0	0				
Fitzroy R	9588.5	9588.5	0	0				

Attachment 2

Flood Hazard Assessment Report

12/11/2015
1810.610.002



Flood Hazard Mapping – Yaamba & South Yaamba Bundle 9

Final Report

2013



The expert in **WATER ENVIRONMENTS**

QLDRA
Final Report
April 2013



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**Flood Hazard Mapping – Yaamba & South
Yaamba
Bundle 9**

April 2013

Client		Client's representative			
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Project		Project No			
Flood Hazard Mapping – Yaamba & South Yaamba Bundle 9		43800978-1			
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APPENDICES

APPENDIX A	Yaamba Maps
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DHI



1 INTRODUCTION

The State of Queensland acting through Queensland Reconstruction Authority (QLDRA) is undertaking a program to implement the Queensland Flood Commission of Inquiry recommendations which are: (1) Collation, repository and display of flood information across the state; and (2) Flood investigations and flood hazard mapping. As part of this program, QLDRA is responsible for delivery of the following:

- Queensland Flood Studies Information Database;
- Flood Investigations resulting in flood hazard maps for Land Use Planning and Emergency Management Purposes;
- Queensland Flood Portal; and
- Flood Information Reports.

The Queensland Reconstruction Authority via Bureau of Meteorology (BOM) has identified major flood prone townships which were grouped into 14 bundles. Each bundle requires a comprehensive study for flood hazard mapping. The purpose of this flood hazard modelling is to develop a more reliable detailed floodplain toolkit that supports the Queensland Flood Commission of Inquiry (QFCOI) recommendations. The flood study defines the nature of the flood risk by providing flood information on the extent, flood level, velocity of the floodwaters and the distribution of floodwaters across the sections of the floodplains adjacent to the townships.

Accordingly, QLDRA has contracted DHI Water and Environment Pty Ltd (DHI) to develop Flood Hazard Mapping (FHM) for Bundles 9 and 10 comprising 13 townships including Yaamba and South Yaamba. The townships of Yaamba and South Yaamba are under the Local Government Area of Rockhampton Regional Council.

This report describes the methodology, available data, development and validation of 2D hydraulic modelling to produce depth, velocity and flood hazard maps for historical and design event simulations for the townships of Yaamba and South Yaamba. The report ends with concluding remarks and recommendations to further improve the model accuracy.



2 METHODOLOGY & DELIVERABLES

The investigation was divided into a number of phases, with the following methodology applied for flood hazard mapping.

- Stage 1: Data Compilation and Review
- Stage 2: Model Setup and Validation
- Stage 3: Design Event Simulation and Mapping
- Stage 4: Deliverables

2.1 Stage 1-Data Compilation and Review

The available GIS layers were collected and compiled into an ArcGIS geodatabase which includes:

- Aerial Photography
- 1m LiDAR data
- Cadastral data
- Road and rail network
- Historical flood information especially flood marks levels and flood extents
- Flood frequency analysis results
- A Point of Interest GIS layer
- A Planning Schemes GIS layer
- Flood town extent

Once the geodatabase was established, the flood model extent was determined by overlaying the flood town extents, LiDAR data, roads and railway lines and aerial photography in GIS. Suitable model boundary conditions were established in a way that the area of interest was fully covered and that influences from model boundaries were minimised. Once the model extent was determined the 1m LiDAR grid was processed and used as the basis for model development.

2.1.1 Topographical Data

The topographical data provided by Queensland Reconstruction Authority (QLDRA) is based on Airborne Laser Scanning (ALS). The ALS was carried out to capture the ground level spot heights that were used to generate Digital Terrain Model (DTM) for the study area. The supplied ALS data contains multiple tiles in raster format. The raster tiles were merged in order to create a 1m resolution DEM covering the entire study area (see the details in Section 3.1.1).

2.1.2 Historical Flood Information and Flood Frequency Analysis

Available recorded historical flood levels were supplied by QLDRA, together with water level measurements at the designated BOM and/or NRM gauging stations in the area.

The 1991 event was recorded as a major historical flood event for the townships of Yaamba and South Yaamba. BoM Gauge #33076 recorded a peak water level of 17.95m AHD during this event. The corresponding peak flow at the gauge was estimated to 14,500m³/s, see Table 1. The recorded flood level and estimated discharge were used for model validation.



Table 1 Historical Flood Event Data

BoM Gauge	Flood Event	Flood Level (m AHD)	Discharge (m ³ /s)
#33076	1991	17.95	14,500 (Estimated)

A flood frequency analysis (FFA) at NRM Gauge Station 130005A was provided by QLDRA for South Yaamba, see Table 2.

Table 2 South Yaamba Flood Frequency Analysis (QLDRA, 2012a)

AEP (%)	Peak Discharge (m ³ /s)
10	7,600
5	11,000
2	16,000
1	20,000
0.5	25,000
0.2	31,000

2.2 Stage 2-Model Setup and Validation

DHI's MIKE21 Version 2012 rectangular grid modelling software was applied in this study. MIKE21 is a two dimensional, physically based hydrodynamic model for overland flow modelling. In MIKE21 the floodplain is divided up into a grid of square model cells, with information on the ground level, including channel invert, entered at each grid cell. A feature of MIKE21 is the ability to apply inflows directly at the model boundary and simulate surface water levels and velocities for both channel and floodplain. The detailed model setup is described in Section 3 of this report.

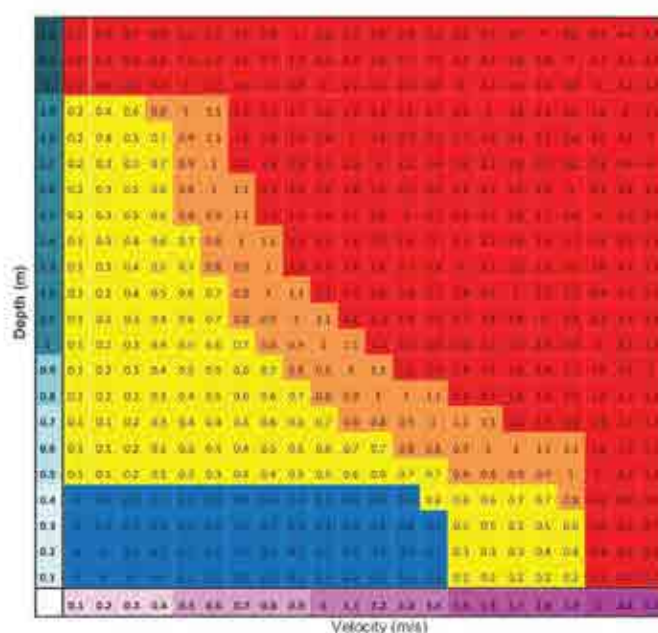
2.3 Stage 3-Completion of Modelling and Digital Mapping

2.3.1 Design Flood Modelling

Upon completion of the validation process, the simulation of specified AEP events was performed using design peak flow estimates. This was applied using a steady state boundary, since temporal data was not supplied. All simulations were carried out until either the peak flow had passed the downstream boundary, or a steady state condition was reached.

2.3.2 Flood Hazard Categorisation and Mapping

Flood hazard classification was estimated based on the velocity-depth matrix provided by QLDRA (see Figure 1). The 2D model results were post-processed to produce spatial grid outputs of maximum depth, level, speed and flood hazard. The hazard was computed at each time step, with the maximum hazard in each grid cell exported as a raster for mapping purposes.



	Low	Significant	High	Extreme
Depth	<0.5	<2	<2	2+
Velocity	<1.5	<2	<2	2+
DxV Product	<0.6	0.6 to <0.8	0.8 to <1.2	1.2 +

Figure 1 Flood Hazard Classification (Source: QLDPA)

The flood hazard criteria used in the flood hazard maps are based on Schedule 4 on page 45 in QLDRA's "Planning for stronger, more resilient floodplains" document (QLDRA, 2012b).

The flood hazard criteria 'have been prepared for use in preparing flood investigations (level 2), and planning evaluations based on latest available engineering guidance. In absence of other more appropriate flood hazard definitions, the criteria below may be used'. The references used to develop the criteria are given in the guidelines.

The low hazard category was mainly based on the ARR Revision Project 10: Appropriate Safety Criteria for People (ARR, 2010) and Appropriate Safety Criteria for Vehicles (ARR, 2011). A proper understanding of what is meant by Low Hazard can be gained by reviewing these reports.

For example, it is noted in ARR (2010) that for the Low Hazard category stability is 'uncompromised for persons within laboratory test program at these flows (to maximum flow depth of 0.5 m for children and 1.2 m for adults and a maximum velocity of 3.0 m/s at shallow depths)'.



It is further noted that 'loss of stability could occur in lower flows when adverse conditions are encountered including:

- **Bottom conditions:** uneven, slippery, obstacles;
- **Flow conditions:** floating debris, low temperature, poor visibility, unsteady and flow aeration;
- **Human subject:** standing or moving, experience and training, clothing and footwear, physical attributes additional to height and mass including muscular development and/or disability, psychological factors;
- **Others:** strong wind, poor lighting, definition of stability limit (i.e. felling unsafe or complete loss of footing).'

There are also caveats on the criteria for stability of vehicles. It should be noted that the low flow criteria applies to large 4WD vehicles. Small passenger vehicles may not be safe in this category.

It should be noted that the QRA flood hazard criteria are only interim guidelines and local authorities may wish to use a different criteria based on local experience. One alternative is given in Appendix J of the "Floodplain Management in Australia: best practice principles and guidelines SCARM Report 73" (CSIRO, 2000).

2.4 Stage 4-Deliverables

2.4.1 Flood Maps

Mapping of the 2D model results was undertaken using ArcGIS 10.1, after establishing a geodatabase. The following maps were prepared for the validation and design events using the templates provided by QLDRA.

- A map showing the inundation extent for the validation and design events over the planning scheme.
- A four classification maximum hazard map over aerial photography.
- A five category map showing the maximum flood depth on aerial photography.
- A five category map showing the maximum velocity magnitude on aerial photography.

All maps are included in the appendix of this report, and printed separately as laminated A2 prints.

2.4.2 Geodatabase

A geodatabase was prepared with the following GIS layers, which were used to produce the maps:

- Raster representing flood depth for all the events
- Raster representing flood velocity for all the events
- Raster representing flood hazard for all the events
- Points of interest
- Roads
- Railway
- Ortho-Imagery (if it exists)



All geodatabases developed during this study were delivered back to QLDRA on the same digital media which contained the source data provided by QLDRA.

2.4.3 Flood Animations

Flood animations in AVI format were generated for validation and design events. These animations were also delivered back to QLDRA on the same digital media which contained the source data provided by QLDRA. In the case where steady state flows were applied, dynamic elements of the animation result from the model warm-up period over which the steady state peak flow is established.



3 HYDRODYNAMIC MODEL DEVELOPMENT

The following section documents the specific issues encountered during the development and validation of the flood model.

3.1 Model Domain and Setup

The 2D model domain for Yaamba and South Yaamba townships extends approximately 16.3 km upstream of the confluence of Alligator Creek and Fitzroy River (along Fitzroy River) to approximately 7.4 km downstream of the confluence along the Fitzroy River, as shown in Figure 2. The model domain is based on the available LiDAR data supplied as well as the flood town extents.

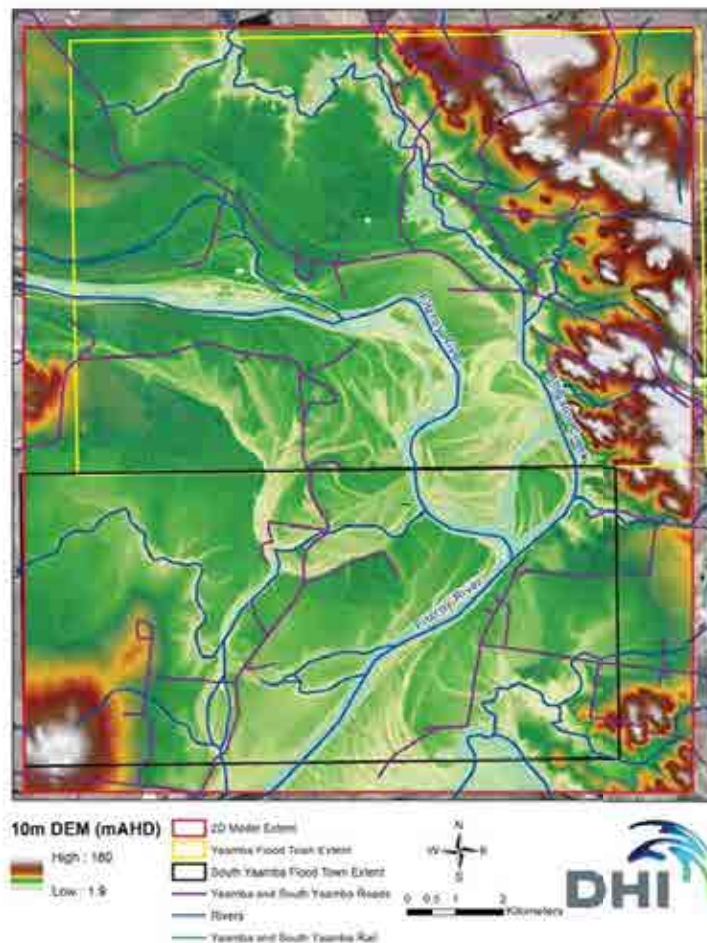


Figure 2 Yaamba and South Yaamba Model Setup



3.1.1 Bathymetry Development

The MIKE21 model incorporates a detailed elevation model (bathymetry) of the ground surface. A DEM for use in the model was created using the LiDAR data provided by QLDRA. The surface DEM was developed on a 10m grid resolution, using an automated GIS based technique to collate and manipulate the available ground survey data. A 10m grid was developed covering an area as far upstream and as far downstream of the township as possible based on the source LiDAR extents.

Specifically, the steps as described below were followed to prepare the model bathymetry:

- Combine the tiles of 1m grid files (raster) to a single grid file (raster) using ArcCatalog.
- The 1m fine DEM was "clipped" to the model extent.
- The clipped DEM was interpolated to a grid at the model resolution of 10m as specified in the brief.
- Flow path connectivity was enforced by removing bridge and culvert obstructions where appropriate.
- The grid was converted to MIKE 21 format.

Flow path connectivity was checked for free flow at major waterway crossings like bridges, while smaller flow structures such as culverts and those crossings on secondary flow paths were implemented as they were represented in the source LiDAR data. This implies that most small culverts and structures were assumed to be 100% blocked during a flood, thus producing a conservative estimate of the flood extent.

All other features of the floodplain likely to influence the flow of floodwaters over the specified range of design floods were included in the 2D model. These include appropriate discretisation of elevated embankments, dam walls, roads and railways in a form that ensures correct representation of the features both for smaller floods, where the influence on flow behaviour has been observed, and for more extreme events, where the feature may be overwhelmed. Correct and appropriate representation of these features is paramount for the model to correctly extrapolate flood behaviour for extreme events.

The crest levels of the roads and railway embankments were incorporated into the model using the following steps:

- Digitise polylines along the crown of road and railway embankments;
- Convert the polylines to points with 1m spacing;
- Extract the elevation at each point from the 1m DEM;
- Create a 10m raster from the points; and
- Update the 'base' bathymetry or DEM with this raster.

3.1.2 Model Roughness

MIKE21 models require the specification of hydraulic roughness to be applied in each cell, either as a constant value or in the form of a map (grid) of roughness values. A spatially distributed roughness map for the model domain was created based on the land use classes verified in the Planning Scheme and vegetation coverage identified from the aerial photography provided by QLDRA. Five distinct land use classes were identified within the study area.



The adopted hydraulic roughness values (Manning's 'n') for each class are shown in Table 3. These values were based on DHI's extensive previous experience in Queensland, and are considered appropriate and representative for the land use classes defined. The roughness map is presented in Figure 3.

Table 3 Land Use Classes & Adopted Roughness Values

Land use	Manning's 'n'
Floodplain	0.040
Roads & Railway	0.025
Developed Areas	0.050
Dense Vegetation	0.066
River Bed	0.033



Figure 3 Yaamba and South Yaamba Roughness Map



3.1.3 **Flooding and Drying Depths**

Within Version 2012 of the MIKE21 software there is an option to utilise an optimised flooding and drying solution that has the beneficial effect of enabling a 10m resolution model with undulating and steep terrain to be run at time step of 1 second. An appropriate flooding depth of 0.002m and drying depth of 0.01m was used in this study.

3.1.4 **Eddy Viscosity**

A constant velocity based eddy viscosity value of 1.0 m²/s was adopted for the developed model. This value is consistent with the model resolution (10m) and based on DHI's extensive previous experience with selections of secondary model parameters.

3.1.5 **Model Boundaries**

Open model boundaries were specified at the inflow point to the model and at the downstream exit point. A steady state flow for validation and design events was applied to the 2D model at the inflow boundary. The inflow peak flows were all supplied by QLDRA, or agreed with QLDRA as part of the model validation process. The downstream open model boundary was specified as a constant water level of 8m for the validation event and all design events. The downstream model boundary was positioned as far downstream of the area of interest as possible to minimise backwater effects from assumptions made at the boundary location.

3.1.6 **Model Validation**

The hydraulic model was validated against a peak flood mark level for the 1991 event. The maximum flood level estimated from the simulation was compared against historical flood level data acquired from the BoM Gauge. Extensive consultation with QLDRA occurred throughout the model validation process, to ensure that all methodologies applied were approved by QLDRA and that any resulting uncertainty was well understood and documented.

According to QLDRA's recommendation, attempts were made to achieve a target accuracy of +/-0.5m difference between simulated flood levels and observed/recorded levels.



4 ASSESSMENT OF MODEL PERFORMANCE

The Yaamba and South Yaamba model was validated for the 1991 flood event. An inflow of 14,500m³/s was applied at the inflow boundary, and after iterations an almost perfect match was achieved between the simulated and recorded level at the BoM Gauge. The validation plot is graphically shown in Figure 4.

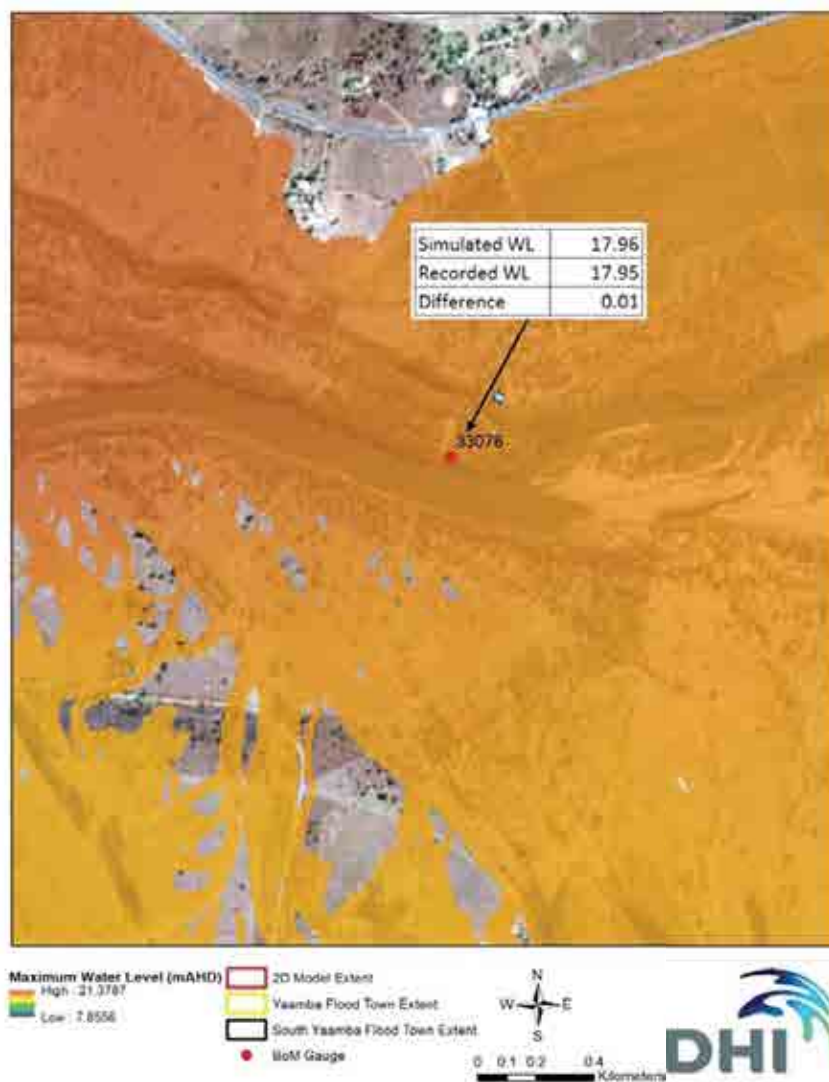


Figure 4 Comparison of Peak Water Levels for the 1991 Validation Event



5 DESIGN EVENTS

Based on the results from the validation event, the initial design flows provided by QLDRA were considered adequate (refer to Table 4). To match design event consistency, the 2%, 1% and 0.2% AEP events were run. The results were processed to produce peak flood depth, velocity and hazard maps, with mapping presented in Appendix A and Appendix B.

Table 4 Yaamba and South Yaamba Design Floods

AEP (%)	Peak Discharge (m ³ /s)
2	16,000
1	20,000
0.2	31,000



6 SUMMARY AND CONCLUSIONS

Two dimensional hydraulic modelling of Yaamba and South Yaamba was undertaken for validation and design floods supplied by QLDRA. A 2D MIKE21 model was developed with a 10m grid resolution and domain extended as far upstream and downstream as possible based on available LiDAR data. The model was validated for a selected historical event for which flood level and discharge data was available from a BoM Gauge located within the model extent. The validation results were demonstrated graphically and the predicted levels were well within the required accuracy of $\pm 0.5\text{m}$.

The model validation result is summarised below:

- Peak water level and discharge information was available for validation from BoM Gauge #33076 located in Yaamba. The model achieved a very good match for the 1991 flood level that was recorded at the BoM Gauge. The validation event verified that the initial design event peak flows were acceptable for the design event modelling. To be consistent with QLDRA's design event mapping, the 2%, 1% and 0.2% AEP events were modelled.

Comprehensive mapping is included in Appendices A and B of this report. Digital mapping, GIS geodatabases and model data files were also delivered as part of the study.



7 RECOMMENDATIONS

The following recommendations should be considered to improve the accuracy of the model performance.

1. Detailed calibration for at least two historical flood events should be performed to improve the model accuracy. Additional historical flood levels should be surveyed if available, and structures added to the model if they are considered to have a hydraulic impact.
2. If necessary, the design event discharges should be adjusted in the event that additional model validation data becomes available.
3. Hydrological modelling (rainfall-runoff analysis) and/or Regional Flood Frequency Estimation (RFFE) based on the latest guidance provided by Institution of Engineers Australia (2012) should be considered to verify results from FFA.
4. Hydrological modelling (rainfall-runoff analysis) should also be performed to determine the contribution from ungauged tributaries and local catchments known to impact on flood levels.
5. Where LiDAR intersects with standing water, creek and river bed levels are not accurately represented. Channel cross-section data should be collected in these areas to supplement the LiDAR data and improve the channel conveyance in the 2D model.
6. Simulated inundation extent for the validation and calibration events should be verified against flood photos and anecdotal records if available.
7. Sensitivity analysis of the design event modelling should be undertaken for inflow, roughness, blockage of hydraulic structures, assumed downstream boundary levels and climate change.
8. Additional flood levels may exist for flood events different to the adopted validation flood event used in this assessment. Further analysis and calibration of the model using these additional flood levels should be considered in future investigations.



8 REFERENCES

1. ARR (2010), "ARR Revision Project 10: Appropriate Safety Criteria for People". [Online]: March 21, 2013 at http://www.ncwe.org.au/arr/Website_links/ARR_Project_10_Stage1_report_Final.pdf
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7. QLDRA (2012a), "Flood Frequency Analysis Results", Analysis Performed by Queensland Reconstruction Authority
8. QLDRA (2012b), "Planning for stronger, more resilient floodplains, Part 2 - Measures to support floodplain management in future planning schemes". [Online]: March 21, 2013 at <http://www.qldreconstruction.org.au/u/lib/cms2/resilient-floodplains-part2-full.pdf>



APPENDICES

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DHI



APPENDIX A

Yaamba Maps

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DHI



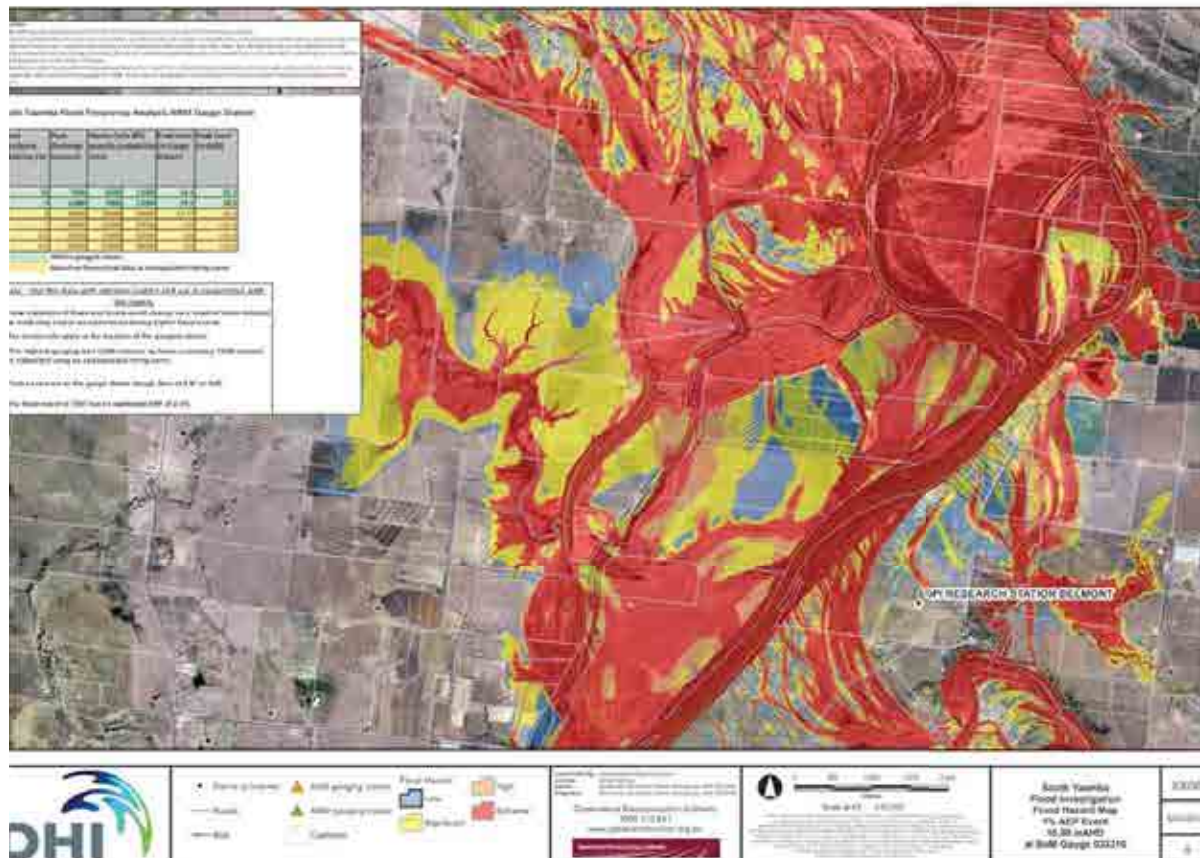
A P P E N D I X B

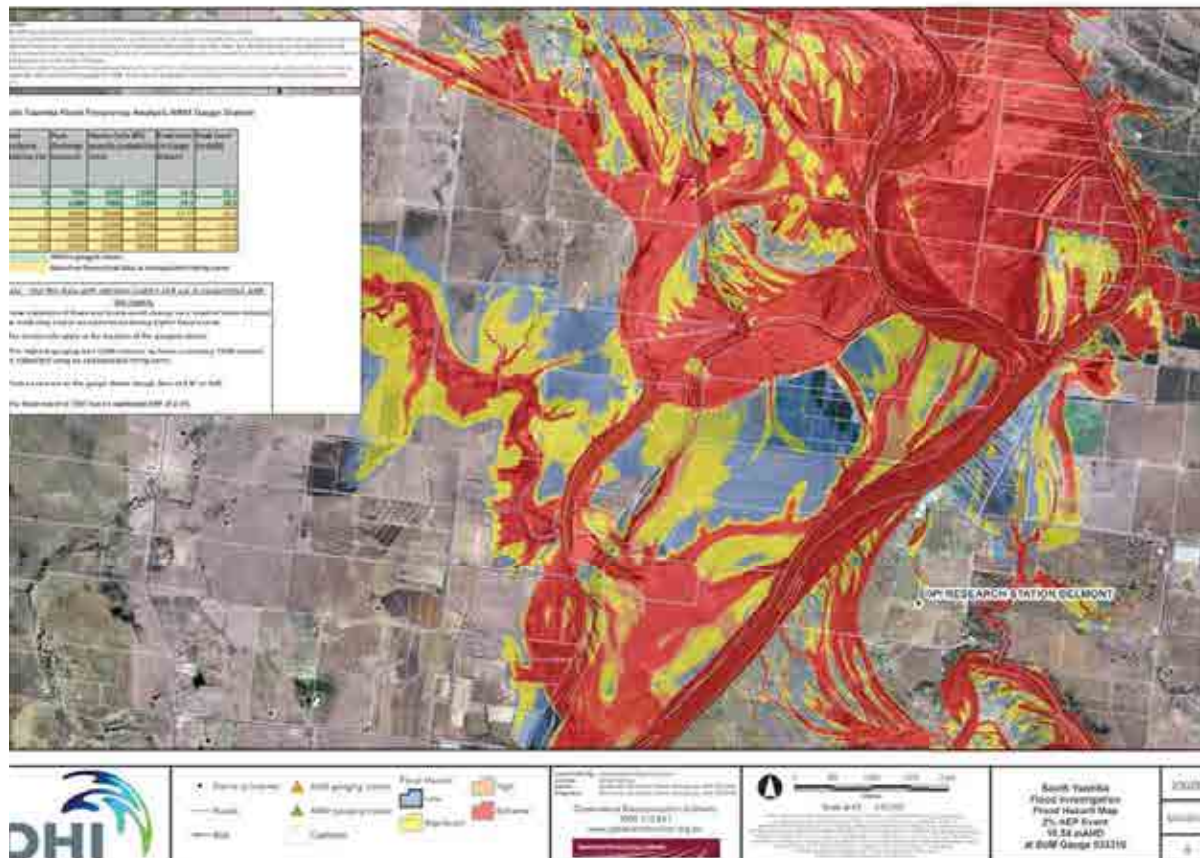
South Yaamba Maps

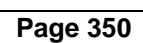
43800978-

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DHI







Attachment 3

Registered Groundwater Bore Logs

12/11/2015
1810 610.002

DATE 29/10/2015

GROUNDWATER DATABASE

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BORE REPORT

REG NUMBER 111645

REGISTRATION DETAILS

OFFICE	Rockhampton	BASIN	1300	LATITUDE	23-12-30	MAP-SCALE	253
ATE LOG RECD		SUB-AREA		LONGITUDE	150-23-45	MAP-SERIES	M
D/O FILE NO.	515/030/0669	SHIRE	4530-LIVINGSTONE SHIF	EASTING	233461	MAP-NO	8951-12
R/O FILE NO.		LOT	3	NORTHING	7431020	MAP NAME	
H/O FILE NO.		PLAN	RP601603	ZONE	56	PROG SECTION	
		ORIGINAL DESCRIPTION		ACCURACY		PRES EQUIPMENT	
				GPS ACC			
GIS LAT	-23.208419908	PARISH NAME	1882-FITZROY			ORIGINAL BORE NO	
GIS LNG	150.395759169	COUNTY	LIVINGSTONE			BORE LINE	-
CHECKED	Y						
						POLYGON	
						RN OF BORE REPLACED	
						DATA OWNER	
FACILITY TYPE	Sub-Artesian Facility	DATE DRILLED	24/01/2002				
STATUS	Abandoned but Still Usable	DRILLERS NAME	JOHN BEASLEY				
ROLES	WS	DRILL COMPANY	HILLGROVE DRILLING				
		METHOD OF CONST.	ROTARY				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM (mm)	TOP (m)	BOTTOM (m)
A	24/01/2002	1	Polyvinyl Chloride	5.900	WT	140	0.00	18.20
A	24/01/2002	2	Screen	0.510	AP	140	18.20	19.20

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	10.70	TOPSOIL-CLAYS
2	10.70	19.30	LAYERS SANDY CLAYS WITH GRAVEL LAYERS

STRATIGRAPHY DETAILS
**** NO RECORDS FOUND ****

AQUIFER DETAILS

CTR

DATE 29/10/2015

GROUNDWATER DATABASE

Page 2 of 4

BORE REPORT

REG NUMBER 111645

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW (m)	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	10.70	19.30	GRAV	24/01/2002	-11.00	N	COND 11890	1.26	Y	PS	FITZROY RIVER ALLUVIUM

PUMP TEST DETAILS PART 1

**** NO RECORDS FOUND ****

PUMP TEST DETAILS PART 2

**** NO RECORDS FOUND ****

BORE CONDITION

**** NO RECORDS FOUND ****

ELEVATION DETAILS

**** NO RECORDS FOUND ****

WATER ANALYSIS PART1

PIPE	DATE	RD	ANALYST	QAN	DEPT H (m)	RMK	SRC	COND (uS/cm)	pH	Si (mg/L)	TOTAL IONS (mg/L)	TOTAL SOLIDS (mg/L)	HARD	ALK	FIG. OF MERIT	SAR	RAH
A	20/02/2002	1	UCQ	202282	19.30	PU	GB	11890	6.9		7411.81	6859.80	2439	891	0.6	15.9	

WATER ANALYSIS PART 2

PIPE	DATE	RD	Na	K	Ca	Mg	Mn	HCO3	Fe	CO3	Cl	F	NO3	SO4	Zn	Al	B	Cu
A	20/02/2002	1	1800.0	5.7	350.0	380.0	0.08	1086.0	0.03		3750.0			40.0				

WATER LEVEL DETAILS

**** NO RECORDS FOUND ****

WIRE LINE LOG DETAILS

**** NO RECORDS FOUND ****

FIELD MEASUREMENTS

**** NO RECORDS FOUND ****

DATE 29/10/2015

GROUNDWATER DATABASE

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BORE REPORT

REG NUMBER 111645

SPECIAL WATER ANALYSIS

INFO NO RECORDS FOUND ****

DATE 29/10/2015

GROUNDWATER DATABASE

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DATE 18/09/2015

GROUNDWATER DATABASE

Page 1 of 4

BORE REPORT

REG NUMBER 88289

REGISTRATION DETAILS

OFFICE Rockhampton	BASIN 1300	LATITUDE 23-12-49	MAP-SCALE 253
ATE LOG RECD	SUB-AREA	LONGITUDE 150-22-58	MAP-SERIES M
D/O FILE NO. 515/030/0669	SHIRE 4530-LIVINGSTONE SHIF	EASTING 232137	MAP-NO 8951-12
R/O FILE NO. 30-0669	LOT 10	NORTHING 7430401	MAP NAME
H/O FILE NO.	PLAN SP142291	ZONE 56	PROG SECTION
	ORIGINAL DESCRIPTION S2 P1490	ACCURACY SKET	PRES EQUIPMENT
		GPS ACC	
GIS LAT -23.213788486	PARISH NAME 1882-FITZROY		ORIGINAL BORE NO OFFICE LICENCE ONLY
GIS LNG 150.382733552	COUNTY LIVINGSTONE		BORE LINE -
CHECKED Y			
			POLYGON
FACILITY TYPE Sub-Artesian Facility	DATE DRILLED 26/09/1984		RN OF BORE REPLACED
STATUS Existing	DRILLERS NAME		DATA OWNER
ROLES WS	DRILL COMPANY		
	METHOD OF CONST. ROTARY		

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM (mm)	TOP (m)	BOTTOM (m)
A	26/09/1984	1	Steel Casing		WT	220	0.00	19.40
A	26/09/1984	2	Screen	2.540	AP	205	19.20	22.20
A	15/06/2011	3	Polyvinyl Chloride	8.300	WT	160	0.00	19.70
A	15/06/2011	4	Centraliser				3.00	22.20
A	15/06/2011	5	Screen			154	19.07	22.20
A	15/06/2011	7	Gravel Pack	5.000	GR	160	5.00	22.20
A	15/06/2011	8	Grout			160	0.00	6.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	6.00	SANDY CLAYS
2	6.00	12.00	CLAY & SANDS

DATE 18/09/2015

GROUNDWATER DATABASE

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BORE REPORT

REG NUMBER 88289

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
3	12.00	20.00	LAYERS OF CLAY & SAND
4	20.00	29.00	CLAYBOUND SAND & GRAVEL
5	29.00	30.00	CLAYS & BASALT
902			SWL 2/10/84 - 11.63 M
903			AIR TESTED AT 16 L/S
910			WRC COND - 1300 MICROS/CM

STRATIGRAPHY DETAILS

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1	0.00	29.00	FITZROY RIVER ALLUVIUM

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	19.20	22.00	SAND GRAV	02/10/1984	-11.63	N	COND 1300	16.00	Y	UC	FITZROY RIVER ALLUVIUM

PUMP TEST DETAILS PART 1

PIPE	DATE	REC RN OF NO. PUMP-BORE	TOP (m)	BOTTOM (m)	DIST (m)	METH	TEST TYPES	PUMP TYPE	SUCTION SET (m)	Q PRIOR TO TEST (l/s)	DUR OF Q PR (min)	PRES ON ARRIV (m)	Q ON ARRIV (l/s)
A	02/10/1984	1 88289	19.20	22.20			PUM SD						

PUMP TEST DETAILS PART 2

PIPE	DATE	REC DUR (mins)	TEST DUR (mins)	SWL (m)	RECOV. TIME (mins)	RESID. DD (m)	MAX DD or P RED (m)	Q at MAX DD (l/s)	TIME TO MAX DD (mins)	Max Q (l/s)	CALC STAT HD (m)	DESIGN YIELD (l/s)	DESIGN BP (m)	SUCT. SET (m)	TMSY SET (m2/DAY)	STOR
A	02/10/1984	1	1440	-11.63			2.92	21.23	1440			50.78	19.20		2130	

BORE CONDITION

**** NO RECORDS FOUND ****

DATE 18/09/2015

GROUNDWATER DATABASE

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BORE REPORT

REG NUMBER 88289

ELEVATION DETAILS

**** NO RECORDS FOUND ****

WATER ANALYSIS PART1

PIPE E	DATE	RD	ANALYST	QAN	DEPT H (m)	RMK	SRC	COND (uS/cm)	pH	Si (mg/L)	TOTAL IONS (mg/L)	TOTAL SOLIDS (mg/L)	HARD	ALK	FIG. OF MERIT	SAR	RAH
A	03/10/1984	1	GCL	106178	22.00	PU	GB	1300	7.3	47	766.30	701.47	341	181	1.3	2.8	

WATER ANALYSIS PART 2

PIPE	DATE	RD	Na	K	Ca	Mg	Mn	HCO3	Fe	CO3	Cl	F	NO3	SO4	Zn	Al	B	Cu
A	03/10/1984	1	120.0	1.9	46.0	55.0		220.0		0.3	290.0	0.10	3.0	30.0				

WATER LEVEL DETAILS

**** NO RECORDS FOUND ****

WIRE LINE LOG DETAILS

**** NO RECORDS FOUND ****

FIELD MEASUREMENTS

**** NO RECORDS FOUND ****

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

DATE 18/09/2015

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GROUNDWATER DATABASE

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BORE REPORT

REG NUMBER 151494

REGISTRATION DETAILS

OFFICE	Rockhampton	BASIN	1300	LATITUDE	23-12-52	MAP-SCALE	104
ATE LOG RECD	03-JUN-11	SUB-AREA		LONGITUDE	150-23-02	MAP-SERIES	M
D/O FILE NO.	515/030/0669	SHIRE	4530-LIVINGSTONE SHIF	EASTING	232262	MAP-NO	8951
R/O FILE NO.		LOT	10	NORTHING	7430332	MAP NAME	RIDGELANDS
H/O FILE NO.		PLAN	SP142291	ZONE	56	PROG SECTION	12
		ORIGINAL DESCRIPTION		ACCURACY		PRES EQUIPMENT	
				GPS ACC			
GIS LAT	-23.21442932	PARISH NAME	1882-FITZROY			ORIGINAL BORE NO	
GIS LNG	150.3839269	COUNTY	LIVINGSTONE			BORE LINE	-
CHECKED	Y						
						POLYGON	
						RN OF BORE REPLACED	88289
						DATA OWNER	
FACILITY TYPE	Sub-Artesian Facility	DATE DRILLED	03/06/2011				
STATUS	Existing	DRILLERS NAME	SAINSBURY, RICHARD BRUCE				
ROLES	WS	DRILL COMPANY	R&G DRILLING				
		METHOD OF CONST.	CABLE TOOL				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM (mm)	TOP (m)	BOTTOM (m)
A	03/06/2011	1	Polyvinyl Chloride	8.000	WT	280	0.00	19.11
A	03/06/2011	2	Stainless Steel	2.000	WT	280	0.00	19.89
A	03/06/2011	3	Screen	0.050	AP	256	19.11	22.11
A	03/06/2011	4	Gravel Pack	5.000	GR	340	5.00	14.60
A	03/06/2011	5	Grout			340	0.00	5.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	0.60	BLACK SOIL
2	0.60	2.40	BROWN SANDY LOAM
3	2.40	7.30	BROWN CLAY
4	7.30	8.50	FINE SAND

DATE 18/09/2015

GROUNDWATER DATABASE

Page 2 of 4

BORE REPORT

REG NUMBER 151494

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
5	8.50	14.60	BROWN CLAY
6	14.60	22.25	FINE TO COARSE SAND & GRAVEL
7	22.25	22.35	CLAY
8	22.35	22.86	FINE TO COARSE SAND & CLAY-BOUND GRAVEL

STRATIGRAPHY DETAILS
**** NO RECORDS FOUND ****

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW (m)	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	14.60	22.11	SAGR	03/06/2011	-10.40	N	670 MS/CM	31.06	Y	UC	FITZROY RIVER ALLUVIUM

PUMP TEST DETAILS PART 1												
PIPE	DATE	REC RN OF NO. PUMP-BORE	TOP (m)	BOTTOM (m)	DIST METH (m)	TEST TYPES	PUMP TYPE	SUCTION SET (m)	Q PRIOR TO TEST (l/s)	DUR OF Q PR (min)	PRES ON ARRIV (m)	Q ON ARRIV (l/s)
A	01/06/2011	1 151494				PUM CO RT	TURBINE	19.00	0.00	0		0.00

PUMP TEST DETAILS PART 2																
PIPE	DATE	REC	TEST DUR	SWL (m)	RECOV. TIME (mins)	RESID. DD (m)	MAX DD or P RED (m)	Q at MAX DD (l/s)	TIME TO MAX DD (mins)	Max Q (l/s)	CALC STAT HD (m)	DESIGN YIELD (l/s)	DESIGN BP (m)	SUCT. SET (m)	TMSY (m2/DAY)	STOR
A	01/06/2011	1	1440	-10.40	150	0.20	8.70	31.06	1110	0.04				19.00		

BORE CONDITION
**** NO RECORDS FOUND ****ELEVATION DETAILS
**** NO RECORDS FOUND ****WATER ANALYSIS PART1

DATE 18/09/2015

GROUNDWATER DATABASE

Page 3 of 4

BORE REPORT

REG NUMBER 151494

**** NO RECORDS FOUND ****

WATER ANALYSIS PART 2

**** NO RECORDS FOUND ****

WATER LEVEL DETAILS

**** NO RECORDS FOUND ****

WIRE LINE LOG DETAILS

**** NO RECORDS FOUND ****

FIELD MEASUREMENTS

**** NO RECORDS FOUND ****

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

DATE 18/09/2015

GROUNDWATER DATABASE

Page 4 of 4

BORE REPORT

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** End of Report. Produced: 18/09/2015 12:09:36 PM **

DATE 18/09/2015

GROUNDWATER DATABASE

Page 1 of 4

BORE REPORT

REG NUMBER 151501

REGISTRATION DETAILS

OFFICE Rockhampton	BASIN 1300	LATITUDE 23-13-29	MAP-SCALE 254
ATE LOG RECD	SUB-AREA	LONGITUDE 150-22-59	MAP-SERIES
D/O FILE NO. 515/030/0669	SHIRE 4530-LIVINGSTONE SHIF	EASTING 232190	MAP-NO 8951-12
R/O FILE NO.	LOT 5	NORTHING 7429204	MAP NAME
H/O FILE NO.	PLAN RP601603	ZONE 56	PROG SECTION
	ORIGINAL DESCRIPTION	ACCURACY	PRES EQUIPMENT
		GPS ACC	
GIS LAT -23.22460002	PARISH NAME 1882-FITZROY		ORIGINAL BORE NO
GIS LNG 150.38303	COUNTY LIVINGSTONE		BORE LINE -
CHECKED Y			
			POLYGON
			RN OF BORE REPLACED 88290
			DATA OWNER DNR
FACILITY TYPE Sub-Artesian Facility	DATE DRILLED 11/06/2011		
STATUS Existing	DRILLERS NAME SAINSBURY, RICHARD BRUCE		
ROLES	DRILL COMPANY R&G DRILLING		
	METHOD OF CONST. CABLE TOOL		

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM (mm)	TOP (m)	BOTTOM (m)
A	11/06/2011	1	Polyvinyl Chloride	8.300	WT	160	0.00	29.00
A	11/06/2011	2	Centraliser				3.00	21.00
A	11/06/2011	3	Centraliser				9.00	27.00
A	11/06/2011	4	Centraliser				15.00	33.00
A	11/06/2011	5	Screen	0.040	AP	150	27.00	30.50
A	11/06/2011	6	Gravel Pack	5.000	GR	160	5.00	10.00
A	11/06/2011	7	Grout			160	0.00	5.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	4.50	LOAM, SANDY
2	4.50	9.10	SAND, CLAYEY

DATE 18/09/2015

GROUNDWATER DATABASE

Page 2 of 4

BORE REPORT

REG NUMBER 151501

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
3	9.10	9.70	CLAY, BROWN
4	9.70	11.60	SAND, FINE TO CORSE AND GRAVEL, FINE
5	11.60	18.30	CLAY, BROWN
6	18.30	18.60	SAND, FINE TO CORSE AND GRAVEL
7	18.60	21.00	CLAY, BROWN
8	21.00	29.90	SAND, FINE TO CORSE AND GRAVEL
9	29.90	30.50	SAND, FINE TO CORSE, BLUE IN COLOUR AND GRAVEL

STRATIGRAPHY DETAILS
**** NO RECORDS FOUND ****

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	21.00	30.50	SAGR	11/06/2011	-10.40	N	POTABLE	3.30	Y	UC	FITZROY RIVER ALLUVIUM

PUMP TEST DETAILS PART 1

PIPE	DATE	REC RN OF NO. PUMP-BORE	TOP (m)	BOTTOM (m)	DIST METH (m)	TEST TYPES	PUMP TYPE	SUCTION SET TO TEST (m)	Q PRIOR TO TEST (l/s)	DUR OF Q PR (min)	PRES ON ARRIV (m)	Q ON ARRIV (l/s)
A	11/06/2011	1 151501	9.70	11.60		PUM		29.00				

PUMP TEST DETAILS PART 2

PIPE	DATE	REC	TEST DUR (mins)	SWL (m)	RECOV. TIME (mins)	RESID. DO (m)	MAX DD or P RED (m)	Q at MAX DD (l/s)	TIME TO MAX DD (mins)	Max Q (l/s)	CALC STAT HD (m)	DESIGN YIELD (l/s)	DESIGN BP (m)	SUCT. SET (m2/DAY) (m)	TMSY	STOR
A	11/06/2011	1	240	-10.40			12.80			3.30				29.00		

BORE CONDITION

**** NO RECORDS FOUND ****

ELEVATION DETAILS

DATE 18/09/2015

GROUNDWATER DATABASE

Page 3 of 4

BORE REPORT

REG NUMBER 151501

**** NO RECORDS FOUND ****

WATER ANALYSIS PART1

**** NO RECORDS FOUND ****

WATER ANALYSIS PART 2

**** NO RECORDS FOUND ****

WATER LEVEL DETAILS

**** NO RECORDS FOUND ****

WIRE LINE LOG DETAILS

**** NO RECORDS FOUND ****

FIELD MEASUREMENTS

PIPE	DATE	DEPTH (m)	COND (uS/cm)	pH	TEMP (C)	NO3 (mg/L)	DO (mg/L)	Eh (mV)	ALK (mEq)	METH	SOURCE
A	11/06/2011		365							PU	GB

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

DATE 18/09/2015

GROUNDWATER DATABASE

Page 4 of 4

BORE REPORT

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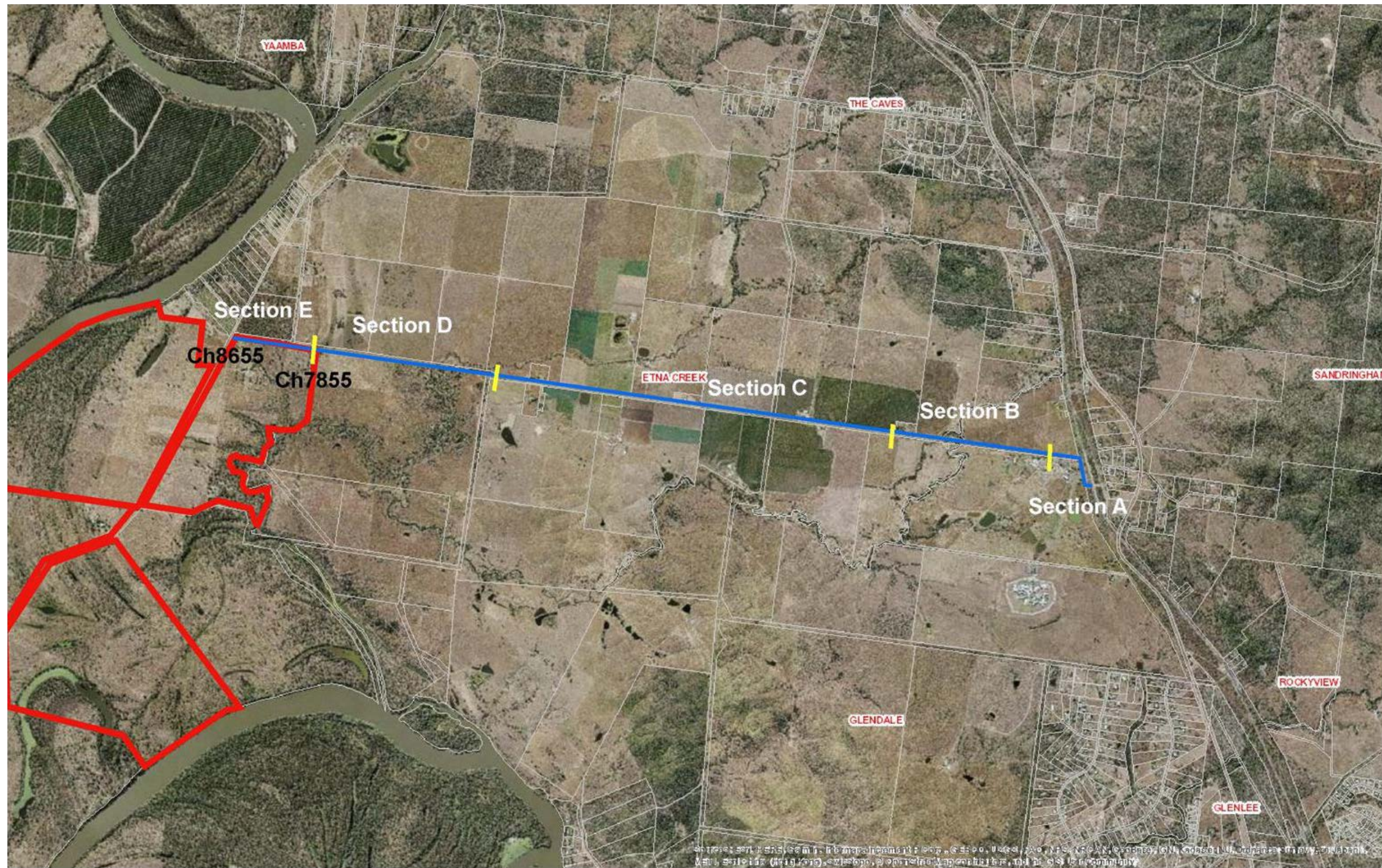
** End of Report. Produced: 18/09/2015 12:01:29 PM **

**12.13 - DECISION ASSESSMENT FOR A
DEVELOPMENT PERMIT FOR MAKING
A MATERIAL CHANGE OF USE OF
PREMISES FOR AN EXTRACTIVE
INDUSTRY FOR SAND AND GRAVEL
AND ASSOCIATED ACTIVITIES AND
MAKING A MATERIAL CHANGE OF
USE OF PREMISES FOR
CONCURRENCE ENVIRONMENTALLY
RELEVANT ACTIVITY AT LOT 5, LOT 6,
LOT 8, AND LOT 10 MELDRUM ROAD
AND 887 ETNA CREEK ROAD, ETNA
CREEK**

Road Section Plan

Meeting Date: 17 July 2018

Attachment No: 8



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The State Government of Queensland (Dept. of Natural Resources and Mines) 2015.

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0.4 0.8 1.6 Km 1:36 112 at A3

ArcGIS Web Map

Map Created by: Web AppBuilder for ArcGIS

Road Section Plan N
D-174-2015 ↑
1 July 2018



Printed from ArcPortal on 12/07/20

**12.13 - DECISION ASSESSMENT FOR A
DEVELOPMENT PERMIT FOR MAKING
A MATERIAL CHANGE OF USE OF
PREMISES FOR AN EXTRACTIVE
INDUSTRY FOR SAND AND GRAVEL
AND ASSOCIATED ACTIVITIES AND
MAKING A MATERIAL CHANGE OF
USE OF PREMISES FOR
CONCURRENCE ENVIRONMENTALLY
RELEVANT ACTIVITY AT LOT 5, LOT 6,
LOT 8, AND LOT 10 MELDRUM ROAD
AND 887 ETNA CREEK ROAD, ETNA
CREEK**

State Response

Meeting Date: 17 July 2018

Attachment No: 9



Department of Infrastructure,
Local Government and Planning

Our reference: SDA-0815-023415
Your reference: D/174-2015

18 January 2016

The Chief Executive Officer
Livingstone Shire Council
enquiries@livingstone.qld.gov.au

Attention: Jane Witham

Dear Sir

Concurrence agency response—with conditions

887 Etna Creek Road, Etna Creek

(Given under section 285 of the *Sustainable Planning Act 2009*)

The referral agency material for the development application described below was received by the Department of Infrastructure, Local Government and Planning under section 272 of the *Sustainable Planning Act 2009* on 19 August 2015.

Applicant details

Applicant name:	Belmont Sands Pty Ltd (c/- Groundwork Plus)
Applicant contact details:	PO Box 1779 smalkin@groundwork.com.au

Site details

Street address:	887 Etna Creek road, Etna Creek
Lot on plan:	Lots 5 RP601603, Lot 8 RP601603, Lot 10 SP142291, Lot 3 RP601603, Lot 6 RP601603
Local government area:	Livingstone Shire Council

Application details

Proposed development:	Development permit for a material change of use of premises for an Extractive Industry (and associated activities) and Development permit for material change of use of premises for an Environmentally relevant activity
-----------------------	---

Referral triggers

Page 1

Fitzroy/Central Regional Office
Level 2, 209 Bolsover Street
PO Box 113
Rockhampton QLD 4700

SDA-0815-023415

The development application was referred to the department under the following provisions of the *Sustainable Planning Regulation 2009*:

Referral trigger Schedule 7, Table 2, Item 1—Environmentally relevant activity
Schedule 7, Table 3, Item 21A—Land in or near a wetland
Schedule 7, Table 3, Item 2—Development impacting on State
transport infrastructure

Conditions

Under section 287(1)(a) of the *Sustainable Planning Act 2009*, the conditions set out in Attachment 1 must be attached to any development approval.

Reasons for decision to impose conditions

Under section 289(1) of the *Sustainable Planning Act 2009*, the department must set out the reasons for the decision to impose conditions. These reasons are set out in Attachment 2.

Approved plans and specifications

The department requires that the following plans and specifications set out below and in Attachment 3 must be attached to any development approval.

Drawing/Report Title	Prepared by	Date	Reference no.	Version/Issue
Aspect of development: material change of use of premises				
Conceptual Site Layout Plan	Groundwork Plus	17 July 2015	1810.026A	9
Part 4.6 Weed Management Plan	Groundwork Plus	2/11/2015	1810.610.001	1

A copy of this response has been sent to the applicant for their information.

For further information, please contact Maaret Sinkko, Senior Planning Officer, SARA Fitzroy & Central on 4924 2918, or email RockhamptonSARA@dilgp.qld.gov.au who will be pleased to assist.

Yours sincerely



Don Cook
Manager Planning
Fitzroy and Central

cc: Belmont Sands Pty Ltd (c/- Groundwork Plus), smalkin@groundwork.com.au; Your ref: 1810
enc: Attachment 1—Conditions to be imposed
Attachment 2—Reasons for decision to impose conditions
Attachment 3—Approved Plans and Specifications

SDA-0815-023415

Our reference: SDA-0815-023415

Your reference: D/174-2015

Attachment 1—Conditions to be imposed

No.	Conditions	Condition timing
Material change of use of premises		
<p>7.2.1 Environmentally relevant activity—Pursuant to section 255D of the <i>Sustainable Planning Act 2009</i>, the chief executive administering the Act nominates the Director-General of Department of Environment and Heritage to be the assessing authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):</p>		
1.	<p>The development must be carried out generally in accordance with the following plans:</p> <ul style="list-style-type: none"> Conceptual Site Layout Plan, prepared by Groundwork Plus, 17 July 2015, 1810.026A, version 9. Part 4.6 Weed Management Plan, prepared by Groundwork Plus, 1810.610.001 rev 1, 2/11/15 	At all times
2.	Storage areas for hazardous contaminants must be located above the Q50 flood level.	At all times
3.	<p>The facility for the activity must include:</p> <ul style="list-style-type: none"> (a) a storage area for hazardous contaminants that has secondary containment system to prevent any release of contaminants from the system, or containers within the system, to land, groundwater, or surface waters; and (b) containers for hazardous contaminants are secured to prevent movement during any flood event. 	At all times
<p>7.3.21A Land in or near a wetland—Pursuant to section 255D of the <i>Sustainable Planning Act 2009</i>, the chief executive administering the Act nominates the Director-General of Department of Environment and Heritage to be the assessing authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):</p>		
4.	<p>Develop and implement a site-based pest management plan that includes, but is not limited to, the following:</p> <ul style="list-style-type: none"> (a) A pre-works inspection of the property to locate, map and identify existing pest flora and fauna species. (b) Training of site personnel in the identification of local pest species likely to occur at the site. (c) Measures to minimise spread/dispersal of weeds (d) Weeds management practices that provide for the long-term integrity of wetlands 	At all times during construction works
<p>7.3.2 Development impacting on State transport infrastructure—Pursuant to section 255D of the <i>Sustainable Planning Act 2009</i>, the chief executive administering the Act nominates the Director-General of Department of Transport and Main Roads to be the assessing authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):</p>		
5.	(a) Pay an annual monetary contribution to the Department of Transport and Main Roads (Fitzroy District / Central Queensland Region), towards protecting or maintaining the safety or efficiency of the State-controlled road network under section 666 (2) of the <i>Sustainable Planning Act 2009</i> :	(a) and (b): At all times

SQA-0815-023415

No.	Conditions	Condition timing												
	<table><tr><th>Amount extracted per financial year</th><th>Contribution</th></tr><tr><td>0 to 200,000 tonnes</td><td>0 cents per tonne</td></tr><tr><td>200,000 to 250,000 tonnes</td><td>2.12 cents per tonne</td></tr><tr><td>250,000 to 500,000 tonnes</td><td>2.39 cents per tonne</td></tr><tr><td>500,000 to 600,000 tonnes</td><td>3.71 cents per tonne</td></tr><tr><td>600,000+ tonnes</td><td>4.72 cents per tonne</td></tr></table> <p>(b) This monetary contribution shall be indexed based on the Road and Bridge Construction Index, Queensland – Class 3101, published quarterly by the Australian bureau of Statistics (ABS Cat No. 6427, Series ID A2333727L) to the date of payment.</p>	Amount extracted per financial year	Contribution	0 to 200,000 tonnes	0 cents per tonne	200,000 to 250,000 tonnes	2.12 cents per tonne	250,000 to 500,000 tonnes	2.39 cents per tonne	500,000 to 600,000 tonnes	3.71 cents per tonne	600,000+ tonnes	4.72 cents per tonne	
Amount extracted per financial year	Contribution													
0 to 200,000 tonnes	0 cents per tonne													
200,000 to 250,000 tonnes	2.12 cents per tonne													
250,000 to 500,000 tonnes	2.39 cents per tonne													
500,000 to 600,000 tonnes	3.71 cents per tonne													
600,000+ tonnes	4.72 cents per tonne													
6.	Heavy vehicles as defined in the <i>Transport Operations (Road Use Management) Act 1995</i> associated with the proposed development are permitted only to use the Bruce Highway from Etna Creek Road to Knight Street as the haul route.	At all times												
7.	<p>(a) The proponent must notify the Department of Transport and Main Roads (Fitzroy District / Central Queensland Region on FitzroyDistrict@tmr.qld.gov.au) upon the commencement of operations.</p> <p>(b) Records which document the quantity of product that is transported by road must be kept by the applicant for no less than five years, and produced upon request.</p>	<p>(a): Upon the commencement of operations</p> <p>(b): At all times</p>												

SDA-0815-023415

Our reference: SDA-0815-023415
Your reference: D/174-2015

Attachment 2—Reasons for decision to impose conditions

The reasons for this decision are:

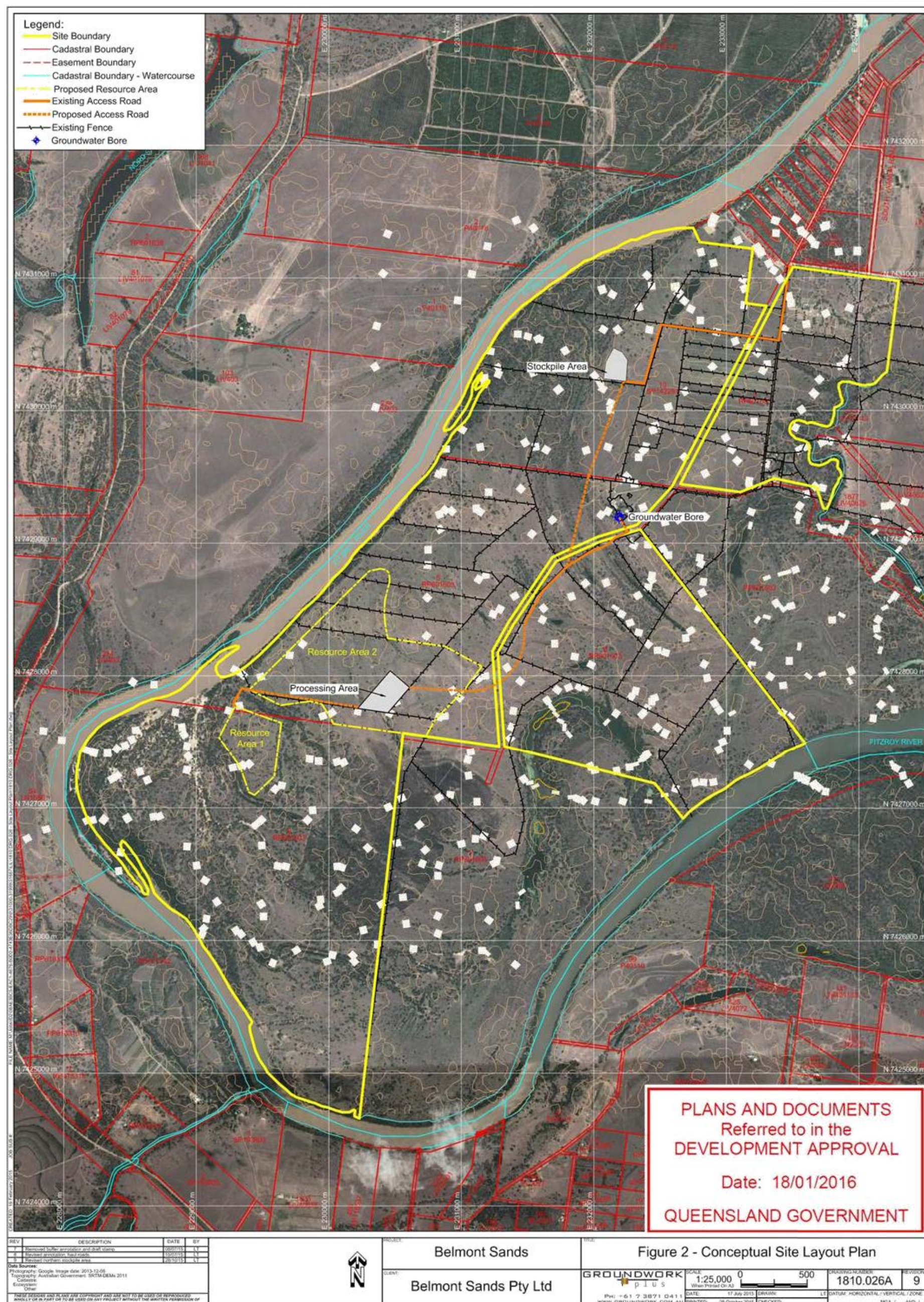
- To ensure the development is carried out generally in accordance with the plans of development submitted with the application.
- To prevent the risk of hazardous contaminants being released into the surrounding environment during a flood event.
- To ensure that the risk of hazardous contaminants being released into the surrounding environment either as a result of spillages, leaks or during a flood event is managed.
- To manage impacts from non-native plants and animals.
- To offset the impacts of development on the safety and efficiency of the state-controlled road.
- To ensure the development does not compromise the safe and efficient management or operation of state-controlled roads.

SDA-0815-023415

Our reference: SDA-0815-023415
Your reference: D/174-2015

Attachment 3—Approved plans and specifications

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4.6 Weed Management Plan

Purpose	<p>This Weed Management Plan has been developed to ensure adequate control measures are implemented to control the spread and infestations of weeds and declared plant species within the site.</p> <p>A 'weed' is a plant which, because of its characteristics and location, may result in economic, ecological, physical or aesthetic problems. Weeds can alter ecosystem functionality, reduce primary productivity and profitability, and limit long term sustainability of natural and agricultural resources if not appropriately controlled.</p> <p>Weed impacts that may occur due to the extractive industry operations include:</p> <ul style="list-style-type: none"> • areas of exposed earth available for weed colonisation including topsoil stockpiles. • spread of existing weed infestations due to disturbance and vehicle traffic. • unsuccessful or weed-infested revegetated areas. <p>The primary legislation governing the management of weeds in Queensland is the <i>Land Protection (Pest and Stock Route Management) Act 2002</i> (LP Act).</p> <p>The LP Act declares plants considered to be serious or potentially serious and imposes a legal responsibility for control of these plants by all landowners or land under management. Three classes of declared plants exist and are targeted for control because they have, or could have serious economic, environmental or social impacts:</p> <ul style="list-style-type: none"> • Class 1 has the potential to become a serious pest and is subject to eradication from the State. • Class 2 has already spread over Queensland and gaining control is considered to be very important. • Class 3 is commonly found in Queensland and prevention of the sale of Class 3 declared plants is expected to reduce their spread, especially if land is adjacent to an environmentally significant area. Landowners are not expected to try to control them.
Performance Targets	Prevent the spread of weeds on the site.
Relevant Conditions	Refer to EA once issued.
Strategies/mitigation measures	Specific control measures to be implemented may include, but not necessarily be limited to the following strategies:

PLANS AND DOCUMENTS
Referred to in the
DEVELOPMENT APPROVAL

Date: 18/01/2016

GROUNDWORK plus

2/11/2015
1810-610-001

This document is uncontrolled when printed.

4.6 Weed Management Plan

General

- Weed infestations are to be controlled as soon as possible to prevent further spread of weeds.
- Maintain groundcover for as long as possible by minimising land disturbance at any one time, where practicable.
- Annual weed spraying campaigns should be implemented at the site, with additional spraying campaigns (e.g. spot spray, bi-annual sprays, etc) undertaken if necessary.
- Weeds identified on-site will be prioritised for weed management according to the class of weeds identified, and the cause of the weed establishment will be determined to prevent or minimise further introduction and spread.
- Weed plant materials and seed should be disposed of at a Council refuse station, or buried at an appropriate depth on-site, whenever possible.
- Employees should be trained appropriately to recognise existing and potential weeds present on-site and within the surrounding area to ensure they are not inadvertently brought onto the site via items contaminated by seed (e.g. vehicles, machinery, hand tools, soil, mulch or livestock).
- If areas containing weeds are encountered, clean all equipment, vehicles and machinery prior to leaving the area.

Access Roads/Hardstand areas

- All access routes and hard stand areas will be maintained in a weed-free or weed-reduced state to lessen the spread of weed seed by vehicle movements.
- Established roads and tracks should be used wherever possible and weed-infested areas / sites are to be avoided.

Topsoil Management

- Visual surveys will be undertaken prior to all topsoil stripping operations and, if necessary, control mechanisms will be undertaken to reduce the risk of the contamination of topsoil stockpiles with seed and vegetative weed material.
- Weed control mechanisms may include separate stockpiling, herbicide spraying of stripped soils, or disposal as fill of soil materials infested with weeds.
- Weed control mechanism strategies will be implemented to control weed infestation if required, both before and after use of top-dressing material in the rehabilitation program.
- All topsoil stockpiles will be regularly monitored and managed for weed infestation.

Rehabilitation

- Implement progressive rehabilitation as soon as practical as areas become available.
- Avoid importing topsoil onto the site where possible.
- Prior to the establishment of vegetation:
 - a spraying campaign may be required to prevent migration or establishment of weed species into the area under rehabilitation.
 - alternative methods for controlling both grasses and weeds may be used, including manual weeding, burning, slashing, weed matting and mulching, where practicable.

PLANS AND DOCUMENTS
Referred to in the
DEVELOPMENT APPROVAL

Date: 18/01/2016

GROUNDWORK p104

4.6 Weed Management Plan

Weed Control Methods

As a guide to assist in planning weed control, a summary of weed control options that may be implemented are presented in **Table 3 – General Weed Control Options**.

- Department of Agriculture, Fisheries and Forestry (DAFF) provides an A to Z listing of weeds including plants declared under the LP Act. This listing can be found at: <http://www.dpi.qld.gov.au>. Detailed information on controlling individual species is also provided in the A-Z listing along with fact sheets and information sheets.

Monitoring

All employees on-site shall carry out general daily visual surveillance for weeds within the quarry and ensure that vehicles leaving site are free of soil and vegetation.

The Site Manager shall:

- Conduct weekly inspections of all access routes on-site to ensure they are maintained weed free or in a reduced state to lessen the spread of weed seed by vehicle movements.
- Conduct inspection of any area/s and treat any weed infestations prior to topsoil removal.
- Carry out at least four thorough inspections per year of the quarry to identify:
 - effectiveness of weed control measures implemented and whether an amendment is required
 - new areas where weed control is required
 - infestations of new weed species
 - areas where rehabilitation should be carried out.

Note: The frequency of site inspections will vary depending on the identified weed species on-site and what management requirements are necessary for those species.

Table 3 – General Weed Control Options

Infestation Level	Biological	Chemical	Mechanical	Physical
Low (Canopy cover between 1% and 10%)	Not suitable.	Spot-spraying by hand with a registered herbicide.	Not suitable.	Hand grubbing (remove roots and burn plant).
Medium (Canopy cover between 11% and 50%)	Release of biological control agents.	Spot-spraying by hand with a registered herbicide.	Chaining, rolling, raking or back-ploughing, then burning.	Followup control of seedlings – could include physical removal.
High (Over 50% canopy cover)	Inspect infestation to see if, and what, bio-control agents are already present. If necessary, release biological control agents and monitor their progress.	Aerial spraying with a registered herbicide.	Attach with chaining, rolling or raking. Use fire to kill any regrowth and break seed dormancy.	Followup control of seedlings – could include physical removal.

PLANS AND DOCUMENTS
Referred to in the
DEVELOPMENT APPROVAL

**12.13 - DECISION ASSESSMENT FOR A
DEVELOPMENT PERMIT FOR MAKING
A MATERIAL CHANGE OF USE OF
PREMISES FOR AN EXTRACTIVE
INDUSTRY FOR SAND AND GRAVEL
AND ASSOCIATED ACTIVITIES AND
MAKING A MATERIAL CHANGE OF
USE OF PREMISES FOR
CONCURRENCE ENVIRONMENTALLY
RELEVANT ACTIVITY AT LOT 5, LOT 6,
LOT 8, AND LOT 10 MELDRUM ROAD
AND 887 ETNA CREEK ROAD, ETNA
CREEK**

Environmental Authority Permit

Meeting Date: 17 July 2018

Attachment No: 10



Department of
**Environment and
Heritage Protection**

07-JAN-2016

To: Belmont Sands Pty Ltd
GPO Box 3013
BRISBANE QLD 4001

Email: info@fqr.com.au

Your reference: EPPR03407715
Our reference: 427623

Application details

I refer to the application that was received by the administering authority on 19-AUG-2015.

Land description: 887 Etna Creek Road, Etna Creek Lot 8 Plan RP601603, Lot 6 Plan RP601603, Lot 10 Plan SP142291, Lot 5 Plan RP601603, Lot 3 Plan RP601603.

Decision

Your application has been approved and your environmental authority (reference EPPR03407715) is attached.

Additional comments or advice

You are advised that if you are not the owner of the land to which the environmental authority relates, you have 10 business days from receipt of this environmental authority to give each owner of the land, written notice that you have been issued this environmental authority.

This permit only provides an approval under the Environmental Protection Act 1994. In order to lawfully operate you may also require permits / approvals from your local government authority and other State Government agencies prior to commencing any activity at the site. For example, this may include permits / approvals with your local Council (for planning approval), the Department of Transport and Main Roads (to access state controlled roads), the Department of Natural Resources and Mines (to clear vegetation), and the Department of Agriculture Forestry and Fisheries (to clear marine plants or to obtain a quarry material allocation).

If you are operating a quarry, other than a sand and gravel quarry where there is no crushing capability, you will be required to comply with the Mining and Quarrying Safety and Health Act 1999. For more information on your obligations under this legislation contact Mine Safety and Health at www.dnrm.qld.gov.au, or phone 13 QGOV (13 74 68) or your local Mines Inspectorate Office.

Development Approval

This permit is not a development approval under the *Sustainable Planning Act 2009*. The conditions of this environmental authority are separate, and in addition to, any conditions that may be on the development approval.

Lisa Fritz
ES - Reg Serv - Western - Twba - EPA
PO Box 731
TOOWOOMBA QLD 4350
Phone: (07) 4699 4529
Fax: (07) 4699 4388
Email: lisa.fritz@ehp.qld.gov.au
Website www.ehp.qld.gov.au
ABN 46 640 294 485

Page 1 of 2

If a copy of this environmental authority is attached to a development approval, it is for information only, and may not be current. Please contact the Department of Environment and Heritage Protection to ensure that you have the most current version of the environmental authority relating to this site.

Should you have any further enquiries, please contact Lisa Fritz on telephone (07) 4699 4329.

Yours sincerely

	7/1/2016
Signature	Date

Tariq Khan
Department of Environment and Heritage Protection
Delegate of the administering authority
Environmental Protection Act 1994

Enclosed

Permit - environmental authority (reference EPPR03407715)

Department of Environment and Heritage Protection

Permit¹

Environmental Protection Act 1994

Environmental authority

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Permit¹ number: EPPR03407715

Environmental authority takes effect when your related development application takes effect.

The first annual fee is payable within 20 business days of the effective date.

The anniversary date of this environmental authority is the same day each year as the effective date. An annual return and the payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

Name	Registered address
Belmont Sands Pty Ltd	Level 4, 247 Adelaide Street BRISBANE QLD 4001

Environmentally relevant activity and location details

Environmentally relevant activity(ies)	Location(s)
16-(2b) Extracting, other than by dredging, in a year, more than 100,000t but not more than 1,000,000t of material	887 Etna Creek Road, Etna Creek - Lot 8 Plan RP601603, Lot 6 Plan RP601603, Lot 10 Plan SP142291, Lot 5 Plan RP601603 and Lot 3 Plan RP601603
16-(3b) Screening, in a year, more than 100,000t but not more than 1,000,000t of material	

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority is issued is a restatement of the ERA as defined by legislation at the time the approval is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an environmental authority as to the scale, intensity or manner of carrying out an ERA, then the conditions prevail to the extent of the inconsistency.

An environmental authority authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the authority specifically authorises environmental harm.

¹ Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation



Permit
Environmental authority EPPR03407715

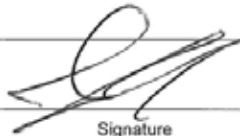
A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of land give written notice to the chief executive if they become aware of the following:

- a notifiable activity (as defined in Schedule 3) that is being, or has been, carried out on the land (notice must be given within 20 business days)
- an event involving a hazardous contaminant on the land, or a change in the condition of the contaminated land, that is causing, or is reasonably likely to cause, serious or material environmental harm (notice must be given within 24 hours).

For further information, including the form for giving written notice, refer to the Queensland Government website <http://www.qld.gov.au/> (using the search term 'managing contaminated land').


Signature

7/11/2016

Date

Tariq Khan
Department of Environment and Heritage Protection
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:
Department of Environment and Heritage
Protection
GPO Box 2454
BRISBANE QLD 4001
Phone: 1300 130 372
Fax: 07 3330 6037
palm@ehp.qld.gov.au

Permit

Environmental authority EPPR03407715

Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Conditions of environmental authority

The environmentally relevant activity(ies) conducted at the location as described above must be conducted in accordance with the following site specific conditions of approval.

Agency interest: General	
Condition number	Condition
G1	Activities conducted under this environmental authority must be conducted in accordance with the following limitation: a) Notwithstanding condition G10, disturbance is limited to resource areas, the stockpile area, and access roads identified in Figure 1 – Conceptual Erosion and Sediment Control Plan, produced by Groundwork Plus, and dated 4 November 2015.
G2	All reasonable and practicable measures must be taken to minimise the likelihood of environmental harm being caused.
G3	Any breach of a condition of this environmental authority, must be reported to the administering authority as soon as practicable, or at most, within 24 hours of you becoming aware of the breach. Records must be kept including full details of the breach and any subsequent actions undertaken.
G4	Other than as permitted by this environmental authority, the release of a contaminant into the environment must not occur.
G5	All information and records that are required by the conditions of this environmental authority must be kept for a minimum of five (5) years. Environmental monitoring results must be kept until surrender of this environmental authority. All information and records required by the conditions of this environmental authority must be provided to the administering authority upon request.
G6	An appropriately qualified person(s) must monitor, record and interpret all parameters that are required to be monitored by this environmental authority and in the manner specified by this environmental authority.
G7	All analyses required under this environmental authority must be carried out by a laboratory that has NATA certification, or an equivalent certification, for such analyses. The only exception to this condition is for <i>in situ</i> monitoring pH, Turbidity and Dissolved Oxygen.



Permit
Environmental authority EPPR03407715

G8	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority , to investigate a complaint that is not considered by the administering authority to be frivolous or vexatious, of environmental nuisance arising from the activity . The monitoring results must be provided to the administering authority upon request.
G9	The activity must be undertaken in accordance with written procedures that: <ul style="list-style-type: none"> a) identify potential risks to the environment from the activity during routine operations, closure and an emergency b) establish and maintain control measures that minimise the potential for environmental harm c) ensure plant, equipment and measures are maintained in a proper and effective condition d) ensure plant, equipment and measures are operated in a proper and effective manner e) ensure that staff are trained and aware of their obligations under the <i>Environmental Protection Act 1994</i> f) ensure that reviews of environmental performance are undertaken at least annually.
G10	A minimum buffer distance of 50m must be maintained between resource areas and the high banks of any watercourse .
G11	Chemicals and fuels in containers of greater than 15 litres must be stored within a secondary containment system .
Agency interest: Air	
Condition number	Condition
A1	Odours or airborne contaminants which are noxious or offensive or otherwise unreasonably disruptive to public amenity or safety must not cause nuisance to any sensitive place or commercial place .
Agency interest: Water	
Condition number	Condition
WT1	The stormwater runoff from disturbed areas, generated by (up to and including) a 24 hour storm event with an average recurrence interval of 1 in 5 years must be retained on site or managed to remove contaminants before release.

Permit
Environmental authority EPPR03407715

WT2

The only contaminants to be released to surface **waters** are treated stormwater runoff waters in accordance with *Table 1—Surface water release limits* and the associated monitoring requirements.

Table 1—Surface water release limits

Quality characteristic (units)	Limit	Limit Type	Minimum Monitoring Frequency
Dissolved Oxygen (%)	85-110	Range	Prior to release and weekly thereafter whilst releasing
Turbidity (NTU)	50	Maximum	
Total Suspended Solids (mg/L)	85	Maximum	
pH (pH units)	6.5-8.5	Range	

Associated monitoring requirements

a) Release points must be in accordance with those identified in Schedule 1 Figure 1 Conceptual Erosion and Sediment Control Plan, produced by Groundwork Plus, and dated 4 November 2015

b) Monitoring must be in accordance with the methods prescribed in the current edition of the Department of Environment and Heritage Protection *Water Quality Sampling Manual*.

c) Samples must be taken using representative samples.

d) Samples must be taken at the point of release.

e) All determinations must employ analytical practical quantification limits sufficiently low enough to enable comparisons to be made against water quality objectives/limits relevant to the particular water quality characteristic.

f) Monitoring must be undertaken prior to release and during a release as per the frequency stated.

g) All monitoring devices must be correctly calibrated and maintained.

WT3

Monitoring of contaminant releases to **waters** must be undertaken in accordance with condition WT2 and records of the results must be kept.

WT4

In addition to WT2, the release to **waters** must not:

a) have any other properties at a concentration that is capable of causing environmental harm

b) produce any slick or other visible evidence of oil or grease, nor contain visible floating oil, grease, scum, litter or other visually objectionable matter.

WT5

Erosion and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment.

Permit

Environmental authority EPPR03407715

Agency interest: Noise

Condition number	Condition															
N1	<p>Noise from the activity must not exceed the levels identified in <i>Table 2—Noise limits</i> when measured in accordance with the associated monitoring requirements.</p> <p>Table 2—Noise limits</p> <table><tr><th rowspan="2">Noise level dB(A) measured as</th><th colspan="3">Monday to Sunday including public holidays</th></tr><tr><th>7am - 6pm</th><th>6pm - 10pm</th><th>10pm - 7am</th></tr><tr><td></td><td colspan="3">Noise measured at a sensitive place</td></tr><tr><td>$L_{Aeq,adj,T}$</td><td>45</td><td>35</td><td>30</td></tr></table> <p>Associated monitoring requirements</p> <ol style="list-style-type: none">1) All monitoring devices must be correctly calibrated and maintained.2) Any monitoring must be in accordance with the most recent version of the administering authority's Noise Measurement Manual.3) Any monitoring of noise emissions from the activity must be undertaken when the activity is in operation.	Noise level dB(A) measured as	Monday to Sunday including public holidays			7am - 6pm	6pm - 10pm	10pm - 7am		Noise measured at a sensitive place			$L_{Aeq,adj,T}$	45	35	30
Noise level dB(A) measured as	Monday to Sunday including public holidays															
	7am - 6pm	6pm - 10pm	10pm - 7am													
	Noise measured at a sensitive place															
$L_{Aeq,adj,T}$	45	35	30													
N2	<p>When required by the administering authority, noise monitoring must be undertaken in accordance with the associated monitoring requirements of <i>Table 2—Noise Limits</i>, and the results notified within 14 days to the administering authority. Monitoring must include:</p> <ol style="list-style-type: none">a) $L_{Aeq,adj,T}$b) Background noise (Background) as $L_{A,90,adj,T}$c) $MaxL_{pA,T}$d) the level and frequency of occurrence of any impulsive or tonal noisee) atmospheric conditions including wind speed and directionf) effects due to extraneous factors such as traffic noiseg) location, date and time of recording.															
N3	Blasting or the generation of substantial low frequency noise is not permitted.															

Agency interest: Land

Condition number	Condition
L1	<p>Land that has been disturbed for activities conducted under this environmental authority must be rehabilitated in a manner such that:</p> <ol style="list-style-type: none">a) suitable species of vegetation for the location are established and sustained for earthen surfacesb) potential for erosion is minimisedc) the quality of water, including seepage, released from the site does not cause environmental harmd) potential for environmental nuisance caused by dust is minimisede) the water quality of any residual water body does not have potential to cause environmental harmf) the final landform is stable and protects public safety.
L2	Rehabilitation of disturbed areas required under condition L1, must take place progressively as works are staged and new areas of extraction are commenced.

Permit
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Agency interest: Waste	
Condition number	Condition
WS1	All waste generated in carrying out the activity must be reused, recycled or removed to a facility that can lawfully accept the waste.



Permit
Environmental authority EPPR03407715

Definitions

Key terms and/or phrases used in this document are defined in this section and **bolded** throughout this document. Applicants should note that where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

Activity means the environmentally relevant activities, whether resource activities or prescribed activities, to which the environmental authority relates.

Administering authority means the Department of Environment and Heritage Protection or its successors or predecessors.

Appropriately qualified person(s) means a person or persons who has professional qualifications, training, skills and experience relevant to the EA requirement and can give authoritative assessment, advice and analysis in relation to the EA requirement using the relevant protocols, standards, methods or literature.

Background means noise, measured in the absence of the noise under investigation, as $L_{A90,T}$ being the A-weighted sound pressure level exceeded for 90% of the time period of not less than 15 minutes, using Fast response.

Blasting is the use of explosives to fracture:

Commercial place means a place used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.

Disturbed areas includes areas:

1. that are susceptible to erosion;
2. that are contaminated by the activity; and/or
3. upon which stockpiles of soil or other materials are located.

Groundwater means water that occurs naturally in, or is introduced artificially into, an aquifer.

$L_{Aeq,adj,T}$ means the adjusted A weighted equivalent continuous sound pressure level measures ~~on~~ fast response, adjusted for tonality and impulsiveness, during the time period T, where T is measured for a period no less than 15 minutes when the **activity** is causing a steady state noise, and no shorter than one hour when the approved **activity** is causing an intermittent noise.

Land does not include **waters**.

$MaxL_{pA,T}$ means the maximum A-weighted sound pressure level measured over a time period T of not less than 15 minutes, using Fast response.

Measures have the broadest interpretation and includes plant, equipment, physical objects, monitoring, procedures, actions, directions and competency.

NATA means National Association of Testing Authorities.

Noxious means harmful or injurious to health or physical well-being.

Offensive means causing offence or displeasure, is unreasonably disagreeable to the sense, disgusting, nauseous or repulsive.

Records include breach notifications, written procedures, analysis results, monitoring reports and monitoring programs required under a condition of this authority.

Resource areas means the proposed resource areas identified in Figure 1 – Conceptual Erosion and Sediment Control Plan, produced by Groundwork Plus, and dated 4 November 2015



Permit

Environmental authority EPPR03407715

Secondary containment system means a system designed, installed and operated to prevent any release of contaminants from the system, or containers within the system, to land, groundwater, or surface waters.

Sensitive place includes the following and includes a place within the curtilage of such a place reasonably used by persons at that place:

1. a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
2. a motel, hotel or hostel; or
3. a kindergarten, school, university or other educational institution; or
4. a medical centre or hospital; or
5. a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 2004* or a World Heritage Area; or
6. a public park or garden; or
7. for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2008.

Substantial low frequency noise means a noise emission that has an unbalanced frequency spectrum shown in a one-third octave band measurements, with a predominant component within the frequency range 10 to 200 Hz. It includes any noise emission likely to cause an overall sound pressure level at a noise sensitive place exceeding 55 dB(Z).

Watercourse means a watercourse as defined under Schedule 4 of the *Environmental Protection Act 1994*, and which aligns with a watercourse on the vegetation management watercourse and drainage features map prescribed under the *Vegetation Management Act 1999*.

Waters includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water, natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

You means the holder of the environmental authority.

24 hour storm event with an average recurrence interval of 1 in 5 years means the maximum rainfall depth from a 24-hour duration precipitation event with an average recurrence interval of once in 5 years. For example, an Intensity-Frequency-Duration table for a 24-hour duration event with an average recurrence interval of 1 in 5 years, identifies a rainfall intensity of 8.2mm/hour. The rainfall depth for this event is therefore 24 hour x 8.2mm/hour = 196.8mm.

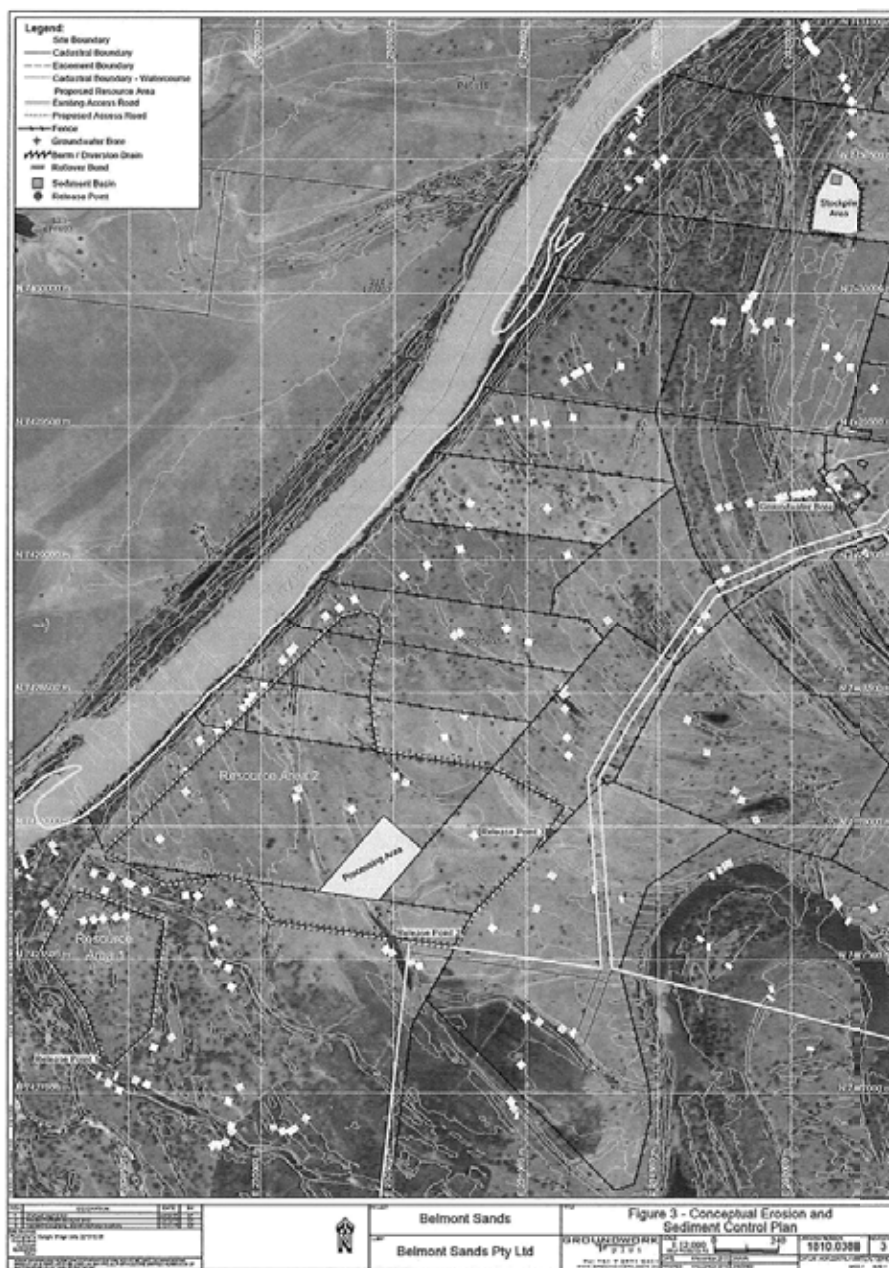


Permit
Environmental authority EPPR03407715

Schedules

Schedule 1—Approved plans

Figure 1 – Conceptual Erosion and Sediment Control Plan, produced by Groundwork Plus, and dated 4 November 2015.



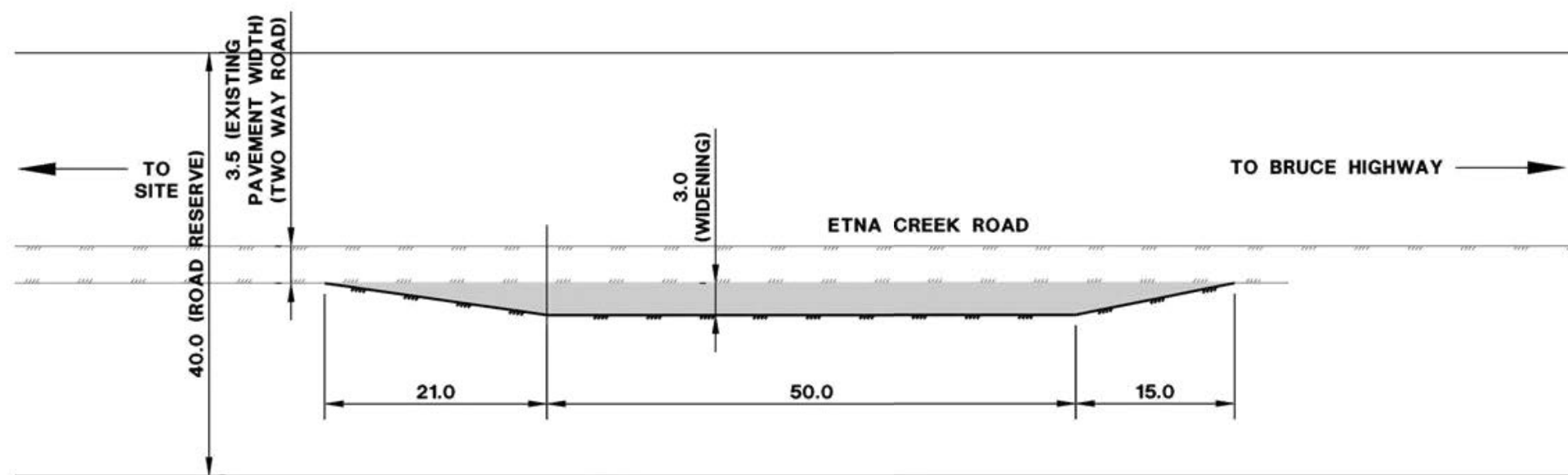
END OF PERMIT

**12.13 - DECISION ASSESSMENT FOR A
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RELEVANT ACTIVITY AT LOT 5, LOT 6,
LOT 8, AND LOT 10 MELDRUM ROAD
AND 887 ETNA CREEK ROAD, ETNA
CREEK**

Passing Bay Proposal Plan

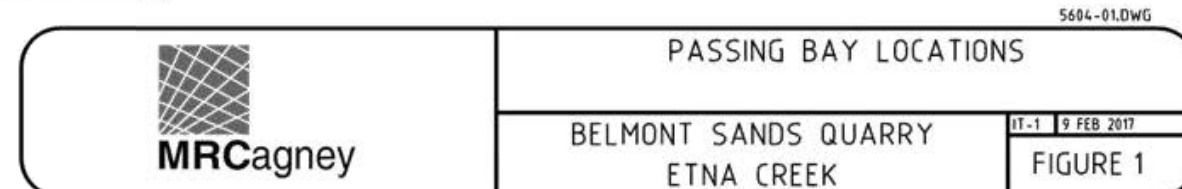
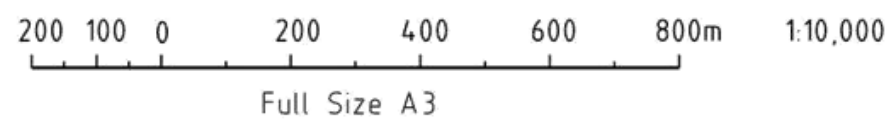
Meeting Date: 17 July 2018

Attachment No: 11



**TYPICAL PASSING
BAY DETAIL**
(AT 500m INTERVALS)

NTS



**12.13 - DECISION ASSESSMENT FOR A
DEVELOPMENT PERMIT FOR MAKING
A MATERIAL CHANGE OF USE OF
PREMISES FOR AN EXTRACTIVE
INDUSTRY FOR SAND AND GRAVEL
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CONCURRENCE ENVIRONMENTALLY
RELEVANT ACTIVITY AT LOT 5, LOT 6,
LOT 8, AND LOT 10 MELDRUM ROAD
AND 887 ETNA CREEK ROAD, ETNA
CREEK**

Second Carriageway Proposal Plan

Meeting Date: 17 July 2018

Attachment No: 12

