APPENDIX B

RESOURCE ESTIMATION
&
FUTURE QUARRY AREAS

QUARRY AREAS

QUARRY SITE BOUNDARIES - 123.87 Ha
EXISTING EXTRACTION - 32.7 Ha
EXISTING PROCESSING AREA - 14.2 Ha
PROCESSING AREA EXTENSION/PUGMILL - 1.0 Ha
PREVIOUSLY RE-HABILITATED - 6.4 Ha
FUTURE WEST PIT EXPANSION - 12.6 Ha
PROPOSED EAST PIT A - 22.8 Ha
PROPOSED EAST PIT B - 6.8 Ha
APPROVED LIMIT OF EXTRACTION

LOT 6
D P 2 4 2 2 1 0
25.26 ha

WEST PIT

LOT 5
D P 2 4 2 2 1 0
27.06 ha

LOT 21
D P 7 7 3 2 2 0
28.87 ha

PROPOSED
EAST PIT A

LOT 42
D P 8 1 5 6 2 8
9.887 ha

PROPOSED
EAST PIT B

LOT
D P 1 0 0 4 3 7 5
28.10 ha

PROCESSING
AREA

LOT 1
D P 2 0 4 3 7
4.7 ha

PROPOSED
PUGMILL

NORTH
COAST
GRACE
STATION ST
ROAD
VOGELES
COREY ST
DOUGLAS ST
AVE
RAILWAY
ROAD
COREY ST

50 0 50 100 150 200 250m

NOTES

DARACON Group Est.1983

PREPARED BY

NCPL
Neil Charters Pty Ltd
SURVEY AND DESIGN SERVICES
Ph : 0412 149 691 email : ncharters@bigpond.com

SCALE : AS PER BAR SCALE

DATE : 3.9.17

DARACON GROUP
MARTINS CREEK QUARRY
QUARRY AREAS SEPTEMBER 2014

NCPL DRG No.

11745

EXTRACTION VOLUMES

PIT	CU.M.	TONNES	YEARS
WEST	7,172,380	19,635,425	15.5
EAST A	10,720,030	28,944,080	23.2
EAST B	1,318,500	3,555,950	2.8
TOTALS	19,210,910	51,869,455	41.5

NOTES : TONNAGES CALCULATED AT 2.7 TONNES PER CUBIC METRE.
YEARS CALCULATED AT 1,250,000 TONES PER YEAR.
THERE IS 156,000 CU.M. BELOW THE WEST PIT DESIGN .

NOTES

PROPOSED PIT DESIGN
LIMIT VOLUME CALCULATIONS
QUARRY BOUNDARY

3 ● DENOTES 1968 BOREHOLE
2 ● DENOTES DECEMBER 2006 BOREHOLE
10 ● DENOTES FEBRUARY 2007 BOREHOLE
4 ● DENOTES 1984 BOREHOLE

CO-ORDINATE SYSTEM : MGA
DATUM : AHD.
MAPPING DATE JUNE 2014

WEST PIT DESIGN BASED ON INTERPOLATION OF BOREHOLE DATA BY RAILCORP.
EAST PIT DESIGNS BASED ON PARAMETERS FROM DARACON.
NCPL TAKES NO RESPONSIBILITY FOR THESE DESIGNS.

25 0 25 50 75 100 125m

CLIENT: DARACON Group Est.1983

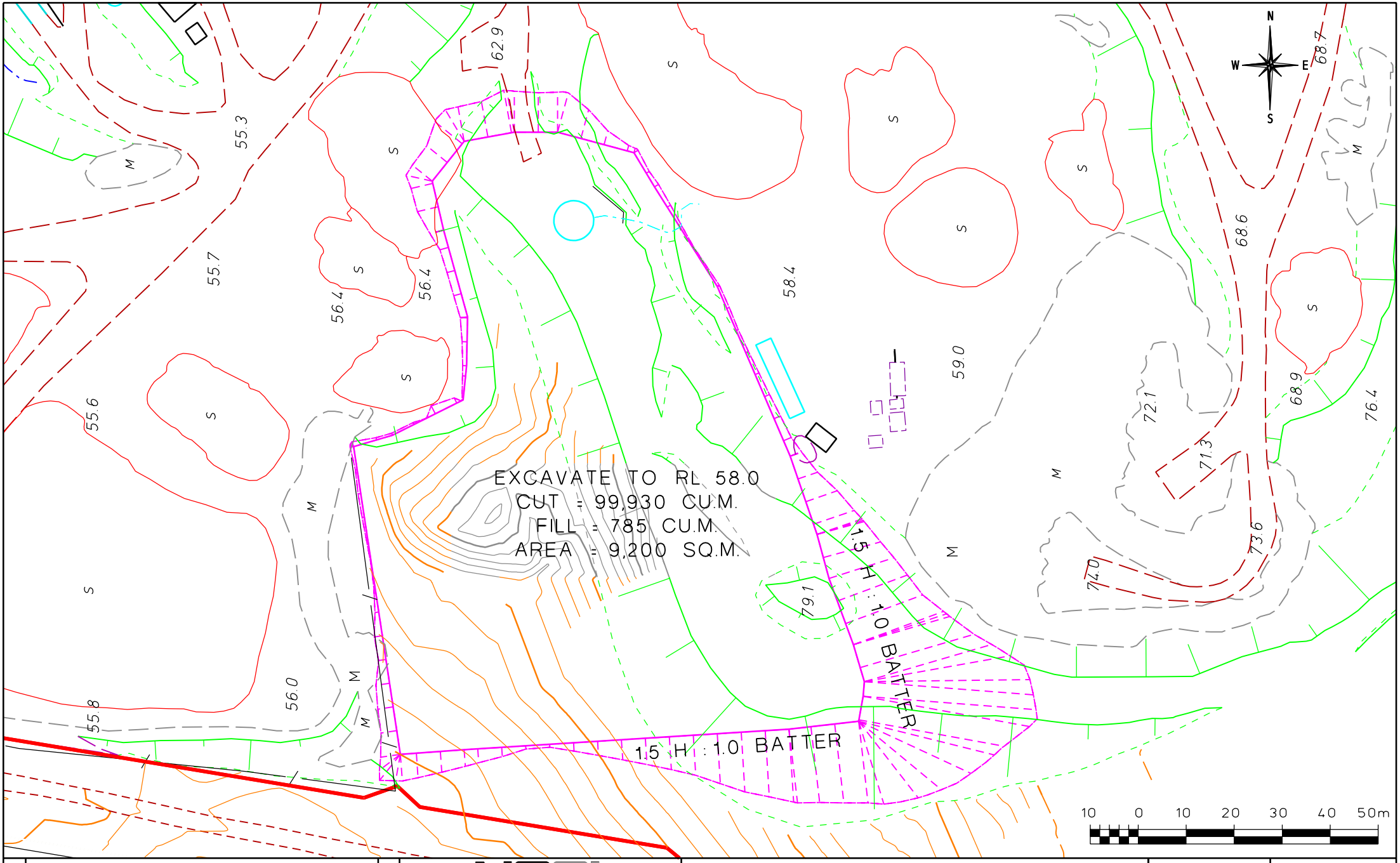
PREPARED BY: NCPL Neil Charters Pty Ltd SURVEY AND DESIGN SERVICES Ph : 0412 149 691 email : ncharters@bigpond.com

SCALE	1 : 2500 AT A1
DATE	4.9.14
DRN NC	APPRO

DARACON GROUP
MARTINS CREEK QUARRY
PROPOSED PIT DESIGNS
SEPTEMBER 2014

REFERENCE PLANS
11748 - CROSS SECTIONS
11745 - PIT AREAS
11747 - PUGMILL EXCAVATION VOLUME

NCPL DRG No.
11746



CLIENT

DARACON Group Est.1983

PREPARED BY

NCPL
Neil Charters Pty Ltd
SURVEY AND DESIGN SERVICES
Ph : 0412 149 691 email : ncharters@bigpond.com

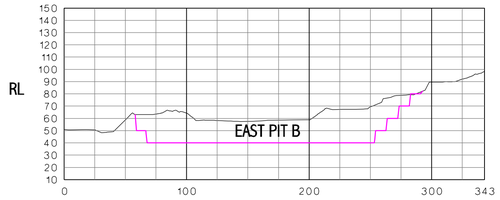
DARACON GROUP
MARTINS CREEK QUARRY
PROPOSED PUGMILL LAYOUT

SCALE 1 : 1000 AT A4

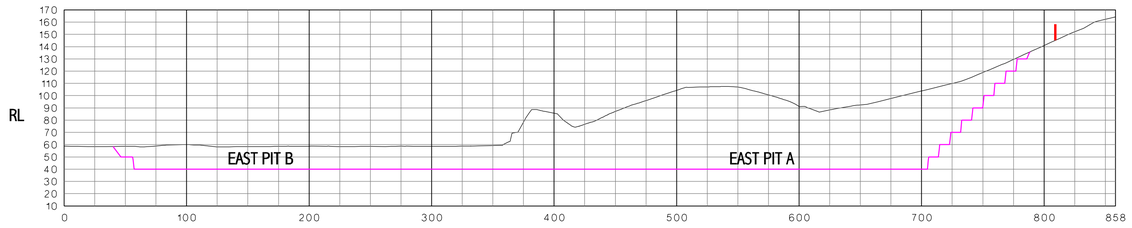
DATE : 5.9.14

NCPL DRG No.

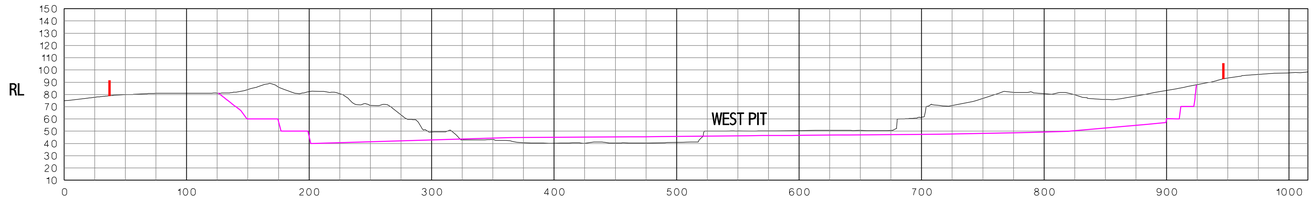
11747



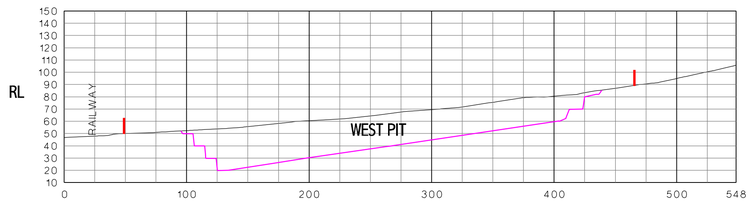
SECTION E - E1



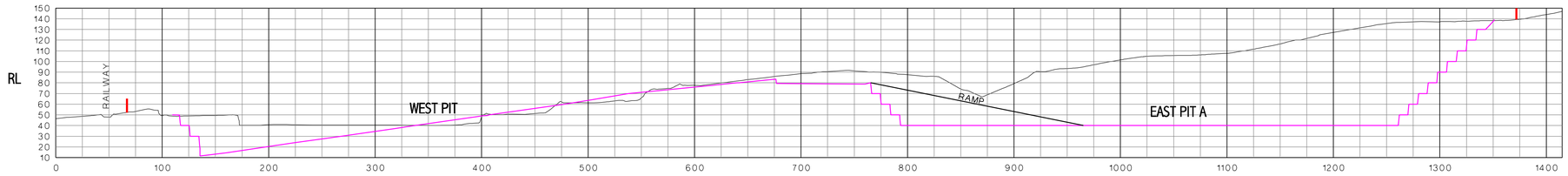
SECTION D - D1



SECTION C - C1



SECTION B - B1



SECTION A - A1

NOTES

PROPOSED PIT DESIGN
QUARRY BOUNDARY

CO-ORDINATE SYSTEM : MGA
DATUM : AHD.
MAPPING DATE JUNE 2014

WEST PIT DESIGN BASED ON INTERPOLATION OF BOREHOLE DATA BY RAILCORP.
EAST PIT DESIGNS BASED ON PARAMETERS FROM DARACON.
NCPL TAKES NO RESPONSIBILITY FOR THIS INFORMATION

25 0 25 50 75 100 125m

CLIENT

DARACON Group Est.1983

PREPARED BY

NCPL Neil Charters Pty Ltd
SURVEY AND DESIGN SERVICES
Ph : 0412 149 691 email : ncharters@bigpond.com

SCALE	1 : 2500 AT A1
DATE	4.9.14
DRN NC	APPRO

DARACON GROUP
MARTINS CREEK QUARRY
PROPOSED PIT DESIGNS CROSS SECTIONS
SEPTEMBER 2014

REFERENCE PLANS
11746 - PIT DESIGN PLAN
11745 - PIT AREAS
11747 - PUGMILL EXCAVATION VOLUME

NCPL DRG No.
11748

APPENDIX C

ENVIRONMENTAL PROTECTION LICENCE

Environment Protection Licence

Licence - 1378

Licence Details	
Number:	1378
Anniversary Date:	30-June

Licensee

BUTTAI GRAVEL PTY LTD

PO BOX 299

WALLSEND NSW 2287

Premises

MARTINS CREEK QUARRY

STATION STREET

MARTINS CREEK NSW 2420

Scheduled Activity

Crushing, Grinding or Separating

Extractive Activities

Fee Based Activity	Scale
Crushing, grinding or separating	> 500000-2000000 T processed
Land-based extractive activity	> 500000-2000000 T extracted, processed or stored

Region

North - Hunter

Ground Floor, NSW Govt Offices, 117 Bull Street

NEWCASTLE WEST NSW 2302

Phone: (02) 4908 6800

Fax: (02) 4908 6810

PO Box 488G NEWCASTLE

NSW 2300

Environment Protection Licence

Licence - 1378

Environment Protection Licence

Licence - 1378

Environment Protection Licence

Licence - 1378

Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act); and
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

Environment Protection Licence

The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

BUTTAI GRAVEL PTY LTD
PO BOX 299
WALLSEND NSW 2287

subject to the conditions which follow.

Environment Protection Licence

Licence - 1378

1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Crushing, Grinding or Separating	Crushing, grinding or separating	> 500000 - 2000000 T processed
Extractive Activities	Land-based extractive activity	> 500000 - 2000000 T extracted, processed or stored

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
MARTINS CREEK QUARRY
STATION STREET
MARTINS CREEK
NSW 2420
LOT 1 DP 204377, LOT 5 DP 242210, LOT 6 DP 242210, LOT 42 DP 815628, LOT 1 DP 1006375

A3 Information supplied to the EPA

A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:
a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

Environment Protection Licence

Licence - 1378

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Air emissions monitoring		Dust Deposition Gauge located immediately south of quarry, referred to as "DG1" on map titled "Railcorp Martins Creek Quarry - Air Monitoring Station Locations", dated April 2011. This map is filed on EPA file LIC09/27.
2	Air emission monitoring		Dust Deposition Gauge located west of the quarry, which is referred to as "DG2" on map titled "Railcorp Martins Creek Quarry - Air Monitoring Station Locations", dated April 2011. This map is filed on EPA file LIC09/27.
3	Air emission monitoring		Dust Deposition Gauge located south-east of the quarry, which is referred to as "DG3" on map titled "Railcorp Martins Creek Quarry - Air Monitoring Station Locations", dated April 2011. This map is filed on EPA file LIC09/27.
4	Air emission monitoring		Dust Deposition Gauge referred to as "DG4" on map titled "Railcorp Martins Creek Quarry - Air Monitoring Station Locations", dated April 2011. This map is filed on EPA file LIC09/27.
5	Air emission monitoring		High Volume Air Sampler located immediately south of the premises, which is referred to as "HV1" on map titled "Railcorp Martins Creek Quarry - Air Monitoring Station Locations", dated April 2011. This map is filed on EPA file LIC09/27.

P1.2 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

P1.3 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description

Environment Protection Licence

Licence - 1378

6	Discharge to waters Water Quality Monitoring	Discharge to waters Water Quality Monitoring	Pumped discharge from Dam 1 as shown on map titled 'Figure 9 Proposed Stormwater System Upgrade' in the report titled "Review of Environmental Factors - June 2011". A copy of the map is kept on EPA file LIC09/27.
7	Discharge to waters Water Quality Monitoring	Discharge to waters Water Quality Monitoring	Discharge point from Dam 2 as shown on map titled 'Figure 9 Proposed Stormwater System Upgrade' in the report titled "Review of Environmental Factors - June 2011". A copy of the map is kept on EPA file LIC09/27.
8	Discharge to waters Water Quality Monitoring	Discharge to waters Water Quality Monitoring	Pumped discharge from Dam 3 as shown on map titled 'Figure 9 Proposed Stormwater System Upgrade' in the report titled "Review of Environmental Factors - June 2011". A copy of the map is kept on EPA file LIC09/27.

3 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Concentration limits

L2.1 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L2.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.

L2.4 Water and/or Land Concentration Limits

Environment Protection Licence

Licence - 1378

POINT 6,7,8

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				10 and none visible
pH	pH				6.5 - 8.5
Total suspended solids	milligrams per litre				50

L3 Waste

L3.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled “Waste” and meeting the definition, if any, in the column titled “Description” in the table below.
Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled “Activity” in the table below.
Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled “Other Limits” in the table below.
This condition does not limit any other conditions in this licence.

Code	Waste	Description	Activity	Other Limits
NA	General or Specific exempted waste	Waste that meets all the conditions of a resource recovery exemption under Clause 51A of the Protection of the Environment Operations (Waste) Regulation 2005	As specified in each particular resource recovery exemption	NA
NA	Waste	Any waste received on site that is below licensing thresholds in Schedule 1 of the POEO Act, as in force from time to time	-	NA

L4 Noise limits

L4.1 Where a noise limits has not been prescribed, all operations and activities occurring on the premises must be conducted in a manner that does not cause offensive noise.

L5 Blasting

L5.1 The overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.2 The overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.3 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.4 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.5 Blasting operations at the premises may only take place between 9:00am – 3:00pm Monday to Friday. Blasting is not permitted on public holidays.

Blasting outside the hours specified above can only take place with the written approval of the EPA.

L6 Hours of operation

L6.1 In accordance with development consent 171/90/79 hours of operations for the western portion of the premises, being Lot 5 and Lot 6 DP 242210, are restricted to 7 am to 5 pm Monday to Saturday with no operations allowed on Sundays and public holidays.

Note: the development consent allows operations outside these hours on a short term emergency basis.

L6.2 Hours of operation for the eastern portion of the premises, being Lot 1 DP 1006375 and Lot 1 DP 204377, are restricted to 6 am to 6 pm Monday to Saturday with no operations allowed on Sundays and public holidays. It is permissible to operate outside these hours for activities like maintenance provided such activities are not audible at the nearest or most affected residential receiver.

L6.3 Operations outside the abovementioned hours are permissible on a short term basis for emergency situations.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

This includes:
a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
a) must be maintained in a proper and efficient condition; and
b) must be operated in a proper and efficient manner.

O3 Dust

O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

O4 Waste management

O4.1 All above ground tanks containing material that is likely to cause environmental harm must be bunded or have an alternative spill containment system in place.

O5 Other operating conditions

O5.1 Clean stormwater must be diverted around quarried areas and provided with energy dissipation to prevent erosion and scouring.

O5.2 Discharges from the stormwater treatment dams must be managed to prevent downstream scouring and erosion.

O5.3 Any flocculent added to stormwater treatment dams must not exceed concentrations that will cause an ecotoxic effect in the downstream receiving environment.

O5.4 A visible marker must be provided in each stormwater treatment dam to delineate minimum water storage volumes necessary for effective treatment. The stormwater treatment dams must be dewatered as is necessary to maintain adequate sediment and water storage volumes.

5 Monitoring and Recording Conditions

M1 Monitoring records

M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.

Environment Protection Licence

M1.2 All records required to be kept by this licence must be:
a) in a legible form, or in a form that can readily be reduced to a legible form;
b) kept for at least 4 years after the monitoring or event to which they relate took place; and
c) produced in a legible form to any authorised officer of the EPA who asks to see them.

M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
a) the date(s) on which the sample was taken;
b) the time(s) at which the sample was collected;
c) the point at which the sample was taken; and
d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2 Water and/ or Land Monitoring Requirements

POINT 6,7,8

Pollutant	Units of measure	Frequency	Sampling Method
Oil and Grease	Visible	Daily during any discharge	Visual Inspection
pH	pH	Daily during any discharge	Probe
Total suspended solids	milligrams per litre	Daily during any discharge	Grab sample

M2.3 Air Monitoring Requirements

POINT 1,2,3,4

Pollutant	Units of measure	Frequency	Sampling Method
Particulates - Deposited Matter	grams per square metre per month	Once a month (min. of 4 weeks)	AM-19

POINT 5

Pollutant	Units of measure	Frequency	Sampling Method
PM10	micrograms per cubic metre	Every 6 days	AM-18

Environment Protection Licence

Licence - 1378

M3 Testing methods - concentration limits

M3.1 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

M3.2 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:
a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M4 Weather monitoring

M4.1 The meteorological weather station must be maintained so as to be capable of continuously monitoring the parameters specified in this licence.

M4.2 For the weather monitoring station the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1 of the table below. The licensee must use the sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the other columns.

Parameter	Unit of Measure	Frequency	Averaging Period	Sampling Method
Air temperature	degrees centigrade	Continuous	1 hour	AM-4
Wind direction	degrees	Continuous	15 minute	AM-2 & AM-4
Wind speed	m/s	Continuous	15 minute	AM-2 & AM-4
Rainfall	mm	Continuous	24 hour	AM-4

M5 Recording of pollution complaints

M5.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M5.2 The record must include details of the following:
a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M6.3 The preceding two conditions do not apply until 3 months after:
a) the date of the issue of this licence or
b) if this licence is a replacement licence within the meaning of the Protection of the Environment Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.

M7 Blasting

M7.1 The licensee must monitor all blasts carried out in or on the premises at or near the nearest residence or noise sensitive location (such as a school or hospital) that is likely to be most affected by the blast and that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee relating to alternative blasting limits.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
a) a Statement of Compliance; and
b) a Monitoring and Complaints Summary.
At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be

completed and returned to the EPA.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
a) the licence holder; or
b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

R1.8 A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.

R1.9 The licensee must report any exceedence of the licence blasting limits to the regional office of the EPA as soon as practicable after the exceedence becomes known to the licensee or to one of the licensee's employees or agents.

R1.10 The licensee must supply, with each Annual Return, a Blast Monitoring Report which must include the following information relating to each blast carried out within the premises during the reporting period covered by the Annual Return:
a) the date and time of the blast;
b) the location of the blast on the premises;
c) the blast monitoring results at each blast monitoring station; and
d) an explanation for any missing blast monitoring results.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R2 Notification of environmental harm

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
a) where this licence applies to premises, an event has occurred at the premises; or
b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:
a) the cause, time and duration of the event;
b) the type, volume and concentration of every pollutant discharged as a result of the event;
c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

R4 Other reporting conditions

R4.1 **Report of blasting monitoring**

The licensee must report any exceedence of the licence blasting limits to the regional office of the EPA as soon as practicable after the exceedence becomes known to the licensee or to one of the licensee's employees or agents.

R4.2 The licensee must supply, with each Annual Return, a Blast Monitoring Report which must include the following information relating to each blast carried out within the premises during the reporting period covered by the Annual Return:
(a) the date and time of the blast;
(b) the location of the blast on the premises;
(c) the blast monitoring results at each blast monitoring station; and
(d) an explanation for any missing blast monitoring results.

7 General Conditions

G1 Copy of licence kept at the premises or plant

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

8 Pollution Studies and Reduction Programs

U1 Upgrade Stormwater Management System

U1.1 By **30 June 2012** the licensee must construct Stormwater Treatment Dams 1, 2 and 3 as described in the Review of Environmental Factors report titled "Construction and Operation of a Stormwater Management System Upgrade at Martins Creek Quarry", dated June 2011.

Environment Protection Licence

Licence - 1378

Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

Environment Protection Licence

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environmen t Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder describe d at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 mo nths. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

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Licence - 1378

TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non-putrescible), special waste or hazardous waste

Mr Nigel Sargent

Environment Protection Authority

(By Delegation)

Date of this edition: 27-April-2000

Environment Protection Licence

Licence - 1378

End Notes

1	Licence transferred through application 140326, approved on 17-Apr-2001, which came into effect on 01-Jan-2001.
2	Licence varied by notice 1008976, issued on 07-Sep-2001, which came into effect on 02-Oct-2001.
3	Licence varied by notice 1043571, issued on 21-Feb-2005, which came into effect on 18-Mar-2005.
4	Licence transferred through application 143252, approved on 21-Feb-2005, which came into effect on 01-Jan-2004.
5	Licence varied by notice 1049928, issued on 19-Jul-2005, which came into effect on 13-Aug-2005.
6	Licence varied by notice 1052573, issued on 05-Jan-2006, which came into effect on 30-Jan-2006.
7	Licence fee period changed by notice 1068614 approved on 02-Jan-2007.
8	Licence varied by notice 1071585, issued on 02-Apr-2007, which came into effect on 02-Apr-2007.
9	Licence varied by notice 1078576, issued on 17-Oct-2007, which came into effect on 17-Oct-2007.
10	Licence varied by notice 1084034, issued on 26-Mar-2008, which came into effect on 26-Mar-2008.
11	Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
12	Licence varied by notice 1127041, issued on 02-Jun-2011, which came into effect on 02-Jun-2011.
13	Licence varied by notice 1502198 issued on 09-Dec-2011
14	Licence transferred through application 1510568 approved on 04-Dec-2012 , which came into effect on 30-Nov-2012

APPENDIX D

HOURS OF OPERATION COMPARISON TABLE

COMPARISON OF EXISTING AND PROPOSED HOURS OF OPERATIONS AT MARTINS CREEK QUARRY

ACTIVITY	EXISTING CONDITION OR LIMITS	PROPOSED CONDITION OR LIMIT
IN PIT OPERATIONS, EXTRACTION, PROCESSING, DRILLING, LOADING, HAULING, ANCILLIARY QUARRYING OPERATIONS	7:00 AM TO 5:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS	6:00 AM TO 6:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS
IN PIT STORMWATER TESTING, PUMPING AND DISCHARGING	7:00 AM TO 5:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS	24 HRS / 7 DAYS PER WEEK INCLUDING PUBLIC HOLIDAYS
BLASTING ACTIVITIES	9:00 AM TO 3:00 PM MONDAY TO FRIDAY EXCLUDING PUBLIC HOLIDAYS	9:00 AM TO 3:00 PM MONDAY TO FRIDAY EXCLUDING PUBLIC HOLIDAYS
PRIMARY, SECONDARY CRUSHING AND SCREENING PLANT OPERATIONS	6:00 AM TO 6:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS	6:00 AM TO 6:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS
TERTIARY CRUSHING AND SCREEING PLANT OPERATIONS	6:00 AM TO 6:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS	6:00 AM TO 10:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS
PUGMILL MIXING AND BINDER DELIVERY OPERATIONS	6:00 AM TO 6:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS	4:30 AM TO 10:00 PM MONDAY TO FRIDAY. 4:30 AM TO 6:00 PM SATURDAY. EXCLUDING PUBLIC HOLIDAYS
PRECOATING PLANT OPERATIONS	6:00 AM TO 6:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS	6:00 AM TO 10:00 PM MONDAY TO FRIDAY. 6:00 AM TO 6:00 PM SATURDAY. EXCLUDING PUBLIC HOLIDAYS
SALES LOADING, STOCKPILING FOR ROAD TRANSPORT AND DISPATCH OF ROAD TRANSPORT	6:00 AM TO 6:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS	5:30 AM TO 7:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS
PROCESSING PLANT, ANCILLIARY AND STOCKPILE AREAS STORMWATER TESTING PUMPING AND DISCHARGING	6:00 AM TO 6:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS	24 HRS / 7 DAYS PER WEEK INCLUDING PUBLIC HOLIDAYS
TRAIN LOADING OPERATIONS AND ACTIVITIES	6:00 AM TO 6:00 PM MONDAY TO SATURDAY EXCLUDING PUBLIC HOLIDAYS ADDITIONAL LOADING HOURS PERMITTED IN EMERGENCIES.	24 HRS / 7 DAYS PER WEEK INCLUDING PUBLIC HOLIDAYS
MAINTENANCE AND REPAIRS OF ALL PLANT AND EQUIPMENT	24 HRS / 7 DAYS PER WEEK INCLUDING PUBLIC HOLIDAYS	24 HRS / 7 DAYS PER WEEK INCLUDING PUBLIC HOLIDAYS

APPENDIX E

PRELIMINARY BIODIVERSITY ASSESSMENT

PRELIMINARY
BIODIVERSITY ASSESSMENT REPORT

MARTINS CREEK QUARRY

STATION STREET
MARTINS CREEK

AUGUST 2014
REF: 0052

PRELIMINARY
BIODIVERSITY ASSESSMENT REPORT

MARTINS CREEK QUARRY

STATION STREET
MARTINS CREEK

Conacher Consulting Pty Ltd

Environmental and Land Management Consultants

PO Box 4082, East Gosford NSW
Phone: 02 4324 7888
conacherconsulting@gmail.com

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Background

Conacher Consulting have been engaged to prepare a Preliminary Biodiversity Assessment Report for Martins Creek Quarry.

This report has been prepared to identify the biodiversity characteristics of the site to accompany the Request for Director-General's Requirements for the Preparation of an Environmental Impact Statement for a State Significant Development Application.

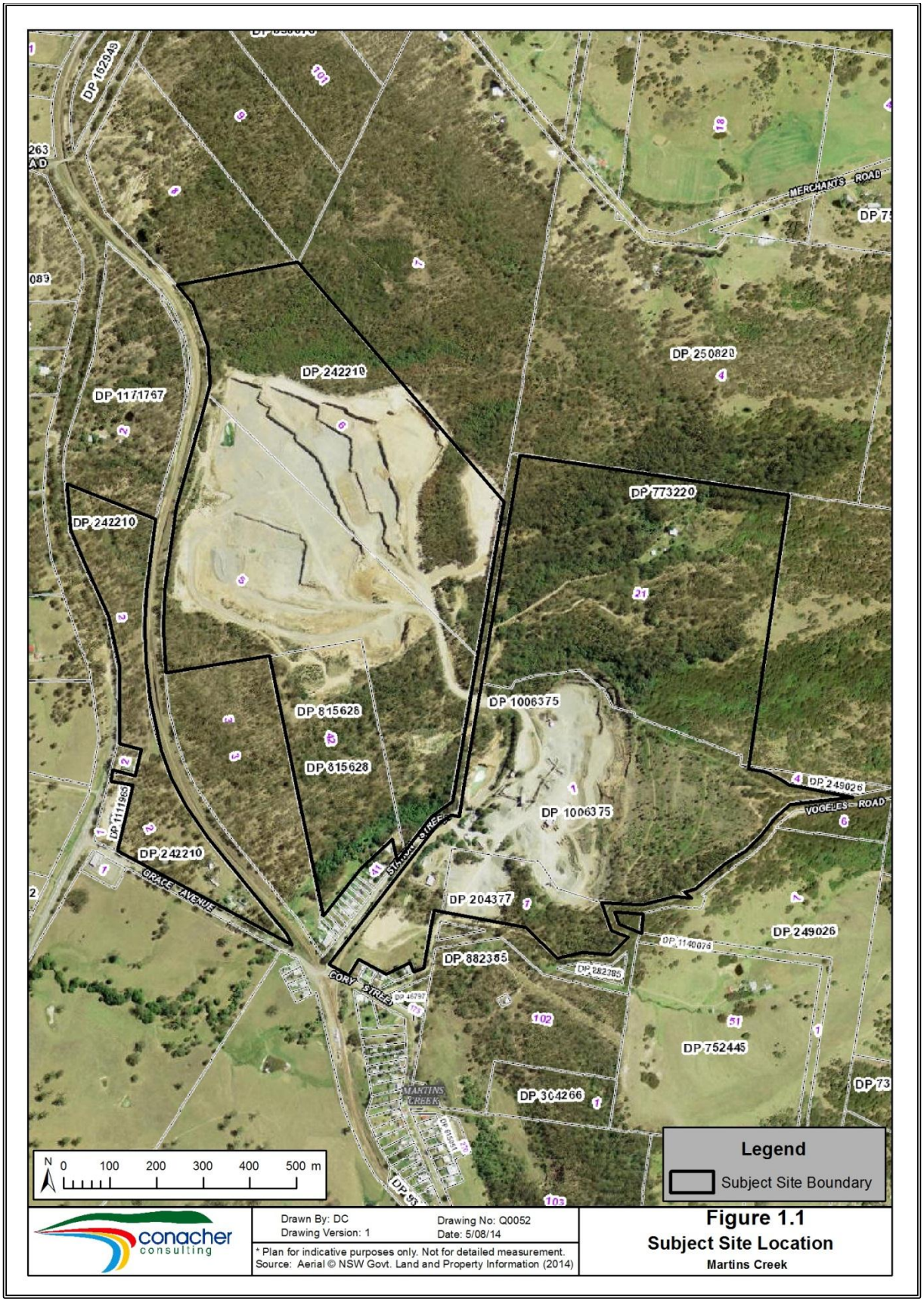
The investigations undertaken are preliminary and are not intended to inform a development application.

1.2 Study Area

The planning and cadastral details of the subject site are provided in Table 1.1. The location of the site is identified in Figure 1.1.

TABLE 1.1
SITE DETAILS

Location	Lots 5 & 6 DP 242210 Lot 1 DP 204377 Lot 1 DP 1006375 Lot 42 DP 815628 Lot 21 DP 773220 Lot 2 DP 242210
Site Area	Approximately 134 hectares
Local Government Area	Dungog
Bioregion	North Coast Bioregion
Existing Land Use	Extractive Industry


DP 242210
DP 1171767
DP 242210
DP 250820
DP 773220
DP 815628
DP 815628
DP 1006375
DP 1006375
DP 249026
VOGELES ROAD
MERCHANTS ROAD
GRACE AVENUE
DP 204377
DP 882385
DP 249026
DP 752445
DP 304266
MARTINS CREEK
0 100 200 300 400 500 m
Legend
Subject Site Boundary
conacher consulting
Drawn By: DC
Drawing Version: 1
Drawing No: Q0052
Date: 5/08/14
* Plan for indicative purposes only. Not for detailed measurement.
Source: Aerial © NSW Govt. Land and Property Information (2014)
Figure 1.1
Subject Site Location
Martins Creek

2. METHODOLOGY

2.1 Database Searches and Literature Reviews

A review of available literature for the area was undertaken to obtain reference material and background information for this study. The following main documents were accessed as part of the literature review for this study:

- The Greater Hunter Native Vegetation Mapping (NSW Office of Environment and Heritage 2012);
- Hunter, Central & Lower North Coast Vegetation Classification & Mapping Project Volume 2: Vegetation Community Profiles (Somerville 2009).
- Soil Landscapes of the Dungog 1:100 000 Sheet (Henderson 2000).

Database searches were conducted to provide background information and identify records of listed threatened and migratory species located within 10km of the site. The databases searched are listed in Table 2.1.

TABLE 2.1
DATABASE SEARCHES CONDUCTED

Database Searched	Purpose of Search	Date Viewed	Reference
Bionet Atlas of NSW Wildlife	Identify threatened species records within 10km of the site	4 August 2014	NSW OEH 2014a
EP&BC Protected Matters Search Tool	Identify threatened and migratory species records within 10km of the site	4 August 2014	SEWPAC 2014
OEH NSW Atlas of NSW Wildlife - Threatened Species Profile Database	Identify profiles for relevant threatened species	4 August 2014	NSW OEH 2014a

2.2 Field Investigations

Previous site biodiversity investigations have also been completed by Umwelt (2009) and Ecotone Ecological Consultants (2011).

A preliminary field inspection was undertaken on 9 July 2014, to supplement literature reviews and previous surveys of the area.

3. EXISTING ENVIRONMENT

3.1 Landscape Context

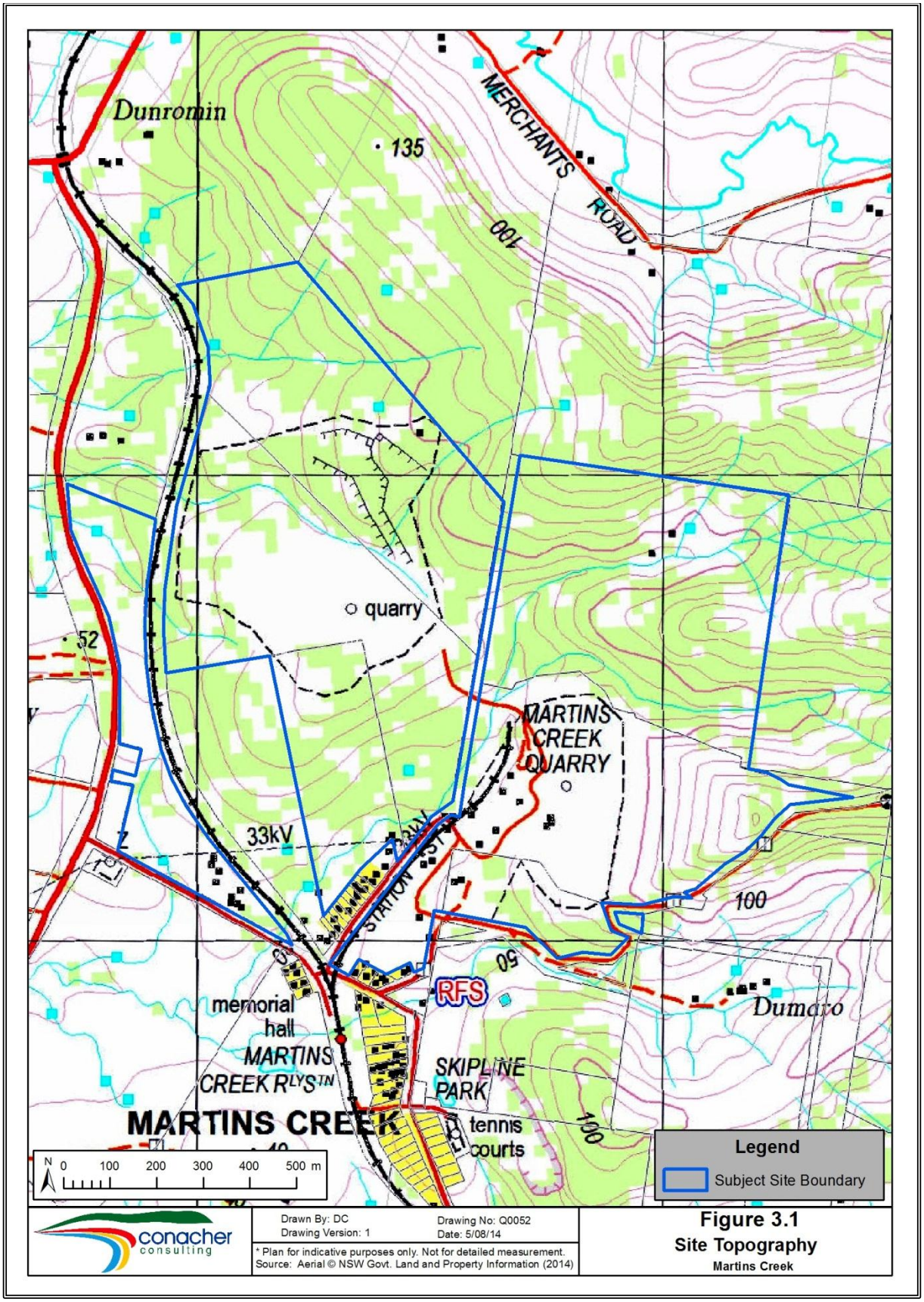
The subject site is located in the southern section of Dungog Shire in the town of Martins Creek.

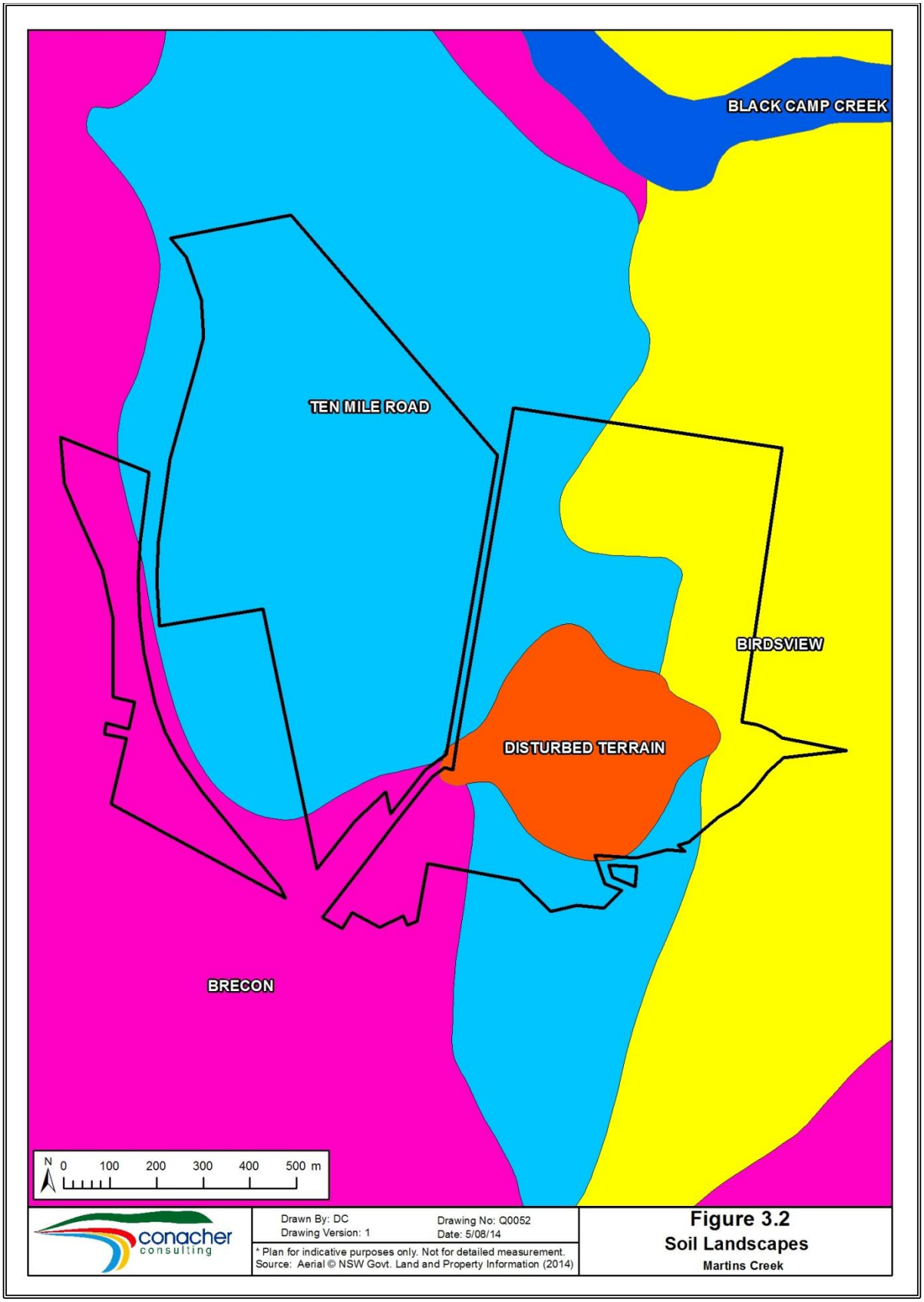
The site is located within the Dungog Hills physiographic region within the NSW North Coast Bioregion (Henderson 2000). A topographic map of the site is provided as Figure 3.1.

The Dungog Hills physiographic region is characterised by rolling to steep hills formed on Carboniferous sediments and alluvial plains. Slope gradients are approximately 5 -15%, elevation is 30 - 170m and relief is up to 140m.

The Soil Landscape mapping undertaken by Henderson (2000) for the site is shown in Figure 3.2.

The site occurs mostly on the erosion soil landscape, Ten Mile Road. The eastern sections of the site also occur on the Birdsview colluvial soil landscape and the south-western sections of the site occur on the Brecon residual soil landscape. The site also contains disturbed terrain due to past quarrying activities (Henderson 2000).


Dunromin
135
MERCHANTS ROAD
100
quarry
52
MARTINS CREEK QUARRY
33kV
STATION ST
100
60
RFS
memorial hall
MARTINS CREEK RLYSTN
SKIPLINE PARK
tennis courts
MARTINS CREEK
Dumaro
100
N 0 100 200 300 400 500 m
Legend
Subject Site Boundary
conacher consulting
Drawn By: DC
Drawing Version: 1
Drawing No: Q0052
Date: 5/08/14
* Plan for indicative purposes only. Not for detailed measurement.
Source: Aerial © NSW Govt. Land and Property Information (2014)
Figure 3.1
Site Topography
Martins Creek


BLACK CAMP CREEK
TEN MILE ROAD
BIRDSVIEW
DISTURBED TERRAIN
BRECON
N 0 100 200 300 400 500 m
conacher consulting
Drawn By: DC
Drawing Version: 1
Drawing No: Q0052
Date: 5/08/14
* Plan for indicative purposes only. Not for detailed measurement.
Source: Aerial © NSW Govt. Land and Property Information (2014)
Figure 3.2
Soil Landscapes
Martins Creek

3.2 Vegetation Communities

The vegetation communities present within the site are:

- MU 000 - Non-native Vegetation/ Cleared Land
- MU 007 - Sandpaper Fig/ Whalebone Tree Warm Temperate Rainforest;
- MU 016 - Black Booyong/ Giant Stinging Tree/ Rosewood/ Moreton Bay Fig lowland subtropical rainforest of the lower North Coast
- MU 023 - Whalebone Tree / Red Kamala Dry Subtropical Rainforest of the Lower Hunter River;
- MU 048 - White Mahogany/ Turpentine Moist Shrubby Tall Open Forest;
- MU 067 - Grey Gum/ Grey Box Shrub/ Grass Open Forest on Sandstone Ranges of the Sydney Basin;
- MU 072 - Spotted Gum/ Broad-leaved Mahogany/ Red Ironbark Shrubby Open Forest;
- MU 083 – Spotted Gum/ Narrow-leaved Ironbark/ Red Ironbark Shrub/ Grass Open Forest of the Central and Lower Hunter
- MU 084 – Spotted Gum/ Narrow-leaved Ironbark Shrub/ Grass Open Forest of the Central and Lower Hunter
- MU 999 – Derived Grasslands of the Greater Hunter mapping Area

The following descriptions of vegetation communities are provided. Vegetation community locations are shown in Figure 3.3.

MU 000 – NON-NATIVE VEGETATION/ CLEARED LAND

Structure and Floristics
This map unit consists of cleared land which does not display structural or floristic characteristics of naturally occurring vegetation.

Occurrence within Study Area
This map unit occurs within areas which have been subject to previous clearing and development.

Conservation Status
None.

MU 007 - SANDPAPER FIG/ WHALEBONE TREE WARM TEMPERATE RAINFOREST

Structure and Floristics
Open forests to closed forests characterised by *Ficus coronata* and *Streblus brunonianus.* The mid storey consists of a range of smaller trees and tall shrubs and various climbers. The mid-storey is typically ferny with sparse forbs and graminoids (NSW OEH 2012).

Occurrence within Study Area
A minor occurrence of this vegetation type is mapped within the southern precinct of the site.

Conservation Status
Not listed.

MU 016 - BLACK BOOYONG/ GIANT STINGING TREE/ ROSEWOOD/ MORETON BAY FIG LOWLAND SUBTROPICAL RAINFOREST OF THE LOWER NORTH COAST

Structure and Floristics
Open to closed forests with a diverse canopy dominated by *Heritiera actinophylla, Dendrocnide excelsa, Dysoxylum fraserianum* and *Ficus macrophylla.* The mid-storey includes a diverse range of small trees along with shrubs and climbers. The ground layer is typically ferny with forbs and graminoids are uncommon (NSW OEH 2012).

Occurrence within Study Area
This map unit occurs within the central section of the site in the northern and southern precincts.

Conservation Status
May correspond to the endangered ecological community Lowland Rainforest in NSW North Coast and Sydney Basin Bioregion, however additional survey is required to determine presence within the site.

MU 023 - WHALEBONE TREE/ RED KAMALA DRY SUBTROPICAL RAINFOREST OF THE LOWER HUNTER RIVER

Structure and Floristics
Open forests to closed forests with a canopy characterised by *Streblus brunonianus* and *Mallotus philippensis.* The mid-storey consists of various small trees, shrubs and climbers. The ground layer is typically sparse and consists of ferns, graminoids and forbs (NSW OEH 2012).

Occurrence within Study Area
This vegetation type is mapped within the northern precinct of the site.

Conservation Status
May correspond to the endangered ecological community Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions, however additional survey is required to determine presence within the site.

MU 048 - WHALEBONE TREE/ RED KAMALA DRY SUBTROPICAL RAINFOREST OF THE LOWER HUNTER RIVER

Structure and Floristics
Shrubby open forests with a mixed canopy dominated by *Eucalyptus acmenoides*. The moist understorey commonly includes small trees and diverse shrubs and climbers. The ground layer is dominated by graminoids with sparse forbs and grasses (NSW OEH 2012).

Occurrence within Study Area
A minor occurrence of this vegetation type is mapped within the southern precinct of the site.

Conservation Status
Not listed.

MU 067 - GREY GUM/ GREY BOX SHRUB/ GRASS OPEN FOREST ON SANDSTONE RANGES OF THE SYDNEY BASIN

Structure and Floristics
Open forests with a canopy characterised by *Eucalyptus punctata.* The mid- storey consists of an open shrub layer with sparse climbers. The ground layer is dominated by grasses with numerous forbs and small ferns (NSW OEH 2012).

Occurrence within Study Area
A minor occurrence of this vegetation type is mapped within the northern precinct of the site.

Conservation Status
Not listed.

MU 72 - SPOTTED GUM/ BROAD-LEAVED MAHOGANY/ RED IRONBARK SHRUBBY OPEN FOREST

Structure and Floristics
Open forests with a canopy dominated by *Corymbia maculata.* The mid-storey consists of a diverse open shrub layer along with various small climbers. The ground layer in characteristically grassy with a mix of forbs, small ferns and other graminoids (NSW OEH 2012).

Occurrence within Study Area
This community is the most widespread vegetation type mapped within the site, it occurs within the northern and southern precincts.

Conservation Status
Not listed.

MU 83 - GREY GUM/ ROUGH-BARKED APPLE SHRUBBY OPEN FOREST OF THE LOWER HUNTER

Structure and Floristics
Open forests with a canopy dominated by Corymbia maculata and Eucalyptus crebra. The mid-storey consists of a sparse shrub layer. The ground layer is predominately grassy with various graminoids, forbs and small ferns (NSW OEH 2012).

Occurrence within Study Area
This community is mapped within the northern precinct of the site.

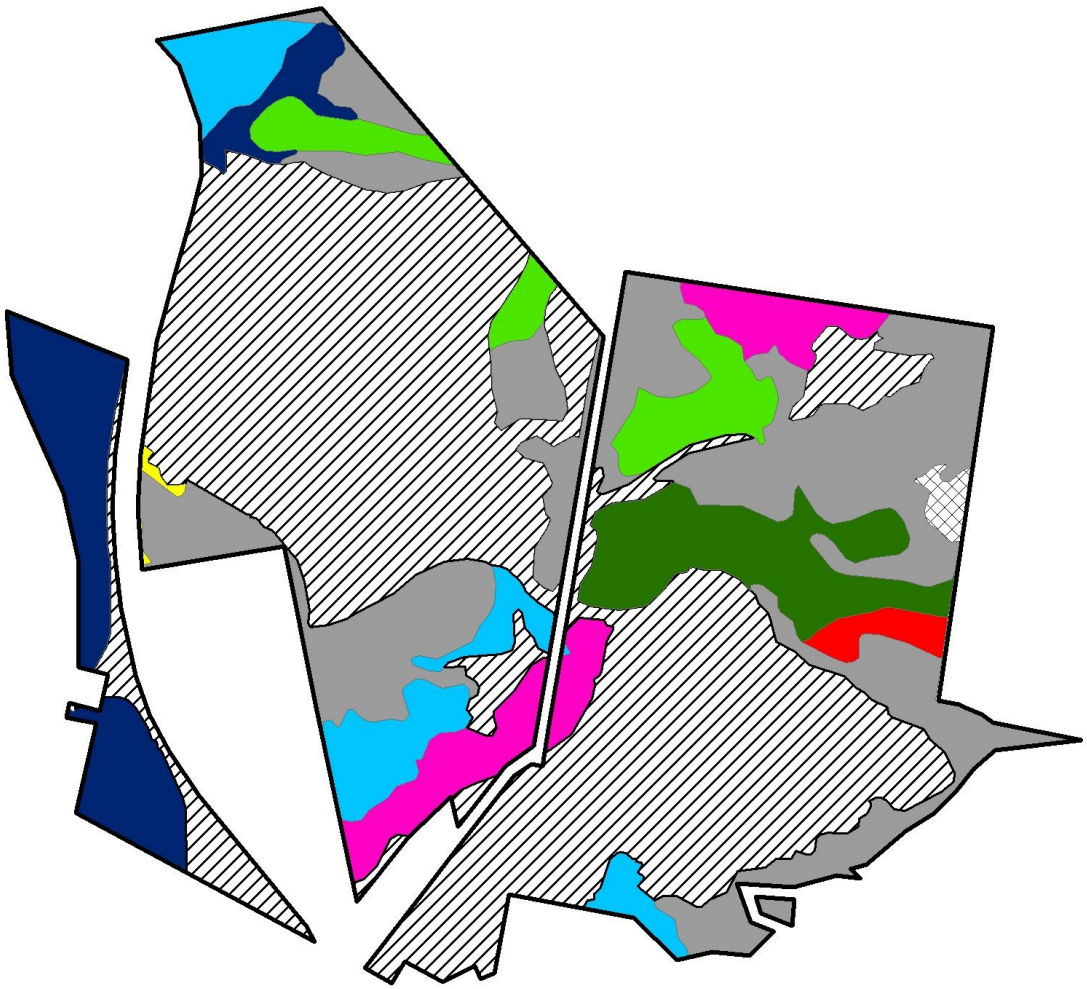
Conservation Status
Not listed.

MU 84 - SPOTTED GUM/ RED IRONBARK/ GREY GUM SHRUB/ GRASS OPEN FOREST OF THE LOWER HUNTER

Structure and Floristics
Open forests with a canopy dominated by *Corymbia maculata.* The mid-storey consists of an open shrub layer. The ground layer is predominately grassy with various graminoids, forbs and small ferns.

Occurrence within Study Area
This community is mapped within the northern and southern precincts of the site.

Conservation Status
Not listed



Legend

- Subject Site Boundary
- MU000 Non-Native Vegetation/ Cleared Land
- Sandpaper Fig/ Whalebone Tree Warm Temperate Rainforest MU007
- Black Booyong/ Giant Stinging Tree/ Rosewood/ Moreton Bay Fig Lowland Subtropical Rainforest of the Lower North Coast MU016
- Whalebone Tree/ Red Kamala Dry Subtropical Rainforest of the Lower Hunter River MU023
- White Mahogany/ Turpentine Moist Shrubby Tall Open Forest MU048
- Grey Gum/ Grey Box Shrub/ Grass Open Forest on Sandstone Ranges of the Sydney Basin MU067
- Spotted Gum/ Broad-leaved Mahogany/ Red Ironbark Shrubby Open Forest MU072
- Spotted Gum/ Narrow-leaved Ironbark/ Red Ironbark Shrub/ Grass Open Forest of the Central and Lower Hunter MU083
- Spotted Gum/ Narrow-leaved Ironbark shrub/ grass open forest of the central and lower MU084
- Derived Grasslands of the Greater Hunter Mapping area MU999

Source: Sommerville (2009)

N 0 100 200 300 400 m

conacher consulting

Drawn By: DC
Drawing Version: 1
Drawing No: Q0052
Date: 4/08/14

* Plan for indicative purposes only. Not for detailed measurement.
Source: Aerial © NSW Govt. Land and Property Information (2014)

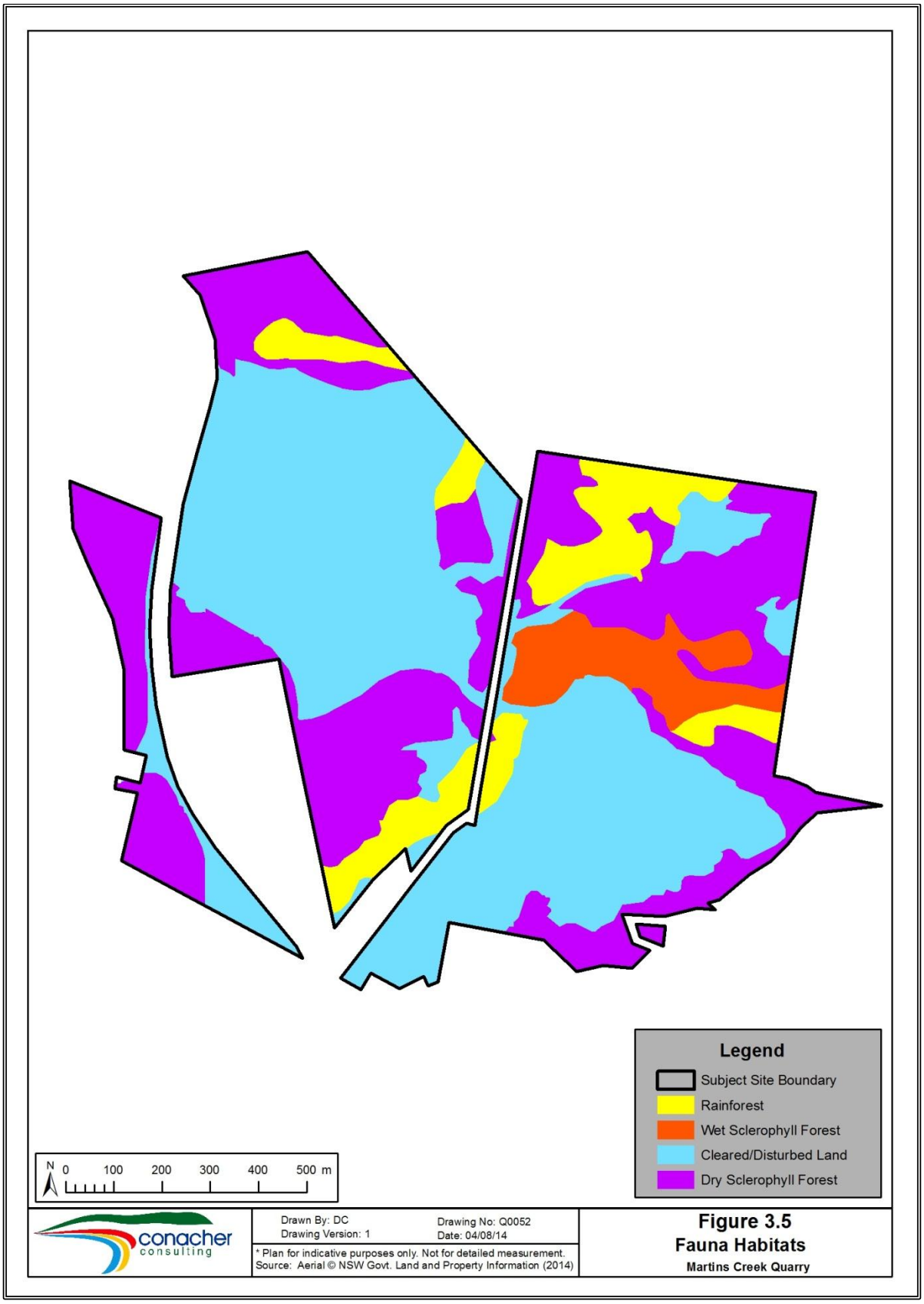
Figure 3.3
Site Vegetation Mapping
Martins Creek Quarry

3.3 Fauna Habitats

The following broad habitat types were identified within the site for fauna species:

- Dry Sclerophyll Forest;
- Wet Sclerophyll Forest;
- Rainforest; and
- Cleared / Disturbed Land.

The broad fauna habitat types identified are mapped in Figure 3.4. The following descriptions of the micro-habitat features provided within each of the identified broad habitat types identified are provided.


Legend
Subject Site Boundary
Rainforest
Wet Sclerophyll Forest
Cleared/Disturbed Land
Dry Sclerophyll Forest
N
0
100
200
300
400
500 m
conacher consulting
Drawn By: DC
Drawing Version: 1
Drawing No: Q0052
Date: 04/08/14
* Plan for indicative purposes only. Not for detailed measurement.
Source: Aerial © NSW Govt. Land and Property Information (2014)
Figure 3.5
Fauna Habitats
Martins Creek Quarry

3.4 Threatened Biodiversity

Endangered Ecological Communities

There are no endangered ecological communities listed as specifically occurring within the Dungog Local Government Area, however there are several with potential to occur. Details regarding the habitat attributes and indicative species for the threatened ecological communities with potential to be present in the local government area are provided in Table 3.1.

TABLE 3.1
THREATENED ECOLOGICAL COMMUNITIES OF THE AREA

Name	TSC Act	EP&BC Act	Habitat Requirements	Comments
Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregion (FWCF)	E	-	**Geology / Soils:** Silts, muds or humic loams. **Topography:** Depressions, flats, drainage lines, backswamps, lagoons and lakes associated with coastal floodplains. **Characteristic Species:** Composition is variable and dependent on water regime. May include amphibious grasses and sedges, emergent floating herbs and emergent tall sedges and floating and submerged aquatic herbs.	No suitable habitat mapped within the site.
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	EEC	-	**Geology / Soils:** Generally on the Permian sediments of the Hunter Valley floor. **Topography:** Depressions and drainage flats. **Characteristic Species:** *Eucalyptus tereticornis, Eucalyptus punctata, Eucalyptus crebra, Angophora floribunda, Corymbia maculata* and *Eucalyptus moluccana.*	No suitable habitat mapped within the site.
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E	CE	**Geology / Soils**: High nutrient geological substrates, notably basalts and fine-grained sedimentary rocks. **Topography:** Coastal plains and plateaux, footslopes and foothills up to 600m ASL and within the Sydney basin below 350m ALS **Characteristic Species:** Principally encompasses the following groupings of Floyd (1990): *Argyrodendron trifoliatum* alliance (suballiances 1, 5 & 6); *Dendrocnide excelsa - Ficus* spp. alliance (suballiances 14 & 15); and *Drypetes australasica – Araucaria cunninghamii* alliance (suballiances 21 & 22).	Suitable habitat is mapped within the site.

TABLE 3.1 THREATENED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**TSC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	EEC	CEEC	**Geology / Soils:** fertile moist silts often on basic volcanic substrates. **Topography:** Lowland river valleys in riverine corridors and on alluvial flats. **Characteristic Species:** Lowland Rainforest on Floodplain falls predominately into Suballiance 3: C*ryptocarya obovata - Dendrocnide excelsa - Ficus spp* – Araucaria of Floyd (1990).	Suitable habitat is mapped within the site.
River-Flat Eucalypt Forest on Coastal Floodplains of the North Coast, Sydney basin and South East Corner Bioregions (REFCF)	E	-	**Geology / Soils:** Silts, clay-loams and sandy loams. **Topography:** Periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. **Characteristic Species:** Eucalypt canopy with species belonging to the genus Angophora or the sections Exsertaria or Transversaria of the genus Eucalyptus. Has low abundance of *E. robusta*, Casuarina and Melaleuca species and a groundcover of soft-leaved forbs and grasses.	No suitable habitat mapped within the site.
Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	EEC	-	**Geology / Soils:** clay-loams and sandy loams. **Topography:** Periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. **Characteristic species**: *Eucalyptus tereticornis, E. siderophloia, Corymbia intermedia* and, north of the Macleay floodplain *Lophostemon suaveolens.*	No suitable habitat mapped within the site.
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions (SOFF)	E	-	**Geology / Soils:** Waterlogged or periodically inundated grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline. **Topography:** Flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains. **Characteristic Species:** *Casuarina glauca.*	No suitable habitat mapped within the site.

TABLE 3.1 THREATENED ECOLOGICAL COMMUNITIES OF THE AREA				
Name	**TSC Act**	**EP&BC Act**	**Habitat Requirements**	**Comments**
Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions (SSFCF)	E	-	**Geology / Soils:** Waterlogged or periodically inundated humic clay loams and sandy loams. **Topography:** Alluvial flats and drainage lines associated with coastal floodplains. **Characteristic Species:** *Eucalyptus robusta, E. longifolia, E. botryoides, Melaleuca quinquenervia* and *M. ericifolia.*	No suitable habitat mapped within the site.
V = vulnerable E = endangered CE = critically endangered				

The following endangered ecological communities have suitable habitat mapped within the subject site as shown in Figure 3.5:

- Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions; and
- Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion.

Further floristic surveys and assessment is required to determine whether these endangered ecological communities are present within the site.

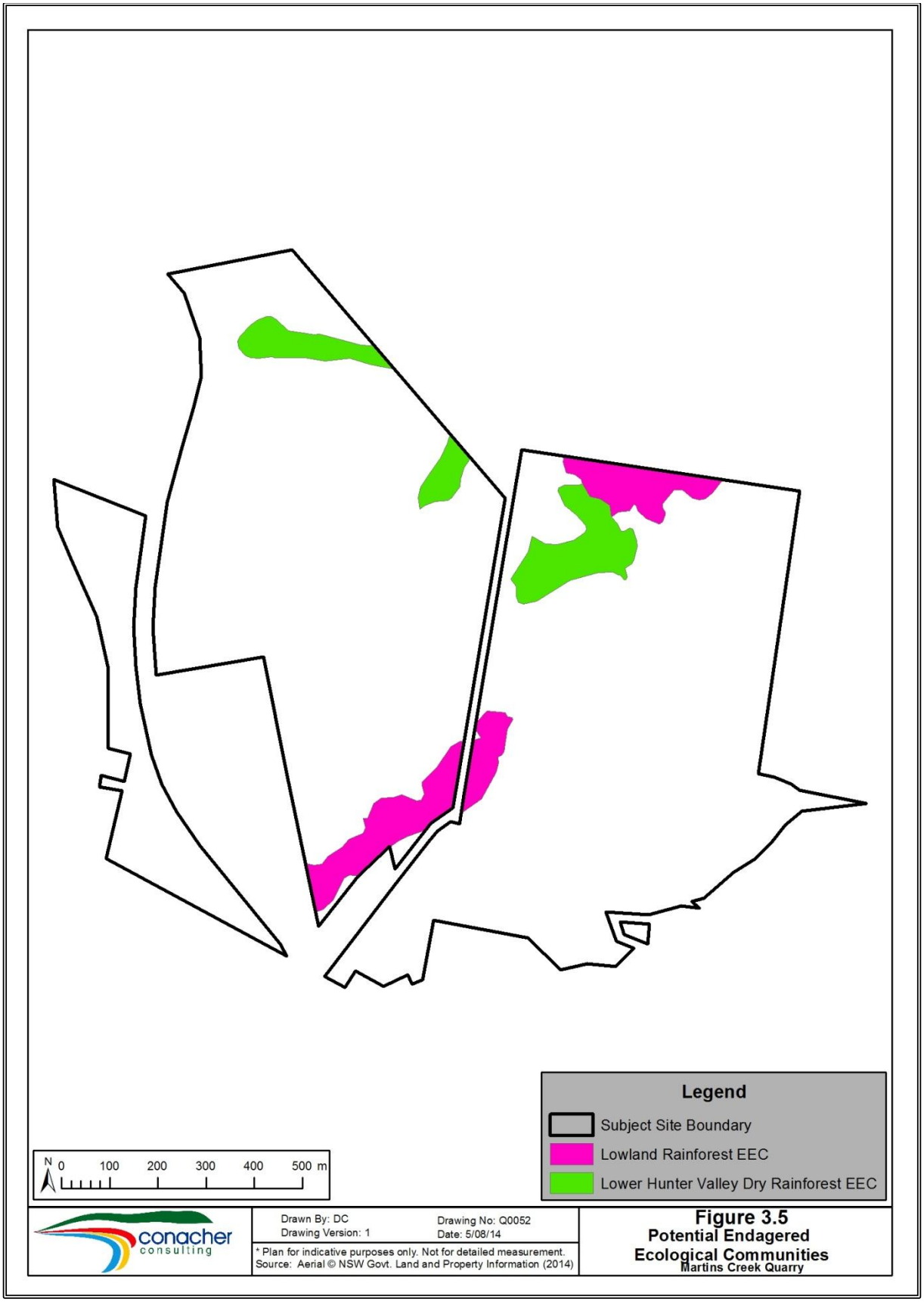


Figure 3.5
Potential Endagered Ecological Communities
Martins Creek Quarry

Endangered Populations

The endangered populations are listed within the local government and/or the hunter catchment area are listed in Table 3.2.

TABLE 3.2
ENDANGERED POPULATIONS OF THE AREA

Endangered Population	Comments
Acacia pendula population in the Hunter catchment	No suitable habitat present.
Broad-toothed Rat at Barrington Tops in the local government areas of Gloucester, Scone and Dungog	No suitable habitat present.
Cymbidium canaliculatum population in the Hunter Catchment	No suitable habitat present.
Eucalyptus camaldulensis population in the Hunter catchment	No suitable habitat present.

The site does not contain suitable habitat for a locally occurring endangered populations.

Threatened Flora Species

A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2014a) was undertaken to identify records of threatened flora species located within 20km of the site. This allowed for a specific search for threatened flora to be undertaken determining if any threatened flora species were present within the subject site. Details on threatened flora species in the *TSC Act* (1995) and the *EP&BC Act* (1999) with a known or possible occurrence within the local area are provided in Table 3.3.

TABLE 3.3
THREATENED FLORA SPECIES OF THE AREA

Scientific Name	TSC Act	EP&BC Act	Growth Form And Habitat Requirements	Habitat Suitability
Asperula asthenes	V	V	Decumbent perennial herb, trailing to 30cm. Grows in damp sites along river banks from Taree to Bulahdelah.	No suitable habitat present.
Cynanchum elegans	E	E	Climber or twiner to 1 m. Grows in rainforest gullies, scrub & on scree slopes.	Suitable habitat present.
Eucalyptus glaucina	V	V	Tree to 30m. Grows in several habitats including shallow soils or stony hillsides (not on poor sandstone), grassy woodland on deep, moderately fertile with moist soils and on gentle slopes near drainage lines in alluvial and clayey soils.	Suitable habitat present.
Eucalyptus largeana	E	-	Tree to 40m. Occurs in wet forest on sub-coastal ranges. Confined to the Gloucester-Craven district and near Pokolbin (NSW OEH 2014).	Suitable habitat present.
Grevillea parviflora subsp. parviflora	V	V	Open to erect shrub to 1 metre. Grows in heathy woodland on light clayey soils and may have an affinity with disturbance margins (NSW NPWS 2002).	Suitable habitat present.
Maundia triglochinoides	V	-	A perennial rhizomatous herb growing in swamp, creek and wetland habitats on deep heavy low nutrient clays soils.	Suitable habitat present.
Persicaria elatior	V	-	An erect herb to 90cm, growing in damp places especially beside streams and lakes, and occasionally in swamp forest or associated with disturbance.	No suitable habitat present.

TABLE 3.3 THREATENED FLORA SPECIES OF THE AREA				
Scientific Name	**TSC Act**	**EP&BC Act**	**Growth Form And Habitat Requirements**	**Habitat Suitability**
Rutidosis heterogama	V	V	Small perennial herb to 30cm tall. Grows in heaths in clay soils and has been recorded along disturbed roadsides (Harden 1994).	Suitable habitat present.
Syzygium paniculatum	E	V	Small tree. Subtropical and littoral rainforest on sandy soil (Fairley and Moore 1995).	Suitable habitat present.
Key to TSC Act and EP&BC Act Status Ext = Extinct P. Ext = Presumed Extinct CE = Critically Endangered E = Endangered V = Vulnerable Species				

There are previous records for *Eucalyptus glaucina* within the subject site (Ecotone Ecological Consultants 2010). The subject site provides suitable habitat for a number of threatened flora species.

Further surveys are required to determine whether any of these species are present or are likely to occur within the subject site.

Threatened Fauna Species

A search of the Bionet Atlas of NSW Wildlife (NSW OEH 2013a) was undertaken to identify records of threatened fauna species located within 10km of the site.

This allowed for a specific search for threatened flora to be undertaken determining if any threatened fauna species were present within the subject site. Details on threatened flora species in the *TSC Act* (1995) and the *EP&BC Act* (1999) with a known or possible occurrence within the local area are provided in Table 3.4.

TABLE 3.4 THREATENED FAUNA SPECIES OF THE AREA AND ASSESSMENT OF HABITAT SUITABILITY				
Common Name Scientific Name	**TSC Act**	**EP&BC Act**	**Preferred Habitat**	**Habitat Suitability**
Stuttering Frog *Mixophyes balbus*	E	V	Inhabits freshwater streams in undisturbed rainforest and wet sclerophyll forest (NSW OEH 2013).	Suitable habitat present (not recorded within 20km).
Green and Golden Bell Frog *Litoria aurea*	E	V	Breeding habitat consists of shallow (<1m) ponds or slowly moving waterways which undergo disturbance regimes such as fluctuating water flow or inflow of saline water with both areas of open water and dense low vegetation (NSW NPWS 1999).	Suitable habitat present.
Littlejohn's Tree Frog *Litoria littlejohni*	V	-	Inhabits permanent rocky streams with thick fringing vegetation associated with eucalypt woodlands and heaths among sandstone outcrops.	No suitable habitat present.
Pale-headed Snake *Hoplocephalus bitorquatus*	V	-	Arboreal species which occupies wet and dry sclerophyll forest, and open woodlands on floodplains and near watercourses. Dependant on old and dead standing trees with hollows and exfoliating bark for shelter sites (wilson and Knowles 1988).	Suitable habitat present.

TABLE 3.4 THREATENED FAUNA SPECIES OF THE AREA AND ASSESSMENT OF HABITAT SUITABILITY				
Common Name Scientific Name	**TSC Act**	**EP&BC Act**	**Preferred Habitat**	**Habitat Suitability**
Magpie Goose *Anseranas semipalmata*	V	-	A strongly nomadic species found in tropical through to sub-tropical wetlands, flood plains, large swamps, dams and wet grasslands with dense growths of rushes and sedges.	No suitable habitat present.
Blue-billed Duck *Oxyura australis*	V	-	Occurs mainly throughout the Murray-Darling basin in cool to warm temperate deep permanent freshwater lakes, lagoons and swamps with extensive reed-beds (Marchant and Higgins 1998).	No suitable habitat present.
Freckled Duck *Stictonetta naevosa*	V	-	Occurs mainly within the Murray-Darling basin and the channel country within large cool temperate to sub-tropical swamps, lakes and floodwaters with cumbungi, lignum or melaleucas (Marchant and Higgins 1998).	No suitable habitat present.
Wompoo Fruit-Dove *Ptilinopus magnificus*	V	-	Inhabits large undisturbed patches of lowland, adjacent highland rainforest and moist eucalypt forests feeding on fruit (Higgins and Davies 1996).	Suitable habitat present.
Rose-crowned Fruit-Dove *Ptilinopus regina*	V	-	Occurs in dense rainforests with a substantial understorey where it feeds entirely on fruit (Higgins and Davies 1996).	Suitable habitat present.
Black-necked Stork *Ephippiorhynchus asiaticus*	E	-	Prefers shallow, permanent, freshwater terrestrial wetlands, and surrounding marginal vegetation, including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters and adjacent habitats. Also forages within estuaries and along intertidal shorelines, such as saltmarshes, mudflats and sandflats, and mangrove vegetation (Marchant and Higgins 1990).	No suitable habitat present.
Australasian Bittern *Botaurus poiciloptilus*	E	E	Inhabits shallow freshwater or brackish wetlands with tall dense beds of reeds, sedges or rush species and swamp edges. Distribution Limit - N-North of Lismore. S- Eden.	No suitable habitat present.
Black Bittern *Ixobrychus flavicollis*	V	-	Prefers permanent freshwater wetlands with tall, dense vegetation (Lindsey 1992).	No suitable habitat present.
Square-tailed Kite *Lophoictinia isura*	V	-	Utilises mostly coastal and sub-coastal open forest, woodland or lightly timbered habitats and inland habitats along watercourses and mallee that are rich in passerine birds.	Suitable habitat present.
Spotted Harrier *Circus assimilis*	V	-	Occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. Also inhabits agricultural land and forages over open habitats including edges of inland wetlands.	Suitable habitat present.

TABLE 3.4 THREATENED FAUNA SPECIES OF THE AREA AND ASSESSMENT OF HABITAT SUITABILITY				
Common Name Scientific Name	**TSC Act**	**EP&BC Act**	**Preferred Habitat**	**Habitat Suitability**
Little Eagle *Hieraaetus morphnoides*	V	-	Inhabits a variety of habitats including woodland open forest, partially cleared areas, along watercourses and around wetlands (Marchant and Higgins 1993).	Suitable habitat present.
Eastern Osprey *Pandion cristatus*	V	-	Utilises waterbodies including coastal waters, inlets, lakes, estuaries and offshore islands with a dead tree for perching and feeding.	No suitable habitat present.
Black Falcon *Falco subniger*	V	-	Inhabits the inland regions of NSW. Most reports of Black Falcons on the tablelands and coast of NSW are likley to be referrable to the Brown Falcon (NSW Scientific Committee 2013)	No suitable habitat present.
Grey Falcon *Falco hypoleucos*	E	-	Occurs over mainly inland drainage systems of open plains and lightly timbered country including the acacia scrub, spinifex and tussock grasslands.	No suitable habitat present.
Bush Stone-curlew *Burhinus grallarius*	E	-	Utilises open forests, savannah woodlands, dune scrub, savannah and mangrove fringes (Marchant and Higgins 1993).	Suitable habitat present.
Comb-crested Jacana *Irediparra gallinacea*	V	-	Deep and permanent vegetation-choked tropical and warm temperate wetlands (Marchant and Higgins 1993).	No suitable habitat present.
Gang-gang Cockatoo *Callocephalon fimbriatum*	V	-	Prefers wetter forests and woodlands from sea level to > 2000m on Divide, timbered foothills and valleys, timbered watercourses, coastal scrubs, farmland and suburban gardens (Higgins 1999).	Suitable habitat present.
Glossy Black-Cockatoo *Calyptorhynchus lathami*	V	-	Open forests with *Allocasuarina* species and hollows for nesting (Higgins 1999).	Suitable habitat present.
Swift Parrot *Lathamus discolor*	E	E	Within NSW inhabits eucalypt forests and woodlands with winter flowering eucalypts (Saunders and Tzaros 2011).	Suitable habitat present.
Turquoise Parrot *Neophema pulchella*	V	-	Inhabits coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands (Higgins 1999).	Suitable habitat present.
Little Lorikeet *Glossopsitta pusilla*	V	-	Inhabits forests and woodlands feeding mostly on nectar and pollen particularly in profusely-flowering eucalypts (Courtney and Debus 2006).	Suitable habitat present.
Barking Owl *Ninox connivens*	V	-	Inhabits principally woodlands but also open forests and partially cleared land and utilises hollows for nesting (Higgins 1999).	Suitable habitat present.
Powerful Owl *Ninox strenua*	V	-	Mature forests containing large hollows for breeding & densely vegetated gullies for roosting (Higgins 1999).	Suitable habitat present.
Masked Owl Tyto novaehollandiae	V	-	Open forest & woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting (Higgins 1999).	Suitable habitat present.

TABLE 3.4 THREATENED FAUNA SPECIES OF THE AREA AND ASSESSMENT OF HABITAT SUITABILITY				
Common Name Scientific Name	**TSC Act**	**EP&BC Act**	**Preferred Habitat**	**Habitat Suitability**
Eastern Grass Owl *Tyto longimembris*	V	-	Inhabits grassland, coastal heath and lignum swamps, sheltering in dense grass tussocks by day (Higgins 1999).	Suitable habitat present.
Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae*	V	-	Occupies open Eucalypt woodlands lacking a dense understorey with fallen dead timber (Higgins *et al*., 2001).	Suitable habitat present.
Speckled Warbler *Chthonicola sagittata*	V	-	Found in temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts (Higgins and Peter 2002).	Suitable habitat present.
Regent Honeyeater *Anthochaera phrygia*	CE	E	Found in temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts (Higgins e*t al.*, 2001).	Suitable habitat present.
White-fronted Chat *Epthianura albifrons*	V	-	Found in estuarine and marshy and damp open grassland habitats on the coast and open grassy plains, saltlakes and saltpans that are along the margins of rivers and waterways in inland areas (Higgins et al., 2001).	No suitable habitat present.
Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis*	V	-	Found in dry open forests, woodland scrubland, and farmland with isolated trees. Occurs mostly west of the Great Divide except Hunter Valley (Higgins and Peter 2002).	Suitable habitat present.
Varied Sittella *Daphoenositta chrysoptera*	V	-	Prefers open eucalypt woodlands and forests, mallee, inland acacia, coastal tee-tree scrubs, parks and gardens (Higgins and Peter 2002).	Suitable habitat present.
Olive Whistler *Pachycephala olivacea*	V	-	Tall wet forest, woodlands and alpine heaths.	Suitable habitat present.
Hooded Robin (south-eastern form) *Melanodryas cucullata cucullata*	V	-	Found in Eucalypt woodlands, Acacia scrubland, open forest, and open areas adjoining large woodland blocks, with areas of dead timber (Higgins and Peter 2002).	Suitable habitat present.
Scarlet Robin *Petroica boodang*	V	-	Dry eucalypt forest and woodlands with open understorey during breeding season, dispersing during autumn–winter into open habitats including urban areas (Higgins and Peter 2002).	Suitable habitat present.
Flame Robin *Petroica phoenicea*	V	-	Upland moist Eucalypt forests and woodlands during breeding season, disperses to open lowland habitats during winter (Higgins and Peter 2002).	Suitable habitat present.

TABLE 3.4 THREATENED FAUNA SPECIES OF THE AREA AND ASSESSMENT OF HABITAT SUITABILITY				
Common Name Scientific Name	**TSC Act**	**EP&BC Act**	**Preferred Habitat**	**Habitat Suitability**
Diamond Firetail *Stagonopleura guttata*	V	-	Found in Eucalypt woodlands, forests and mallee where there is grassy understorey west of the Great Div. also drier coastal woodlands (Higgins *et al*., 2006).	Suitable habitat present.
Spotted-tailed Quoll *Dasyurus maculatus*	V	E	Inhabits a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Shelters in hollow-bearing trees, fallen logs, small caves and rock crevices (NSW NPWS 1999).	Suitable habitat present.
Brush-tailed Phascogale *Phascogale tapoatafa*	V	E	A largely arboreal mammal of open forests and woodlands using hollows as nesting in hollow bearing trees.	Suitable habitat present.
Koala *Phascolarctos cinereus*	V	V	Inhabits both wet & dry eucalypt forest on high nutrient soils containing preferred feed trees (Reed *at al*., 1991).	Suitable habitat present.
Eastern Pygmy-possum *Cercartetus nanus*	V	-	Found in a variety of habitats from rainforest through open forest to heath. Feeds on insects but also gathers pollen from banksias, eucalypts and bottlebrushes. Nests in banksias and myrtaceous shrubs (Turner and Ward 1995).	No suitable habitat present.
Yellow-bellied Glider *Petaurus australis*	V	-	Inhabits tall mature eucalypt forests with high nectar producing species and shelters in large hollow bearing trees (Goldingay and Kavanagh 1991).	Suitable habitat present.
Squirrel Glider *Petaurus norfolcensis*	V	-	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and coastal forest with heath understorey. Shelters in tree hollows (Suckling 1995).	Suitable habitat present.
New Holland Mouse Pseudomys novaehollandiae	-	V	Within NSW occurs in a variety of structural vegetation types including heathland and woodland, dry sclerophyll forest with a dense shrub layer and on vegetated sand dunes (Wilson and Laidlaw 2003).	No suitable habitat present.
Grey-headed Flying-fox *Pteropus poliocephalus*	V	V	Found in a variety of habitats including rainforest, mangroves, paperbark swamp, wet and dry open forest and cultivated areas. Forms camps commonly found in gullies and in vegetation with a dense canopy (Tidemann 1995).	Suitable habitat present.
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*	V	-	Inhabits wet and dry sclerophyll forest, open woodland, shrubland, mallee, grassland and desert. Roosts in tree hollows (Churchill 2008).	Suitable habitat present.

TABLE 3.4 THREATENED FAUNA SPECIES OF THE AREA AND ASSESSMENT OF HABITAT SUITABILITY				
Common Name Scientific Name	**TSC Act**	**EP&BC Act**	**Preferred Habitat**	**Habitat Suitability**
Eastern Freetail-bat *Mormopterus norfolkensis*	V	-	Inhabits eucalypt forest and woodland on the coastal side of the Great Dividing Range. Roosts in tree hollows, under bark and in various man-made structures (Churchill 2008).	Suitable habitat present.
Large-eared Pied Bat *Chalinolobus dwyeri*	V	V	Warm-temperate to subtropical dry sclerophyll forest and woodland. Roosts in caves, tunnels and tree hollows in colonies (Churchill 2008).	Suitable habitat present.
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	V	-	Inhabits wet sclerophyll forest, open forest, rainforest and coastal mallee. Roosts mostly in roosts in hollow trunks of eucalypts but also in caves and man-made structures (Churchill 2008).	Suitable habitat present.
Golden-tipped Bat *Kerivoula papuensis*	V	-	Inhabits rainforest and adjoining moist open forest habitats. Roosts in tree hollows and dense vegetation (Churchill 2008).	Suitable habitat present.
Little Bentwing-bat *Miniopterus australis*	V	-	Inhabits rainforest, vine thicket, wet and dry melaleuca swamps and coastal forests. Roosts in caves, man-made structures such as abandoned mines and buildings and occasionally banana trees and tree hollows (Churchill 2008).	Suitable habitat present.
Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*	V	-	Inhabits rainforest, wet and dry sclerophyll forest, open woodland, Melaleuca forests and open grassland. Roosts in caves and man-made structures (Churchill 2008).	Suitable habitat present.
Southern Myotis *Myotis macropus*	V	-	Roosts in caves, mines, tunnels, buildings, tree hollows and under bridges. Forages over open water (Churchill 2008).	Suitable habitat present.
Greater Broad-nosed Bat *Scoteanax rueppellii*	V	-	Inhabits moist gullies in mature coastal forest, rainforest, open woodland, Melaleuca swamp woodland, wet and dry sclerophyll forest, cleared areas with remnant trees and tree-lined creeks in open areas. Roosts in tree hollows, cracks and fissures in trunks and dead branches, under exfoliating bark, and in man-made structures (Churchill 2008).	Suitable habitat present.
Eastern Cave Bat *Vespadelus troughtoni*	V	-	Roosts in caves and rock overhangs, and is primarily found in areas containing sandstone or volcanic rock escarpments. Inhabits mixed woodland and wet and dry sclerophyll forest along the coast and the Great Dividing Range. Is found in drier forest on the western slopes and within inland areas (Churchill 2008).	Suitable habitat present.
Ext = Extinct P. Ext = Presumed Extinct CE = Critically Endangered E = Endangered V = Vulnerable Species				

There are previous records for the following threatened fauna species within the subject site (Ecotone Ecological Consultants 2010):

- Speckled Warbler
- Powerful Owl
- Koala
- Grey-headed Flying-fox
- East-coast Freetail Bat
- Eastern Bentwing-bat
- Little Bentwing-bat
- Yellow-bellied Sheathtail-bat
- Greater Broad-nosed Bat (possible record only)

The subject site provides suitable habitat for a number of threatened flora species. Further surveys are required to determine whether these species are currently present or are likely to occur within the subject site.

3.5 Critical Habitats

The subject site does not contain or adjoin an area classed as critical habitat within the provisions of the *Threatened Species Conservation Act* (1995).

3.6 Listed Migratory Species

A search of the EP&BC Act Protected Matters Search Tool (SEWPaC 2013) was conducted for migratory fauna listed within the *EP&BC Act* (1999) recorded within 10 km of the subject site. This revealed a number of listed migratory species that may be present in the area. Details on migratory fauna species with a known or possible occurrence within the local area are provided in Table 3.5.

TABLE 3.5
LISTED MIGRATORY TERRESTRIAL FAUNA SPECIES OF THE AREA

Common Name ***Scientific Name***	**Preferred Habitat**	**Comments**
Fork-tailed Swift (*Apus pacificus*)	Almost exclusively aerial.	Suitable habitat present.
Great Egret (*Ardea modesta*)	Wetland and estuarine habitats.	No suitable habitat present.
Cattle Egret (*Ardea ibis*)	Grazing lands and wetland habitats.	Suitable habitat present.
White-bellied Sea-eagle (*Haliaeetus leucogaster*)	Coastal areas and inland rivers and water bodies.	Suitable habitat present.
White-throated Needletail (*Hirundapus caudacutus*)	Almost exclusively aerial.	Suitable habitat present.
Rainbow Bee-eater (*Merops ornatus*)	Open, cleared or lightly timbered areas particularly in close proximity to water bodies.	Suitable habitat present.
Black-faced Monarch (*Monarcha melanopsis*)	Wet sclerophyll and rainforest vegetation.	Suitable habitat present.
Spectacled Monarch (*Monarcha trivirgatus*)	Inhabits rainforest, wet sclerophyll forest and mangrove vegetation. North distributional limit is Central Coast NSW.	Suitable habitat present.
Satin Flycatcher (*Myiagra cyanoleuca*)	Heavily vegetated forests. When migrating may be found in more open coastal	Suitable habitat present.

TABLE 3.5 LISTED MIGRATORY TERRESTRIAL FAUNA SPECIES OF THE AREA		
Common Name ***Scientific Name***	**Preferred Habitat**	**Comments**
	habitats.	
Rufous Fantail (*Rhipidura rufifrons*)	Wet sclerophyll and rainforest vegetation.	Suitable habitat present.
Latham's Snipe (*Gallinago hardwickii*)	Low dense vegetation within and surrounding freshwater wetlands.	No suitable habitat present.
Painted Snipe	Shallow freshwater wetlands, and adjoining grassy areas.	No suitable habitat present.

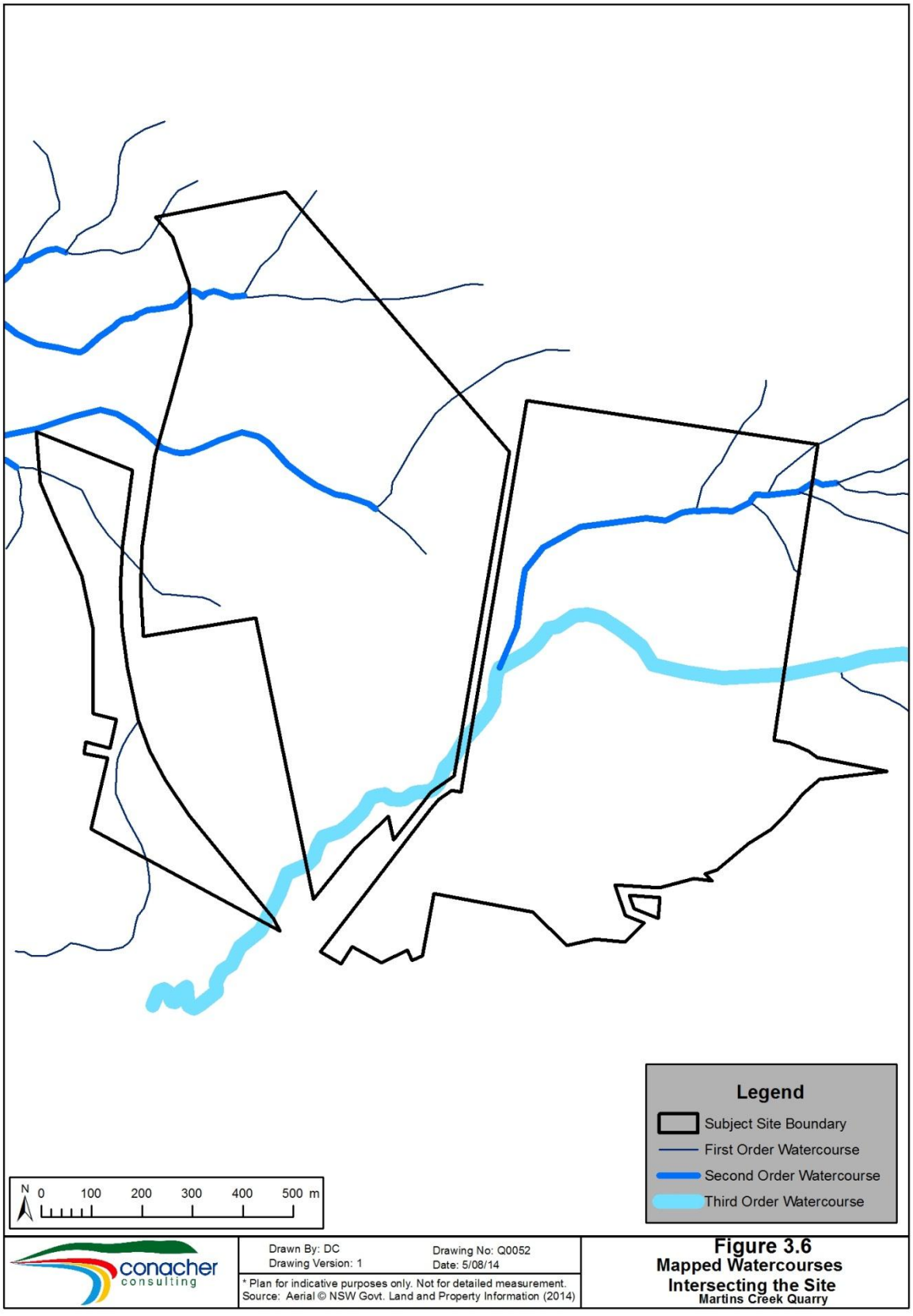
The Black-faced Monarch and Rufous Fantail have been previously recorded within the subject site. The subject site provides suitable habitat for a number of nationally listed migratory species. Further surveys are required to determine whether these species are present or are likely to occur within the subject site.

3.7 Habitat Linkages

The existing quarry site is located on the side slope of a local ridgeline which contains remnant native vegetation. The vegetation present has some connectivity to vegetation further to the south-east of the site in areas of similar topography.

3.8 Aquatic and Riparian Habitats

The site contains the upper heads of two unnamed watercourses which flow to the Paterson River. These watercourses are formed from several smaller first and second order watercourses as shown in Figure 3.6.



4. CONCLUDING COMMENTS

Based on the preliminary field survey and information provided in this report it is concluded that:

i. The subject site provides suitable habitats for a range of threatened species listed within the *TSC Act* (1995) and/or the *EP&BC Act* (1999);

ii. The subject site does not contain suitable habitat for endangered populations listed within the *TSC Act* (1995) and/or the *EP&BC Act* (1999);

iii. The endangered ecological communities (EECs), 'Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions; and 'Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion' have been mapped within the subject site. Further surveys are required to determine if these EECs are present within the subject site.

iv. The subject site provides suitable habitat for several migratory species listed within the *EP&BC Act* (1999);

v. Detailed seasonal biodiversity surveys should be undertaken in accordance with the relevant Field Survey Methods and Flora and Fauna Survey Guidelines (OEH 2013; DECC 2009; DECC 2004) to provide appropriate detail for future assessment under the *EP&A Act* (1979) or the *EP&BC Act* (1999).

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7. REFERENCES

Blakers, M, Davies, S and Reilly, PN 1984, *The Atlas of Australian Birds,* RAOU Melbourne University Press.

Cogger, HG 2000, R*eptiles and Amphibians of Australia, Sixth* Edition, Reed New Holland, Frenchs Forest NSW.

Courtney, J & Debus, SJS 2006, 'Breeding habits and conservation status of the Musk Lorikeet *Glossopsitta concinna* and Little Lorikeet *G. pusilla* in Northern New South Wales', *Australian Field Ornithology,* 23, 109-124.

Department of Environment and Conservation 2004, Threatened Biodiversity Survey and Assessment; Guidelines for Developments and Activities (Working Draft). Department of Environment and Conservation NSW.

Ecotone Ecological Consultants 2011. Flora and Fauna Impact Assessment for Proposed New Sedimentation Structures at Martins Creek Quarry, Dungog LGA. Unpublished Report for RailCorp.

Edgar, R 1988, 'Tiger Quoll *Dasyurus maculatus'*, in *The Australian Museum Complete Book of Australian Mammals,* Strahan R (ed.), Angus and Robertson, Sydney.

Fairley, A & Moore, P 1995, *Native Plants of the Sydney District*, Kangaroo Press.

Garnett, ST & Crowley, GM 2000, T*he Action Plan for Australian Birds 2000*, (Natural Heritage Trust), Environment Australia Canberra ACT.

Goldingay, RL & Kavanagh, RP 1991, 'The Yellow-bellied Glider: a review of its ecology and management considerations', *In Conservation of Australia's Forest Fauna,*Lunney, D (Ed.), The Royal Zoological Society of New South Wales, Sydney, pp. 365-375.

Harden, GJ 1994, *Flora of New South Wales,* Vols 1-4 & supplements, Royal Botanic Gardens, New South Wales University Press, Kensington NSW.

Henderson, LE 2000, *Soil Landscapes of the Dungog 1:100 000 Sheet Report*, Department of Land and Water Conservation, Sydney.

Higgins, PJ & Davies SJJF (eds) 1996, *Handbook of Australian, New Zealand and Antarctic Birds,* Volume 3 - Snipe to Pigeons, Oxford University Press, Melbourne.

Higgins, PJ & Peter, JM (eds) 2002, *Handbook of Australian New Zealand and Antartic Birds*, Volume 6: Pardalotes to shrike-thrushes. Oxford University Press, Melbourne.

Higgins, PJ (ed) 1999, *Handbook of Australian, New Zealand and Antarctic Birds, Volume 4 - Parrots to Dollarbird,* Oxford University Press, Melbourne.

Higgins, PJ, Peter, JM & Steel, WK (eds) 2001, *Handbook of Australian New Zealand and Antartic Birds, Volume 5: Tyrant-flycatchers to Chats,* Oxford University Press, Melbourne.

Higgins, PJ, Peter, JM & Cowling SJ (eds) 2006, *Handbook of Australian, New Zealand and Antarctic Birds, Volume 7 - Boatbill to Starlings,* Oxford University Press, Melbourne.

Law, BS & Chidel, M 2004, 'Roosting and foraging ecology of the golden-tipped bat (*Kerivoula papuensis*) on the south coast of New South Wales', *Wildlife Research*, 31, 73-82.

Lindsey, TR 1992, *Encyclopedia of Australian Animals - Birds,* Angus and Robertson Publishers, Sydney.

Marchant, S & Higgins, PJ (eds) 1990, *Handbook of Australian, New Zealand and Antarctic Birds, Volume 1 - Ratites to Ducks,* Oxford University Press, Melbourne.

Marchant, S and Higgins, PJ (eds) 1993, *Handbook of Australian, New Zealand and Antarctic Birds, Volume 2 - Raptors to Lapwings,* Oxford University Press, Melbourne.

NSW Department of Environment and Conservation 2004, *Threatened Biodiversity and Assessment: Guidelines for Developments and Activities (working draft)*, New South Wales Department of Environment and Conservation, Hurstville, NSW.

NSW National Parks and Wildlife Service 1999, *Green and Golden Bell Frog (Litoria aurea) Threatened Species Information*, NPWS Hurstville NSW.

NSW National Parks And Wildlife Service 1999, *Spotted-tailed Quoll (Dasyurus maculatus) Threatened Species Information*. NPWS Hurstville NSW.

NSW National Parks and Wildlife Service 2002, *Grevillea parviflora subsp. parviflora Threatened Species Information,* NPWS Hurstville NSW.

NSW Office of Environment and Heritage 2014, BioNet Atlas of NSW Wildlife, [Online] Available from: http://www.bionet.nsw.gov.au/

NSW Office of Environment and Heritage 2013, Field Survey Methods, [Online] Available from: http://www.environment.nsw.gov.au/threatenedspecies/surveymethodsfauna.htm

Reed, PC, Lunney, D & Walker, P 1991, 'A 1986-1987 survey of the Koala *Phascolarctos cinereus* (Goldfuss) in New South Wales and an ecological interpretation of its distribution', In: *Biology of the Koala*, Lee, AK, Handasyde KA & Sanson, GD (eds), Surrey Beatty and Sons, Chipping Norton, Sydney. Pp 55-73.

Saunders, DL & Tzaros, CL 2011, N*ational Recovery Plan for the Swift Parrot Lathamus discolor*, Birds Australia, Melbourne.

Suckling, GC 1995, 'Squirrel Glider (*Petaurus norfolcensis*)'. In *The Mammals of Australia,* Strahan, R (Ed.), Reed Books, Chatswood.

Tidemann, C 1995, 'Grey-headed Flying-fox *(Pteropus poliocephalus)'.* In *The Mammals of Australia, Strahan, R (Ed.), Reed Books, Chatswood.*

Turner, V & Ward, SJ 1995, 'Eastern Pygmy Possum (*Cercartetus nanus*)'. In *The Mammals of Australia*, Strahan, R (Ed.), Reed Books, Chatswood.

Umwelt 2009. Ecological Constraints Analysis, Martins Creek Quarry, Unpublished Report prepared by Umwelt (Australia) Pty Ltd for RailCorp.

Wilson, SK & Knowles DG 1988, *Australia's Reptiles; a photographic reference to the terrestrial reptiles of Australia,* Collins Publishers, Sydney.