W.A. LIMESTONE

EXTRACTIVE INDUSTRY LICENCE (EIL) SUPPORTING INFORMATION

Wattle Avenue Quarry

Lot 8 (No. 259) Wattle Avenue, Nowergup

PMR Quarries Pty Ltd T/A WA Limestone
401 Spearwood Ave, Bibra Lake WA
PO Box 1404 Bibra Lake WA 6595

Report: Rev 0 17 January 2020

EIL SUPPORTING INFORMATION

Wattle Avenue Quarry

Lot 8 (No. 259) Wattle Avenue, Nowergup

Prepared By:

PMR Quarries Pty Ltd T/A WA Limestone
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Document Control

Status	Date	Prepared	Checked	Authorised
Rev 0	17/01/2020	R Koufakis	R Stephens	D Della Bona

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1.0 BACKGROUND

PMR Quarries Pty Ltd T/A WA Limestone took ownership of Lot 8 (No. 259) Wattle Avenue, Nowergup in January 2018, with the intention of continuing quarry activities onsite in accordance with currently approvals granted for the site:

- Planning Approval - Extractive Industry, DA2013/663
  City of Wanneroo (31 January 2014; expiring on 31 January 2024)
- Extractive Industry Licence
  City of Wanneroo (31 January 2014; expiring on 31 January 2019)
- Approval to Commence Development - Extractive Industry, Limestone
  WA Planning Commission (13 March 2014)

WA Limestone has prepared this report to provide supporting information for the renewal of the Extractive Industry Licence, and to provide an overview and update on the status of operations at this site. The site has been operated previously on a campaign basis by a basic raw material contractor; however, is currently under care and maintenance while the transfer of land titles and various statutory approvals has been taking place. WA Limestone requests that the Extractive Industry Licence expiry date aligns with the Planning Approval (31 January 2024).

WA Limestone is family owned business and has operated a significant number of sand and limestone quarries across the Perth metropolitan area over the past 40 years. The company is accredited to international ISO standards 4801 (Health & Safety Management), 9001 (Quality Management) and 14001 (Environmental Management), and implements these recognised practices across all extractive industry sites.

When proposed activities recommence at Wattle Avenue Quarry the site will be managed and operated in accordance with WA Limestone's independently audited ISO 14001:2015 Environmental Management System (EMS), as well as relevant health and safety, and quality management system requirements.

The Department of Water and Environmental Regulation have issued a Prescribed Premises Licence (Licence No. L8605) for the crushing and screening of materials onsite. This licence was transferred to PMR Quarries Pty Ltd (WA Limestone) in May 2018.

State and Commonwealth Government approvals to allow for the clearing vegetation remain in place for the excavation areas as outlined in the Planning Approval.

This supporting documentation takes into consideration previous operations and activities conducted on site prior to PMR Quarries Pty Ltd taking ownership in January 2018.

WA Limestone commits to conduct future extractive operations at this site in accordance with all relevant planning approval and extractive industry licence conditions, licences and permits issued under the *Environmental Protection Act 1986* as well as the company's internal ISO accredited standards.

1.1 PROPONENT DETAILS

The proponent for this proposal is:
PMR Quarries Pty Ltd T/A WA Limestone (the registered Proprietor) of Lot 8 Wattle Avenue, Nowergup

Contact: Mr Roger Stephens
Street Address: 401 Spearwood Avenue, Bibra Lake WA 6163
Postal Address: PO Box 1404 Bibra Lake WA 6965
Phone : 08 9434 7700
Email Address: roger.s@walimestone.com

1.2 REQUESTED APPROVAL

The proponent is requesting an excavation licence with an expiry date which matches the current Planning Approval DA2013/663, expiring on the 31 January 2024. The excavation licence is for the excavation of limestone and some sand from the site to be used in the construction industry in the Perth metropolitan region.

This application represents an extension of the previously approved extractive industry that has been conducted on Lot 8 Wattle Avenue. The proposal that is the subject of this application will be conducted in accordance with the previous methods which were compliant with the existing approval conditions.

Further details relating to the proposal are provided in Section 4.0 Future Works Program.

2.0 PREVIOUS ACTIVITIES

As outlined above, WA Limestone took ownership of Wattle Avenue Quarry in January 2018. Prior to this time the site was managed and operated by a recognised basic raw material contractor, Oakford Land Company Pty Ltd.

WA Limestone has endeavoured to obtain relevant detail, where possible, regarding previous operations for the purpose of preparing this report.

The site has operated previously under the Department of Water and Environmental Regulation Prescribed Premises Licence No. L8605, as required by the *Environmental Protection Act 1986,* for the crushing and screening of materials onsite. This licence has now been transferred to PMR Quarries Pty Ltd (WA Limestone).

A site survey, provided as Appendix 1, was undertaken recently by WA Limestone to show detail of previous excavation activity and current ground levels.

In some instances, limited records have been provided by the previous operator so WA Limestone has used best available information and knowledge to complete the Compliance Table in the Compliance Report from December 2019 (see Appendix 2).

3.0 CURRENT STATUS

The site is currently under care and maintenance, while the transfer of land titles and various statutory approvals has been taking place, with the intention to recommence activities in 2020.

The site survey (Appendix 1) was completed in October 2018 to show areas of previous activity and current ground contours, in particular the depth of excavations to date. This image provides detail of the various areas used for quarrying activities, including:

- Excavation - open pit.
- Hardstand area - for crushing/processing activities.
- Laydown and storage area - for the storage of associated plant and equipment.
- Tracks - internal access roads.

Figures 1 and 2, below, are photos taken recently onsite.

Figure 1. Hardstand Area

Figure 2. Excavation pit

The Compliance Table in the Compliance Report (December 2019) in Appendix 2 provides detail on the compliance to each condition of Planning Approval and gives an overview of the current site disturbance.

4.0 FUTURE WORKS PROGRAM

WA Limestone intends to develop and operate the site in 2020. No changes to operations are proposed at this time and all ongoing future works will be undertaken in accordance with:

- Planning Approval - Extractive Industry, DA2013/663
  City of Wanneroo (see Appendix 3)
- Extractive Industry Licence renewal
  City of Wanneroo (see Appendix 4 for original approved EIL)
- Approval to Commence Development - Extractive Industry, Limestone
  WA Planning Commission
- Extractive Industries Local Law 1998
  City of Wanneroo
- Prescribed Premises Licence (Licence No. L8605)
  Department of Water and Environmental Regulation
- Vegetation Clearing Permit (Permit No. CPS 4924/3) (as amended)

Department of Water and Environmental Regulation

- EPBC Approval (EPBC No. 2013/6767)
  Department of the Environment and Energy
- All other relevant legislative requirements where applicable.

The purpose of this supporting documentation is to provide the City with the information for the assessment and renewal of the Extractive Industry Licence at Lot 8, Wattle Avenue, Nowergup. The site is proposed to operate for at least 20 years, with the expiry date of the current Planning Approval set at 31 January 2024. WA Limestone requests that the Extractive Industry Licence expiry date aligns with this expiry date for ease of renewing and reporting.

Information relating to the site details can be seen within Section 2 of the Aurora Environmental 'Application for Industry Extraction, Lot 8 Wattle Avenue, Nowergup' (May 2013) (see Appendix 5).

The timing and stages of the excavations can be seen in Figures 1, 2 and 3 in the Aurora Environmental response to the City of Wanneroo (dated 1 November 2013) (see Appendix 6). Only a small amount of extra clearing has been done within the 'Year 5 – 7' and 'Year 7 – 10' sections by the previous proponent, Oakford Land Company Pty Ltd. In addition, planning and operations information can be seen within Section 4 of the Aurora Environmental 'Application for Industry Extraction, Lot 8 Wattle Avenue, Nowergup' (May 2013) (see Appendix 5).

Section 5 of the Aurora Environmental 'Application for Industry Extraction, Lot 8 Wattle Avenue, Nowergup' (May 2013) covers the management of clearing and rehabilitation of the site (please refer to the document in Appendix 5 for more details).

The overarching management of the environment is covered in the 'Limestone Excavation and Rehabilitation Management Plan, Limestone Quarry, Lot 8, Wattle Avenue, Nowergup' (see Appendix 7) prepared by Landform Research in 2007 which was referred to in the original Extractive Industry Licence application (Aurora Environmental, 2013). Management of clearing (and rehabilitation) in relation to the EPBC Act approval can be reviewed in the Clearing and Rehabilitation Management Plan (CRMP) by Strategen (December 2014) (see Appendix 8).

As outlined above, WA Limestone is an experienced operator of limestone quarries in the Perth area. Wattle Avenue Quarry will be managed and operated in accordance with the company's ISO 14001 accredited Environmental Management System which assists in ensuring that all statutory approvals and legislative requirements are monitored and complied with on an ongoing basis.

5.0 REFERENCES

Aurora Environmental 2013, *Application for Industry Extraction, Lot 8 Wattle Avenue, Nowergup*, report prepared for Oakford Land Company, Western Australia.

Aurora Environmental 2013. *RE: Development Application and Extractive Industry Licence Application - LOT 8 (No. 259) Wattle Avenue, Nowergup*. Response prepared for the Oakford Land Company in response to the City of Wanneroo submissions received during the advertising period for the proposed extractive industry on Lot 8 Wattle Avenue, Nowergup.

Landform Research 2007, *Limestone Excavation and Rehabilitation Management Plan, Limestone Quarry, Lot 8, Wattle Avenue, Nowergup*, report prepared for Oakford Land Company, Western Australia.

Strategen 2014, *Lot 8 Wattle Avenue Nowergup, Clearing and Rehabilitation Management Plan*, report prepared for Oakford Land Company, Western Australia.

Appendix 1
Site Survey

382,700mE 382,800mE 382,900mE 383,000mE 383,100mE 383,200mE

6,497,300mN

6,497,200mN

6,497,100mN

6,497,000mN

EDGE OF CLEARING

LIMESTONE EXCAVATION PIT

EDGE OF CLEARING

LIMESTONE ROAD

Lot 8
54.18ha

Site Survey
Wattle Avenue (West) Quarry
Lot 8 Wattle Avenue West, Nowergup
DATE: 25 October 2018
DATUM: GDA 1994 MGA Zone 50 / AHD

W.A. LIMESTONE

NORTH

10 5 0 10 20 30 40 50 m

Scale at A3: 1:1,500

Appendix 2

Wattle Ave Quarry Compliance Report
December 2019

W.A. LIMESTONE

COMPLIANCE REPORT

Wattle Avenue Quarry

Lot 8 (No. 259) Wattle Avenue, Nowergup

PMR Quarries Pty Ltd T/A WA Limestone
401 Spearwood Ave, Bibra Lake WA
PO Box 1404 Bibra Lake WA 6595

Report: Rev3

10th December 2019

COMPLIANCE REPORT

Wattle Avenue Quarry

Lot 8 (No. 259) Wattle Avenue, Nowergup

Prepared By:

PMR Quarries Pty Ltd T/A WA Limestone
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Rev 3	10/12/2019	C McDonald	R Stephens	D Della Bona

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Attachment 1: Site Survey

APPENDICES

Appendix 1: Compliance Table

1.0 BACKGROUND

PMR Quarries Pty Ltd T/A WA Limestone took ownership of Lot 8 (No. 259) Wattle Avenue, Nowergup in January 2018, with the intention of continuing quarry activities onsite in accordance with currently approvals granted for the site:

- Planning Approval - Extractive Industry, DA2013/663
  City of Wanneroo (31 January 2014)
- Extractive Industry Licence
  City of Wanneroo (31 January 2014)
- Approval to Commence Development - Extractive Industry, Limestone
  WA Planning Commission (13 March 2014)

WA Limestone has prepared this Compliance Report to meet the requirements of Condition 1 a) of the City's Planning Approval, and to provide an overview and update on the status of operations at this site. The site has been operated previously on a campaign basis by a basic raw material contractor however is currently under care and maintenance while the transfer of land titles and various statutory approvals has been taking place.

WA Limestone is family owned business and has operated a significant number of sand and limestone quarries across the Perth metropolitan area over the past 40 years. The company is accredited to international ISO standards 4801 (Health & Safety Management), 9001 (Quality Management) and 14001 (Environmental Management), and implements these recognised practices across all extractive industry sites.

When proposed activities recommence at Wattle Avenue Quarry the site will be managed and operated in accordance with WA Limestone's independently audited ISO 14001:2015 Environmental Management System (EMS), as well as relevant health and safety, and quality management system requirements.

The Department of Water and Environmental Regulation have issued a Prescribed Premises Licence (Licence No. L8605) for the crushing and screening of materials onsite. This licence was transferred to PMR Quarries Pty Ltd (WA Limestone) in May 2018.

State and Commonwealth Government approvals to allow for the clearing vegetation remain in place for the excavation areas as outlined in the Planning Approval.

This Compliance Report takes into consideration previous operations and activities conducted on site prior to PMR Quarries Pty Ltd taking ownership in January 2018.

WA Limestone commits to conduct future extractive operations at this site in accordance with all relevant planning approval and extractive industry licence conditions, licences and permits issued under the *Environmental Protection Act 1986* as well as the company's internal ISO accredited standards.

2.0 PREVIOUS ACTIVITIES

As outlined above, WA Limestone took ownership of Wattle Avenue Quarry in January 2018. Prior to this time the site was managed and operated by a recognised basic raw material contractor.

WA Limestone has endeavoured to obtain relevant detail, where possible, regarding previous operations for the purpose of preparing this report.

The site has operated previously under the Department of Water and Environmental Regulation Prescribed Premises Licence No. L8605, as required by the *Environmental Protection Act 1986,* for the crushing and screening of materials onsite. This licence has now been transferred to PMR Quarries Pty Ltd (WA Limestone).

A site survey, provided as Attachment 1, was undertaken recently by WA Limestone to show detail of previous excavation activity and current ground levels.

In some instances limited records have been provided by the previous operator so WA Limestone has used best available information and knowledge to complete the Compliance Table (Appendix 1).

3.0 CURRENT STATUS

The site is currently under care and maintenance, while the transfer of land titles and various statutory approvals has been taking place, with the intention to recommence activities in 2019.

The site survey (Attachment 1) was completed in October 2018 to show areas of previous activity and current ground contours, in particular the depth of excavations to date. This image provides detail of the various areas used for quarrying activities, including:

- excavation - open pit
- hardstand area - for crushing/processing activities
- laydown and storage area - for the storage of associated plant and equipment
- tracks - internal access roads

Figures 1 and 2 below are photos taken recently onsite.

Figure 1. Hardstand Area

Figure 2. Excavation pit

4.0 FUTURE WORKS PROGRAM

WA Limestone intends to develop and operate the site in 2019. No changes to operations are proposed at this time and all ongoing future works will be undertaken in accordance with:

- Planning Approval - Extractive Industry, DA2013/663
  City of Wanneroo
- Extractive Industry Licence
  City of Wanneroo
- Approval to Commence Development - Extractive Industry, Limestone
  WA Planning Commission
- Extractive Industries Local Law 1998
  City of Wanneroo
- Prescribed Premises Licence (Licence No. L8605)
  Department of Water and Environmental Regulation
- Vegetation Clearing Permit (Permit No. CPS 4924/2) (as amended)
  Department of Water and Environmental Regulation
- All other relevant legislative requirements where applicable

The purpose of this Compliance Report is to provide the City with an overview of previous and proposed future activities onsite, and to meet the requirements of Condition 1 of the City's Planning Approval DA2013/663.

The Compliance Table in Appendix 1 provides detail for each condition of this Planning Approval.

As outlined above, WA Limestone is an experienced operator of limestone quarries in the Perth area. Wattle Avenue Quarry will be managed and operated in accordance with the company's ISO 14001 accredited Environmental Management System which assists in ensuring that all statutory approvals and legislative requirements are monitored and complied with on an ongoing basis.

5.0 ACCESS AND FENCING

To date access to the site has been from Wattle Ave East as per the Development Approval (DA2013/663) advice note No.3. The first 100 metres of the access road from the intersection on Wattle Avenue East has been sealed with bitumen. Furthermore, engineering plans for Wattle Ave East have been submitted to the City's Engineering Department who has confirmed support of the proposed widening design. Construction of the Eastern upgrade is planned to be completed by late 2020.

The Wattle Ave West upgrade will be completed when the necessary Extractive Industry licence to operate is approved and design and engineering plans are satisfied. The upgrade works to Wattle Ave West will be undertaken in accordance with the City's requirements once the Extractive Industry Licence is approved and negotiations of the upgrade requirements are finalised. PMR Quarries intend to construct the upgrade according to the geometric road layout plans approved by the City 30 June 2009 (File Ref: R24/0008V01 (817711).

Suitable boundary fencing is in place on the western boundary of the site (see figure 4). The southern boundary was recently surveyed to install a new fence to an extent indicted on the fence site plan (to be installed early 2020), existing armour rock will also be maintained as a secondary barrier along this boundary line (figure 5). As shown on the photos labelled north boundary (figure 6), it is evident that a thick buffer of vegetation restricts access including a wall of armour rock, similarly, to the north east and eastern boundary dense vegetation with large scattered naturally occurring limestone rocks will inhibit access from vehicles and pedestrians. It is worth noting any fencing installation to the north, north east and eastern boundary would require unnecessary clearing of good quality native vegetation.

Figure 3 – Site Boundary

Figure 4 confirms the existing fence on the western boundary is in place and adequate for its purpose (photo taken 3 December 2019).

Figure 4 – Western Boundary Fence

Figure 5: Southern boundary fence survey peg.

The North boundary of the site is shown in the below figures, a thick buffer of vegetation and a high wall of armour rock will prevent access from pedestrians and vehicles.

Figure 6: Northern boundary – photo taken facing south

Figure 7: Northern boundary – photo taken facing north

Figure 8: Dense vegetation extends from the north east –east boundary

Attachment 1
Site Survey

382,700mE 382,800mE 382,900mE 383,000mE 383,100mE 383,200mE

6,497,300mN

6,497,200mN

6,497,100mN

6,497,000mN

EDGE OF CLEARING

LIMESTONE EXCAVATION PIT

EDGE OF CLEARING

LIMESTONE ROAD

Lot 8
54.18ha

Site Survey
Wattle Avenue (West) Quarry
Lot 8 Wattle Avenue West, Nowergup
DATE: 25 October 2018
DATUM: GDA 1994 MGA Zone 50 / AHD

W.A. LIMESTONE

NORTH

10 5 0 10 20 30 40 50 m

Scale at A3: 1:1,500

Appendix 2
Compliance Table

CITY OF WANNEROO PLANNING APPROVAL: EXTRACTIVE INDUSTRY - LOT 8 WATTLE AVENUE, NOWERGUP

REF: DA2013/663

Commencement Date: 31 January 2014; Expiry Date: 31 January 2024

Condition No.	Condition	Management Strategy	Actions undertaken previously	Actions proposed for future activities
1	Subject to the following paragraphs (a) and (b), this approval shall be for a total period of 10 years expiring on 31 January 2024, consisting of two consecutive 5 year periods from the date of issue.	• City's approval currently being sought to continue activities onsite for the second 5 year approval period, to 31 January 2024.	• None to date (by current landholder, WA Limestone).	• Future ongoing Planning Approvals to be applied for as needed.
1 a)	At least 12 months (but not more than 18 months) prior to the end of the first 5 year period of this approval (expiring on 31 January 2019), the landowner shall submit to the City of Wanneroo a report (Compliance Report) outlining compliance with the conditions subject to this approval.	• This Compliance Report is provided to meet the requirements of this condition.	• NA	• Future reporting requirements to be completed in accordance with Planning Approval conditions.
1 b)	With the aid of the Compliance Report (referred to in (i) above), the City shall within six months of receiving the Compliance Report, review the landowner's general compliance with these conditions (including compliance with any associated plan, permit or direction). If the Compliance Report is found to be satisfactory, or if the City does not complete a review within six months of receiving the Compliance Report, the second 5 year period of this approval will commence from the later date of either: • the expiry of the first five year period; or • the date 6 months from when the Compliance Report is submitted.	• This Compliance Report is provided to meet the requirements of this condition.	• NA	• Future reporting requirements to be completed in accordance with Planning Approval conditions.
2	Should the City form the view that the Compliance Report is not satisfactory or that the landowners compliance with these conditions is unsatisfactory, then the second 5 year period referred to in condition (1) above will not commence and all structures, plant, machinery, equipment and other material erected on the subject site shall be removed no later than 31 July 2016 (*date 5.5 years from approval*).	• Liaise with City with regard to the Compliance Report to ensure all requirements are fulfilled.	• NA	• Maintain ongoing communication with the City to meet all reporting and compliance requirements.

Condition No.	Condition	Management Strategy	Actions undertaken previously	Actions proposed for future activities
3	Notwithstanding conditions (1) and (2) above, if the development the subject of this approval is not substantially commenced within a period of 24 months from the date of approval, the approval shall lapse and be of no further effect. Where an approval has lapsed, no further development shall be carried out without the further approval of the City having first been sought and obtained.	• Development has substantially commenced.	• Site developed in accordance with relevant approval conditions.	• All future development onsite in compliance with conditions of Planning Approval.
4	Unless alternative hours are agreed to in writing by the City, the hours of operation for the approved development shall be as follows: a) Crushing shall be limited to 0700 - 1700 hours, Monday to Friday (excluding public holidays); b) Loading and movement of trucks into and out of the Site shall be limited to 0700 - 1700 hours, Monday to Friday and 0700 - 1200 on Saturday (excluding public holidays); and c) Clearing, establishment, excavation works and all other operations not referred to in paragraphs (a) and (b) shall be limited to 0700 - 1700 hours, Monday to Friday and 0700 - 1200 on Saturday (excluding public holidays). If at any time compliance with the *Environmental Protection (Noise) Regulations 1997* cannot be maintained; the operations on site shall immediately cease until such time that operations can comply with the aforementioned Regulations and (a) to (c) above.	• Operations conducted in accordance with approved Management Plans.	• Noise management strategies implemented by previous operator. • Not aware of any previous complaints received in relation to noise.	• Compliance with operational hours stated in this condition.
5	Within 3 months from the date of this approval (or an alternative time as agreed to in writing by the City), a revised Program and Operation Management Plan, Environmental Management Overview and Rehabilitation and Decommissioning Management Plan shall be submitted for endorsement by the City to supersede those previously provided. The revised Program and Operation Management Plan, Environmental Management Overview and Rehabilitation and Decommissioning Management Plan shall incorporate all additional plans and information required by the conditions outlined in this approval.	• Operations conducted in accordance with approved Management Plans.	• Operations conducted by previous operator.	• Management Plans are reviewed on a regularly basis to align with WA Limestone's (WAL's) ISO accredited Environmental Management System. • Operations conducted in accordance with approved Management Plans.

Condition No.	Condition	Management Strategy	Actions undertaken previously	Actions proposed for future activities
6	Development on the subject site shall comply in all respects and at all times with the Program and Operation Management Plan, Environmental Management Overview and Rehabilitation and Decommissioning Management Plan (appended to this approval) and the conditions of this approval. In the event of any inconsistency between these conditions and the Management Plans, the conditions of Planning Approval will prevail to the extent of any inconsistency.	• Development and operations conducted in accordance with approved Management Plans.	• Operations conducted by previous operator.	• Management Plans are reviewed on a regularly basis to align with WAL's ISO accredited Environmental Management System. • Operations conducted in accordance with approved Management Plans.
7	The approved extent of the development is denoted by the solid black line shown on the 'Disturbance and Excavation' plan prepared by Aurora Environmental (drawing dated 30 October 2013 attached to this approval) (Disturbance Area).	• Development of site to occur within area defined on the approved *'Disturbance and Excavation'* plan.	• Development of the site has occurred to date within the area defined on the approved *'Disturbance and Excavation'* plan.	• Site development and operations in accordance with approved Management Plans.
8	The mining sequence shall be in accordance with the 'Notional Mining Sequence' plan prepared by Aurora Environmental (drawing dated 30 October 2013 attached to this approval) and comprises a maximum footprint (Development Footprint) at any one time, of one Mining Sequence Boundary area (denoted by the solid black line) unless agreed to in writing by the City. Relative to this condition, Development Footprint shall mean the area under excavation at any given time, where works are occurring to extract, grade, stockpile, process and otherwise handle the earthwork material, but shall exclude the access road into the Disturbance Area and other areas formerly comprising the Development Footprint, but which have since or are now undergoing rehabilitation, revegetation and/or re- contouring to achieve the approved finished contour levels.	• Excavation works to be planned and undertaken in accordance with the *'Notional Mining Sequence'* plan dated 30 October 2013 (attached to the Planning Approval).	• Excavation works to date have occurred within the 'Year 0-5' area as indicated on the *'Notional Mining Sequence'* plan.	• Site development and operations in accordance with approved Management Plans.
9	The intended depth and direction of excavation and extent of rehabilitation shall be in accordance with condition 1 of this approval and shall be consistent with the indicative finished level contour shown on the 'Indicative Finished Level' plan prepared by Aurora Environmental (drawing dated 15 May 2013 attached to this approval). Finished contour levels shall	• Excavation depth and the extent of rehabilitation works to be planned and undertaken in accordance with the *'Indicative Finished Level'* plan dated 15 May 2013 (attached to the Planning Approval).	• Excavation to date has been in accordance with approved plans.	• Site development and operations in accordance with approved Management Plans.

Condition No.	Condition	Management Strategy	Actions undertaken previously	Actions proposed for future activities
	be coordinated with surrounding areas.			
10	The Disturbance Area shall be progressively rehabilitated when final contour levels and grades for each stage are achieved and within 18 months of the closure of each sequence referred to in condition 8, with such rehabilitation being in accordance with the Rehabilitation and Decommissioning Management Plan.	• Rehabilitation works to be completed within 18 months of the closure of each sequence, in accordance with the requirements of the *Rehabilitation and Decommissioning Management Plan*.	• No areas completed or available yet for rehabilitation works.	• Site rehabilitation works in accordance with approved Management Plans.
11	Notwithstanding anything contained within a submitted Management Plan: (a) no excavation is to occur within 4 metres of the winter maximum groundwater level, as will be determined using the bores described at condition 27; and (b) excavation is not to continue if at any stage it becomes reasonably apparent to the landowner or to the City that to proceed would be detrimental to below ground karstic features on the Site.	• No excavation within 4 metres of the maximum groundwater level or if risk to karstic features becomes known.	• Refer to attached Site Survey. • No evidence of Karstic features.	• Excavation to be monitored by regular site surveys.
12	With exception of vehicular access and revegetation, all operations relating to this approval shall be confined within the Disturbance Area. No other areas of the site shall be utilised in a manner subject to this approval without the further planning approval of the City.	• All operations to occur within approved disturbance areas in accordance with approved plans.	• Refer to attached Site Survey.	• Future operations conducted in accordance with approved Management Plans.
13	A perimeter security fence, to an appropriate standard sufficient to prevent sheep and livestock entry and restrict vehicle and pedestrian access to the site shall be constructed prior to commencement of any works.	• Suitable boundary buffers, barriers fencing and gates to be maintained to prevent access to the site for livestock, vehicles and pedestrians.	• Refer to Section 5 'Access and Fencing' of this Compliance Report for details	• Site to be made secure in accordance with the requirements of the *Mine Safety and Inspection Act 1994.*
14	All ancillary facilities, such as (but not limited to) ablution and lunchroom facilities shall be provided on the site prior to the commencement of operations, to the satisfaction of the City.	• Suitable facilities to be provided for staff in accordance with the City's *Health Local Law 1999* and other relevant requirements when the site is operational.	• Staff facilities not currently provided as the site is not operational.	• Facilities are provided on an adjoining site operated by WAL and will be available at all times while this site is operational.

Condition No.	Condition	Management Strategy	Actions undertaken previously	Actions proposed for future activities
15	Upgrading of Wattle Avenue, and its extension to Lot 8, is to be designed constructed and maintained to the satisfaction of the City.	• Upgrade to commence once all necessary approvals, design and engineering plans are agreed.	• Refer to Section 5 'Access and Fencing' of this Compliance Report for details	• Wattle Ave will be upgraded in accordance with the City's requirements late 2020.
16	Access to the site shall be from Wattle Avenue, where indicated on the site plan, once condition 15 is satisfied, via a sealed crossover designed and constructed to the City's specifications.	• Subject to future design and approval.	• To date access to the site has been from Wattle Ave East, engineering plans for Wattle Ave East have been submitted to the City's Engineering Department who support the proposed widening design. Construction of the Eastern upgrade is planned to be completed by late 2020.	• The Wattle Ave West upgrade to access Lot 8 can commence when the necessary Extractive Industry licence to operate is approved and design and engineering plans are satisfied by both parties. The upgrade works to Wattle Ave West will be undertaken in accordance with the City's requirements late 2020.
17	With regard to condition 16, the first 100 metres of the access road from the intersection with Wattle Avenue shall be sealed in bitumen, with the remainder of the access road being constructed to ensure dust emissions from machinery and traffic are minimised.	• Subject to future design and approval.	• To date access to the site has been from Wattle Ave East, the first 100 metres of the access road from the intersection on Wattle Avenue East has been sealed with bitumen. Furthermore, engineering plans for Wattle Ave East have been submitted to the City's Engineering Department who has confirmed support of the proposed widening design. Construction of the Eastern upgrade is planned to be completed by late 2020.	• If required upgrades to the access road to be considered, however dust emissions are managed more effective by an on-site water cart and traffic speed • Maintain 100m of road seal, as required.
18	Once access is gained from Wattle Avenue in accordance with condition 16, the haulage route for all trucks entering and leaving the site shall be via Wattle Avenue.	• Access to site from Wattle Ave when required.	• To date access to the site has been from the east therefore upgrade works to Wattle Ave have not yet been required.	• When access from the west is proposed, upgrade works to Wattle Ave will be undertaken in accordance with the City's requirements late 2020.

Condition No.	Condition	Management Strategy	Actions undertaken previously	Actions proposed for future activities
19	The City may deem, at any time, that operations on the site are generating an unreasonable amount of dust or that the operations are not compliant with condition (6) above. Should that occur, the Manager Planning Implementation may direct in writing that: (i) An amended dust management plan be submitted and endorsed; or (ii) The activities on the site are brought into compliance with this approval.	• Condition noted • Dust control measures to be implemented in accordance with approved Management Plans.	• Dust control strategies implemented by previous operator. • Not aware of any previous complaints received in relation to dust.	• Dust control measures will be implemented in accordance with the approved Management Plan and in accordance with WAL's ISO accredited EMS.
20	Any cutting, grinding, chipping or mulching of trade waste vegetation to be utilised for soil stabilisation or dust suppression on the site shall at all times occur within the Disturbance Area. Unless agreed to in writing by the Manager Planning Implementation, trade waste vegetation not utilised on the site shall be disposed of at a landfill site that is in the opinion acceptable of the Manager Planning Implementation.	• Waste vegetation to be processed within approved disturbance area and utilised onsite for stabilising soil or supressing dust where possible. • Disused vegetation material to be stored or disposed of in an approved manner.	• Waste management implemented by previous operator. • There appears to be no significant accumulation of waste material onsite.	• Waste management measures will be implemented in accordance with the approved Management Plan and in accordance with WAL's ISO accredited EMS.
21	The proponent shall plant a line of appropriate vegetation along the western boundary of the subject site to provide a visual barrier between the subject site and the adjoining dwelling to the satisfaction of the Manager, Planning Implementation. This vegetation must be maintained for the life of the approval.	• Revegetation to be undertaken in accordance with approved Management Plan and regulatory approvals.	• Established vegetation exists along the western boundary.	• Ongoing monitoring and maintenance of vegetation.
22	The landowner shall ensure that all approved activities in accordance with the noise management, suppression and mitigation measures contained in the Noise Management Plan and ensure that the requirements of the Environmental Protection (Noise) Regulations 1997 are complied with at all times.	• Management of noise in accordance with the approved Management Plan and *Environmental Protection (Noise) Regulations 1997*.	• Noise management strategies implemented by previous operator. • Not aware of any previous complaints received in relation to noise.	• Noise management measures will be implemented in accordance with the approved Management Plan and in accordance WAL's ISO accredited EMS.
23	Within three months from the commencement of excavation, the landowner shall construct bunds and/or 'excavation walls' are constructed where required to ensure noise emissions	• Implementation of noise management strategies as required	• Noise management strategies implemented by previous	• Noise screening bunds will be created where required to meet

Condition No.	Condition	Management Strategy	Actions undertaken previously	Actions proposed for future activities
	satisfy the requirements of condition (22) above.	in accordance with the approved Management Plan.	operator. • Not aware of any previous complaints received in relation to noise.	this requirement.
24	Crushing and all activities associated with reconstituted limestone block manufacturing shall only occur in the Extraction Area, which shall be shielded by one or more of the following: (i) the slopes of natural landforms as they exist prior to the proponent commencing the development subject to this approval ; and/or (ii) the bunds described in condition (23).	• Implementation of noise management strategies as required in accordance with the approved Management Plan.	• Noise management strategies implemented by previous operator. • Not aware of any previous complaints received in relation to noise.	• Noise screening bunds and other noise management strategies will be utilised where required to meet this requirement.
25	The City may deem at any time that operations on the site are generating an unreasonable amount of noise or that the operations are not compliant with the conditions of this approval. Should that occur, the Manager Planning Implementation may direct in writing that: (i) An amended Noise Management Plan be submitted and endorsed; or (ii) The activities on the site are brought into compliance with this approval.	• Implementation of noise management strategies as required in accordance with the approved Management Plan. • Amendment of Noise Management plan as required.	• Noise management strategies implemented by previous operator. • Not aware of any previous complaints received in relation to noise.	• Noise management strategies to be implemented and/or amended where required to meet this requirement.
26	All activities pertaining to any vehicle or equipment wash-down or servicing shall be confined to a wash down area with a pollutant trap, which shall be provided within three months from the commencement of excavation.	• Any vehicle and equipment wash-down and servicing onsite to occur within an approved area consisting of a pollutant trap.	• It is understood that the previous contractor did not conduct any vehicle or equipment washing/servicing onsite and therefore no wash-down area or pollutant trap has been installed.	• No vehicle or equipment wash-down or servicing proposed onsite.
27	No explosives shall be stored on the site and no blasting shall be carried out without the approval of the appropriate State Government authority and the Manager Planning Implementation.	• Explosives will only be stored onsite and blasting carried out with prior approval from State Government authorities (where required) and the	• Blast management practices implemented by previous operator. • Not aware of any previous	• Blast management practices will be implemented in accordance with the approved Management Plan and in accordance WAL's

Condition No.	Condition	Management Strategy	Actions undertaken previously	Actions proposed for future activities
		City's Manager Planning Implementation.	complaints received in relation to blasting.	ISO accredited EMS.
28	At six monthly intervals, the landowner shall carry out the monitoring of: (i) Noise emissions to ensure that noise outputs are consistent with the noise output described in the Noise Management Plan; and (ii) Water extracted from bores. The results of the monitoring prescribed in (i) and (ii) above shall thereafter be provided to the City within 28 days from the day of the intervals.	• Noise managed in accordance with approved Management Plan. • Water extracted from bores onsite to be monitored on a six monthly basis while the site is operational.	• WAL has not been provided with any previous monitoring records.	• Noise will be managed in accordance with approved Management Plan. • Groundwater monitoring will be conducted on a six monthly basis while the site is operational (when a licensed bore has been installed).
29	The landowner shall: (i) keep a complaints log in which the following is to be recorded: • the date and time, where relevant, of each complaint made and received; • the means (telephone, email or mail) by which the complaint was made; • any personal details of the complainant that were provided or, if no details were provided, a note to that effect; • the nature of the complaint (including a description of the operations and the equipment to which the complaint relates); • the steps or actions taken in, and the timing of, the response to each complaint, including any follow up contact with the complainant; and • if no actions or steps were taken in relation to the complaint/enquiry, the reason(s) why no actions or steps were taken; (ii) immediately notify the City of any complaint received; (iii) respond as soon as possible, and in any event within three working days, to any complaint received and provide the City with a copy of the response;	• All complaints from the community to be recorded and managed in accordance with an appropriate system. • The City will be notified of complaints received from the community and provided with a complaints log as required.	• Complaint management implemented by previous operator. • Not aware of any complaints received previously.	• All complaints from the community will be recorded and managed in accordance with WAL's ISO accredited EMS. • The City will be notified immediately of any compliant received from the community and provided with a complaints log as required.

Condition No.	Condition	Management Strategy	Actions undertaken previously	Actions proposed for future activities
	(iv) provide the complaints' log to the City upon request; and (v) cause to be provided to the City, concurrently with any reports being provided to the Department of Environment and Conservation (DEC), all reports prepared and submitted to the DEC as required by and forming part of the landowner's monitoring and reporting requirements contained in any licences/permits issued by the DEC in accordance with the *Environmental Protection Act 1986*.			
30	By 31 January each year, the proponent shall submit to the City a report (Report) that includes: (a) the progress of the excavation activities; (b) production levels; (c) the progress of rehabilitation undertaken and completed; (d) the measures taken to suppress and minimise dust and noise; (e) the number and type of community complaints and responses, and whether and how such complaints have been resolved; (f) results of noise, dust and bore monitoring; and (g) traffic movements . The City may provide to the landowner direction as to how the development on the site should be changed in order to address any matter identified in the Report referred to in this condition. The landowner shall alter the operation shall direction be prescribed in writing by the City and the operation shall thereafter be carried out in accordance with the written direction.	• Annual report to be provided to the City by 31 January each year, providing detail as listed under Condition 30.	• Previous reporting was the responsibility of the previous operator	• WAL commits to prepare and submit an annual report to the City by 31 January each year providing all detail as listed under Condition 30.
31	No peat, landfill, soil, chemical or any other substance or material is to be brought into the site for the purposes of: i) filling the land to achieve the approved finished contour levels, or	• Management of externally sourced materials in accordance with the approved Management Plan.	• Management of externally sourced materials by previous operator	• Operations will be conducted in accordance with the approved Management Plan and in accordance WAL's ISO accredited

Condition No.	Condition	Management Strategy	Actions undertaken previously	Actions proposed for future activities
	ii) blending it with the limestone extracted; or iii) manufacturing products or materials from the limestone extracted; or iv) storage or stockpiling.			EMS.

Appendix 3

City of Wanneroo Planning Approval DA2013/663
259 Wattle Avenue, Nowergup
31 January 2014

City of Wanneroo

LOCKED BAG 1
WANNEROO WA 6946
TELEPHONE: (08) 9405 5000
FACSIMILE: (08) 9405 5499

File Number : DA2013/663
Application Number : DA2013/663
Enquiries Officer : Jeremy Thompson
9405 5311

31 January 2014

Aurora Environmental
2 Bulwer Street,
PERTH WA 6000

Attention: Paul Zuvela

Application for Planning Approval for Extractive Industry at 259 Wattle Avenue NOWERGUP

An Application for Planning Approval received by the City on 20 May 2013 has now been considered by the City of Wanneroo and formal notice setting out the terms of this decision is attached.

Should the applicant be aggrieved by this decision, there is a right to apply for a review under the *Planning and Development Act 2005*. The application for review must be submitted in accordance with the Act and should be lodged within 28 days of the date of this decision to the State Administrative Tribunal, 12 St George's Terrace, Perth WA 6000. It is recommended that you contact the Tribunal for further information by telephoning 9219 3111 or the website http://www.sat.justice.wa.gov.au/

ADVICE TO APPLICANT/LANDOWNERS:

1. The City has determined this application only under the City of Wanneroo District Planning Scheme No. 2, and that it has forwarded the submitted application to the Western Australian Planning Commission for its consideration and determination under the Metropolitan Region Scheme. The City advises that the Western Australian Planning Commission is also required to issue its 'Approval to Commence Development' under the Metropolitan Region Scheme prior to the commencement of any works.

2. The City does not undertake to ascertain the validity of signatures nor the authority of the persons nominated as owners.

3. In relation to Condition 16, until such time as Wattle Avenue is constructed in accordance with condition 15, access to the site may be subject to informal arrangements being made between the applicant or landowner and the owners of the adjacent lots. The applicant is advised that the City is not party to these arrangements.

4. In relation to various conditions above, the term 'Disturbance Area' and 'Extraction Area' have the same meaning as that defined in the City's draft Local Planning Policy 2.7: Extractive Industry.

5. Development subject of this approval shall only be operated while the landowner/proponent holds a licence approved under the City of Wanneroo Extractive

Industries Local Law 1998 (Extractive Industry Licence. In the event that the second 5 year period of approval referred to in condition 1 does not commence, no further Extractive Industry Licences will be approved.

6. If required, licences must be obtained prior to the commencement of the approved development on the site from:

   i. the Department of Environment and Conservation, in accordance with the Environmental Protection Act 1986 and Environmental Protection Regulations 1987, in respect to:

   - The site being a prescribed premises for quarrying and ancillary operations; and
   - the use of the crusher on the site for quarrying operations.

   ii. from the Department of Water, in accordance with the Rights in Water and Irrigation Act 1914 (WA), in respect of the installation of bores.

7. To ensure that the amenity of nearby residents is not unduly interfered with:

   i. vehicles, equipment and machinery used on the Site (other than trucks collecting limestone or sand from the Site) should not use reversing beepers unless those beepers are required for the safe conduct of operations on the site or it is demonstrated that no acceptable alternative exists;

   ii. any reversing alarm on any vehicle, piece of equipment or machinery shall be broad-band reversing alarms, for example, 'croakers'; and

   iii. the Disturbance Area layout will at all stages of the landowners operations be designed in a way that reasonably minimises the need for vehicles, equipment and machinery to be reversed when loading.

8. This approval does not allow the use of any peat, landfill or any other material to be brought into the site for the purpose of filling the land to achieve the approved finished contour levels.

9. In relation to Condition 19, the term 'an unreasonable amount of dust' generally means visible dust crossing the boundary of the Site, or visually excessive dust on the Site.

10. In relation to Condition 20, 'trade waste' means any stockpiled vegetation resulting from clearing of the site and the construction of the bunds.

11. In relation to Condition 23, the term 'an unreasonable amount of noise' generally means noise which exceeds the levels assigned by the Environmental Protection (Noise) Regulations 1997.

Should you have any further queries relating to this advice or the formal notice of approval as attached, please contact Jeremy Thompson from the City of Wanneroo Planning and Sustainability Directorate on 9405 5311.

Ryan Hall
A/Manager Planning Implementation
City of Wanneroo

City of Wanneroo

LOCKED BAG 1
WANNEROO WA 6946
TELEPHONE: (08) 9405 5000
FACSIMILE: (08) 9405 5499

File Number : DA2013/663
Application Number : DA2013/663
Enquiries Officer : Jeremy Thompson
9405 5311

31 January 2014

Aurora Environmental
149-151 Kensington Street
EAST PERTH WA 6014

CITY OF WANNEROO PLANNING APPROVAL
METROPOLITAN REGION SCHEME
FORM 2

Land Parcel Details:	Lot: 8 D: 53380
Property Details:	259 Wattle Avenue NOWERGUP
Registered Owner(s):	Oakford Land Company Pty Ltd
Application Date:	15 May 2013
Application Received:	20 May 2013.
Development Description:	Extractive Industry

The City advises that Planning Approval has now been **granted** under the provisions of the City of Wanneroo District Planning Scheme No. 2. This Approval requires the development to be undertaken in accordance with the enclosed approved plans and is subject to compliance with the following conditions:

Term of Approval

1. Subject to the following paragraphs (a) and (b), this approval shall be for a total period of 10 years expiring on 31 January 2024, consisting of two consecutive 5-year periods from the date of issue.

   (a) At least 12 months (but not more than 18 months) prior to the end of the first 5 year period of this approval (expiring on 31 January 2019), the landowner shall submit to the City of Wanneroo a report (Compliance Report) outlining compliance with the conditions subject to this approval.

   (b) With the aid of the Compliance Report (referred to in (i) above), the City shall within six months of receiving the Compliance Report, review the landowner's general compliance with these conditions (including compliance with any associated plan, permit or direction). If the Compliance Report is found to be satisfactory, or if the City does not complete a review within six months of receiving the Compliance Report, the second 5 year period of this approval will commence from the later date of either:

   - the expiry of the first five year period; or
   - the date 6 months from when the Compliance Report is submitted.

2. Should the City form the view that the Compliance Report is not satisfactory or that the landowners compliance with these conditions is unsatisfactory, then the second 5 year period referred to in condition (1) above will not commence and all structures, plant, machinery, equipment and other material erected on the subject site shall be removed no later than 31 July 2016 *(date 5.5 years from approval)*.

3. Notwithstanding conditions (1) and (2) above, if the development the subject of this approval is not substantially commenced within a period of 24 months from the date of approval, the approval shall lapse and be of no further effect. Where an approval has lapsed, no further development shall be carried out without the further approval of the City having first been sought and obtained.

Hours of Operation

4. Unless alternative hours are agreed to in writing by the City, the hours of operation for the approved development shall be as follows:

   a) Crushing shall be limited to 0700 – 1700 hours, Monday to Friday (excluding public holidays);

   b) Loading and movement of trucks into and out of the Site shall be limited to 0700 – 1700 hours, Monday to Friday and 0700 – 1200 on Saturday (excluding public holidays); and

   c) Clearing, establishment, excavation works and all other operations not referred to in paragraphs (a) and (b) shall be limited to 0700 – 1700 hours, Monday to Friday and 0700 – 1200 on Saturday (excluding public holidays).

   If at any time compliance with *the Environmental Protection (Noise) Regulations 1997* cannot be maintained; the operations on site shall immediately cease until such time that operations can comply with the aforementioned Regulations and (a) to (c) above.

Management Plans

5. Within 3 months from the date of this approval (or an alternative time as agreed to in writing by the City), a revised Program and Operation Management Plan, Environmental Management Overview and Rehabilitation and Decommissioning Management Plan shall be submitted for endorsement by the City to supersede those previously provided. The revised Program and Operation Management Plan, Environmental Management Overview and Rehabilitation and Decommissioning Management Plan shall incorporate all additional plans and information required by the conditions outlined in this approval.

6. Development on the subject site shall comply in all respects and at all times with the Program and Operation Management Plan, Environmental Management Overview and Rehabilitation and Decommissioning Management Plan (appended to this approval) and the conditions of this approval. In the event of any inconsistency between these conditions and the Management Plans, the conditions of Planning Approval will prevail to the extent of any inconsistency.

Extent and Sequence of Permitted Development

7. The approved extent of the development is denoted by the solid black line shown on the 'Disturbance and Excavation' plan prepared by Aurora Environmental (drawing dated 30 October 2013 attached to this approval) (**Disturbance Area**).

8. The mining sequence shall be in accordance with the 'Notional Mining Sequence' plan prepared by Aurora Environmental (drawing dated 30 October 2013 attached to this approval) and comprises a maximum footprint (**Development Footprint)** at any one time, of one Mining Sequence Boundary area (denoted by the solid black line) unless agreed to in writing by the City. Relative to this condition, Development Footprint shall mean the area under excavation at any given time, where works are occurring to extract, grade, stockpile, process and otherwise handle the earthwork material, but shall exclude the access road into the Disturbance Area and other areas formerly comprising the Development Footprint, but which have since or are now undergoing rehabilitation, revegetation and/or re-contouring to achieve the approved finished contour levels.

Detailed Excavation Plan

9. The intended depth and direction of excavation and extent of rehabilitation shall be in accordance with condition 1 of this approval and shall be consistent with the indicative finished level contour shown on the 'Indicative Finished Level' plan prepared by Aurora Environmental (drawing dated 15 May 2013 attached to this approval). Finished contour levels shall be coordinated with surrounding areas.

10. The Disturbance Area shall be progressively rehabilitated when final contour levels and grades for each stage are achieved and within 18 months of the closure of each sequence referred to in condition 8, with such rehabilitation being in accordance with the Rehabilitation and Decommissioning Management Plan.

11. Notwithstanding anything contained within a submitted Management Plan:

    (a) no excavation is to occur within 4 metres of the winter maximum groundwater level, as will be determined using the bores described at condition 27; and

    (b) Excavation is not to continue if at any stage it becomes reasonably apparent to the landowner or to the City that to proceed would be detrimental to below ground karstic features on the Site.

12. With exception of vehicular access and revegetation, all operations relating to this approval shall be confined within the Disturbance Area. No other areas of the site shall be utilised in a manner subject to this approval without the further planning approval of the City.

Infrastructure and security fencing

13. A perimeter security fence, to an appropriate standard sufficient to prevent sheep and livestock entry and restrict vehicle and pedestrian access to the site shall be constructed prior to commencement of any works.

14. All ancillary facilities, such as (but not limited to) ablution and lunchroom facilities shall be provided on the site prior to the commencement of operations, to the satisfaction of the City.

Access and crossover

15. Upgrading of Wattle Avenue, and its extension to Lot 8, is to be designed constructed and maintained to the satisfaction of the City.

16. Access to the site shall be from Wattle Avenue, where indicated on the site plan, once condition 15 is satisfied, via a sealed crossover designed and constructed to the City's specifications.

17. With regard to condition 16, the first 100 metres of the access road from the intersection with Wattle Avenue shall be sealed in bitumen, with the remainder of the access road being constructed to ensure dust emissions from machinery and traffic are minimised.

18. Once access is gained from Wattle Avenue in accordance with condition 16, the haulage route for all trucks entering and leaving the site shall be via Wattle Avenue.

Dust management

19. The City may deem, at any time, that operations on the site are generating an unreasonable amount of dust or that the operations are not compliant with condition (6) above. Should that occur, the Manager Planning Implementation may direct in writing that:

    (i) An amended dust management plan be submitted and endorsed; or

    (ii) The activities on the site are brought into compliance with this approval.

Vegetation, Dieback and Weed management

20. Any cutting, grinding, chipping or mulching of trade waste vegetation to be utilised for soil stabilisation or dust suppression on the site shall at all times occur within the Disturbance Area. Unless agreed to in writing by the Manager Planning Implementation, trade waste vegetation not utilised on the site shall be disposed of at a landfill site that is in the opinion acceptable of the Manager Planning Implementation.

21. The proponent shall plant a line of appropriate vegetation along the western boundary of the subject site to provide a visual barrier between the subject site and the adjoining dwelling to the satisfaction of the Manager, Planning Implementation. This vegetation must be maintained for the life of the approval.

Noise management

22. The landowner shall ensure that all approved activities in accordance with the noise management, suppression and mitigation measures contained in the Noise Management Plan and ensure that the requirements of the *Environmental Protection (Noise) Regulations 1997* are complied with at all times.

23. Within three months from the commencement of excavation, the landowner shall construct bunds and/or 'excavation walls' are constructed where required to ensure noise emissions satisfy the requirements of condition (22) above.

24. Crushing and all activities associated with reconstituted limestone block manufacturing shall only occur in the Extraction Area, which shall be shielded by one or more of the following:

(i) the slopes of natural landforms as they exist prior to the proponent commencing the development subject to this approval; and/or

(ii) the bunds described in condition (23).

25. The City may deem at any time that operations on the site are generating an unreasonable amount of noise or that the operations are not compliant with the conditions of this approval. Should that occur, the Manager Planning Implementation may direct in writing that:

(i) An amended Noise Management Plan be submitted and endorsed; or

(ii) The activities on the site are brought into compliance with this approval.

Pollutants, fuel and explosives

26. All activities pertaining to any vehicle or equipment wash-down or servicing shall be confined to a wash down area with a pollutant trap, which shall be provided within three months from the commencement of excavation.

27. No explosives shall be stored on the site and no blasting shall be carried out without the approval of the appropriate State Government authority and the Manager Planning Implementation.

Notice, ongoing reporting and directions

28. At six monthly intervals, the landowner shall carry out the monitoring of:

(i) Noise emissions to ensure that noise outputs are consistent with the noise output described in the Noise Management Plan; and

(ii) water extracted from bores.

The results of the monitoring prescribed in (i) and (ii) above shall thereafter be provided to the City within 28 days from the day of the intervals.

29. The landowner shall:

(i) keep a complaints log in which the following is to be recorded:

- the date and time, where relevant, of each complaint made and received;
- the means (telephone, email or mail) by which the complaint was made;
- any personal details of the complainant that were provided or, if no details were provided, a note to that effect;
- the nature of the complaint (including a description of the operations and the equipment to which the complaint relates);
- the steps or actions taken in, and the timing of, the response to each complaint, including any follow up contact with the complainant; and

- if no actions or steps were taken in relation to the complaint/enquiry, the reason(s) why no actions or steps were taken;

(ii) immediately notify the City of any complaint received;

(iii) respond as soon as possible, and in any event within three working days, to any complaint received and provide the City with a copy of the response;

(iv) provide the complaints' log to the City upon request; and

(v) cause to be provided to the City, concurrently with any reports being provided to the Department of Environment and Conservation (DEC), all reports prepared and submitted to the DEC as required by and forming part of the landowner's monitoring and reporting requirements contained in any licences/permits issued by the DEC in accordance with the *Environmental Protection Act 1986.*

30. By 31 January each year, the proponent shall submit to the City a report (Report) that includes:

(a) the progress of the excavation activities;

(b) production levels;

(c) the progress of rehabilitation undertaken and completed;

(d) the measures taken to suppress and minimise dust and noise;

(e) the number and type of community complaints and responses, and whether and how such complaints have been resolved;

(f) results of noise, dust and bore monitoring; and

(g) traffic movements.

The City may provide to the landowner direction as to how the development on the site should be changed in order to address any matter identified in the Report referred to in this condition. The landowner shall alter the operation shall direction be prescribed in writing by the City and the operation shall thereafter be carried out in accordance with the written direction.

Miscellaneous

31. No peat, landfill, soil, chemical or any other substance or material is to be brought into the site for the purposes of:

i) filling the land to achieve the approved finished contour levels, or

ii) blending it with the limestone extracted; or

iii) manufacturing products or materials from the limestone extracted; or

iv) storage or stockpiling.

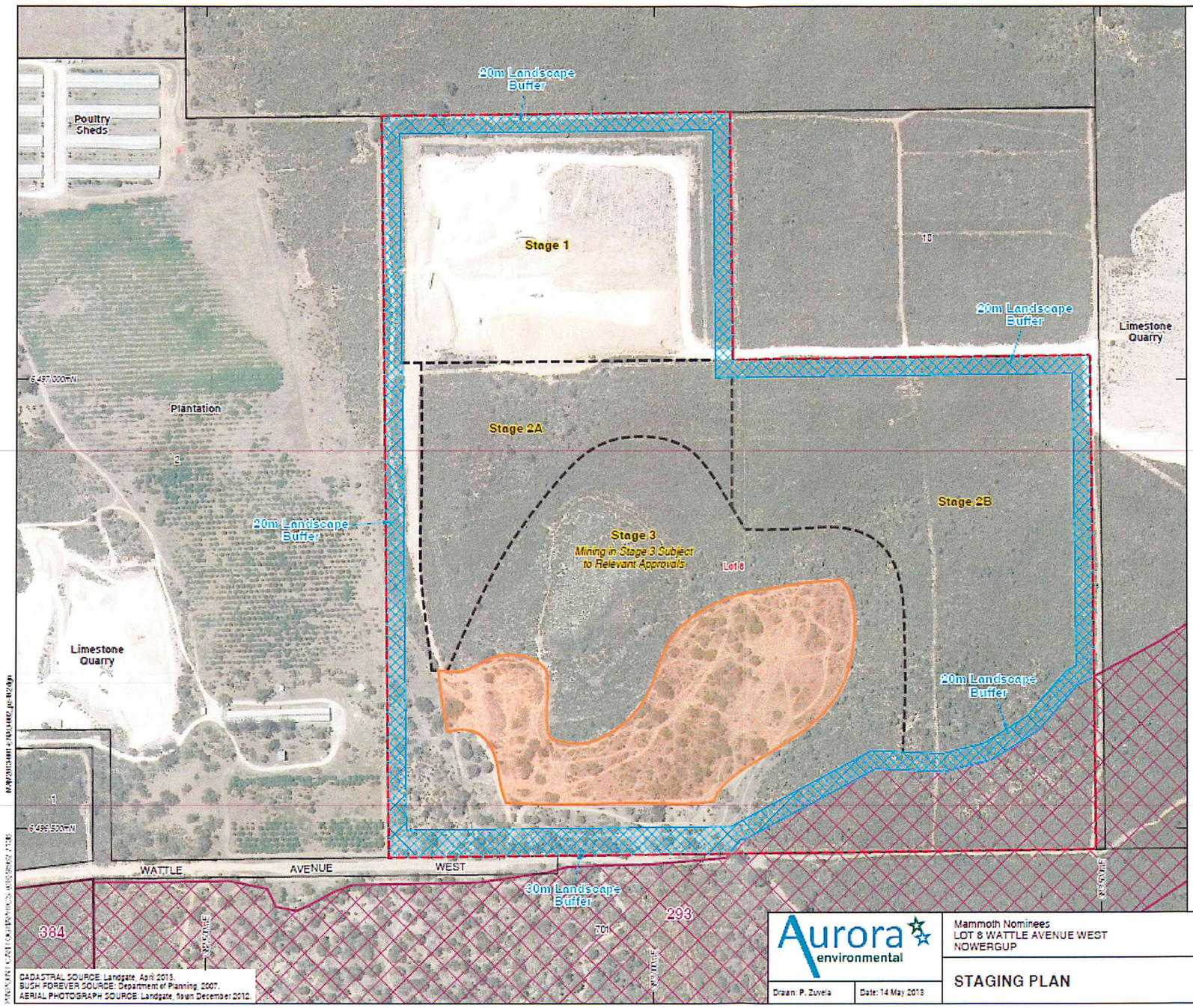
Unless otherwise specified, all conditions shall be complied with, by and at the cost of the owner, to the specification and satisfaction of the City, before the development is occupied.

Thereafter, maintenance and compliance with conditions of approval shall continue to the City's satisfaction.

If the development the subject of this approval is not substantially commenced within a period of two (2) years from the date of this letter, the approval shall lapse and be of no further effect. Where an approval has so lapsed, no development shall be carried out without the further approval of the responsible authority having first been sought and obtained.

Ryan Hall
A/Manager Planning Implementation
City of Wanneroo

Attachment 2



N

0 50 100 150 200m

SCALE 1 : 4 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Stage Boundary
- Bush Forever Site
- Landscape Buffer
- Rehabilitation Offset Area

CADASTRAL SOURCE: Landgate, April 2013.
BUSH FOREVER SOURCE: Department of Planning, 2007.
AERIAL PHOTOGRAPH SOURCE: Landgate, flown December 2012.

CITY OF WANNEROO
PLANNING APPLICATION APPROVED
SUBJECT TO THE ENDORSEMENT HEREON AND COMPLIANCE WITH THE CONDITIONS OF PLANNING APPROVAL
APP'N No. DA2013/663
DATE APPROVED 31/1/14
NUMBER OF PAGES 1 of 5
NOTE: THIS APPROVAL DOES NOT CONSTITUTE A BUILDING LICENCE

Aurora environmental

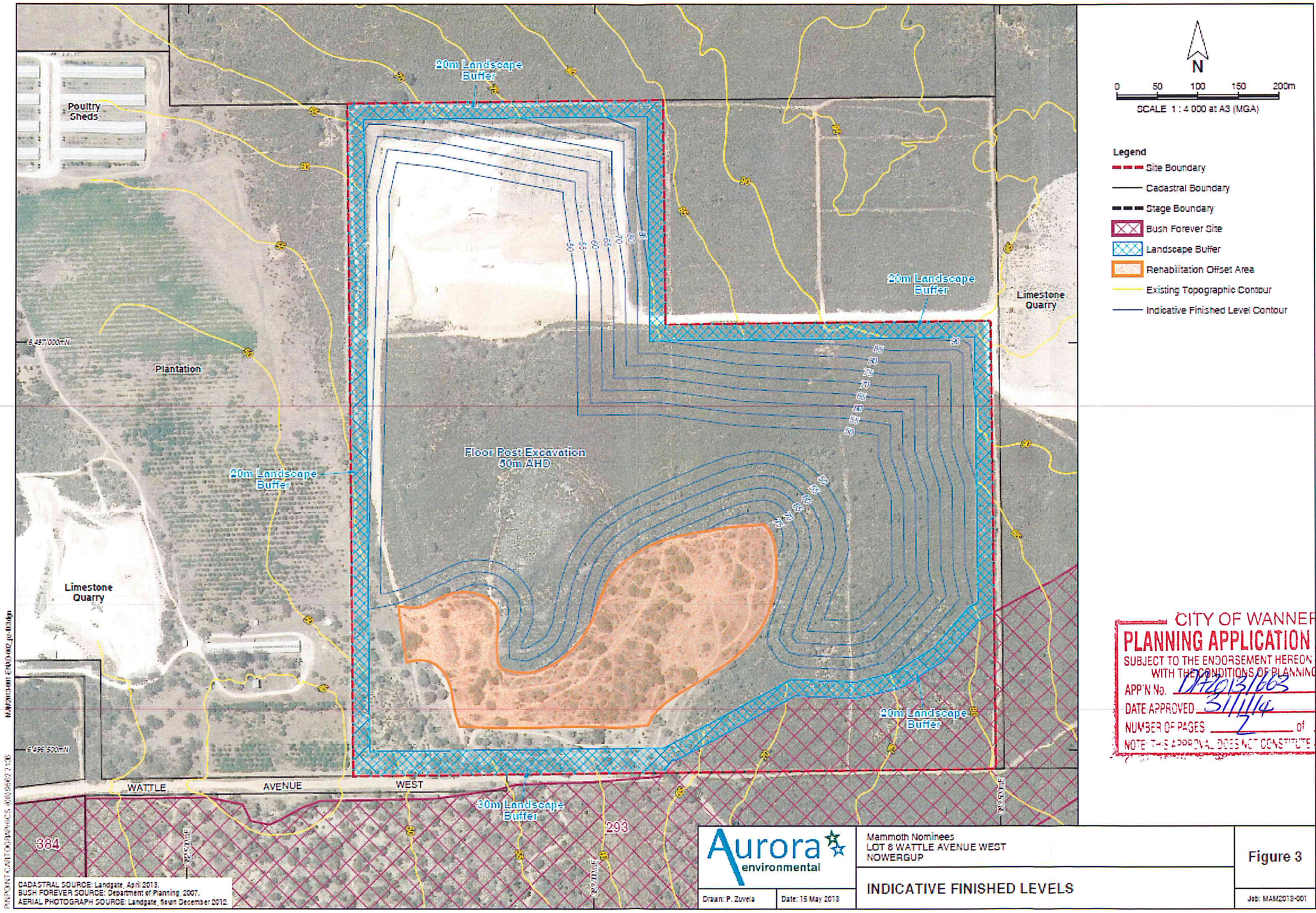
Drawn: P. Zuvela | Date: 14 May 2013

Mammoth Nominees
LOT 8 WATTLE AVENUE WEST
NOWERGUP

STAGING PLAN

Figure 2

Job: MAM2013-001



CITY OF WANNEROO
PLANNING APPLICATION APPROVED
SUBJECT TO THE ENDORSEMENT HEREON AND COMPLIANCE WITH THE CONDITIONS OF PLANNING APPROVAL
APP'N No. DA2013/1663
DATE APPROVED 31/1/14
NUMBER OF PAGES 2 of 5
NOTE: THIS APPROVAL DOES NOT CONSTITUTE A BUILDING LICENCE

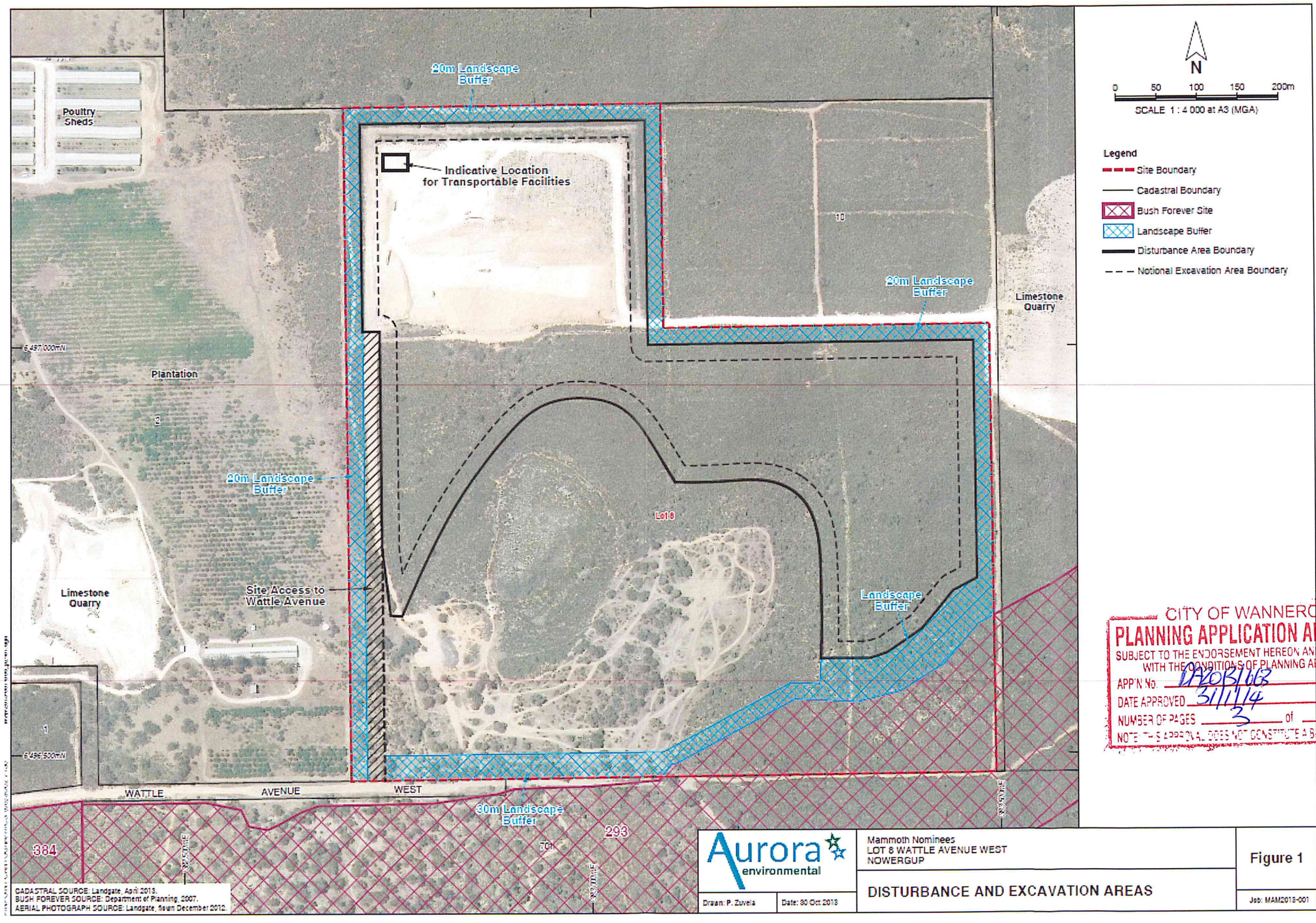
Aurora environmental

Mammoth Nominees
LOT 8 WATTLE AVENUE WEST
NOWERGUP

INDICATIVE FINISHED LEVELS

Figure 3

Drawn: P. Zuvela | Date: 15 May 2013 | Job: MAM2013-001



CITY OF WANNEROO
PLANNING APPLICATION APPROVED
SUBJECT TO THE ENDORSEMENT HEREON AND COMPLIANCE WITH THE CONDITIONS OF PLANNING APPROVAL
APP'N No. DA08/163
DATE APPROVED 31/1/14
NUMBER OF PAGES 3 of 5
NOTE: THIS APPROVAL DOES NOT CONSTITUTE A BUILDING LICENCE

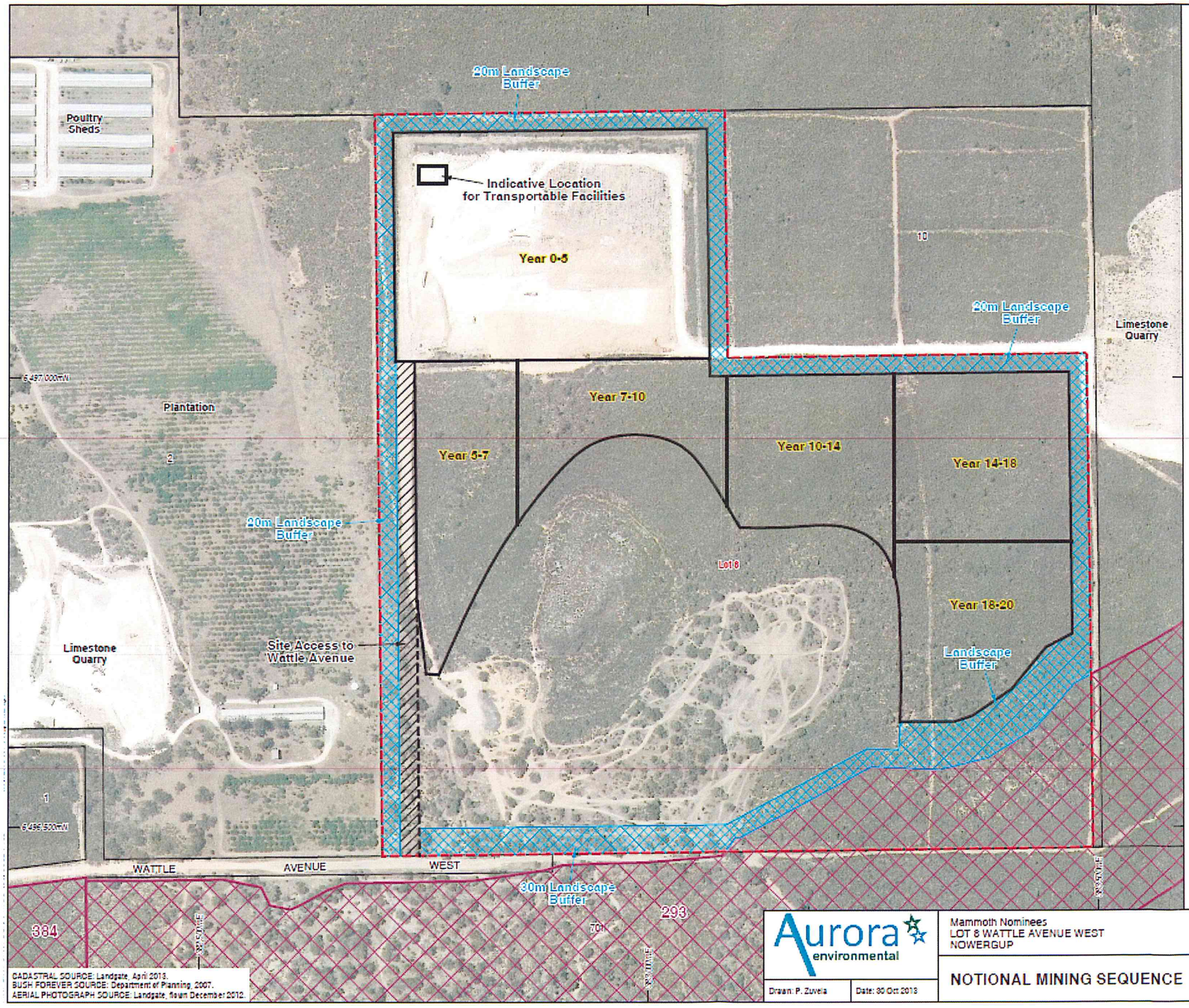
Aurora environmental

Mammoth Nominees
LOT 6 WATTLE AVENUE WEST
NOWERGUP

DISTURBANCE AND EXCAVATION AREAS

Figure 1

Drawn: P. Zuvela | Date: 30 Oct 2013 | Job: MAM2013-001



CITY OF WANNEROO
PLANNING APPLICATION APPROVED
SUBJECT TO THE ENDORSEMENT HEREON AND COMPLIANCE WITH THE CONDITIONS OF PLANNING APPROVAL
APP'N No. DA2013/663
DATE APPROVED 31/1/14
NUMBER OF PAGES 4 of 5
NOTE THIS APPROVAL DOES NOT CONSTITUTE A BUILDING LICENCE

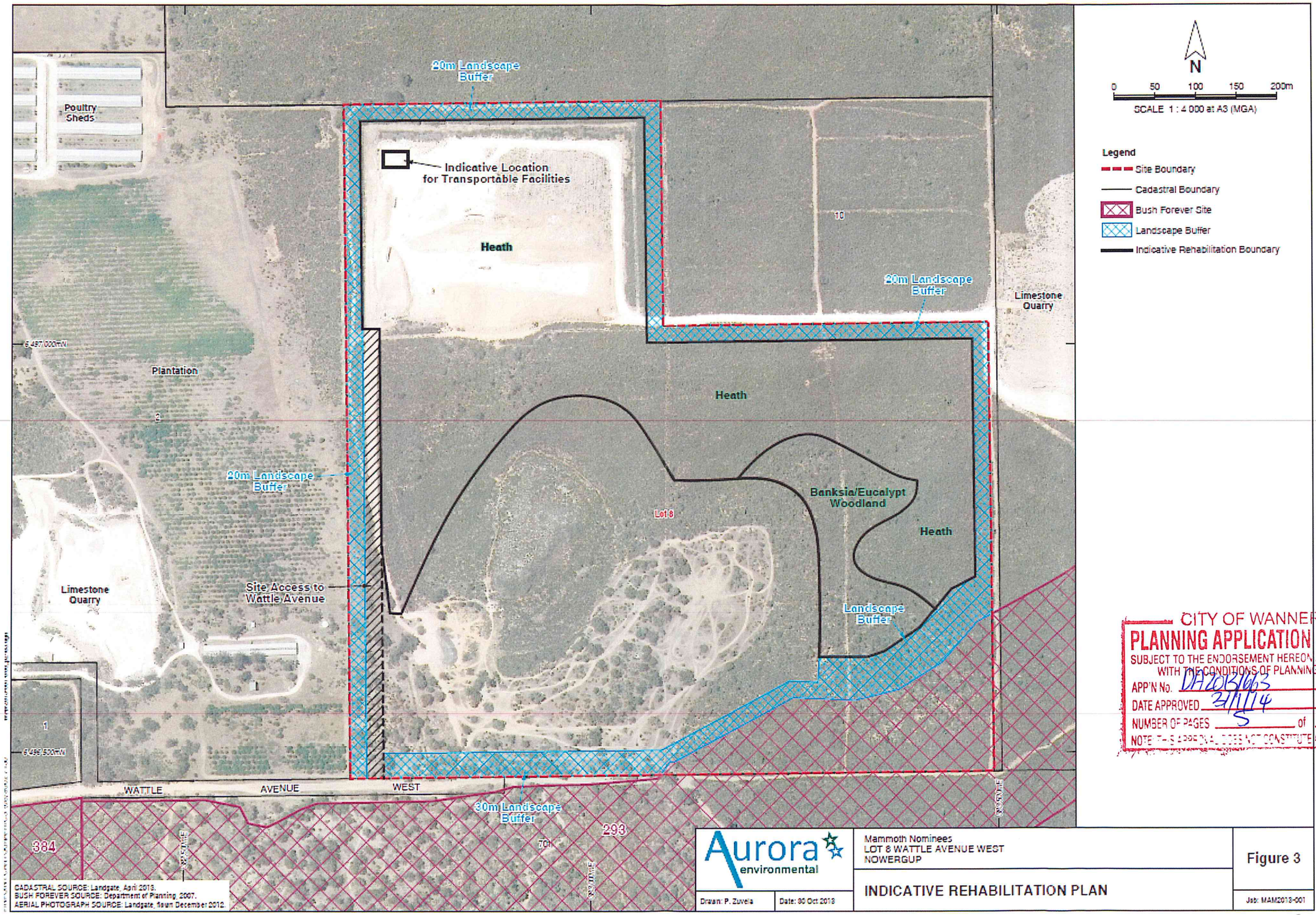
Aurora environmental

Mammoth Nominees
LOT 8 WATTLE AVENUE WEST
NOWERGUP

NOTIONAL MINING SEQUENCE

Figure 2

Drawn: P. Zuvela | Date: 30 Oct 2013 | Job: MAM2013-001



CITY OF WANNEROO
PLANNING APPLICATION APPROVED
SUBJECT TO THE ENDORSEMENT HEREON AND COMPLIANCE WITH THE CONDITIONS OF PLANNING APPROVAL
APP'N No. DA2013/663
DATE APPROVED 3/11/14
NUMBER OF PAGES 5 of 5
NOTE THIS APPROVAL DOES NOT CONSTITUTE A BUILDING LICENCE

Aurora environmental

Mammoth Nominees
LOT 8 WATTLE AVENUE WEST
NOWERGUP

INDICATIVE REHABILITATION PLAN

Figure 3

Drawn: P. Zuvela | Date: 30 Oct 2013 | Job: MAM2013-001

Appendix 4

City of Wanneroo Extractive Industry Licence
Lot 8 Wattle Avenue, Nowergup

31 January 2014

City of Wanneroo

Local Government Act 1995

CITY OF WANNEROO - FORM 3

EXTRACTIVE INDUSTRY LICENCE

Licensee:	Oakford Land Company
Mailing Address:	Aurora Environmental 149-151 Kensington Street EAST PERTH, WA 6004
Operator	Oakford Land Company PO Box 6913 EAST PERTH, WA 6892
Land Description:	Lots 8 Wattle Avenue, Nowergup
Material to be Excavated:	Limestone and Sand
Term of Licence:	5 years
Date of Expiry :	31 January 2019

This license is issued in accordance with the City of Wanneroo (the City) Local Law relating to Extractive Industries 1998 as amended (the Local Law), and is subject to the following conditions of approval. The Licensee is responsible for complying at its cost, with the Local Law and all conditions imposed under this license, to the satisfaction of the City.

1. The extractive industry shall operate in accordance with the City's Planning Approval DA2013/663, dated 15 January 2014 (copy attached) and the conditions of this licence.

2. The extractive industry shall operate in accordance with the submitted report dated 14 May 2013 and entitled "Approval for Extractive Industry, Lot 8 Wattle Avenue, Nowergup", as amended by the correspondence and plans, submitted by Aurora Environmental on 1 November 2013.

3. A survey plan (prepared by a licensed surveyor) and annual report shall be submitted by 30 June each year to depict the current ground levels of the subject site, details of the progress of rehabilitation, and that backfill is in accordance with condition 17 below.

4. No blasting or storage of explosives is permitted on site without the prior approval of the City and other appropriate authorities.

5. Operating hours shall be limited to 0700 to 1700 on weekdays and 0700 to 1700 on Saturdays. No operations are permitted on Sundays and Public Holidays.

6. Pit walls shall be battered to a gradient no steeper than 1 in 10.

7. Only minor servicing and repair of vehicles shall be allowed to occur on site.

8. No excavation works shall be carried out within 20 metres of a property boundary, or 40 metres of an abutting road reserve, without prior approval of the City.

9. All stormwater shall be contained on-site and erosion managed so that no materials are deposited off site.

10. The owner shall maintain a water allocation to the property, or secure a water supply to enable adequate dust control at all times.

11. All stockpiles and access roads on site shall be stabilised, using suitable dust suppression methods, to prevent dust nuisance.

12. All fuel storage shall be in accordance with the Department of Environment and Conservation Water Quality Protection Note for Temporary Above Ground Fuel Storage in Public Drinking Water Source Areas.

13. Excavation works shall be operated in accordance with all aspects of the Environmental Protection Act (1986). This includes the implementation of measures to ensure adequate pollution controls relating to noise, dust and other environmental concerns.

14. A secure fence and warning signs shall be erected and maintained along the top and continuing around the edges of the excavation face prior to the face exceeding 1.5 metres in height. The warning signs shall be 1.8 metres high and 1 metre in width and shall be spaced no more than 200 metres apart.

15. Adequate sanitary facilities shall be provided for all employees.

16. All fill areas shall utilise inert fill, compacted to a 95% modified maximum dry density when tested in accordance with AS1289 E2.1-1977 and certified by a NATA registered laboratory. Unless otherwise approved by the City, no material (e.g peat or 'red mud') may be imported for landfill or storage purposed, and fill material shall be placed in 300mm layers and each layer compacted and appropriately tested.

17. Topsoil shall be directly transferred from excavation areas to rehabilitation areas where possible. Topsoil should not be stored for more than six months in order to preserve root stock.

18. Denuded areas, and areas compacted by machinery and vehicles, shall be deep ripped before being rehabilitated, covered with topsoil and revegetated with native species. The list of native species to be used for revegetation, together with details of seed mix and planting densities and patterns, shall be

submitted to the City for approval before planting. Thereafter, plantings shall be managed and watered until well established.

19. A rehabilitation bond, sufficient to cover the rehabilitation works required under this approval shall be submitted to the City within 30 days of the date of this licence.

FOOTNOTES:

1. The Licensee shall obtain a works approval from the Department of Environment and Conservation before any excavation commences under this Licence.

2. You are reminded that the Planning Approval granted by the City will expire on 15 January 2024, and your Licence will not be renewed beyond that date unless another Planning Approval is granted. It is advisable to submit a new application for planning approval at least six months prior to the expiration of the current planning approval.

3. Six months before the expiry of this licence on 15 July 2018, an application for licence renewal shall be submitted to the City for consideration in accordance with the Local Law. The licence renewal shall include a survey plan (prepared by a licensed surveyor), which depicts the current ground levels of the subject site (demonstrating that material has not been excavated below the approved final contour levels), and details relating to the progress of rehabilitation.

4. For your convenience, extracts of Parts 6 and 7 of the Local Law are attached and should be referred to in relation to Prohibitions, Public Liability, and provisions of the Mines Safety and Inspection Act and the Environmental Protection Act.

Ryan Hall
A/MANAGER PLANNING IMPLEMENTATION

31 January 2014

PART 6 - PROHIBITIONS

Prohibitions

17. Subject to any licence conditions imposed by the local government with respect to carrying on an extractive industry, a person -

(1) must not without the written approval of the local government, excavate within -

(a) 20 metres of the boundary of any land on which the excavation site is located;
(b) 20 metres of any land affected by a registered grant of easement;
(c) 40 metres of any thoroughfare;
(d) 50 metres of any watercourse, wetland, swamp or other water reserve; or
(e) 3 metres of the estimated maximum water table level as determined from time to time by the Water & Rivers Commission or otherwise as adopted by the local government.

(2) must -

(a) not remove any trees or shrubs within 40 metres (or such lesser distance as may be allowed, in writing, by the local government) of the boundary of any thoroughfare reserve on land in respect of which a licence has been granted, except for the purpose of constructing access thoroughfares, erecting buildings or installing plant for use in connection with the excavation and then only with the express approval of the local government and subject to any conditions which the local government may impose in accordance with clause 10;
(b) where the local government so requires, securely fence the excavation to a standard determined by the local government and keep the gateways locked when not actually in use in order to prevent unauthorised entry;
(c) erect and maintain warning signs along each of the boundaries of the area excavated under the licence so that each sign -
(i) is not more than 200 metres apart;
(ii) is not less than 1.8 metres high and not less than 1 metre wide; and
(iii) bears the words "DANGER EXCAVATIONS - KEEP OUT";
(d) except where the local government approves otherwise, drain and keep drained to the local government's satisfaction any excavation to which the licence applies so as to prevent the accumulation of water;
(e) not store, or permit to be stored, any explosives or explosive devices on the site to which the licence applies other than with the approval of the local government and the Department of Minerals and Energy;
(f) not fill or excavate, other than in accordance with the terms and conditions of the licence, the site plans and the works and excavation program approved by the local government;
(g) restore and reinstate the excavation site in accordance with the terms and conditions of the licence, the site plans and the works and excavation program approved by the local government;
(h) take all reasonable steps to prevent the emission of dust, noise, vibration and other forms of nuisance from the excavation site;
(i) otherwise comply with the conditions imposed by the local government in accordance with clause 10; and
(j) cease excavating and undertake the restoration and reinstatement of the site and comply with notices issued by the local government.

(3) must not carry out or permit to be carried out any blasting in the course of excavating unless -
(a) the local government has otherwise given approval in respect of blasting generally or in the case of each blast;
(b) subject to sub-clause (2), the blasting takes place only between the hours of 8.00 am and 5.00pm, or as determined by the local government, on Mondays to Fridays inclusive;
(c) the blasting is carried out in strict accordance with the AS2187 SAA

Explosives Code, the Mines Safety and Inspection Act 1994, the Environmental Protection Act 1986, and all relevant local laws of the local government; and
(d) in compliance with any other conditions imposed by the local government concerning -
(i) the time and duration of blasting;
(ii) the purposes for which the blasting may be used;
(iii) the methods of detonation and blasting;
(iv) the types of explosives to be used; and
(v) such other matters as the local government may reasonably require in the interests of the safety and protection of members of the public and of property within the district.
(4) must not carry out or permit to be carried out any blasting on a Saturday, Sunday or public holiday except with the prior approval of the local government.

PART 7 - MISCELLANEOUS PROVISIONS

Public Liability

18. (1) A licensee must have at all times a current public liability insurance policy taken out in the joint names of the licensee and the local government indemnifying the licensee and the local government for a sum of not less than $10,000,000 or such other sum as is approved by the local government in respect of any one claim relating to any of the excavation operations;
(2) The licensee shall provide to the local government a copy of the policy taken out under sub-clause (1), within 14 days after the issue of that policy and shall provide to the local government evidence of renewal within 14 days of each renewal date.

Mines Safety and Inspection Act and Environmental Protection Act

19. (1) In any case where the Mines Safety and Inspection Act 1994 or the Environmental Protection Act 1986 applies to any excavation carried on or proposed to be carried on at a site, the licensee in respect of that site must comply with all applicable provisions of that Act or those Acts; and
(2) In this clause, the Mines Safety and Inspection Act 1994 and the Environmental Protection Act 1986 include all subsidiary legislation made under those Acts.

END

Appendix 5

Aurora Environmental Approval for Extractive Industry Licence Supporting Documentation

May 2013

APPROVAL FOR EXTRACTIVE INDUSTRY
LOT 8 WATTLE AVENUE, NOWERGUP

Prepared For:	Oakford Land Company Pty Ltd c/- Mammoth Nominees Pty ltd PO Box 6913 EAST PERTH WA 6892
Report Number:	AP2013/068
Report Version:	V1
Report Date:	14 May 2013

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Aurora Environmental has implemented a comprehensive range of quality control measures on all aspects of the company's operation.

An internal quality review process has been applied to each project task undertaken by us. Each document is carefully reviewed and signed off by senior members of the consultancy team prior to issue to the client.

Document No: MAM2013-001-ENAD-002_pz_V1

Report No: AP2013/068

Author:	Paul Zuvela Manager - Environmental Impact Assessment		14 May 2013
		Signature	Date
Reviewed by:	Dr Mark Shepherd Principal - Environmental Geology		14 May 2013
		Signature	Date

DISTRIBUTION

No. of copies	Report File Name	Report Status	Date	Prepared for:	Initials
1	MAM2013-001-ENAD-002_pz_V1	V1	14 May 2013	Mammoth Nominees Aurora Environmental City of Wanneroo	PZ

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1 INTRODUCTION

1.1 BACKGROUND

Aurora Environmental has been commissioned by Mammoth Nominees Pty Ltd on behalf of Oakford Land Company Pty Ltd (ACN 113 593 883) to prepare this report to support a Development Application (DA) and Extractive Industries Licence Renewal/Application relating to the extraction of basic raw materials (BRM) from Lot 8 Wattle Avenue, Nowergup.

Oakford Land Company has existing planning approval and an Extractive Industries Licence to extract limestone and sand from the site. The planning approval was granted by the Western Australian Planning Commission (WAPC) on 16 June 2008 and the City of Wanneroo on 3 June 2008 for a period of five years (Appendix A). More recently, an extractive industries licence renewal was approved by the City of Wanneroo on 19 October 2012 and is due to expire on 23 June 2013 (Appendix B).

Mining has occurred on the site since the original granting of the planning approval. Planning approval and an extractive industries licence are needed to enable the continuation of the mining operation.

A native vegetation clearing permit has been issued by the Department of Environment and Conservation (DEC) to clear a maximum of 15.54ha of native vegetation on Lot 8 in accordance with the conditions contained within the approval (Appendix C). The permit remains valid until 14 December 2022.

1.2 PURPOSE AND SCOPE

The purpose of this report is to outline the proposal to mine limestone and sand on Lot 8 Wattle Avenue. In particular this report provides an overview of:

- The site including the existing environment;
- Surrounding land uses;
- Statutory planning matters;
- Description of the proposal; and
- Operational management matters.

1.3 PROPONENT DETAILS

The proponent for this proposal is:

Oakford Land Company Pty Ltd (the registered Proprietor) of Lot 8 Wattle Avenue, Nowergup

Contact: Mr Allen Caratti

Street Address: 48 Wickham Street

East Perth WA 6004

Postal Address: PO Box 6913

East Perth WA 6892

Phone: (08) 9225 6991

1.4 REQUESTED APPROVAL

The proponent is requesting a 20 year planning approval and excavation licence for the excavation of limestone and some sand from the site to be used in the construction industry in the Perth metropolitan region.

A 20 year approval is being sought to provide certainty to the proponent and to reduce the number of future planning applications to avoid duplication of reporting and assessment time. However, the proponent understands that if more control is required, then the excavation licence may be issued for a lesser period e.g. for a five year period.

This application represents an extension of the previously approved extractive industry that has been conducted on Lot 8 Wattle Avenue. The proposal that is the subject of this application will be conducted in accordance with the previous methods which were compliant with the existing approval conditions.

Further details relating to the proposal are provided in Section 4.

2 SITE DETAILS

2.1 SITE DESCRIPTION

The subject site is Lot 8 (on Diagram 53380, Volume 2132, Folio 850) Wattle Avenue, Nowergup. A copy of the Certificate of Title is provided in Appendix B. Lot 8 is approximately 52.5ha.

2.2 LOCATION AND CONTEXT

Lot 8 is approximately 35km north of the Perth central business district, 10km north of Wanneroo in the rural locality of Nowergup (Figure 1).

Table 1 describes the land uses within 1km of the site.

TABLE 1
DESCRIPTION OF SURROUNDING LAND USES

DIRECTION	LAND USES
West	BRM extraction, poultry farm, market gardening and some dwellings
South	Undeveloped, vegetated land
East	BRM extraction, undeveloped/vegetated land
North	BRM extraction, undeveloped/vegetated land

Basic raw material extraction has been conducted in the immediate vicinity of Lot 8 (and on Lot 8) for many years. The nearest sensitive land use, a residential dwelling, is located approximately 650m west of the site.

2.3 TOPOGRAPHY

The site generally slopes from the north-east towards the south-western corner (Appendix D). The highest point on the site is approximately 95m AHD in the north-east (near the south-eastern corner of the Water Corporation's Lot 10) and the lowest elevation is approximately 46m AHD in the south-west (closest to Wattle Avenue).

2.4 FLORA AND VEGETATION

A spring flora and vegetation survey was conducted by Regeneration Technology (2006) of the site. A copy of the survey report is provided in Appendix E. The survey was conducted as a Level 2 survey in accordance with the requirements of EPA Guidance Statement No. 51 – Terrestrial Flora and Vegetation Surveys (EPA, 2004).

A total of 96 plant taxa (including 10 weed species) from 35 families were recorded on the site. No threatened flora was recorded during the survey and one Priority 3 species (*Jacksonia sericea*) was identified as being present on the site.

Three vegetation units were recorded by Regeneration Technology (2006) as being present on the site, these being:

Open heath: Open heathland consisting of *Xanthorrhoea preissii* and *Banksia sessillis* (formerly *Dryandra sessilis*) over *Acacia pulchella* and *Hibbertia hypericoides* on grey to yellow sand with limestone.

Woodland: *Eucalyptus marginata* and *Banksia attenuata* woodland over *Hibbertia hypericoides, Acacia pulchella* and weed species on grey to yellow sands.

Open Woodland: *Eucalyptus marginata* open woodland over cleared pasture on grey to yellow sands.

The vegetation condition ranged from Completely Degraded to Excellent using the Bush Forever rating scale devised by Keighery (1994). The south western portion of the site is the most degraded area due to a history of past and on-going disturbances.

The vegetation present is consistent with the vegetation described by Heddle *et al* (1980) as the Cottesloe Complex – Central and South.

The south- eastern portion of the site is mapped as part of Bush Forever Site 293. This area has been excluded from the area to be mined.

The DEC has previously approved the clearing of 9.96ha of native vegetation on Lot 8 (Purpose Permit No. CPS 2807/2) which covered the land contained in the north western portion of the site and near the western boundary (Appendix F). This permit is due to expire on 30 December 2013.

A second clearing application (CPS 4924/2) was granted by the DEC on 31 January 2013 to clear 15.54ha of native vegetation (Appendix C).

2.5 FAUNA

The site is comprised of Banksia/Eucalypt Woodland and Closed Heath dominated by *Banksia sessilis*. The habitat is in excellent condition comprising a diverse and dense understorey.

Aurora Environmental conducted a search of the DEC's NatureMap database using a 5km radial buffer from the site (see Appendix G for search results). The search returned a total of eight conservation significant fauna species as being recorded or potentially within the search area. These were:

- *Calyptorhynchus latirostris* (Carnaby's Cockatoo) - Conservation Status: Threatened;
- *Pogona minor* subsp. *minima* (Dwarf Bearded Dragon) - Conservation Status: Threatened;
- *Merops ornatus* (Rainbow Bee-eater) - Conservation Status: Protected Under International Agreement;
- *Austrosaga spinifer* (Cricket) - Conservation Status: Priority 3;
- *Hylaeus globuliferus* (Bee) - Conservation Status: Priority 3;
- *Synemon gratiosa* (Graceful Sunmoth) – Conservation Status: Priority 4;
- *Macropus irma* (Western Brush Wallaby) - Conservation Status: Priority 4; and
- *Isoodon obesulus* subsp. *fusciventer* (Quenda) - Conservation Status: Priority 5.

Appendix G indicates that the Graceful Sunmoth's conservation status is Threatened. The conservation status of this species has recently been reduced by the DEC to Priority 4 following the compilation of survey results which indicate that the species is more widespread with several populations located in secure conservation reserves.

The DEC conducted an assessment of the site's faunal values as part of its assessment of Clearing Permits CPS 2807/2 and 4924/2. In summary, the DEC considered that the vegetation present in the application area was likely to support Black Cockatoo foraging and that the areas comprising dense understorey as providing suitable habitat for ground dwelling fauna such as conservation significantly species, Quenda and Western Brush Wallaby.

To offset potential impacts to conservation significant species resulting from the clearing, the DEC conditioned the approval of CPS 4924/2 which requires the proponent to provide a financial contribution to the DEC for the acquisition of 95ha of remnant vegetation suitable as foraging habitat for the Black Cockatoo. Additionally, the proponent is required to rehabilitate 8ha of completely degraded vegetation within Lot 8.

2.6 HYDROLOGY

2.6.1 Groundwater

The site is located on a limestone ridge which rises from approximately 47m AHD in the southwest corner of the site up to 92m AHD in the northeast corner of the site. The DoW's Perth Groundwater Atlas estimates that groundwater ranges between 27m (in the southwest corner of the site) and 69m (in the northeast corner of the site) below ground level. This approximately equates to the groundwater level ranging between 20m AHD and 26m AHD with the gradient indicating that flows are towards the southwest.

Several DoW Water Information Network (WIN) bores are located in close proximity to Lot 8, these being:

- Site 61610600 – 1km west
- Site 61610634 – 1.35km east
- 61610635 – 1.35km east
- 61610636 – 1km northeast

Hydrographs for the above bores are provided in Appendix H. Data has generally been collected from the mid-late 1970s for these bores. There is a clear trend indicating a significant and sustained decline in groundwater levels in the region. This decline is associated with reducing rainfall.

The site is not located in a Public Drinking Water Source Area.

2.6.2 Wetlands

No wetlands are present on the site or in close proximity to the site.

2.7 KARST

The site is located along the eastern margins of the area depicted as a karst/caves risk area. Mining conducted on Lot 8 in the northwestern corner of the site has not encountered any karstic features. Given that no features have been encountered on the site to date and the depth to groundwater the risk associated with intersecting karstic environments on Lot 8 is considered low.

2.8 HERITAGE

2.8.1 Aboriginal Heritage

A search of the Department of Indigenous Affairs' Aboriginal Heritage Inquiry System did not yield any registered sites occurring on Lot 8 Wattle Avenue.

2.8.2 European Heritage

There are no heritage places on Lot 8 in the City's Municipal Heritage Inventory or registered on the Heritage Council of Western Australia's *InHerit* database.

2.9 VISUAL IMPACT APPRAISAL

The site is located in the rural area of Nowergup surrounded by native vegetation, rural land uses and other extractive industries. It is isolated from dwellings or public gathering places.

3 PLANNING

3.1 METROPOLITAN REGION SCHEME

The site is zoned Rural in the Metropolitan Region Scheme (MRS). Land immediately to the west, north and east is also zoned Rural and land to the immediate south is zoned Industrial in the MRS.

Pursuant to Clauses 28 and 32 of the MRS, Extractive Industry is deemed to be development of state significance and is required to be referred to the WAPC for approval to commence development. The requirement to seek development from the WAPC is in addition to seek approval from the City of Wanneroo in accordance with the City's District Scheme No. 2.

3.2 CITY OF WANNEROO DISTRICT SCHEME NO. 2

The site is zoned 'Rural Resource' in the City of Wanneroo's District Planning Scheme No. 2. The objectives for the Rural Resource zone are to:

3.17.1 Protect from incompatible uses or subdivisions, intensive agriculture, horticultural and animal husbandry areas with the best prospects for continued or expanded use; and

3.17.2 Protect from incompatible uses or subdivision of basic raw materials priority areas and basic raw materials key extraction areas.

Source: City of Wanneroo (2001)

Importantly, Section 3.17.2 (b) of the Scheme indicates that the extraction of basic raw materials is a priority use within areas zoned Rural Resource. Section 3.17.2 (f) of the Scheme text states that *"there is a presumption of favour of applications for the extraction of basic raw materials in the basic raw materials resource areas identified in the Local Rural Structure subject to the management of offsite impacts and an approved land restoration plan to a standard suitable for intended subsequent long term land uses."*

The extraction of limestone and sand from this site is consistent with the objectives of the City's assigned land use zone contained within the District Planning Scheme No. 2. Despite this, proposals for extractive industries in the Rural Resource zone are subject to Council discretionary approval.

3.3 STATEMENT OF PLANNING POLICY NO. 2.4 – BASIC RAW MATERIALS

Statement of Planning Policy No. 2.4 (SPP No. 2.4) guides the development of extractive industry in Western Australia. The Policy identifies 'Priority Resource Locations'. Lot 8 Wattle Avenue is located in an area that is identified in SPP No. 2.4 as being a Priority Resource location.

SPP No. 2.4 outlines that proposals for Extractive Industries in Western Australia must have regard to the following:

- Impacts on flora, fauna, natural landscape and water quality;
- Effects on agricultural land
- Vehicular traffic, including availability and suitability of road access;

- Impacts of noise, dust and vibration; and
- Capacity for land to be rehabilitated to support land use compatible with the area.

These factors are addressed within this report and supporting documentation.

3.4 CITY OF WANNEROO INTERIM LOCAL RURAL STRATEGY

The Interim Local Rural Strategy provides the City's vision of the management and coordination of land uses within the rural area. The following are of potential relevance to this extractive industries proposal:

- Bushplan (now Bush Forever) sites should be protected from development including extraction of basic raw materials;
- The proponent for an extractive industry licence is to demonstrate that that best practice and progressive rehabilitation will be used to eliminate or minmise on-site and off-site impacts;
- The finished levels and rehabilitation should be compatible with the intended subsequent land use;
- In Nowergup, the storage and replacement of topsoil should occur to allow subsequent horticulture where appropriate;
- Council is to have regard to the State Industrial Buffer Policy; and
- Cave and karstic areas are to be protected.

The above principles have been considered in the preparation of this planning application and are addressed in this report.

4 PROGRAM AND OPERATIONAL MANAGEMENT

4.1 PROPOSAL DESCRIPTION

The proposal is to excavate limestone and sand on Lot 8 Wattle Avenue, Nowergup. The proponent prefers that the development approval and excavation licence is issued for a 20 year period. However, the proponent understands that if additional control is required, that a lesser period for the Extractive Industries Licence may be required. The DEC has approved a clearing permit (CPS 4924/2/) for Lot 8 until December 2022 (Appendix C).

The excavated limestone and sand will be used for construction materials in the Perth metropolitan area.

Mining on Lot 8 Wattle Avenue will be conducted in accordance with the previously approved proposal and will involve the supply of limestone and sand for construction materials in the Perth metropolitan area, supply of limestone to an existing reconstituted block plant located to the west and production of dimension stone. However, the previously supplied staging plan has been revised and is presented at Figure 2. For simplicity reasons, the site has been divided into three stages. Stage 1 is the continuation of mining in the northwestern corner of the site. On completion of mining in this location, mining will commence in Stage 2 which is notionally shown in two parts. Given the size of Stage 2, the subsequent stage will most likely be split into two or more sub-stages depending upon the rate of mining. However, the sequence of mining these stages is not known at the time of preparing this application.

Following excavation at the site, landform restoration will be undertaken to ensure that finished topography blends with the surrounding landscape while maintaining the potential use of the site for potential industrial use (Figure 3).

At the time of preparing this application, excavation has been undertaken at the site in accordance with the requirements of the previous planning approval and the excavation licence. Mining has been restricted to the northwest corner of the site. A feature survey of the site was completed by Ross McLoughlin Surveyors in June 2012. These plans are the most current survey plans available and little mining has occurred on the site since this survey was completed. A copy of the survey plans are provided in Appendix I.

4.2 SITE HOURS

The hours of operation will be between 0700 and 1700 Monday to Friday, and between 0730 and 1700 on Saturdays, excluding public holidays. Work outside of these operating hours will be subject to prior approval from the City.

These operating hours are consistent with the hours previously approved at the site by the City.

4.3 EXCAVATION DETAILS

The excavation will be undertaken using the same method previously approved at the site by the City and as described in the Excavation and Rehabilitation Management Plan prepared by Landform Research (2007). A copy of the Excavation and Rehabilitation Management Plan is provided in

Appendix J. The following is an excerpt from Landform Research (2007) which indicates that the excavation sequence will involve the following:

1. Remove the vegetation cover by pushing it into windrows for use on the batters to minimise soil erosion and assist spreading on the final land surface as part of the final rehabilitation. Vegetation clearing will be progressive and limited to the area required for each stage of excavation.
2. Where practicable, the vegetation will be directly transferred to a batter slope being rehabilitated.
3. Smaller native shrubs material will be used in the rehabilitation process when available and suitable.
4. Topsoil will be removed for spreading directly onto areas to be revegetated, batter slopes and screening bunds. If direct spreading is not possible, the top soil will be stored in low dumps for spreading at a later date. Weed affected topsoil will be buried to reduce the future weed loading at the site.
5. Where possible topsoil and overburden will be directly transferred from an area being cleared to an area to be rehabilitated. Where this is not possible the topsoil and overburden will be stored in low dumps to less than 1.0 metre high for future use in rehabilitation.
6. Soil overburden, as yellow and brown sand and low grade limestone, will be directly transferred or stored in low dumps for later use and for forming the screening bunds around the perimeter of the excavation area.
7. Limestone overburden or interburden, if encountered, will be taken off site and used for reconstituted block manufacture. If this is not possible it will be pushed into screening bunds on the western side of the cutting floor, separate from the topsoil, for later use in re-contouring the land surface at the conclusion of excavation.
8. Excavation will be worked progressively in the stages as shown on the attached staging plan commencing in the south west and spreading north east.
9. Limestone will be excavated to a floor level at 50m AHD in the centre of the site, as shown on the plan of the land surface, prior to rehabilitation by inert landfill.
10. Excavation methods will include:

Road Base	Deep ripped with a bulldozer and loaded into a portable crusher for reduction into the required size. This will use waste from armour stone production.
Dimension Stone Blocks	Blocks will be cut if suitable stone is available.
Armour Stone	May be excavated from suitable materials. Generally a bulldozer will be used but small blasts may be required. See 4.10 Noise

11. All static and other equipment such as crushers and screens, will be located on the floor of the quarry to provide visual and acoustic screening. Stockpiles of products will be retained on the floor of the pit where possible to reduce visual impact.

12. The northern and eastern boundaries will be left in a stable manner to the requirements of the *Mines Safety and Inspection Act 1994*.

13. It is not anticipated that blasting will be required. However if blasting is needed, a Blasting Management Plan will be prepared to the satisfaction of the City of Wanneroo prior to any blasting taking place.

14. At the end of excavation the floor of the quarry will be rehabilitated to local native vegetation prior to decisions being made for an industrial end use.

Dimension Stone Cutting

Dimension stone cutting, if used, will initially be commenced in the east of the excavation area to enable better noise and visual screening and to not compromise the bulk limestone excavations. If used dimension stone excavation will consist of the following excavation methods:

1. The vegetation will be removed for use on the batters to minimise soil erosion and assist spreading on the final land surface as part of the final rehabilitation.

2. Any topsoil will be removed for spreading directly onto areas to be revegetated, batter slopes and screening bunds. If direct spreading is not possible the top soil will be stored in low dumps, for spreading at a later date.

3. A bulldozer will be used to remove the cap rock and surface limestone, to produce a relatively flat cutting floor of soft limestone.

4. Overburden will be pushed by the bulldozer into a bund along the western side of the cutting floor to provide visual and noise screening.

5. Finally a grader will be used to smooth and level the floor, as flat as possible, to allow the installation of rails and cutting machines.

6. When dimension stone is cut, sections of the floor will be lowered by the depth of one block until the whole floor is lowered. The next set of blocks will be cut by the re-installation of the rails and cutting machines on the lowered floor and the process repeated. This method of excavation means that the cutting floor is gradually lowered below the land surface. Either electric or diesel powered saws may be used.

7. Water will be used for dust suppression, to reduce the potential for dust generation from the movement of machinery and the effect of wind.

8. All static and other equipment such as cutting machines, block making machinery, or screens, will be located on the floor of the quarry, or screened by earth bunds where possible to provide visual and acoustic screening.

9. Blasting is not part of dimension stone operations because it can fracture the stone.

10. Limestone not used for dimension stone will be used for construction materials.

4.4 STAGING PROGRAM

Excavation will continue within the existing pit as per previous approvals. The original staging plan presented in the Limestone Excavation and Rehabilitation Management Plan has now been superseded by the plan shown in Figure 2. To maintain flexibility, the site is now shown as two stages with Stage 2 being a larger area. It is likely that this area will be broken into two or more sub-stages, however the sequence of these is not yet known and will be determined closer to completion of mining in Stage 1 area. A third stage is shown in Figure 2, however this will be subject to the resolution of remaining environmental issues. Note that clearing permit CPS 4924/2 covers the entire area shown as Stage 2. This clearing permit is due to expire in December 2022.

4.5 ON-SITE PROCESSING

Apart from excavating limestone and sand from the site, the proponent's contractor will undertake on-site crushing and screening of material. This aspect of the operation has an approved licence from the DEC under Part V of the *Environmental Protection Act 1986* (Appendix K).

4.6 SITE ACCESS AND TRANSPORT

The previous planning application indicated that transport to and from the site will use the existing road network with access to the site being from Wanneroo Road then Wattle Avenue. An access track in the western portion of the site provides vehicle access to the Stage 1 excavation area. Subsequent to the issuance of planning approval, the contractor operating on Lot 8 was also operating the quarry to the east of Lot 8. Access from Lot 8 has been along existing firebreaks eastwards to the quarry located immediately east. As a consequence the proponent did not upgrade Wattle Avenue and its extension to Lot 8 as required by Condition 3 of DA07/0674. This access arrangement was favoured to avoid heavy truck usage along Wattle Avenue and thereby minimizing disturbance to residents further west of the site. Notwithstanding this, the proponent has prepared road upgrade drawings and will undertake the upgrade of Wattle Avenue to the satisfaction of the City should access from the site follow the original plan i.e. access via Wattle Avenue to Wanneroo Road.

Semi-trailer truck or truck and trailer combinations will be used to transport limestone products, with up to 20 laden vehicle movements per day.

4.7 SITE FACILITIES

No structures or storage tanks are proposed on the site. Re-fuelling of equipment will be undertaken using a mobile mini tanker as required.

4.8 MANAGEMENT OF VISUAL IMPACT

The opportunity for adverse impacts on the visual amenity of the locality is minimal. The site is isolated and is not highly visible. The site does not front on to any scenic drives (e.g. Wanneroo Road or Gibbs Road). Local amenity will be protected by the retention of a vegetated buffer around the perimeter of the site as depicted in Figure 2. In addition the following management principles will be

implemented during the life of the project to manage the visual impact associated with the proposed use on Lot 8:

- Locating exposed features behind natural barriers where practical.
- Minimising the amount of open ground at any one time.
- Excavation will occur from the bottom of the pit floor behind the western face.
- Over burden will be used to form screening bunds along the western edge of the cutting floor and excavation area.
- Undertaking sequential rehabilitation of excavated and disturbed areas.

5 ENVIRONMENTAL MANAGEMENT OVERVIEW

A Limestone Excavation and Rehabilitation Management Plan prepared by Landform Research (2007) was submitted with previous applications. A copy of this report is provided in Appendix J. It describes the proposed excavation methods and site management procedures along with a description of the environmental management and rehabilitation procedures to be implemented by the proponent or its nominated contractor.

The following information has been summarised from the Landform Research (2007) management plan.

5.1 BIODIVERSITY MANAGEMENT

5.1.1 Vegetation and Topsoil

Clearing of native vegetation will be undertaken in accordance with the requirements of CPS 2807/2 and CPS 4924/2. The following principles will be implemented during site clearing works:

- Vegetation will not be cleared unless active mining will occur in the area within three months of clearing.
- The proponent will keep to a minimum the area to be cleared at any one time.
- Clearing areas will be demarcated prior to the commencement of clearing.
- Areas for retention will be demarcated in the field as exclusion zones.
- Machinery used for clearing will be clean on entry.
- Machinery will be restricted to the limits of the area to be cleared or on designated access tracks.
- Cleared vegetative material and topsoil (of which there is expected to be limited quantities) will be retained and stockpiled in a previously cleared area.
- Salvaged topsoil will be re-spread as soon as practical after stripping to maximize seed germination.

5.1.2 Weeds

The management of weeds on the site will follow similar principles to the management of dieback with the primary focus being preventing the introduction of invasive weeds. The following measures will be implemented on Lot 8:

- All vehicles and equipment to be used during land clearing or rehabilitation will be clean and free from soil or plant material when arriving at site.
- No soil and vegetation should be brought to the site apart from that to be used in rehabilitation.
- Plants to be used in rehabilitation should be free from weeds.
- Access into vegetated areas that are ahead of excavation will be restricted.

- Weed affected top soils may need to be taken offsite, used in weed affected areas, buried by 500mm soil/overburden or taken offsite.
- Illegally dumped rubbish is the major source of weeds and is to be removed promptly.
- Weeds will be sprayed as required with broad spectrum spray prior to planting or seeding in weed affected soils.
- Grasses will be sprayed with a grass selective spray prior to seeding or rehabilitation or as required.
- Weed management will work from least affected areas to most affected.
- Declared weeds will be treated promptly by manual removal or spraying.
- Ongoing monitoring of weeds will be undertaken at least annually in autumn, prior to winter rains.

The potential for weed encroachment into adjacent sites will be managed via the retention of a vegetated buffer around the perimeter of Lot 8.

5.1.3 Fauna

Impacts to fauna will be managed via implementing a staged clearing program. Clearing will proceed towards retained vegetation to provide fauna an opportunity to relocate into surrounding vegetated areas.

Fauna habitat will be replaced via site rehabilitation activities. Details relating to site rehabilitation are provided in Section 6.

5.2 DIEBACK MANAGEMENT

Under the approved clearing permit (CPS 4924/2), the proponent (or its nominated contractor) is required to implement the following dieback and weed controls to minimise the risk of introduction and spread of weeds and dieback:

- Clean earth moving machinery of soil and vegetation prior to entering and leaving the area to be cleared.
- Soils shall be moved under dry conditions.
- No dieback or weed affect soil, mulch, fill or other material is brought into the area to be cleared.
- Machinery and other vehicles will be restricted to cleared areas and existing tracks/access roads.

5.3 WATER MANAGEMENT

The natural hydrological regime of the catchment will not be adversely impacted by mining activities on Lot 8 due to the following reasons:

- The soil types present are highly porous.

- There are no surface water features on the site or in close proximity to the site.
- The groundwater table will be approximately 30m below the base of the pit.
- There will be no significant alteration to the site water balance.
- Internal access roads will be constructed using compacted limestone with stormwater either infiltrating at source or runoff to the sides of the road where it will infiltrate.

The opportunity for impacts to groundwater quality is negligible as there will not be any storage of chemicals or hydrocarbons on the site. Vehicles will be re-fuelled using a mobile tanker as required. All machinery will be kept well maintained and inspected periodically to detect leaks. If a significant spill does occur on site, the proponent will clean up the spill immediately noting the following:

- Estimated quantity of fluid discharged.
- The type of fluid.
- The action taken to clean up the spill.

On closure the site will remain free draining.

5.4 FIRE MANAGEMENT

Fire resulting from the mining operation is considered a minimal risk as the operations will be conducted within a pit away from vegetated areas. Typical fire management practices will include the following:

- Maintenance of boundary firebreaks.
- Vehicles and equipment will be restricted to the operational area, particularly on high fire risk days.
- Water used for dust minimisation will be available for use in fire extinguishing.

5.5 CULTURAL HERITAGE

No heritage sites have been recorded on the site. Despite this, the proponent will observe and comply with its requirements under the *Aboriginal Heritage Act 1972.* Should any evidence of an Aboriginal site/use be identified during the course of mining, the development will be halted until the site is assessed by an appropriately qualified archaeological consultant.

5.6 NOISE MANAGEMENT

Noise impacts associated with mining on Lot 8 were assessed as part of the DEC's Works Approval/licensing process. The DEC considered that the noise impacts from mining activities on Lot 8 were not likely to be an issue as the nearest residence from the site is approximately 650m west.

Noise modelling conducted by Lloyd George Acoustics for the Works Approval predicted that noise levels could potentially exceed the assigned daytime levels by up to 2 decibels at pre-quarrying heights. The DEC reported that a 2 decibel exceedance is negligible and can be adequately managed by stockpiling material within 20m of the crushing and screening area.

At finished ground level, noise levels are predicted to comply with day-time assigned levels.

Since the commencement of mining on Lot 8 there have not been any complaints relating to noise. Therefore, existing noise management practices will be continued and will include the following as reported by Landform Research (2007):

- Restricting operating hours to 0700 to 1700 Monday to Friday and 0730 to 1700 on Saturdays, excluding public holidays.
- Overburden will be used to form noise screening bunds along the western edge of the cutting floor and excavation area.
- Working in exposed areas such as during land clearing will be timed to occur during a week day at a time when disruption is less likely to impact on local residents.
- All equipment will be fitted with noise shields and efficient silencers. Workers will be inducted and trained for operation on the site and provided with the correct noise protection equipment.
- Excavated areas will be progressively backfilled and rehabilitated as they are completed.
- The likely noisiest part of the operation will be the cutting of dimension stone high up the landscape if it is undertaken. The proposed dimension stone cutting is planned for the eastern section which is further away from the dwellings and where a western overburden bund can be constructed to provide maximum screening. Use of the eastern floor increases the separation of the dimension stone cutting to over 1,000m to the closest dwelling. This exceeds the EPA guidelines for a 300 – 500m separation.
- It has been found in other quarries that the provision of overburden screening dumps along the western side of the cutting floor makes a significant difference to noise shielding. There is also a significant reduction in noise if only one cutting saw is used instead of two. In addition electric cutting saws can be quieter than diesel saws.
- All saws and mobile plant, such as the bobcats, will operate on the cutting floor below natural ground level and behind bunding along the western edge of the floor.
- Blasting is not part of normal block cutting and is not proposed. It is not anticipated that blasting will be required. However if it is used to produce armour stone, the operators will use small charges, with millisecond delays, to reduce air blast over pressure and ground vibration. If blasting is to be used, a "Blasting Management Plan" will be prepared and approved prior to any blasting taking place.

5.7 DUST MANAGEMENT

The generation of dust is one of the key issues which require considered management during the operation of the mining on the site. Normally dust associated with limestone extraction is related to the mobilisation of fine particles into the air at the site under suitable conditions (typically dry and windy). This fine material is generally generated by vehicular/equipment movement and cutting saws which crush and powder the fine particles (Landform Research, 2007).

When limestone is placed and not disturbed it readily develops a crust of reprecipitated calcium carbonate that tends to stabilise the surface (Landform Research, 2007). Also the fine particles are washed below the surface leaving only coarse material behind. Therefore bunds do not normally generate dust, and become stabilised after experiencing a winter. It is really only the traffic and active areas that are highly susceptible to dust generation (Landform Research, 2007).

The prevailing winds are from the south west, particularly in the afternoon. In summer the easterly in the mornings and the sea breeze in the afternoon can be quite strong.

At 3.00pm wind speeds exceed 10km/h for 80% of the time in summer but only 30% to 40% in winter (Landform Research, 2007). At other times the wind speed is calm for 30% of the time in winter at 9.00am and 10% in summer, with 40% of the time exceeding 10km/h in summer and 20% in excess of 10km/h in winter (Landform Research, 2007). The most likely time for dust to become an issue is on summer mornings (Landform Research, 2007).

Dust will continue to be managed at the site in accordance with the DEC's (2011) *Guidelines for Managing the Impacts of Dust and Associated Contaminants from Land Development Site, Contaminated Sites Remediation and Other Related Activities.*

An assessment of the risk associated with the dust generation potential and its impacts was completed in accordance with the risk assessment contained in the DEC's (2011) guidelines. The results of this assessment are presented in Table 2 and the justification for the assigned scores is outlined in **Table 3**.

TABLE 2
SITE RISK ASSESSMENT/CLASSIFICATION FOR ACTIVITIES GENERATING UNCONTAMINATED DUST

PART A – NATURE OF THE SITE					
ITEM	**SCORE OPTIONS**				**ALLOCATED SCORE**
Nuisance potential of soil when disturbed	Very Low – 1	Low – 2	Medium – 4	High – 8	4
Topography and protection provided by undisturbed vegetation	Sheltered and screened – 1	Medium screening – 6	Little screening – 12	Exposed and wind prone – 18	1
Area of site disturbed by the works	<1ha – 1	1 to 5ha – 3	5 to 10ha – 6	>10ha - 9	3
Type of work being done	Roads or shallow trenches – 1	Roads, drains and medium depth sewers – 3	Roads, drains, sewers and partial earthworks – 6	Bulk earthworks and deep trenches – 9	9
				Total Score Part A	**17**

PART A – NATURE OF THE SITE					
ITEM	**SCORE OPTIONS**				**ALLOCATED SCORE**
PART B – PROXIMITY OF THE SITE TO OTHER LAND USES					
ITEM	**SCORE OPTIONS**				**ALLOCATED SCORE**
Distance of other land uses from the site	>1km – 1	500m to 1km – 6	100m to 500m – 12	<100m – 18	12
Effect of prevailing wind direction	Not affected – 1	Isolated land uses affected by one wind direction – 6	Dense land uses affected by one wind direction – 9	Dense/sensitive land uses highly affected by prevailing winds – 12	6
				Total Score Part B	**18**
SITE CLASSIFICATION SCORE	**PART A SCORE x PART B SCORE**			**17 x 18 = 306**	

TABLE 3
JUSTIFICATION FOR ASSIGNED SCORES

ITEM	JUSTIFICATION
Nuisance potential of soil when disturbed	In its undisturbed state the soils present on the site present a low risk. If cleared, the natural soils have a higher risk of erosion by the wind.
Topography and protection provided by undisturbed vegetation	A vegetated buffer around the perimeter of the site will retained providing sufficient sheltering and screening to adjacent properties.
Area of site disturbed by the works	Mining will be undertaken in stages. To be conservative a rating of between 1 and 5ha was selected as previously mined areas will be progressively rehabilitated on completion.
Type of work being done	Limestone extraction best relates to bulk earthworks.
Distance of other land uses from the site	The nearest adjacent land use is approximately 300m west of the site, noting that this property includes a plantation and poultry sheds.
Effect of prevailing wind direction on other land uses	The adjacent land uses most likely impacted by dust generation from the site are located west of the site. The prevailing easterly wind during the summer months will most likely be the problematic wind direction.

The site classification score of 306 determines that this site is classified as low risk (DEC, 2011). The treatment of dust at the site will primarily be undertaken through the controlled use of water and where applicable, through the application of hydro-mulch and gluon to stabilize exposed areas. The access road will be treated with Dustex to minimise dust generation associated with the movement of vehicles and equipment. Retained vegetation around the perimeter of the site will filter airborne dust particles. The site will be progressively rehabilitated once mining has ceased in each area.

The transport of the excavated product from the site via the existing mine to the east, further reduces the potential impacts to occupants of land west of Lot 8 along Wattle Avenue. Loads that are likely to generate dust will be wetted down or covered prior to leaving the site.

When winds are sufficiently strong to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved.

Complaints related to dust management will be recorded on a Dust Incident Form which will be used to gather essential information such as:

- Date and time of the complaint;
- How the complaint was received;
- The nature of the complaint
- The corrective action implemented; and
- The outcomes of the rectification.

The complainant will be contacted and advised of the action taken to rectify the issue.

5.8 COMPLAINTS MANAGEMENT

All complaints received will be recorded, investigated, actioned and reported as appropriate. Complaints will be recorded in a complaints log which will include the date and time of the complaint, how the complaint was received, the nature of the complaint, the corrective action implemented and the outcomes of the rectification. The complainant will be contacted and advised of the action taken to rectify the issue.

6 REHABILITATION AND DECOMMISSIONING

Details relating to rehabilitation and decommissioning have been addressed in the Excavation and Rehabilitation Management Plan prepared by Landform Research (2007). A copy of this is provided in Appendix J. However in summary the following should be noted:

- The land surface will be a level floor at 50mAHD with sloping batters at 1:3 vertical to horizontal to the flat floor. It is anticipated that the site will be brought into line with the adjoining land to the east and north, when that land is excavated at some point in the future.
- In any case the land surface will have to be consistent with Lot 10, and will need to rise up to at least 90 – 95 metres to Lot 10.
- The land surface will be formed to the requirements of the *Mines Safety and Inspection Act 1994 and Regulations 1995* as a final land surface.
- Limestone floor will be deep ripped in two directions. The width between rip lines will be 1 metre intervals.
- A minimum of 300mm of overburden will be spread over the surface where available to provide a substrate for revegetation.
- Pre-seeding weed control is only likely to be required where the topsoil used contains weed species.
- Vegetation plus leaf, root and organic matter collected from the land clearing procedures will be spread across the rehabilitation area to increase the total organic carbon fraction, improving soil properties such as resistance to water and wind erosion and moisture retention.
- Topsoil will be re-distributed in rehabilitated areas to depths of 50mm where available and ideally as a direct transfer from areas being cleared, though this is not always practical.
- Rehabilitation plantings will take place following winter rainfall to maximize germination and seedling survival.
- Local provenance seed will be collected from the site or purchased from commercial seed collectors. Tube plants are also desirable because they reduce the risk of failure by providing another method of establishment.
- Monitoring will be undertaken to review rehabilitation progress and identify any issues related to success/failure.

The proponent recognizes that it is obligated to rehabilitate the site back to native vegetation. However, the flat areas could potentially be used for industrial purposes at some point in the future. It is acknowledged that this will be subject to a separate approvals process.

7 JUSTIFICATION

Limestone and sand are commonly used in the construction industry in the Perth metropolitan region. Land development, land use incompatibility and sterilization of land for conservation purposes have reduced the availability of basic raw materials, particularly within close proximity to key development areas.

The limestone on Lot 8 Wattle Avenue is identified in the Statement of Planning Policy 2.4 – Basic Raw Materials as a priority limestone resource.

Mining has been on-going at the site under existing approvals for the last five years. This application is to continue mining the resource on Lot 8 for at least a 20 year period. The proposed management measures contained in this report and the associated supporting documents will ensure that potential impacts arising from mining on Lot 8 can be adequately managed.

8 REFERENCES

City of Wanneroo (2001). *District Planning Scheme No. 2 (As Amended) Scheme Text*. City of Wanneroo, Perth Western Australia.

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Heddle, E.M. Loneragan, O.W, Havel, J.J (1980). *Vegetation Complexes of the Darling System Western Australia*, In. Atlas of Natural Resources, Darling System Western Australia. Department of Conservation and Environment, Perth.

Keighery, B.J. (1994). *Bushland Plant Survey: a Guide to Plant Community Survey.* For the Western Australian Planning Commission (2000). Bush Forever: Volume 2 Directory of Bush Forever Sites, Perth.

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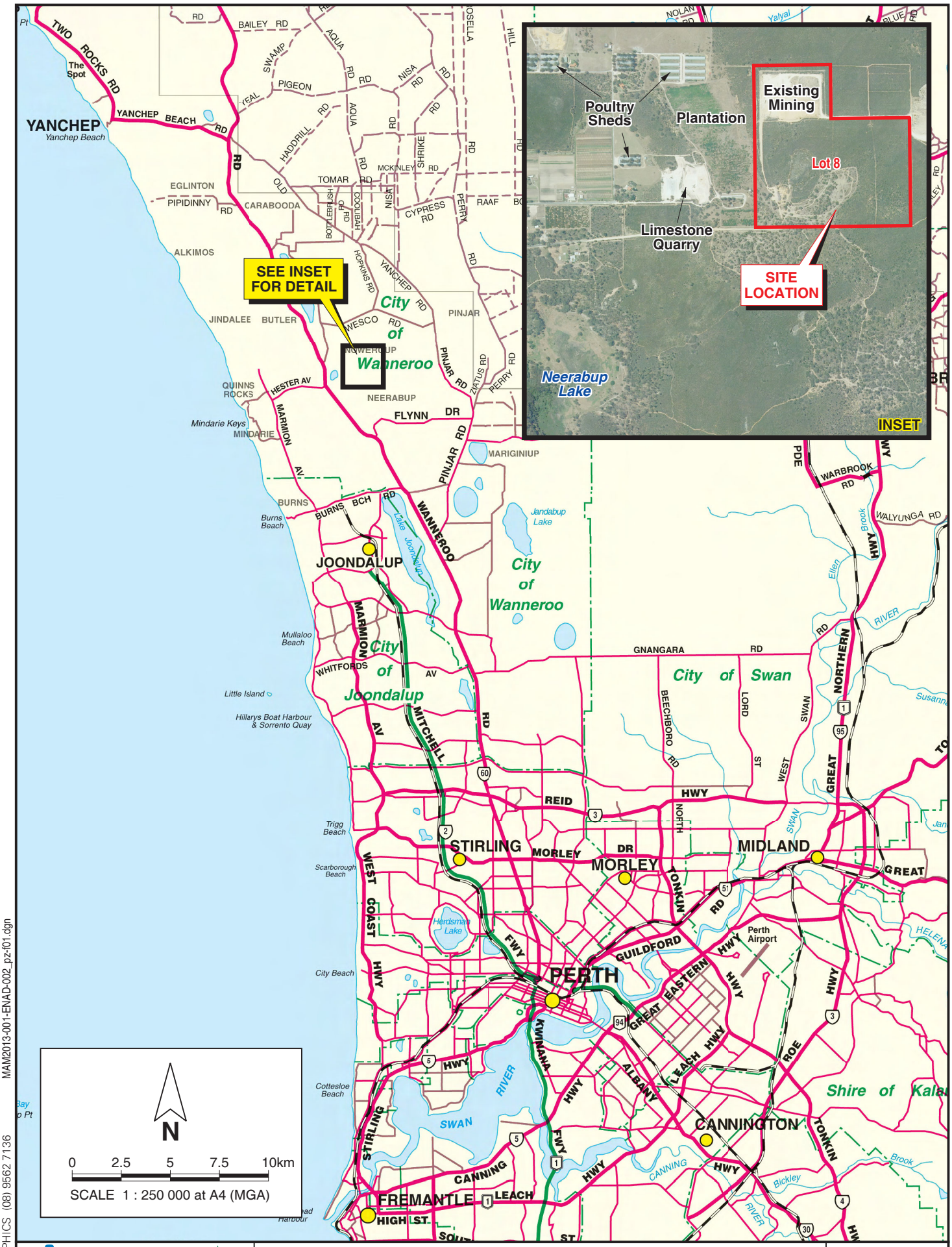
Regeneration Technology (2006). *Lot 8 Wattle Avenue, Nowergup Flora and Vegetation Assessment*. Unpublished report prepared for Oakford Land Company. Regeneration Technology, Perth, Western Australia.

FIGURES



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PINPOINT CARTOGRAPHICS (08) 9562 7136

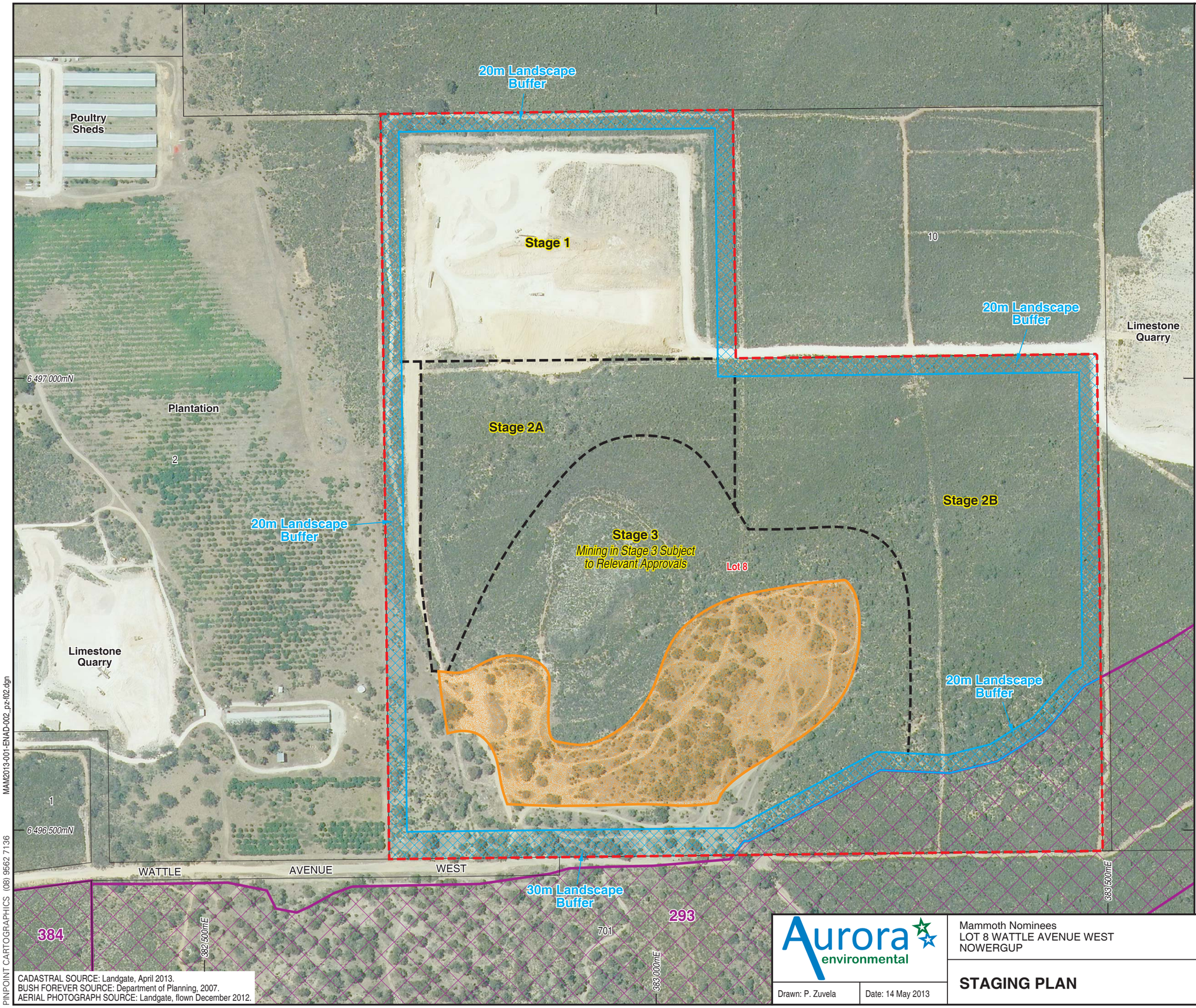
Aurora environmental

Mammoth Nominees
LOT 8 WATTLE AVENUE WEST
NOWERGUP

Figure 1

REGIONAL LOCATION

Drawn: P. Zuvela | Date: 14 May 2013 | Job: MAM2013-001



N

0 50 100 150 200m

SCALE 1 : 4 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Stage Boundary
- Bush Forever Site
- Landscape Buffer
- Rehabilitation Offset Area

CADASTRAL SOURCE: Landgate, April 2013.
BUSH FOREVER SOURCE: Department of Planning, 2007.
AERIAL PHOTOGRAPH SOURCE: Landgate, flown December 2012.

PINPOINT CARTOGRAPHICS (08) 9562 7136 MAM2013-001-ENAD-002_pz-f02.dgn

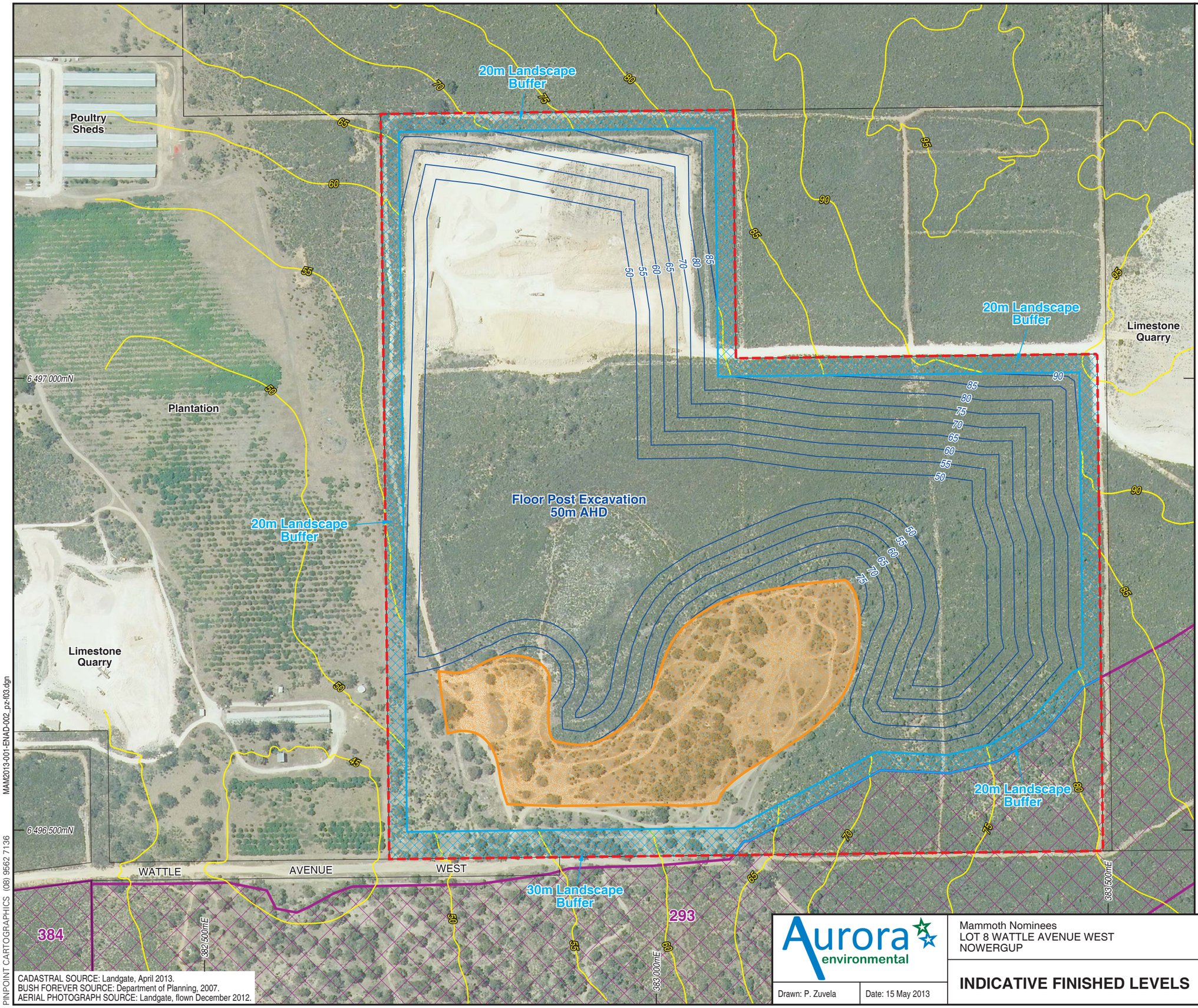
Aurora environmental

Mammoth Nominees
LOT 8 WATTLE AVENUE WEST
NOWERGUP

STAGING PLAN

Figure 2

Drawn: P. Zuvela | Date: 14 May 2013 | Job: MAM2013-001



N

0 50 100 150 200m

SCALE 1 : 4 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Stage Boundary
- Bush Forever Site
- Landscape Buffer
- Rehabilitation Offset Area
- Existing Topographic Contour
- Indicative Finished Level Contour

CADASTRAL SOURCE: Landgate, April 2013.
BUSH FOREVER SOURCE: Department of Planning, 2007.
AERIAL PHOTOGRAPH SOURCE: Landgate, flown December 2012.

Aurora environmental

Drawn: P. Zuvela | Date: 15 May 2013

Mammoth Nominees
LOT 8 WATTLE AVENUE WEST
NOWERGUP

INDICATIVE FINISHED LEVELS

Figure 3

Job: MAM2013-001

PINPOINT CARTOGRAPHICS (08) 9562 7136 MAM2013-001-ENAD-002_pz-f03.dgn

APPENDIX A

Previous Approvals

Western Australian Planning Commission

50 spatial planning years

Our Ref : 30-50170-1
Your Ref :
Enquiries : David Carter (Ph 9264 7678)

23 JUN 2008

16 June 2008

Koltasz Smith
P O Box 127
BURSWOOD WA 6100

Dear Sir/Madam

Application for Approval to Commence Development dated 14 May 2007 received 22 August 2007.

LOT	:	8
LOCATION	:	Swan 2739
PLAN/DIAGRAM	:	53380
VOLUME/FOLIO	:	2132/850
LOCALITY	:	Wattle Ave, Nowergup
OWNER	:	Oakford Land Company P/L P O Box 6913 EAST PERTH WA 6892

Under the provisions of the Metropolitan Region Scheme this application has been referred for determination by the Western Australian Planning Commission.

The application has now been considered by the Commission and the formal notice setting out the terms of the decision is attached.

A copy of this decision has been forwarded to the Local Government for information.

You are advised of the need to consult with the Local Government with regard to the gaining of all necessary approvals and the issuing of the requisite building licence.

This decision is issued pursuant to the provisions of the Metropolitan Region Scheme, and has been made by the Commission after due consideration of the regional planning implications of the proposal. The development must also comply with the requirements of Council's Local Planning Scheme(s) and any determination in this regard must be made by the local government. The Commission's decision, therefore, is made without prejudice to any others that may be separately required from Council.

Should the applicant be aggrieved by this decision there is a right to apply for a review pursuant to the provisions of Clause 33 of the Metropolitan Region Scheme. Such an application for review must be submitted to the State Administrative Tribunal, 12 St George's Terrace, Perth in accordance with Part 14 of the *Planning and Development Act 2005*. It is recommended that you contact the State Administrative Tribunal for further details (telephone 9219 3111) or go to its website: http://www.sat.justice.wa.gov.au.

Albert Facey House, 469 Wellington Street (cnr Forrest Place), Perth, Western Australia 6000
Tel: (08) 9264 7777; Fax: (08) 9264 7566; TTY: (08) 9264 7535; Infoline: 1800 626 477
e-mail: corporate@wapc.wa.gov.au; web address: http://www.wapc.wa.gov.au
ABN 35 482 341 493

Western Australian Planning Commission

50 spatial planning years

Our Ref : 30-50170-1
Your Ref :
Enquiries : David Carter (Ph 9264 7678)

16 June 2008

METROPOLITAN REGION SCHEME

City of Wanneroo

APPROVAL TO COMMENCE DEVELOPMENT

Name and Address of Owner and Land on which Development Proposed:

OWNER	:	Oakford Land Company P/L P O Box 6913 EAST PERTH WA 6892
LOT	:	8
LOCATION	:	Swan 2739
PLAN/DIAGRAM	:	53380
VOLUME/FOLIO	:	2132/850
LOCALITY	:	Wattle Ave, Nowergup
APPLICATION DATE	:	14 May 2007
APPLICATION REC'D	:	22 August 2007
Development Description	:	Sand & Limestone Extraction

The application for approval to commence development in accordance with the plans submitted thereto is granted subject to the following condition(s):

1. The Commission's approval is granted for a period of five (5) years from the date of this approval.

2. The co-ordination of finished ground levels, batters and buffers to accommodate the design and widening of Wattle Avenue and to integrate with adjoining sites to the specification of the City of Wanneroo and to the satisfaction of the Western Australian Planning Commission.

3. Wattle Avenue to be upgraded and constructed to the specification of the City of Wanneroo and to the satisfaction of the Western Australian Planning Commission.

4. Hours of work shall be limited to 07:00 - 17:00 hours Monday - Friday and 07:30 - 17:00 hours on Saturdays. Work is not permitted on Sundays and Public Holiday's without prior approval from the City of Wanneroo.

5. All stormwater shall be collected within the development site and disposed of on-site to the specification of the City of Wanneroo and to the satisfaction of the Western Australian Planning Commission.

Albert Facey House, 469 Wellington Street (cnr Forrest Place), Perth, Western Australia 6000
Tel: (08) 9264 7777; Fax: (08) 9264 7566; TTY: (08) 9264 7535; Infoline: 1800 626 477
e-mail: corporate@wapc.wa.gov.au; web address: http://www.wapc.wa.gov.au
ABN 35 482 341 493

Western Australian Planning Commission
50 spatial planning years

6. Dust mitigation measures being used to minimise dust nuisance to neighbours and surrounding land uses.

7. Disturbed areas shall be stabilised on completion and thereafter maintained to the specification of the City of Wanneroo and to the satisfaction of the Western Australian Planning Commission.

8. The development site is to be appropriately compacted and stabilised using clean fill only to the specification of the City of Wanneroo and to the satisfaction of the Western Australian Planning Commission.

9. The development site shall be excavated and rehabilitated in accordance with the Limestone Excavation and Rehabilitation Management Plan to the specification of the City of Wanneroo and to the satisfaction of the Western Australian Planning Commission.

10. The provision of a 50 - 100 metre landscape buffer of undisturbed vegetation during excavation between Bush Forever Site 293 and the development site, to the specification of the Department for Planning and Infrastructure's Strategic Biodiversity Planning Branch and to the satisfaction of the Western Australian Planning Commission.

11. Prior to the commencement of site works, a uniform fence is required to be constructed along the common boundary of the development site and the landscape buffer, with access via a gate on the south western side.

12. Site works, including construction, access and drainage shall not be deposited within Bush Forever Site 293.

If the development of the subject of this approval is not substantially commenced within a period of two years from the date of this letter, the approval shall lapse and be of no further effect. Where an approval has so lapsed, no development shall be carried out without the further approval of the responsible authority having first been sought and obtained.

for Moshe Gilovitz
Secretary
Western Australian Planning Commission

Albert Facey House, 469 Wellington Street (cnr Forrest Place), Perth, Western Australia 6000
Tel: (08) 9264 7777; Fax: (08) 9264 7566; TTY: (08) 9264 7535; Infoline: 1800 626 477
e-mail: corporate@wapc.wa.gov.au; web address: http://www.wapc.wa.gov.au
ABN 35 482 341 493

Western Australian Planning Commission

50 spatial planning years

ADVICE TO APPLICANT:

1. The City of Wanneroo advise that burning of cleared vegetation shall not be allowed without the prior written approval of the City. The applicant should refer to the Department of Environment and Conservation's guidelines for alternative methods of treating cleared vegetation.

2. All development must comply with the provisions of the City of Wanneroo District Planning Scheme No.2, Health Regulations, Building Code of Australia, Public Building Regulations and all other relevant Acts, Regulations and Local Laws.

3. In regard to Condition 6, the applicant is advised that the Department of Environment and Conservation has prepared dust control guidelines for development sites which outline procedures for the preparation of Dust Management Plans.

4. The Department of Environment and Conservation advise that clearing of native vegetation in Western Australia is prohibited, unless the clearing is authorised by a clearing permit obtained from the Department of Environment and Conservation, or is of a kind that is exempt in accordance with Schedule 6 or Regulation 5 (Clearing of Native Vegetation Regulations) of the Environmental Protection Act 1986. Please note, however, that exemptions in the Regulations do not apply in Environmentally Sensitive Areas.

5. The Department of Water advise that the proposed development is located within the Wanneroo Groundwater Area where there may be a requirement to obtain a Groundwater Licence for the use of groundwater. The issue of a Licence is not guaranteed but if issued will contain a number of conditions including the quantity of water that can be pumped each year. In the case of an existing Groundwater Well Licence for the subject site, it may be necessary to amend the purpose/area/holder of that licence. The applicant is encouraged to contact the Department's Swan Avon Region Office on 6250 8000 to discuss water management options.

Yours faithfully

for Moshe Gilovitz
Secretary
Western Australian Planning Commission

Albert Facey House, 469 Wellington Street (cnr Forrest Place), Perth, Western Australia 6000
Tel: (08) 9264 7777; Fax: (08) 9264 7566; TTY: (08) 9264 7535; Infoline: 1800 626 477
e-mail: corporate@wapc.wa.gov.au; web address: http://www.wapc.wa.gov.au
ABN 35 482 341 493

City of Wanneroo

LOCKED BAG 1
WANNEROO WA 6946
Telephone: (08) 9405 5000
Facsimile: (08) 9405 5499

File Number : P24/0022V02
Application Number : DA07/0674
Enquiries Officer : Aiton Sheppard 9405 5462

23 June 2008

KOLTASZ SMITH
PO BOX 127
BURSWOOD WA 6100

Proposed Development:	EXTRACTIVE INDUSTRY
Property Details:	259 WATTLE AVENUE NOWERGUP WA 6032
Land Parcel(s) Details:	Part Lot 8 D 53380 Vol 2132 Fol 850
Owner(s) Details:	OAKFORD LAND COMPANY PTY LTD

I refer to your Application for Planning Approval received by the City of Wanneroo on 26 July, 2007 and approved by the WA Planning Commission on 16 June, 2008.

You are advised that approval has now been **granted** under the provisions of the City of Wanneroo District Planning Scheme No 2. This Approval requires the development to be undertaken in accordance with the submitted application, the enclosed approved plan. Please note that this approval is also subject to compliance with the WA Planning Approval dated 16 June, 2008, and the following conditions:

1. Planning approval shall be limited to a period of five years from the date of the notice of approval and shall be subject to application being made for and the issue of an extractive industry licence in accordance with the City's Local Law.
2. The coordination of finished levels, batters and buffers to –
   a) Accommodate the design and widening of Wattle Avenue and to integrate with adjoining sites to the satisfaction of the City;
   b) Protect Bush Forever Site 293 by clearly delineating it on site with temporary fencing. (Note - *If this site is to be retained, it is suggested the buffer area of native vegetation is expanded to between 50m and 100m to reduce potential impact on natural drainage and to minimise edge affects).*
   c) Protect Lot 10 and its access leg to Wattle Avenue.
3. Upgrading of Wattle Avenue, and its extension to Lot 8, is to be designed, constructed and maintained to the satisfaction of the City.
4. Clearing of vegetation shall –
   a) Facilitate fauna movement to adjacent bushland, and is to take place when the main breeding/nesting time has finished.

b) Take place when dieback is less mobile. Machinery is to be washed down prior to entering the site.

c) Retain large hollows logs and the like for use as habitat in rehabilitation areas.

5. No burning of cleared vegetation shall be allowed without prior written approval from the City. The applicant to refer to DEP guidelines for alternative methods of treating cleared vegetation.

6. Hours of work shall be restricted to between 0700 and 1700 Mondays to Fridays, and between 0730-1700 on Saturdays. Work shall not be permitted on Sundays and Public Holidays without prior approval from the City.

7. All stormwater shall be contained on-site, to the satisfaction of the City. Erosion control measures shall be implemented to ensure no sand runoff into the road reserve.

8. The control of dust and sand drift in accordance with Department of Environment and Conservation (DEC) guidelines. Disturbed areas shall be stabilised on completion and thereafter maintained to the satisfaction of the City.

9. No construction work, plant, materials or earthworks (including batters), shall intrude onto adjacent land, road reserves or any proposed POS without the prior approval of the City.

10. Compaction and stabilisation shall be carried out to the satisfaction of the City. Only clean fill shall be used on site.

11. The site shall be progressively rehabilitated in accordance with the Limestone Extraction and Rehabilitation Management Plan prepared for the proponent by Landform Research and which was submitted with the application for planning approval.

FOOTNOTE – That the Water Corporation of WA be advised that the City will be undertaking studies with other agencies to determine the finished contour profile for surrounding land after quarrying of the basic raw material resources.

The City advises:

(a) It does not undertake to ascertain the validity of signatures nor the authority of the person(s) nominated as owner(s).

(b) In particular where the subject land is part of a strata or survey strata scheme, the applicant must ensure that there is authority to apply and to carry out the development (or building work) under the bylaws of the relevant strata company and any other relevant laws.

(c) The issue of a development approval (or building licence) does not cure any defect that may exist in the authority of the owner or applicant.

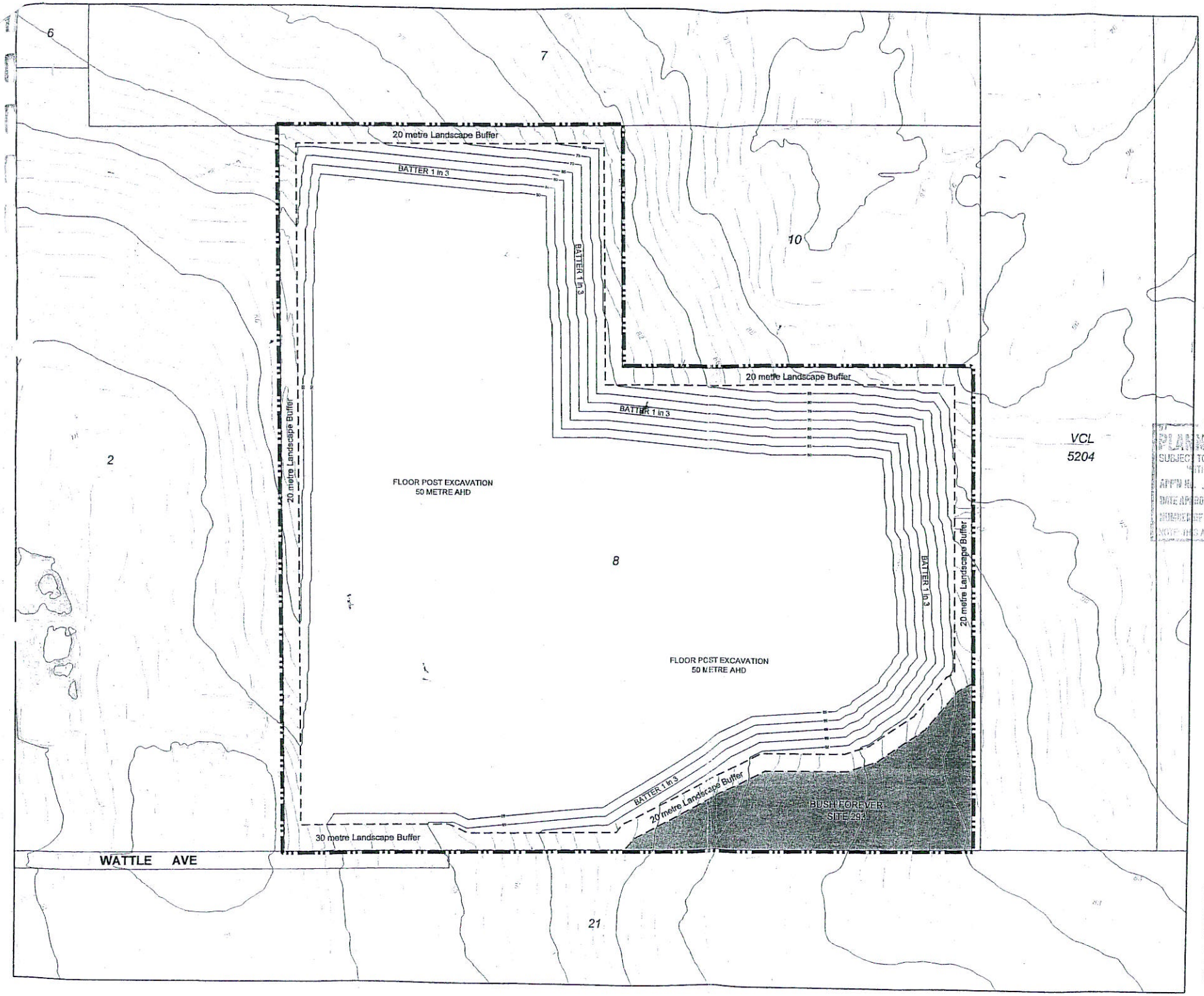
Unless otherwise specified, all conditions shall be complied with, by and at the cost of the owner, to the specification of and to the satisfaction of the City, before the development is occupied. Thereafter, maintenance and compliance with conditions of approval shall continue to the City's satisfaction.

This decision constitutes a planning approval only and is valid for a period of two (2) years from the date of this letter. If the subject development is not substantially commenced within the two (2) year period, the approval shall lapse and be of no further effect. Where an approval has so lapsed, no development shall be carried out without the further approval of the City having first been sought and obtained.

Planning approval does not, however, remove the need for approvals, licences, permits, etc, that may be required under other legislation.

Should the applicant be aggrieved by this decision, there is a right to apply for a review under the *Planning and Development Act 2005*. The application for review must be submitted in accordance with the Act and should be lodged within 28 days of the date of this decision to the State Administrative Tribunal, 12 St George's Terrace, Perth WA 6000. It is recommended that you contact the Tribunal for further details on telephone 9219 3111 or the website http://www.sat.justice.wa.gov.au/

Aiton Sheppard
SENIOR PROJECT PLANNER
Enc.



EXCAVATION DESIGN CONTOURS

Lot 8 Wattle Avenue
NOWERGUP

LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS
- PROPOSED CONTOURS
- LANDSCAPE BUFFER
- RESERVED BUSH FOREVER SITE

0 50 100 200m

-	CLIENT
1:4,000@A3	SCALE
22 May 2007	DATE
2919-5-004a	PLAN No
a	REVISION
M.Z	PLANNER
M.H	DRAWN

Base data supplied by Landgate
Aerial Photography dated January 2006, accuracy +/- 4m,
Projection MGA50

Areas and dimensions shown are subject to final survey calculations. All carriageways are shown for illustrative purposes only and are subject to detailed engineering design.

PLAN 2

koltasz smith
TOWN PLANNING · PROJECT MANAGEMENT
URBAN DESIGN · DEVELOPMENT CONSULTING
PERTH Tel. (08) 9486 2222 Email: perth@ksap.com.au

APPENDIX B

Extractive Industry Licence Renewal

City of Wanneroo

File Ref: 5437
Your Ref:
Enquiries: Jeremy Thompson – 9405 5311

19 October 2012

RPS Environment and Planning Pty Ltd
PO Box 465
Subiaco WA 6904

Attention: Scott Vincent

RENEWAL OF EXTRACTIVE INDUSTRY LICENCE: LOT 8 (259) WATTLE AVENUE, NOWERGUP

I refer to your application dated 25 June 2012, for renewal of the current extractive industry licence for Lot 8 (259) Wattle Avenue, Nowergup.

A renewal of the licence is attached.

Should you have any questions regarding this matter please contact Jeremy Thompson, Senior Project Planner, on 9405 5311.

Yours sincerely

John Corbellini
COORDINATOR PLANNING IMPLEMENTATION

City of Wanneroo

Local Government Act 1995

CITY OF WANNEROO - FORM 3

EXTRACTIVE INDUSTRY LICENCE

Licensee:	Oakford Land Company Pty Ltd
Mailing Address:	c/o RPS Scott Vincent PO Box 465 SUBIACO WA 2904
Operator	Oakford Land Company Pty Ltd PO Box 6913 EAST PERTH WA 6892
Land Description:	*Lot 8 Wattle Avenue, NOWERGUP*
Material to be Excavated:	*Limestone/Sand*
Term of Licence:	12 Months
Date of Expiry :	23 June 2013

This license is issued in accordance with the City of Wanneroo (the City) Local Law relating to Extractive Industries 1998 as amended (the Local Law), and is subject to the following conditions of approval. The Licensee is responsible for complying at its cost, with the Local Law and all conditions imposed under this license, to the satisfaction of the City.

1. The extractive industry shall operate in accordance with the City's Planning Approval DA2007/0674, dated 23 June 2008 (copy attached) and the conditions of this licence.

2. Excavation shall be in accordance with the ultimate design levels of Plan 2 of the submitted report entitled "Limestone Excavation and Rehabilitation Management Plan, Lot 8 Wattle Avenue, NOWERGUP" as amended and submitted on 4 January 2011. The coordination of finished levels, batters and buffers to –

   a) Accommodate the design and widening of Wattle Avenue and to integrate with adjoining sites to the satisfaction of the City;

b) Protect Bush Forever Site 293 by clearly delineating it on site with temporary fencing. (Note - If this site is to be retained, it is suggested the buffer area of native vegetation is expanded to between 50m and 100m to reduce potential impact on natural drainage and to minimise edge affects).

c) Protect Lot 10 and its access leg to Wattle Avenue.

3. A survey plan prepared by a licensed surveyor and an annual report shall be submitted by 23 June 2013 to depict the current ground levels of the subject site, details of the progress of rehabilitation, and that backfill is in accordance with condition 10 below.

4. Clearing of vegetation shall –

   a) Facilitate fauna movement to adjacent bushland, and is to take place when the main breeding/nesting time has finished.

   b) Take place when dieback is less mobile. Machinery is to be washed down prior to entering the site.

   c) Retain large hollows logs and the like for use as habitat in rehabilitation areas.

5. No burning of cleared vegetation shall be allowed without prior written approval from the City. The applicant to refer to DEP guidelines for alternative methods of treating cleared vegetation.

6. Hours of work shall be restricted to between 0700 and 1700 Mondays to Fridays, and between 0730-1700 on Saturdays. Work shall not be permitted on Sundays and Public Holidays without prior approval from the City.

7. All stormwater shall be contained on-site, to the satisfaction of the City. Erosion control measures shall be implemented to ensure no sand runoff into the road reserve.

8. The control of dust and sand drift in accordance with Department of Environment and Conservation (DEC) guidelines. Disturbed areas shall be stabilised on completion and thereafter maintained to the satisfaction of the City. The owner shall maintain a water allocation to the property, or secure a water supply to enable adequate dust control at all times.

9. No construction work, plant, materials or earthworks (including batters), shall intrude onto adjacent land, road reserves or any proposed POS without the prior approval of the City. No excavation works shall be carried out within 20 metres of a property boundary, or 40 metres of an abutting road reserve, without prior approval of the City.

10. Compaction and stabilisation shall be carried out to the satisfaction of the City. Only clean fill shall be used on site. All fill areas shall utilise inert fill, compacted to a 95% modified maximum dry density when tested in accordance with AS1289 E2.1-1977 and certified by a NATA registered laboratory. Unless otherwise approved by the City, the fill material shall be placed in 300mm layers and each layer compacted and appropriately tested.

11. The site shall be progressively rehabilitated in accordance with the Limestone Extraction and Rehabilitation Management Plan prepared for the proponent by Landform Research and which was submitted with the application for planning approval.

12. Denuded areas and areas compacted by machinery and vehicles, shall be deep ripped before being rehabilitated, covered with topsoil and revegetated with native species. The list of native species to be used for revegetation, together with details of seed mix and planting densities and patterns, shall be submitted to the City for approval before planting. Thereafter, plantings shall be managed and watered until well established.

13. No blasting or storage of explosives is permitted on site without the prior approval of the City and other appropriate authorities.

14. Pit walls shall be battered to a gradient no steeper than 1 in 3 as depicted on Plan 2, in the "Limestone Excavation and Rehabilitation Management Plan, Lot 8 Wattle Avenue, NOWERGUP" as amended and submitted on 4 January 2011.

15. Only minor servicing and repair of vehicles shall be allowed to occur on site.

16. All stockpiles and access roads on site shall be stabilised, using suitable dust suppression methods, to prevent dust nuisance. This includes storage in approved underground tanks, or in above ground tanks on a bunded hardstand area sufficient to contain any leaks, and constructed to Department of Environment specifications.

17. All fuel storage shall be in accordance with the Department of Environment and Conservation Water Quality Protection Note for Temporary Above Ground Fuel Storage in Public Drinking Water Source Areas.

18. Excavation works shall be operated in accordance with all aspects of the Environmental Protection Act (1986). This includes the implementation of measures to ensure adequate pollution controls relating to noise, dust and other environmental concerns.

19. A secure fence and warning signs shall be erected and maintained along the top and continuing around the edges of the excavation face prior to the face exceeding 1.5 metres in height. The warning signs shall be 1.8 metres high and 1 metre in width and shall be spaced no more than 200 metres apart.

20. Adequate sanitary facilities shall be provided for all employees.

21. Topsoil shall be directly transferred from excavation areas to rehabilitation areas where possible. Topsoil should not be stored for more than six months in order to preserve root stock.

FOOTNOTES:

1. The Licensee shall obtain a works approval from the Department of Environment and Conservation before any excavation commences under this Licence.

2. For your convenience, the current Planning Approval for the site is attached. You are reminded that the Planning Approval granted by the City will expire on 23 June 2013, and your Licence will not be renewed beyond that date unless another Planning Approval is granted. It is advisable to submit a new application for planning approval at least six months prior to the expiration of the current planning approval.

3. Three months before the expiry of this licence on 23 June 2013, an application for licence renewal shall be submitted to the City for consideration in accordance with the Local Law. The licence renewal shall include a survey plan (prepared by a licensed surveyor), which depicts the current ground levels of the subject site (demonstrating that material has not been excavated below the approved final contour levels), and details relating to the progress of rehabilitation.

4. Three month before the expiry of planning approval (DA2007/674) on 23 June 2013, an application for development approval shall be submitted to the City for consideration in accordance with the City of Wanneroo District Planning Scheme No 2 and the

5. For your convenience, extracts of Parts 6 and 7 of the Local Law are attached and should be referred to in relation to Prohibitions, Public Liability, and provisions of the Mines Safety and Inspection Act and the Environmental Protection Act.

6. In regard to condition 2 the "Limestone Excavation and Rehabilitation Management Plan, Lot 8 Wattle Avenue, NOWERGUP, July 2007" and correspondence submitted by RSP Scott Vincent on 4 January 2011 amending this document is attached.

John Corbellini
COORDINATOR PLANNING IMPLEMENTATION

19 October 2012

PART 6 - PROHIBITIONS

Prohibitions

17. Subject to any licence conditions imposed by the local government with respect to carrying on an extractive industry, a person -

(1) must not without the written approval of the local government, excavate within -

(a) 20 metres of the boundary of any land on which the excavation site is located;
(b) 20 metres of any land affected by a registered grant of easement;
(c) 40 metres of any thoroughfare;
(d) 50 metres of any watercourse, wetland, swamp or other water reserve; or
(e) 3 metres of the estimated maximum water table level as determined from time to time by the Water & Rivers Commission or otherwise as adopted by the local government.

(2) must -

(a) not remove any trees or shrubs within 40 metres (or such lesser distance as may be allowed, in writing, by the local government) of the boundary of any thoroughfare reserve on land in respect of which a licence has been granted, except for the purpose of constructing access thoroughfares, erecting buildings or installing plant for use in connection with the excavation and then only with the express approval of the local government and subject to any conditions which the local government may impose in accordance with clause 10;
(b) where the local government so requires, securely fence the excavation to a standard determined by the local government and keep the gateways locked when not actually in use in order to prevent unauthorised entry;
(c) erect and maintain warning signs along each of the boundaries of the area excavated under the licence so that each sign -
(i) is not more than 200 metres apart;
(ii) is not less than 1.8 metres high and not less than 1 metre wide; and
(iii) bears the words "DANGER EXCAVATIONS - KEEP OUT";
(d) except where the local government approves otherwise, drain and keep drained to the local government's satisfaction any excavation to which the licence applies so as to prevent the accumulation of water;
(e) not store, or permit to be stored, any explosives or explosive devices on the site to which the licence applies other than with the approval of the local government and the Department of Minerals and Energy;
(f) not fill or excavate, other than in accordance with the terms and conditions of the licence, the site plans and the works and excavation program approved by the local government;
(g) restore and reinstate the excavation site in accordance with the terms and conditions of the licence, the site plans and the works and excavation program approved by the local government;
(h) take all reasonable steps to prevent the emission of dust, noise, vibration and other forms of nuisance from the excavation site;
(i) otherwise comply with the conditions imposed by the local government in accordance with clause 10; and
(j) cease excavating and undertake the restoration and reinstatement of the site and comply with notices issued by the local government.
(3) must not carry out or permit to be carried out any blasting in the course of excavating unless -
(a) the local government has otherwise given approval in respect of blasting generally or in the case of each blast;
(b) subject to sub-clause (2), the blasting takes place only between the hours of 8.00 am and 5.00pm, or as determined by the local government, on Mondays to Fridays inclusive;
(c) the blasting is carried out in strict accordance with the AS2187 SAA

Explosives Code, the Mines Safety and Inspection Act 1994, the Environmental Protection Act 1986, and all relevant local laws of the local government; and
(d) in compliance with any other conditions imposed by the local government concerning -
(i) the time and duration of blasting;
(ii) the purposes for which the blasting may be used;
(iii) the methods of detonation and blasting;
(iv) the types of explosives to be used; and
(v) such other matters as the local government may reasonably require in the interests of the safety and protection of members of the public and of property within the district.
(4) must not carry out or permit to be carried out any blasting on a Saturday, Sunday or public holiday except with the prior approval of the local government.

PART 7 - MISCELLANEOUS PROVISIONS

Public Liability

18. (1) A licensee must have at all times a current public liability insurance policy taken out in the joint names of the licensee and the local government indemnifying the licensee and the local government for a sum of not less than $10,000,000 or such other sum as is approved by the local government in respect of any one claim relating to any of the excavation operations;
(2) The licensee shall provide to the local government a copy of the policy taken out under sub-clause (1), within 14 days after the issue of that policy and shall provide to the local government evidence of renewal within 14 days of each renewal date.

Mines Safety and Inspection Act and Environmental Protection Act

19. (1) In any case where the Mines Safety and Inspection Act 1994 or the Environmental Protection Act 1986 applies to any excavation carried on or proposed to be carried on at a site, the licensee in respect of that site must comply with all applicable provisions of that Act or those Acts; and
(2) In this clause, the Mines Safety and Inspection Act 1994 and the Environmental Protection Act 1986 include all subsidiary legislation made under those Acts.

END

APPENDIX C

Clearing Permit CPS 4924/2 Approval

GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 4924/2
Permit Holder:	Oakford Land Company Pty Ltd
Duration of Permit:	14 December 2012 – 14 December 2022

ADVICE NOTE:

The funds referred to in condition 11 of this permit are intended for the purchase of 95 hectares of Carnaby's cockatoo foraging habitat within the Shire of Gingin.

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I –CLEARING AUTHORISED

1. **Purpose for which clearing may be done**
   Clearing for the purpose of an extractive industry.

2. **Land on which clearing is to be done**
   Lot 8 on Diagram 53380 (Nowergup)

3. **Area of Clearing**
   The Permit Holder must not clear more than 15.54 hectares of native vegetation within the area hatched yellow on attached Plan 4924/2.

4. **Period in which clearing is authorised**
   The Permit Holder shall not clear any native vegetation after 14 December 2017.

5. **Application**
   This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

6. **Compliance with Assessment Sequence and Management Procedures**
   Prior to clearing any native vegetation under conditions 1, 2 and 3 of this Permit, the Permit Holder must comply with the Assessment Sequence and the Management Procedures set out in Part II of this Permit.

PART II – ASSESSMENT SEQUENCE AND MANAGEMENT PROCEDURES

7. **Avoid, minimise etc clearing**
   In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in order of preference:
   (a) avoid the clearing of native vegetation;

   (b) minimise the amount of native vegetation to be cleared; and

   (c) reduce the impact of clearing on any environmental value.

8. **Dieback and weed control**
When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of *weeds* and *dieback*:
(a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

(b) shall only move soils in *dry conditions*;

(c) ensure that no *dieback* or *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared; and

(d) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

9. **Wind erosion management**
The Permit Holder shall not clear native vegetation unless extractive activities begin within three months of the clearing being undertaken.

10. **Rehabilitation of area outside application**
Objectives
(a) The Permit Holder must undertake rehabilitation of the area hatched red on Plan 4924/2 in the first May following clearing permitted under this permit to establish an ecologically diverse and stable vegetation community that has similar structure and composition to the original native vegetation of the Neerabup area, including:
(i) establishment of *Xanthorrhoea preissii* understorey and *Banksia attenuata* overstorey; and
(ii) establishment of vegetation with similar floristic composition to Floristic Community Type 26a where appropriate conditions exist to reflect the adjacent threatened ecological community.

Targets and indicators
(b) In determining whether the *rehabilitation* has similar structure and composition to the original native vegetation of the Neerabup area as required under condition 10(a), the Permit Holder shall engage an *environmental specialist* to make an assessment against the completion criteria contained in Appendix 1 of this Permit according to the monitoring program required under condition 10(e).

Seeding and planting
(c) Seeding and *planting* shall be undertaken using *local provenance* seed and propagating material where practicable.

Monitoring
(d) Monitoring of *rehabilitation* shall be undertaken by an *environmental specialist* in Spring and commencing within six months of initial *rehabilitation* activities in accordance with the monitoring program in Table 4.

(e) Annual monitoring shall continue for five years or until completion criteria in Appendix 1 are met.

(f) Transects shall be established within the *rehabilitation* area hatched red on Plan 4924/2 and within adjacent *analogue sites*.

(g) Monitoring, including visual assessments and where necessary counts to determine the success of the *rehabilitation* and restoration within the area hatched red on Plan 4924/2, shall be undertaken of plant density, species composition, growth habit of each species, health of *revegetation*, plant deaths, *weed* infestation, areas of erosion and *dieback* presence.

Table 4 Monitoring program for the Rehabilitation area

Objective	Parameter	Frequency/Duration	Location	Purpose
Establishment of an ecologically diverse and stable vegetation community that has similar structure and composition to the original native vegetation of the Neerabup area.	Native flora • density • species composition • growth habit • health of revegetation • deaths.	During spring and within six months from initial rehabilitation with subsequent monitoring undertaken annually for five years or until completion criteria are met.	Establish monitoring sites within Rehabilitation area and analogue sites in adjacent remnant vegetation.	Monitor establishment of vegetation and compare progress to performance indicators and completion criteria.
	Weed infestation.	Establish analogue sites in adjacent remnant vegetation and compare annually in autumn (prior to winter rains) for five years or until completion criteria are met.	Establish monitoring sites within Rehabilitation area and analogue sites in adjacent remnant vegetation.	To monitor and compare presence and distribution of weeds.
	Areas of erosion	During Spring and within six months from initial rehabilitation with subsequent monitoring undertaken annually for five years or until completion criteria are met.	Susceptible areas within Rehabilitation area.	To monitor occurrence and extent of erosion.
	Dieback presence.	Opportunistically.	Susceptible species within Rehabilitation area.	To monitor presence and distribution of dieback in revegetation areas.

11. Monetary contributions to a fund maintained for the purpose of establishing or maintaining vegetation (offset)

Prior to undertaking any clearing authorised under this permit, the Permit Holder shall contribute documentary evidence to the CEO that funding of $100,000 has been transferred to the Department of Environment and Conservation to purchase land for the purpose of establishing or maintaining vegetation.

12. Retain vegetative material and topsoil, revegetation and rehabilitation

The Permit Holder shall:

(a) retain the vegetative material and topsoil removed by clearing authorised under this Permit and stockpile the vegetative material and topsoil in an area that has already been cleared.

(b) within six months following completion of the clearing authorised under this Permit *revegetate* and *rehabilitate* the area(s) that are no longer required for the purpose for which they were cleared under this Permit by:

(i) reshaping the surface of the land so that it is consistent with the surrounding 20 metres of uncleared land; and

(ii) ripping the ground on the contour to remove soil compaction; and

(iii) ripping the pit floor and contour batters within the extraction site; and

(iv) laying the vegetative material and topsoil retained under condition 12(a) on the cleared area(s); and

(v) deliberately *planting* and/or *direct seeding* native vegetation that will result in a similar species composition, structure and density of native vegetation to pre-clearing vegetation types in that area; and

(vi) ensuring only *local provenance* seeds and propagating material are used to *revegetate* and *rehabilitate* the area.

(c) within 24 months of undertaking *revegetation* and *rehabilitation* in accordance with condition 12(b) of this Permit:

(i) engage an *environmental specialist* to determine the species composition, structure and density of the area *revegetated* and *rehabilitated*; and

(ii) where, in the opinion of an *environmental specialist*, the composition structure and density determined under condition 12(c)(i) of this Permit will not result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, the Permit Holder must undertake additional *planting* or *direct seeding* of native vegetation in accordance with the requirements of condition 12(b)(v) and (vi) of this Permit.

(d) Where additional *planting* or *direct seeding* of native vegetation is undertaken in accordance with condition 12(c)(ii) of this Permit, the Permit Holder shall repeat condition 12(c)(i) and 12(c)(ii) within 24 months of undertaking the additional *planting* or *direct seeding* of native vegetation.

(e) Where a determination by an *environmental specialist* that the composition, structure and density within areas *revegetated* and *rehabilitated* will result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, as determined in condition 12(c)(i) and (ii) of this permit, that determination shall be submitted for the CEO's consideration. If the CEO does not agree with the determination made under condition 12(c)(ii), the CEO may require the Permit Holder to undertake additional *planting* and *direct seeding* in accordance with the requirements under condition 12(c)(ii).

PART III - RECORD KEEPING AND REPORTING

13. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit:

(a) In relation to the clearing of native vegetation authorised under this Permit:
   (i) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
   (ii) the date that the clearing commenced;
   (iii) the date the extraction operations ceased; and
   (iv) the size of the area cleared (in hectares).

(b) In relation to monetary contribution pursuant to condition 11 of this Permit, the date funds were transferred.

(c) In relation to the *revegetation* and *rehabilitation* of areas pursuant to conditions 10 and 12 of this Permit:
   (i) the location of any areas *revegetated* and *rehabilitated*, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
   (ii) a description of the *revegetation* and *rehabilitation* activities undertaken;
   (iii) the size of the area *revegetated* and *rehabilitated* (in hectares); and
   (iv) the species composition, structure and density of *revegetation* and *rehabilitation*

14. Reporting

(a) The Permit Holder must provide to the CEO on or before 1 July of each year, a written report:
   (i) of records required under condition 13 of this Permit; and
   (ii) concerning activities done by the Permit Holder under this Permit between 1 July to 30 June of the preceding financial year.

(b) Prior to 14 September 2022, the Permit Holder must provide to the CEO a written report of records required under condition 13 of this Permit where these records have not already been provided under condition 14(a) of this Permit.

DEFINITIONS

The following meanings are given to terms used in this Permit:

analogue site means a site used to compare the vegetation structure and composition with *rehabilitation* areas.

dieback means the effect of *Phytophthora* species on native vegetation;

direct seeding means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species;

dry conditions means when soils (not dust) do not freely adhere to rubber tyres, tracks, vehicle chassis or wheel arches;

environmental specialist means a person who is engaged by the Permit Holder for the purpose of providing environmental advice, who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit;

fill means material used to increase the ground level, or fill a hollow;

floristic community type means a vegetation community as described in Gibson, N, Keighery, B, Keighery, G, Burbidge, A and Lyons, M (1994). *A Floristic Survey of the Swan Coastal Plain.* Unpublished report for the Australian Heritage Commission.

local provenance means native vegetation seeds and propagating material from natural sources within 20 kilometres of the area cleared.

mulch means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation;

planting means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species;

regenerate/ed/ion means re-establishment of vegetation from in situ seed banks and propagating material (such as lignotubers, bulbs, rhizomes) contained either within the topsoil or seed-bearing *mulch*;

rehabilitate/ed/ion means actively managing an area containing native vegetation in order to improve the ecological function of that area;

revegetate/ed/ion means the re-establishment of a cover of *local provenance* native vegetation in an area using methods such as natural *regeneration*, *direct seeding* and/or *planting*, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area; and

weed/s means any plant -

(a) that is declared under section 37 of the *Agriculture and Related Resources Protection Act 1976*; or
(b) published in the Department of Environment and Conservation Regional Weed Assessments, regardless of ranking;
(c) or not indigenous to the area concerned.

Stuart Cowie
A/DEPUTY DIRECTOR GENERAL, ENVIRONMENT

Officer delegated under Section 20
of the Environmental Protection Act 1986

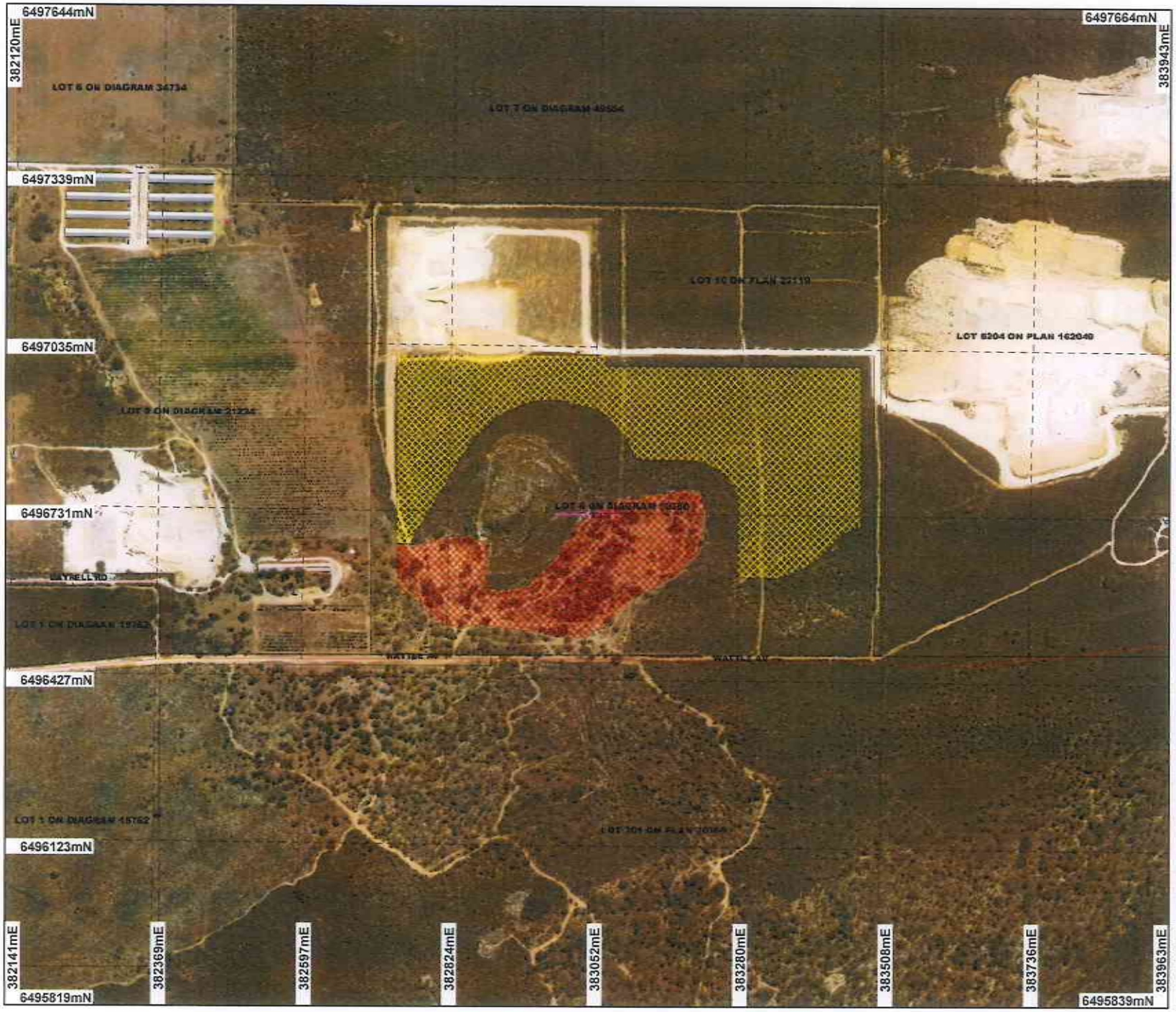
31 January 2013

APPENDIX 1
COMPLETION CRITERIA

Completion criteria have been determined to provide clear targets that must be met before related rehabilitation activities can cease. Completion criteria for the Rehabilitation area are:

- *Xanthorrhoea preissii* understorey and *Banksia attenuata* overstorey established at a similar density to analogue sites.
- vegetation with similar floristic composition to FCT 26a established where appropriate conditions exist.
- after three years vegetation within Rehabilitation area to achieve:
  * minimum density of 1 native plant per square metre when averaged over the Rehabilitation area
  * percentage foliage cover of native species indigenous to each vegetation unit to be greater than or equal to 80 per cent foliage cover compared to vegetation in analogue sites
  * vegetation structure comprising percentages of overstorey, midstorey and understorey comparable to vegetation structure in analogue sites
  * species richness of greater than or equal to 80 per cent compared to vegetation in analogue sites
  * weed species density and diversity similar to or less than analogue site
- revegetated landscape stable with minimal erosion.

Plan 4924/2



LEGEND

Clearing Instruments

- Areas Subject to Conditions
- Areas Approved to Clear
- Road Centrelines
- Local Government Authorities
- Cadastre for labelling

N

0 250 m

Scale 1:8785

(Approximate when reproduced at A4)

Geocentric Datum Australia 1994

(Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Date 31/1/13

S Cowie

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.

Department of Environment and Conservation

Our environment, our future

Department of Environment and Conservation

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 4924/2
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Oakford Land Company Pty Ltd

1.3. Property details

Property: LOT 8 ON DIAGRAM 53380 (House No. 259 WATTLE NOWERGUP 6032)
Local Government Area: City Of Wanneroo
Colloquial name:

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
15.54		Mechanical Removal	Extractive Industry

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 31 January 2013

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
Beard Vegetation Associations: - 949: Low woodland; banksia - 998: Medium woodland, tuart (Shepherd et al, 2001). Heddle Vegetation Complex: - Cottesloe Complex Central and South: Mosaic of woodland of E. gomphocephala and open forest of E. gomphocephala-E. marginata- C. calophylla; closed heath on the Limestone outcrops (Heddle et al. 1980).	The application is to clear 15.54 hectares of native vegetation for the purpose of limestone and sand extraction. The vegetation under application is considered to be in an excellent (Keighery, 1994) condition (DEC, 2012) The vegetation under application comprises of two communities, a Xanthorrhoea preissii and Banksia sessilis closed heath over limestone ridge and a Banksia woodland consisting of Banksia grandis and Banksia attenuata over Xanthorrhoea preissii on lower slopes of the ridge. Both recorded communities have dense shrub layers, with the vegetation including Calothamnus sp, Hibbertia sp and Acacia sp (DEC, 2012). Scattered Eucalyptus species were also recorded in the application area.	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)	The condition of the vegetation was established through a site inspection of the application area by Department of Environment and Conservation (DEC) officers on the 4 April 2012 (DEC 2012).

3. Assessment of application against clearing principles

Comments

The Department of Environment and Conservation initiated an administrative amendment to CPS 4924/1 relating to permit conditions 10 and 11 on 3 January 2013.

A review of current environmental information reveals no new additional information. Therefore the assessment

against the clearing principles has not changed and can be found in the Clearing Permit Decision Report for CPS 4924/1.

Planning instrument, Native Title, Previous EPA decision or other matter.

Comments

Administrative changes to permit conditions have been made to bring the conditions in line with current Department of Environment and Conservation practice.

4. References

DEC (2012) Site Inspection Report for Clearing Permit Application CPS 4924/1, Lot 8 Wattle Drive, Nowergup. Site inspection undertaken 4/04/2012. Department of Environment and Conservation, Western Australia (DEC Ref A594084)

Government of Western Australia (2011); 2011 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). WA Department of Environment and Conservation, Perth.

Heddle, E. M., Loneragan, O. W., and Havel, J. J. (1980) Vegetation Complexes of the Darling System, Western Australia. In Department of Conservation and Environment, Atlas of Natural Resources, Darling System, Western Australia.

Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

5. Glossary

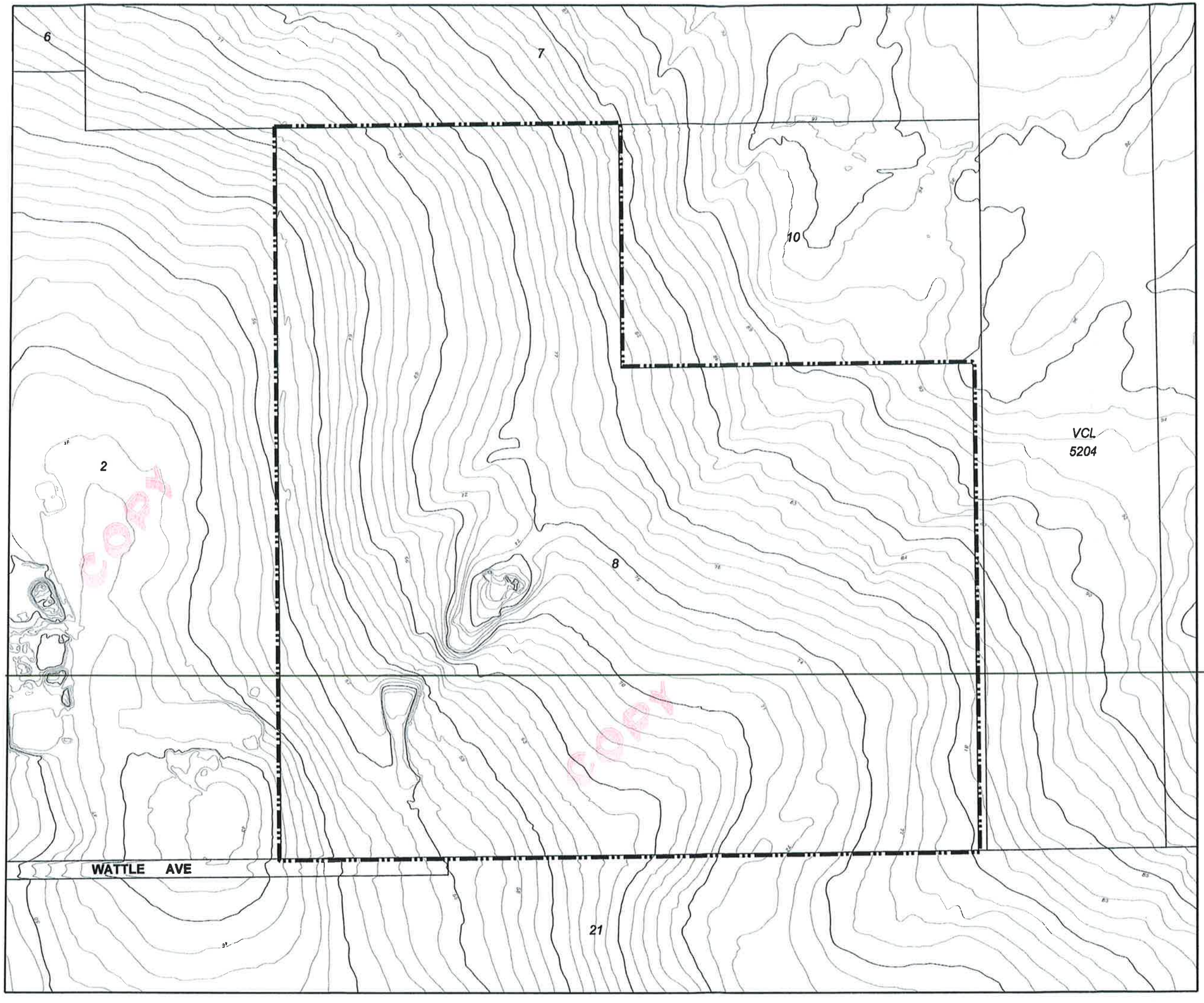
Term	Meaning
BCS	Biodiversity Coordination Section of DEC
CALM	Department of Conservation and Land Management (now BCS)
DAFWA	Department of Agriculture and Food
DEC	Department of Environment and Conservation
DEP	Department of Environmental Protection (now DEC)
DoE	Department of Environment
DoIR	Department of Industry and Resources
DRF	Declared Rare Flora
EPP	Environmental Protection Policy
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
TEC	Threatened Ecological Community
WRC	Water and Rivers Commission (now DEC)

APPENDIX D

Site Contours

EXISTING CONTOURS

Lot 8 Wattle Avenue
NOWERGUP



LEGEND

SITE BOUNDARY

0 50 100 200m

-	:	CLIENT
1:4,000@A3	:	SCALE
9 MARCH 2007	:	DATE
2919-5-003	:	PLAN No
-	:	REVISION
M.Z	:	PLANNER
M.H	:	DRAWN

Base data supplied by Landgate
Aerial Photography dated January 2006, accuracy +/- 4m,
Projection MGA50

Areas and dimensions shown are subject to final survey calculations. All carriageways are shown for illustrative purposes only and are subject to detailed engineering design.

PLAN 1

koltasz smith
TOWN PLANNING · PROJECT MANAGEMENT
URBAN DESIGN · DEVELOPMENT CONSULTING

PERTH Tel. (08) 9486 2222 Email: perth@ksap.com.au

APPENDIX E

Spring Flora and Vegetation Report

LOt 8 Wattle Ave Nowergup

Flora and Vegetation Assessment

October 2006

Report for Oakford Land Company

Regeneration Technology Pty Ltd

TABLE OF CONTENTS

BACKGROUND

Lot 8 Wattle Ave, Nowergup, (Figure 1) in the City of Waneroo is the site of a development proposal for sand and limestone extraction. The development proponents have commissioned Regeneration Technology to undertake an independent assessment of the flora and vegetation as a component of the application.

This study has been undertaken to satisfy a "Level 2 Survey' in accordance with the EPA guidance statement No 51 "Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia" to determine the suitability of the subject land for limestone extraction purposes.

The areas surrounding the remnant bushland of Lot 8 Wattle Ave includes existing quarries to the north east and west of the site, powto nia tree plantation and timber mill to the immediate west of the property and chicken farming and processing sheds. Bushland to the immediate east and south of the site is a Bush Forever site that forms part of a regional link within the proposed Gnangarra Park between Swan Hill to the west and Lake Neerabup to the east.

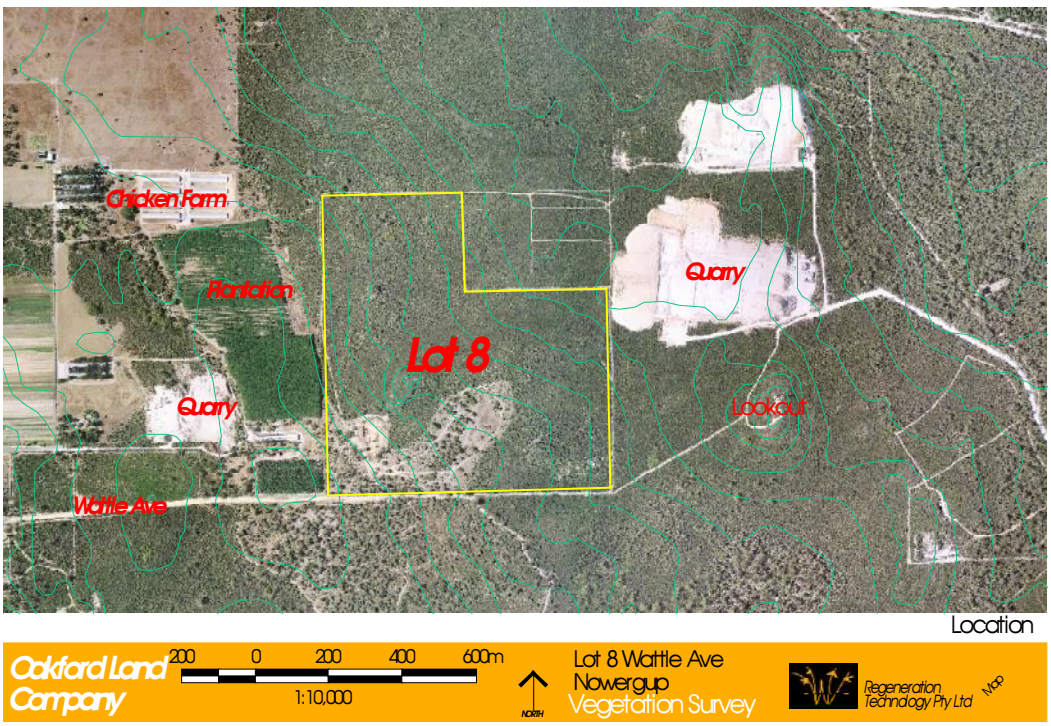


Figure 1. Location – Lot 8 Wattle Rd Nowergup

SITE DESCRIPTION

Lot 8 Wattle Ave Nowergup is a 52.5 ha lot that has been used for a variety of pursuits in the past. The lot is gently sloping from the southwestern corner (AHD 50m) on Wattle Ave to the north east (AHD 85m). The southern portion of the property has been cleared; old fencing through the bushland indicates the property may have been used for grazing and other agricultural purposes. Within the cleared southern section of the property is an abandoned sand quarry that contains numerous tracks and has been used for motor cross. Within the sand quarry and elsewhere on the property there are numerous dumped and burnt out cars in dicative of illegal and uncontrolled access. There is a small limestone hill in the center of the cleared section of the property that rises to the north of the sand quarry.

CLIMATE

Nowergup lies on the Swan Coastal Plain and has a warm Mediterranean clim ate characterized by having 5-6 dry summer months per year and winter precipitation averaging 600-100 mm per annum.

INTERIM BIOGEOGRAPHIC REGION (IBRA)

Biogeogrpahic Regions for Australia is a framework for conservation based on a bioregional context. Eighty-five bioregions within Australia have been recognized of which 26 occur within Western Australia. Lot 8 Wattle Rd Nowergup is within the middle portion of ***SWA – Swan Coastal Plain Bioregion,*** which is described as

"Low lying coastal plain, mainly covere d with woodlands. It is dominated by Banksia or Tuart on sandy soils, Allocasuarina obesa *on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. Warm Mediterranean. Thr ee phases of marine sand dune development provide relief. The outwash plains, once dominated by* A. obesa*-marri woodlands and Melaleuca shrublands, are extensive only in the south"*

SOILS

The underlying geology of the area is Tamala Limestone, which is forme d from calcareous beach sands. Calcrete can occur on ridges with the re -precipitation of calcium carbonate, this can result in minor pinnacle formation. Sands derived from the Tamala limestone make up the geomorphological system known as Spearwood Dunes (after McArthur and Bettenay 1960). This system typically occurs beyond the primary coastal dune system (Quindalup dunes).

The soils of Lot 8 Wattle Ave, Nowergup were not mapped as part of this study but were recorded as; white and yellow sands with limes tone boulders. Cleared fire breaks and access tracks across the site showed blocky limestone in amongst the sand.

VEGETATION

The importance of the soils with regard to the vegetation is that vegetation units often closely approximate the distribution of particular soil types. Vegetation complexes have been arranged by Heddle et al (1980) in accordance with the major geomorphic units. The geomorphic unit of Lot 8 Wattle Ave, (as per Heddle et al (1980)) is the Spearwood Dunes - Cottesloe complex central and southern. The Cottesloe complex – Central and South is described as : '*Mosaic of woodland of* E. gomphocephala *and open forest of* E.gomphocephala - E. marginata – C. calophylla; *and closed heath on limestone outcrops'*

FLORISTIC COMMUNITY TYPES

Floristic Community Types (FTC's) of the Swan Coastal Plain have been determined as a result of a study by Gibson et al (1994). This study considered patterning of plant distribution based on analysis of species occurrence in 509 100m ^{2} plots and used multi-variant analysis to group the occurrence of species. The grouping of the species has been used to assign FTC's to vegetation complexes on the Swan Coastal Plain.

Three FTC's as described in Gibson et al (1994) inferred as occurring on within the vicinity of Lot 8 Wattle Ave Nowergup, they are:

1. FTC 24 - Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands;
2. FTC 26a – *Melaleuca huegellii – Melaleuca systena* shrublands on limestone ridges;
3. FCT 27 – Species poor mallees and shrublands on limestone.
4. FTC 28 – Spearwood *Banksia attenuata* or *Banksia attenuata – Eucalyptus* Woodlands.

These FTC's are centered on the uplands of Spearwood and Quindalup dunes.

THREATENED ECOLOGICAL COMMUNITIES

There are twenty-eight Threatened Ecological Communities listed by the Department of Conservation and Environment's Threatened Ecological Community database as occurring on the Swan Coastal Plain. Of these one is known to occur within proximity of Lot 8 Wattle Rd. This is Floristic Community Type 26a as described by Gibson et al (1994).

Floristic Community Type 26a (see above) is listed as an Endangered Ecological Community with CALM. FTC 26a is not listed as a TEC under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

An endangered community has been defined by English and Blyth (1999) as:

"*An ecologcial community which has been adequately surveyed and found to have been subject to a major contraction in area and/or was orinignally of limited distribution and is in danger of significant modification throughout it's range or severe modification or destruction over most of it's range in the near future"*

(See Appendix 1 for explanation of all categories of communities)

DECLARED RARE AND PRIORITY LISTED FLORA SPECIES

A database search of the Department of Conservation and Land Management' Declared Rare and Priority Flora records indicated there are possibly seven priority taxa (see Appendix 2 for explanation of Conservation Codes for Rare and Priority Listed Flora) that may be present on the site. They are listed in Table 1.

Species	Conservation Status Code
Eucalyptus agutifolia	R
Chorizema vaium	R
Diuris micrantha ms	R
Haloragis aculeolata	2
Hibbertia spicata subsp *leptotheca*	3
Melaleuca sp Yanchep (GJ Keighery 11242)	2

Table 1. Results of rare and priority listed flora search for Lot 8 Wattle Rd, Nowergup.

SURVEY METHOD

RARE AND PRIORITY LISTED FLORA

Species identified by the CALM's data base search were studied prior to ground truthing the property to ensure familiarization with the species that may be present.

FIELD SURVEY

A recent aerial photo was examined before visiting the site to determine the context of the property in the regional setting and to identify major structural units present. A grid system of waypoints was set up over the aerial photo and downloaded into a GPS to ensure a thorough coverage of the site during ground truthing. The site was visited on 3 separate occasions (8 Sep 2006, 20 Sep2006 and 4 Oct 2006) by Georgina Nielssen.

The survey area was traversed along transects by foot. Flora was systematically collected from across the property ensuring that all structural units identified from aerial photography were sampled.

The following information was recorded;

- waypoint number;
- photo number;
- plant species;
- vegetation condition;

- aspect, landform and soil.

Dominant species and vegetation structure were recorded and referenced using a GPS at numerous locations across the property in order to map the vegetation units.

In addition 5 10x10m quadrats were set up and examined in detail using the Gibson et al (1994) methodology. Each of these quadrats was marked in the north western corner with a 10 inch steel nail for future reference if required. Species were recorded directly onto field sheets. Where they could not be readily identified a sample was collected for further identification.

Vegetation condition was scored using Keighery's scale (Bush Forever, Vol 2, 1994), which assigns the following scales;

Scale		**Description**
1	Pristine	No obvious sign of disturbance
2	Excellent	Vegetation structure intact, disturbance affecting individual species and are no aggressive weed species.
3	Very Good	Vegetation structure altered, obvious signs of disturbance.
4	Good	Vegetation structure significantly altered by obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
6	Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost without native species. These areas are often described as parkland cleared with the flora comprising of weed or crop species with isolated native trees or shrubs.

WETLANDS

The *Geomorphic Wetlands of the Swan Coastal Plains* dataset was used to identify the location and proximity of wetlands to the site.

TUARTS

The *Tuart Atlas* dataset was used to identify the location and proximity of tuart populations that may be of conservation significance.

MAPPING

All mapping was undertaken in Arcview over an aerial photo base at a scale of 1:2000. Field data collected and referenced using a GPS was used as an aid to identify the boundaries of the vegetation units and bushland condition.

RESULTS

FLORA

A total of 35 families and 96 plant taxa (appendix 3) were recorded in the study area. Of these 10 taxa were recorded as weed species.

DECLARED RARE AND PRIOIRTY LISTED FLORA

No declared rare flora was identified as being present on the site. Several groves of small mallees occur on Lot 8 Wattle Ave. These mallees were identified as being *Eucalyptus petrensis* and *Eucalyptus foecunda* and not the rare species, *Eucalyptus agutifolia.*

One priority-listed flora species were identified as being present on the site: *Jacksonia sericea* (P3).

VEGETATION UNITS

Three vegetation units were defined and mapped within the survey area (Figure 2). They are:

1. **Open heath** - Open heathland of of *Xanthorrhea preissii* and *Dryandra sessilis* over *Acacia pulchella* and *Hibbertia hypericoides* on grey to yellow sands with limestone.
2. **Woodland** - *Eucalyptus marginata* and *Banksia attenuata* woodland over *Hibbertia hypericoides, Acacia pulchella* and weed species on grey to yellow sands; and
3. **Open Woodland** - *Eucalyptus marginata* open woodland over cleared pasture on grey to yellow sands;

The open woodland over cleared pasture is most likely to have been similar to the *Eucalyptus marginata* and *Banksia attenuata* woodland prior to clearing however with no native understorey and few remaining trees it is difficult to assign a vegetation community and this vegetation unit has been mapped as parkland cleared (Figure 2)

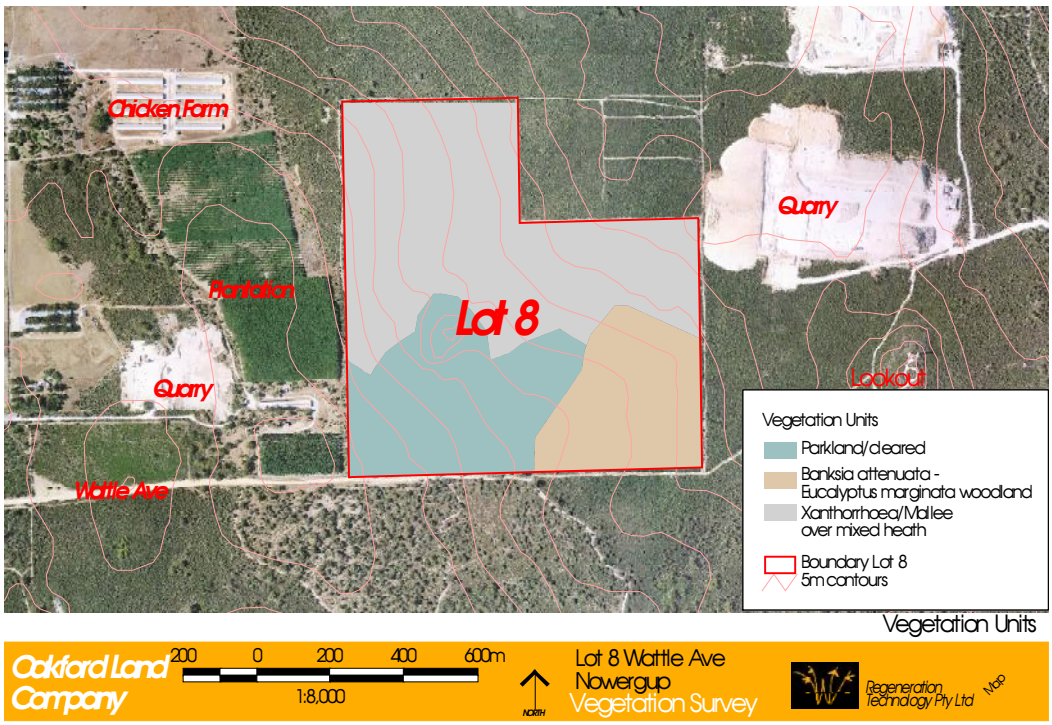


Figure 2 Vegetation units – Lot 8 Wattle Ave Nowergup.

Photo 1. ***Xanthorrhoea preissii*** **and** ***Dryandra sessilis*** **Heath**

Photo 2. ***Eucalyptus marginata*** **–** ***Banksia*** **Woodland**

Photo 3. *Eucalyptus marginata* open woodland *(*Parkland Cleared)

BUSHLAND CONDITION

The bushland condition of Lot 8 Wattle Ave Nowergup ranged f rom 2 (excellent) to 6 (completely degraded or parkland cleared) (Figure 3). The bushland condition of the northern section of the site was the least disturbed with only minor weed encroachment. It is possible this section is regenerated bushland and may have been completely cleared in the past. There is evidence of old fencing in the midst of the bushland as well as scattered bulbous weeds such as *Gladioli* that would normally not penetrate beyond the edges. Grass weeds were present throughout the condi tion - 2 bushland however the weed load was not considered to have significantly impacted upon the overall bushland condition.

The southern section of the property been impacted by multiple ongo ing distrurbance factors and is in poorer condition than the northern section of the p roperty. There are areas within the southern section of the property that have been completely cleared of all vegetation and areas that have only trees and occasional *Xanthorrhoea* present. These areas were assessed as having a bushland condition of 6 (completely degraded or parkland cleared).

The bushland on southeastern section of the property was identified as being the most complete remnant on the southern section of Lot 8 Wattle Ave, having both and overstorey and understorey, however the weed load in this area was recorded as being significantly higher than in the northern section of the property. The high weed load is most likely to be due to past land management practices such as clearing, grazing, uncontrolled access, and frequent fires.

It is evident from the large numbers of dumped bu rnt out cars that illegal and uncontrolled access has been ongoing for a number of years and has contributed to the decline in the bushland condition especially in the southern section of the property. In addition an abandoned sand quarry with burnt out c ars and a high weed load has negatively impacted on the bushland condition of the site.

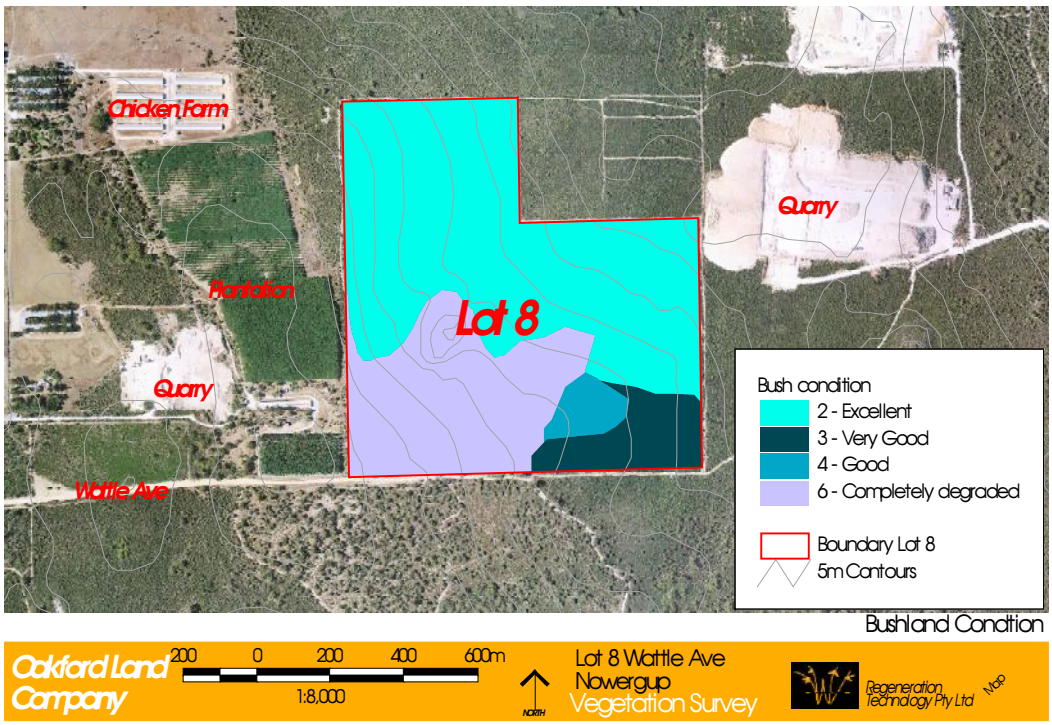


Figure 3 Bushland Condition – Lot 8 Wattle Rd, Nowergup

Photo 4 Abandoned sand quarry

Photo 5 Dumped cars

WETLANDS

No wetlands were identified on the site during ground truthing. No vegetation indicative of wetlands or damplands was found on the site. The *Geomorphic Wetlands of the Swan Coastal Plains* has no wetlands mapped on Lot 8 Wattle Ave.

TUARTS

The *Tuart Atlas Dataset* has Tuart populations mapped to the south and west of Lot 8 Wattle Ave. A single Tuart tree was recorded as being present on the site and as such there is no population of Tuarts of conservation significance (as defined by Ecoscape 2004) found to occur on the site.

DISCUSSION

Lot 8 Wattle Ave, Nowergup, occurs within the Cottesloe complex of the Spearwood dunes. The property is roughly divided into the northern and southern sections. The northern section of the property supports a more complete remnant with minimal disturbance and the southern section of the property, which has a different vegetation community to the north but has been impacted over a long period of time by multiple high impact disturbances.

Land use in the surrounding area includes, market gardens to the west, exotic timber plantations, chicken farming and processing, and limestone quarrying to the east. Lot 8 Wattle Ave, is at the end of an isolated sparsely populated road that has been subject to antisocial activities such as rubbish and car dumping.

FLORA

The site was visited on three occasions during the Spring of 2006. Systematic ground truthing on foot was undertaken on each occasion and notes on the species present and collections (where required for further identification) were made during each of the visits.

A total of 35 families and 96 species were identified as being present on the site. Of these 10 species were identified as weeds. Weed species were only collected and identified from the bushland remnants and as such the ten identified species may be an under representation of weeds present in the cleared areas.

No declared Rare Flora species were located during this survey. One priority listed species that was not identified in the database search were identified as being present they are: *Jacksonia sericea* (P3). This species is currently considered to be endangered (see definitions Appendix 1). *Jacksonia sericea* is restricted to the Swan Coastal Plain making it vulnerable. It occurs in the *Eucalyptus marginata – Banksia* woodland in the south eastern corner of Lot 8 Wattle Ave.

VEGETATION COMMUNITIES

Three vegetation units were recorded identified on Lot 8 Wattle Ave (Figure 2). They are:

1. **Open heath** Open heathland of of *Xanthorrhea preissii* and *Dryandra sessilis* over *Acacia pulchella* and *Hibbertia hypericoides* on grey to yellow sands with limestone.
2. **Woodland** *Eucalyptus marginata* and *Banksia attenuata* woodland over *Hibbertia hypericoides, Acacia pulchella* and weed species on grey to yellow sands; and
3. **Open Woodland** *Eucalyptus marginata open woodland* over cleared pasture on grey to yellow sands;

The vegetation units of Lot 8 Wattle Rd, Nowergup followed the Cottesloe Complex central and south as identified by Heddle et al (1980). The delineation of the vegetation units identified was based on a thorough system of ground truthing the site on foot along transects. There was no distinct boundary between the vegetation communities with the understorey component changing subtlety with the change in the overstorey. On the northern sections of the property there was very little overstorey present, where the overstorey was present it occurred as patches of Banksia and Mallees mainly on the higher ridges. The understorey to on the western side of Lot 8 Wattle supported species more commonly found in coastal communities such as *Acanthocarpus preissii* and *Hemiandra pungens* however the difference in the species composition did not warrant allocation of a separate vegetation unit.

The vegetation units identified on Lot 8 Wattle Ave most closely approximate the following vegetation communities as described by Gibson et al (1994).

1. **FCT – 26b** Woodlands and Mallees on Limestone; and
2. **FCT – 28** Spearwood *Banksia attenuata – Eucalyptus* woodlands.

Quadrat data from five randomly selected locations across the site as well as the overall species collection was compared to the Gibson et al dataset in order to assign a Floristic Community Type (FCT). The closest FCT match for the quadrats was determined by the number of species the Gibson et al dataset and the quadrats had in common no weighting was given to individual species or groups of species in the anaylsis. The closest approximation in terms of species composition and site description was FCT – 26b Woodlands and Mallees on limestone.

BUSHLAND CONDITION

Bushland condition across the site ranged from 2 (Excellent) to 6 (Completely degraded (Figure 3). The southern section of the site has been impacted by multiple disturbances over an extended period of time including: clearing, grazing, sand quarrying activities, uncontrolled access, fire, weeds (in particular Patersons Curse) and rubbish dumping. The impact of the disturbance factors has rendered the bushland in a condition that would be difficult without major intervention to return it to near natural state.

The bushland to the north of the site is in better condition with minimal disturbances noted. Old fencing, the lack of an overstorey, the dominance of *Xanthorrhoea* and the presence of weeds throughout the site such as grasses and *Gladioli* indicate the northern section of the property may have been cleared in the past (20years +) and or grazed.

There is no evidence of recent or frequent fires in the northern section of the property. Frequent fires in this type of vegetation will often result in monocultures of some of the pioneering species such as *Dryandra sessilis.* No dominance of *Dryandra sessilis* was noted during this survey however the lack of size of the individual plants was indicative that the vegetation had either been cleared or burnt in the past (10years+).

FRAGMENTATION

Lot 8 Wattle Rd Nowergup is a partially cleared lot that occurs within a larger remnant that extends to the north and east of the property. The southeastern corner of the property and land to the south of Lot 8 Wattle Ave has been mapped as being part of Bush Forever site 293. The Bush Forever site 293 is as part of the proposed Gnangarra Park and forms a link between Swan Hill and Lake Neerabup. The section of Lot 8 that is within the Bush Forever site 293 supports the *Eucalyptus marginata – Banksia* woodland, (which closely approximates **FCT – 28** Spearwood *Banksia attenuata – Eucalyptus* woodlands). FCT 28 is considered as well reserved and low risk (Gibson et al, 1994).

To the east of Lot 8 Wattle Ave is a deciduous exotic timber plantation and mill. With no native understorey this plantation provides no habitat or refuge for local flora or fauna.

WETLANDS

There are no wetlands (Geomorphic wetlands of the Swan Coastal Plan dataset) on Lot 8 Wattle Ave Nowergup. Neerabup Lake occurs approximately 1.5km to the west of Lot 8. There are no surface drainage lines from Lot 8 that flow directly towards Neerabup Lake

RECOMMENDATIONS/GUIDELINES

It is recommended that if a license for an extractive industry be granted for this site that:

- Unnecessary clearing of vegetation beyond that which is strictly required be avoided;
- Clearing and site layout design should ensure the minimization of edge effects and should where possible utilise areas that are already cleared or degraded;
- Topsoil, logs, and plant material cleared from the site should be directly replaced elsewhere on the site in disturbed areas, where this is not possible they should be stockpiled and used for rehabilitation works on the site within a year.

- The site should be rehabilitated using species listed for eac h community in appendix 3;
- Seed collection and plant propagules for rehabilitation works should be collected from the site or bushland within the surrounding area to ensure local provenance of species replanted.;
- A vegetated buffer should be maintained whe re practical along the northern and western boundaries of the site to reduce noise and dust effects on neighbours.

REFERENCES

Department of Environmental Protection (2000) Bush Forever Volume 2. Department of Environmental Protection. Perth Western Austr alia.

Environment Australia (2000) *Revision of Interim Biogeographic Rationalisation for Australia (IBRA) and Development of Version 5.1. Summary Report.*

Gibson, N., Keighery, B., Keighery, G., Burbidge, A., and Lyons, M. (1994) A Floristic Survey of the Swan Coastal Plan. Unpublished Report for the Australian Heritage Commission.

Heddle, E.M., Loneragan, O.W., and Havel, J.J., (1980) Vegetation Complexes of the Darling System, Western Australia. Atlas of Natural Resources Darling System Western Australia. Department of Conservation and Environment.

Ecoscape (2004) Tools for Identifying Tuart populations of conservation significance on the Swan Coastal Plain.

APPENDIX 1

The Department of Conservation and Land Management's conservation codes for Flora in Western Australia

CONSERVATION CODES

R: Declared Rare Flora - Extant Taxa

Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

X: Declared Rare Flora - Presumed Extinct Taxa

Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.

1: Priority One - Poorly known Taxa

Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

2: Priority Two - Poorly Known Taxa

Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

3: Priority Three - Poorly Known Taxa

Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

4: Priority Four - Rare Taxa

Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors . These taxa require monitoring every 5-10 years.

APPENDIX 2

Definitions of the status of the threat to ecological communities (English and Blyth 1999) in Bush Forever (2000)

Category	Definition
1 – Presumed Totally Destroyed	*"An ecological communit,y which has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout it's range that no occurrence of it is likely to recover it's species composition and/or structure in the forese eable future"*
2 - Critically Endangered	*"An ecological community which has been adequately surveyed and found to have been subject to a major contraction and/or was originally of limited distribution and is facing severe modification or destruction throughout it's range in the immediate future, or is already severely degraded throughout it's range but capable of being substantially restored or rehabilitated"*
3 - Endangered	*" An ecological community which has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout it's range or severe modification or destruction over most of it's range in the near future.*
4 - Vulnerable	*"An ecological community which has been adequately surveyed and found to be declining and/or has declined in the distribution and/or condition ands whose ultimate security has not been assured and/or a community which is still widespread but is believed to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout it's range."*
5 – Data Deficient	*"An ecological community for which there is an inadequate data to assign it to one of the above categories and/or which is not yet evaluated. (Usually an ecological community with poorly known distribution or biology that is suspected to belong to any of the above categories. These ecological communities have a priority for survey and/or research.)"*
6 – Lower Risk	*"A community which has been adequately surveyed and evaluated and available information suggests that it does not qualify"*

APPENDIX 3

Species list for Lot 8 Wattle Ave Nowergup

*Denotes a weed species

Family	Species
ANTHERIACEAE	*Sowerbaea laxiflora*
	Thysanotus manglesianus
	Tricoyne elatior
ASPARAGACEAE	**Asparagus aparagoides*
ASTERACEAE	*Podolepis gracilis*
	**Ursinia anthemoides*
	Waitzia citrina
	**Arthoteca calendula*
BORAGINACEAE	**Echium plantagineum*
BRASSICAEAE	*Heliophila pulsilla*
CARYOPHYLLACEAE	**Petrorhagia relutina*
CASUARINACEAE	*Allocasuarina fraseriana*
	Allocasuarina humilis
COLCHICACEAE	*Burchardia umbellata*
CYPERACEAE	*Lepidosperma squamatum*
	Mesomelaena stigia
	Schoenus gandiflorus
DASYPOGONACEAE	*Acanthocarpus preissii*
	Lomandra hermaphrodita
DILLENIACEAE	*Hibbertia hypericoides*
	Hibbertia racemosa
EPACRIDACEAE	*Leucopogon assimilis*
	Leucopogon parviflorus
	Leucopogon pendulus
	Leucopogon polymorphis
	Leucopogon propinquus
	Lysinema ciliatum
EUPHORBIACEAE	**Anagalis arvensis*
	Phyllanthus calycinus
GERANIACEAE	*Gernaium solonderi*
	Pelargonium capitatum
GOODENIACEAE	*Leschenaultia linariodes*
HAEMODORACEAE	*Anigozanthos humilis*
	Conostylis aculeata
	Conostylis candicans

	Conostylis setigia
IRIDACEAE	**Gladiolus caryophyllaceus*
	Orthrosanthus laxus
	Patersonia occidentalis
	**Romulea rosea*
LAMINACEAE	*Hemiandra pungens*
LORANTHACEAE	*Nuytsia floribunda*
MENYANTHACEAE	*Opercularia vaginata*
MIMOSACEAE	*Acacia cochlearis*
	Acacia pulchella
MIMOSACEAE	*Acacia rostellifera*
MYRTACEAE	*Eucalyptus foecunda*
	Eucalyptus gomphocephala
	Eucalyptus marginata subsp marginata
	Eucalyptus petrensis
	Kunzea ericifolia
	Melaleuca huegelii
	Melaleuca systena
ORCHIDACEAE	*Caladenia flava*
	Diuris magnifica
	Drosera macrantha
	Elythanthera brunonis
	Pterostylis aff nana
PAPILIONACEAE	*Bossiaea eriocarpa*
	Dillwynia sp "A Perth Flora"
	Gompholobium tomentosum
	Hovea trisperma
	Jacksonia sericia
	Kenneida prostrata
	Nemcia reticulata
	Sphaerolobium medium
	Trifolium campestre
	Viminaria juncea
PHORMIACEAE	*Dianella revolta*
POACEAE	*Austrostipa flavescens*
	**Briza maxima*
	**Ehrharta longifolia*
POLYGONACEAE	*Comesperma cconfertum*
PROTEACEAE	*Banksia attenutata*
	Banksia grandis
	Calothamnus quadrifidus
	Calothamnus sanguineus

	Dryandra linleyana subsp lindleyana
	Dryandra sessilis
	Grevillea preissii
	Hakea lissiocarpa
	Hakea prostrata
	Hakea ruscifolia
	Hakea trifuncata
	Hakea varia
	Petrophile macrostachya
	Petrophile macrostachya
RESTIONACEAE	*Desmocalsus flexuosa*
RHAMINACAE	*Spyridium globulosum*
STACKHOUSIACEAE	*Tripteroccus brunonis*
STYLIDACEAE	*Stylidium sp*
	Stylidium violaceum
XANTHORRHOEACEAE	*Xanthorrhoea preissii*
ZAMIACEAE	*Macrozamia riedlei*

APPENDIX F

Clearing Permit CPS 2807/2 Approval

GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose permit number:	CPS 2807/2
Permit holder:	Oakford Land Company Pty Ltd (ACN 113 593 883)
Duration of permit:	30 December 2008 – 30 December 2013

The permit holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I – CLEARING AUTHORISED

1. Purpose for which clearing may be done

Extractive Industry

2. Land on which clearing is to be done

Lot 8 on Diagram 53380

3. Area of Clearing

The permit holder must not clear more than 9.96 hectares of native vegetation within the area hatched yellow on attached Plan 2807/2.

4. Application

This Permit allows the permit holder to authorise persons, including employees, contractors and agents of the permit holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

5. Compliance with Assessment Sequence and Management Procedures

Prior to clearing any native vegetation under conditions 1, 2 and 3 of this Permit, the permit holder must comply with the Assessment Sequence and the Management Procedures set out in Part II of this Permit.

PART II – ASSESSMENT SEQUENCE AND MANAGEMENT PROCEDURES

6. Avoid, minimise etc clearing

In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in order of preference:
(a) avoid the clearing of native vegetation;
(b) minimise the amount of native vegetation to be cleared; and
(c) reduce the impact of clearing on any environmental value.

7. Staged Clearing

The Permit Holder shall not clear native vegetation unless actively mining the area to be cleared within six months of the clearing.

8. Retention, revegetation and rehabilitation

(a) The Permit Holder shall retain the vegetative material and topsoil removed by clearing authorised under this Permit and stockpile the vegetative material and topsoil in an area that has already been cleared.

(b) Within twelve months of the area no longer being required for sand or limestone extraction, the Permit Holder must revegetate and rehabilitate the area cross-hatched yellow on attached Plan 2807/2 by:

(i) deliberately laying the vegetative material and topsoil retained under condition 8(a) on the cleared area;
(ii) deliberately planting and/or direct seeding native vegetation that will result in a similar species composition, structure and density of native vegetation to pre-clearing vegetation types in that area; and
(iii) ensuring only local provenance seeds and propagating material sourced from within 10 kilometres of the area cleared are used to *revegetate* and rehabilitate the area.

(c) Within twelve months of undertaking *revegetation* and rehabilitation in accordance with condition 8(b) of this Permit, the Permit Holder must:

(i) determine the species composition, structure and density of the area *revegetated* and rehabilitated; and
(ii) where, in the opinion of an *environmental specialist*, the composition structure and density determined under condition 8(c)(i) of this Permit will not result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, the Permit Holder must undertake additional planting or direct seeding of native vegetation in accordance with the requirements of condition 8(b)(ii) and (iii) of this Permit.

PART III - RECORD KEEPING AND REPORTING

9. Records must be kept

(a) The Permit Holder must maintain the following records for activities done pursuant to this Permit in relation to the clearing of native vegetation authorised under this Permit:

(i) the species composition, structure and density of the cleared area;
(ii) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;
(iii) the date that the area was cleared; and
(iv) the size of the area cleared (in hectares).

(b) In relation to the *revegetation* of areas pursuant to condition 8:

(i) the location of any area *revegetated* recorded using Geocentric Datum Australia 1994
(ii) description of the *revegetation* activities undertaken; and
(iii) the size of the area *revegetated* (in hectares).

10. Reporting

(a) The Permit Holder must provide to the CEO, on or before 30 June of each year, a written report of records required under condition 9 of this Permit and activities done by the Permit Holder under this Permit between 1 January and 31 December of the preceding year.

(b) Prior to 30 September 2013, the Permit Holder must provide to the CEO a written report of records required under condition 9 of this Permit where these records have not already been provided under condition 10(a) of this Permit.

Definitions

The following meanings are given to terms used in this Permit:

environmental specialist means a person who is engaged by the permit holder for the purpose of providing environmental advice, who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit;

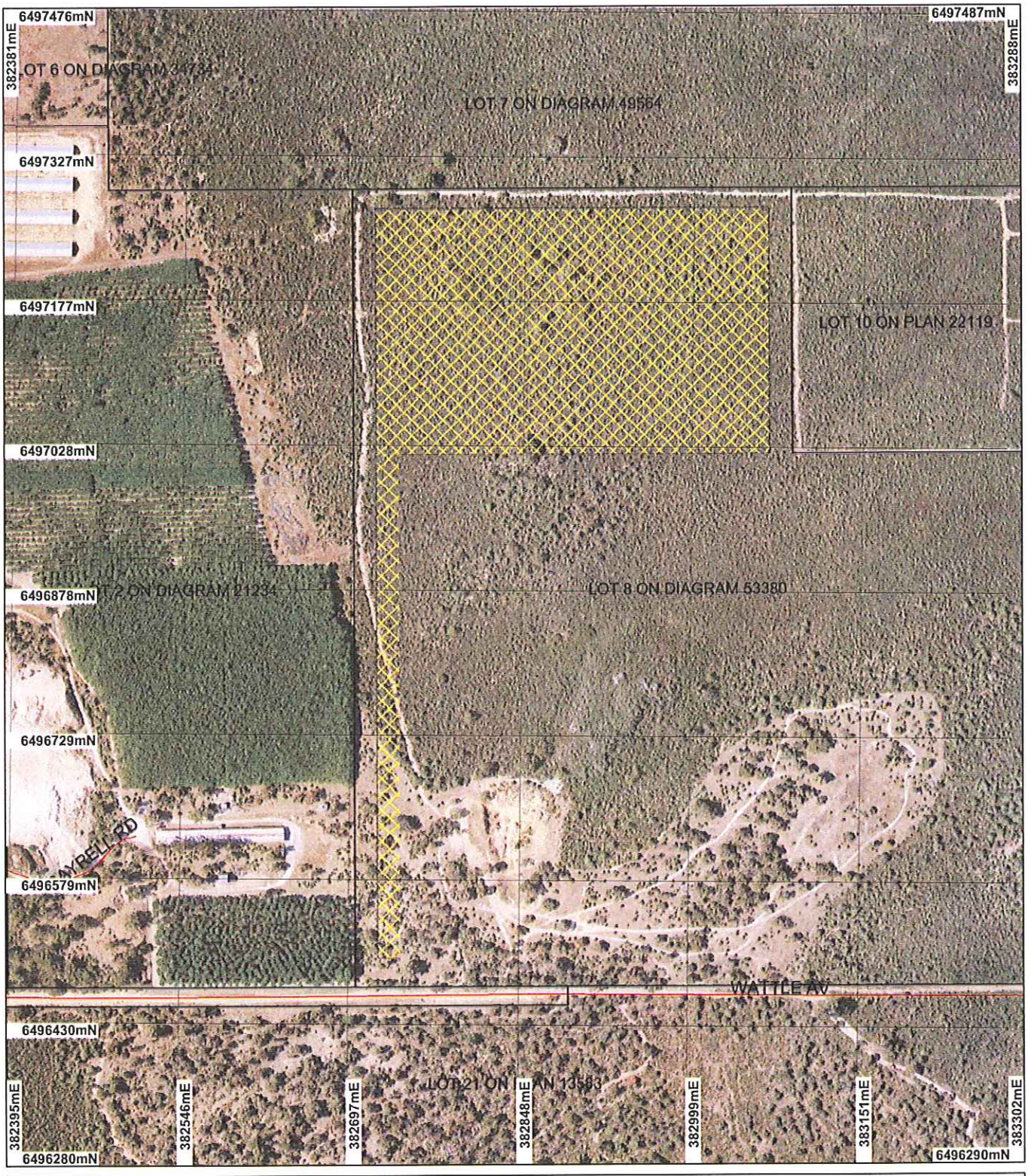
revegetate, revegetated **and** ***revegetation*** means the re-establishment of a cover of native vegetation in an area such that the species composition, structure and density is similar to pre-clearing vegetation types in that area, and can involve regeneration, direct seeding an/or planting.

Kelly Faulkner
MANAGER
NATIVE VEGETATION CONSERVATION BRANCH

Officer delegated under Section 20
of the Environmental Protection Act 1986

30 September 2009

Plan 2807/1



LEGEND

Clearing Instruments

- Areas Approved to Clear
- Road Centrelines

Swan Coastal Plain North
20cm Orthomosaic - Landgate
2006

- Cadastre for labelling

N

0 ~150 m

Scale 1:5300
(Approximate when reproduced at A4)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Date 30/9/05

Kelly Faulkner
Officer with delegated authority under Section 20 of the Environmental Protection Act 1986

Information derived from this map should be confirmed with the data custodian acknowleged by the agency acronym in the legend.

Department of Environment and Conservation

Department of Environment and Conservation

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 2807/2

Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Oakford Land Company (C/- RPS Koltasz Smith)**

1.3. Property details

Property: LOT 8 ON DIAGRAM 53380 (House No. 259 WATTLE NOWERGUP 6032)

Local Government Area:

Colloquial name:

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
9.96		Mechanical Removal	Extractive Industry

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
Beard Vegetation Associations: - 1948: Low woodland; banksia on limestone (Shepherd et al. 2001). Heddle Vegetation Complex: - Cottesloe Complex Central and South: Mosaic of woodland of E. gomphocephala and open forest of E. gomphocephala-E. marginata-C. calophylla; closed heath on the Limestone outcrops (Heddle et al. 1980).	The proposal is to clear up to 9.96ha on a 54ha property, for limestone extraction. The property is located within an area zoned Rural under the Metropolitan Region Scheme. The vegetation under application can be described as being in excellent condition and depending on the location in the landscape vegetation units vary from: Open Eucalypt/Banksia Woodland, Open Banksia woodland, or Closed Heath of D. sessilis, all of which comprise a dense shrub layer. Generally the shrub layer is consistent across these areas being dense and diverse dominated by Xanthorrhoea, Calothamnus, Hibbertia and Acacia. Melaleuca spp. are common components of the shrub layer in areas associated with limestone outcropping.	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)	The vegetation and clearing description is based on information obtained during the site inspection (2007).

3. Assessment of application against clearing principles

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments

The vegetation area under application is excellent condition and described as Open Eucalypt/Banksia Woodland, Open Banksia woodland, and Closed Heath of D. sessilis (Site Inspection, 2007). All comprise a dense diverse shrub layer generally dominated by Xanthorrhoea sp., Calothamnus sp., Hibbertia sp. and Acacia sp.. This dense understorey is considered to comprise suitable habitat for ground dwelling fauna.

The area under application supports the Priority Flora, Jacksonia sericea (P4) and is considered to have a high level of species diversity.

Given the area under application is known to support Priority Flora, suitable habitat for ground dwelling fauna and vegetation comprising a high level of species diversity in excellent condition, the area under application is considered to comprise a high level of biodiversity is considered to be at variance to this Principle.

Methodology

References:
- Keighery, 2007
- Site Inspection (2007)

GIS databases:
- SAC Bio datasets (13/11/2007)
- Swan Coastal Plain North 20cm Orthomosaic - DLI06

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments

There are six species of conservation significant fauna have been recorded within the local area (~5km radius) with a large flock of greater than 50 Carnaby's Black Cockatoo (Calyptorhynchus latirostris) were observed feeding on vegetation within Lot 8 Wattle Ave during a site inspection (Site inspection, 2008). DEC Fauna Habitat Notes (2007) indicate Carnaby's move around seasonally in flocks and feed in areas of proteaceous scrubs and heaths and eucalypt woodlands.

The vegetation under application comprises Banksia woodland and Closed Heath dominated by Dryandra sessilis (Site Inspection, 2007). It is considered likely the area under application would be utilised by Carnaby's as a food source. A Birds Australia report on the Conservation of Carnaby's Black Cockatoo on the Swan Coastal Plain (2006) predicts the current land-clearing for further urban development and the planned removal of the pine plantations over the next 20 years is likely to have a significant impact on Carnaby's Cockatoo populations.

Both the Quenda and Brush Wallaby prefer dense understorey (DEC Fauna Habitat Notes, 2007) as seen in the vegetation under application. The vegetation under application consists of a diverse dense understorey in excellent condition (Site Inspection, 2007) and is therefore considered likely to comprise suitable feeding habitat for Carnaby's and significant habitat for ground dwelling fauna in the local area.

Methodology

References:
- DEC Fauna Habitat Notes (2007)
- Shah, B. (2006)
- Site Inspection (2007)
-Site Inspection (2008)

GIS Databases:
- DEC SAC Bio datasets (13/11/2007)
- Swan Coastal Plain North 20cm Orthomosaic - DLI06

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments

There are 10 records of 1 rare flora species and 8 records of 6 Priority Flora species within the local area. The closest known record of rare flora is Eucalyptus argutifolia, known to occur ~450 metres north east of the area under application.

A flora survey conducted by Regeneration Technology (2006) during September and October 2006 did not identify the rare flora species, Eucalyptus argutifolia, within the area under application. Several groves of mallees were observed within the applied area, these mallees were identified as E. petrensis and E. foecunda and not E. argutifolia (Regeneration Technology Pty Ltd, 2006).

Given that no rare flora was observed during the flora survey, it is considered the proposed clearing is not likely to be at variance to this Principle.

Methodology

References:
- Keighery (2007)
- Regeneration Technology Pty Ltd (2006)
- Site Inspection (2007)

GIS Databases:
- SAC Bio datasets (13/11/2007)
- Heddle Vegetation Complexes - DEP 21/06/95

- Pre-European Vegetation - DA 01/01
- Soils, Statewide - DA 11/99
- Swan Coastal Plain North 20cm Orthomosaic - DLI06

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Comments

There is 1 occurrence of a Threatened Ecological Community (TEC) mapped on Lot 8 Wattle Avenue. This TEC is known as Floristic Community Type (FCT) 26a, 'Melaleuca huegelii-Melaleuca systena shrublands on limestone ridges' (Gibson et al. 1994), and considered Endangered in Western Australia (DEC, 2004). A further 17 occurrences of FCT 26a are identified within the local area.

The main portion of the area under application is located approximately ~200 metres north of this TEC and portion of the area under application that forms the access track is ~150 metres west of the TEC. This is considered to provide an appropriate buffer between the proposed clearing and the mapped TEC.

Given the area under application provide an adequate buffer to the mapped TEC the proposal not considered to be at variance with this Principle.

Methodology

Reference:
- DEC (2001)
- DEC (2004)
- Gibson et al. (1994)
- Site Inspection Report (2007)

GIS Databases:
- DEC SAC Bio Datasets, 06/12/2007

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments

The Heddle vegetation complex identified in the area under application is the Cottesloe Complex-Central and South which has a pre-European representation level of 41% remaining (Heddle et al 1980). Beard Vegetation Associations 1948 are identified within the applied area, which have a current representation level of 21.4% (Shepherd, 2006; Shepherd et al., 2001). In addition, there is ~53.9% of native vegetation remaining in the local area.

The State Government is committed to the National Objectives Targets for Biodiversity Conservation which includes a target that prevents clearance of ecological communities with an extent below 30% of that present pre-1750 (Commonwealth of Australia, 2001).

Beard Vegetation Association 1948 has a remaining extent of 21.4%. Although this vegetation association has less then the recommended 30% minimum of Pre-European extent remaining, the applied area is considered to be within a constrained area. The EPA (2006) recognises the Perth Metropolitan Region as a ?constrained area?, providing for the reduction of vegetation complexes to a minimum of 10% of the Pre-European extent.

Given the extent of vegetation remaining in the local area (~53.9%) and the current representation levels of the Heddle complex and Beard vegetation associations, it is not considered likely that the vegetation under application is significant as a remnant in an area that has been extensively cleared.

	Pre-European (ha)	Current extent (ha)	Remaining (%)	% In reserves DEC Managed Land
IBRA Bioregions*				
Swan Coastal Plain^	1,501,456	571,758	38.1	32.7
LGA**				
City of Wanneroo	68,070	34,057	50.0	N/A
Vegetation in the Local Area (~5km radius)	~9,180	~4,950	~53.9	
Heddle Vegetation Complex***				
Cottesloe Complex-Central and South	44,995	18,474	41.0	21.0

Beard Vegetation Type 1948****	81,022	17,315	21.4	15.6

* (Shepherd 2006)
** (Del Marco et al. 2004)
*** (EPA 2006)
**** (Shepherd et al 2001)
^ Area within Intensive Land Use Zone

Methodology

References:
- Commonwealth of Australia (2001)
- DEC (2001)
- DEC (2004)
- Del Marco et al. (2004)
- EPA (2006)
- Shepherd (2006)
- Shepherd et al. (2001)

GIS databases:
- Clearing Instruments
- Heddle Vegetation Complexes - DEP 21/06/95
- Interim Biogeographic Regionalisation of Australia - EA 18/10/00
- Pre-European Vegetation - DA 01/01
- Remnant Vegetation, Metropolitan Area - DA 12/00
- SAC Bio datasets 06/12/2007

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments

There are no watercourses or wetlands associated with the area under application (Site Inspection, 2007). There are 3 lakes within the local area. Neerabup Lake (~1km west), Lake Pinjar (~3km east) and Nowergup Lake (~3.5km north west).

Given that the vegetation applied to be cleared is representative of an upland community associated with limestone ridges, the site inspection (2007) and flora survey (2007) did not identify any wetland dependant vegetation and the distance to the nearest watercourse or wetland, the vegetation under application is not considered likely to be associated with a watercourse or wetland

Methodology

References:
- Site Inspection Report (2007)
- Regeneration Technology Pty Ltd (2006)

GIS databases:
- EPP, Lakes - DEP 1/12/92
- Hydrography, linear - DOE 1/2/04
- Hydrography, linear (hierarchy) - DOW

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments

The area under application is associated with an undulating dune landscape underlain by limestone which is frequently exposed. Chief soils are siliceous sands (Northcote et al. 1968). Generally, these soils have a high risk of wind erosion and a low risk of water erosion due to the high infiltration rates associated with sands and limestone.

The area under application has a low risk of salinity. The salinity risk increases in the south western corner of the area under application which is a low lying area in the landscape.

The proposed clearing has a high risk of wind erosion given the sandy soils on site, and without appropriate ground cover, windbreaks or adequate dust suppression on exposed surfaces the proposal may cause appreciable land degradation.

I has been noted however that the Limestone Excavation and Rehabilitation Plan (2007) details measures that will be taken by Oakford Land Company to stabilise the soils and reduce to reduce the risk of wind erosion including: fence wind breaks, spray mulching and mulch. The clearing as proposed may be considered likely to cause appreciable land degradation.

Methodology References:
- Northcote et al. (1968)
- Landform Research (2007)

GIS databases:
- Acid Sulfate Soil Risk Map, Swan Coastal Plain } DEC
- Groundwater Contours, Minimum - DOW
- Salinity Risk LM 25m - DOLA 00
- Soils, Statewide - DA 11/99

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Comments

There are 2 DEC managed conservation areas, Gnangara-Moore River State Forest (~1.5km east) and Neerabup National Park (~3.3km), and 23 Bush Forever Sites (including Bush Forever site 293, 550m from the area under application) within the local area.

Bush Forever Site 293 known as 'Shire View Hill and adjacent bushland' occurs in the south east corner of Lot 8, Wattle Ave and is located 550m from the area under application. Bush Forever site 293 and the vegetation under application are part of a regionally significant contiguous bushland/wetland linkage providing a north/south and east/west ecological linkage (Government of Western Australia, 2000) however the clearing as proposed is not within the buffer of 50m to the Bush Forever site 293.

Given the distance to the Bush Forever Sites in the local area, the clearing as proposed is not likely to be at variance to this Principle.

Methodology Reference:
- Hill et al. (1996)

GIS databases:
- EPP, Areas - DEP 06/95
- EPP, Wetlands 2004 (DRAFT) - DOE 21/7/04
- EPP, Lakes - DEP 1/12/92
- Groundwater Contours, Historic Maximum } DOW
- Hydrography, linear - DOE 1/2/04
- Hydrography, linear (hierarchy) - DOW
- Public Drinking Water Source Areas (PDWSAs) } DOW
- Topographic Contours, Statewide - DOLA 12/09/02

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Comments

The area under application is situated between two proclaimed groundwater areas, Gnangara Underground Water Pollution Control Area (a Priority 1 Public Drinking Water Source Area (PDWSA)) and Perth Coastal Underground Water Pollution Control Area (Priority 3 PDWSA). Groundwater generally flows north east to south west and depth varies from ~20-50m within the applied area. Given the depth to groundwater and distance to the nearest PDWSA the proposed clearing is not considered likely to cause deterioration in the quality of groundwater.

There are 3 lakes within the local area. Neerabup Lake (~1km west), Lake Pinjar (~3.5km east) and Nowergup Lake (~3.5km north west) of the applied area. It is considered any development within 50m the boundary of a wetland can critically influence the wetland and any development within 200m of the wetland boundary would have a secondary influence on the wetland (Hill et al. 1996). Given that the vegetation under application is outside the 200m zone of influence (Hill et al. 1996), the proposed clearing is not considered likely to impact the surface water quality of the Lakes.

Given the depth to groundwater and distance to closest wetland, the vegetation under application is not considered likely to cause deterioration in surface water or groundwater.

Methodology Reference:
- Hill et al. (1996)

GIS databases:
- EPP, Areas - DEP 06/95
- EPP, Wetlands 2004 (DRAFT) - DOE 21/7/04
- EPP, Lakes - DEP 1/12/92

- Groundwater Contours, Historic Maximum } DOW
- Hydrography, linear - DOE 1/2/04
- Hydrography, linear (hierarchy) - DOW
- Public Drinking Water Source Areas (PDWSAs) } DOW
- Topographic Contours, Statewide - DOLA 12/09/02

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments

The closest wetland is Neerabup Lake, ~1km west of the applied area. The closest watercourse is a minor tributary of Lake Pinjar ~5km from the area under application on the eastern side of the Lake.

Given the distance to the nearest water body and high infiltration rates associated with sandy soils over limestone, the clearing as proposed is considered unlikely to cause or exacerbate the incidence of flooding.

Methodology

GIS databases:
- Hydrography, linear - DOE 1/2/04
- Hydrography, linear (hierarchy) - DOW
- Soils, Statewide - DA 11/99

Planning instrument, Native Title, Previous EPA decision or other matter.

Comments

DEC have issued a Vegetation Conservation Notice (VCN) on a portion of Lot 8 Wattle Ave however the area covered by this application does not include the vegetation subject to the VCN.

Lot 8 Wattle Ave is zoned Rural under the Town Planning Scheme and Metropolitan Regional Scheme and is zoned Rural Resource under the City of Wanneroo District Planning Scheme No. 2 (City of Wanneroo, 2008). Lot 8 Wattle Ave is also located within the State Planning Policy 2.4 - Basic Raw Materials which identifies the land as a priority resource area.

The Western Australian Planning Commission and City of Wanneroo have granted the relevant land use approvals including an extractive industries licence for Lot 8 Wattle Ave.

Oakford Land Company anticipates 5,000kL of groundwater is required for dust suppression associated with the limestone extraction works on site (Landform Research, 2007). The Department of Water have advised a groundwater extraction licence is required and to date, an application has not yet been received.

The area under application is located within an area identified as an Aboriginal Site of Significance (Interim Registered), being Neerabup Lake and Orchestra Shell Cave. It is the responsibility of the proponent to ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

Methodology

References:
- Bush Forever (2007)
- City of Wanneroo (2007)
- Gibson et al. (1994)
- Zuvela (2008)

GIS databases:
- Aboriginal Sites of Significance - DIA
- Metropolitan Regional Scheme - DPI 07/10/05
- Native Title Claims - DLI
- Town Planning Scheme Zones - MFP 8/98

4. Assessor's comments

Comment

The assessable criteria have been addressed and the clearing as proposed is at variance to Principles (a) and may be at variance to principles (b) and (g)

5. References

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6. Glossary

Term	Meaning
BCS	Biodiversity Coordination Section of DEC
CALM	Department of Conservation and Land Management (now BCS)
DAFWA	Department of Agriculture and Food
DEC	Department of Environment and Conservation
DEP	Department of Environmental Protection (now DEC)
DoE	Department of Environment
DoIR	Department of Industry and Resources
DRF	Declared Rare Flora
EPP	Environmental Protection Policy
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
TEC	Threatened Ecological Community
WRC	Water and Rivers Commission (now DEC)

APPENDIX G

NatureMap Search Results

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 15/04/2013

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115°46' 00" E,31°39' 24" S
Buffer 5km
Group By Conservation Status

Conservation Status	Species	Records
Rare or likely to become extinct	4	34
Protected under international agreement	1	5
Priority 1	1	1
Priority 2	1	1
Priority 3	5	11
Priority 4	2	5
Priority 5	1	9
Non-conservation taxon	366	1245
TOTAL	**381**	**1311**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Rare or likely to become extinct					
1.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo (short-billed black-cockatoo))*		T	
2.	13091	*Eucalyptus argutifolia (Wabling Hill Mallee)*		T	
3.	24905	*Pogona minor subsp. minima (Dwarf Bearded Dragon (Houtman Abrolhos Is.))*		T	
4.	33992	*Synemon gratiosa (Graceful Sunmoth)*		T	
Protected under international agreement					
5.	24598	*Merops ornatus (Rainbow Bee-eater)*		IA	
Priority 1					
6.	33022	*Melaleuca sp. Wanneroo (G.J. Keighery 16705)*		P1	Y
Priority 2					
7.	3237	*Acacia benthamii*		P2	
Priority 3					
8.	33973	*Austrosaga spinifer (cricket)*		P3	
9.	11461	*Hibbertia spicata subsp. leptotheca*		P3	
10.	33977	*Hylaeus globuliferus (bee)*		P3	
11.	5237	*Pimelea calcicola*		P3	
12.	13127	*Stylidium maritimum*		P3	
Priority 4					
13.	4027	*Jacksonia sericea (Waldjumi)*		P4	
14.	24133	*Macropus irma (Western Brush Wallaby)*		P4	
Priority 5					
15.	24153	*Isoodon obesulus subsp. fusciventer (Quenda, Southern Brown Bandicoot)*		P5	
Non-conservation taxon					
16.	15470	*Acacia barbinervis subsp. borealis*			
17.	3282	*Acacia cyclops (Coastal Wattle)*			
18.	3408	*Acacia lasiocalyx (Silver Wattle)*			
19.	11611	*Acacia lasiocarpa var. lasiocarpa*			
20.	3502	*Acacia pulchella (Prickly Moses)*			
21.	3525	*Acacia rostellifera (Summer-scented Wattle)*			
22.	3527	*Acacia saligna (Orange Wattle)*			
23.	30032	*Acacia saligna subsp. saligna*			
24.	3584	*Acacia truncata*			
25.	3602	*Acacia willdenowiana (Grass Wattle)*			
26.	24260	*Acanthiza apicalis (Broad-tailed Thornbill)*			
27.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
28.	24262	*Acanthiza inornata (Western Thornbill)*			
29.	1208	*Acanthocarpus preissii*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
30.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
31.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
32.	25536	*Accipiter fasciatus (Brown Goshawk)*			
33.	24282	*Accipiter fasciatus subsp. fasciatus*			
34.	-19786	*Acritoscincus trilineatus*			
35.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
36.	184	*Aira caryophyllea (Silvery Hairgrass)*	Y		
37.	1728	*Allocasuarina fraseriana (Sheoak)*			
38.	1732	*Allocasuarina humilis (Dwarf Sheoak)*			
39.	2668	*Amaranthus powellii (Powell's Amaranth)*	Y		
40.	2671	*Amaranthus viridis (Green Amaranth)*	Y		
41.	-14519	*Amblyomma triguttatum*			
42.	24312	*Anas gracilis (Grey Teal)*			
43.	24315	*Anas rhynchotis (Australasian Shoveler)*			
44.	24316	*Anas superciliosa (Pacific Black Duck)*			
45.	6311	*Andersonia heterophylla*			
46.	24561	*Anthochaera carunculata (Red Wattlebird)*			
47.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
48.	24991	*Aprasia repens*			
49.	24285	*Aquila audax (Wedge-tailed Eagle)*			
50.	-13654	*Araneus cyphoxis*			
51.	-14831	*Araneus senicaudatus*			
52.	24341	*Ardea pacifica (White-necked Heron)*			
53.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
54.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
55.	20283	*Astartea scoparia*			
56.	6323	*Astroloma ciliatum (Candle Cranberry)*			
57.	6331	*Astroloma microcalyx (Native Cranberry)*			
58.	6334	*Astroloma pallidum (Kick Bush)*			
59.	-13995	*Austracantha minax*			
60.	17240	*Austrostipa flavescens*			
61.	231	*Avellinia michelii*	Y		
62.	234	*Avena fatua (Wild Oat)*	Y		
63.	24318	*Aythya australis (Hardhead)*			
64.	1800	*Banksia attenuata (Slender Banksia)*			
65.	11386	*Banksia leptophylla var. melletica*			
66.	1834	*Banksia menziesii (Firewood Banksia)*			
67.	32077	*Banksia sessilis var. cygnorum*			
68.	24319	*Biziura lobata (Musk Duck)*			
69.	17665	*Boronia purdieana subsp. purdieana*			
70.	3710	*Bossiaea eriocarpa (Common Brown Pea)*			
71.	-19669	*Brachyurophis semifasciatus*			
72.	11187	*Brassica barrelieri subsp. oxyrrhina (Smooth-stem Turnip)*	Y		
73.	3000	*Brassica tournefortii (Mediterranean Turnip)*	Y		
74.	244	*Briza maxima (Blowfly Grass)*	Y		
75.	245	*Briza minor (Shivery Grass)*	Y		
76.	249	*Bromus diandrus (Great Brome)*	Y		
77.	25714	*Cacatua pastinator (Western Long-billed Corella)*			
78.	25715	*Cacatua roseicapilla (Galah)*			
79.	25716	*Cacatua sanguinea (Little Corella)*			
80.	24727	*Cacatua sanguinea subsp. westralensis (Little Corella)*			
81.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
82.	1276	*Caesia micrantha (Pale Grass-lily)*			
83.	11038	*Caladenia bicalliata*			
84.	1592	*Caladenia flava (Cowslip Orchid)*			
85.	1595	*Caladenia hirta (Sugar Candy Orchid)*			
86.	1599	*Caladenia latifolia (Pink Fairy Orchid)*			
87.	2848	*Calandrinia corrigioloides (Strap Purslane)*			
88.	5415	*Calothamnus lateralis*			
89.	5426	*Calothamnus quadrifidus (One-sided Bottlebrush)*			
90.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
91.	7909	*Carduus pycnocephalus (Slender Thistle)*	Y		
92.	757	*Carex preissii*			
93.	2952	*Cassytha glabella (Tangled Dodder Laurel)*			
94.	2957	*Cassytha racemosa (Dodder Laurel)*			
95.	1125	*Centrolepis drummondiana*			
96.	1132	*Centrolepis mutica*			
97.	2889	*Cerastium glomeratum (Mouse Ear Chickweed)*	Y		
98.	1280	*Chamaescilla corymbosa (Blue Squill)*			
99.	24377	*Charadrius ruficapillus (Red-capped Plover)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
100.	24321	*Chenonetta jubata (Australian Wood Duck)*			
101.	2483	*Chenopodium album (Fat Hen)*	Y		
102.	24980	*Christinus marmoratus (Marbled Gecko)*			
103.	24288	*Circus approximans (Swamp Harrier)*			
104.	7937	*Cirsium vulgare (Spear Thistle)*	Y		
105.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
106.	24613	*Colluricincla harmonica subsp. rufiventris*			
107.	24399	*Columba livia (Domestic Pigeon)*	Y		
108.	4552	*Comesperma confertum*			
109.	4554	*Comesperma flavum*			
110.	1885	*Conospermum triplinervium (Tree Smokebush)*			
111.	6348	*Conostephium pendulum (Pearl Flower)*			
112.	1418	*Conostylis aculeata (Prickly Conostylis)*			
113.	11826	*Conostylis aculeata subsp. aculeata*			
114.	1427	*Conostylis candicans (Grey Cottonhead)*			
115.	1443	*Conostylis pauciflora (Dawesville Conostylis)*			
116.	1454	*Conostylis setigera (Bristly Cottonhead)*			
117.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
118.	-14150	*Cormocephalus aurantiipes*			
119.	-14003	*Cormocephalus novaehollandiae*			
120.	-13559	*Cormocephalus rubriceps*			
121.	-14815	*Cormocephalus turneri*			
122.	25592	*Corvus coronoides (Australian Raven)*			
123.	24417	*Corvus coronoides subsp. perplexus*			
124.	17104	*Corymbia calophylla (Marri)*			
125.	1285	*Corynotheca micrantha (Sand Lily)*			
126.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
127.	25595	*Cracticus tibicen (Australian Magpie)*			
128.	24422	*Cracticus tibicen subsp. dorsalis (White-backed Magpie)*			
129.	25596	*Cracticus torquatus (Grey Butcherbird)*			
130.	24424	*Cracticus torquatus subsp. torquatus*			
131.	3137	*Crassula colorata (Dense Stonecrop)*			
132.	24918	*Crenadactylus ocellatus subsp. ocellatus*			
133.	25400	*Crinia insignifera (Squelching Froglet)*			
134.	4802	*Cryptandra mutila*			
135.	4810	*Cryptandra scoparia*			
136.	30893	*Cryptoblepharus buchananii*			
137.	30899	*Ctenophorus adelaidensis (Southern Heath Dragons)*			
138.	25027	*Ctenotus australis*			
139.	25039	*Ctenotus fallens*			
140.	25087	*Cyclodomorphus celatus*			
141.	24322	*Cygnus atratus (Black Swan)*			
142.	10916	*Cyrtostylis huegelii*			
143.	26731	*Cystoseira trinodis*			
144.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
145.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
146.	6218	*Daucus glochidiatus (Australian Carrot)*			
147.	3793	*Daviesia angulata*			
148.	3805	*Daviesia decurrens (Prickly Bitter-pea)*			
149.	3824	*Daviesia nudiflora*			
150.	3845	*Daviesia triflora*			
151.	25766	*Delma fraseri (Fraser's Legless Lizard)*			
152.	24999	*Delma grayii*			
153.	25296	*Demansia psammophis subsp. reticulata*			
154.	17663	*Desmocladus asper*			
155.	1259	*Dianella revoluta (Blueberry Lily)*			
156.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
157.	1287	*Dichopogon capillipes*			
158.	27392	*Dictyota dichotoma var. intricata*			
159.	4453	*Diplolaena angustifolia (Yanchep Rose)*			
160.	4746	*Diplopeltis huegelii*			
161.	1635	*Diuris longifolia (Common Donkey Orchid)*			
162.	3095	*Drosera erythrorhiza (Red Ink Sundew)*			
163.	3106	*Drosera macrantha (Bridal Rainbow)*			
164.	13216	*Drosera menziesii subsp. penicillaris*			
165.	3118	*Drosera pallida (Pale Rainbow)*			
166.	25251	*Echiopsis curta (Bardick)*			
167.	347	*Ehrharta calycina (Perennial Veldt Grass)*	Y		
168.	349	*Ehrharta longiflora (Annual Veldt Grass)*	Y		
169.	1643	*Elythranthera brunonis (Purple Enamel Orchid)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
170.	376	*Eragrostis curvula (African Lovegrass)*	Y		
171.	1646	*Eriochilus dilatatus (White Bunny Orchid)*			
172.	13536	*Eucalyptus decipiens subsp. decipiens*			
173.	5649	*Eucalyptus foecunda (Narrow-leaved Red Mallee)*			
174.	5659	*Eucalyptus gomphocephala (Tuart)*			
175.	5708	*Eucalyptus marginata (Jarrah)*			
176.	20808	*Eucalyptus petiolaris*	Y		
177.	13541	*Eucalyptus petrensis*			
178.	24368	*Eurostopodus argus (Spotted Nightjar)*			
179.	25622	*Falco cenchroides (Australian Kestrel)*			
180.	25623	*Falco longipennis (Australian Hobby)*			
181.	24041	*Felis catus (Cat)*	Y		
182.	25727	*Fulica atra (Eurasian Coot)*			
183.	7323	*Galium murale (Small Goosegrass)*	Y		
184.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
185.	20483	*Gastrolobium linearifolium*			
186.	4339	*Geranium molle (Dove's Foot Cranesbill)*	Y		
187.	25530	*Gerygone fusca (Western Gerygone)*			
188.	1520	*Gladiolus caryophyllaceus (Wild Gladiolus)*	Y		
189.	6143	*Glischrocaryon aureum (Common Popflower)*			
190.	24735	*Glossopsitta porphyrocephala (Purple-crowned Lorikeet)*			
191.	8005	*Gnephosis uniflora*			
192.	3957	*Gompholobium tomentosum (Hairy Yellow Pea)*			
193.	24443	*Grallina cyanoleuca (Magpie-lark)*			
194.	15839	*Grevillea preissii subsp. preissii*			
195.	2119	*Grevillea vestita*			
196.	12824	*Grevillea vestita subsp. vestita*			
197.	1468	*Haemodorum laxum*			
198.	2175	*Hakea lissocarpha (Honey Bush)*			
199.	2214	*Hakea trifurcata (Two-leaf Hakea)*			
200.	24295	*Haliastur sphenurus (Whistling Kite)*			
201.	3961	*Hardenbergia comptoniana (Native Wisteria)*			
202.	25410	*Heleioporus eyrei (Moaning Frog)*			
203.	3016	*Heliophila pusilla*	Y		
204.	16934	*Hemiandra glabra subsp. glabra*			
205.	25119	*Hemiergis quadrilineata*			
206.	5134	*Hibbertia huegelii*			
207.	5135	*Hibbertia hypericoides (Yellow Buttercups)*			
208.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
209.	25734	*Himantopus himantopus (Black-winged Stilt)*			
210.	24491	*Hirundo neoxena (Welcome Swallow)*			
211.	6222	*Homalosciadium homalocarpum*			
212.	3968	*Hovea trisperma (Common Hovea)*			
213.	5216	*Hybanthus calycinus (Wild Violet)*			
214.	6232	*Hydrocotyle hispidula*			
215.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
216.	1070	*Hypolaena exsulca*			
217.	-13557	*Idiommata blackwalli*			
218.	910	*Isolepis cernua (Nodding Club-rush)*			
219.	3992	*Isotropis cuneifolia (Granny Bonnets)*			
220.	14783	*Jacksonia calcicola*			
221.	4029	*Jacksonia sternbergiana (Stinkwood)*			
222.	4044	*Kennedia prostrata (Scarlet Runner)*			
223.	467	*Lagurus ovatus (Hare's Tail Grass)*	Y		
224.	28342	*Landoltia punctata (Thin Duckweed)*			
225.	925	*Lepidosperma angustatum*			
226.	944	*Lepidosperma scabrum*			
227.	945	*Lepidosperma squamatum*			
228.	946	*Lepidosperma striatum*			
229.	5847	*Leptospermum erubescens (Roadside Teatree)*			
230.	25133	*Lerista elegans*			
231.	25165	*Lerista praepedita*			
232.	6427	*Leucopogon parviflorus (Coast Beard-heath)*			
233.	7677	*Levenhookia stipitata (Common Stylewort)*			
234.	25005	*Lialis burtonis*			
235.	24577	*Lichenostomus ornatus (Yellow-plumed Honeyeater)*			
236.	24581	*Lichenostomus virescens (Singing Honeyeater)*			
237.	25661	*Lichmera indistincta (Brown Honeyeater)*			
238.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
239.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
240.	1228	*Lomandra hermaphrodita*			
241.	1231	*Lomandra maritima*			
242.	1234	*Lomandra nigricans*			
243.	1239	*Lomandra preissii*			
244.	1246	*Lomandra suaveolens*			
245.	6456	*Lysinema ciliatum (Curry Flower)*			
246.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
247.	85	*Macrozamia riedlei (Zamia)*			
248.	25651	*Malurus lamberti (Variegated Fairy-wren)*			
249.	25652	*Malurus leucopterus (White-winged Fairy-wren)*			
250.	25654	*Malurus splendens (Splendid Fairy-wren)*			
251.	24552	*Malurus splendens subsp. splendens*			
252.	24583	*Manorina flavigula (Yellow-throated Miner)*			
253.	5920	*Melaleuca huegelii (Chenille Honeymyrtle)*			
254.	18598	*Melaleuca systena*			
255.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
256.	25184	*Menetia greyii*			
257.	955	*Mesomelaena pseudostygia*			
258.	485	*Microlaena stipoides (Weeping Grass)*			
259.	8106	*Millotia tenuifolia (Soft Millotia)*			
260.	16693	*Minuartia mediterranea*	Y		
261.	25192	*Morethia obscura*			
262.	24223	*Mus musculus (House Mouse)*	Y		
263.	25420	*Myobatrachus gouldii (Turtle Frog)*			
264.	25248	*Neelaps bimaculatus (Black-naped Snake)*			
265.	24738	*Neophema elegans (Elegant Parrot)*			
266.	25748	*Ninox novaeseelandiae (Boobook Owl)*			
267.	25252	*Notechis scutatus (Tiger Snake)*			
268.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
269.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
270.	-13203	*Ommatoiulus moreletii*			
271.	-14750	*Oratemnus curtus*			
272.	1537	*Orthrosanthus laxus (Morning Iris)*			
273.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
274.	24328	*Oxyura australis (Blue-billed Duck)*			
275.	25679	*Pachycephala pectoralis (Golden Whistler)*			
276.	24623	*Pachycephala pectoralis subsp. fuliginosa*			
277.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
278.	24624	*Pachycephala rufiventris subsp. rufiventris*			
279.	-13778	*Paraplectanoides crassipes*			
280.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
281.	25682	*Pardalotus striatus (Striated Pardalote)*			
282.	4343	*Pelargonium capitatum (Rose Pelargonium)*	Y		
283.	4346	*Pelargonium littorale*			
284.	2258	*Persoonia comata*			
285.	24659	*Petroica goodenovii (Red-capped Robin)*			
286.	25695	*Petroica multicolor (Scarlet Robin)*			
287.	2299	*Petrophile linearis (Pixie Mops)*			
288.	2301	*Petrophile macrostachya*			
289.	2309	*Petrophile serruriae*			
290.	24409	*Phaps chalcoptera (Common Bronzewing)*			
291.	1478	*Phlebocarya ciliata*			
292.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
293.	4675	*Phyllanthus calycinus (False Boronia)*			
294.	39079	*Physarum viride*			
295.	5232	*Pimelea argentea (Silvery Leaved Pimelea)*			
296.	5243	*Pimelea ferruginea*			
297.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
298.	25720	*Platycercus icterotis (Western Rosella)*			
299.	24750	*Platycercus zonarius subsp. semitorquatus (Twenty-eight Parrot)*			
300.	578	*Poa porphyroclados*			
301.	25704	*Podiceps cristatus (Great Crested Grebe)*			
302.	8175	*Podolepis gracilis (Slender Podolepis)*			
303.	8177	*Podolepis lessonii*			
304.	24907	*Pogona minor subsp. minor*			
305.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
306.	25722	*Polytelis anthopeplus (Regent Parrot)*			
307.	4691	*Poranthera microphylla (Small Poranthera)*			
308.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
309.	25511	*Pseudonaja affinis (Dugite)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
310.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
311.	17267	*Pterostylis brevisepala*			
312.	12217	*Pterostylis sanguinea*			
313.	1698	*Pterostylis vittata (Banded Greenhood)*			
314.	11260	*Ptilotus drummondii var. drummondii (Pussytail)*			
315.	2742	*Ptilotus manglesii (Pom Poms)*			
316.	25008	*Pygopus lepidopodus (Common Scaly Foot)*			
317.	8195	*Quinetia urvillei*			
318.	25271	*Ramphotyphlops australis*			
319.	24243	*Rattus fuscipes (Western Bush Rat)*			
320.	24245	*Rattus rattus (Black Rat)*	Y		
321.	2578	*Rhagodia baccata (Berry Saltbush)*			
322.	25613	*Rhipidura fuliginosa (Grey Fantail)*			
323.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
324.	1556	*Romulea rosea (Guildford Grass)*	Y		
325.	7603	*Scaevola canescens (Grey Scaevola)*			
326.	13182	*Scaevola repens var. repens*			
327.	982	*Schoenus clandestinus*			
328.	992	*Schoenus grandiflorus (Large Flowered Bogrush)*			
329.	997	*Schoenus lanatus (Woolly Bog-rush)*			
330.	1006	*Schoenus odontocarpus*			
331.	1018	*Schoenus subfascicularis*			
332.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
333.	2910	*Silene nocturna (Mediterranean Catchfly)*	Y		
334.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
335.	30948	*Smicrornis brevirostris (Weebill)*			
336.	8230	*Sonchus asper (Rough Sowthistle)*	Y		
337.	9367	*Sonchus hydrophilus (Native Sowthistle)*			
338.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
339.	1312	*Sowerbaea laxiflora (Purple Tassels)*			
340.	4207	*Sphaerolobium medium*			
341.	4828	*Spyridium globulosum (Basket Bush)*			
342.	4733	*Stackhousia monogyna*			
343.	2918	*Stellaria media (Chickweed)*	Y		
344.	2316	*Stirlingia latifolia (Blueboy)*			
345.	25597	*Strepera versicolor (Grey Currawong)*			
346.	25589	*Streptopelia chinensis (Spotted Turtle-Dove)*	Y		
347.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
348.	24943	*Strophurus spinigerus subsp. inornatus*			
349.	7693	*Stylidium brunonianum (Pink Fountain Triggerplant)*			
350.	7745	*Stylidium junceum (Reed Triggerplant)*			
351.	25705	*Tachybaptus novaehollandiae (Australasian Grebe)*			
352.	24331	*Tadorna tadornoides (Australian Shelduck)*			
353.	24167	*Tarsipes rostratus (Honey Possum)*			
354.	4256	*Templetonia retusa (Cockies Tongues)*			
355.	1036	*Tetraria octandra*			
356.	5105	*Thomasia triphylla*			
357.	24844	*Threskiornis molucca (Australian White Ibis)*			
358.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
359.	25207	*Tiliqua rugosa subsp. rugosa*			
360.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
361.	6280	*Trachymene pilosa (Native Parsnip)*			
362.	39094	*Trichia affinis*			
363.	39098	*Trichia favoginea*			
364.	39100	*Trichia persimilis*			
365.	25723	*Trichoglossus haematodus (Rainbow Lorikeet)*			
366.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
367.	4292	*Trifolium campestre (Hop Clover)*	Y		
368.	4295	*Trifolium dubium (Suckling Clover)*	Y		
369.	4297	*Trifolium glomeratum (Cluster Clover)*	Y		
370.	4737	*Tripterococcus brunonis (Winged Stackhousia)*			
371.	-14745	*Urodacus novaehollandiae*			
372.	8254	*Urospermum picroides (False Hawkbit)*	Y		
373.	8255	*Ursinia anthemoides (Ursinia)*	Y		
374.	15432	*Verticordia densiflora var. densiflora*			
375.	4322	*Vicia sativa (Common Vetch)*	Y		
376.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
377.	8282	*Waitzia suaveolens (Fragrant Waitzia)*			
378.	-13862	*Westrarchaea spinosa*			
379.	1256	*Xanthorrhoea preissii (Grass tree)*			

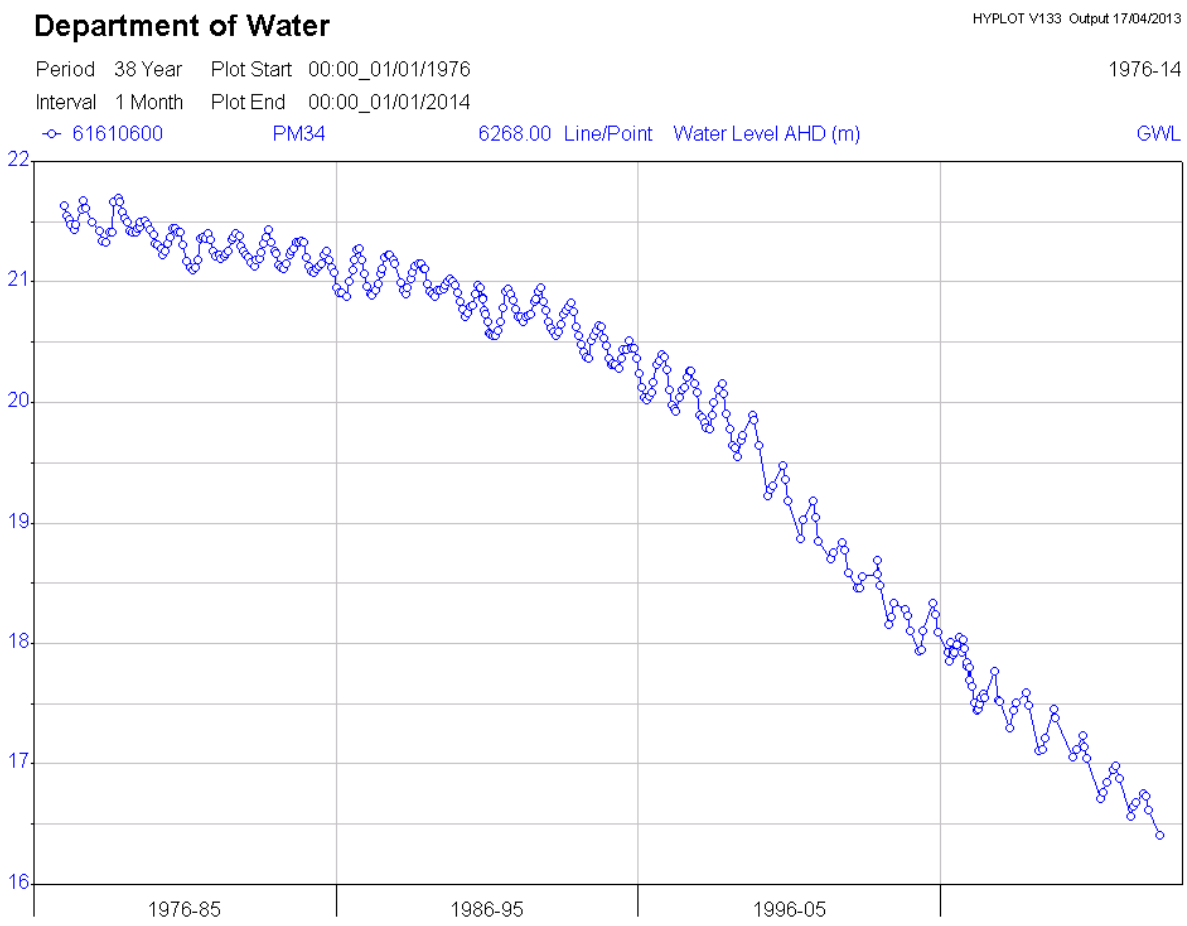
	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
380.	6289	*Xanthosia huegelii*			
381.	25765	*Zosterops lateralis (Grey-breasted White-eye)*			

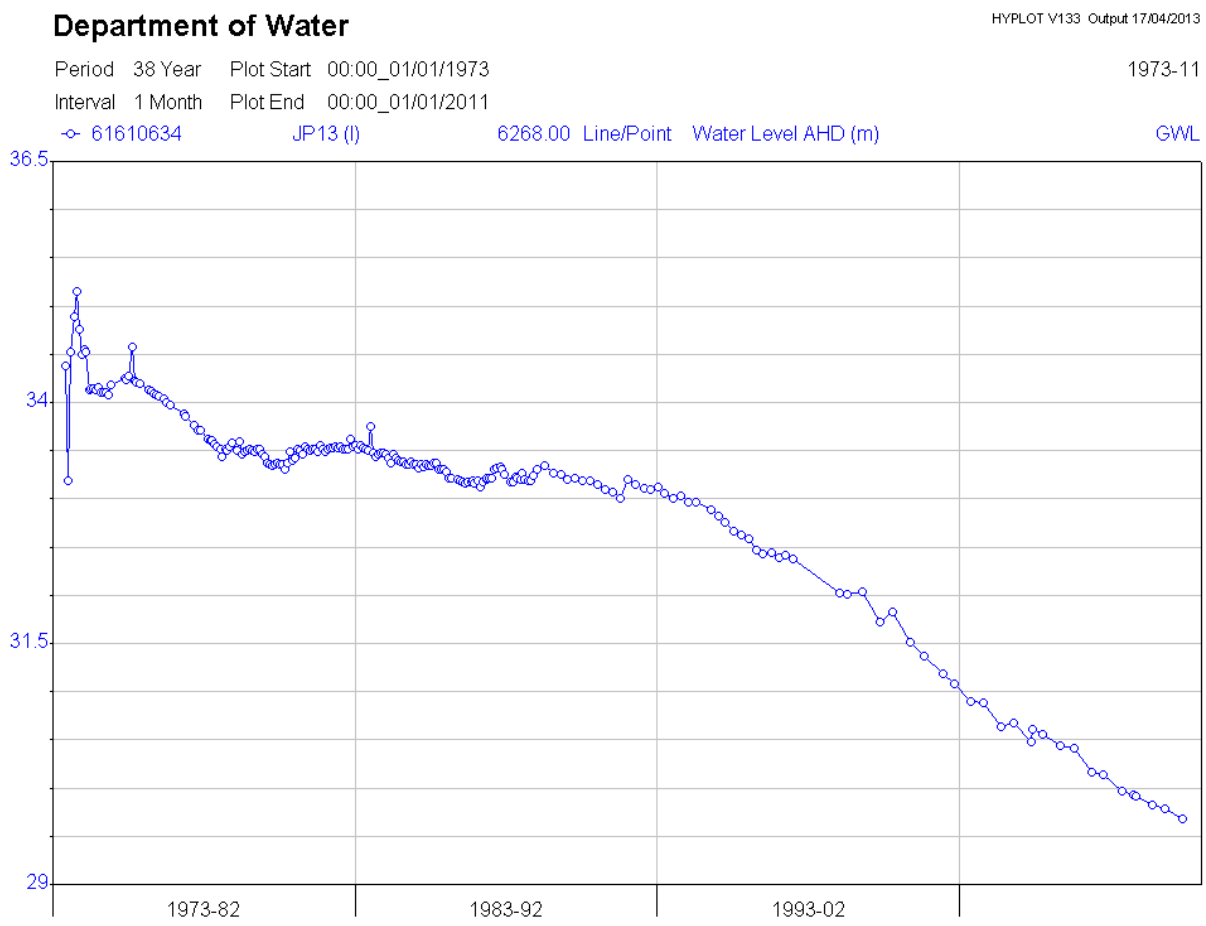
Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

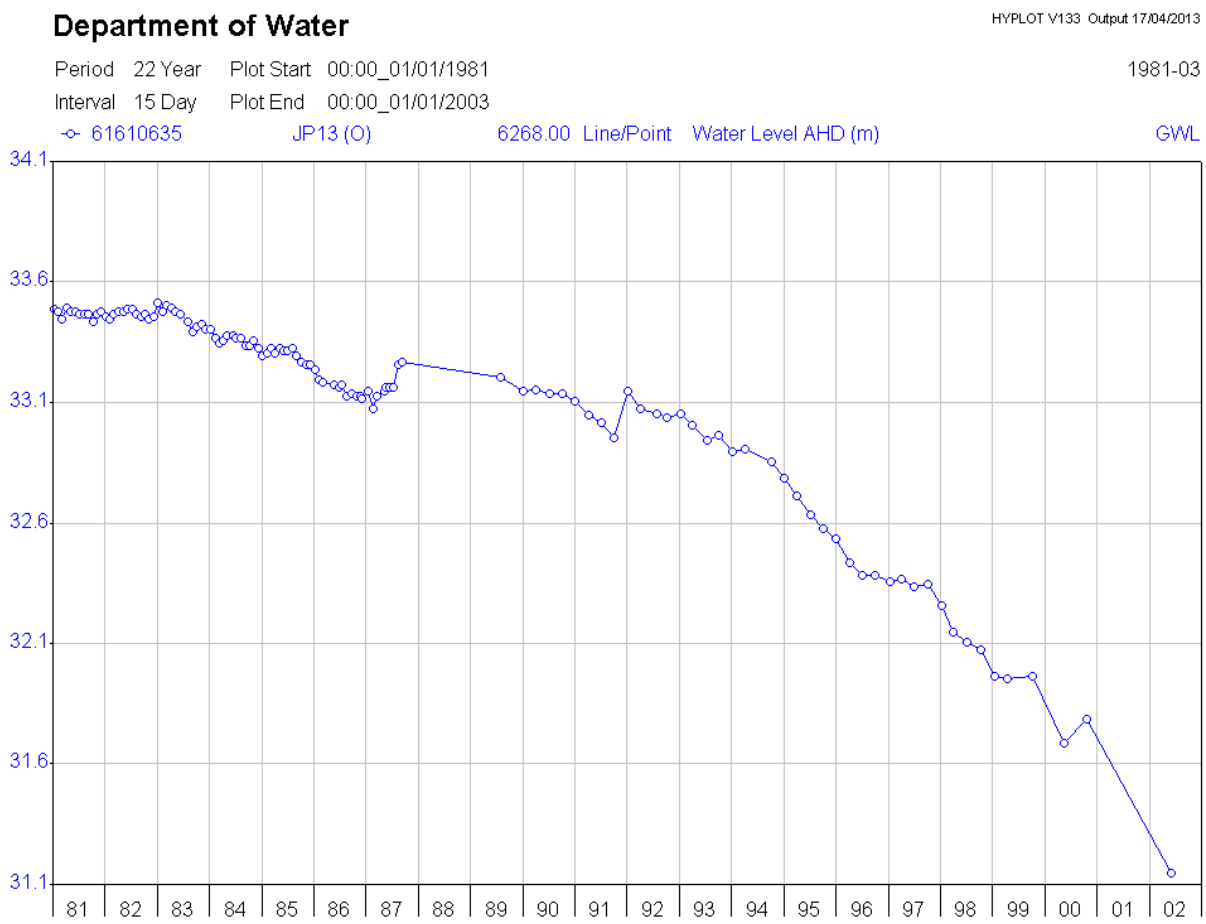
[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

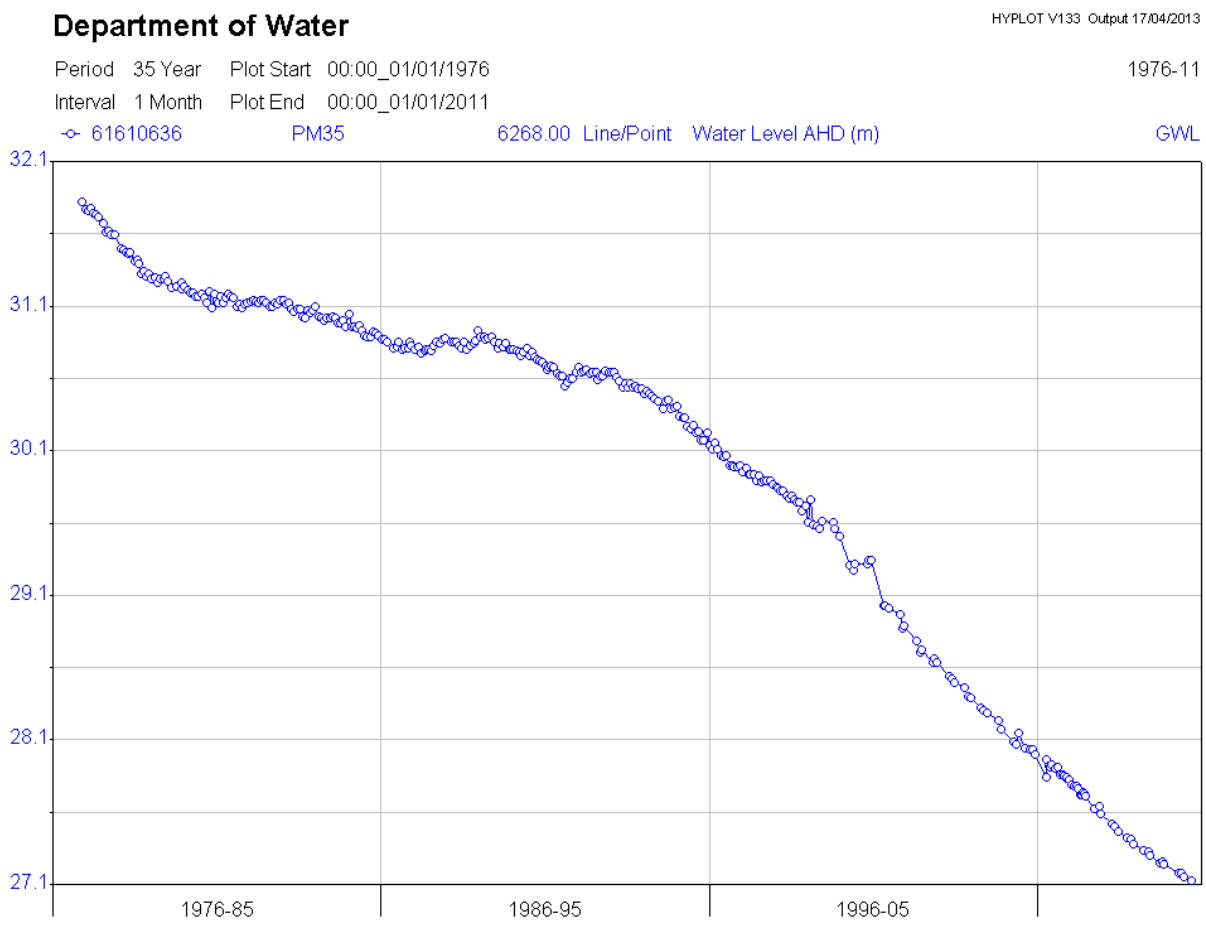
APPENDIX H

Hydrographs


Department of Water
HYPLOT V133 Output 17/04/2013
Period 38 Year Plot Start 00:00_01/01/1976
1976-14
Interval 1 Month Plot End 00:00_01/01/2014
61610600 PM34 6268.00 Line/Point Water Level AHD (m) GWL
22
21
20
19
18
17
16
1976-85
1986-95
1996-05


Department of Water
HYPLOT V133 Output 17/04/2013
Period 38 Year Plot Start 00:00_01/01/1973
1973-11
Interval 1 Month Plot End 00:00_01/01/2011
61610634 JP13 (I) 6268.00 Line/Point Water Level AHD (m) GWL
36.5
34
31.5
29
1973-82
1983-92
1993-02


Department of Water
HYPLOT V133 Output 17/04/2013
Period 22 Year Plot Start 00:00_01/01/1981
1981-03
Interval 15 Day Plot End 00:00_01/01/2003
61610635 JP13 (O) 6268.00 Line/Point Water Level AHD (m) GWL
34.1
33.6
33.1
32.6
32.1
31.6
31.1
81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00 01 02


Department of Water
HYPLOT V133 Output 17/04/2013
Period 35 Year Plot Start 00:00_01/01/1976
1976-11
Interval 1 Month Plot End 00:00_01/01/2011
61610636 PM35 6268.00 Line/Point Water Level AHD (m) GWL
32.1
31.1
30.1
29.1
28.1
27.1
1976-85
1986-95
1996-05

APPENDIX I

Survey Plans

7

390.13

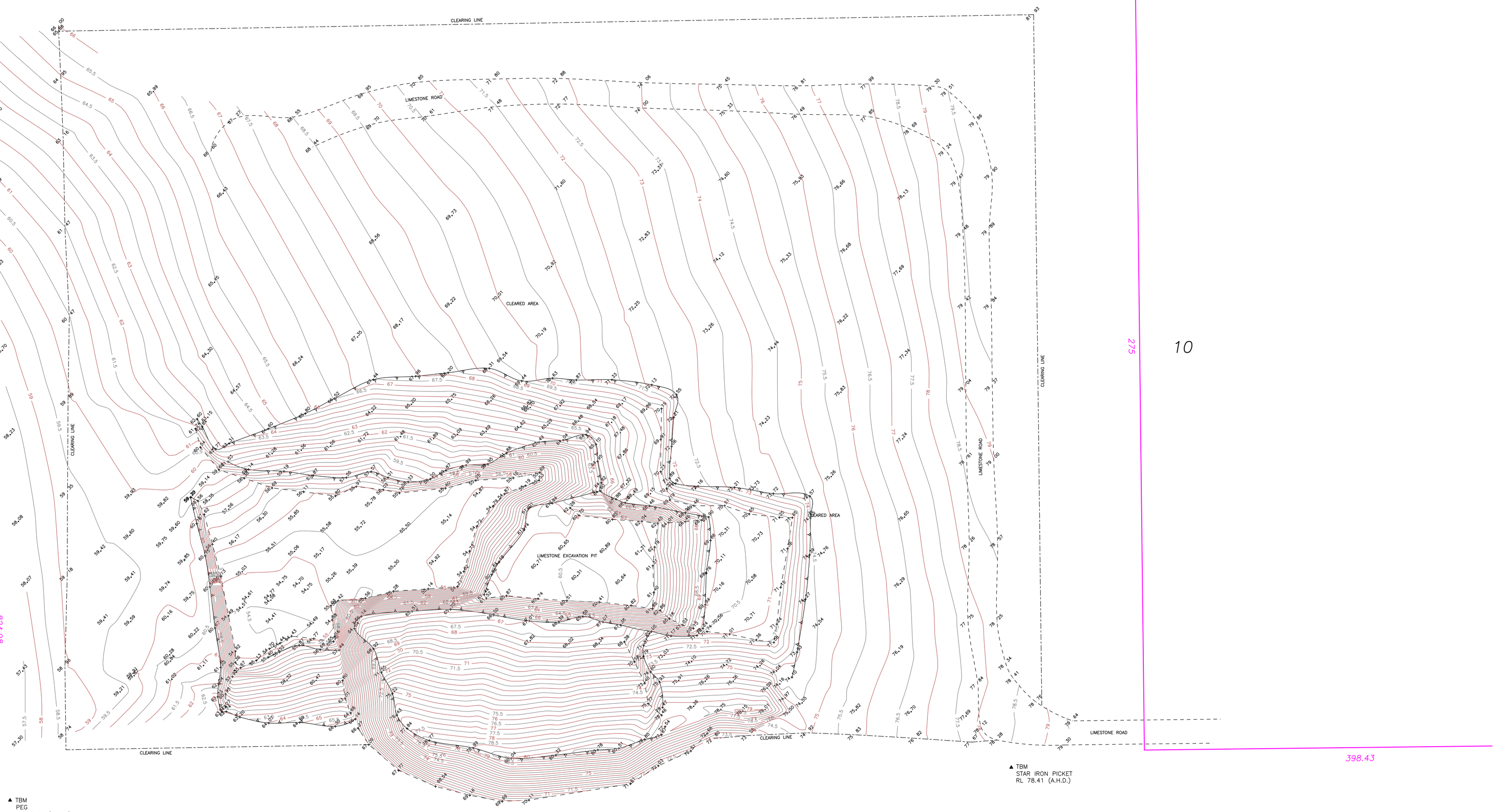
10

2

824.98

275

398.43



ROSS McLOUGHLIN
CONSULTING SURVEYOR
UNIT 1 / 9 MERCER LANE JOONDALUP 6027
TELEPHONE (08) 9301 2779 or 0419 255 999
FACSIMILE (08) 9301 1319
EMAIL rossmac@iinet.net.au

JOB: LOT 8 WATTLE AVENUE WEST – NOWERGUP
SCALE: 1:750 @ A1 SIZE
DATE: 14.6.2012
DATUM: MGA94/AHD
LOCAL AUTHORITY: CITY OF WANNEROO
PLAN: DIAGRAM 53380
AREA: 54.18 ha

EXCAVATION PLAN – 10.6.2012

7

390.13

10

275

2

824.98

8

398.43

212

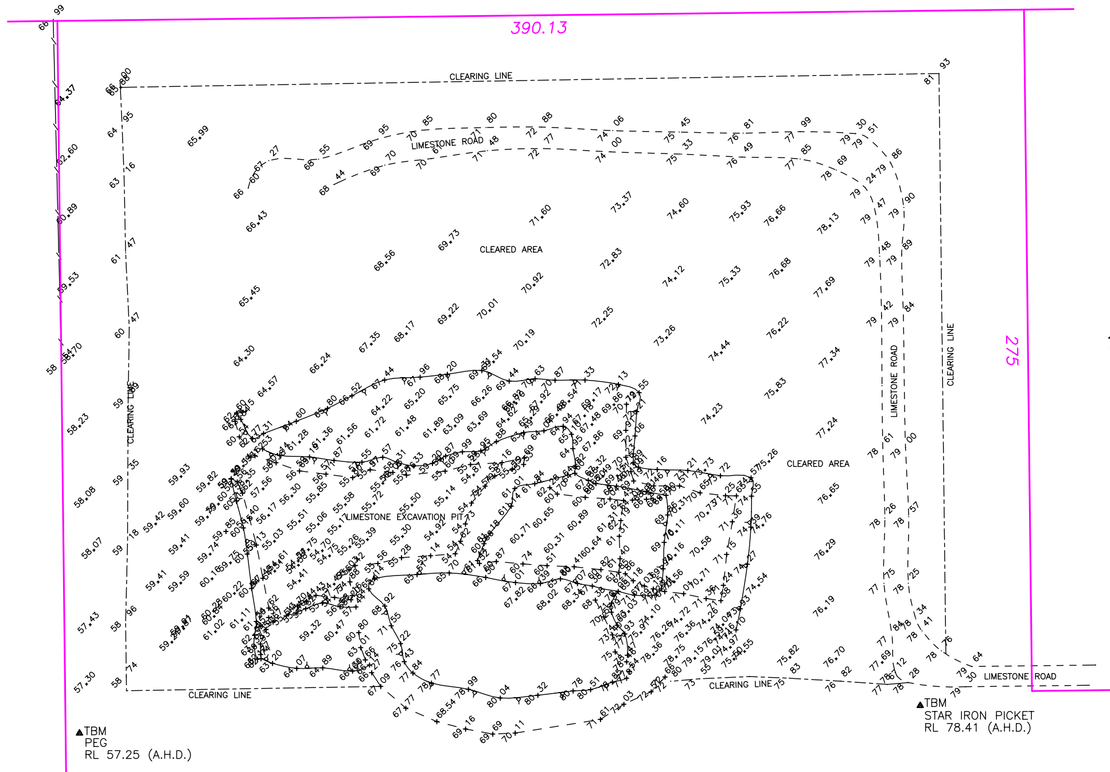
548.52

10

790.11

WATTLE AVENUE WEST

2



ROSS McLOUGHLIN
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UNIT 1 / 9 MERCER LANE JOONDALUP 6027
TELEPHONE (08) 9301 2779 or 0419 255 999
FACSIMILE (08) 9301 1319
EMAIL rossmac@iinet.net.au

JOB: LOT 8 WATTLE AVENUE WEST – NOWERGUP
SCALE: 1:1750 @ A1 SIZE
DATE: 14.6.2012
DATUM: MGA94/AHD
LOCAL AUTHORITY: CITY OF WANNEROO
PLAN: DIAGRAM 53380
AREA: 54.18 ha

APPENDIX J

Excavation and Rehabilitation Plan

Limestone Excavation and Rehabilitation Management Plan

Lot 8, Wattle Avenue, Nowergup

Oakford Land Company

JUNE 2007

Landform Research

Limestone Excavation and Rehabilitation Management Plan

Lot 8, Wattle Avenue, Nowergup

Oakford Land Company

PO Box 1130, Canning Bridge,
Applecross, WA, 6153

Phone 9277 7077

Landform Research
Land Systems - Quarries - Environment
ABN 29 841 445 694

Lindsay Stephens Bsc (Geology), Msc (Botany) MEIANZ
Mem Aust Geomechanics Soc - Mem WA Environ Cons Assoc

25 Heather Road, Roleystone WA 6111
Tel 9397 5145 Fax 9397 5350

SUMMARY

Oakford Land Company seeks Development Approval and an Extractive Industries Licence for twenty years to enable an extractive industry to be located on Lot 8, Wattle Avenue for the removal of limestone and minor sand. The proposal is a rehabilitation plan that involves the restoration of the land surface to be suitable for industrial land use.

This document provides the supporting information for the application for Planning Consent and an Extractive Industries Licence.

It is proposed to extract limestone and minor sand from the site for use as construction materials in the Perth Metropolitan Area and to supply the existing reconstituted block plant that is located to the west, which is operated by associates of the proponents. In addition some dimension stone may also be cut.

The proposed quarry will supply a strategic resource of dimension stone to the north of Perth and the Perth Metropolitan Area.

Landform restoration and rehabilitation is to progressively follow excavation.

The site lies in an important area of limestone resources that is strategic to the development of the Perth Metropolitan Area. Limestone on Lot 8 is identified in Planning Policies such as Statement of Planning Policy 2.4, Basic Raw Materials as a Priority Limestone Resource. The pit is listed as SPP 2.4 Site 30/17.

The extraction of limestone is seen as an interim use of the land prior to utilisation of the area by the current land holder.

The final land surface has to be compatible with the Water Corporation tank site to the north on Lot 10, and so will need to slope gently or be stepped up to the elevation of Lot 10.

At this stage the most appropriate end use is to restore the surface to be suitable for industrial use but be visually compatible with the surrounding rural land surface, and to rehabilitate the site with local native species.

Access is proposed to be directly to Wattle Avenue. Wattle Avenue will require upgrade from the junction of Dayrell Avenue and will be sealed to minimise dust generation.

The closest dwelling is to the west on Dress Circle Farm (650 metres away), associated with intensive poultry and extractive industries. There are several shed facilities, two limestone quarries, a sand quarry and a soil amendment industry. A limestone quarry lies between Lot 8 and the closest residence.

Bush Forever Site 293 lies in the south eastern corner of Lot 8. This site will be protected by a 50 metre buffer. A flora study has been undertaken by Regeneration Technology Pty Ltd.

The operations have been designed to minimise visual impact.

Hours of operation will be 6.00 am to 5.00 pm Monday to Saturday inclusive, excluding public holidays. This is similar to the operations of nearby quarries in the local area.

Perimeter fences and locked gates will be maintained to prevent illegal entry. Warning signs will be maintained as required by the Department of Industry and Resources and the City of Wanneroo.

Detailed Management Plans are submitted to cover;

- Visual Management
- Dust Management
- Noise Management
- Rehabilitation Plan

Concurrent applications have been made for through the Department of Environment and Conservation.

This proposal is for 20 year Planning Consent with an Extractive Industries Licence for 10 – 20 years.

CONTENTS

APPENDICIES

FIGURES

1.0 OVERVIEW

1.1 Proposal

This proposal seeks Development Approval and an Extractive Industries Licence for twenty years to enable an extractive industry to be located on Lot 8, Wattle Avenue, for the removal of limestone and minor sand. As part of the proposal is a rehabilitation plan, that involves the restoration of the land surface to be suitable for an industrial end use.

This document provides the supporting information for the application for Planning Consent and an Extractive Industries Licence.

It is proposed to extract limestone and minor sand from the site for use as construction materials in the Perth Metropolitan Area and to supply the existing reconstituted block plant that is located to the west, which is operated by the proponents. In addition some dimension stone may also be cut.

The proposed quarry will supply a strategic resource of dimension stone to the north of Perth and the Perth Metropolitan Area.

Landform restoration and rehabilitation is to progressively follow excavation.

Importance and Rationale

Limestone is used for dimension stone, road bases, the construction industry, reconstituted stone, armour rock, lime and cement manufacture.

The reality is that the limestone and sand is only extracted for the community. If the community did not need the limestone there would be no extraction. Almost all the limestone is used on public works projects and for structural works, such as footings, structural walls in subdivisions and for building materials.

Whilst limestone might seem common, most of the resources closer to Perth have been sterilised by development, conservation of vegetation, and public intolerance.

For example, in the northern Perth metropolitan area all good limestone is either held predominantly by one company or is located in State Forest or the potential extension of the Yanchep National Park.

Not all limestone has the same characteristics, and the best deposits are valuable community assets. The limestone on Lot 8 and the surrounding area is a particularly valuable community resource. Quality material that is suitable for construction purposes therefore has very high community value as the Perth Metropolitan area spreads north.

Limestone on Lot 8 is identified in Planning Policies such as Statement of Planning Policy 2.4, Basic Raw Materials as a Priority Limestone Resource. The site is listed as Site 30/17. Figure 2.

The Chamber of Commerce and Industry 1996, considered the need for limestone and the potential sterilisation of resources. Currently the Chamber of Commerce and Industry is updating the assessments of basic raw materials.

Research on the limestone resources can be found in the following;

- Abeysinghe P B, 1998, *Limestone and Limesand Resources of Western Australia*, Geological Survey of Western Australia, Mineral Resources Bulletin 18.

- Gozzard J R, 1987, *Limesand and Limestone Resources between Lancelin and Bunbury*, Geol Surv WA, Record 1987/5.

- Western Australia, Western Australian Planning Commission, *Statement of Planning Policy 2.4, Basic Raw Materials.*

- Chamber of Commerce and Industry, 1995 and 1996, *Managing the Basic Raw Materials of Perth and the Outer Metropolitan Region*, Parts 1 and 2.

Requested Approval

Planning Consent could be provided for say 20 years to provide long term protection, and if more control is required, an Extractive Industry Licence issued for say 10 years.

The flora and vegetation study included will form the basis for an application for a Clearing Permit.

1.2 Proponent

The proponent is Oakford Land Company.

Contact can be made through

Manager
Oakford Land Company, A.C.N. 101 717 177
PO Box 1130 Canning Bridge
Applecross WA 6153

Phone 9277 7077 Fax 9277 3844

1.3 Location, Ownership and Agreements

Lot 8 is located at the eastern portion of Wattle Avenue West; 10 km north from Wanneroo at Nowergup.

Lot	Lot 8
Swan Location	
Volume	
Folio	
Diagram	
Owner	Oakford Land Company PO Box 1130, Canning Bridge Applecross, WA, 6153 Phone 9277 7077 Fax 9277 3844

1.4 Aims of the Proposal

The aims of the proposal are to;

- Provide Oakford Land Company with reserves of strategically located limestone suited to a variety of end products, such as dimension stone, road base, screened limestone products, raw material for reconstituted limestone blocks and armour stone.

- Maximise the use of limestone to the north of Perth, to enable greenhouse gases, transport, and other environmental issues associated with alternative resources, to be minimised.

- Help to keep the prices of local limestone products at the lowest possible levels, by maintaining small transport distances and competition. This benefits the whole community.

- Comply with Statement of Planning Policy No 2.4 Basic Raw Materials, and Rural Land Policies for the Metropolitan Area which state that basic raw materials should be taken prior to sterilisation of the area by development.

2.0 PLANNING ISSUES

2.1 Alternative Resources

The site is a lot that was held by the City of Wanneroo and has been intended for limestone excavation for many years, as evidenced by its classification within Statement of Planning Policy 2.4, Basic Raw Materials as Site 30/17. The site was sold to Oakford Land Company. Figure 2.

The limestone resources of the northern Perth Metropolitan area are seen as strategic resources for the community, which is why they are identified in SPP 2.4.

Whilst limestone might seem common, most of the resources closer to Perth have been sterilised by development, conservation of vegetation considerations, and public intolerance.

In the northern Perth Metropolitan area good limestone is either held predominantly by one company or is located in State Forest or potential extension of the Yanchep National Park. The only alternatives are hard rock products from the Darling Scarp, which involves large transport distances and clearing and excavation of portion of the Darling Scarp.

There are no other resources for limestone available, with all resources held by Adelaide Brighton Cement Ltd for their long term future or held and utilised by smaller operators.

Bush Forever and the Conservation areas have sterilised very large resources in the northern Perth Metropolitan area as shown in Figure 3.

For road base the only alternatives to limestone are hardrock products which involve clearing of vegetation on the Darling Scarp, further travel distances and consequent significantly increased greenhouse gas emissions and higher production and energy costs.

.2 The Site and Land Zonings

Limestone has been extracted from the local area for many years, and the surrounding land to the east, north and south has been held and earmarked for limestone extraction by Adelaide Brighton Cement Ltd (formerly Swan Portland Cement Ltd) for a clinker plant. The Adelaide Brighton land previously had EPA approval for quarrying and a clinker plant, and there are significant portions of the site that hold current approvals for limestone extraction. There is a limestone quarry just west of Lot 8.

The land is currently zoned Rural Resource, which allows Extractive Industries following Council approval.

Section 3.17.1b of the City of Wanneroo District Planning Scheme has the objective; "*protect from incompatible uses or subdivision, basic raw materials priority areas and basic raw materials key extraction areas*".

Section 3.17.3f commences "*There is a presumption in favour of applications for the extraction for basic raw materials in the basic raw materials resource areas ……*"

Statement of Planning Policy 2.4 recognises the site as Priority Limestone Resource, Number 30/17. This is also recognised in the Metropolitan Rural Plan and the North West Structure Plan. Furthermore SPP 2.4 requires that resources be staged and taken prior to sterilisation by other land uses.

The need for limestone is also recognised by the Chamber of Commerce and Industry in their comprehensive summary of Basic Raw Materials, (Managing the Basic Raw Materials of the Perth and Outer Metropolitan Region, April 1996).

The site has been earmarked for some time in planning strategies as a site suitable for industrial activity.

2.3 End Use

The extraction of limestone is seen as an interim use of the land prior to utilisation of the area by the current land holder.

The final land surface has to be compatible with the Water Corporation tank site and so will need to slope gently or be steeped up to the elevation of Lot 10.

At this stage the most appropriate end use is to restore the surface to be suitable for industrial use but be visually compatible with the surrounding rural land surface, and to rehabilitate the site with local native species.

Final Contours

It is proposed that the concept excavated floor be down to 50 metres AHD with batter slopes of 1 : 3 vertical to horizontal up to the Lot 10, Water Corporation tank stand site. Provision will be made to excavate through into Adelaide Brighton Ltd land to the east and north to enable a consistent land form to be created. See Appendix 3.

If excavation does not immediately allow excavation through to the north west and east the land will be brought into line with that adjoining. See Concept Final Contour Plan Figure 10.

The land surface will have to be consistent with Lot 10, and will need to rise up to at least 90 – 95 metres to Lot 10.

The use of a flat area is seen as a compromise to potentially allow industrial activity on portion of the site at some point in the future.

The final land surface will be smoothed to match the existing natural landform of the area.

2.4 Surrounding Landuses and Buffers

Surrounding Land Uses

Limestone has been extracted through the years from the local area and there are old and current quarries on the ridge to the south, west, east and north.

Pine plantations lie further east in State Forest 65. Market gardens are the predominate land use to the west.

Water Corporation owns the adjoining Lot 10 to the north which is proposed to be used as tank storage for drinking water at some point in the future. Lot 10 has a battle axe access leg along the eastern side of Lot 8.

The land to the north, south and east is held by Adelaide Brighton Cement through Mining Tenement and private land and will be excavated at some point in the future.

Bush Forever identified a vegetation linkage as crossing the south eastern corner of Lot 8. Figures 3 to 5.

Buffers

The issue of appropriate buffers is a matter of the distance and protection measures to prevent impact on adjoining land users. This applies mainly to noise, dust and visual impact, all of which are treated separately.

A number of Government Policies relate to buffer distances and the protection of Basic Raw Materials. *Statement of Planning Policy No 4.1*, *State Industrial Buffer Policy*, (draft July 2004) discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this.

Statement of Planning Policy No 2.5, Agricultural and Rural Land Use Planning, makes provision for the extraction of basic raw materials. SPP 2.5 in Point 9 states that "The location of rural residential and rural small holdings should avoid unacceptable impacts on, or sterilisation of natural primary resources including prospective areas for mineralisation and basic raw materials .....".

Generic buffer requirements were developed by the Victorian Government and used by the Environmental Protection Authority as the basis for a Draft guideline on recommended buffer distances. These formed the basis of EPA Guidance Statement Number 3, Separation Distances between Industrial and Sensitive Land Uses, June 2005.

EPA guidance "Separation Distances between Industrial and Sensitive Land Uses", June 2005 lists the generic buffers for sand and limestone pits as 300 - 500 metres depending on the extent of processing. A generic buffer relates to the distance at which there are unlikely to be any problems without some further investigations and does not mean that smaller buffers are not acceptable. EPA Guidance for the Assessment of

Environmental Factors No 3 June 2005 provides for a case by case separation, based on the potential impacts.

The excavation and processing methods are designed to be predominantly below ground level wherever possible.

The main issues are the potential generation of dust and noise.

The site is bordered by rural land with a number of quarries in the surrounding wider area.

There are no dwellings known within 500 metres. The closest dwelling is to the west on Dress Circle Farm (650 metres away), associated with intensive poultry and extractive industries. There are several shed facilities, two limestone quarries, a sand quarry and a soil amendment industry on that property. Figures 3 – 5.

A limestone quarry lies between Lot 8 and the closest residence on Dress Circle Farm.

The excavation will be worked from the floor of the pit as an inside – out operation where possible with the landform being retained to assist visual and noise management.

A 50 metre buffer is proposed to Bush Forever Site 293; 20 metres at excavation and 50 plus metres after rehabilitation to local native species

BUFFERS			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Adjoining properties	• The proposed excavation is 650 metres from the closest dwelling with a limestone quarry between.	The proponent will design the operation to work from the floor of the pit behind landform wherever possible in order to minimise potential noise and visual issues. They will operate according to the Management Plan.	Compliance with the Excavation Management Plan and Noise Regulations. Ongoing

2.5 Aboriginal Sites

The database of the Sites Department of the Department of Indigenous Affairs has no record of any aboriginal sites in the area. No sites are recorded for Lot 8.

ABORIGINAL SITES			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Aboriginal sites	***Aboriginal Heritage Act 1972-1980*** • Should any evidence of early aboriginal occupation be uncovered during the extension of the quarry, development will be stopped pending an assessment by a recognised consultant. • If the site is confirmed as a site under the provisions of Section 15 of the Aboriginal Heritage Act 1972-1980 and Amendments operations will cease pending relevant negotiations.	The proponent will comply with the *Aboriginal Heritage Act 1972-1980*	None required at this time.

2.6 Community Consultation

The City of Wanneroo will be required to advertise the proposal.

2.7 Responsible Authorities

A number of local and state authorities are responsible for quarrying of this type or have an interest in its operation.

City of Wanneroo

- Has responsibility for local roads in the area.
- Issues Development Approval under the Town Planning Scheme.
- Issues and oversees the Extractive Industries Licence.
- Has District Planning Strategy which supports Extractive Industries.

Department of Industry and Resources

- Controls the safety and methods of excavation through the *Mines Safety and Inspection Act 1994.*
- Covers the health and safety of workers.

Department of Environment and Conservation

- Oversees all significant environmental impacts.
- Licenses any screening plant used in the processing of limestone.
- Responsible for flora and fauna.

Department of Water

- Issues guidelines for water quality management for extractive industries.
- Oversees protection of groundwater and water courses.

Water Corporation

- Has plans for a water tank storage facility on Lot 10 adjoining to the north.

Western Australian Planning Commission

- Responsible for Statement of Planning Policy No 2.4, Basic Raw Materials Policy.
- Issues approval under the Metropolitan Region Scheme.
- Approved the City of Wanneroo Town Planning Scheme and Local Planning Scheme.

Main Roads

- Responsible for construction and maintenance of main roads and the use of these roads by truck traffic.

Department of Indigenous Affairs

- Oversees the Native Title Amendment Act and the *Aboriginal Heritage Act 1972 - 1980*.

3.0 GEOLOGY, REGOLITH and CLIMATE

3.1 Geology and Geomorphology

The site lies on the eastern of two main ridges of limestone that extend inland from the west coast separated by a line of wetlands and lakes. Elevation grades from 50 metres AHD in the south western corner rising to 92 metres on the northern edge of the site.

The limestone is an aeolian calcarenite (formed from wind blown calcareous sands) derived from beach sands and categorised as the Tamala Limestone. Calcrete formation has occurred on top of the ridge as calcium carbonate has been dissolved and re-precipitated. This has formed a hard cap rock of higher calcium carbonate content and has resulted in minor pinnacle formation. See Perth Environmental Geology 1 : 50 000 Series, Yanchep and Perth maps, (Geological Survey, 1982 and 1986). Figure 1.

The Tamala Limestone extends from Exmouth in the north to, and along, the south coast. Its age is late Pleistocene based on dates of between 100 000 and 25 000 years which have been obtained for limestone elsewhere. It consists of foraminifer, shell fragments and quartz grains. Grade of the limestone ranges from 81 % to 86 % calcium carbonate, although some variation can be expected laterally and vertically as excavation proceeds. (Geological Survey of WA, 1990).

Soil coverage is very low with shallow yellow brown sands over abundant limestone outcrop. They are classified as Cottesloe soils; Uc1.23 (Northcote). Where present, soil depth is generally only 200 to 300 mm. On the lower elevations, on the edges of the

site in the south west, the soils are deeper and tend to be more like the Spearwood Sands.

The nature of the limestone is exposed in the limestone pits to the east which has a vertical exposure of some 20 metres. There is no evidence of any karst formation or caves in those faces. In fact the presence of cavities significantly reduces the quality of the stone for use as dimension stone. The site lies outside the Karst Risk Area in Csaky 2003. See Figure 3.

3.2 Description of the Resource

Scattered limestone outcrops occur across the site between deeper covering sand. The limestone has been indurated on the outcrops raising the calcium carbonate content to between 50% and 80%. As the calcium carbonate content drops, the stone becomes less suitable for dimension stone.

The degree of lithification (hardness) changes both vertically and horizontally over the site and determines the use to which each type of limestone can be put. For example pits which start off with good product may become sub-grade as excavation proceeds. Similarly the lateral extent of the higher quality material can terminate quickly. These variations in grade require a number of excavations to be worked concurrently.

The sand resources are deep yellow sands that are suitable for fill and concrete sand. These occur in swales adjacent to the limestone resources.

Although the resource extends to depth, extraction will be limited by the quality of stone encountered at depth.

3.3 Climate

The climate of the area is Mediterranean with warm to hot summers and cool wet winters.

The closest recording station is Beenyup (Wanneroo), although averages of only six years' data have been recorded. Other weather data must be taken from Perth.

The highest temperatures are in February, with 30.0 maxima, and the lowest are recorded in July with maxima of 18 degrees Celsius and 7.4 degrees C minima.

Rainfall for the area is slightly less than Perth at 722 mm compared to Perth's 869 mm, of which more than 90% falls in the months April to October inclusive. Evaporation is high and exceeds rainfall in all but the four wettest months, May to September.

The prevailing winds are from the south west, particularly in the afternoon. In summer the easterly in the mornings and the sea breeze in the afternoon can be quite strong. At 3.00 pm wind speeds exceed 10 kph for 80 % of the time in summer but only 30 % to 40 % in winter. At other times the wind speed is calm for 30 % of the time in winter at 9.00 am and 10 % in summer, with 40 % of the time exceeding 10 kph in summer and 20 % in excess of 10 kph in winter.

4.0 EXCAVATION MANAGEMENT

Environmental issues including dust, noise and traffic can be managed in such a way to minimise or eliminate any potential impact on the local community. Dust and noise can be contained by the methods of extraction to be used and the control measures which will be put into place. Measures to protect the site and minimise the influence of dieback are addressed under Environmental Management.

4.1 Extraction of the Resource

It is proposed to excavate the limestone by coming in from the south western corner at floor elevation and opening up the centre of the site from ground level, gradually expanding the excavation to the north and east.

The type of excavation will be similar to other limestone pits in the local area. See Figure 3.

Excavation will be conducted to the:-

- *Mines Safety and Inspection Act 1994 and Regulations 1995.*

Excavation Methods

Excavation will be carried out as a sequence. Figure 8.

1. Remove the vegetation cover by pushing it into windrows for use on the batters to minimise soil erosion and assist spreading on the final land surface as part of the final rehabilitation. Vegetation clearing will be progressive and minimised to that required for each stage of excavation.

2. Where practicable vegetation will be directly transferred to a batter slope being rehabilitated in order to preserve the local genetic diversity.

3. Smaller indigenous shrub material will be used in the rehabilitation process when available and suitable; for example on the batter slopes of completed areas. It will be laid on re-formed slopes to reduce wind and water erosion as well as provide a source of seeds for revegetation.

4. Any topsoil will be removed for spreading directly onto areas to be revegetated, batter slopes and screening bunds. If direct spreading is not possible the top soil will be stored in low dumps, for spreading at a later date. Weed affected topsoil from the cleared area will be buried to reduce the future weed loading on the site.

5. Where possible topsoil and overburden will be directly transferred from an area being cleared to an area to be rehabilitated. Where this is not possible the topsoil and overburden will be stored in low dumps to less than 1.0 metre high for future use in rehabilitation.

6. Soil overburden, as yellow and brown sand and low grade limestone, will be directly transferred or stored in low dumps for later use and for forming the screening bunds around the perimeter of the excavation area.

7. Limestone overburden or interburden, if encountered, will be taken off site and used for reconstituted block manufacture. If this is not possible it will be pushed into screening bunds on the western side of the cutting floor, separate from the top soil, for later use in re-contouring the land surface at the conclusion of excavation.

8. Excavation will be worked progressively in the stages as shown on the attached staging plan commencing in the south west and spreading north east.

9. Limestone will be excavated to a floor level at 50 metres AHD in the centre of the site, as shown on the plan of the land surface, prior to rehabilitation by inert landfill.

10. Excavation methods will include;

Road Base	Deep ripped with a bull dozer and loaded into a portable crusher for reduction into the required size. This will use waste from armour stone production.
Dimension Stone Blocks	Blocks will be cut if suitable stone is available.
Armour stone	May be excavated from suitable materials. Generally a bull dozer will be used but small blasts may be required. See 4.10 Noise.

11. All static and other equipment such as crushers and screens, will be located on the floor of the quarry to provide visual and acoustic screening. Stockpiles of products will be retained on the floor of the pit where possible to reduce visual impact.

12. The northern and eastern boundaries will be left in a stable manner to the requirements of the *Mines Safety and Inspection Act 1994*.

13. It is not anticipated that blasting will be required. However if it is used to produce armour stone, the operators will use small charges, with millisecond delays, to reduce air blast over pressure and ground vibration. If blasting is to be used, a "Blasting Management Plan" will be prepared and approved prior to any blasting taking place.

14. At the end of excavation the floor of the quarry will be rehabilitated to local native vegetation prior to decisions being made for an industrial end use.

Dimension Stone Cutting

Dimension stone cutting, if used, will initially be commenced in the east of the excavation area to enable better noise and visual screening and to not compromise the bulk limestone excavations. If used dimension stone excavation will consist of the following excavation methods

1. The vegetation will be removed for use on the batters to minimise soil erosion and assist spreading on the final land surface as part of the final rehabilitation.

2. Any topsoil will be removed for spreading directly onto areas to be revegetated, batter slopes and screening bunds. If direct spreading is not possible the top soil will be stored in low dumps, for spreading at a later date.

3. A bull dozer will be used to remove the cap rock and surface limestone, to produce a relatively flat cutting floor of soft limestone.

4. Overburden will be pushed by the bulldozer into a bund along the western side of the cutting floor to provide visual and noise screening.

5. Finally a grader will be used to smooth and level the floor, as flat as possible, to allow the installation of rails and cutting machines.

6. When dimension stone is cut, sections of the floor will be lowered by the depth of one block until the whole floor is lowered. The next set of blocks will be cut by the re-installation of the rails and cutting machines on the lowered floor and the process repeated. This method of excavation means that the cutting floor is gradually lowered below the land surface. Either electric or diesel powered saws may be used.

7. Water will be used for dust suppression, to reduce the potential for dust generation from the movement of machinery and the effect of wind.

8. All static and other equipment such as cutting machines, block making machinery, or screens, will be located on the floor of the quarry, or screened by earth bunds where possible to provide visual and acoustic screening.

9. Blasting is not part of dimension stone operations because it can fracture the stone.

10. Limestone not used for dimension stone will be used for construction materials.

Details of the Landform Restoration and Rehabilitation are Listed under 7.0 Rehabilitation.

4.2 Staging and Timing

The proposed excavation is planned to commence in the south western corner and move north and east.

It is anticipated that the northern portion will be excavated prior to the eastern portion to enable the progressive restoration of the land surface and direct transfer of topsoil where possible.

See the Staging plan Figure 4. A total of 44.8 hectares of resource are available, of which 34% is already cleared.

4.3 Hours of Operation

Hours of operation will be 6.00 am to 5.00 pm Monday to Saturday inclusive, excluding public holidays. This is similar to the operations of nearby quarries in the local area.

Transporting material on Saturday should not present a problem because of the high traffic volumes using local roads and low numbers of dwellings.

However Wattle Avenue will need to be upgraded to allow better traffic flows. The use of Wattle Avenue will also reduce the impact on local residences.

HOURS OF OPERATION			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Operating times	• Hours of operation will be 6.00 am to 5.00 pm Monday to Saturday inclusive, excluding public holidays.	The proponent will maintain the transport of sand.	Compliance with the Excavation Management Plan. Compliance with Licence and operating conditions

4.4 Machinery and Equipment

The following equipment is likely to be used during the excavation of limestone. Apart from dimension stone cutting machines similar equipment will be used during land restoration through the placement of inert landfill.

Site office/lunchroom	Located in the south west for the management and security of small items.
Toilet system	A septic or serviced portable toilet system is to be installed at the site office.
Machinery shed	Located in the south west of the site for the sharpening of dimension stone saw blades and minor day to day servicing of plant.
Bore	A bore is proposed for the south western corner of Lot 8. Water will be pumped to a tank on the high elevation and gravity fed to the operations from that tank.
Fenced compound	Located on Lot 8 for the storage of mobile plant.
Bulldozer	Clearing and movement of limestone as required and for use in land restoration. This will come to the site as required to push up limestone and compact and distribute the inert landfill.
Dimension Stone cutting equipment	Electric or diesel block cutting machines operate on the cutting floors.
Water tanker	Used for dust suppression on the access road and working floors as required. Alternatively a tank with sprinklers can be used for dust suppression.
Loader and bobcat	Loading and handling blocks and other products. The loader will be used for the movement of limestone, loading road trucks and feeding any crushing and screening plant. Bobcats and loaders will be used for the stacking and loading of dimension stone and reconstituted blocks.
Blasting	Unlikely to be used. If used will only be required to produce armour stone. Prior to any blasting a blasting management plan will be prepared.
Weighbridge	At this stage a weighbridge is not proposed but may be included at a later date if required.
Fuel Storage	An overhead fuel tank is to be located on site and lined with impermeable membrane to DOIR and DEC guidelines

All static and operational equipment will work on the quarry floor to provide maximum sound and visual screening where possible.

All mobile and static plant will be registered or licensed by the Department of Environment and Conservation.

4.5 Access and Transport

Transport is proposed along Wattle Avenue which will need to be upgraded to allow better traffic flows.

The use of Wattle Avenue will also reduce the impact on local residences. Wattle Avenue will require upgrade from the junction of Dayrell Avenue and will be sealed to minimise dust generation.

The site will be fenced in the area of the access point and extending along the boundaries to prevent inadvertent and unauthorised entry. In places large boulders will be used to discourage four wheel drive access.

A stranded wire fence and signs will be erected above vertical faces.

Appropriate signs will be erected on site as required, combined with locked gates and perimeter fences maintained at all times when the site is not manned, as required by the Department of Industry and Resources and the City of Wanneroo.

In some areas vehicle barrier fences are not likely to be required because the vegetation is so thick and prickly that the public is unlikely to walk across the site, and the limestone is rough with pinnacle formation preventing off road vehicles.

Oakford Land Company will use semi-trailer truck or truck and trailer combinations to transport limestone products, with an average of up to 20 laden vehicle movements per day.

A fenced yard and large shed are proposed for the security of mobile plant.

TRAFFIC			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Traffic on Wattle Avenue	• Wattle Avenue will be upgraded from the turn off at Dayrell Road.	Oakford Land Company is committed to maintaining a secure safe operating site and will follow the steps required to achieve this.	Compliance with the Excavation Management Plan. Compliance with Licence and operating conditions

4.6 Workforce

The workforce will vary, depending on the level of operation and market demands, but usually 4 to 6 persons can be expected to be working on site at any one time.

4.7 Water Use

Water is to be mainly used for dust suppression and cooling of the saw blades if dimension stone is cut.

The site lies within the Nowergup Groundwater Sub-Area.

Water will be drawn from a bore to be applied for and located in the southwestern corner of Lot 8. This water is proposed to be pumped to a tank on top of the hill and then gravity fed to the block cutting operation.

The bore will be applied for through the Department of Environment and Conservation. If no bore allocation is available an allocation will be transferred from the quarry operated by an associate of Oakford Land Company on the adjoining Lot 6 to the west.

From similar operations, it is anticipated that 5 000 kL will be sufficient for all required water use. Many limestone quarries that do not make reconstituted limestone blocks or cut dimension stone use less than 1 500 kL per year.

Potable water is to be collected from the roof of the site office or brought to the site as needed.

4.8 Safety

The site will operate to the *Mines Safety and Inspection Act 1994 and Regulations 1995*, which are administered by the Department of Industry and Resources and Worksafe.

Final contours will be less than 1: 3 vertical to horizontal for the bund to Lot 10.

The issues of road safety are discussed under 4.3 Hours of Operation and 4.5 Access and Transport.

Oakford Land Company is committed to maintaining a safe working environment.

A Safety Management Plan will be implemented prior to commencement to cover operational procedures and include workforce induction and training to ensure that all employees involved in limestone excavation are made aware of the environmental and safety implications associated with all stages of the mining activities.

Where applicable Safe Operating Procedure Sheets will be prepared and will be available for hazards. Workers and staff will be trained in the use of the procedures and all employees provided with site induction and training as necessary prior to commencing work on the site.

See 4.5 Access and Transport for site security and 4.12 Fire Management.

A key aspect of site safety is the provision of fencing and signage.

SAFETY			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Operational Safety	*Mines Safety and Inspection Act 1994 and Regulations 1995.* ▪ The site is within mobile and landline telephone contact. ▪ A Safety Management Plan will be prepared for the operations and implemented prior to commencement. ▪ All workers will be provided with site induction and necessary training prior to entering the site.	Oakford Land Company is committed to maintaining a safe working environment. Oakford Land Company will prepare and implement a Safety Management Plan for the operations prior to commencement.	Compliance with *Mines Safety and Inspection Act 1994.* Ongoing

Adjoining properties	*Mines Safety and Inspection Act 1994 and Regulations 1995.* • Warning signs are to be erected around the operating area. • Locked gates and fences will be maintained on site.	Oakford Land Company is committed to maintaining a safe working environment. A Safety Management Plan will be prepared for the operations and implemented prior to commencement.	Compliance with the Excavation Management Plan. Compliance with *Mines Safety and Inspection Act 1994.* Compliance with Licence and operating conditions

4.9 Visual Management

Visual Impact can occur in a number of circumstances, by the operation being set too high in the landscape, by being too close to neighbours and by insufficient visual protection.

There are a number of management actions that can be taken in quarries to minimise visual impact and these will be used wherever possible. The general management actions are summarised below together with the visual impact issues that relate to this site. The actions will be used where applicable and as the opportunity presents to minimise visual impact.

- *Locate exposed features behind natural barriers and landform*
- *Excavate from the floor of the pit below natural ground level*
- *Avoid breaks in the skyline due to workings and haul roads*
- *Push overburden and interburden dumps into positions where they will not be seen or can form screening barriers.*
- *Construct screening bunds and plant tree and shrub screens to reduce visual impact*
- *Stage workings and progressive rehabilitation to provide visual protection of later excavations*
- *Cover barriers and landscaping with forms, colours and textures compatible with the natural environment*
- *Adopt good house cleaning practices such as orderly storage and removal of disused equipment or waste*
- *Provide progressive rehabilitation of all completed, excavated or disturbed areas.*
- *Minimise the amount of ground open at any one time*
- *Install fences and gates which are compatible with the style of the area*
- *Minimise offsite impacts of night lighting*
- *Paint and maintain buildings exposed, plant and equipment with low impact colours*
- *Locate roads and access to prevent direct views into the site*
- *Locate buildings, plant and stockpiles in areas of low visual impact and maintain appropriate size*
- *Provide temporary revegetation of road embankments and disturbed areas as soon as practicable*
- *Control weeds and maintain amenity planting*
- *Ensure transport vehicles do not spill material on public roads and ensure prompt cleanup if it occurs*

The excavation operations will incorporate the procedures listed above wherever possible to minimise visual impact from on site activities. The excavation will operate from the floor of the pit behind the western face, which will assist visual screening.

Overburden will be used to form screening bunds along the western edge of the cutting floor and excavation area. These will be seeded with local native species to provide temporary vegetation cover.

The upper parts of the excavation adjacent to Lot 10 will be rehabilitated with seeding and direct transfer of topsoil and local vegetation cleared from the site, to minimise the long distance visual impact.

The closest existing dwellings to the west are over 650 metres from the site with a limestone quarry between. However as the excavation is located on, and extends up a ridge, some parts of the open ground are likely to be visible from long distance to the west such as from Wanneroo Road, in a similar manner to other limestone quarries in the local area. However every effort will be made to minimise these views by the methods outlined, particularly the staging, construction of overburden dumps along the west and temporary revegetation of disturbed visible areas. See Figure 8.

The pit will be progressively rehabilitated by the careful use of top soil as discussed in 7.0 Rehabilitation.

Excavated areas will be progressively backfilled and rehabilitated as they are completed.

VISUAL MANAGEMENT			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Neighbours or road users.	• The active operations are unlikely to be seen from the closest dwellings at 650 metres to the west, but may be seen from longer elevated viewpoints to the west. • The methods of excavation and staging have been designed to minimise visual impact. • Every effort will be made to minimise the visual impact using appropriate methods from those listed above. • Rehabilitation will progressively follow excavation as outlined In 7.0 Rehabilitation.	Oakford Land Company are committed to minimising visual impact and will implement the measures outlined.	Compliance with the Excavation Management Plan. Ongoing

4.10 Noise Management

Offsite noise is governed by the Environmental Protection (Noise) Regulations 1997.

The Environmental Protection (Noise) Regulations 1997, require that sensitive premises including dwellings in non industrial areas are not subjected to noise levels exceeding 45 dBA for more than 10% of the time, 55 dBA for more than 1% of the time and never exceeding 65 dBA during normal working hours. There are penalties for tonality of 5 dB, modulation 5 dB and 10 dB for impulsiveness, although impulsiveness is not likely to be relevant.

Occupational noise associated with the quarrying processes falls under the Mines Safety and Inspection Act 1994 and Regulations 1995. The management of occupational noise is normally handled by providing all necessary hearing protection, as well as conducting worker inductions, and educational programs for all staff. Regular site audits of quarry and mining operations are normally conducted by the Department of Industry and Resources.

Blasting noise (airblast overpressure) is controlled by the Department of Environment and Conservation under the Environmental Protection (Noise) Regulations 1997. Environmental Protection (Noise) Regulations stipulate that 9 out of 10 consecutive blasts are to be less than 120dB with no blast exceeding 125dB. Ground vibration is controlled by Australian Standard which lists a maximum vibration of 10mm/sec for dwellings and 20mm/sec for commercial premises. The Department of Environment and Conservation normally requires that 9 out every 10 blasts are to be below 5mm/sec with none above 10mm/sec.

Noise can originate from a number of operations and may impact on onsite workers, or travel offsite and impact on external sensitive premises. Both potential noise impacts are addressed by reducing the noise generated from the quarrying and processing operations.

There are a number of management actions that can be taken in quarries to minimise noise generation or travel and these will be used wherever possible. The general management actions are summarised below together with the potential noise impact issues that relate to this site. The actions will be used where applicable and as the opportunity presents to minimise noise on this site.

- *Comply with the Environmental Protection (Noise) Regulations 1997*
- *Comply with the provisions of the Mines Safety and Inspection Act 1994 and Regulations 1995*
- *Maintain adequate buffers to sensitive premises*
- *Locate exposed features behind natural barriers and landform*
- *Excavate from the floor of the pit below natural ground level*
- *Push overburden and interburden dumps into positions where they can form screening barriers*
- *Design excavation procedures and staging to maximise the separation to sensitive premises*
- *Design the excavation to provide enhance landform and constructed noise screening*
- *Maintain all plant in good condition with efficient mufflers and noise shielding*
- *Maintain haul road and hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades*
- *Implement a site code outlining requirements for operators and drivers*
- *Shut down equipment when not in use*
- *Provide all workers with efficient noise protection equipment*
- *Scheduling activities to minimise the likelihood of noise nuisance*
- *Fit warning lights, rather than audible sirens or beepers, on mobile equipment wherever possible*
- *Use transport routes that minimise community disruption*
- *Avoid the use of engine braking on product delivery trucks in built up areas*
- *Conduct training programs on noise minimisation practices*
- *Consult with the local community*
- *Minimise and conduct at the least disruptive times, non day to day activities such as vegetation, topsoil or overburden stripping on exposed ridgelines*
- *Provide a complaints recording, investigation, action and reporting procedure*

The excavation operations will incorporate the procedures listed above wherever possible to minimise noise emanation from on site activities. The excavation will be designed to operate from the floor of the pit behind the western face, which will assist noise screening. See Figure 8.

Overburden will be used to form noise screening bunds along the western edge of the cutting floor and excavation area.

Working in exposed areas such as during land clearing will be timed to occur during a week day at a time when disruption is less likely to impact on local residents.

The closest existing dwellings to the west are over 650 metres from the edge of the bulk limestone excavation, which will take place behind the western edge of the quarry, with a limestone quarry between.

All equipment will be fitted with noise shields and efficient silencers. Workers will be inducted and trained for operation on the site and provided with the correct noise protection equipment.

Excavated areas will be progressively backfilled and rehabilitated as they are completed.

The likely noisest part of the operation will be the cutting of dimension stone high up the landscape if it is undertaken. The proposed dimension stone cutting is planned for the eastern section which is further away from the dwellings and where a western overburden bund can be constructed to provide maximum screening. Use of the eastern floor increases the separation of the dimension stone cutting to over 1 000 metres to the closest dwelling. This exceeds the EPA guidelines for a 300 – 500 metre separation.

It has been found in other quarries that the provision of overburden screening dumps along the western side of the cutting floor makes a significant difference to noise shielding. There is also a significant reduction in noise if only one cutting saw is used instead of two. In addition electric cutting saws can be quieter than diesel saws. Shielding of the saw blades has been tried and was found not to be very effective at reducing noise and can raise safety issues.

All saws and mobile plant, such as the bobcats, will operate on the cutting floor below natural ground level and behind bunding along the western edge of the floor.

Blasting is not part of normal block cutting and is not proposed. It is not anticipated that blasting will be required. However if it is used to produce armour stone, the operators will use small charges, with millisecond delays, to reduce air blast over pressure and ground vibration. If blasting is to be used, a "Blasting Management Plan" will be prepared and approved prior to any blasting taking place.

It should be reinforced that dimension stone cutting is possible but may not be used.

NOISE			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Noise may impact on neighbours	*Environmental Protection (Noise) Regulations 1997.* • The quarry complies with the EPA Buffer Guidelines. • The dimension stone cutting floor will be located over 1000 metres from the closest dwelling, with the separation to bulk limestone excavation being 650 metres. An existing limestone quarry lies between the dwelling and the proposed quarry. • All static equipment and stockpiles will be located on the floor of the quarry. • Every effort will be made to minimise the visual impact using appropriate methods from those listed above.	Oakford Land Company are committed to minimising noise emissions and will implement the measures outlined. Oakford Land Company will comply with the *Environmental Protection (Noise) Regulations 1997.*	None necessary at this time. Ongoing
Blasting	• It is not anticipated that blasting will be required. However if it is used to produce armour stone, the operators will use small charges, with millisecond delays, to reduce air blast over pressure and ground vibration. If blasting is to be used, a "Blasting Management Plan" will be prepared and approved prior to any blasting taking place.	Oakford Land Company are committed to minimising noise emissions and will implement the measures outlined.	If blasting is proposed, a "Blasting Management Plan" will be prepared and approved prior to any blasting taking place.
Workers	*Mines Safety and Inspection Act 1994 and Regulations 1995.* • All workers will be supplied with the correct noise protection equipment. • Workers will be inducted to the site and instructed in the use of noise protection equipment and the potential hazards and minimisation.	Noise management implemented by Oakford Land Company will comply with the provisions of the *Mines Safety and Inspection Act 1994 and Regulations 1995.*	All workers will be supplied with adequate noise protection equipment as required when operating machinery. Ongoing

4.11 Dust Management Plan

Excessive dust has the potential to impact on both the workers and the adjoining land.

Dust can originate from a number of operations and may impact on onsite workers, or travel offsite. Potential dust impacts are addressed by reducing the dust generated from the quarrying, processing and transport operations.

Dust emissions fall under the Guidance for the Assessment of Environmental Factors, EPA, March 2000. Assessments of the potential dust risk are normally made using the Land development sites and impacts on air quality, Department of Environmental Protection and Conservation Guidelines, November 1996.

There are a number of management actions that can be taken in quarries to minimise dust generation or travel and these will be used wherever possible. The general management actions are summarised below together with the potential dust issues that relate to this site. The actions will be used where applicable and as the opportunity presents to minimise dust on this site.

- *Comply with the provisions of the Mines Safety and Inspection Act 1994 and Regulations 1995*
- *Maintain adequate buffers to sensitive premises*
- *Locate activities behind natural barriers, landform and vegetation*
- *Excavate from the floor of the pit below natural ground level*
- *Push overburden and interburden dumps into positions where they can form screening barriers*
- *Plant screening barriers with trees*
- *Design excavation procedures and staging, to maximise the separation to sensitive premises*
- *Design the excavation to provide enhance landform and constructed noise screening*
- *Maintain all plant in good condition*
- *Maintain haul road and hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades*
- *Water and/or treat access roads using a water tanker or sprinkler system*
- *Wet down stockpiles using water canon or sprinklers as required*
- *Wet down or cover loads on trucks that are likely to blow during transport*
- *Ensure mobile and static plant are provide with dust extraction, shielding or filtration systems as appropriate.*
- *Provide skirts and dust extraction systems to drills*
- *Implement a site code outlining requirements for operators and drivers*
- *Shut down equipment when not in use*
- *Clearing and reinstating vegetation, topsoil and overburden will be confined to the wetter months, April to October, where possible*
- *Schedule activities such as vegetation, topsoil or overburden stripping on exposed ridgelines at times when the materials are less likely to blow or during suitable wind conditions.*
- *Provide a bitumen apron to the site to minimise dust carried on vehicle wheels*
- *Maintain road trucks in a clean condition*
- *Avoid spillages on roads and clean up promptly*
- *Conduct training programs on dust minimisation practices*
- *Consult with the local community as necessary*
- *Provide a complaints recording, investigation, action and reporting procedure such as Appendix 3 of Land development sites and impacts on air quality, Department of Environmental Protection Guidelines, November 1996*
- *In the event of dust management not being able to be achieved, such as a bore breakdown or exceptional weather conditions, the dust generating activities will be stopped until conditions improve.*
- *When winds are sufficiently strong to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved*

Normally dust associated with limestone extraction is the fine calcium carbonate and any clay that occurs in the limestone. This fine material can be generated by vehicular traffic and cutting saws which crush and powder the fine particles.

When limestone is placed and not disturbed it readily develops a crust of reprecipitated calcium carbonate that tends to stabilise the surface. Also the fine particles are washed

below the surface leaving only coarse material behind. Therefore bunds do not normally generate dust, and become stabilised after experiencing a winter. It is really only the traffic and active areas that are highly susceptible to dust generation.

The prevailing winds are from the south west, particularly in the afternoon. In summer the easterly in the mornings and the sea breeze in the afternoon can be quite strong. At 3.00 pm wind speeds exceed 10 kph for 80 % of the time in summer but only 30 % to 40 % in winter. At other times the wind speed is calm for 30 % of the time in winter at 9.00 am and 10 % in summer, with 40 % of the time exceeding 10 kph in summer and 20 % in excess of 10 kph in winter.

The most likely time for dust to become an issue is on summer mornings. However, as can be seen in the Aerial Photographs (Figures 2 and 4), an existing limestone quarry is much closer to the nearest dwelling, and would have more potential impact.

Dust emissions fall under the *Guidance for the Assessment of Environmental Factors*, *EPA*, *March 2000*. However an assessment of the dust risk can be made using the *Land development sites and impacts on air quality*, Department of Environmental Protection Guidelines, November 1996 which reveal that the risk of dust impacting on the closest dwelling is as listed below.

Activity	**Calculated Score**	**Allocated Risk of Dust**
Excavation of limestone	84	Negligible
Land clearing and excavation	192	Negligible

Treatment of dust is normally managed through the use of water for dust suppression, and therefore dust is not normally a problem in winter.

The access road will be watered as necessary or have sprinklers installed to reduce the generation of dust in the drier months.

The road base quarry is separated from the closest dwelling by 650 metres with another limestone quarry between. At such a distance the risk of dust reaching the dwelling is remote because of the distances involved.

Transport past the dwelling in Wattle Avenue may carry a small risk of dust but this will be negated by up grading and sealing that portion of Wattle Avenue and wetting down and covering loads as appropriate.

On this site, Oakford Land Company will take the necessary steps to manage and contain dust by incorporating the methods listed above.

Some site specific activities to be used in addition to the general practices listed above are;

1. Clearing and reinstating vegetation, topsoil and overburden will be confined to the wetter months, April to October, where possible.

2. Intervening vegetation will act as a filter for airborne dust particles. Dust particles fall out from the air as the wind speed drops on travelling through perimeter vegetation.

3. All workers will have access to efficient dust masks for use as required.

4. Completed sections of the quarry will be rehabilitated as soon as practical to reduce the area of open ground and help reduce wind speed.

5. A water tanker or sprinkler system will be maintained on site as necessary or sprinklers installed to ensure adequate wetting down of the operations.

6. The access road on Lot 8 and other internal roads will be watered as required through the year to reduce dust generation.

7. A water tanker is to be maintained at the site, or water from the bore will be pumped to tanks and will be available to the cutting floor and quarry in general.

8. Loads likely to generate dust or sand will be wetted down and/or adequately covered prior to leaving the pit.

9. In the event of dust management not being able to be achieved, such as a bore breakdown or exceptional weather conditions, the dust generating activities will be stopped until conditions improve, to minimise impact on adjoining land holders.

10. All complaints relating to dust will be investigated immediately on receipt of a complaint. Appendix 3 of *Land development sites and impacts on air quality*, Department of Environmental Protection Guidelines, November 1996, will form the basis of the methods on which a complaint on dust is dealt with.

11. When winds are sufficiently strong to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved.

12. A record of all dust complaints will be retained together with the mitigation measures to be used to reduce the dust impacts.

Appendix 3.

Procedures to be adopted following a complaint from a land development site

The procedures to be adopted by the developer following receipt of a dust-related complaint from a member of the public should be as follows:

- Record the details of the complaint as specified below. The complaint form should be retained by the developer and be made available upon request by the local government or an authorised DEP officer.
- Take measures to control any excessive dust by implementing the contingency arrangements which have been specified for the agreed site classification.
- If the developer regards the complaint to be unjustified, then the developer should forward the details of the complaint to the local government within 24 hours.

As a guide, the procedures to be adopted by local government, following receipt of a dust-related complaint from a member of the public or passed on by the developer, should be as follows:

- Record the details of the complaint as specified below or on a local government-approved complaint form. The complaint form should be retained by the local government and be made available upon request to an authorised DEP officer.
- Evaluate the complaint by conducting a visual inspection, preferably as soon as possible, taking into account the prevailing weather conditions which were being experienced at the time the complaint was lodged.
- If the complaint is valid, instruct the developer to take measures to control any excessive dust by implementing the contingency arrangements which have been specified for the agreed site classification.
- If the local government regards the complaint to be unjustified, contact the complainant and inform them of these findings.
- If the local government is unable to resolve the complaint, after exhausting all possible avenues, then the local government may request advice from the DEP.

Appendix 3.

Pollution Incident Report Form - Land Development Sites

Sheet 3

Date: .....(1) **Time:**.....(2) **Received by:** .....(3)

From:

Name:.....(4) Tel. Nº·(s):.....(5)

Address:.....(6)

Area/Suburb:.....(7) Municipality:.....(8)

Name of developer:.....(9)

Address of developer .....(10)

Address of development: .....(11)

Type of complaint (Odour, Dust, Smoke, Noise, Other).....(12)

Details of Incident Received (effect/frequency): .....

.....

.....(13)

Referred to:.....(14) Date: .....(15)

Action Taken/Advice Given/Matter Referred to: .....

.....

.....

.....

.....(16)

Recorded by: .....(17) Date:.....(18)

DUST			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Neighbours	*Guidance for the Assessment of Environmental Factors, EPA, March 2000.* *Land development sites and impacts on air quality, DEP, 1996.* • Oakford Land Company will take the necessary steps to manage and contain dust by incorporating the methods listed above. • The potential for dust nuisance is assessed as "Negligible". • The forms listed "Appendix 3" (*Land development sites and impacts on air quality, DEP, 1996)* above will be used in the event of a complaint on dust.	Oakford Land Company will take the necessary steps to manage and contain dust by implementing and maintaining the Dust Management Plan methods listed above.	Compliance with the submitted Dust Management Plan. Ongoing
Workers	*Mines Safety and Inspection Act 1994 and Regulations 1995.* • All workers will have access to efficient dust masks for use as required. • All workers will be instructed in the use of dust minimisation equipment.	Oakford Land Company will ensure the quarry operates to the standards in the *Mines Safety and Inspection Act 1994 and Regulations 1995.*	All workers will have access to efficient dust masks for use as required. All workers will be instructed in the use of dust minimisation equipment. Ongoing

4.12 Fire Management

The safety of workers is managed through a Safety Management Plan developed through the Mines Safety and Inspection Act 1994 and Regulations 1995.

There are a number of management actions that can be taken in quarries to minimise fire risk and these will be used wherever possible. The general management actions are summarised below together with the potential issues that relate to this site. The actions will be used where applicable and as the opportunity presents to minimise fire risk.

- *Restrict vehicles to operational area, particularly on high fire risk days*
- *Use diesel rather than petrol powered vehicles*
- *Maintain perimeter fire breaks as required*
- *Ensure fire risk is addressed and maintained through the Safety Management Plan*
- *Provide an emergency muster area, communications and worker induction and training*
- *Establish on site water supplies for potential use in extinguishing fire*
- *Secure the site from unauthorised access*

There is less potential fire risk from quarries than other land uses because quarries clear land and vehicles are restricted to cleared access roads, the pit floor, processing and stockpile areas.

These cleared areas form a natural firebreak. The main risk comes from an external fire in the surrounding vegetation, impacting on the quarry. As such the fire risk is no greater than a rural property.

Fire risk is normally controlled through the *Bush Fires Act 1954* and local authority bylaws.

There is little potential fire risk from limestone mining operations of this type. The quarry itself will form a natural firebreak. However fire is always a potential risk in remnant vegetation and rehabilitated vegetation, particularly on the lot to the north.

Perimeter firebreaks will be maintained, water from a bore will be available, as well as a tanker truck at dry times of the year.

FIRE PROTECTION			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Fire Protection	*Bush Fires Act 1954* City of Wanneroo bylaws. • The excavated area provides a natural fire break. • Perimeter firebreaks will be maintained. • Public access to the site will be prohibited and fences maintained. • Water for dust minimisation will be available for fire fighting. • The site is serviced by telephone.	Oakford Land Company will ensure the quarry operates to the standards in the *Mines Safety Inspection Act 1994 and Regulations 1995*. Oakford Land Company will ensure the quarry complies with the local fire safety requirements.	Compliance with City of Wanneroo requirements. Ongoing

5.0 HYDROLOGY

5.1 Local Hydrology

The site is located on a relatively high limestone ridge which rises to 92 metres, with the deepest floor elevation proposed to be 55 metres.

The water table was at a depth of 21 – 24 metres AHD in May 2003, 30 metres below the proposed base of the pit. Flow of the groundwater is from the north east to south west. Perth Groundwater Atlas 2004.

A licensed bore is to be located on the south western corner of Lot 8 with water pumped to a small tank and then gravity fed to the operations.

The bore will be applied for through the Department of Environment and Conservation. If no bore allocation is available an allocation will be purchased from a landholder within the Nowergup Groundwater Sub-Area or transferred from the quarry on Lot 6 to the west with which the Oakford Land Company is associated.

5.2 Protection of Water Quality

The protection of water whether groundwater or surface water is an important part of the management of quarries. Different types of quarries have different potential impacts which are listed below in general terms. Not all potential impacts will apply to this quarry and the main impacts affecting this site are also listed.

Guidance on the quality of water can be found in;

- *Western Australian Water Quality Guidelines for Fresh and Marine Waters, EPA Bulletin 711, 1993.*
- *ANZECC, 1992, Australian Water Quality Guidelines for Fresh and Marine Waters.*

A number of documents provide guidance on the management and disposal of surface water that can lead to waterways, wetlands and underground water systems. These mainly apply to urban development but the methods are also applicable to the quarrying industry.

- *See Engineers Australia 2003, Australian Runoff Quality, National Committee on Water Engineering.*
- *Stormwater Management Manual for Western Australia, Department of Environment WA, 2004.*
- *Guidelines for Groundwater Protection in Australia, ARMCANZ, ANZECC, September 1995.*
- *Environmental Protection Authority Victoria/Melbourne Water, undated, Urban Stormwater, Best Practice Environmental Management Guidelines*
- *Water and Rivers Commission, 1998, Manual for Managing Urban Stormwater Quality in Western Australia.*

Documents specific to the mining and quarrying operations are the DEC – DOIR Water Quality Protection Guidelines for Mining and Mineral Processing

- *1 Overview*
- *Minestite water quality monitoring*
- *Minesite stormwater*
- *Mechanical servicing and workshop facilities*
- *10 Above-ground fuel and chemical storage*
- *11 Mine dewatering*

A list of the management actions which are contained in the above documents is provided below. The actions will be used where applicable and as the opportunity presents to maintain water quality on this site.

- *Maintain adequate buffers to sensitive watercourses and wetlands*
- *Maintain a separation of 3 metres to the highest known groundwater level*
- *Contain all stormwater on site and only release clean, treated water*
- *Maintain all plant in good condition*
- *Maintain haul road and hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades, and direct runoff to trapping and filtration devices*
- *Recycle water through sediment settling ponds*
- *Provide an approved serviced portable or septic toilet system*
- *Separate extraction, washdown and storm waters*
- *Implement a site code outlining requirements for operators and drivers*
- *Avoid spillages on roads and clean up promptly*
- *Conduct training programs on dust minimisation practices*

- *In the event of a spill or adverse incident, activities will be stopped in that area until the incident is resolved*
- *All significant adverse incidents are to be recorded, investigated and remediated. A record is to be kept of incidents and the Local Authority and Department of Environment and Conservation notified within 24 hours*
- *See Refuelling and Maintenance for additional procedures*

The extraction of limestone and sand is a chemically free operation with the only liquids used being lubricants for machinery. Extractive Industries are one of the few industries permitted to operate in Groundwater Source Protection Areas provided a 3 metre vertical buffer is in place.

The proposal complies with Department of Environment and Conservation Guidelines.

Recharge and Water Use

The area has no surface drainage because of the permeable and porous nature of the sand and limestone. The site lies outside the Gnangara Priority Water Source Protection Area. There is no surface drainage from the excavation site. All excess water infiltrates the permeable limestone.

There will be no alteration to drainage lines, and neither surface water nor ground water will be affected. On closure the surface will continue to be free draining to the water table.

Drainage is to the water table which is greater than 30 metres from the surface at the lowest point of excavation on Lot 8.

The nature of dimension stone cutting and bulk limestone extraction is that both are conducted dry with water being used as a dust suppressant. There is no potential for water recycling or reuse, and this will not be undertaken.

As the limestone is so porous the only potential runoff is minimal surface water during heavy storm events. Therefore the only requirement for stormwater treatment is the direction of stormwater away from hard surfaces towards infiltration areas which will normally be broad areas of infiltration adjacent to the roads and hard stand. There is no need for defined detention basins. There will be no dewatering.

Limestone excavation is a clean operation similar to sand excavation in the nature of the risk to groundwater. No chemicals are used apart from normal lubricants, which is similar to sand excavation, and sand excavation is one of the few industries that are permitted to operate in a Priority 1 Public Drinking Water Source Area, indicating the clean nature of the activity. See Department of Water for *Land Use Compatibility in Public Drinking Water Source Areas.*

The proposed operation complies with all Government Policies and Guidelines.

Acid Sulfate

There has been an increased interest in acid sulfate soils since the release of WAPC Planning Bulletin 64.

However the interest has been over-reactive with assessments sought and risk applied in many areas where there is no geological risk or evidence of acid sulfate potential or actual conditions.

The most definitive survey procedure was produced by the Acid Sulfate Soil Management Advisory Committee NSW, 1998, in their *Acid Sulfate Manual.* This Manual forms the basis for much of the assessment procedures in Australia, including those adopted by the Western Australian Planning Commission and the Department of Environment and Conservation. The *Acid Sulfate Manual* adopts the procedure of reviewing the published data followed up by field assessment, which has been completed for this site. If a geological risk is determined, then a Preliminary Acid Sulfate Assessment is conducted.

On this site the resource of limestone is high in the landscape, highly oxidised and alkaline. The same limestone is in fact used for neutralisation of acid soil conditions. For example agricultural lime is produced from the same Tamala Limestone in the local area.

The site is shown as Low to no risk of acid sulfate conditions at depths of > 3 metres in WAPC Planning Bulletin 64.

A geological examination of the site by Lindsay Stephens of Landform Research showed that the site has no risk of containing acid sulfate conditions in the proposed depths of excavation.

Unauthorised Access and Illegal Dumping

The potential for rubbish to be dumped relates mainly to unauthorised access and is low as the site is set back from roads. Gates will be locked at all times when the site is unmanned and equipment is retained on site. Farm fences will be maintained.

Wastes generated will be recycled wherever possible and periodically disposed of at an approved landfill site. Any illegally dumped materials are to be removed promptly to an approved landfill or other suitable site, depending on the nature of the material.

Employee Amenities, Washdown, Wastes and Servicing

All major servicing of vehicles will be conducted off site. Wastes generated from excavation and processing activities will be collected and removed off site weekly to an approved landfill site. Regular inspections (at least weekly) will be conducted to ensure no wastes, litter and the like are present in or around the excavation area.

Vehicle washdown will not normally be required.

A septic toilet or serviced portable toilet system will be maintained at all times when the site is operating.

Refuelling and Maintenance

> *The protection of water from fuels and other chemicals is an important part of the management of quarries. Different types of quarries have different potential impacts which are listed below in general terms. Not all potential impacts will apply to this quarry and the main impacts affecting this site are also listed*
>
> *See 5.2 Protection of Water Quality above.*
>
> *Documents specific to the fuel and maintenance are the DEC – DOIR Water Quality Protection Guidelines for Mining and Mineral Processing*

- *Mechanical servicing and workshop facilities*
- *10 -Above-ground fuel and chemical storage*

A list of the management actions for fuel and maintenance is provided below. The actions will be used where applicable and as the opportunity presents to maintain water quality on this site.

- *Maintain adequate buffers to sensitive watercourses and wetlands*
- *Maintain a separation of 3 metres to the highest known groundwater level*
- *Minimise the quantity of fuels, lubricants and chemicals stored*
- *Store fuels in bunded lined facilities designed to contain 110% of the storage volume*
- *Workshop and fuel/liquid handling facilities are to be installed with hardstand from which all stormwater is directed to filtration and collection facilities*
- *Incorporate oil/water separators in sediment traps for vehicle and equipment washdown areas,*
- *Regularly clean out bunded fuel facilities and take contaminated water offsite*
- *Effectively treat process waters through settling pond systems, retention tanks/ponds, water clarifiers or other , water filtration systems*
- *Major servicing of large machinery is only to be undertaken offsite or in specially designed facilities approved for the location of the quarry*
- *Prepare an accidental spill containment and cleanup protocol*
- *Store flammable and combustible liquids in accordance with AS1940*
- *Storing and handling of corrosive materials in accordance with AS3780-8*
- *Rubbish generated is to be recycled wherever possible and periodically disposed of at an approved landfill site.*
- *Any illegally dumped materials are be removed promptly to an approved landfill or other suitable site, depending on the nature of the material.*
- *Regularly inspect fuel, oil and hydraulic fluids in storages and liners for wear or faults*
- *Service plant and equipment in accordance with a maintenance schedule*
- *Ensue refuelling and lubricating activities occur in designated areas, and equipment for the containment and cleanup of spills is provided*
- *Contain spillages in plant and working areas shutting down plant or equipment if the plant or equipment is the source of the spill (provided it is safe to do so)*
- *Dispose of waste chemicals in accordance with the Waste Guideline*
- *Transport chemicals in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code);*
- *Maintain the site in a tidy manner by removing all rubbish regularly offsite.*
- *All significant adverse incidents (such as a fuel spill of >5 litres) are to be recorded, investigated and remediated. A record is to be kept of incidents and the Local Authority and Department of Environment and Conservation notified within 24 hours*
- *See Refuelling and Maintenance for additional procedures*

All equipment is mobile and will move across the site as excavation proceeds. A permanent refueling facility may be used, bunded to the requirements of the Department of Environment and Conservation (*DEC – DOIR Water Quality Protection Guidelines Mining and Mineral Processing*).

This method is undertaken on most mine, industrial, farm and construction sites as well as many farming properties.

Soils such as those on this site are highly porous and adsorptive. The main risk of contamination is the minor drips that occur during the removal of hoses etc. Minor spills are quickly degraded by soil microbial matter.

The only other risk is from a tank rupture, but tanks are designed to manage this eventuality. A commitment is made to notify Department of Environment and Conservation/Department of Water and City of Wanneroo within 24 hours of any spill greater than 5 litres.

The same procedures will be used in the event of any fuel or hydrocarbon spill, including those in excess of 5 litres. Any spills will be contained by the excavation. Soil and resource will quickly be placed around the spill to contain it in as small an area as possible. When contained, the contaminated sand will be scooped up and removed to an approved landfill or other approved site.

No potential chemical pollutants, fuel or oils are to be stored on site. Minor servicing will be conducted onsite by mobile service vehicles, or offsite. Major servicing of large machinery will be conducted offsite.

Surface Water

Limestone is very porous and direct infiltration of rainfall is normal without any detention basins or other collection systems.

There are no watercourses on site or nearby and therefore surface water will not be altered or impacted on.

Ground Water

The water table will be 30 metres below the proposed base of the pit. The operation complies with all Government Policies and Guidelines.

There will be no significant changes to the water balance. Rainfall and infiltration rates will be essentially the same and the small amount of water loading of less than 5 000 kL will be negated by evaporation from dust suppression actions.

Dewatering is not necessary.

WATER QUALITY			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Surface water	*DEC – DOIR Water Quality Protection Guidelines for Mining and Mineral Processing* • *1 Overview* • *Minestite water quality monitoring* • *Minesite stormwater* • *Mechanical servicing and workshop facilities* • *10 Above-ground fuel and chemical storage* • *11 Mine dewatering* • There is no surface water runoff.	None necessary.	None necessary at this time

Ground water	*DEC – DOIR Water Quality Protection Guidelines for Mining and Mineral Processing* • Interpretation of the geology and hydrology, shows that there will be no alteration to the groundwater regime. • Complies with all Government Policies.	Oakford Land Company will implement and maintain the water protection policies to minimise the potential for alteration to surface or ground water.	None necessary at this time
Salinity	• No evidence of surface water or salinity.	None necessary.	None necessary at this time
Waste Materials	***DEC – DOIR Water Quality Protection Guidelines for Mining and Mineral Processing*** • A septic or serviced portable waste water system will be maintained on this site. • No liquid or solid wastes will be disposed of on site. • All waste will be collected and either recycled or disposed of at an approved waste disposal site.	Oakford Land Company will ensure that all solid and liquid wastes generated are stored and disposed of appropriately without causing the contamination of the water regime.	Maintain a tidy site. Ongoing

6.0 BIODIVERSITY

6.1 Flora

The site is predominantly vegetated. The adjoining land to the north and east is covered by remnant native vegetation.

A Flora and Vegetation Study was conducted by Regeneration Technology Pty Ltd in October 2006 and this study is attached as Appendix 1.

Vegetation Communities

Regeneration Technology found that the site is occupied by Cottesloe Complex Central and South as described by Heddle et al 1980. They conducted five 10 x 10 metre square plots and analysed them according to Gibson et al 1994.

Regeneration Technology recorded three vegetation communities, which were correlated against the vegetation communities identified by Gibson et al 1994.

> **Open Heath** of *Xanthorrhoea preissii* and *Dryandra sessilis* over *Acacia pulchella* and *Hibbertia hypericoides* on grey and yellow sand with limestone.
>
> **Woodland** of *Eucalyptus marginata* and *Banksia attenuata over Hibbertia hypericoides*, *Acacia pulchella* and weed species on grey to yellow sands.
>
> **Open Woodland** of *Eucalyptus marginata* over cleared pasture and grey to yellow sands. (This relates to the cleared area).

The vegetation communities are shown in Figure 2 of Appendix 1. The majority of the limestone resource is Open Heath. See Appendix 1 for site photographs.

Using the five sample plots and the methodology of Gibson et al 1994, the Open Heath most closely correlated with Community Type 26b *Woodlands and Mallees on Limestone*, whereas the Woodland correlated most closely with Community Type 28 *Spearwood Banksia attenuata – Eucalyptus woodlands.*

Species

A total of 96 plant taxa from 35 families were identified, of which 10 are weed/exotic species.

Rare, Priority and Significant Species

A search of the Department of Environment and Conservation databases was conducted prior to the site inspection by Regeneration Technology. No Declared Rare Flora were identified. The Declared Rare *Eucalyptus argutifolia* was not observed, with the mallee type Eucalypts on site being *Eucalyptus petrensis* and *Eucalyptus foecunda*.

One Priority species *Jacksonia sericea* (P3) was recorded.

A single Tuart Tree *Eucalyptus gomphocephala* was observed but does not constitute a population.

No wetlands occur on site.

Vegetation Condition

Vegetation Condition ranged from Excellent to Completely Degraded using Bush Forever 2000 condition score. Regeneration Technology found that the impacted vegetation had been subjected to a number of effects, including clearing, grazing, sand excavation, uncontrolled access, fire, weeds and rubbish dumping. Vegetation condition is shown in Figure 3 of Appendix 1. The majority of the limestone resource is shown as having vegetation in Excellent Condition, with the south western portion being shown as completely degraded. See Appendix 1 for site photographs.

Conclusions of the Vegetation Assessment

Regeneration technology made a number of recommendations/Guidelines, namely;

- *Unnecessary clearing of vegetation beyond that which is strictly required be avoided.*
- *Clearing and site layout design should ensure the minimisation of edge effects and should where possible utilise areas that are already cleared or degraded.*
- *Topsoil, logs and plant material cleared from the site should be directly replaced elsewhere on site in disturbed areas. Where this is not possible they should be stockpiled and used for rehabilitation works on site within a year.*
- *The site should be rehabilitated using species listed for each community.*
- *Seed collection and plant propagules for rehabilitation works should be collected from the site or bushland within the surrounding area to ensure local provenance of species replanted.*

- *A vegetation buffer should be maintained where practical along the northern and western boundaries of the site to reduce noise and dust effects on the neighbours.*

All of these recommendations are incorporated into the rehabilitation management plan. In some cases not all will be possible at all times. For example the spreading of vegetation within one year may not be possible. However through liaison with the adjoining quarry excavators it may be possible to swap material from the same vegetation communities between the sites as the material and rehabilitation area become available.

Another issue is the northern boundary which abuts land held by Adelaide Brighton Cement Ltd that is proposed to be excavated and will be mined through to provide a consistent land surface. The backfilled land surface may not have a limestone base and so some local species may not be appropriate. It may be likely that species from the woodland are more appropriate.

Significance of the vegetation

The significance of the flora depends on a number of issues.

- Rare, Priority or Significant species may be present.
- A Threatened Ecological Community may be present.
- The development may take the area of the particularly vegetation community or complex below desirable levels or guidelines.
- There may be an aspect of the flora that may be listed under the *Commonwealth Environment Protection and Biodiverstiy Conservation Act 1999.*

EPA Position Statement No 2, December 2000, Environmental Protection of Native Vegetation in Western Australia, specifically targets the retention of native vegetation in the Agricultural Areas in 4.1, Clearing in the agricultural areas for agricultural purposes. In 4.3, Clearing in other areas of Western Australia, it is unclear what "other areas" refers to, but may refer to retention of a 30% threshold in non agricultural areas.

Section 4.3 Clearing in other areas of Western Australia, (EPA Position Statement No 2, December 2000) expects that clearing will not take vegetation types below the 30% of the pre-clearing vegetation as recommended by ANZECC, 1999, National Framework for the Management and Monitoring of Australia's Native Vegetation**.** *The National Objectives and Targets for Biodiversity Conservation 2001 - 2005* (Commonwealth of Australia 2001) also recognise 30% as the trigger value.

For towns and cities such Perth Metropolitan Area and the Greater Bunbury Area the EPA minimum retention figure is 10% (EPA Guidance Statement No 10).

The vegetation on the limestone resources is mainly in Excellent Condition with some Completely Degraded in the south west.

No Declared Rare, or Tuart Woodlands were observed. One Priority Species, *Jacksonia sericea* (P3) was observed by Regeneration Technology.

No Taxa or plant communities listed under Commonwealth Legislation were recorded by Regeneration Technology.

The vegetation on Lot 8 is listed as Cottesloe Complex, Central South. Cottesloe Complex, Central South extends to the north through State Forest to pinch out north east of Yanchep.

EPA Guidance 10 *Level of assessment for proposals affecting natural areas within the System 6 region and Swan Coastal Plain portion of the System 1 Region* lists Cottesloe Complex - Central South as having 41.1% of the pre-European area still occurring and 8.8% in secure tenure.

Bush Forever 2000, lists the percentage of Cottesloe Complex - Central South remaining in the Perth Metropolitan area as 36% of pre-European vegetation remaining.

Depending on the end land uses, the site can be revegetated to native vegetation communities similar to Cottesloe Complex - Central South, and, with weed control, native vegetation could be provided across the whole site including the degraded areas. The end use of the site is proposed to be industrial land local native vegetation pending an industrial land use.

Balanced against this is the community need for resources. In the case of Lot 8, limestone is essential for road making and other construction purposes and cannot easily be replaced. There is a shortage of available or protected reserves of limestone from the Perth Metropolitan area to Bunbury, and, as resources are sterilised by the creep of development and conservation, some resources are likely to never be available. The consequence of this will be the use of sometimes substandard materials and materials from much further away; for example gravels from the Darling Scarp and hard rock from the closest quarries at Red Hill. To get these products to a site will involve taking of vegetation in another area such as the Darling Scarp, and large transport distances, great numbers of truck movements and consequent large increases in greenhouse emissions, potential road pavement and safety impacts.

With limestone now becoming restricted in the Perth Metropolitan Area, there is a need to preserve and utilise alternative nearby sources in a staged manner to ensure future supplies for the community. See 1.1 Proposal, Importance and Rationale,

The limestone is also a natural resource, recognised by *Statement of Planning Policy (SPP) 2.0 Environment and Natural Resources Policy*, *and Statement of Planning Policy No 2.5*, *Agricultural and Rural Land Use Planning.*

6.2 CLEARING PRINCIPLES

Area to be impacted on

The area of each vegetation community within the proposed excavation area is listed below.

Plant Community	**Area present on the proposed excavation**	
	Percentage	Area
Open Heath of *Xanthorrhoea preissii* and *Dryandra sessilis* over *Acacia pulchella* and *Hibbertia hypericoides* on grey and yellow sand with limestone.	53%	23.7 ha
Woodland of *Eucalyptus marginata* and *Banksia attenuata over Hibbertia hypericoides*, *Acacia pulchella* and weed species on grey to yellow sands.	13%	5.8 ha

Open Woodland of *Eucalyptus marginata* over cleared pasture and grey to yellow sands. (This relates to the cleared area).	34%	15.2 ha

The area of each vegetation condition score within the proposed excavation area is listed below.

Vegetation Condition	**Area present on the proposed excavation**	
	Percentage	**Area**
Excellent	60.0%	26.9 ha
Very Good	2.5%	1.1 ha
Good	3.5%	1.6 ha
Degraded	nil	nil
Completely Degraded	34%	15.2 ha
Total	100%	44.8 ha

Clearing Principles

Clearing is controlled under the ***Environmental Protection (Clearing of Native Vegetation) Regulations 2004.*** *These regulations provide for a number of principles against which clearing is assessed.*

	CLEARING PRINCIPLE *(Schedule 5 Environmental Protection Amendment Act, 1986*
1a	*High Level of diversity*
1b	*Significant fauna habitat*
1c	*Necessary to existence of Rare flora*
1d	*Threatened Ecological Community*
1e	*Significant area of vegetation in an area that has been extensively cleared*
1f	*Wetland or watercourse*
1g	*Land degradation*
1h	*Impact on adjacent or nearby conservation areas*
1i	*Deterioration of underground water*
1j	*Increase flooding*

As well as considering Biodiversity and other conservation issues the Clearing Principles that have to be satisfied are designed for rural regions and do not address the issues of the metropolitan area or resource needs. Therefore some additional principles need to be added when considering the need for Basic Raw Materials. In an attempt to provide a better balance to the clearing principles those principles have been expanded as listed in the tables below.

Lot 8 has always been earmarked for this purpose by its nomination Planning Policies such as Statement of Planning Policy 2.4, Basic Raw Materials, where Lot 8 is listed as a Priority Limestone Resource; Site 30/17.

The issue of clearing native vegetation and fauna habitat cannot therefore be considered separately but must be considered in terms of community needs in the northern Perth Metropolitan area. If development of urban areas was staged to extract the basic raw materials as recommended in Government Planning Policies the need for basic raw materials from other sites would be reduced. Unfortunately this is not so and there is no alternative but to take resources from sites such as Lot 8. The CEO may take

into account other matters that the "CEO considers relevant" (*EP ACT 1986 Section 51O*)

Section 51O of the *Environmental Protection Act 1986* allows the CEO to take planning matters into account when making clearing decisions, such as a State Planning Policy.

Lot 8 has always been earmarked for this purpose by its nomination Planning Policies such as Statement of Planning Policy 2.4, Basic Raw Materials, where Lot 8 is listed as a Priority Limestone Resource; Site 30/17.

There are many quarries and resource areas that have been allocated for use by the community prior to the introduction of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004.* These approvals or nominations in planning policies such as Statement of Planning Policy 2.4 were made to ensure a sufficient availability of resources for the community and pre-date the Clearing Regulations. Unfortunately the Regulations do not allow for any consideration of any pre-existing nomination or approval or for the value to the community of a resource.

The proposal therefore has been assessed under the Clearing Principles of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and the additional considerations below to provide an assessment of the likely impacts of the proposal.

Proposed Clearing

	ADDITIONAL CLEARING PRINCIPLES – EXTRACTIVE INDUSTRIES
2a	*Need for the resource*
2b	*Classification of the resource and existing approvals*
2c	*Availability of alternative resources and the impact of their use*
2d	*Proposed final land use*
2e	*Offsite Environmental impacts if the resource is not used*
2f	*Sound environmental management and rehabilitation*

CLEARING PRINCIPLE *(Schedule 5, Environmental Protection Amendment Act, 1986).*		**COMMENT**
1a	High Level of diversity	• The site has been assessed in the flora surveys by Regeneration Technology (Appendix 1), and found to have a normal diversity for the particular vegetation communities associated with Cottesloe Complex Central South.
1b	Significant fauna habitat	• The habitat is in excellent condition across two thirds of the site and disturbed, but degraded in the south west. • It would provide fauna habitat. • Clearing will be progressive. The end use of the site is to be rehabilitated to native vegetation, pending industrial land use at some point in the future.
1c	Necessary to existence of Rare flora	• No Declared Rare Flora was found by Regeneration Technology during the flora and vegetation survey. One Priority flora *Jacksonia sericea* was found. This is to be included in the rehabilitation.

1d	Threatened Ecological Community	• The vegetation on site is not listed as a Threatened Ecological Community and none was found. • Only one Tuart tree was found and this does not constitute a Tuart woodland as considered by the *Tuart Conservation and Management Strategy (draft December 2004*).
1e	Significant area of vegetation in an area that has been extensively cleared	• The land to the west has been cleared, and the surrounding land to the east, north and south is owned by Adelaide Brighton Cement Ltd as a significant limestone resource that eventually will be taken. • The site is listed as a Priority Limestone Resource in Statement of Planning Policy 2.4. • Bush Forever has allocated the south eastern corner of Lot 8 as part of Bush Forever Site 293 as a compromise to the preservation of vegetation in the local area.
1f	Wetland or watercourse	• No wetlands or watercourses occur on site.
1g	Land degradation	• The excavation can be managed in a manner that does not lead to degradation of the soil and land integrity apart from normal development issues. These are discussed in the main body of the Excavation and Rehabilitation Management Plan prepared for the site.
1h	Impact on adjacent or nearby conservation areas	• There are no nearby conservation areas, apart from Bush Forever Site 293 which will be provided with a 50 metre buffer.
1i	Deterioration of underground water	• Excavation of limestone and sand is well known with respect to groundwater resources. Sand is extensively mined in the Gnangara Pine Plantation and Jandakot, and limestone and sand in the Hope Valley and Nowergup areas. These operations are managed in a manner to minimise any potential impact on groundwater. • There will be a separation of 30 metres to the highest known water table.
1j	Increase in flooding	• The high permeability of the limestone and depth of 30 metres to the water table ensure that flooding will not occur. • Recharge levels will not change significantly.

ADDITIONAL CLEARING PRINCIPLES – EXTRACTIVE INDUSTRIES		**COMMENT**
2a	*Need for the resource*	• Limestone is used for dimension stone, road bases, the construction industry, reconstituted stone, armour rock, lime and cement manufacture and is essential to community development and sustainability. • The reality is that the limestone and sand is only extracted for the community. If the community did not need the limestone there would be no extraction. Almost all the limestone is used on public works projects and for structural works, such as footings, structural walls in subdivisions and for building materials. • Whilst limestone might seem common, most of the resources closer to Perth have been sterilised by development, conservation of vegetation considerations, and public intolerance. • See Section 1.0 Proposal, Importance and Rationale.

2b	*Classification of the resource and existing approvals*	• Limestone on Lot 8 is identified in Planning Policies such as Statement of Planning Policy 2.4, Basic Raw Materials as a Priority Limestone Resource. The pit is listed as Site 30/17. • *Section 51O of the Environmental Protection Act 1986* provides for Planning decisions to be taken into account. • It lies in an area that has always been earmarked as a source of limestone for the community.
2c	*Availability of alternative resources and the impact of their use*	• There are few alternative resources. Much limestone is already sterilised. The only alternatives are hard rock from the Darling Scarp, which involves clearing of vegetation on the Scarp. • Hard rock requires more energy and processing to extract than limestone. • Other limestone is available at Moore River and northwards but is often of lower quality and the transport distances lead to more road impacts and greenhouse gas emissions. The same applies for hard rock products brought from the Darling Scarp
2d	*Proposed final land use*	• The proposed final land use is to return the site to local native species which helps negate the impacts of clearing as an interim land use prior to industrial land use.
2e	*Offsite Environmental impacts if the resource is not used*	• Not taking the resource will result in additional greenhouse gas emissions and road impacts from the additional transport and processing of alternative products. • If this resource is not taken limestone or hard rock will have to be taken from another site resulting in land clearing on that site. • The site is to be returned to native vegetation, therefore reducing the potential impacts of clearing.
2f	*Sound environmental management and rehabilitation*	• Extensive environmental and rehabilitation management procedures are to be used to minimise any environmental impact. • The site will be returned to native vegetation using local provenance species.

FLORA			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Flora	• Whilst the site is covered by native vegetation, the return of the site to native vegetation, the community need for limestone and the negative environmental impacts of not using material from this site can offset issues arising from vegetation clearing. • A 50 metre buffer is proposed to Site 293 comprised 20 m undisturbed vegetation and 50 m local native species rehabilitation. • An application for clearing has been lodged.	Oakford Land Company will restrict alteration to vegetation to the areas outlined in this management plan and implement an extensive rehabilitation plan. They will rrehabilitate all areas where limestone and mining or associated activities have been carried out using locally occurring plant species with the aim of achieving stable and sustainable vegetation communities.	Undertake the Rehabilitation Program.

6.3 Fauna

The site is predominantly native vegetation.

The survival and disturbance to fauna depends on the end use of the site. The site is to be cleared progressively and returned progressively to local native vegetation in order to minimise impacts on fauna.

The re-establishment of local native flora species and habitats with the various commitments to that achievement will provide a mechanism for a return of fauna.

A database search was made by the Department of Environment and Conservation. This is included as Appendix 2.

The search found that a number of taxa of significance have been recorded within a 10 km radius of the site.

There are a number of sightings of Black Cockatoos in the general area. The listed taxa are *Calyptorhynchus latirostris* with *Caloptorhynchus* sp being recorded in 2005 at Pinjar. *Calyptorhynchus baudinii* has not been locally recorded on DEC databases. Both are listed on State and EPBC conservation databases. On the State database the taxa are listed in Schedule 1 as "Fauna that is rare or is likely to become extinct".

The species is listed as seasonally moving in flocks and feeding on Proteaceous shrubs. the Western Australian Museum (undated) lists *Calyptorhynchus latirostris* as visiting pine plantations, parks and gardens and proteace shrubs, especially *Dryandra sessilis*, *Banksia menziesii*, *B. attenuata* and *B. grandis* in the area from March to September .

Bamford Consulting Ecologists in a personal communication note that *Calyptorhynchus latirostris* occurs from Kalbari to east of Esperance, generally breeding in the Wheatbelt but more recently also in large trees with suitable nesting hollows in coastal areas. The trees on site are very small and sparse and not suitable for breeding, based on the published requirements for breeding trees and pers com Mike Bamford

Large numbers have been recorded at times and there are no doubt many un-recorded observations made by the public. The database of this species is likely to reflect the recorded sightings rather than the real presence of the taxa. However the presence of large numbers appears over a number of years with 700 being recorded at Carabooda in 1998 and 500 being recorded at Pinjar in 2005. Only one recording is listed for Nowergup, in 2003.

Calyptorhynchus latirostris may be a seasonal visitor to the site, but is unlikely to breed on site and as BSD/Meinhardt Joint Venture, 2004, notes "It is locally common on a seasonal basis". The main means of managing the site for this species is to progressively clear and use local species for rehabilitation. This is proposed.

Several invertebrate taxa have been recorded within 10 km of the site, a cricket *Austrosaga spinifer*, two records in 1981-82. BSD/Meinhardt Joint Venture, 2004, notes that this species occurs in coastal communities from Neerabup to Cervantes and "is probably more common than the present results suggest".

Native bees *Hylaeus globuliferus* four records from Neerabup 1995-96. BSD/Meinhardt Joint Venture, 2004 note that the species "is also widely in the south-west". The Commonwealth department of Environment and Water Resources shows the species as occurring across the south west of Western Australia (south west coastal).

The native bee *Leiptroctus contrarius*, is listed by DEC database as 1 record at Gnangara which is "more widespread than previously thought".

The Graceful Sunmoth *Synemon gratiosa* has 5 records from 1984 to 1996 in the surrounding 10 km and is known to extend to Mandurah, being "under pressure from development, occurring in Spearwood and Bassendean dunes east through Whiteman Park, (BSD/Meinhardt Joint Venture, 2004).

There are also several records of mammals, Western brush Wallaby, *Macrocopus irma*, and Quenda *Isoodon obesulus fusciventer*.

Several species are listed on the DEC database but are less likely to occur based on the database records.

The Peregrine Falcon *Falco peregrinus* is listed as uncommon with a preferred habitat less likely on site, of rocky ledges, edges of open ground, open woodland and watercourses. Only two recordings are included in the database.

The Crested Shrike Tit *Falcunculus frontatus leugaster* is listed as uncommon with only one record from Wanneroo.

There is one record of the carpet Python *Morelia spilota imbricatata* at Carabooda in 2001. This taxa is widespread across the south west of Western Australia. It may occur on site. Its best form of protection is returning the site to native vegetation which is proposed.

The Little Bittern *Ixobrychus minutus* and Black Bittern *Ixobrychus flavicollis australis* are water birds.

Two further species are listed as fossils records, the freshwater mussel *Westralunio carteri* and Woylie, *Bettongia penicillata ogilbyi*.

As noted above the best means of minimising impact on fauna is to allow for progressive clearing and a return to local native vegetation which is proposed. It should be noted that the only reason that this site is to be quarried is to help satisfy the community needs for basic raw materials.

It is also noted that very large areas of native vegetation are cleared to allow the development of urban areas from Merriwa, Ridgewood, Quinns Rocks, Jindalee, Alkimos and Eglinton. The creation of these urban areas requires the wholesale clearing of large numbers of hectares of native vegetation, much of it similar to or the same vegetation complexes as that on site, Cottesloe Complex Central South. The creation of the urban areas does not permit the progressive removal of basic raw materials and from ahead of development and therefore there is no alternative but to source these materials from offsite, hence the need to open Lot 8 to excavation.

The differences between urban areas and excavation is that on urban areas the vegetation communities are lost whereas on Lot 8 local native species will be returned.

Lot 8 has always been earmarked for this purpose by its nomination Planning Policies such as Statement of Planning Policy 2.4, Basic Raw Materials, where Lot 8 is listed as a Priority Limestone Resource; Site 30/17.

The issue of clearing native vegetation and fauna habitat cannot therefore be considered separately but must be considered in terms of community needs in the northern Perth Metropolitan area. If development of urban areas was staged to extract the basic raw materials as recommended in Government Planning Policies the need for basic raw materials from other sites would be reduced. Unfortunately this is not so and there is no alternative but to take resources from sites such as Lot 8.

FAUNA			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Fauna	• The site is to be cleared progressively and returned progressively to local native vegetation in order to minimise impacts on fauna.	Oakford Land Company will restrict alteration to vegetation to the areas outlined in this management plan and implement an extensive rehabilitation plan. Oakford Land Company will comply with the Excavation – Rehabilitation Management Plan.	Undertake the Rehabilitation Program.

6.4 Wetlands

There are no nearby wetlands. Wetlands occur at Neerabup Lake to the west at a distance of 1.5 km with other quarries and market gardens in between.

WETLANDS			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Wetlands	• There are no proposed changes to the water recharge on site.	Oakford Land Company will comply with the Excavation – Rehabilitation Management Plan.	None necessary

6.5 Dieback Management Plan

Dieback of vegetation is often attributed to Phytophthora cinamomi even though there are other Phytophthora species and other diseases such as Armillaria that can cause dieback like symptoms.

In most cases dieback is caused by a pathogen which infests the plant and causes it to lose vigour, with leaves dying, and overtime may kill the plant. As such the management of Dieback is essentially related to plant hygiene when coming onto a site and within a site.

There are several guides to the management of Dieback.

- *Department of Environment and Conservation CALM Dieback Hygiene Manual 1992 is a practical guide to Dieback management.*
- *Department of Environment and Conservation CALM Best Practice Guidelines for the Management of Phytophthora cinamomi, draft 2004.*
- *Dieback Working Group 2005, Management of Phytophthora Dieback in Extractive Industries.*

The Department of Environment and Conservation generally recognises that Dieback is less likely to impact on vegetation on limestone and Spearwood/Cottesloe Land Systems, Podger F D and K R Vear, 1998, Management of Phytophthora and disease caused by it, IN Phytophthora cinnamomi and the disease caused by it - protocol for identifying protectable areas and their priority for management, EPA 2000.

Dieback is only likely to be an issue when equipment is brought to the site from a dieback affected area either through vehicles or plant and soil materials therefore the following general principles are applied to Dieback management. Not all potential impacts will apply to this quarry and the main impacts affecting this site are also listed.

- *Dieback diseases are more likely to be transported under moist soil conditions.*
- *All vehicles and equipment to be used during land clearing or land reinstatement, should be clean and free from soil or plant material when arriving at site.*
- *Washdown of vehicles and equipment off site should be prior to arriving on site and to the procedures in CALM Guidelines for Dieback Management.*
- *No soil and vegetation should be brought to the site apart from that to be used in rehabilitation.*
- *Plants to be used in rehabilitation should be from dieback free sources.*
- *Vegetated areas ahead of excavation should be quarantined to onsite access*
- *Unwanted access to vegetated areas is to be discouraged through a lack of tracks and external fencing*
- *Rehabilitated surfaces are to be free draining and not contain wet or waterlogged conditions.*
- *Illegally dumped rubbish is to be removed promptly.*
- *No contaminated or suspect soil or plant material is to be brought onto the site.*
- *Vehicles and earth moving equipment are to be cleaned prior to entering the site if they originate from a dieback affected area.*
- *When clearing land or firebreaks vehicles are to work from dieback free areas towards dieback free areas.*
- *Roads should be free draining and hard surfaced*

On Lot 8, Dieback principles will be followed even though there is a reduced risk of spread on calcareous soils such as this. (Podger F D and K R Vear, 1998, *Management of Phytophthora and disease caused by it, IN Phytophthora cinnamomi and the disease caused by it - protocol for identifying protectable areas and their priority for management*, EPA 2000*).*

The proposed access road will be limestone with a bitumen apron.

Excavation and the placement of fill will be undertaken using practices recommended by CALM. *See CALM Dieback Hygiene Manual 1992* which is more practical and *CALM Best Practice Guidelines for the Management of Phytophthora cinamomi, draft 2004. See* also *Dieback Working Group 2005, Management of Phytophthora Dieback in Extractive Industries.*

The aim of dieback management during excavation is to minimise the risk of entry of dieback into the site. However with inert fill added as part of the rehabilitation program care will be taken to maintain free draining soils adjacent to remnant vegetation and to minimise the spread of soils onto remnant vegetation. The calcareous soils of the remnant vegetation are unlikely to allow *Phytophthora* to spread but there may be other pathogens such as *Armillaria.*

Management would be most applicable adjacent to Bush Forever Site 293, which will have a buffer of 20 m undisturbed vegetation and 50 m local native species rehabilitation.

In many ways the management of the site for dieback is similar to that for the management of weeds, and the two management practices should be considered together.

The final land surface is to be formed and rehabilitated by the use of inert landfill and will be formed to encourage infiltration.

The other management is to ensure that all excavation equipment and road transport vehicles are clean and free from soil and vegetable matter prior to entering the operations.

The specific onsite dieback management in addition to the above actions will be;

- Excavate the site in compliance with CALM Best Practice Guidelines for the Management of Phytophthora cinamomi, draft 2004 and Dieback Working Group 2005, Management of Phytophthora Dieback in Extractive Industries.

- A buffer of 20 m undisturbed vegetation and 50 m local native species rehabilitation.

- Topsoil will be cleared according to 7.0 Rehabilitation.

- Topsoil and overburden stored in separate dumps.

- Vehicles used in clearing and removing topsoil, excavation or transport are to be clean and free from soil or plant material prior to arriving on site from an area known or thought to be dieback infected. Cleaning should be conducted offsite.

- All drivers and plant operators are made aware of the need to have clean trucks and plant when initially arriving on or accessing the site.

- Machinery will work from higher vegetation condition to lower vegetation condition.

- The site is to be secured from unwanted access.

- Excavation vehicles will be restricted to the excavation area apart from clearing land.

- Vehicles are to be prohibited from entering vegetation ahead of excavation, apart from normal travel along made firebreaks and roads for normal security and maintenance activities.

- Restrict road transport to the stockpile loading and access areas.

- A hygienic site is to be maintained by not bringing any soil or plant material onto the site except for rehabilitation purposes or from known dieback free areas.

- All plants seeds and other materials used in rehabilitation are sourced from dieback free areas.

- Illegally dumped rubbish or materials are to be promptly removed from site.

DIEBACK DISEASE			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Dieback Disease	*CALM Dieback Hygiene Manual 1992.* *CALM Best Practice Guidelines for the Management of Phytophthora cinamomi, draft 2004.* Dieback Working Group 2005, Management of *Phytophthora* Dieback in Extractive Industries. • The management procedures listed above will be followed, even though there is a low risk of dieback because of the calcareous soils.	Oakford Land Company will implement and maintain the Dieback Management Policy to reduce the spread of *Phytophthora spp.*	Vehicles to be used on site will be washed down or cleaned prior to leaving the previous site. Any materials used in rehabilitation are to be dieback free

6.6 Weed Management Plan

The management of weeds is essentially similar to that for plant diseases. The impact of weeds is really the impact within the local area and the more they are controlled the better. It is desirable that the site does not become a haven for environmental weeds and therefore a management and control program is warranted at all sites.

Weeds can be declared under the Agriculture and Related Resources Protection Act 1976 which requires that Declared Weeds are eradicated. Other weeds are not Declared but may be classified as Environmental Weeds because they are well known for impacting on vegetation.

Generally if the actions taken for Dieback are applied they will also control weeds. Not all potential impacts will apply to this quarry and the main impacts affecting this site are also listed.

- *All vehicles and equipment to be used during land clearing or land reinstatement, should be clean and free from soil or plant material when arriving at site.*
- *No soil and vegetation should be brought to the site apart from that to be used in rehabilitation.*
- *Plants to be used in rehabilitation should be free from weeds.*
- *Vegetated areas ahead of excavation should be quarantined to onsite access*
- *Unwanted access to vegetated areas is to be discouraged through a lack of tracks and external fencing*
- *Weed affected top soils may need to be taken offsite, used in weed affected areas, buried by 500 mm soil/overburden or taken offsite*
- *Illegally dumped rubbish is the major source of weeds and is to be removed promptly.*
- *No weed contaminated or suspect soil or plant material is to be brought onto the site.*
- *When clearing land or firebreaks vehicles are to work in conjunction with dieback principles and push from dieback free areas towards dieback free areas.*
- *Weeds should be sprayed with broad spectrum spray prior to planting or seeding in weed affected soils.*
- *Grasses should be sprayed with grass selective spray prior to seeding or rehabilitation*

- *Weed management should work from least affected areas to most affected.*
- *Declared weeds should be treated promptly by digging out or spraying.*
- *Ongoing monitoring of weeds should be undertaken at least annually in autumn, prior to winter rains.*

The potential for weeds is less likely to be a problem during excavation. However there are weeds present in the degraded and completely degraded areas in the south and south west. Soils from these areas should be contained and not used in areas to be rehabilitated unless spraying is used or the affected soils are used adjacent to already weed affected areas.

Revegetation will only take place when soils have been left in autumn to allow for germination of weed seeds and these sprayed prior to seeding or planting.

Management is required adjacent to Bush Forever Site 293, which will have a buffer of 20 m undisturbed vegetation and 50 m local native species rehabilitation.

In addition to the actions listed above the following site specific management is used.

- The Dieback Management actions are also used to assist weed management.
- Inspections conducted to monitor the presence and introduction of weeds on an annual or more frequent basis. On identification of weed infiltration weeds are either removed, buried, or sprayed with a herbicide.
- No plant, weed affected soil or fill material is brought to the site.
- The site is secured to prevent illegal dumping of rubbish and all illegal rubbish is removed promptly.
- Weeds are treated promptly no matter how few there are.
- Normally weed management works from the least weed affected areas to the most weed affected, which therefore gives a smaller area to treat with spray or earthworks.
- Weed affected soils should not be used for rehabilitation and are to be buried.

WEED MANAGEMENT			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Weeds	***Agriculture and Related Resources Protection Act 1976.*** • The weed management actions listed above will be used as applicable to manage weeds on the site. • In autumn the soils will be monitored and a spraying program implemented for the rehabilitated surface prior to seeding and planting. • Declared or Environmental weeds will be controlled.	Oakford Land Company will implement and maintain a weed policy to try and prevent the introduction of Declared, Environmental or other weeds to the site.	Compliance with the weed management program listed above.

6.7 Rehabilitation Program

Rehabilitation will be directed towards the final end land use. In general it should be aimed at the highest level of rehabilitation, however there is no point planning good native vegetation or tree belts if they are to be immediately cleared for an alternative land use. On the other hand it is often beneficial to establish fast growing native vegetation as interim soil cover.

The species to be chosen and the planting densities should match pre-excavation vegetation, adjoining vegetation, soil conditions and function of each site. For example when revegetating land within a National Park or Reserve a higher level of species richness and plant density might be expected than on a visual screening bund.

The species will therefore need to be selected to match the local plant communities or a restricted number of fast growing species may be used. The species to be used in rehabilitation may be different to that which originally occurred on site, because the land surface might be much lower and have higher levels of soil moisture or the soil conditions may be different.

Rehabilitation should contain Dieback and Weed Management in addition to monitoring and replanting failed areas. There should also be a completion criteria against which the revegetation should be compared.

There are a number of management actions that can be taken in quarries to maximise rehabilitation effort and these will be used wherever possible. The general management actions are summarised below and will be used where applicable and as the opportunity presents.

The site specific issues that relate to this site are also listed to explain how this site compares to the general rehabilitation guidelines.

- *All buildings, equipment and machinery will be removed from site.*
- *Local education programs and the involvement of site staff should be undertaken to increase on site ownership.*
- *Save and directly transfer topsoil where possible.*
- *Where topsoil cannot be directly transferred it should be stored in low dumps of less than 1 metre high.*
- *Overburden and interburden should be removed and stored separate from topsoil.*
- *Weed affected topsoil and overburden is to be buried.*
- *Studies have shown that topsoil stripping and placement is best undertaken in summer for maximum germination, but this raises the potential for additional dust generation from the fine humus particles.*
- *Topsoil will be spread at depths of 5 cm and should be spread during summer, preferably by the end of February.*
- *Vegetation clearing should be progressive and minimised to that required for each stage of excavation.*
- *Useful timber should be recovered for timber, fence posts and for firewood subject to liabilities and site safety.*
- *Where possible vegetation should not be burned, but at times it may be beneficial to seed germination.*
- *Seeds and other genetic material can be collected if suitable onsite areas are available.*

- *Vegetation fragments and leaf litter should be collected and directly transferred to rehabilitation areas.*
- *If direct transfer is not possible the vegetation is to be stored in low dumps to 1 metre high for later spreading.*
- *Compacted planting substrates should be deep ripped in two directions at 1 metre intervals.*
- *A minimum 400 mm of overburden is to be spread over the surface where available.*
- *Pre-seeding weed control may be required after any potential weed seeds have been allowed to germinate.*
- *Any weeds likely to significantly impact on the rehabilitation are to be sprayed with broad spectrum spray or grass specific spray depending on the species involved.*
- *Rehabilitation is to take place during the first winter months to minimise compaction effects.*
- *Local provenance seeds are to be collected from the site or purchased from commercial seed collectors.*
- *A mixture of tube plants and seeding combined with the direct transfer of topsoil is normally the most effective where available.*
- *Seeding conducted in summer will need to use scarified leguminous seeds.*
- *Seeding conducted in July to August will require the leguminous seeds to be heat treated or scarified.*
- *All seeds are to be smoke treated by soaking in "smoke water" for 24 hours prior to seeding, or dry smoked.*
- *A 10 g tree tablet or small handful of fertiliser beside each tube plant.*
- *Rehabilitation will progressively follow mining with completed areas of the excavation being revegetated as soon as practicable.*
- *Fertiliser is not always required and will add nutrients to the ground water. If used a fertiliser containing low nitrogen, phosphorous and potassium, and trace elements, is recommended to be spread at rates of up to 100 kg/hectare depending on the planting site.*
- *If completed correctly there shoull be no need for irrigation of revegetation in the south west of Western Australia*
- *Planting substrates should be left rough to encourage rainfall infiltration.*
- *Erosion of sloping surfaces can be minimised by leaving the surface soft, rough and undulating, with the undulations running along contour.*
- *The final machinery run should be along contour and not down slope.*
- *Wind erosion and the movement of sand grains can significantly impact on growth rates unless controlled in susceptible areas. Remedial actions can include but not be limited to; fence wind breaks, spray mulching, cover crops, interim native vegetation or spreading mulch and vegetation.*
- *Rabbit guards or control may be required.*
- *Stock must be excluded from rehabilitation.*
- *Completion criteria specifying the number of plants, species and structural form in a given area are required.*
- *Rehabilitation should be monitored at least annually to determine growth rates, any factors impacting on revegetation and to compare against the completion criteria.*
- *Steps to remedy deficiencies in rehabilitation should be taken during the next planting period.*
- *Monitoring and restoration should be undertaken for three years or until completion criteria is achieved.*

Rehabilitation Objectives

The concept excavated floor is proposed to be 50 metres AHD with batter slopes of 1 : 3 vertical to horizontal up to Lot 10, Water Corporation tank stand site. Provision will be made to excavate through into Adelaide Brighton land to the east and north to enable a consistent land form to be created.

To rehabilitate the land the excavated surface will be formed to gently sloping batters at I : 4 vertical to horizontal to the flat floor and then at 1 : 3 up to the tank stand site at the boundary of Lot 10. This will bring the land into line with the adjoining land to the east and north, and provide the largest level footprint for future industrial land.

The land surface will have to be consistent with the tank stand on Lot 10, and will need to rise up to at least 90 – 95 metres to Lot 10.

The use of a flat area is seen as a compromise to potentially allow industrial activity on portion of the site at some point in the future, although at this time it is proposed to rehabilitate the whole surface to local native plants.

The final land surface will be smoothed to match the existing natural landform of the area.

1. Quarry faces will be checked for stability and any substandard faces will be made safe to Department of Industry and Resources standards.

2. As the limestone is porous there will be no need for upslope contour or diversion banks to prevent water entering the void. Similarly there will be no need for drainage works on the floor of the void.

By achieving satisfactory performance in their Rehabilitation Plan, and establishing suitable vegetation coverage on the restored landform, Oakford Land Company will ensure that the site is suitable for a range of future land uses such as industrial use, but including returning the site to native vegetation pending City of Wanneroo plans for the area.

The aim of the rehabilitation program is to provide an ecologically stable community as close as possible to the original native vegetation of the Neerabup area.

Revegetation activities will be integrated into the excavation and land clearing process. The process of collecting local seed and the direct return of topsoils for use in rehabilitation will be pursued wherever possible in order to maintain vegetation provenance. Because of the nature of the timing of the operation there may be a need to liaise with nearby operators to swap topsoil if there are no on site areas to directly place the topsoil.

Appropriate topsoil management is seen to be an important element in achieving successful rehabilitation and plant re-establishment on the restored surface.

Completion criteria

The aim of the rehabilitation is to provide an ecologically stable community as close as possible to the original native vegetation of the Neerabup area.

The Objectives of the rehabilitation plan will therefore be to "restore the conservation and ecological values of the native vegetation in the Neerabup area so that it complements the surrounding landscape and wetlands".

Completion Criteria

- Achievement of an ecologically diverse and stable vegetation community, which requires minimal long- term management and maintenance.
- Stable post-mining landscape, and the minimisation of wind erosion.
- Create an environment that encourages re-colonisation by a diverse range of fauna species.
- Provide for the protection of the local groundwater resource in terms of both quality and quantity.
- Provide a self sustaining cover of local native groundcovers, shrubs and trees.
- Achieve plant density of 1 native plant per m^2 in native vegetation rehabilitation at three years.
- Achieve a species richness of 10 native species per 100 m^2 in native vegetation rehabilitation at three years.
- Achieve weed species at levels not likely to threaten the native species.

Depending on the success of rehabilitation, evolving community standards, and new research, the completion criteria may be adjusted to reflect emerging trends and also adjusted in terms of cover and species richness depending on the results achieved and emerging technologies or techniques.

Vegetation Clearing

1. Vegetation clearing will be progressive and minimised to that required for each stage of excavation.
2. Useful timber will be taken for firewood, if feasible and subject to liabilities and site safety. Consideration also needs to be made of the possibility that large fragments of vegetation may inhibit future use of the site. Where possible vegetation will not be burned, but at times there may be little alternative. Alternatively, chipping may be used.
3. Seeds and other genetic material will be collected if suitable areas are available for rehabilitation and would enable the preservation of genetic material, such as on batter slopes and in green belts.
4. Where practicable vegetation will be directly transferred to a batter slope being rehabilitated. Smaller indigenous shrub material will be used in the rehabilitation process when available and suitable, for example on the batter slopes of worked out areas. It will be laid on re-formed slopes to reduce wind and water erosion as well as provide a source of seeds for revegetation.
5. If direct transfer is not possible the vegetation will be stored in low dumps to 1 metre high or swapped with a nearby operator to try and ensure that the material is not wasted.

Topsoil and Overburden Removal

1. Where possible topsoil and overburden will be directly transferred from an area being cleared to an area to be rehabilitated.

2. Overburden, as yellow and brown sand and low grade limestone, will be pushed to the perimeters of the excavation, particularly the western edges, to assist with visual and noise screening. From there it can be used for the rehabilitation process.

3. Excavation will be worked progressively in the stages as shown on the attached plan.

4. Where possible topsoil clearing will be undertaken in wetter months.

Landform Reconstruction and Contouring

1. All buildings, equipment and machinery will be removed from site.

1. The final landform will be formed to the interim final concept plan.

2. The land surface will be a level floor at 50 metres AHD with sloping batters at I : 3 vertical to horizontal to the flat floor. It is anticipated that the site will be brought into line with the adjoining land to the east and north, when that land is excavated at some point in the future. See Figures 3 and 4.

3. In any case the land surface will have to be consistent with Lot 10, and will need to rise up to at least 90 – 95 metres to Lot 10.

4. The land to the north and east will be mined through when Adelaide Brighton excavates those areas.

5. The land surface will be formed to the requirements of the *Mines Safety and Inspection Act 1994 and Regulations 1995* as a final land surface.

6. Land surfaces that are mined through, will be left in a temporary form in compliance with *Department of Industry and Resources Guidelines for the Abandonment of Quarries.*

7. Limestone floor will be deep ripped in two directions. The width between rip lines will be 1 metre intervals.

8. A minimum of 300 mm of overburden will be spread over the surface where available to provide a substrate for revegetation. On limestone rehabilitation can be very successful with minimum overburden when the floor is adequately deep ripped.

9. Experience by Landform Research on limestone rehabilitation north of Wesco Road isthat good revegetation can be achieved by planting into soft overburden and deep ripped limestone floor, if suitable local species are used.

Vegetation Establishment

Pre-Planting/Seeding Weed Control

Pre-seeding weed control is only likely to be required where topsoils are used that contain weed species.

If required this is normally only conducted after overburden and topsoil have been spread and any seeds have been allowed to germinate. Broadscale weed treatment can be detrimental to the germination and growth of native species but may be required if the weed load is to be reduced.

In May, after the first autumn rains, check for grass germination. Where grass has the potential to inhibit rehabilitation use a licensed contractor to spray with Fusillade or other suitable herbicide.

1. Any weeds likely to significantly impact on the rehabilitation will be sprayed with Roundup or similar herbicide or grubbed out, depending on the species involved. Weed affected topsoil and overburden will be buried. The Weed Management Plan in 6.6 will form the basis of weed treatment. Depending on the nature of the planting substrate, a broad spectrum spraying program may be used. In areas where grass only is a potential problem grass specific sprays will be used. In some areas where topsoil from cleared native vegetation is available no spraying may be required.

Revegetation

1. Oakford Land Company will spread any vegetation plus leaf, root and organic matter collected from the land clearing procedures. This will increase the total organic carbon fraction, improving soil properties such as resistance to water and wind erosion and moisture retention. The difference in properties between existing topsoil and subsoils is not considered a major impediment to rehabilitation of native species in the area.

2. Topsoil will be re-distributed in rehabilitated areas to depths of 50 mm where available. Whilst burning is not always practicable the mixing of topsoil with ash and charcoal from burnt vegetation has shown a demonstrated improvement in the germination of local native species by triggering some species that do not normally germinate and by increasing germination rates. (Landform Research at Pickering Brook Gravel Quarry).

3. Topsoil provides a useful source of seed for rehabilitation of Limestone Heathlands, when the correct handling of the topsoil is used, stripped and replaced dry (autumn direct return). Maximum depth of 50 mm can be used to optimise revegetation of species-rich plant communities.

4. Studies have shown that topsoil stripping and placement is best undertaken in summer for maximum germination, but this raises the potential for additional dust generation from the fine humus particles.

5. Topsoil will be spread directly from an area being cleared where possible, otherwise reclaimed from a topsoil dump.

6. Topsoil will be spread at depths of 50 mm and should be spread during summer, preferably by the end of February.

7. Rehabilitation will take place during the first winter months following the restoration earth works of each particular section of quarry. Leaving the completed earth works for one season will reduce the success of rehabilitation by at least 50 %, due to compaction effects.

8. Local provenance seed will be collected from the site or purchased from commercial seed collectors. Tube plants are also desirable because they reduce

the risk of failure by providing a third method of establishment;

- topsoil spreading
- seed spreading
- tube plants

A species list is attached.

9. A combination of the three methods is always preferred by Landform Research and has proven to be the most versatile and successful. The amount and species of additional seed and tube stock depends on the quality and seed store within the topsoil, and may vary from stage to stage.

10. Seeds of indigenous species will be scattered during late summer at the rate of approximately 1 - 2 kg seeds per hectare if required.

11. Seeding conducted in summer will use scarified leguminous seeds that have been "dry smoked". Seeding conducted in July to August will have the leguminous seeds heat treated and all seeds will be smoke treated by soaking in "smoke water" for 24 hours prior to seeding.

12. Seed spreading will be achieved either using mechanical seed dispersal equipment or using manual methods. Bulking with a spreading agent such as sawdust, vermiculite or sand is desirable.

13. Plant an additional 1000 tube plants of local native species per hectare, in June.

14. Use a 10 g tree tablet or small handful of fertiliser beside each tube plant.

15. Rehabilitation will progressively follow mining with completed areas of the excavation being revegetated as soon as practicable.

Fertiliser

1. Fertiliser is not always required and will add nutrients to the ground water. If used a fertiliser containing low nitrogen, phosphorous and potassium, and trace elements, is recommended to be spread at rates of up to 100 kg/hectare, applied to rehabilitation areas in the year of planting. Nitrogen is provided by using leguminous seed in the seed mix.

2. Further investigation will be needed to determine suitable rates and the timing of fertilisation. It may be possible to integrate seed dispersal and fertilisation into a single pass. The fertiliser will need to supply macro-nutrients, phosphorus, nitrogen and potassium, and other micro-nutrients.

Irrigation

1. Experience by Landform Research in rehabilitation of sand quarries in Bassendean Sand and limestone has shown that when completed well there is no need for irrigation of the rehabilitation. It is cheaper to use additional seed than to install irrigation. For example irrigation was not used on rehabilitation in Hopkins Road, north of Wesco Road.

2. Also, water for irrigation is unlikely to be available because of a lreduced water allocations.

3. Should there be a high mortality rate in germinated seedlings after the first year due to lack of water, the feasibility of providing irrigation will be investigated.

Erosion Control

1. Soil erosion occurs when soil is exposed and disturbed by wind or water. Erosion involves soil particles being detached from areas not adequately protected by vegetation, and moved down-slope. This is not normally a significnat problem in limestone which crusts after the first winter.

2. The soils are very permeable and runoff is normally minimal unless surface materials become non-wetting. Even so experience shows that there is minimal non wetting and surface particle movement under such conditions.

3. Water erosion on the batter slopes can be avoided by the permeability of the materials and by leaving the surface soft, rough and undulating, with the undulations running along contour. The final machinery run should be along contour and not down slope.

4. Wind erosion will be controlled by rehabilitating the disturbed ground as soon as practicable.

5. If wind erosion and soil stability become an issue measures will be taken to stabilise the soils. These could include but not be limited to fence wind breaks, spray mulching, cover crops, interim native vegetation or spreading mulch and vegetation.

6. For rehabilitation areas, revegetation will take place as soon as possible following landform and soil reconstruction.

7. Cleared vegetation will be transferred from an area being cleared, to protect against erosion, assist with habitat creation and provide a seed source.

8. Control of wind erosion potential will be assisted by spreading brush and vegetation across the topsoil on the batter slopes and reconstructed soils where local native vegetation is to be established.

Monitoring

1. During late summer an assessment of the success of the rehabilitation will be made to determine the rehabilitation requirements for the following winter.

2. Monitoring includes visual assessments and, where necessary, counts to determine the success of the rehabilitation and restoration, as follows;

    - plant density
    - plant growth
    - plant deaths
    - regeneration
    - weed infestation

3. As necessary steps will be taken to correct any deficiencies in the vegetation.

4. Rehabilitation of each stage will be monitored for a period of three years to ensure that the revegetation meets the completion criteria of providing self sustaining indigenous shrub vegetation.

5. If rabbit damage is detected either place guards around the tube stock or bait using commercial baits laid under low concrete slabs.

6. Provide ongoing weed management to identify and treat significant environmental weeds or weeds likely to impact on the rehabilitation.

7. Plants that have not survived are to be assessed to determine the number of replacement plants required. To this is to be added the number of additional plants required to be installed in the following winter to bring any deficiencies up to the completion criteria.

8. In areas of rehabilitation that do not meet the completion criteria measures are to be taken to increase the stem density to achieve the completion criteria. This could include but not be limited to;

    - additional seeding,
    - planting additional tube plants,
    - additional use of fresh topsoil.

Suggested Plant Species to be Used

The species identified in the Flora and vegetation study will be used. However not all of these will be commercially available and some will be returned through the use of local topsoil. Also as the site will be filled there will be less limestone available and so a shift towards *Banksi*a Woodland species may be required. These have been included in the species lists below

The P3 species *Jacksonia sericea* will form a significant part of the planting.

All species are suitable for seeding

X To form signficant portion of the species list
T Suitable as tube plant

Tree/ Tall Shrub	*Acacia rostellifera*	XT	*Allocasuarina fraseriana*	XT
	Acacia saligna	XT	*Banksia ilicifolia*	XT
	Banksia attenuata	XT	*Banksia grandis*	XT
	Banksia menziesii	X	*Eucalyptus marginata*	XT
	Eucalyptus foecunda	XT	*Eucalyptus todtiana*	X
	Eucalyptus decipiens	XT	*Xylomelum occidentale*	XT
	Eucalyptus gomphocephala	T		
Shrub	*Acacia pulchella*	XT	*Acacia lasiocarpa*	X
	Adenanthos cygnorum	XT	*Anigozanthos humilis*	X
	Beaufortia elegans	XT	*Anigozanthos manglesii*	
	Calothamnus quadrifidus	XT	*Austrodanthonia occidentalis*	X
	Calothamnus sanguineus	XT	*Austrostipa elegantissma*	X
	Grevillea preissii	X	*Austrostipa flavescens*	X
	Jacksonia sericea	X	*Austrostipa occidentalis*	X
	Jacksonia sternbergiana	X	*Conospermum* spp	
	Jacksonia floribunda	X	*Conostylis aculeata*	
	Macrozamia riedlei		*Conostylis setosa*	
	Melaleuca huegelii	X	*Dampiera linearis*	
	Melaleuca systena	X	*Daviesia triflora*	
	Melaleuca thymoides		*Hakea prostrata*	XT
	Nemica reticulata		*Hakea ruscifolia*	XT
	Nuytsia floribunda		*Hakea trifurcata*	XT
	Petrophile macrostachya		*Hakea varia*	XT

	Stirlingia latifolia *Viminaria juncea*	 X	*Kunzea ericifolia* *Spyridium globulosum* *Xanthorrhoea preissii*	XT
Understorey shrub / ground cover	*Acacia latericola* *Acacia cochlearis* *Leucopogan spp* *Calytrix flavescens* *Eremaea pauciflora* *Gompholobium tomentosum* *Hibbertia hypericoides* *Hibbertia racemosa* *Patersonia occidentalis* *Petrophile linearis* *Scholtzia involucrata*	X X X	*Bossiaea eriocarpa* *Hardenbergia comptoniana* *Haemodorum spicatum* *Hemiandra pungens* *Hovea trisperma* *Kennedia prostrata* *Lepidosperma squamatum* *Lomandra hermaphrodita* *Podotheca gnaphaliodes* *Scaevola canescens* *Trachymene coerulaea*	X X X

REHABILITATION			
Potential Impact	**Management**	**Outcome Commitments**	**Action Required**
Rehabilitation	See the Rehabilitation, Weed Management and Dieback Plans outlined above. The Rehabilitation Plan aims to restore native vegetation on the site.	Oakford Land Company will implement and maintain the Rehabilitation Plan to rehabilitate the excavated surface as outlined above. Oakford Land Company will monitor the rehabilitation for a period of three years.	Implement and maintain the rehabilitation program Rehabilitate each completed section as soon as practicable.

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APPENDIX 1

LOt 8 Wattle Ave Nowergup

Flora and Vegetation Assessment

October 2006

Report for Oakford Land Company

Regeneration Technology Pty Ltd

TABLE OF CONTENTS

BACKGROUND

Lot 8 Wattle Ave, Nowergup, (Figure 1) in the City of Waneroo is the site of a development proposal for sand and limestone extraction. The development proponents have commissioned Regeneration Technology to undertake an independent assessment of the flora and vegetation as a component of the application.

This study has been undertaken to satisfy a "Level 2 Survey' in accordance with the EPA guidance statement No 51 "Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia" to determine the suitability of the subject land for limestone extraction purposes.

The areas surrounding the remnant bushland of Lot 8 Wattle Ave includes existing quarries to the north east and west of the site, powto nia tree plantation and timber mill to the immediate west of the property and chicken farming and processing sheds. Bushland to the immediate east and south of the site is a Bush Forever site that forms part of a regional link within the proposed Gnangarra Park between Swan Hill to the west and Lake Neerabup to the east.

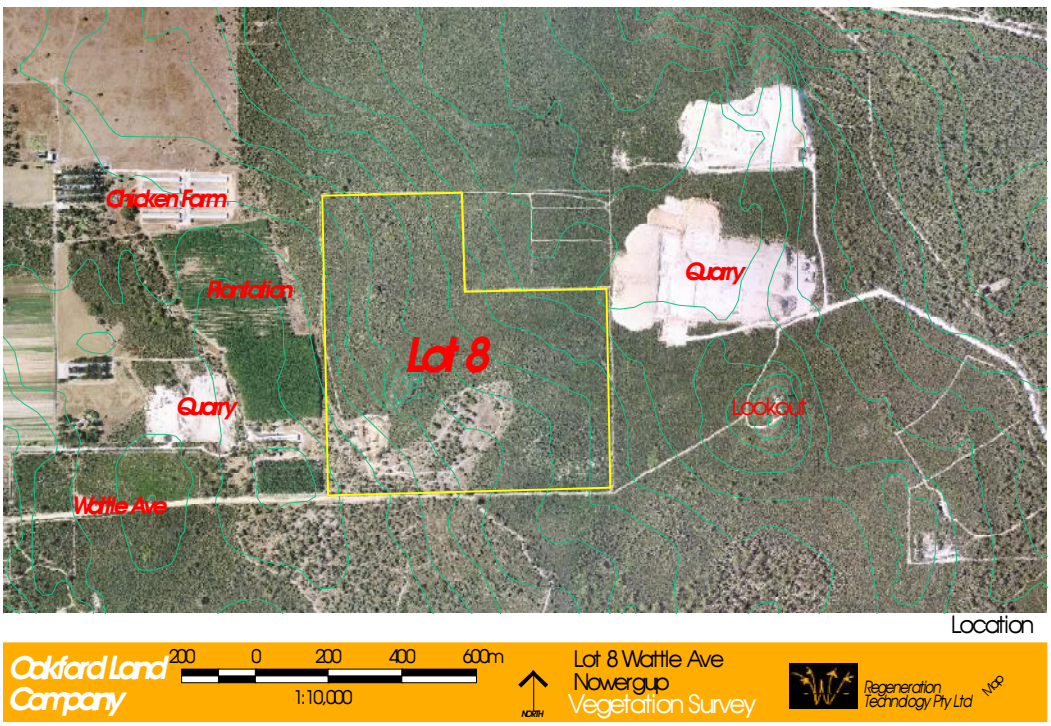

Figure 1. Location – Lot 8 Wattle Rd Nowergup

SITE DESCRIPTION

Lot 8 Wattle Ave Nowergup is a 52.5 ha lot that has been used for a variety of pursuits in the past. The lot is gently sloping from the southwestern corner (AHD 50m) on Wattle Ave to the north east (AHD 85m). The southern portion of the property has been cleared; old fencing through the bushland indicates the property may have been used for grazing and other agricultural purposes. Within the cleared southern section of the property is an abandoned sand quarry that contains numerous tracks and has been used for motor cross. Within the sand quarry and elsewhere on the property there are numerous dumped and burnt out cars in dicative of illegal and uncontrolled access. There is a small limestone hill in the center of the cleared section of the property that rises to the north of the sand quarry.

CLIMATE

Nowergup lies on the Swan Coastal Plain and has a warm Mediterranean clim ate characterized by having 5-6 dry summer months per year and winter precipitation averaging 600-100 mm per annum.

INTERIM BIOGEOGRAPHIC REGION (IBRA)

Biogeogrpahic Regions for Australia is a framework for conservation based on a bioregional context. Eighty-five bioregions within Australia have been recognized of which 26 occur within Western Australia. Lot 8 Wattle Rd Nowergup is within the middle portion of ***SWA – Swan Coastal Plain Bioregion,*** which is described as

"Low lying coastal plain, mainly covere d with woodlands. It is dominated by Banksia or Tuart on sandy soils, Allocasuarina obesa *on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. Warm Mediterranean. Thr ee phases of marine sand dune development provide relief. The outwash plains, once dominated by* A. obesa*-marri woodlands and Melaleuca shrublands, are extensive only in the south"*

SOILS

The underlying geology of the area is Tamala Limestone, which is forme d from calcareous beach sands. Calcrete can occur on ridges with the re -precipitation of calcium carbonate, this can result in minor pinnacle formation. Sands derived from the Tamala limestone make up the geomorphological system known as Spearwood Dunes (after McArthur and Bettenay 1960). This system typically occurs beyond the primary coastal dune system (Quindalup dunes).

The soils of Lot 8 Wattle Ave, Nowergup were not mapped as part of this study but were recorded as; white and yellow sands with limes tone boulders. Cleared fire breaks and access tracks across the site showed blocky limestone in amongst the sand.

VEGETATION

The importance of the soils with regard to the vegetation is that vegetation units often closely approximate the distribution of particular soil types. Vegetation complexes have been arranged by Heddle et al (1980) in accordance with the major geomorphic units. The geomorphic unit of Lot 8 Wattle Ave, (as per Heddle et al (1980)) is the Spearwood Dunes - Cottesloe complex central and southern. The Cottesloe complex – Central and South is described as : '*Mosaic of woodland of* E. gomphocephala *and open forest of* E.gomphocephala - E. marginata – C. calophylla; *and closed heath on limestone outcrops'*

FLORISTIC COMMUNITY TYPES

Floristic Community Types (FTC's) of the Swan Coastal Plain have been determined as a result of a study by Gibson et al (1994). This study considered patterning of plant distribution based on analysis of species occurrence in 509 100m ^{2} plots and used multi-variant analysis to group the occurrence of species. The grouping of the species has been used to assign FTC's to vegetation complexes on the Swan Coastal Plain.

Three FTC's as described in Gibson et al (1994) inferred as occurring on within the vicinity of Lot 8 Wattle Ave Nowergup, they are:

1. FTC 24 - Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands;
2. FTC 26a – *Melaleuca huegellii – Melaleuca systena* shrublands on limestone ridges;
3. FCT 27 – Species poor mallees and shrublands on limestone.
4. FTC 28 – Spearwood *Banksia attenuata* or *Banksia attenuata – Eucalyptus* Woodlands.

These FTC's are centered on the uplands of Spearwood and Quindalup dunes.

THREATENED ECOLOGICAL COMMUNITIES

There are twenty-eight Threatened Ecological Communities listed by the Department of Conservation and Environment's Threatened Ecological Community database as occurring on the Swan Coastal Plain. Of these one is known to occur within proximity of Lot 8 Wattle Rd. This is Floristic Community Type 26a as described by Gibson et al (1994).

Floristic Community Type 26a (see above) is listed as an Endangered Ecological Community with CALM. FTC 26a is not listed as a TEC under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

An endangered community has been defined by English and Blyth (1999) as:

"*An ecologcial community which has been adequately surveyed and found to have been subject to a major contraction in area and/or was orinignally of limited distribution and is in danger of significant modification throughout it's range or severe modification or destruction over most of it's range in the near future"*

(See Appendix 1 for explanation of all categories of communities)

DECLARED RARE AND PRIORITY LISTED FLORA SPECIES

A database search of the Department of Conservation and Land Management' Declared Rare and Priority Flora records indicated there are possibly seven priority taxa (see Appendix 2 for explanation of Conservation Codes for Rare and Priority Listed Flora) that may be present on the site. They are listed in Table 1.

Species	Conservation Status Code
Eucalyptus agutifolia	R
Chorizema vaium	R
Diuris micrantha ms	R
Haloragis aculeolata	2
Hibbertia spicata subsp *leptotheca*	3
Melaleuca sp Yanchep (GJ Keighery 11242)	2

Table 1. Results of rare and priority listed flora search for Lot 8 Wattle Rd, Nowergup.

SURVEY METHOD

RARE AND PRIORITY LISTED FLORA

Species identified by the CALM's data base search were studied prior to ground truthing the property to ensure familiarization with the species that may be present.

FIELD SURVEY

A recent aerial photo was examined before visiting the site to determine the context of the property in the regional setting and to identify major structural units present. A grid system of waypoints was set up over the aerial photo and downloaded into a GPS to ensure a thorough coverage of the site during ground truthing. The site was visited on 3 separate occasions (8 Sep 2006, 20 Sep2006 and 4 Oct 2006) by Georgina Nielssen.

The survey area was traversed along transects by foot. Flora was systematically collected from across the property ensuring that all structural units identified from aerial photography were sampled.

The following information was recorded;

- waypoint number;
- photo number;
- plant species;
- vegetation condition;

- aspect, landform and soil.

Dominant species and vegetation structure were recorded and referenced using a GPS at numerous locations across the property in order to map the vegetation units.

In addition 5 10x10m quadrats were set up and examined in detail using the Gibson et al (1994) methodology. Each of these quadrats was marked in the north western corner with a 10 inch steel nail for future reference if required. Species were recorded directly onto field sheets. Where they could not be readily identified a sample was collected for further identification.

Vegetation condition was scored using Keighery's scale (Bush Forever, Vol 2, 1994), which assigns the following scales;

Scale		**Description**
1	Pristine	No obvious sign of disturbance
2	Excellent	Vegetation structure intact, disturbance affecting individual species and are no aggressive weed species.
3	Very Good	Vegetation structure altered, obvious signs of disturbance.
4	Good	Vegetation structure significantly altered by obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
6	Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost without native species. These areas are often described as parkland cleared with the flora comprising of weed or crop species with isolated native trees or shrubs.

WETLANDS

The *Geomorphic Wetlands of the Swan Coastal Plains* dataset was used to identify the location and proximity of wetlands to the site.

TUARTS

The *Tuart Atlas* dataset was used to identify the location and proximity of tuart populations that may be of conservation significance.

MAPPING

All mapping was undertaken in Arcview over an aerial photo base at a scale of 1:2000. Field data collected and referenced using a GPS was used as an aid to identify the boundaries of the vegetation units and bushland condition.

RESULTS

FLORA

A total of 35 families and 96 plant taxa (appendix 3) were recorded in the study area. Of these 10 taxa were recorded as weed species.

DECLARED RARE AND PRIOIRTY LISTED FLORA

No declared rare flora was identified as being present on the site. Several groves of small mallees occur on Lot 8 Wattle Ave. These mallees were identified as being *Eucalyptus petrensis* and *Eucalyptus foecunda* and not the rare species, *Eucalyptus agutifolia.*

One priority-listed flora species were identified as being present on the site: *Jacksonia sericea* (P3).

VEGETATION UNITS

Three vegetation units were defined and mapped within the survey area (Figure 2). They are:

1. **Open heath** - Open heathland of of *Xanthorrhea preissii* and *Dryandra sessilis* over *Acacia pulchella* and *Hibbertia hypericoides* on grey to yellow sands with limestone.
2. **Woodland** - *Eucalyptus marginata* and *Banksia attenuata* woodland over *Hibbertia hypericoides, Acacia pulchella* and weed species on grey to yellow sands; and
3. **Open Woodland** - *Eucalyptus marginata* open woodland over cleared pasture on grey to yellow sands;

The open woodland over cleared pasture is most likely to have been similar to the *Eucalyptus marginata* and *Banksia attenuata* woodland prior to clearing however with no native understorey and few remaining trees it is difficult to assign a vegetation community and this vegetation unit has been mapped as parkland cleared (Figure 2)

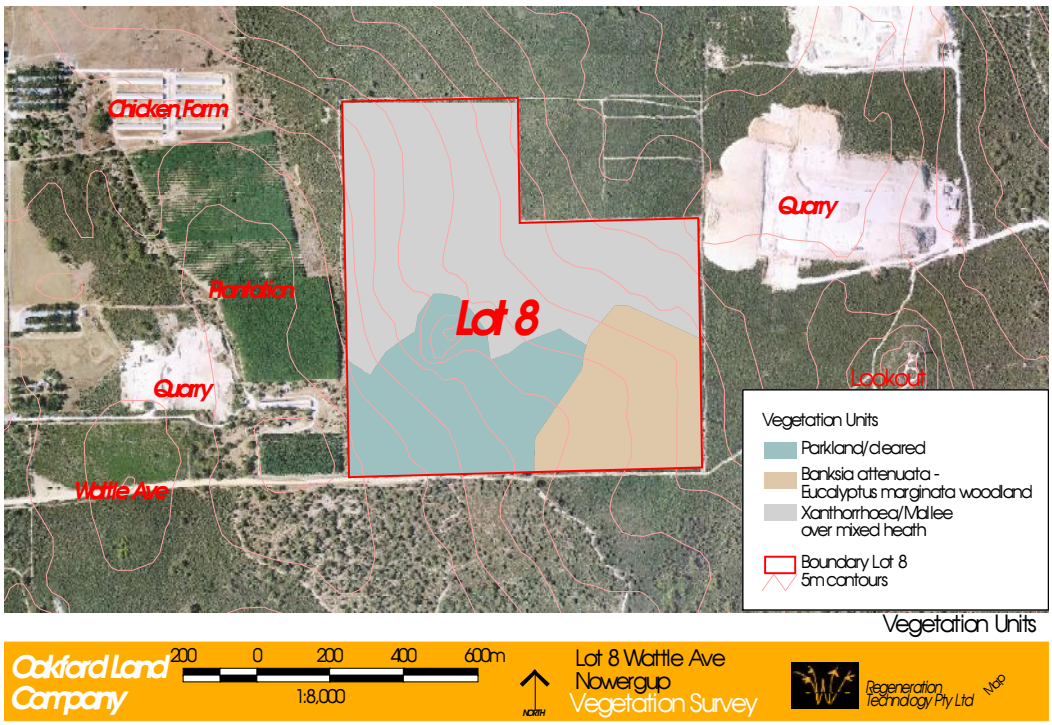

Figure 2 Vegetation units – Lot 8 Wattle Ave Nowergup.

Photo 1. ***Xanthorrhoea preissii*** **and** ***Dryandra sessilis*** **Heath**

Photo 2. ***Eucalyptus marginata*** **–** ***Banksia*** **Woodland**

Photo 3. *Eucalyptus marginata* open woodland *(*Parkland Cleared)

BUSHLAND CONDITION

The bushland condition of Lot 8 Wattle Ave Nowergup ranged f rom 2 (excellent) to 6 (completely degraded or parkland cleared) (Figure 3). The bushland condition of the northern section of the site was the least disturbed with only minor weed encroachment. It is possible this section is regenerated bushland and may have been completely cleared in the past. There is evidence of old fencing in the midst of the bushland as well as scattered bulbous weeds such as *Gladioli* that would normally not penetrate beyond the edges. Grass weeds were present throughout the condi tion - 2 bushland however the weed load was not considered to have significantly impacted upon the overall bushland condition.

The southern section of the property been impacted by multiple ongo ing distrurbance factors and is in poorer condition than the northern section of the p roperty. There are areas within the southern section of the property that have been completely cleared of all vegetation and areas that have only trees and occasional *Xanthorrhoea* present. These areas were assessed as having a bushland condition of 6 (completely degraded or parkland cleared).

The bushland on southeastern section of the property was identified as being the most complete remnant on the southern section of Lot 8 Wattle Ave, having both and overstorey and understorey, however the weed load in this area was recorded as being significantly higher than in the northern section of the property. The high weed load is most likely to be due to past land management practices such as clearing, grazing, uncontrolled access, and frequent fires.

It is evident from the large numbers of dumped bu rnt out cars that illegal and uncontrolled access has been ongoing for a number of years and has contributed to the decline in the bushland condition especially in the southern section of the property. In addition an abandoned sand quarry with burnt out c ars and a high weed load has negatively impacted on the bushland condition of the site.

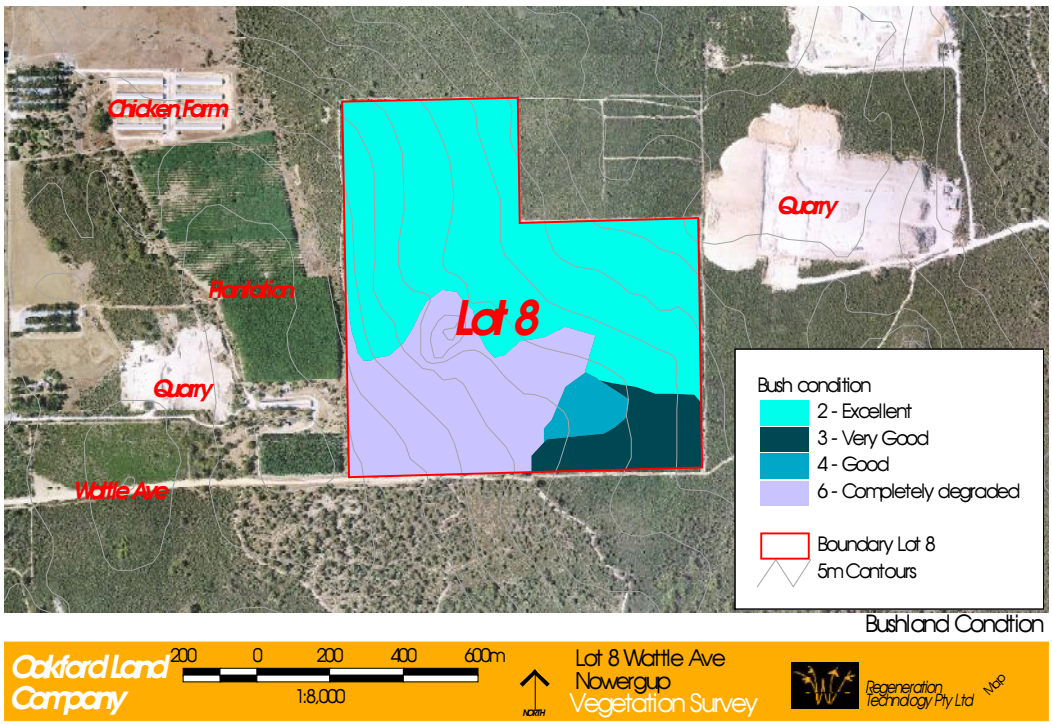

Figure 3 Bushland Condition – Lot 8 Wattle Rd, Nowergup

Photo 4 Abandoned sand quarry

Photo 5 Dumped cars

WETLANDS

No wetlands were identified on the site during ground truthing. No vegetation indicative of wetlands or damplands was found on the site. The *Geomorphic Wetlands of the Swan Coastal Plains* has no wetlands mapped on Lot 8 Wattle Ave.

TUARTS

The *Tuart Atlas Dataset* has Tuart populations mapped to the south and west of Lot 8 Wattle Ave. A single Tuart tree was recorded as being present on the site and as such there is no population of Tuarts of conservation significance (as defined by Ecoscape 2004) found to occur on the site.

DISCUSSION

Lot 8 Wattle Ave, Nowergup, occurs within the Cottesloe complex of the Spearwood dunes. The property is roughly divided into the northern and southern sections. The northern section of the property supports a more complete remnant with minimal disturbance and the southern section of the property, which has a different vegetation community to the north but has been impacted over a long period of time by multiple high impact disturbances.

Land use in the surrounding area includes, market gardens to the west, exotic timber plantations, chicken farming and processing, and limestone quarrying to the east. Lot 8 Wattle Ave, is at the end of an isolated sparsely populated road that has been subject to antisocial activities such as rubbish and car dumping.

FLORA

The site was visited on three occasions during the Spring of 2006. Systematic ground truthing on foot was undertaken on each occasion and notes on the species present and collections (where required for further identification) were made during each of the visits.

A total of 35 families and 96 species were identified as being present on the site. Of these 10 species were identified as weeds. Weed species were only collected and identified from the bushland remnants and as such the ten identified species may be an under representation of weeds present in the cleared areas.

No declared Rare Flora species were located during this survey. One priority listed species that was not identified in the database search were identified as being present they are: *Jacksonia sericea* (P3). This species is currently considered to be endangered (see definitions Appendix 1). *Jacksonia sericea* is restricted to the Swan Coastal Plain making it vulnerable. It occurs in the *Eucalyptus marginata – Banksia* woodland in the south eastern corner of Lot 8 Wattle Ave.

VEGETATION COMMUNITIES

Three vegetation units were recorded identified on Lot 8 Wattle Ave (Figure 2). They are:

1. **Open heath** Open heathland of of *Xanthorrhea preissii* and *Dryandra sessilis* over *Acacia pulchella* and *Hibbertia hypericoides* on grey to yellow sands with limestone.
2. **Woodland** *Eucalyptus marginata* and *Banksia attenuata* woodland over *Hibbertia hypericoides, Acacia pulchella* and weed species on grey to yellow sands; and
3. **Open Woodland** *Eucalyptus marginata open woodland* over cleared pasture on grey to yellow sands;

The vegetation units of Lot 8 Wattle Rd, Nowergup followed the Cottesloe Complex central and south as identified by Heddle et al (1980). The delineation of the vegetation units identified was based on a thorough system of ground truthing the site on foot along transects. There was no distinct boundary between the vegetation communities with the understorey component changing subtlety with the change in the overstorey. On the northern sections of the property there was very little overstorey present, where the overstorey was present it occurred as patches of Banksia and Mallees mainly on the higher ridges. The understorey to on the western side of Lot 8 Wattle supported species more commonly found in coastal communities such as *Acanthocarpus preissii* and *Hemiandra pungens* however the difference in the species composition did not warrant allocation of a separate vegetation unit.

The vegetation units identified on Lot 8 Wattle Ave most closely approximate the following vegetation communities as described by Gibson et al (1994).

1. **FCT – 26b** Woodlands and Mallees on Limestone; and
2. **FCT – 28** Spearwood *Banksia attenuata – Eucalyptus* woodlands.

Quadrat data from five randomly selected locations across the site as well as the overall species collection was compared to the Gibson et al dataset in order to assign a Floristic Community Type (FCT). The closest FCT match for the quadrats was determined by the number of species the Gibson et al dataset and the quadrats had in common no weighting was given to individual species or groups of species in the anaylsis. The closest approximation in terms of species composition and site description was FCT – 26b Woodlands and Mallees on limestone.

BUSHLAND CONDITION

Bushland condition across the site ranged from 2 (Excellent) to 6 (Completely degraded (Figure 3). The southern section of the site has been impacted by multiple disturbances over an extended period of time including: clearing, grazing, sand quarrying activities, uncontrolled access, fire, weeds (in particular Patersons Curse) and rubbish dumping. The impact of the disturbance factors has rendered the bushland in a condition that would be difficult without major intervention to return it to near natural state.

The bushland to the north of the site is in better condition with minimal disturbances noted. Old fencing, the lack of an overstorey, the dominance of *Xanthorrhoea* and the presence of weeds throughout the site such as grasses and *Gladioli* indicate the northern section of the property may have been cleared in the past (20years +) and or grazed.

There is no evidence of recent or frequent fires in the northern section of the property. Frequent fires in this type of vegetation will often result in monocultures of some of the pioneering species such as *Dryandra sessilis.* No dominance of *Dryandra sessilis* was noted during this survey however the lack of size of the individual plants was indicative that the vegetation had either been cleared or burnt in the past (10years+).

FRAGMENTATION

Lot 8 Wattle Rd Nowergup is a partially cleared lot that occurs within a larger remnant that extends to the north and east of the property. The southeastern corner of the property and land to the south of Lot 8 Wattle Ave has been mapped as being part of Bush Forever site 293. The Bush Forever site 293 is as part of the proposed Gnangarra Park and forms a link between Swan Hill and Lake Neerabup. The section of Lot 8 that is within the Bush Forever site 293 supports the *Eucalyptus marginata – Banksia* woodland, (which closely approximates **FCT – 28** Spearwood *Banksia attenuata – Eucalyptus* woodlands). FCT 28 is considered as well reserved and low risk (Gibson et al, 1994).

To the east of Lot 8 Wattle Ave is a deciduous exotic timber plantation and mill. With no native understorey this plantation provides no habitat or refuge for local flora or fauna.

WETLANDS

There are no wetlands (Geomorphic wetlands of the Swan Coastal Plan dataset) on Lot 8 Wattle Ave Nowergup. Neerabup Lake occurs approximately 1.5km to the west of Lot 8. There are no surface drainage lines from Lot 8 that flow directly towards Neerabup Lake

RECOMMENDATIONS/GUIDELINES

It is recommended that if a license for an extractive industry be granted for this site that:

- Unnecessary clearing of vegetation beyond that which is strictly required be avoided;
- Clearing and site layout design should ensure the minimization of edge effects and should where possible utilise areas that are already cleared or degraded;
- Topsoil, logs, and plant material cleared from the site should be directly replaced elsewhere on the site in disturbed areas, where this is not possible they should be stockpiled and used for rehabilitation works on the site within a year.

- The site should be rehabilitated using species listed for eac h community in appendix 3;
- Seed collection and plant propagules for rehabilitation works should be collected from the site or bushland within the surrounding area to ensure local provenance of species replanted.;
- A vegetated buffer should be maintained whe re practical along the northern and western boundaries of the site to reduce noise and dust effects on neighbours.

REFERENCES

Department of Environmental Protection (2000) Bush Forever Volume 2. Department of Environmental Protection. Perth Western Austr alia.

Environment Australia (2000) *Revision of Interim Biogeographic Rationalisation for Australia (IBRA) and Development of Version 5.1. Summary Report.*

Gibson, N., Keighery, B., Keighery, G., Burbidge, A., and Lyons, M. (1994) A Floristic Survey of the Swan Coastal Plan. Unpublished Report for the Australian Heritage Commission.

Heddle, E.M., Loneragan, O.W., and Havel, J.J., (1980) Vegetation Complexes of the Darling System, Western Australia. Atlas of Natural Resources Darling System Western Australia. Department of Conservation and Environment.

Ecoscape (2004) Tools for Identifying Tuart populations of conservation significance on the Swan Coastal Plain.

APPENDIX 1

The Department of Conservation and Land Management's conservation codes for Flora in Western Australia

CONSERVATION CODES

R: Declared Rare Flora - Extant Taxa

Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

X: Declared Rare Flora - Presumed Extinct Taxa

Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.

1: Priority One - Poorly known Taxa

Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

2: Priority Two - Poorly Known Taxa

Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

3: Priority Three - Poorly Known Taxa

Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

4: Priority Four - Rare Taxa

Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors . These taxa require monitoring every 5-10 years.

APPENDIX 2

Definitions of the status of the threat to ecological communities (English and Blyth 1999) in Bush Forever (2000)

Category	Definition
1 – Presumed Totally Destroyed	*"An ecological communit,y which has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout it's range that no occurrence of it is likely to recover it's species composition and/or structure in the forese eable future"*
2 - Critically Endangered	*"An ecological community which has been adequately surveyed and found to have been subject to a major contraction and/or was originally of limited distribution and is facing severe modification or destruction throughout it's range in the immediate future, or is already severely degraded throughout it's range but capable of being substantially restored or rehabilitated"*
3 - Endangered	*" An ecological community which has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout it's range or severe modification or destruction over most of it's range in the near future.*
4 - Vulnerable	*"An ecological community which has been adequately surveyed and found to be declining and/or has declined in the distribution and/or condition ands whose ultimate security has not been assured and/or a community which is still widespread but is believed to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout it's range."*
5 – Data Deficient	*"An ecological community for which there is an inadequate data to assign it to one of the above categories and/or which is not yet evaluated. (Usually an ecological community with poorly known distribution or biology that is suspected to belong to any of the above categories. These ecological communities have a priority for survey and/or research.)"*
6 – Lower Risk	*"A community which has been adequately surveyed and evaluated and available information suggests that it does not qualify"*

APPENDIX 3

Species list for Lot 8 Wattle Ave Nowergup

*Denotes a weed species

Family	Species
ANTHERIACEAE	*Sowerbaea laxiflora*
	Thysanotus manglesianus
	Tricoyne elatior
ASPARAGACEAE	**Asparagus aparagoides*
ASTERACEAE	*Podolepis gracilis*
	**Ursinia anthemoides*
	Waitzia citrina
	**Arthoteca calendula*
BORAGINACEAE	**Echium plantagineum*
BRASSICAEAE	*Heliophila pulsilla*
CARYOPHYLLACEAE	**Petrorhagia relutina*
CASUARINACEAE	*Allocasuarina fraseriana*
	Allocasuarina humilis
COLCHICACEAE	*Burchardia umbellata*
CYPERACEAE	*Lepidosperma squamatum*
	Mesomelaena stigia
	Schoenus gandiflorus
DASYPOGONACEAE	*Acanthocarpus preissii*
	Lomandra hermaphrodita
DILLENIACEAE	*Hibbertia hypericoides*
	Hibbertia racemosa
EPACRIDACEAE	*Leucopogon assimilis*
	Leucopogon parviflorus
	Leucopogon pendulus
	Leucopogon polymorphis
	Leucopogon propinquus
	Lysinema ciliatum
EUPHORBIACEAE	**Anagalis arvensis*
	Phyllanthus calycinus
GERANIACEAE	*Gernaium solonderi*
	Pelargonium capitatum
GOODENIACEAE	*Leschenaultia linariodes*
HAEMODORACEAE	*Anigozanthos humilis*
	Conostylis aculeata
	Conostylis candicans

	Conostylis setigia
IRIDACEAE	**Gladiolus caryophyllaceus*
	Orthrosanthus laxus
	Patersonia occidentalis
	**Romulea rosea*
LAMINACEAE	*Hemiandra pungens*
LORANTHACEAE	*Nuytsia floribunda*
MENYANTHACEAE	*Opercularia vaginata*
MIMOSACEAE	*Acacia cochlearis*
	Acacia pulchella
MIMOSACEAE	*Acacia rostellifera*
MYRTACEAE	*Eucalyptus foecunda*
	Eucalyptus gomphocephala
	Eucalyptus marginata subsp marginata
	Eucalyptus petrensis
	Kunzea ericifolia
	Melaleuca huegelii
	Melaleuca systena
ORCHIDACEAE	*Caladenia flava*
	Diuris magnifica
	Drosera macrantha
	Elythanthera brunonis
	Pterostylis aff nana
PAPILIONACEAE	*Bossiaea eriocarpa*
	Dillwynia sp "A Perth Flora"
	Gompholobium tomentosum
	Hovea trisperma
	Jacksonia sericia
	Kenneida prostrata
	Nemcia reticulata
	Sphaerolobium medium
	Trifolium campestre
	Viminaria juncea
PHORMIACEAE	*Dianella revolta*
POACEAE	*Austrostipa flavescens*
	**Briza maxima*
	**Ehrharta longifolia*
POLYGONACEAE	*Comesperma cconfertum*
PROTEACEAE	*Banksia attenutata*
	Banksia grandis
	Calothamnus quadrifidus
	Calothamnus sanguineus

	Dryandra linleyana subsp lindleyana
	Dryandra sessilis
	Grevillea preissii
	Hakea lissiocarpa
	Hakea prostrata
	Hakea ruscifolia
	Hakea trifuncata
	Hakea varia
	Petrophile macrostachya
	Petrophile macrostachya
RESTIONACEAE	*Desmocalsus flexuosa*
RHAMINACAE	*Spyridium globulosum*
STACKHOUSIACEAE	*Tripteroccus brunonis*
STYLIDACEAE	*Stylidium sp*
	Stylidium violaceum
XANTHORRHOEACEAE	*Xanthorrhoea preissii*
ZAMIACEAE	*Macrozamia riedlei*

APPENDIX 2

Department of Conservation and Land Management

Conserving the nature of WA

Your Ref:
Our Ref: 2007/000430
Enquires: Kellie Mantle

Phone: 9334 0579
Fax: 9334 0278
Email: kellie.mantle@dec.wa.gov.au

Lindsay Stephens
Landform Research
25 Heather Rd
Roleystone WA 6111

Dear Lindsay

REQUEST FOR THREATENED FAUNA INFORMATION

I refer to your request of 10th June for information on threatened fauna occurring in the vicinity of Wattle Rd/Dayrell Rd. (plus ~10km buffer)

A search was undertaken for this area of the Department's Threatened Fauna database, which includes species which are declared as '*Rare or likely to become extinct* (Schedule 1)', '*Birds protected under an international agreement* (Schedule 3)', and '*Other specially protected fauna* (Schedule 4)'.

Attached also are the conditions under which this information has been supplied. Your attention is specifically drawn to the sixth point that refers to the requirement to undertake field investigations for the accurate determination of threatened fauna occurrence at a site. The information supplied should be regarded as an indication only of the threatened fauna that may be present.

An invoice for $150.00 (plus GST), being the set charge for the supply of this information, will be forwarded.

It would be appreciated if any populations of threatened fauna encountered by you in the area could be reported to this Department to ensure their ongoing management.

If you require any further details, or wish to discuss threatened fauna management, please contact my Principal Zoologist, Dr Peter Mawson on 08 93340421.

Yours sincerely

KMantle
.....
for Keiran McNamara
DIRECTOR GENERAL
Department of Environment and Conservation

13th June, 2007

Attachment

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

THREATENED FAUNA INFORMATION

Conditions In Respect Of Supply Of Information

* All requests for data to be made in writing to the Executive Director, Department of Environment and Conservation, Attention: Principal Zoologist, Species and Communities Branch.

* The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided without the prior consent of the Executive Director, Department of Environment and Conservation

* Specific locality information for Threatened Fauna is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information for Threatened Fauna may not be used in reports without the written permission of the Executive Director, Department of Environment and Conservation. Reports may only show generalised locations or, where necessary, show specific locations without identifying species. The Principal Zoologist is to be contacted for guidance on the presentation of Threatened Fauna information.

* Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data, they may be present. The Department of Environment and Conservation accepts no responsibility for this.

* Receiving organisations must also recognise that the database is subject to continual updating and amendment, and such considerations should be taken into account by the user.

* It should be noted that the supplied data do not necessarily represent a comprehensive listing of the Threatened Fauna of the area in question. Its comprehensiveness is dependent of the amount of survey carried out within a specified area. The receiving organisation should employ a biologist/zoologist, if required, to undertake a survey of the area under consideration.

* Acknowledgment of the Department of Environment and Conservation as the source of data is to be made in any published material. Copies of all such publications are to be forwarded to the Department of Environment and Conservation, Attention; Principal Zoologist, Species and Communities Branch.

31.572 °S 115.658 °E / 31.751 °S 115.842 °E Wattle Av/Dayrell Rd (~10km buffer)

*	Date	Certainty	Seen	Location Name	Method

Schedule 1 - Fauna that is rare or is likely to become extinct

Calyptorhynchus latirostris — Carnaby's Black-Cockatoo — *21 records*

This species moves around seasonally in flocks to feeding areas in proteaceous scrubs and heaths and eucalypt woodlands as well as pine plantations. Breeding occurs in winter/spring, mainly in the eastern forests and wheatbelt where they can find mature hollow-bearing trees to nest in.

1993	1	1	Lake Joondalup	Day sighting
1998	1	700	Carabooda	Day sighting
2000	1	10	Neerabup National Park	Day sighting
2000	1	100	Currumbine	Day sighting
2000	1	2	Neerabup	Caught or trapped
2000	1	3	Neerabup	Caught or trapped
2000	1	6	Neerabup	Caught or trapped
2003	1	6	Nowergup	Day sighting
2003	1		Carabooda	Day sighting
2003	1		Carabooda	Day sighting
2003	1		Mariginiup	Day sighting
2003	1		Mindarie	Day sighting
2003	1		Mindarie	Day sighting
2003	1		Neerabup	Day sighting
2003	1		Nowergup	Day sighting
2003	1		Ridgewood	Day sighting
2003	1		Tamala Park	Day sighting
2003	1		Wanneroo	Day sighting
2006	1	1	Pinjar	Day sighting
2006	1	1	Pinjar	Day sighting
2006	1	1	Pinjar	Day sighting

Calyptorhynchus sp — White-tailed Black Cockatoo — *1 records*

These records pertain to either Baudin's Black-Cockatoo or Carnaby's Black-Cockatoo.

2005	1	550	Pinjar	Day sighting

Synemon gratiosa — Graceful Sunmoth — *5 records*

This species has been recorded in a few locations from Wanneroo to Mandurah and is under great pressure from land development.

1984	1	16	Wanneroo	Caught or trapped
1985	1	2	Wanneroo	Caught or trapped
1995	1		Neerabup	Caught or trapped
1996	1	14	Neerabup	Caught or trapped
1996	1	7	Neerabup	Caught or trapped

Schedule 4 - Other specially protected fauna

Falco peregrinus — Peregrine Falcon — *2 records*

This species is uncommon and prefers areas with rocky ledges, cliffs, watercourses, open woodland or margins with cleared land.

2003	1	1	Pinjar/Banksia Grove	Caught or trapped
2005	1	1	Lake Joondalup Nature Reserve	Day sighting

31.572 °S 115.658 °E / 31.751 °S 115.842 °E Wattle Av/Dayrell Rd (~10km buffer)

*	Date	Certainty	Seen	Location Name	Method

Morelia spilota imbricata **Carpet Python** *1 records*

This species occurs in a variety of habitats including forest and heathland. It is often arboreal and preys on birds, other reptiles and small to medium size mammals. This species is listed under both Schedule 4 and Priority 4.

2001	1	1	Carabooda	Day sighting

Priority Two: Taxa with few, poorly known populations on conservation lands

Ixobrychus flavicollis australis **Black Bittern** *1 records*

This species inhabits freshwater pools, swamps and lagoons, well screened with trees.

1987	1	1	Lake Joondalup	Day sighting

Priority Three: Taxa with several, poorly known populations, some on conservation lands

Austrosaga spinifer **Austrosaga spinifer** *2 records*

This species of cricket is known from heath habitats near Perth and Cervantes.

1981	1	1	Neerabup National Park	
1982	1	1	Neerabup National Park	

Hylaeus globuliferus **Hylaeus globuliferus** *4 records*

This species of native bee is known to feed on the flowers of Adenanthos cygnorum in particular but has also been collected from the flowers of Grevillea cagiana, Banksia grossa and Banksia attenuata.

1995	1		Neerabup	
1995	1		Neerabup	
1995	1		Neerabup	
1996	1		Neerabup	

Leioproctus contrarius **Leioproctus contrarius** *1 records*

This species of native bee is apparently dependent on flowers of Goodeniaceae and possibly Lechenaultia stenosepala. Recent surveys have shown that it is more widespread than previously thought.

1982	1	1	GNANGARA	Caught or trapped

Priority Four: Taxa in need of monitoring

Macropus irma **Western Brush Wallaby** *5 records*

This species occurs in areas of forest and woodland supporting a dense shrub layer.

2000	1	1	Neerabup National Park	Day sighting
2003	1		Neerabup	Day sighting
2003	1		Nowergup	Day sighting
2003	1		Nowergup	Day sighting
2006	1	1	Pinjar	Day sighting

Ixobrychus minutus **Little Bittern** *1 records*

This cryptic species inhabits dense reeds and rushes bordering swamps, lakes and watercourses.

1986	1	4	Jandabup	Day sighting

Falcunculus frontatus leucogaster **Crested Shrike-tit (south-western ssp)** *1 records*

This species is an uncommon inhabitant of woodlands.

1943	1	1	Wanneroo	Caught or trapped

31.572 °S 115.658 °E / 31.751 °S 115.842 °E Wattle Av/Dayrell Rd (~10km buffer)

* Date	Certainty	Seen	Location Name	Method
Morelia spilota imbricata			**Carpet Python**	*1 records*
This species occurs in a variety of habitats including forest and heathland. It is often arboreal and preys on birds, other reptiles and small to medium size mammals. This species is listed under both Schedule 4 and Priority 4.				
2001	1	1	Carabooda	Day sighting
Westralunio carteri			**Westralunio carteri**	*1 records*
This species of freshwater mussel is endemic to Western Australia.				
	1		Nowergup	Fossil
Priority Five: Taxa in need of monitoring (conservation dependent)				
Bettongia penicillata ogilbyi			**Woylie**	*1 records*
This species of rat-kangaroo occupies a variety of habitats with a clumped low understorey of tussock grasses or woody shrubs.				
	1		Nowergup	Fossil
Isoodon obesulus fusciventer			**Quenda**	*13 records*
This species prefers areas with dense understorey vegetation, particularly around swamps and along watercourses, that provides ample protection from predators.				
	1		Nowergup	Fossil
1995	1	1	GUMBLOSSOM PARK RESERVE	Caught or trapped
2000	1	1	Neerabup National Park	Diggings
2000	1	1	Neerabup National Park	Diggings
2000	1	1	Neerabup	Caught or trapped
2003	1	2	Wanneroo	Day sighting
2003	2	0	Carabooda	Diggings
2003	1		Carabooda	Day sighting
2003	1		Carabooda	
2003	2	0	Pinjar	Diggings
2006	1		Pinjar	Diggings
2006	1	0	Pinjar	Diggings
2006	1	1	Burns Beach	Day sighting

* Information relating to any records provided for listed species:-
Date: date of recorded observation
Certainty (of correct species identification): 1=Very certain; 2=Moderately certain; and 3=Not sure.
Seen: Number of individuals observed.
Location Name: Name of reserve or nearest locality where observation was made
Method: Method or type of observation

Australian Government
Department of the Environment and Heritage

Protected Matters Search Tool

You are here: DEH Home > EPBC Act > Search

10 November 2006 12:38

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.deh.gov.au/epbc/assessmentsapprovals/index.html

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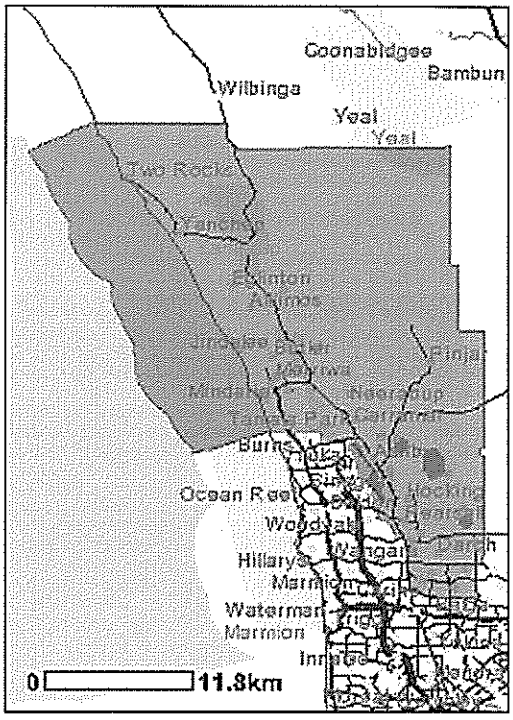
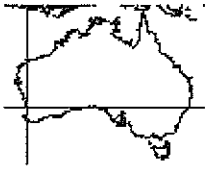


Search Region: Wanneroo, City Of, WA



Report Contents:

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.deh.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance: (Ramsar Sites)	1
Commonwealth Marine Areas:	Relevant
Threatened Ecological Communities:	2
Threatened Species:	28
Migratory Species:	20

Other Matters Protected by the EPBC Act

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

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

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.deh.gov.au/epbc/permits/index.html.

Commonwealth Lands:	2
Commonwealth Heritage Places:	None
Places on the RNE:	18
Listed Marine Species:	47
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

State and Territory Reserves:	7
Other Commonwealth Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Wetlands of International Significance [Dataset Information]
(Ramsar Sites)

FORRESTDALE & THOMSONS LAKES	Within same catchment as Ramsar site

Commonwealth Marine Areas [Dataset Information]

Approval may be required for a proposed activity that is likely to have a significant impact on the environment in a Commonwealth Marine Area, when the action is outside the Commonwealth Marine Area, or the environment anywhere when the action is taken within the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Within 12 Nautical Mile Limit

Within 3 Nautical Mile Limit

Threatened Ecological Communities [Dataset Information]	Status	Type of Presence
Aquatic Root Mat Community in Caves of the Swan Coastal Plain	Endangered	Community known to occur within area
Sedgelands in Holocene dune swales of the southern Swan Coastal Plain	Endangered	Community known to occur within area

Threatened Species [Dataset Information]	Status	Type of Presence
Birds		
*Anous tenuirostris melanops** Australian Lesser Noddy	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus baudinii * Baudin's Black-Cockatoo, Long-billed Black-Cockatoo	Vulnerable	Species or species habitat likely to occur within area
Calyptorhynchus latirostris * Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo	Endangered	Species or species habitat likely to occur within area
Diomedea amsterdamensis * Amsterdam Albatross	Endangered	Species or species habitat may occur within area
Diomedea dabbenena * Tristan Albatross	Endangered	Foraging may occur within area
Diomedea exulans * Wandering Albatross	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni * Gibson's Albatross	Vulnerable	Species or species habitat may occur within area
Halobaena caerulea * Blue Petrel	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus * Southern Giant-Petrel	Endangered	Species or species habitat may occur within area
Macronectes halli * Northern Giant-Petrel	Vulnerable	Species or species habitat may occur within area

Pterodroma mollis * Soft-plumaged Petrel	Vulnerable	Species or species habitat may occur within area
Thalassarche carteri * Indian Yellow-nosed Albatross	Vulnerable	Foraging may occur within area
Thalassarche cauta * Shy Albatross	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris * Black-browed Albatross	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus * Blue Whale	Endangered	Species or species habitat may occur within area
Dasyurus geoffroii * Chuditch, Western Quoll	Vulnerable	Species or species habitat likely to occur within area
Eubalaena australis * Southern Right Whale	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae * Humpback Whale	Vulnerable	Species or species habitat known to occur within area
Neophoca cinerea * Australian Sea-lion	Vulnerable	Species or species habitat may occur within area
Reptiles		
Dermochelys coriacea * Leathery Turtle, Leatherback Turtle, Luth	Vulnerable	Species or species habitat may occur within area
Sharks		
*Carcharias taurus (west coast population)** Grey Nurse Shark (west coast population)	Vulnerable	Species or species habitat may occur within area
Carcharodon carcharias * Great White Shark	Vulnerable	Species or species habitat may occur within area
Rhincodon typus * Whale Shark	Vulnerable	Species or species habitat may occur within area
Plants		
Eucalyptus argutifolia * Yanchep Mallee, Wabling Hill Mallee	Vulnerable	Species or species habitat likely to occur within area
*Grevillea curviloba subsp. curviloba** Curved-leaf Grevillea	Endangered	Species or species habitat likely to occur within area
*Grevillea curviloba subsp. incurva** Narrow curved-leaf Grevillea	Endangered	Species or species habitat likely to occur within area
Lepidosperma rostratum * Beaked Lepidosperma	Endangered	Species or species habitat likely to occur within area
Thelymitra stellata * Star Sun-orchid	Endangered	Species or species habitat likely to occur within area
Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Haliaeetus leucogaster White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Migratory Marine Birds		
Diomedea amsterdamensis Amsterdam Albatross	Migratory	Species or species habitat may occur within area
Diomedea dabbenena	Migratory	Foraging may occur within area

Tristan Albatross		
Diomedea exulans Wandering Albatross	Migratory	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross	Migratory	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel	Migratory	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel	Migratory	Species or species habitat may occur within area
Sterna anaethetus Bridled Tern	Migratory	Breeding known to occur within area
Thalassarche cauta Shy Albatross	Migratory	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross	Migratory	Species or species habitat may occur within area
Migratory Marine Species		
Mammals		
Balaenoptera edeni Bryde's Whale	Migratory	Species or species habitat may occur within area
Balaenoptera musculus * Blue Whale	Migratory	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale	Migratory	Species or species habitat may occur within area
Eubalaena australis * Southern Right Whale	Migratory	Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin	Migratory	Species or species habitat may occur within area
Megaptera novaeangliae * Humpback Whale	Migratory	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca	Migratory	Species or species habitat may occur within area
Reptiles		
Dermochelys coriacea * Leathery Turtle, Leatherback Turtle, Luth	Migratory	Species or species habitat may occur within area
Sharks		
Carcharodon carcharias Great White Shark	Migratory	Species or species habitat may occur within area
Rhincodon typus Whale Shark	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy	Listed	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift	Listed - overfly marine area	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Listed - overfly	Species or species habitat may occur within area

	marine area	
Ardea ibis Cattle Egret	Listed - overfly marine area	Species or species habitat may occur within area
Catharacta skua Great Skua	Listed	Species or species habitat may occur within area
Diomedea amsterdamensis Amsterdam Albatross	Listed	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross	Listed	Foraging may occur within area
Diomedea exulans Wandering Albatross	Listed	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross	Listed	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
Halobaena caerulea Blue Petrel	Listed	Species or species habitat may occur within area
Larus novaehollandiae Silver Gull	Listed	Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel	Listed	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel	Listed	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel	Listed	Species or species habitat may occur within area
Sterna anaethetus Bridled Tern	Listed	Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross	Listed	Foraging may occur within area
Thalassarche cauta Shy Albatross	Listed	Species or species habitat may occur within area
Thalassarche chlororhynchos Yellow-nosed Albatross, Atlantic Yellow-nosed Albatross	Listed	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross	Listed	Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri New Zealand Fur-seal	Listed	Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion	Listed	Species or species habitat may occur within area
Ray-finned fishes		
Acentronura australe Southern Pygmy Pipehorse	Listed	Species or species habitat may occur within area

Campichthys galei Gale's Pipefish	Listed	Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish	Listed	Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish	Listed	Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse	Listed	Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse	Listed	Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse	Listed	Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish	Listed	Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish	Listed	Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish	Listed	Species or species habitat may occur within area
Nannocampus subosseus Bony-headed Pipefish	Listed	Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon	Listed	Species or species habitat may occur within area
Phyllopteryx taeniolatus Weedy Seadragon, Common Seadragon	Listed	Species or species habitat may occur within area
Pugnaso curtirostris Pug-nosed Pipefish	Listed	Species or species habitat may occur within area
Solegnathus lettiensis Indonesian Pipefish, Gunther's Pipehorse	Listed	Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish	Listed	Species or species habitat may occur within area
Stigmatopora nigra Wide-bodied Pipefish, Black Pipefish	Listed	Species or species habitat may occur within area
Syngnathoides biaculeatus Double-ended Pipehorse, Alligator Pipefish	Listed	Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish	Listed	Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish	Listed	Species or species habitat may occur within area
Reptiles		
Aipysurus pooleorum Shark Bay Seasnake	Listed	Species or species habitat may occur within area
Dermochelys coriacea * Leathery Turtle, Leatherback Turtle, Luth	Listed	Species or species habitat may occur within area
Disteira kingii Spectacled Seasnake	Listed	Species or species habitat may occur within area
Pelamis platurus Yellow-bellied Seasnake	Listed	Species or species habitat may occur within area
Whales and Other Cetaceans [Dataset Information]	Status	Type of Presence
Balaenoptera acutorostrata Minke Whale	Cetacean	Species or species habitat may occur within area

Balaenoptera edeni Bryde's Whale	Cetacean	Species or species habitat may occur within area
Balaenoptera musculus * Blue Whale	Cetacean	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale	Cetacean	Species or species habitat may occur within area
Delphinus delphis Common Dolphin	Cetacean	Species or species habitat may occur within area
Eubalaena australis * Southern Right Whale	Cetacean	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus	Cetacean	Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin	Cetacean	Species or species habitat may occur within area
Megaptera novaeangliae * Humpback Whale	Cetacean	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca	Cetacean	Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin	Cetacean	Species or species habitat may occur within area
Tursiops aduncus Spotted Bottlenose Dolphin	Cetacean	Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin	Cetacean	Species or species habitat may occur within area

Commonwealth Lands [Dataset Information]

Defence

Unknown

Places on the RNE [Dataset Information]
Note that not all Indigenous sites may be listed.

Historic

Administration Building Yanchep National Park WA

Cockman House WA

Concrete Bunkers WA

Eglinton Shipwreck WA

Ghost House, Chauffeurs Room & Garage Ruins WA

Gloucester Lodge including Garden and Pool WA

McNess House WA

Yanchep Inn and Garden WA

Indigenous

Orchestra Shell Cave WA

Wanneroo Scarred Tree WA

Natural

Jandabup Lake Nature Reserve WA

Lake Joondalup Reserves WA

Melaleuca Park WA

Neerabup National Park WA

Nowergup Lake Fauna Reserve WA

Reserve 20091 (1978 Boundary) WA

Yanchep National Park WA

Yeal - Gnangara Area WA

Extra Information

State and Territory Reserves [Dataset Information]

Jandabup Nature Reserve, WA

Lake Joondalup Nature Reserve, WA

Marmion Marine Park, WA

Neerabup National Park, WA

Neerabup Nature Reserve, WA

Yanchep National Park, WA

Yeal Nature Reserve, WA

Caveat

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

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

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

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

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

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

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

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

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

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

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

Acknowledgments

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

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

ANUCLIM Version 1.8, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Last updated:

Department of the Environment and Heritage
GPO Box 787 Canberra ACT 2601 Australia
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DEPARTMENT OF Conservation AND LAND MANAGEMENT
Conserving the nature of WA

Fauna Note No. 05/2005
Carnaby's Cockatoo

Written by Tamra Chapman, Belinda Cale and Marion Massam

Carnaby's Cockatoo

There are two species of White-tailed Black-Cockatoo in south-west Western Australia. The long-billed form *Calyptorhynchus baudinii* is known as Baudin's Cockatoo and the short-billed form *Calyptorhynchus latirostris* is known as Carnaby's Cockatoo. It can be difficult to distinguish between these two species (see Figure 1) and their ranges overlap, especially during the non-breeding season. Carnaby's Cockatoo has a long drawn out 'whee-loo' call, whereas Baudin's Cockatoo produces a shortened 'we-ow' whistle. Baudin's Cockatoo is known to damage pome fruit (apple and pear) crops and Carnaby's Cockatoo damages tree shoots, persimmons and nut crops.

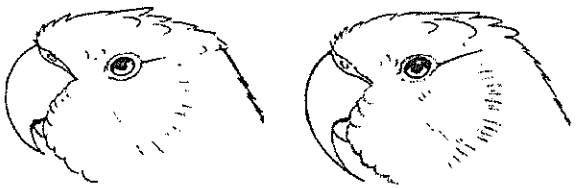

Figure 1 Comparison of the heads of Carnaby's Cockatoo (left) and Baudin's Cockatoo (right) showing the shorter upper bill in Carnaby's Cockatoo. Image reproduced with permission from the Museum of Western Australia.

Description

Carnaby's Cockatoo is a large, black bird with white cheek patches and white panels on the tail (Figure 2). It is 53-58 cm in length and 540-790 g in weight.

The body feathers are brownish black in colour and narrowly edged with dull white, giving them a scalloped appearance. The tail has large white panels and the patch on the cheek is whitish in females and duller in males. The skin surrounding the eye is dark grey in females and pink in males. The bill is light grey in females and blackish in males. Immature birds look similar to adults, but their bills are duller in colour and begin to darken in the birds' third year.

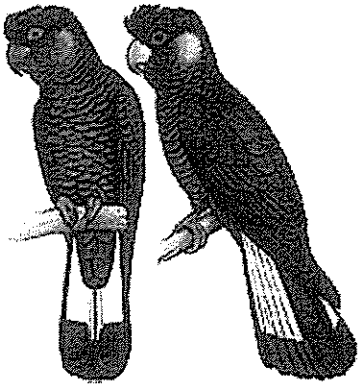

Figure 2 Carnaby's Cockatoo (Adapted from Johnstone and Storr, 1998).

Distribution and Habitat

Carnaby's Cockatoo inhabits a large area of south-west Western Australia, extending from Kalbarri south-east to Esperance (Figure 3). The species is mainly found in uncleared or remnant areas of eucalypt woodland, particularly Salmon Gum *Eucalyptus salmonophloia*, or Wandoo *E. wandoo*, and shrubland and heath country dominated by *Hakea*, *Dryandra* and *Banksia* species. Carnaby's Cockatoo now frequently occurs in Marri *Corymbia calophylla*, Jarrah *E. marginata*, and Karri *E. diversicolor* forests.

The breeding success of Carnaby's Cockatoo is dependent upon heathland feeding areas within 12 km of woodland nesting habitat. Most breeding occurs between Three Springs and the Stirling Range and areas to the west (Cataby to Tone River). Since the 1930s, pine plantations *Pinus* spp. in coastal regions have become important feeding sites during the non-breeding season.

Carnaby's Cockatoo is scarce and patchily distributed in the driest parts of its range and in the extreme south-west. Elsewhere, it is uncommon to common. Its range has contracted, particularly in the northern and eastern wheatbelt, due to clearing and fragmentation of its habitat for agriculture.

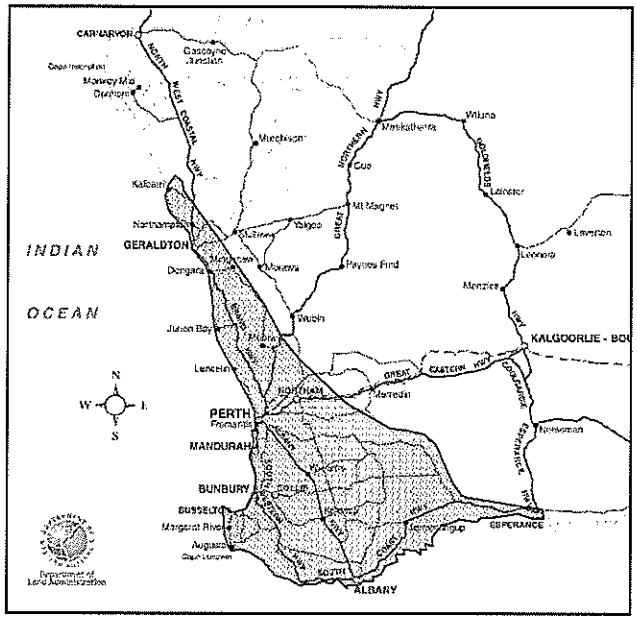

Figure 3 Distribution of Carnaby's Cockatoo. (Adapted from Johnstone and Storr, 1998.)

Diet

Carnaby's Cockatoo feeds on the seeds of a variety of native plants including *Banksia*, *Dryandra*, *Hakea*, *Grevillea*, *Allocasuarina* and *Eucalyptus* species. The birds break the rim of Marri fruits open with their short bills, unlike Baudin's Cockatoo which can extract the seeds without damaging the rim, using its long bill. Other seeds taken include Pine and Storksbill *Erodium* spp, Double Gee *Emex australis*, Wild Radish *Raphanus raphanistum* and lupins. Carnaby's Cockatoo has been observed taking nectar from the flowers of native plants and it feeds on insects hidden in the stems of flowers and fruits of some *Banksia* and *Dryandra* species.

Breeding

One or two (average of 1.7) eggs are laid between July and November in a hollow, usually in a Salmon Gum or Wandoo. The female incubates the eggs for 28 to 29 days and broods the chicks, but later in the nestling phase, both parents return at mid-morning and dusk to feed the young. After fledging, the juvenile is dependent on its parents for several months and remains with them until they return to the breeding area the following season.

The percentage of young that successfully leave the nest can vary greatly – the average survival rate has been measured at 63%, but the maximum recorded is 86%. Studies show that sites with extensive areas of native vegetation have greater breeding success than sites that have been extensively cleared. When feeding and nesting sites are more than 12km apart, the parents take longer to find and gather food for the nestlings and as a result the young birds often die or fledge underweight. A population of Carnaby's Cockatoos studied in the 1970s ceased breeding at one site after the gradual loss of three quarters of native vegetation in the area.

The annual survival rate of adult Carnaby's Cockatoos is 61 to 69%. In contrast, after fledging, only 15% of juveniles are thought to reach one year of age. Females do not begin breeding until they are four or five years of age and the average age of breeding birds is estimated at 15 years.

Hollow Availability

At present there are sufficient eucalypts capable of providing hollows for cockatoos in the wheatbelt. However, few new trees have grown there for over 50 years due to grazing by livestock and rabbits and many of those that remain are dead or dying. Establishment of new trees is urgently needed in reserves and shelter belts so that future generations of cockatoos have hollows in which to breed.

Behaviour

Carnaby's Cockatoo occurs in pairs or small flocks during the breeding season and adults display strong pair bonds throughout their lives. After fledging, the young move with their parents to post-breeding feeding areas where they are joined by other family groups. The birds can collect together into flocks of 30 to 2000 individuals. During the non-breeding season, in some areas, Carnaby's Cockatoo forages locally in heathland reasonably close to breeding areas. Other populations move towards the coast and exploit areas like heathlands and pine plantations, where food is concentrated.

Damage

Carnaby's Cockatoo has been recorded damaging persimmon, almond, pecan and pistachio nut crops. They also damage the shoots of trees in orchards.

Status

Carnaby's Cockatoo is a protected native species under provisions of the *Wildlife Conservation Act 1950* and is listed as 'rare or likely to become extinct'. *It is illegal to destroy these birds and offenders will be subject to prosecution.*

This cockatoo is considered rare and endangered because it has undergone a major decline in range and present estimates put the total population at between 11,000 and 60,000 birds. A Recovery Plan for the species has been formulated and its success depends largely on community involvement. The

plan seeks to promote the maintenance of significant breeding areas adjacent to feeding areas. Landholders can assist by protecting existing nest trees and promoting the establishment of new ones by excluding livestock and rabbits. These activities can often have added benefits to farmers in reducing salinity and increasing productivity.

Further Reading

- Fauna Note 02/2005. Scaring and Repelling Birds to Reduce Damage. CALM, Western Australia.
- Fauna Note 03/2005. Netting to Reduce Bird Damage. CALM, Western Australia.
- Farmnote 125/2000 Parrots and cockatoos in orchards. Department of Agriculture, Western Australia.
- Orchards and Cockatoos. Water Corporation of Western Australia.
- Carnaby's Cockatoo, Western Australian Museum.
- Carnaby's Cockatoo Recovery Project, Birds Australia WA.

References

Cale, B. (1999). Carnaby's Cockatoo *Calyptorhynchus latirostris* Recovery Plan 2000-2009. Department of Conservation and Land Management, Western Australia.

Johnstone, R. E. and Storr, G. M. (1998). Handbook of Western Australian Birds. Volume 1. Non-passerines. WA Museum.

Mawson, P. R. (1995). Observations of nectar feeding by Carnaby's cockatoo *Calyptorhynchus latirostris*. *West. Aust. Nat.* 20: 93-96.

Saunders, D. A. (1980). Food and movements of the short-billed form of the white-tailed black cockatoo. *Aust. Wildl. Res.* 7: 257-269.

Saunders, D. A. (1982). The breeding behaviour and biology of the short-billed form of the white-tailed black cockatoo *Calyptorhynchus funereus*. *Ibis* 124: 422-455.

Saunders, D. A. and Ingram, J. A. (1987). Factors affecting survival of breeding populations of Carnaby's cockatoo *Calyptorhynchus funereus latirostris* in remnants of native vegetation. In 'Nature Conservation: The Role of Remnants of Native Vegetation. (Eds. Saunders, D. A., Arnold, G. W., Burbidge, A. A. and Hopkins, A. J. M.) Surrey Beatty and Sons, Chipping Norton

Saunders, D. A. and Ingram, J. A. (1998). Twenty-eight years of monitoring a breeding population of Carnaby's cockatoo. *Pac. Cons. Biol.* 4: 261-270.

Saunders, D. A., Rowley, I., and Smith, G. T. (1985). The effects of clearing for agriculture on the distribution of cockatoos in the southwest of Western Australia. In 'Birds of Eucalypt Forests and Woodlands: Ecology, Conservation, Management.' (Eds. Keast, A., Ford, H. and Saunders, D.) RAOU and Surrey Beatty and Sons, NSW.

Further Information

Contact your local office of the Department of Conservation and Land Management.

See the Department's website for the latest information:

www.naturebase.com.au

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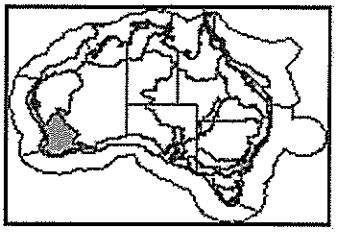
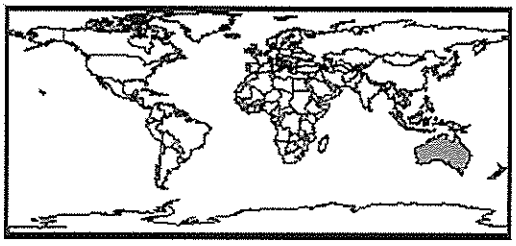
DEPARTMENT OF Conservation AND LAND MANAGEMENT Conserving the nature of WA

No illustration available for *Hylaeus* (*Sphaerhylaeus*) *globuliferus* (Cockerell, 1929)



Distribution by Drainage Basin, States and Marine areas. The States bordering these marine areas may also be highlighted.



Distribution by Geographic Region. Some countries, e.g. China, Indonesia and Mexico, span two Regions.

Hylaeus (*Sphaerhylaeus*) *globuliferus* (Cockerell, 1929)

Contents

Return to Checklist

Taxonomic Placement

- SUPERFAMILY
  - APOIDEA
    - ANTHOPHILA
      - COLLETIDAE
        - HYLAEINAE

Taxonomy: Available Names and Associated Data

Gnathoprosopis (Sphaerhylaeus) globulifera Cockerell, T.D.A. (1929). Bees in the Australian Museum collection. *Rec. Aust. Mus.* **17**: 199-243 [218].
Type data: holotype AM K48307 ♂.
Type locality: King George Sound, WA.

Distribution

Australian Region-Australia: Western Australia (SW coastal)

Ecology

Adult-mellivore, volant
Males territorial, perched on growing tips of *Adenanthos* Labill. [Proteaceae], *Banksia* L.f. [Proteaceae], or *Jacksonia* Smith [Fabaceae]; flower visiting record: *Grevillea* R.Br. ex J. Knight [Proteaceae]

Reference(s)

Houston, T.F. (1981). A revision of the Australian hylaeine bees (Hymenoptera: Colletidae). II. *Aust. J. Zool. Suppl. Ser.* **80**: 1-128 (redescription)

Alcock, J. & Houston, T.F. (1996). Mating systems and male size in Australian hylaeine bees (Hymenoptera: Colletidae). *Ethology* **102**(7): 591-610 [598] (biology)

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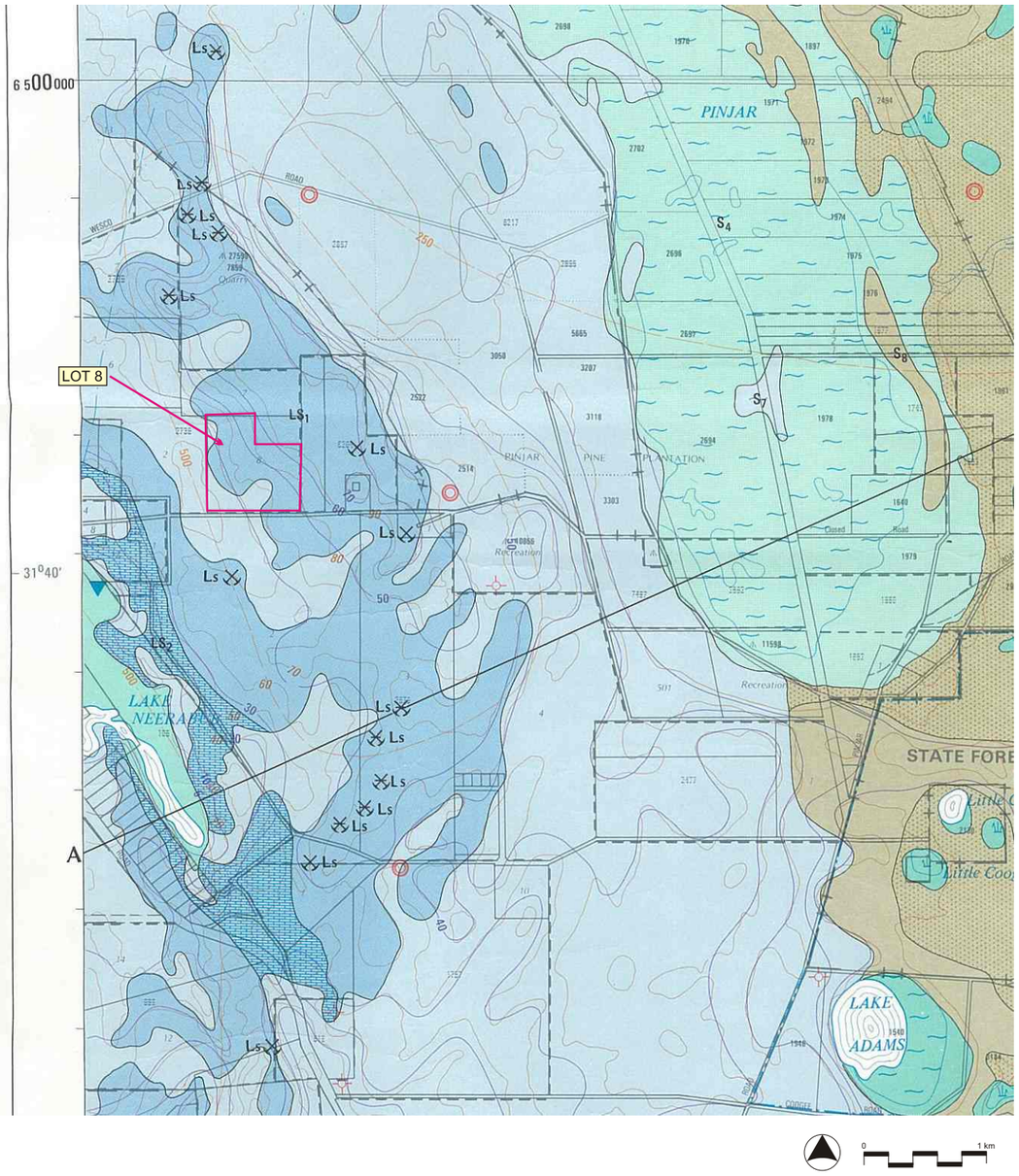
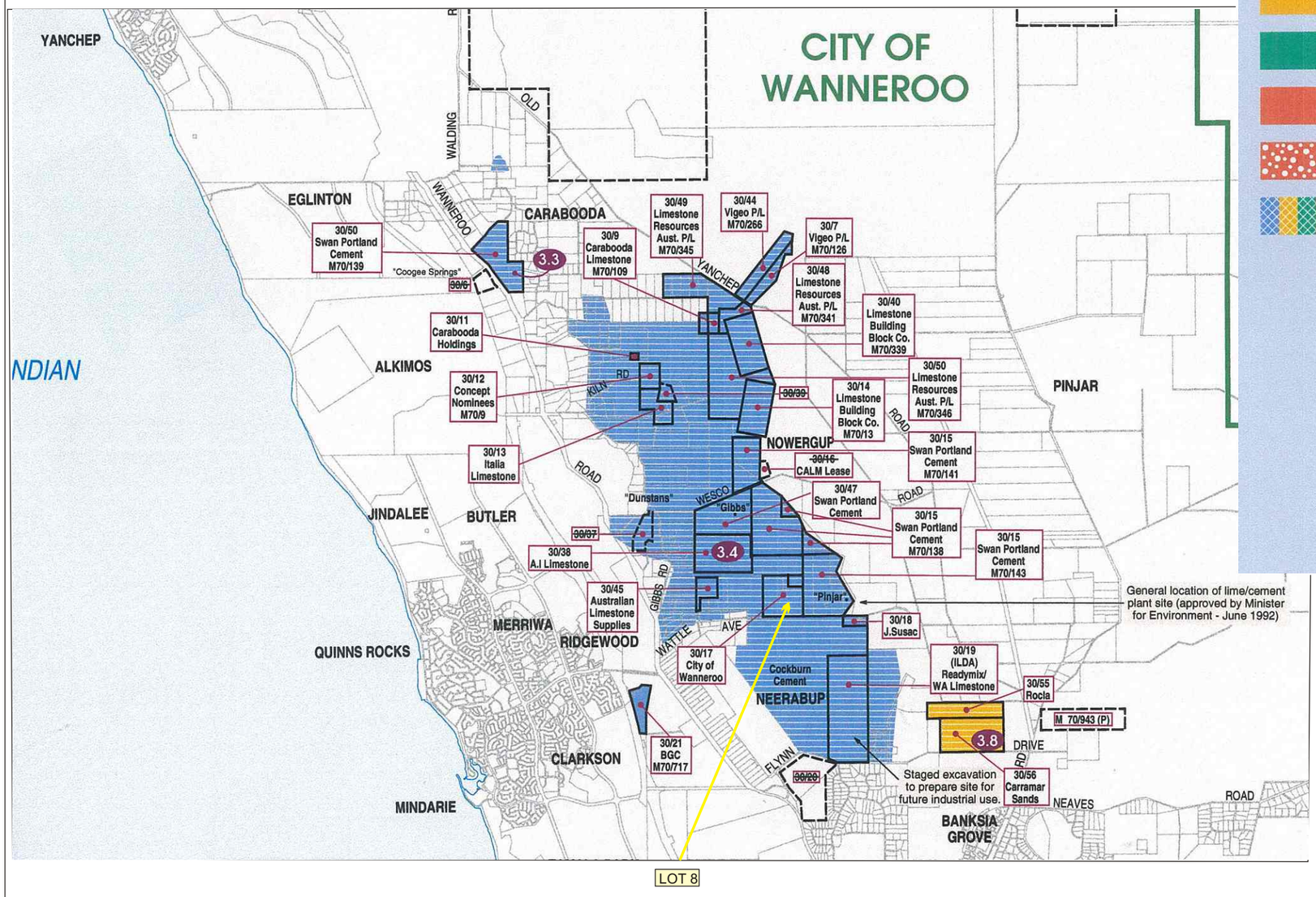


GENERAL FEATURES

Map Unit 1			Description	Equivalent units on geological maps	4Relief;Slope5	Rock-mineral Resources
	Unconsolidated Material 2	Rock 2				
HOLOCENE	Cps		PEATY CLAY dark grey and black 3 with variable sand content, of lacustrine origin	Swamp deposits (Qhw)	20 – 60 m;F	Peat, diatomite
	Sp		PEATY SAND – greyish brown medium-grained, quartz, moderately well sorted, variable organic content, of lacustrine origin		20 – 25 m ; F	Sand, diatomite
	S_4		SAND – greyish brown, medium to coarse-grained, quartz, variable silt content, moderately well sorted, of lacustrine origin		45 m;F	Sand
	Kb		COBBLES with BOULDERS – mostly granite and dolerite with occasional schist, occurs as thin deposit along river bed, alluvial origin, well rounded, poorly sorted	Alluvium (Qa)	25 – 30 m;F	Crushed gravel
	Ms_1		SANDY SILT – brownish yellow, firm silt matrix with angular to sub-rounded quartz sand disseminated throughout, dispersive in places, alluvial origin		80 – 150 m;F	
	Msg		SANDY SILT – strong brown, firm, friable, dispersive in part, occasional pebbly horizons with little matrix containing quartzite, quartz, granite, laterite, of colluvial origin	Colluvium (Qc)	40 – 80 m;G	Used in brick manufacture to impart body
	S_5		SAND – very pale brown, medium to coarse-grained, well sorted, little fines, sub-angular to rounded quartz and feldspar, of colluvial origin		40 – 80 m;G	Potential for use in construction purposes
	S_6		SAND – light grey, fine to coarse, angular to sub-rounded, quartz with some feldspar, moderately sorted, loose, of colluvial origin	Colluvial sands (Qs)	65 – 200 m;F–G	Potential for use in construction purposes
	S_7		SAND – pale and olive yellow, medium to coarse-grained, sub-angular quartz and a trace of feldspar, moderately sorted, of residual origin.	Sand derived from Tamala Limestone (Qts)	20 – 80 m;G	Specification sand
		LS_1	LIMESTONE – light yellowish brown, fine to coarse-grained, sub-angular to well rounded, quartz, a trace of feldspar, shell debris, variably lithified, surface kankar of eolian origin.	Tamala Limestone (Qtl)	20 – 95 m; F–G	Dimension stone, metallurgical, agricultural and construction grade limestone
		LS_2	LIMESTONE – as LS_1 abundant karstic phenomena, including caves, swallows, dolines		20 – 40 m; G–M	As LS_1
		LS_3	LIMESTONE – white fine-grained, in places algal laminated, some kankar development, of alluvial origin	Muchea Limestone(Qpm)	35 – 50 m;F	Construction and agricultural limestone
PLEISTOCENE	S_8		SAND – very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted, of eolian origin	Bassendean Sand (Qpb)	50 – 110 m;F–G	Construction and glass sand
	S_9		SAND– yellowish brown, medium to coarse-grained, angular to sub-rounded, quartz, some fine grained pisolitic laterite, little fines, of lacustrine origin	Lagoonal deposits (Qpw)	70 – 75 m;F	Construction sand
	S_{10}		SAND over PEBBLY SILT – sand as S_8 overlying Mgs_1 gravelly silt	Thin Bassendean Sand over Guildford Formation (Qpb/Qpa)	35 – 70 m;F	Construction and glass sand
	G_1		GRAVEL – dark reddish brown, ferruginous, pisolitic, occasionally cemented, of alluvial origin		30 m;F	Gravel
	Mgs_1		PEBBLY SILT – strong brown, silt with common fine to occasionally coarse grained, sub-rounded laterite, quartz, heavily weathered granite pebbles, some fine to medium-grained quartz sand, of alluvial origin	Guildford Formation (Qpa)	20 – 60 m;F	Plastic clays for brick, pipe and tile manufacture
	S_{11}		SAND – light grey, medium grained, sub-angular to rounded quartz and feldspar, moderately sorted		15 – 50 m;F	Construction sand
	S_{12}		SAND – yellow, fine to medium-grained sub-angular to rounded quartz with some feldspar, well sorted, of ? marine origin	Yoganup Formation (Qpr)	30 – 45 m;G	
		SS	SANDSTONE – light grey, hard, compact, moderately weathered, fine grained silty sandstone, lateritisation has affected the rock in places	Ridge Hill Sandstone (Qph)	50 – 85 m;G	
		LA_1	LATERITE – massive and cemented occasionally vesicular; up to 4 m in thickness, overlain by a ferruginous gravel set in a clay-sand matrix of residual origin	Laterite (Ql)	100 – 270 m;F–G	

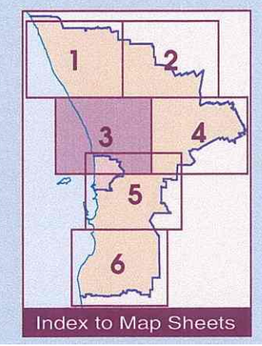
OAKFORD LAND COMPANY	
PROPOSED LIMESTONE AND SAND QUARRY LOT 8, WATTLE AVENUE, NOWERGUP	
GEOLOGY	
Geol Survey 1 : 50 000 Muchea Environmetal Series 1982	Scale 1 : 50 000 at A3

Figure 1



LEGEND

- Limestone / Limesand Resource
- Sand Resource
- Clay Resource
- Rock Resource
- Gravel Resource
- **Key Extraction Area**
  Extraction sites of regional significance.
  Key extraction areas are considered to be:
  - essential to the needs of the region.
  - of a long term nature.
  - strategically located in relation to transport links and manufacturing plant.
- **Priority Resource Location**
  Known areas of high resource potential which should be held available for current and future extraction
- **Extraction Area**
  Areas of existing extractive industry operation
- 27/5 — WAPC Reference No.
- ~~27/5~~ — Tenement expired
- M70/89 P70/81 — DMPR Reference No.
- (P) — Pending
- Work Processing Plant
- Local Government Boundary
- Metropolitan Region Boundary
- Policy Area Boundary



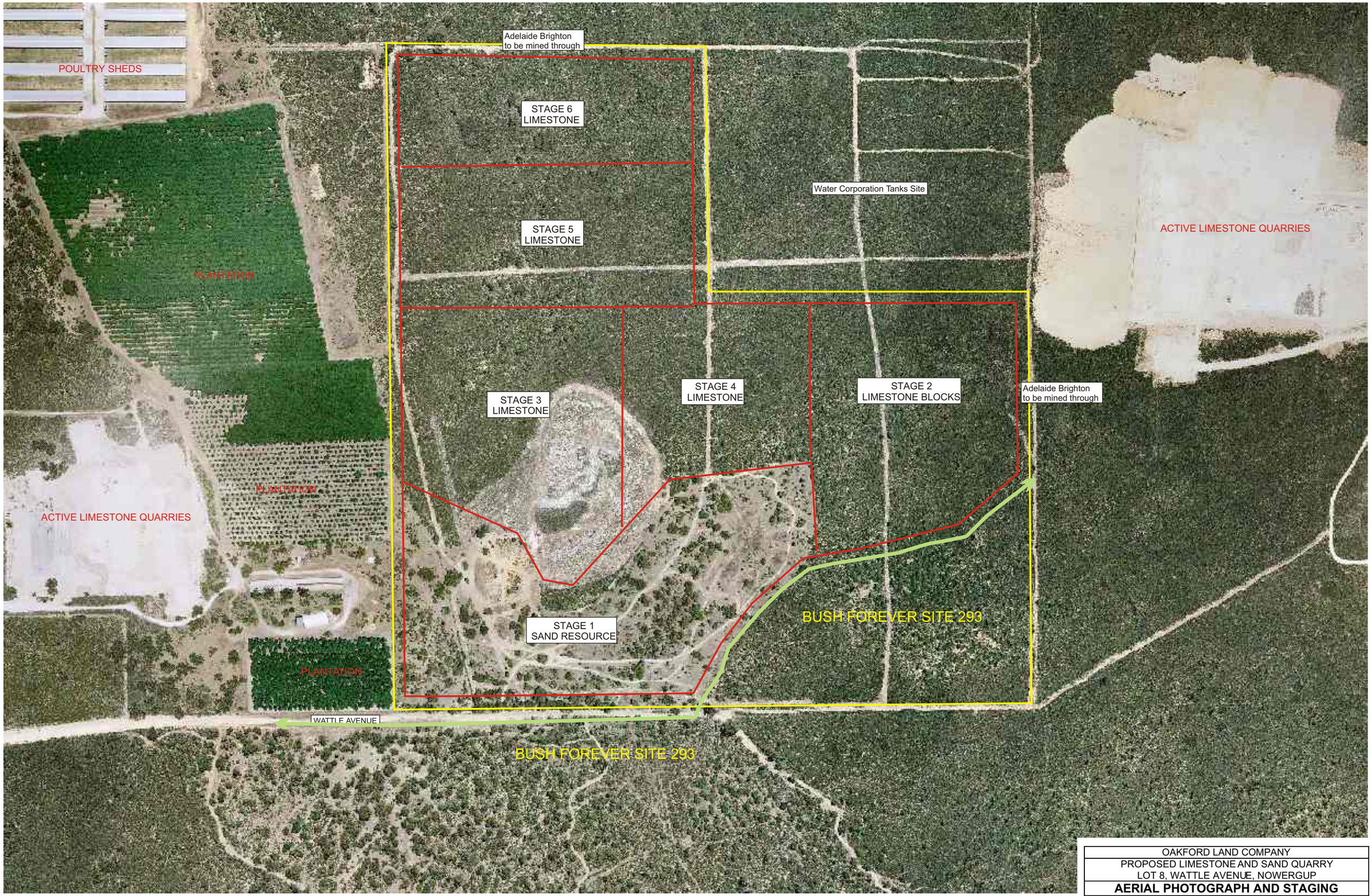
OAKFORD LAND COMPANY	
PROPOSED LIMESTONE AND SAND QUARRY LOT 8, WATTLE AVENUE, NOWERGUP	
BASIC RAW MATERIALS POLICY	
Statement of Planning Policy 2.4, Basic Raw Materials	Scale 1 100 000 at A3

Figure 2

0 350m

Figure 3

OAKFORD LAND COMPANY	
PROPOSED LIMESTONE AND SAND QUARRY LOT 8, WATTLE AVENUE, NOWERGUP	
SURROUNDING LAND USES	
Basemap LANDGATE December 2006	Scale 1 : 17 500 at A3
Landform Research	March 2007



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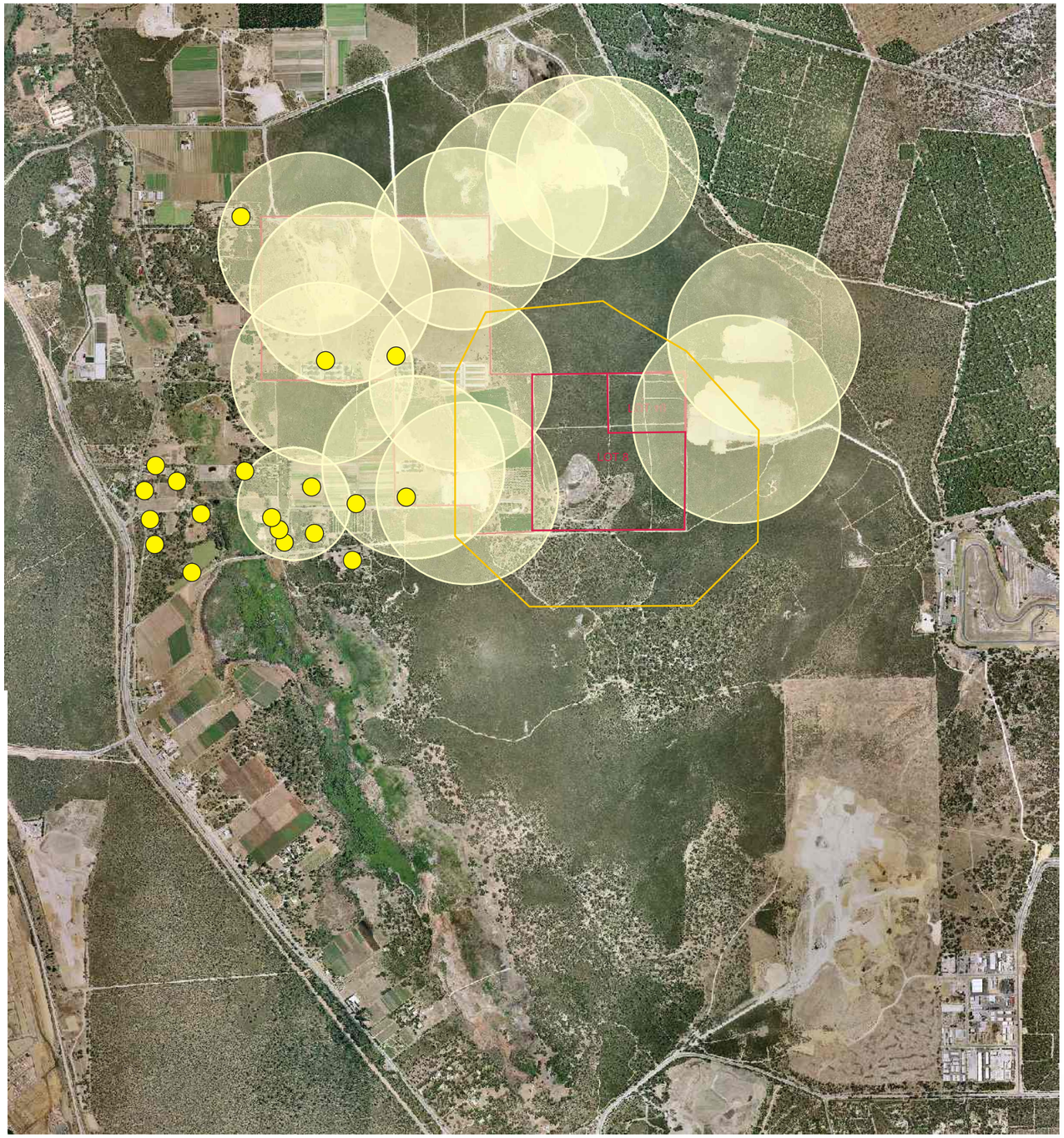
PROPOSED LIMESTONE AND SAND QUARRY LOT 8, WATTLE AVENUE, NOWERGUP	
AERIAL PHOTOGRAPH AND STAGING	
Basemap LANDGATE December 2006	Scale 1 : 4 000 at A3
Landform Research	March 2007

0 80 m

Figure 4



500 metre buffer to existing quarry, and poultry sheds
250 metre buffer to existing market garden

Existing dwelling

Lot 8

500 metre buffer to Lot 8

NOTE No dwelling exists within the 500 metre buffer to Lot 8 and all nearby dwellings are closer to the buffers of other sensitive land uses.

0 500m

OAKFORD LAND COMPANY	
PROPOSED LIMESTONE AND SAND QUARRY LOT 8, WATTLE AVENUE, NOWERGUP	
BUFFERS AND EXISTING LAND USES	
Basemap LANDGATE December 2006	Scale 1 : 25 000 at A3
Landform Research	March 2007

Figure 5

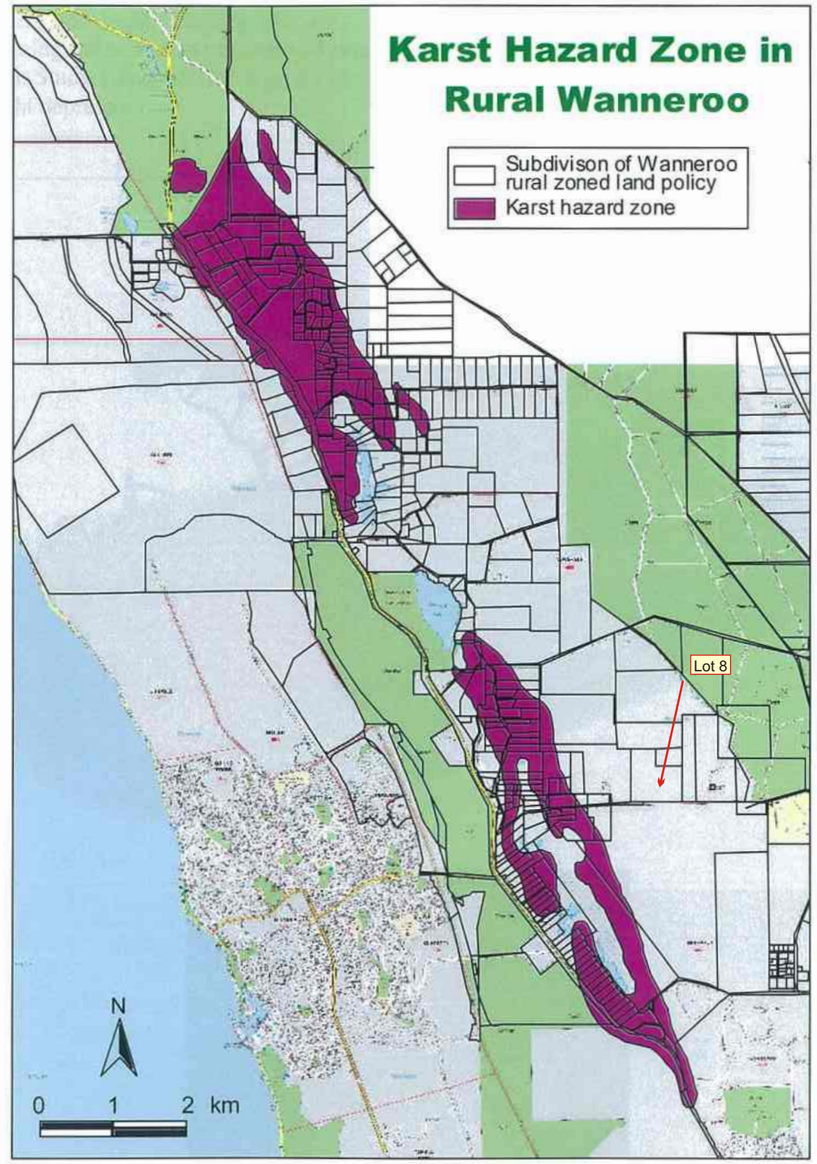


Figure 3.1 Karst Hazard Zone in rural Wanneroo. (Mapped by Lex Bastian).

OAKFORD LAND COMPANY
PROPOSED LIMESTONE AND SAND QUARRY LOT 8, WATTLE AVENUE, NOWERGUP
KARST RISK

Figure 6

View west towards the limestone quarry to the west

View north west to poultry sheds and plantation

Old sand pit in the south east

Cleared area in the south

Vegetation on the limestone

Old sand - limestone pit in the south

View towards cleared area in the south west

Vegetation on sand and limestone pinnacles

Figure 7

OAKFORD LAND COMPANY	
PROPOSED LIMESTONE AND SAND QUARRY LOT 8, WATTLE AVENUE, NOWERGUP	
SITE PHOTOGRAPHS	
Landform Research	March 2007

RESOURCE PREPARATION

Limestone is ripped and pushed into a resource dump by a bull dozer. Operating behind dumps and on floor of pit to provide visual screening and noise suppression.

Loader takes resource from dump to load the crusher. Loader operates on floor of pit, behind dumps, to reduce dust and noise.

Overburden pushed into dumps for later use in rehabilitation. The dumps assist dust and noise mitigation.

Topsoil pushed into low dumps for use in rehabilitation.

Bund pushed to assist with visual and noise screening

Limestone block cutting floor

PROCESSING

Electric primary and secondary crushers powered by self contained diesel generator.
Operating plant is located on the floor of the pit to provide noise and dust screening.

Product is loaded from stockpiles to road trucks. Road traffic is isolated from excavation for safety and to minimise risk of dieback introduction.

Stockpiles help noise screening.

Screening plant to obtain correct product size, which is placed on stockpiles.

Loader takes resource from dump to load the crusher

Sand excavation uses a loader taking sand directly from the face to the road truck similar to loading limestone.

LAND RESTORATION AND REHABILITATION

Overburden followed by topsoil is spread across surface to reform the soil with 1 plus metres of constructed soil over deep ripped limestone

Completed excavation floor is deep ripped in two directions.

Landform Research

Figure 8 TYPICAL LIMESTONE CRUSHING OPERATION - OAKFORD LAND COMPANY

EXISTING CONTOURS

Lot 8 Wattle Avenue
NOWERGUP

LEGEND

SITE BOUNDARY

Figure 9

6
7
10
2
8
21
VCL
5204
WATTLE AVE

0 50 100 200m

-	:	CLIENT
1:4,000@A3	:	SCALE
9 MARCH 2007	:	DATE
2919-5-003	:	PLAN No
-	:	REVISION
M.Z	:	PLANNER
M.H	:	DRAWN

Base data supplied by Landgate
Aerial Photography dated January 2006, accuracy +/- 4m,
Projection MGA50

Areas and dimensions shown are subject to final survey calculations. All carriageways are shown for illustrative purposes only and are subject to detailed engineering design.

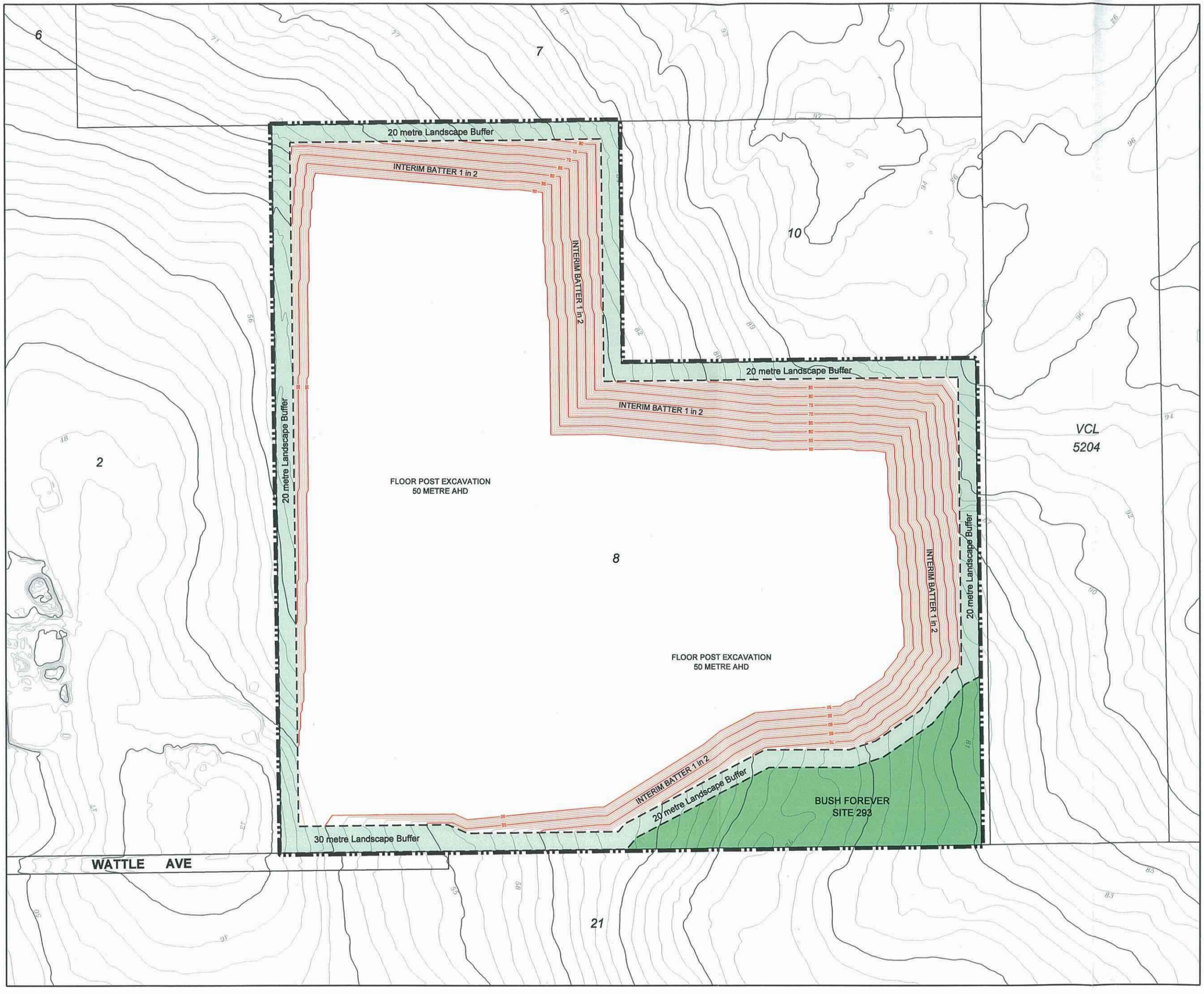
PLAN 1

koltasz smith
TOWN PLANNING · PROJECT MANAGEMENT
URBAN DESIGN · DEVELOPMENT CONSULTING

PERTH Tel. (08) 9486 2222 Email: perth@ksap.com.au

EXCAVATION DESIGN CONTOURS

Lot 8 Wattle Avenue
NOWERGUP



LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS
- PROPOSED CONTOURS
- LANDSCAPE BUFFER
- RESERVED BUSH FOREVER SITE

Figure 10

0 50 100 200m

-	:	CLIENT
1:4,000@A3	:	SCALE
9 MARCH 2007	:	DATE
2919-5-004	:	PLAN No
-	:	REVISION
M.Z	:	PLANNER
M.H	:	DRAWN

Base data supplied by Landgate
Aerial Photography dated January 2006, accuracy +/- 4m,
Projection MGA50

Areas and dimensions shown are subject to final survey calculations. All carriageways are shown for illustrative purposes only and are subject to detailed engineering design.

PLAN 2

koltasz smith
TOWN PLANNING · PROJECT MANAGEMENT
URBAN DESIGN · DEVELOPMENT CONSULTING

PERTH Tel. (08) 9486 2222 Email: perth@ksap.com.au

APPENDIX K

Part V Licence

Government of **Western Australia**
Department of **Environment and Conservation**

Your ref: L8605/2011/1
Our ref: 2011/008790
Enquiries: Luke Claessen
Phone: 08 9333 7510
Fax: 08 9333 7550
Email: Luke.claessen@dec.wa.gov.au

Mr Stephen Elliot
Urban Resources Pty Ltd
PO Box 739
COMO WA 6952

Dear Mr Elliot

Environmental Protection Act 1986
Licence L8605/2011/1
Occupier: Urban Resources Pty Ltd
Premises: Part of Lot 8 on Diagram 53380, 259 Wattle Avenue, Nowergup

You are hereby advised that a licence under the *Environmental Protection Act 1986* (the Act) has been granted for the above premises. The Department of Environment and Conservation will advertise the issuing of this licence in the public notices section of The West Australian newspaper.

The licence is subject to the attached conditions. Under section 58 of the Act, it is an offence to contravene a licence condition. This offence carries a penalty of up to $125,000, with a daily penalty of up to $25,000.

In accordance with section 102(1)(c) of the Act, you are afforded 21 days to appeal the conditions of the licence. Under section 102(3)(a) of the Act, any other person may also appeal the conditions of the licence.

To make an appeal or check if any appeals have been made, contact the Office of the Appeals Convenor on 6467 5190. Please direct all other inquiries to the Licensing Officer above.

Yours sincerely,

Carissa Aitken
Sector Manager, Resource Industries

Friday, 17 February 2012

enc: Environmental Protection Act 1986 Licence 8605/2011/1
copy to: Local Government Authority: City of Wanneroo

Department of
Environment and Conservation
Our environment, our future

Licence

Environmental Protection Act 1986, Part V

Licensee: **URBAN RESOURCES PTY LTD**

Licence: **L8605/2011/1**

Registered office:	4/127 Melville Parade COMO WA 6152
ABN:	47 121 043 034
Premises Address:	Urban Resources Pty Ltd, Limestone Quarry, 259 Wattle Avenue NOWERGUP WA 6032
Licence Period:	5 years
Commencement Date:	Friday 17 February 2012
Expiry Date:	Thursday 16 February 2017

.....

Officer delegated under Section 20
of the *Environmental Protection Act 1986*

Issue Date: Friday 17 February 2012

Contents

Introduction

This Introduction is not part of the Licence.

Premises Description and Licence Summary

Urban Resources Pty Ltd is the operator of the existing limestone quarry operation at Lot 8, 259 Wattle Avenue, Nowergup, under lease agreement with the landowner, Oakford Land Company Pty Ltd. Lot 8 is located within the City of Wanneroo Rural Resource zone.

To the west of the premises is a market garden and quarry activities, the south is vacant but zoned General Industrial, to the east is quarrying operations and a Bush Forever site and to the north east, a Water Corporation reserve. The closest sensitive receptor is a residential dwelling located approximately 650 metres west of the quarry site.

The main potential emissions are expected to be dust and noise from the crushing and screening operations. The site will be operated in accordance with a dust management plan to minimise the generation of dust. Noise modelling has demonstrated that there will be negligible effects to surrounding sensitive receptors. The siting of stockpiles between the noise source and the sensitive receptor will reduce noise emissions further.

This Licence is for the operation of a new facility established under works approval W4987/2011/1.

The Licence is issued under *Environmental Protection Act 1986* as the following categories from the Environmental Protection Regulations 1987 cause this Premises to be a prescribed premises for the purposes of the Act:

Categories Log		
Category number	**Description of category**	**Premises assessment capacity**
12	Screening etc. of material: premises (other than premises within category 5 or 8) on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated.	200 000 tonnes per year

Instrument Log		
Instrument	**Issued**	**Description**
W4987/2011/1	18/08/2011	Works Approval
L8605/2011/1	16/02/2012	New Licence

Severance

It is the intent of these Licence conditions that they shall operate so that, if a condition or a part of a condition is beyond the power of this Licence to impose, or is otherwise *ultra vires* or invalid, that condition or part of a condition shall be severed and the remainder of these conditions shall nevertheless be valid to the extent that they are within the power of this Licence to impose and are not otherwise *ultra vires* or invalid.

END OF INTRODUCTION

Licence Conditions

1 General

1.1 Interpretation

1.1.1 In the Licence, definitions from the Act apply unless the contrary intention appears.

1.1.2 In the Licence, unless the contrary intention appears:

"the Act" means the *Environmental Protection Act 1986;*

"annual" means the period from 1 January to 31 December in that year;

"Code of Practice for the Storage and handling of dangerous goods" means the Storage and handling of dangerous goods, Code of Practice, Dept of Mines and Petroleum, Government of Western Australia;

"contact address" for the purpose of correspondence and advice means:
Regional Leader, Industry Regulation
Department of Environment and Conservation
Locked Bag 104
BENTLEY DELIVERY CENTRE WA 6983
Telephone: (08) 9333 7510
Facsimile: (08) 9333 7550

"dangerous goods" has the meaning defined in the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007;

"Director" means Director, Environmental Regulation Division of the Department of Environment and Conservation for and on behalf of the Chief Executive Officer as delegated under Section 20 of the *Environmental Protection Act 1986;*

"environmentally hazardous material" means material (either solid or liquid raw materials, materials in the process of manufacture, manufactured products, products used in the manufacturing process, by-products and waste) which if discharged into the environment from or within the premises may cause pollution or environmental harm;

"fugitive emissions" means all emissions not arising from point sources;

"Licence" means this licence numbered **L8605/2011/1** and issued under the *Environmental Protection Act 1986;*

"Licensee" means the person or organisation named as Licensee on page i of the Licence;

"placard quantity" has the meaning defined in the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007;

"Premises" is as defined by Condition 1.2.3 of the Licence;

1.1.3 Any reference to an Australian or other standard in the Licence means the relevant parts of the current version of that standard.

1.2 General conditions

1.2.1 Nothing in this Licence shall be taken to authorise any emission that is not mentioned in this licence, where the emission amounts to:
(a) pollution;
(b) unreasonable emission;
(c) discharge of waste in circumstances likely to cause pollution; or
(d) being contrary to any written law.

1.2.2 The Licensee shall provide to the Director prior written notice of any works it intends to undertake on the Premises that may:
(a) cause any emission;
(b) alter the volume, nature, location or source of any emission;
(c) alter the method of detecting, monitoring or measuring any emission; or
(d) involve the installation, alteration or replacement of any emission causing process equipment or industrial plant.

1.2.3 The Premises is the area defined in the Premises Map in Schedule 1 and a summary is given in Table 1.2.1.

Table 1.2.1: Premises location & description

Location	Premises definition	All or part	Record of cadastral definition
259 Wattle Avenue, Nowergup	Lot 8	Part	Diagram 53380

1.2.4 The Licensee shall maintain all pollution control and monitoring equipment to the manufacturer's specification and any internal management system.

1.2.5 The Licensee shall, except where storage is prescribed in section 1.3, only store more than 250 kg or 250 litres of any substance that is classed as dangerous goods below placard quantities or environmentally hazardous materials not classified as dangerous goods if:
(a) they are stored in accordance with the Code of Practice for the Storage and handling of dangerous goods; and
(b) if secondary containment is required by 1.2.5(a), it is constructed and maintained to:
(i) contain not less than 110% of the volume of the largest storage vessel or inter-connected system; and
(ii) contain at least 25% of the total volume of vessels stored in the compound; and
(iii) have a low permeability (10^{-9} m/s or less).

1.2.6 The Licensee shall immediately recover, or remove and dispose of spills or leaks of environmentally hazardous materials outside its storage vessel.

Stormwater control

1.2.7 The Licensee shall ensure that uncontaminated stormwater is kept separate from contaminated or potentially contaminated stormwater. Where stormwater has come into contact with possible sources of contamination it should be treated as contaminated.

1.3 Premises operation

There are no specified conditions relating to premise operation in this section.

2 Emissions

2.1 General

2.1.1 The Licensee shall record and investigate the exceedance of any limit and/or target in this section.

2.2-2.5 Emissions to air, water, land and groundwater

There are no specified or general conditions relating to emissions to air, surface waters, land or groundwater in these sections.

2.6 Fugitive emissions

2.6.1 The Licensee shall ensure that no visible dust generated by the activities of the Premises crosses the boundary of the Premises.

2.6.2 The Licensee shall implement the Dust Management Plan and additional dust control measures detailed in section 4.2 and Appendix 6 of the document titled 'Application for Works Approval, Limestone Crushing and Screening Premises, Lot 8, Wattle Avenue, Nowergup, RPS, 2011'.

2.7-2.8 Odour and environmental quality

There are no specified conditions relating to odour and environmental quality in these sections.

2.9 Noise

2.9.1 The Licensee shall ensure that stockpiles of processed material are positioned within 20 metres of the crushing and screening plant and between the plant and the nearest noise sensitive receptor identified in the Noise Impact Assessment prepared by Lloyd George Acoustics Pty Ltd and dated 26 May 2011.

3 Monitoring

There are no specified conditions relating to monitoring in this section.

4 Improvements

4.1 Improvement Programme

There are no specified conditions relating to improvements in this section.

5 Information

5.1 Records

5.1.1 All information and records required by the Licence shall:
- (a) be legible;
- (b) if amended, be amended in such a way that the original and subsequent amendments remain legible or are capable of retrieval;
- (c) except for records listed in 5.1.1(d) be retained for at least 6 years from the date the records were made or until the expiry of the Licence or any subsequent licence; and
- (d) for those following records, be retained until the expiry of the Licence or any subsequent licence:
  - (i) off-site environmental effects; or
  - (ii) matters which affect condition of the land or groundwater.

5.1.2 The Licensee shall ensure that:
- (a) any person left in charge of the Premises is aware of the conditions of this Licence and has access at all times to this Licence or copies thereof; and
- (b) any person who performs tasks on the Premises is informed of all of the conditions of this Licence that relate to the tasks which that person is performing.

5.1.3 The Licensee shall complete an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the conditions of the Licence, and any previous licence issued under Part V of the Act for the Premises for the previous year.

5.1.4 The Licence shall implement a complaints management system that as a minimum records the number and details of complaints received concerning the environmental impact of the activities undertaken at the Premises and any action taken in response to the complaint.

5.2 Reporting

5.2.1 The Licensee shall submit to the Director at the Contact Address an annual environmental report within 28 calendar days after of the end of the annual period. The report shall contain the information listed in Table 5.2.1 in the format or form specified in that table.

Table 5.2.1: Annual environmental report

Condition or Table (if relevant)	Parameter	Format or Form[1]
5.1.3	Compliance	AACR
5.1.4	Summary of any complaints	None specified

Note 1: Forms are in Schedule 2

5.3 Notification

5.3.1 Parameters listed in Table 5.3.1 shall be notified to the Director at the Contact Address and in accordance with the notification requirements of the table.

Table 5.3.1: Notification requirements

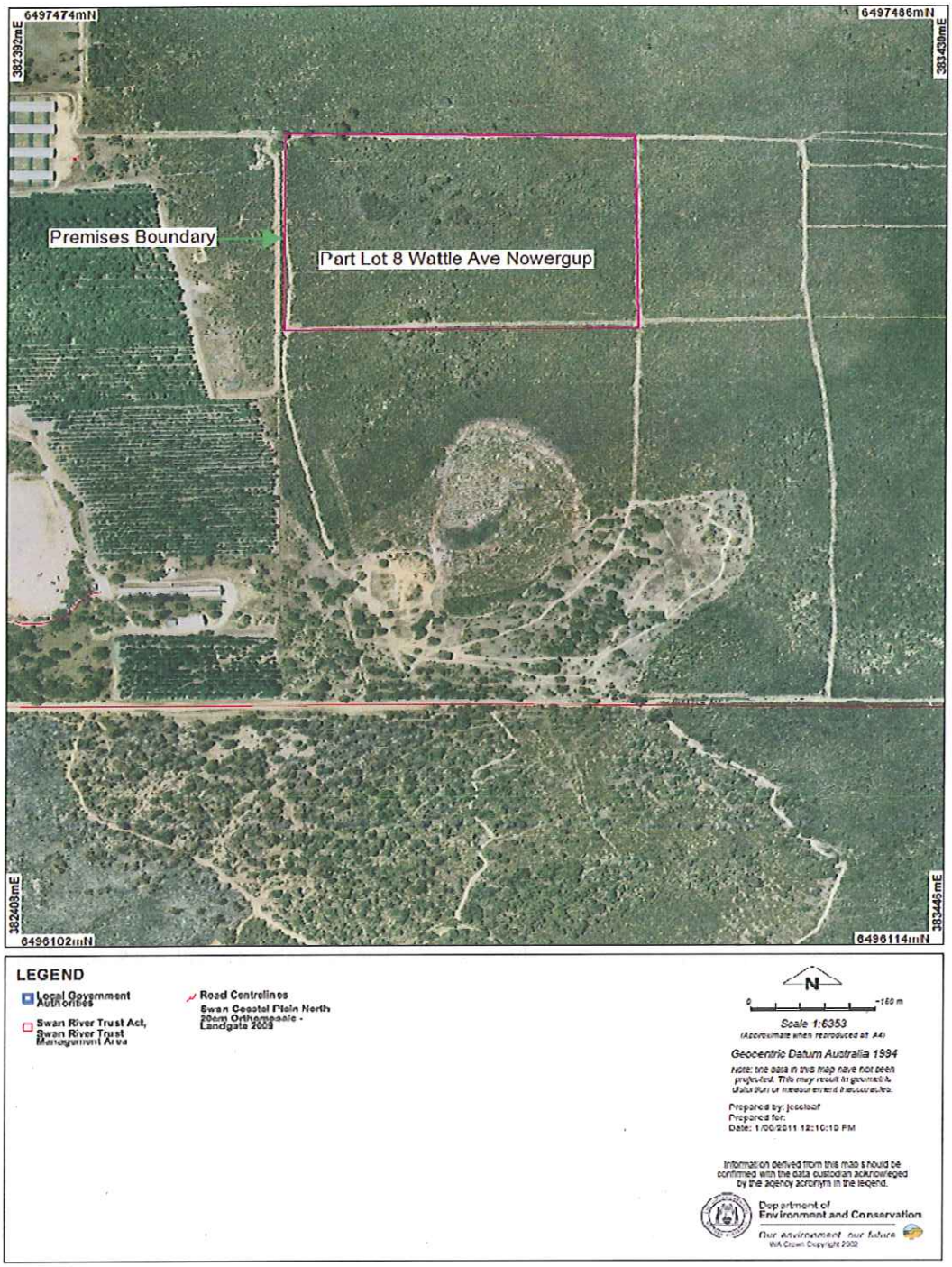
Condition or table (if relevant)	Parameter	Notification requirement[1]	Format or form[2]
1.2.4	Any failure or malfunction of any pollution control equipment or any incident which has caused, is causing or may cause pollution	Part A: As soon as practicable but no later than 5PM of the next usual working day. Part B: As soon as practicable	N1

Note 1: No notification requirement in the Licence shall negate the requirement to comply with s72 of the Act.
Note 2: Forms are in Schedule 2.

Schedule 1: Maps

Premises Map

The Premises is shown in the map below. The pink line defines the Premises boundary but it is also listed in Table 1.2.1. The definition in the map should prevail if any discrepancy exists.



Schedule 2: Reporting & Notification Forms

These forms are provided for the proponent to report monitoring and other data required by this licence. They can be requested in an electronic format.

The original monitoring reports must also be submitted.

Licence: **L8605/2011/1** Licensee: Urban Resources Pty Ltd
Form: AACR Period: yyyy
Name: Annual Audit Compliance Report

Annual Audit Compliance Report

Section A: Statement of compliance with licence conditions

Were all conditions of licence complied with within the reporting period?		
Yes	□	Initial Sections A & B, then proceed to Section C
No	□	Initial Section A, then proceed to Section B

Each page must be initialled by the person(s) who signs Section C of this annual audit compliance report (AACR).

Initial:

Section B: Details of non-compliance with licence condition

a) Licence condition not complied with?	
b) Date(s) and time(s) the non compliance occurred, if applicable?	
c) Was this non compliance reported to DEC?	
☐ Yes, and ☐ Reported to DEC verbally Date ☐ Reported to DEC in writing Date	☐ No
d) Has DEC taken, or finalised any action in relation to the non compliance?	
e) Summary of particulars of non compliance, and what was the environmental impact?	
f) If relevant, the precise location where the non compliance occurred (attach map or diagram)	
g) Cause of non compliance	
h) Action taken or that will be taken to mitigate any adverse effects of the non compliance	
i) Action taken or that will be taken to prevent recurrence of the non compliance	

Please use a separate page for each licence condition that was not complied with. Each page must be initialled by the person(s) who signs Section C of this AACR

Initial:

Section C: Signature and certification

This AACR may only be signed by a person(s) with legal authority to sign it as defined below. Please tick the box next to the category that describes how this AACR is being signed. If you are uncertain about who is entitled to sign or which category to tick, please contact the licensing officer for your premises.

If the licence holder is		The AACR must be signed and certified:
an individual	☐	by the individual licence holder, or
	☐	by a person approved in writing by the Chief Executive Officer (CEO) of DEC to sign on the Licensee's behalf.
a corporation	☐	by affixing the common seal of the Licensee in accordance with the Corporations Act 2001; or
	☐	by two directors of the Licensee; or
	☐	by a director and a company secretary of the Licensee, or
	☐	if the Licensee is a proprietary company that has a sole director who is also the sole company secretary – by that director, or
	☐	by the principal executive officer of the Licensee; or
	☐	by a person with authority to sign on the Licensee's behalf who is approved in writing by the CEO of DEC.
A public authority (other than a local government)	☐	by the principal executive officer of the Licensee; or
	☐	by a person with authority to sign on the Licensee's behalf who is approved in writing by the CEO of DEC.
a local government	☐	by the CEO of the Licensee; or
	☐	by affixing the seal of the local government.

It is an offence under section 112 of the *Environmental Protection Act 1986* for a person to give information on this form that to their knowledge is false or misleading in a material particular. There is a maximum penalty of $50,000 for an individual or body corporate.

I/We declare that the information in this AACR is correct and not false or misleading in a material particular.

Signature: _____

Name: (printed) _____

Position: _____

Date: _____/_____/_____

Seal (if signing under seal)

Signature: _____

Name: (printed) _____

Position: _____

Date: _____/_____/_____

Department of
Environment and Conservation
Our environment, our future

Licence:	**L8605/2011/1**	Licensee:	**URBAN RESOURCES PTY LTD**
Form:	N1	Date of breach:	dd/mm/yyyy

Notification of detection of the breach of a limit or any failure or malfunction of any pollution control equipment or any incident which has caused, is causing or may cause pollution.

These pages outline the information that the operator must provide.
Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

Part A

Licence Number	*L8605/2011/1*
Name of operator	*URBAN RESOURCES PTY LTD*
Location of Premises	
Time and date of the detection	

Notification requirements for the breach of a limit	
To be notified as soon as practicable and no later than 5PM of the next working day	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

Notification requirements for any failure or malfunction of any pollution control equipment or any incident which has caused, is causing or may cause pollution	
To be notified as soon as practicable and no later than 5PM of the next working day	
Date and time of event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken , or intended to be taken, to stop any emission	
Description of the failure or accident	

Part B - to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the installation in the preceding 24 months.	

Name	
Post	
Signature on behalf of **URBAN RESOURCES PTY LTD**	
Date	

Government of Western Australia
Department of Environment and Conservation

ENVIRONMENTAL ASSESSMENT REPORT

LICENCE NUMBER: L8605/2011/1
FILE NUMBER: 2011/008790
APPLICATION DATE: 9 September 2011
EXPIRY DATE: 15 December 2016

PREMISES DETAILS

WORKS APPROVAL HOLDER AND OCCUPIER
Urban Resources Pty Ltd
4/127 Melville Parade
COMO WA 6152
ABN: 47 121 043 034

PREMISES
Urban Resources Pty Ltd
Part of Lot 8 on Diagram 53380
259 Wattle Avenue
NOWERGUP WA 6032

PRESCRIBED PREMISES SUMMARY

Table 1: Prescribed Premises summary

Category number*	Category Description*	Category Production or Design Capacity*	Premises Production or Design Capacity#	Premises Fee Component**
12	Screening, etc. of material: premises (other than premises within category 5 or 8) on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated.	50 000 tonnes or more per year	200 000 tonnes per year	More than 100 000 but not more than 500 000 tonnes per year

* From Schedule 1 of the Environmental Protection Regulations 1987
# From application
** From Schedule 4 of the Environmental Protection Regulations 1987

This Environmental Assessment Report (EAR) has been drafted for the purposes of detailing information on the management and mitigation of emissions and discharges from the prescribed premises. The objective of the EAR is to provide a risk assessment of emissions and discharges, and information on the management of other activities occurring onsite which are not related to the control of emissions and discharges from the prescribed premises activity. This does not restrict the Department of Environment and Conservation (DEC) to assessing only those emissions and discharges generated from the activities that cause the premises to become prescribed premises.

Basis of Assessment

The Urban Resources Pty Ltd limestone crushing and screening premises has been assessed as a "prescribed premises" under category number 12, within Schedule 1 of the Environmental Protection Regulations 1987.

- Category 12: Screening, etc. of material: premises (other than premises within category 5 or 8) on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated.

Urban Resources Pty Ltd proposes to install mobile crushing and screening equipment at Lot 8 Wattle Avenue Nowergup for the crushing and screening of up to 200 000 tonnes of limestone extracted from the approved clearing permit area of lot 8 Wattle Avenue.

1.0 BACKGROUND

1.1 GENERAL COMPANY DESCRIPTION

Urban Resources Pty Ltd is a privately owned, local business. The company commenced trading in August 2006 and its main business is the mining of sand and limestone for use in the Perth metropolitan construction industry. Their products service a range of companies from large entities to distributors to the home building industry for sand products. Filling sand is also supplied to contracting companies in residential developments or directly to developers. Stephen Elliot is the sole Director of the company.

Urban Resources Pty Ltd is the operator of the existing quarry operation under lease agreement with the landowner, Oakford Land Company Pty Ltd.

1.2 LOCATION OF PREMISES

Lot 8 Wattle Avenue Nowergup is located within the City of Wanneroo Rural Resource zone. To the west of the premises, is a market garden and quarry activities, the south is vacant but zoned General Industrial, to the east is quarrying operations and a Bush Forever site and to the north east, a Water Corporation reserve.
The surface geology has been described as Tamala Limestone consisting of mainly calcarenite. The soil type in the area has been described as undulating dune landscape underlain by aeolianite, frequently exposed with small swales of estuarine deposits including siliceous sands, brown sands and leached sands in the wetter sites.

The premises is within the Nowergup groundwater subarea. The south west corner of lot 8 is within the Gnangara mound groundwater abstraction area, (500 metres from proposed prescribed activity and quarry activities).

Lot 8 is within the vicinity of aboriginal site of significance - Lake Nowergup.

The premises has been cleared of native vegetation and subsequently no fauna is expected to inhabit the premises.

The closest sensitive receptor is a residential dwelling located approximately 650 metres west of the quarry site.

Community concerns have been raised in this area. WA Limestone has proposed to clear native vegetation and construct a limestone quarry and concrete batching plant. Lime Industries is licensed as a lime manufacturing facility and received 106 submissions during their last licence re-issue application relating to planning, dust and noise issues on its existing site. This licence was not re-issued as it did hold the required approvals with the City of Wanneroo. This proposal is not anticipated to raise community concerns as it will be

conducting operations that are in accordance with the town planning scheme for the area. Lime manufacturing and concrete batching do not conform to the zoned usages.

The EPA does not have a recommended buffer distance for crushing and screening operations – it is assessed case-by-case. From the information received by the proponent they will be able to sufficiently manage emissions within the premises.

Potential environmental risks and mitigation methods as a result of crushing and screening have been addressed in Table 2.

1.3 PROPOSAL DESCRIPTION

Urban Resources Pty Ltd proposes to install portable crushing and screening plant for limestone products extracted at Lot 8 Wattle Avenue. Equipment will be located within the area defined within the boundary of operations map for Lot 8 Wattle Avenue.

The plant may also be relocated to a number of sites within and around the Perth metropolitan area. These other locations are not included in this works approval and will require a separate works approval and licence for each proposed site. The owner has not identified specific future potential sites of operation to date.

It is expected that the plant will be on-site for 162 days per year. This will mainly be from April to November. The City of Wanneroo Extractive Industries Licence limits quarrying operations to the following hours:

- 07:00 – 17:00 Monday to Friday (except Public Holidays)
- 07:30 – 17:00 Saturday
- No work permitted Sundays and Public Holidays.

The plant consists of the following items:

- Striker JM11-80 Jaw Crusher,
- Pegson 428 Impact Crusher,
- Finlay 694 Screening Plant,
- Striker 18M Stockpiling Conveyor.

The crushing and screening process is described as follows:

- Limestone raw feed (excavated from the quarry site) is fed into the feed hopper of the jaw crusher.
- The resulting product is fed to the screening plant where oversize materials are recycled through the Pegson impact crusher, then fed back over the screening plant.
- This product is then stockpiled via the conveyor and further manual stockpiling is carried out by the second front end loader.
- All material fed into the process is eventually ground to the required size, therefore no waste material is generated by the process.

Plant is diesel fuelled. Mobile fuel tankers are brought on-site as required, therefore no fuel will be stored on-site.

1.4 REGULATORY CONTEXT

1.4.1 Part V Environmental Protection Act 1986, Environmental Management

Oakford Land Company Pty Ltd was issued a Permit to Clear Native Vegetation under the *Environmental Protection Act 1986* on 30 September 2009. This permit allows the clearance of no more than 9.96 hectares of native vegetation within a specified area of Lot 8 Wattle Ave Nowergup. The duration of permit is from 30 December 2008 to 30 December 2013, permit number CPS 2807/2.

Urban Resources Pty Ltd previously held a licence for a mobile screening and crushing plant. The plants previous location was Lots 25 and 26 Moylan Rd Wattleup WA.

1.4.3 Other Decision Making Authorities' Legislation which applies

The Western Australian Planning Commission issued the owner of the premises– Oakford Land Company Pty Ltd conditional development approval on 16 June 2008 in relation to sand and limestone extraction at the premises.

The Department of Mines and Petroleum is responsible for Dangerous Goods legislation.

The Department of Commerce WorkSafe is responsible for Occupational Health and Safety legislation.

1.4.4 Rights in Water Irrigation Act 1914

The property owner does not hold a Groundwater Licence under the *Rights in Water Irrigation Act 1914* for abstraction bores. The premises is located within the Wanneroo Groundwater Area, where there is a requirement to obtain a groundwater licence for the abstraction of groundwater. Water required for dust suppression will be brought on-site via water cart.

1.4.5 Local Government Authority

The City of Wanneroo issued an Extractive Industries Licence and Development Approval for an Extractive Industry for the premises in 2008. The City of Wanneroo is responsible for managing town planning issues regulating issues that may arise from the quarrying activities.

The land area is zoned Rural Resource.

2.0 STAKEHOLDER AND COMMUNITY CONSULTATION

SUBMISSIONS RECEIVED DURING 21 DAY PUBLIC COMMENT PERIOD

The Application for Licence details for this facility was advertised in the West Australian newspaper on 11 July 2011 as a means of advising stakeholders and to seek public comments. No submissions were received.

3.0 EMISSIONS AND DISCHARGES RISK ASSESSMENT

DEC considers that conditions should focus on regulating emissions and discharges of significance. Where appropriate, emissions and discharges which are not significant should be managed and regulated by other legislative tools or management mechanisms.

The following section assesses the environmental risk of potential emissions from the Urban Resources crushing and screening operations. In order to determine the site's appropriate environmental regulation, an emissions and discharges risk assessment was conducted of Urban Resources using the environmental risk matrix outlined in Appendix B. The results of this are summarised in Table 2.

Table 2: Risk assessment and regulatory response summary table.

Risk factor	Significance of emissions	Socio-Political Context of Each Regulated Emission	Risk Assessment	DEC Regulation (EP Act - Part V)	EAR Reference	Other management (legislation, tools, agencies)
Dust emissions	Operation - 2. Dust will be controlled in accordance with the Site Dust Management Plan which forms part of the Limestone Excavation and Rehabilitation Management Plan. Dust will primarily be controlled by way of site watering and the application of hydro-mulch and gluon to stabilise exposed areas. Access roads will be treated with Dustex to minimise dust generated by vehicle/machinery movements. Any potential complaints will be managed by means of actively responding to complaints and registering complaints. The company has developed a Dust Incident Form which is used to gather all necessary information. There is potential for dust to become an issue if the Site Dust Management Plan is not adhered to.	Medium. Other limestone quarries in the area are subject to scrutiny from the public due to the Lake Nowergup Valley Community Groups interest in saving the lake system and native vegetation in Nowergup.	D= EIPs, other management mechanisms/licence conditions (monitoring/reporting)/other regulatory tools	WA – No conditions LIC – Conditions required to ensure dust does not cross the premises boundary.	N/A N/A	Environmental Protection (Unauthorised Discharges) Regulations 2004, Extractive Industries Licence (City of Wanneroo) Urban Resources Dust Management Plan.
Noise emissions	Operation – 2. Noise is not anticipated to be an issue for the premises as the closest neighbouring residence is 650 metres from the premises. A noise modelling study was undertaken for the premises. Predicted noise levels could potentially exceed the assigned day-time levels by up to 2 decibels at pre-quarrying heights. 2 decibel exceedance is negligible and can be managed by stockpiling within 20 metres of the crushing and screening area. At finished ground level, noise levels are predicted to comply with day-time assigned levels. Operation of equipment and machinery should be restricted from 07:00 to 17:00 Monday to Friday and from 07:30 to 17:00 on Saturdays with no work permitted on Sundays or public holidays – as per the City of Wanneroo's Extractive Industry Approval if predicted noise levels are accurate. The noise exceedances were recalculated as the quarry floor levels across the site are already at least 2 metres below the pre quarrying height. As such, calculations have shown an estimated maximum 1db exceedance at 1 residence. Truck access is via an existing quarry operation to the east of the premises. This access arrangement has been chosen to avoid heavy vehicles using Wattle Ave and potentially disturbing residents further west of the site. There are no noise sensitive premises to the east.	Medium. Noise has the potential to become an issue of concern if not managed in accordance with noise management techniques explained in the Lloyd George Acoustic Report.	D= EIPs, other management mechanisms/licence conditions (monitoring/reporting)/other regulatory tools	WA- No conditions LIC– Conditions required for the placement of stockpiles for pre-quarrying ground heights and placement of equipment at finished ground height.	N/A N/A	Environmental Protection (Noise) Regulations 1997.
Solid / liquid wastes	N/A. No solid waste material is generated in the crushing screening process. Contaminated run-off is not anticipated to be an issue of concern at this premises, no chemicals or hydrocarbons will be stored onsite and the only run-off produced onsite is from dust suppression of limestone stockpiles.	No interest or concern.	E - No regulation, other management techniques.	WA – No conditions LIC - No conditions	N/A N/A	Environmental Protection (Controlled Waste) Regulations 2004.

Risk factor	Significance of emissions	Socio-Political Context of Each Regulated Emission	Risk Assessment	DEC Regulation (EP Act - Part V)	EAR Reference	Other management (legislation, tools, agencies)
Hydrocarbon/ chemical storage	N/A. No hydrocarbons will be stored on-site. Mobile mini tankers will be brought on site as required for re-fuelling of vehicles and equipment. A Fuel and Chemical Spill Management Plan was submitted to DEC and sufficiently addresses action required in case of a spill.	Medium. Potential for community concern in case of a spill.	D= EIPs, other management mechanisms/licence conditions (monitoring/reporting)/other regulatory tools	WA – No conditions LIC – Conditions required for the storage, containment and clean-up of hazardous goods brought on to site temporarily.	N/A N/A	Dangerous Goods storage licence and relevant legislation (DMP) Urban Resources Fuel and Chemical Spill Management Plan.
Native vegetation clearing	The owner of the premises, Oakford Land Company Pty Ltd was issued a Permit to Clear Native Vegetation under the *Environmental Protection Act 1986* on 30 September 2009. This permit allows the clearance of no more than 9.96 hectares of native vegetation within a specified area of Lot 8 Wattle Ave Nowergup. The duration of permit is from 30 December 2008 to 30 December 2013, permit number CPS 2807/2.	Low. Community concerns for the native vegetation in Nowergup area. Not specific to this site. Clearing will be in accordance with Clearing Permit CPS2807/2.	E - No regulation, other management techniques.	WA – No conditions	N/A	Clearing permit number CPS 2807/2.

4.0 GENERAL SUMMARY AND COMMENTS

The main environmental issues for this premises are noise and dust.

Urban Resources have prepared a dust management plan where they plan to use

- water for suppression
- hydromulch and gluon
- roads to be treated with dustex
- dust incident report form
- operations cease with problematic high winds

Lloyd George Acoustics prepared a noise impact assessment and the conclusion is that during worst case scenario, a 1 and 2 db exceedances and two residential properties. This was recalculated as quarry is already 2 metres deep and exceedance is now 1db at one residence. This can be managed by limiting operating hours and strategically placing stockpiles.

Other potential environmental issues associated with crushing and screening operations include hydrocarbon storage. Fuel will not be stored on site. Mini tankers are to be brought on site as required for re-fuelling. Spills will be managed in accordance with the Urban Resources Spill Management Plan.

The Lake Nowergup Carabooda Valley Community Group has previously raised concerns about the impact on amenity, lake system and native vegetation in the area from nearby limestone quarries.

Lake Nowergup is located approximately 3 km north-west of the premises and unlikely to be affected by the proposed crushing and screening operations.

OFFICER PREPARING REPORT

Luke Claessen

Position: Environmental Officer
Swan Region
Department of Environment and Conservation
(08) 9333 7524

Tuesday, 12 December 2011

ENDORSEMENT

Marko Pasalich

Position: Team Leader
Swan Region
Department of Environment and Conservation
(08) 9333 7510

Tuesday, 12 December 2011

APPENDIX A: EMISSIONS AND DISCHARGES RISK ASSESSMENT MATRIX

Table 3: Measures of Significance of Emissions

Emissions as a percentage of the relevant emission or ambient standard		Worst Case Operating Conditions (95th Percentile)			
		>100%	50 – 100%	20 – 50%	<20%*
Normal Operating Conditions (50th Percentile	>100%	5	N/A	N/A	N/A
	50 – 100%	4	3	N/A	N/A
	20 – 50%	4	3	2	N/A
	<20%*	3	3	2	1

*For reliable technology, this figure could increase to 30%

Table 4: Socio-Political Context of Each Regulated Emission

		Relative proximity of the interested party with regards to the emission				
		Immediately Adjacent	Adjacent	Nearby	Distant	Isolated
Level of Community Interest or Concern*	5	High	High	Medium High	Medium	Low
	4	High	High	Medium High	Medium	Low
	3	Medium High	Medium High	Medium	Low	No
	2	Low	Low	Low	Low	No
	1	No	No	No	No	No

Note: These examples are not exclusive and professional judgement is needed to evaluate each specific case

*This is determined by DEC using the DEC "Officer's Guide to Emissions and Discharges Risk Assessment" May 2006.

Table 5: Emissions Risk Reduction Matrix

		Significance of Emissions				
		5	4	3	2	1
Socio-Political Context	High	A	A	B	C	D
	Medium High	A	A	B	C	D
	Medium	A	B	B	D	E
	Low	A	B	C	D	E
	No	B	C	D	E	E

PRIORITY MATRIX ACTION DESCRIPTORS
A = Do not allow (fix)
B = licence condition (setting limits + EMPs - short timeframes)(setting targets optional)
C = licence condition (setting targets + EMPs - longer timeframes)
D= EIPs, other management mechanisms/licence conditions (monitoring/reporting)/other regulatory tools
E = No regulation, other management mechanisms

Note: The above matrix is taken from the DEC Officer's Guide to Emissions and Discharges Risk Assessment May 2006.

Appendix 6

Aurora Environmental Development Application and Extractive Industry Licence Application

Additional Information

November 2013

East Perth
149-151 Kensington Street
East Perth WA 6004
T (08) 9261 4900
F (08) 9261 4999

1 November 2013

Mr Alex Campbell
Planning Officer
Planning Implementation
City of Wanneroo
Administration Centre
23 Dundebar Road
Wanneroo WA 6946

Attention: Alex Campbell

Dear Alex,

RE: DEVELOPMENT APPLICATION AND EXTRACTIVE INDUSTRY LICENCE APPLICATION - LOT 8 (NO. 259) WATTLE AVENUE, NOWERGUP

Further to your correspondence received via emails dated 8 and 29 August 2013 respectively, this letter addresses the additional items requested by the City as well as provides the proponent's response to submissions received during the advertising period for the proposed extractive industry on Lot 8 Wattle Avenue, Nowergup.

RESPONSE TO PUBLIC SUBMISSIONS

Attachment 1 contains the proponent's response to the submissions received during the public comment period.

REQUESTED ADDITIONAL INFORMATION

1. Site Plan

An amended site plan has been requested to show the extent of the disturbance area and the proposed extraction area. Please refer to **Figure 1** which outlines the requested information.

2. Sequential Mining Plans

A plan showing the proposed mining sequence across the site has been requested. A notional plan depicting the proposed sequence of mining across the site is provided in **Figure 2**, noting that the actual sequence will be reviewed annually in line with the Licence renewal process.

3. Elevations for Structures

The city has requested plans showing the elevations for any proposed structures. At this stage, no structures are on the site as the current quarry operator is utilising existing facilities at an adjacent quarry. Should this arrangement cease, the operator will be required to source transportable facilities for the Lot 8 operations. As the transportable facilities have not yet been sourced, we are unable to provide elevations for this structure.

4. Geotechnical Report

The City has requested a geotechnical report in accordance with its Local Planning Policy (LPP) 4.13. It is understood that the reason for the geotechnical report is to certify that the land is capable of supporting the proposed development. However, the City may waive the requirement for the geotechnical report where the nature of the proposed development is such that karstic features will pose no impact upon the development and where the information provided at prior planning stages is sufficient in determining whether the subject land is capable of the proposed development.

As previously indicated, the requirement for a geotechnical report certifying that the site is capable of supporting an existing use is unreasonable particularly when an existing approval for the intended land use was issued without the requirement for a geotechnical assessment. The mining conducted under the previous approval for the site has demonstrated that there are substantial limestone resources present on the site and that the site is capable of supporting limestone mining. Mining operations conducted on site to date have not encountered karstic features.

The Wanneroo karst belt is generally located east of Wanneroo Road and is associated with the area of land mapped as LS2 in the Environmental Geology Series (Gozzard, 1982a, b, c) (**Plates 1 and 2**) which is where sinkholes and caves are usually found. The area mapped as LS1 (which occupies the majority of the subject site – **see Plate 1**) is similar in composition to LS2, except that it has a lower carbonate content and is therefore less susceptible to dissolution.

The karst belt lies within the Spearwood Dune System and represents an interdunal swale (Csaky, 2003). This area is prone to karst features as the low topography has enabled groundwater to interact with the limestone (Csaky, 2003). On neighbouring dunes (as is the case on the subject site), the limestone sits higher and therefore the interaction with groundwater is limited due to the depth of groundwater. Bastion (2003) confirmed that in Wanneroo, karstic activity has been dominated by previous high groundwater levels, causing caves and sinkholes to form.

Groundwater depths at the site have been estimated from the Department of Water's Perth Groundwater Atlas, indicating that levels are between 20mAHD and 26mAHD or approximately 27m to 69m below ground level. Hydrographs for groundwater bores in the region have demonstrated a significant and sustained decline in groundwater levels due to reduced rainfall over the last 35 years.

The likelihood of encountering karst landforms during mining cannot be completely ruled out. However, the risk of encountering karst is considered low for the following reasons:

- The mining area is located outside of the mapped Karst belt as depicted in Csaky (2003);
- The limestone deposits to be mined are located well above the water table; and
- Mining conducted to date has not encountered karstic features on the site.

PLATE 1

ENVIRONMENTAL GEOLOGY – TAMALA LIMESTONE BELT IN WANNEROO

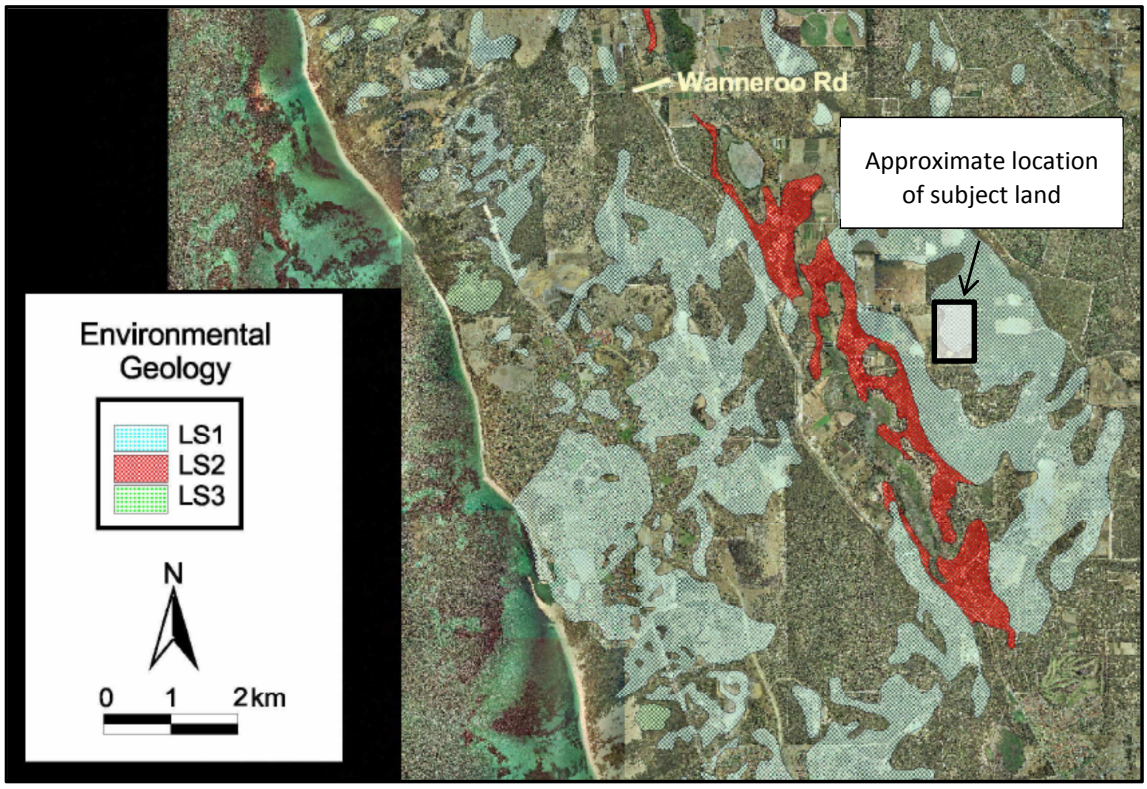
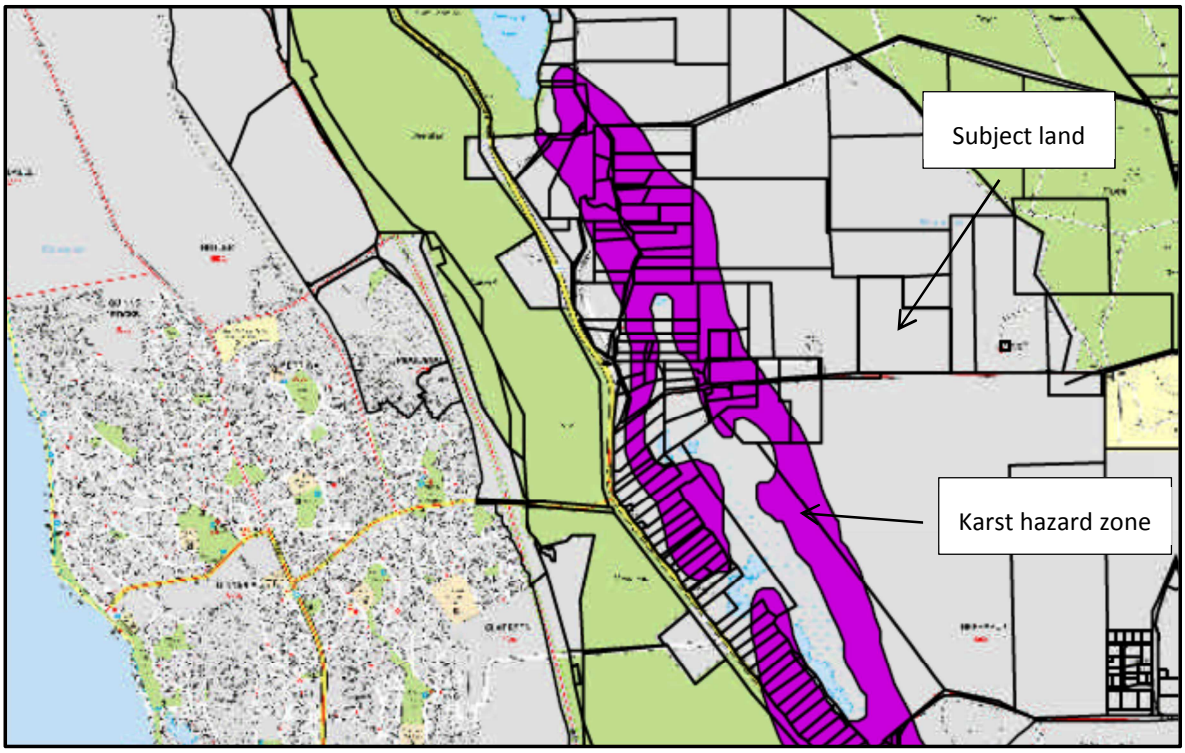


PLATE 2

KARST HAZARD ZONE



As a precautionary measure, the proponent commits to undertaking a site walk over to identify potential karst features (i.e. caves, sinkholes etc.) prior to clearing commencing for each subsequent stage of mining.

5. Landscape Plan

As indicated in the documentation accompanying the development application, the rehabilitation program will be undertaken progressively in areas where mining has ceased. This approach will enable direct transfer of topsoil from areas being cleared across to areas where rehabilitation is being undertaken. Topsoil provides a useful source of native seed. Plant material salvaged from the clearing operations will be spread in rehabilitation areas. This approach encourages seed drop, provides coverage across the bare soil to reduce wind and water erosion and contributes to the organic carbon content within the soil. The rehabilitation process will also involve supplementary planting via either direct seeding with native seed or planting with tubestock. Direct seeding will be conducted at a rate of 1-2kg/ha and tubestock planting will be undertaken at approximately 1000 plants per hectare.

An indicative rehabilitation plan has been prepared (**Figure 3**). The plan identifies the areas on the site that will be rehabilitated back to native vegetation consistent with the pre-mining land use. Two rehabilitation zones area identified in **Figure 3**: heath and Banksia/Eucalypt Woodland. The species to be used in each zone is provided in Tables 1 and 2. The final species mix used will be dependent upon the commercial availability of tubestock and seed from commercial suppliers. Target densities to be used as a basis for planting are provided in Table 3.

Table 1
Heath Planting List

Acacia alata var. tetrantha	*Conostylis aculeata*	*Kennedia prostrata*
Acacia lasiocarpa	*Desmocladus flexuosus*	*Lepidosperma squamatum*
Acanthocarpus preissii	*Eucalyptus decipiens*	*Leucopogon parviflorus*
Astroloma microcalyx	*Grevillea preissii*	*Lomandra hermaphrodita*
Austrostipa flavescens	*Hakea lissocarpha*	*Melaleuca huegelii*
Banksia lindleyana	*Hakea prostrata*	*Melaleuca systena*
Banksia sessilis	*Hakea trifurcata*	*Schoenus grandiflorus*
Bossiaea eriocarpa	*Hardenbergia comptoniana*	*Templetonia retusa*
Calothamnus quadrifidus	*Hibbertia hypericoides*	*Xanthorrhoea preissii*
Cassytha racemosa	*Hibbertia racemosa*	
Comesperma confertum	*Hovea trisperma*	

Table 2
Banksia / Eucalypt Woodland Planting List

Trees / Tall Shrubs		
Allocasuarina fraseriana	*Banksia menziesii*	*Eucalyptus todtiana*
Banksia attenuata	*Eucalyptus decipiens*	*Xylomelum occidentale*
Banksia grandis	*Eucalyptus foecunda*	
Banksia ilicifolia	*Eucalyptus marginata*	
Mid-storey / Understorey		
Acacia lasiocarpa	*Grevillea preissii*	*Macrozamia riedlei*
Acacia pulchella	*Hakea lissocarpha*	*Melaleuca huegelii*
Acanthocarpus preissii	*Hakea prostrata*	*Melaleuca systena*
Adenanthos cygnorum	*Hakea trifurcata*	*Melaleuca thymoides*
Anigozanthos humilis	*Hardenbergia comptoniana*	*Nemica reticulata*
Anigozanthos manglesii	*Hibbertia hypericoides*	*Nuytsia floribunda*
Allocasuarina humilis	*Hypocalymma angustifolium*	*Patersonia occidentalis*
Banksia lindleyana	*Hypocalymma robustum*	*Pericalymma ellipticum*
Banksia sessilis	*Jacksonia sericea*	*Petrophile linearis*
Beaufortia elegans	*Jacksonia sternbergiana*	*Petrophile macrostachya*
Bossiaea eriocarpa	*Jacksonia floribunda*	*Stirlingia latifolia*
Calothamnus quadrifidus	*Kennedia prostrata*	*Viminaria juncea*
Conostephium pendulum	*Lepidosperma squamatum*	*Xanthorrhoea preissii*
Gompholobium tomentosum	*Lomandra hermaphrodita*	

Table 3
Planting Densities

Growth Form	**Planting Density**
Trees	1 tree/50m^2
Shrubs	1 plant/m^2
Groundcover	1 plant/m^2

Please do not hesitate to contact the undersigned on 9261 4900, 0429 409 146 or via email at paul.zuvela@auroraenvironmental.com.au if you have any queries relating to these applications.

For and on behalf of Aurora Environmental

Paul Zuvela

Manager - Environmental Impact Assessment

Attachments

Attachment 1: Proponent Response to Public Submissions

Figure 1: Disturbance and Excavation Areas
Figure 2: Notional Mining Sequence
Figure 3: Indicative Rehabilitation Plan

cc: Jas Lapinski, Department of Planning

Mammoth Nominees

References

Bastion, L.V. (2003). *Pers comm.* In: Csaky, D. (2003). *Review of Karst Hazards in the Wanneroo Area, Perth, Western Australia*. Report prepared as part of Geoscience Australia's Graduate Program.

Csaky, D. (2003). *Review of Karst Hazards in the Wanneroo Area, Perth, Western Australia*. Report prepared as part of Geoscience Australia's Graduate Program.

Gozzard, J.R. (1982a). *Muchea Sheet 2034 I and Part 3134 IV, Perth Metropolitan Region.* Environmental Geology Series, Geological Survey of Western Australia.

Gozzard, J.R. (1982b). *Muchea Sheet 2034 II and Part 2034 III and 2134 II, Perth Metropolitan Region.* Environmental Geology Series, Geological Survey of Western Australia.

Gozzard, J.R. (1982c). Yanchep *Sheet 2034 IV, Perth Metropolitan Region.* Environmental Geology Series, Geological Survey of Western Australia.

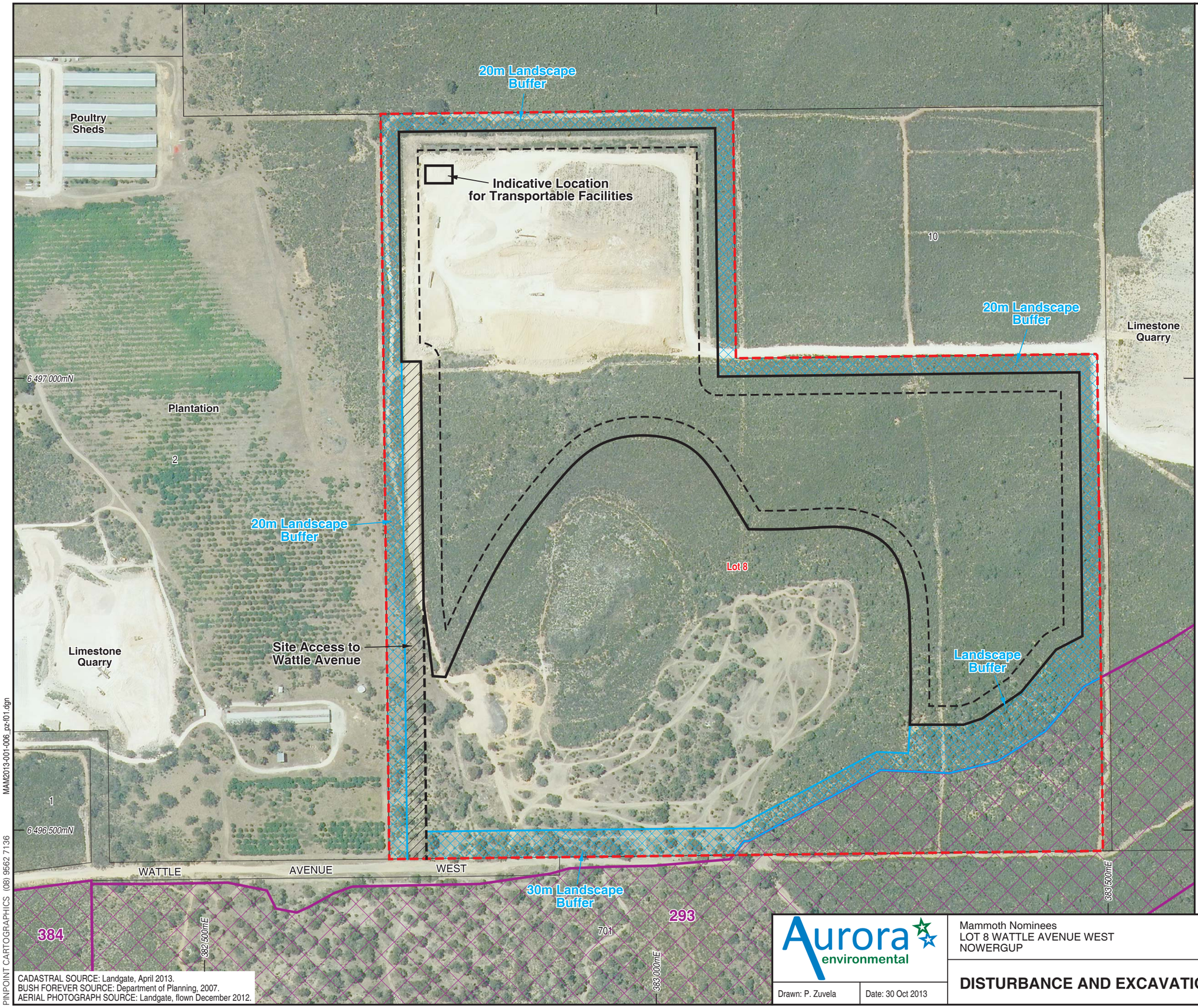
DA2013/663 - SUMMARY OF SUBMISSIONS FOLLOWING ADVERTISING OF INDUSTRY – EXTRACTIVE AT LOT 8 (259) WATTLE AVENUE NOWERGUP

The City advertised the proposal in accordance with Clause 6.7 of District Planning Scheme No. 2 and received comments from three respondents. Two of the respondents providing comments as summarised below and the third provided support for the proposal.

	Summary of Submission	Applicants Response
1.0		
1.1	*Comment: Dust management* Respondent notes that the section 5.7 of the Extractive Industry Report indicates that operations are to cease when winds negate the effect of dust management. During the development of Stage 1 the mitigation of dust was not achieved to a satisfactory level. The 'Dust incident form' is to record all complaints and submitted to the City. Respondent requires certainty that future dust events will not impact on their farm operations	The proponent acknowledges that the initial stage of mining did generate nuisance dust emissions from the subject site. This was largely a result of initial vegetation clearing being undertaken on an elevated and exposed portion of the site. This was unavoidable due to the elevated nature of the limestone deposits on the site, resulting in the initial stages being exposed to prevailing breezes. Subsequent mining on the site has formed a mine pit, which substantially reduces the exposure to prevailing winds and therefore minimises the risks associated dust emissions from the site. Upon receiving notification of the original complaint, the proponent's mining contractor initiated dust control measures including the use of wart carts to mitigate further dust nuisance. The proponent is unaware of any additional dust issues that have arisen since the initial dust complaint. However, the proponent remains committed to ensuring that the continued operation on the subject site will have as minimal impacts on surrounding properties as far as practicable.
1.2	*Comment: Visual Impact* The site is highly visible and the respondent is requesting that the applicant plant a row of trees and shrubs to act as a visual barrier	As indicated in the supporting documentation provided with the planning application, the site is located in a rural area, largely

	Summary of Submission	Applicants Response
	and screen. This will help reduce the impact of dust and create better view from their property.	surrounded by native vegetation and in an area where there are several limestone operations currently operating. The subject site isolated from dwellings or other public gathering places. For this reason the opportunity for adverse visual impacts was deemed to be low. The planting of tall screening trees in these elevated areas is not feasible due to the unfavourable ground conditions. The native vegetation found on the elevated and exposed limestone hills is generally comprised of small shrubs. The proponent will continue to maintain a 20m landscape buffer around the perimeter of the site. Mining will be undertaken on a staged basis, with progressive site rehabilitation being undertaken. This approach will minimise the area open to mining at any one point in time.
1.3	*Comment: Reconstitution block plant* Respondent noted in program and operational management that proponent supplies 'an existing reconstitution (limestone) block plant west of Lot 8'. The respondent disputes this statement and indicates that no such arrangement is in place.	The proponent is leasing the subject land to Urban Resources Pty Ltd.
2.0		
2.1	*Comment: Noise Level* Respondent has noted a high level of noise created from machinery as early as 5:30am. The respondent objects to the proposal if the intensity and length of noise continues within hours that are not approved.	The proponent reiterates that the hours of operation of the site will be 0600 to 1700, Monday to Saturday inclusive but excluding public holidays. It is unaware of any complaints in relation to operating outside of these hours. However, the proponent will ensure that the mining contractor is aware of the correct operating hours.
2.2	*Comment: Dust* There is a high likelihood of significant dust events that may occur	The proponent will implement the dust management procedures

	Summary of Submission	Applicants Response
	when strong easterlies blow from the subject site to the proponent's property. The dust particles may have a significant impact on the proponent's children's health, with one having a respiratory problem.	outlined in the supporting documentation submitted with the initial application and in accordance with the DEC's (2011) *Guidelines for Managing the Impact of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and Other Related Activities*. The measures to be implemented primarily rely upon the use of water for dust suppression and where applicable through the application of hydro-mulch and gluon to stabilise exposed areas. Retained vegetation in the landscape buffer will also assist with managing dust migration. Furthermore, progressive rehabilitation of the site will ensure that areas of the site do not remain exposed for longer than is necessary. Apart from the initial dust nuisance complaint received during the initial clearing phase of the stage 1 mining, the proponent is unaware of any other nuisance dust complaints.
2.3	*Comment: Traffic* The proposal will generate up to 25 trucks per day along Wattle Avenue once it is extended. The increased number of trucks along the road will create a dangerous road environment for the proponent's children when they ride their bikes along Wattle Avenue. Proponent requests a dedicated road be from the quarry to a major road be made to allow trucks to avoid Wattle Avenue.	To minimise disruptions to residents along Wattle Avenue, the proponent has by way of informal arrangement, secured access to and from the site through a nearby limestone quarry to the east of the subject site. While this informal arrangement remains in place, trucks will not access Wattle Avenue. Should this arrangement



N

0 50 100 150 200m

SCALE 1 : 4 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Bush Forever Site
- Landscape Buffer
- Disturbance Area Boundary
- Notional Excavation Area Boundary

CADASTRAL SOURCE: Landgate, April 2013.
BUSH FOREVER SOURCE: Department of Planning, 2007.
AERIAL PHOTOGRAPH SOURCE: Landgate, flown December 2012.

Aurora environmental

Mammoth Nominees
LOT 8 WATTLE AVENUE WEST
NOWERGUP

DISTURBANCE AND EXCAVATION AREAS

Figure 1

Drawn: P. Zuvela | Date: 30 Oct 2013 | Job: MAM2013-001

PINPOINT CARTOGRAPHICS (08) 9562 7136 MAM2013-001-006_pz-f01.dgn

20m Landscape Buffer

Poultry Sheds

Indicative Location for Transportable Facilities

Year 0-5

10

20m Landscape Buffer

Limestone Quarry

6 497 000mN

Plantation

Year 7-10

Year 5-7

Year 10-14

Year 14-18

2

20m Landscape Buffer

Lot 8

Year 18-20

Limestone Quarry

Site Access to Wattle Avenue

Landscape Buffer

1

6 496 500mN

WATTLE AVENUE WEST

30m Landscape Buffer

384

382 500mE

701

293

383 000mE

383 500mE

N

0 50 100 150 200m

SCALE 1 : 4 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Bush Forever Site
- Landscape Buffer
- Mining Sequence Boundary

CADASTRAL SOURCE: Landgate, April 2013.
BUSH FOREVER SOURCE: Department of Planning, 2007.
AERIAL PHOTOGRAPH SOURCE: Landgate, flown December 2012.

PINPOINT CARTOGRAPHICS (08) 9562 7136 MAM2013-001-006_pz-f02.dgn

Aurora environmental

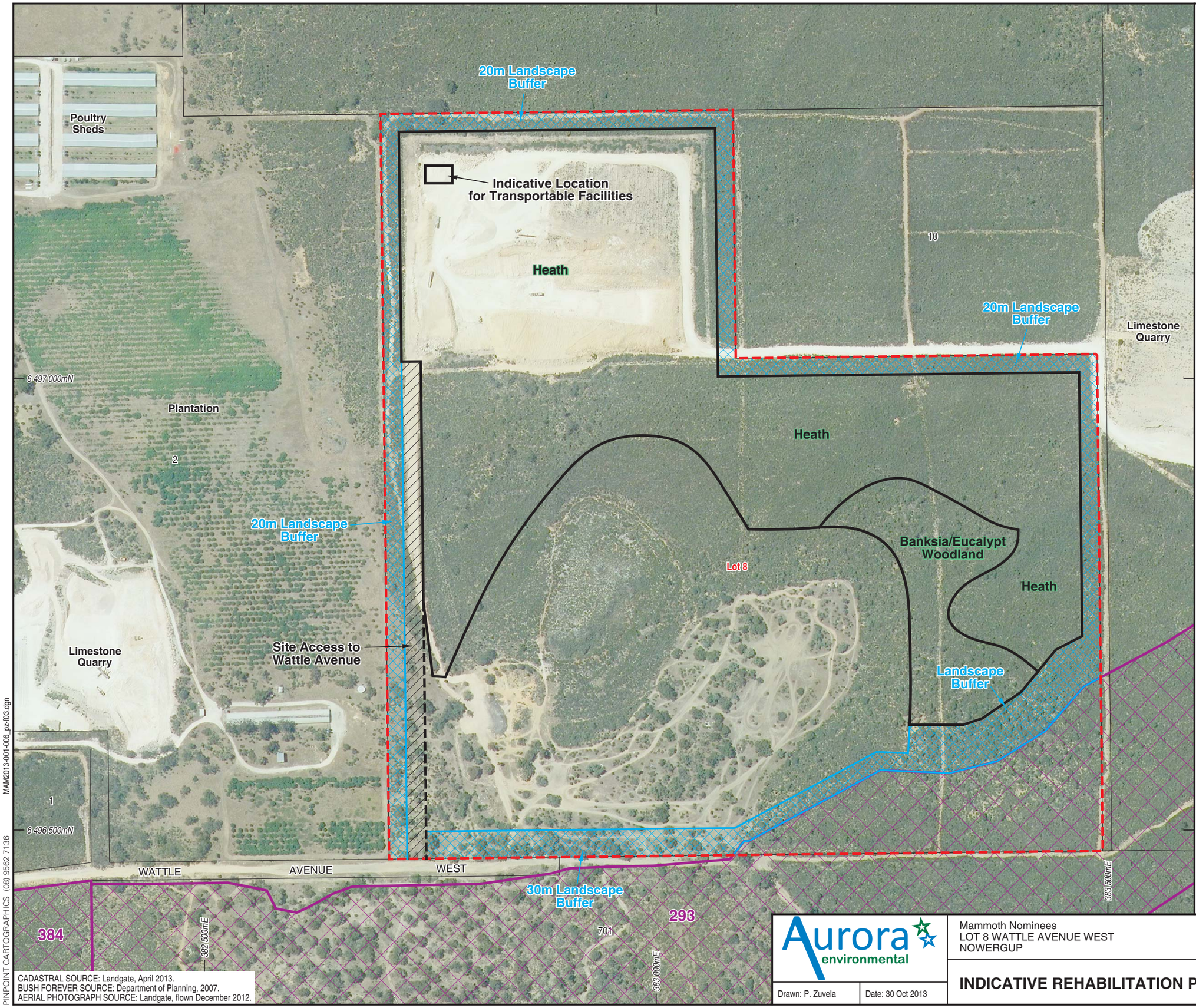
Drawn: P. Zuvela | Date: 30 Oct 2013

Mammoth Nominees
LOT 8 WATTLE AVENUE WEST
NOWERGUP

NOTIONAL MINING SEQUENCE

Figure 2

Job: MAM2013-001



N

0 50 100 150 200m

SCALE 1 : 4 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Bush Forever Site
- Landscape Buffer
- Indicative Rehabilitation Boundary

CADASTRAL SOURCE: Landgate, April 2013.
BUSH FOREVER SOURCE: Department of Planning, 2007.
AERIAL PHOTOGRAPH SOURCE: Landgate, flown December 2012.

PINPOINT CARTOGRAPHICS (08) 9562 7136 MAM2013-001-006_pz-f03.dgn

Aurora environmental

Mammoth Nominees
LOT 8 WATTLE AVENUE WEST
NOWERGUP

INDICATIVE REHABILITATION PLAN

Figure 3

Drawn: P. Zuvela | Date: 30 Oct 2013 | Job: MAM2013-001