Lattice Energy

Plan

CDN/ID 17315667

TRIESTE 3D SEISMIC SURVEY

Environment Plan

Review record

Rev	Date	Reason for issue	Author	Reviewer/s	Approver
A	24/11/2017	Issued for internal review	G. Pinzone	K. Hunt	-
B	12/12/2017	Issued for internal technical review	G. Pinzone	D. Dorling	-
0	22/12/2017	Issued for regulator assessment	G. Pinzone	K. Hunt	D. Dorling
0.1	05/03/2018	Issued for internal review	G. Pinzone	K. Hunt, D. Dorling	-
1	09/03/2018	Re-issued for regulator assessment, addressing assessment comments	G. Pinzone	K. Hunt	D. Dorling
2	29/05/2018	Re-issued for regulator assessment, addressing DMIRS comments	G. Pinzone	K. Hunt	D. Dorling, Z. Brooking

Review due: 29/05/2019
Review frequency: 1 year

THE THREE WHATS
What can go wrong?
What could cause it to go wrong?
What can I do to prevent it?

Document Information and History

DOCUMENT CUSTODIAN GROUP

Title	Name/s
Chief Geophysicist	Randall Taylor
Project Manager, Exploration and Development	David Dorling
Senior Environmental Specialist	Kelly Hunt

DOCUMENT AUTHOR

Position	Name
Principal Environmental Consultant (Aventus Consulting)	Giulio Pinzone

STAKEHOLDERS AND OTHER CONTRIBUTORS

Position	Name
Senior Seismic Field Manager	John Mitchell
Seismic Field Manager	Bob Foot
Senior Access Advisor	Shane Bailey
Senior Health & Safety Advisor	Jason Parker
Operations Manager	Terry Ernst (Terrex)

DOCUMENT HISTORY

Rev	Date	Changes made in document	Reviewer/s	Consolidator	Approver
A	24/11/2017	Issued for internal review	Kelly Hunt	Giulio Pinzone	N/A
B	12/12/2017	Issued for internal technical review	David Dorling, Shane Bailey, Jason Parker, Alison Araos	Giulio Pinzone	N/A
0	22/12/2017	Issued for regulator assessment	Kelly Hunt	Giulio Pinzone	David Dorling
0.1	05/03/2018	Issued for internal review	Kelly Hunt, David Dorling	Giulio Pinzone	David Dorling
1	09/03/2018	Re-issued for regulator assessment, addressing assessment comments	Kelly Hunt	Giulio Pinzone	David Dorling
2	29/05/2018	Re-issued for regulator assessment, addressing DMIRS comments	Kelly Hunt	Giulio Pinzone	David Dorling, Zoe Brooking

Table of contents

List of Tables

List of Appendices

A PGER Environment Regulations 2012 concordance table

B Landowner consultation letters

C Targetted flora survey report

D Vertebrate fauna survey report

E EP commitments register

Acronyms

Acronym	Definition
3D	Three-Dimensional
4WD	Four-Wheel Drive
ABS	Australian Bureau of Statistics
AHIS	Aboriginal Heritage Inquiry System (WA)
ALARP	As Low As Reasonably Practicable
APPEA	Australian Petroleum Production and Exploration Association
ATV	All-terrain Vehicle
BPEM	Best Practice Environmental Management
CAR	Corrective Action Request
CH_4	Methane
CO_2	Carbon Dioxide
Cth	Commonwealth
CoEP	Code of Environmental Practice
DAA	Department of Aboriginal Affairs (WA)
DAF	Department of Agriculture and Food (Cth)
DBCA	Department of Biodiversity, Conservation and Attractions (WA)
DBH	Diameter at Breast Height
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DEC	Department of Environment and Conservation (WA)
DFES	Department of Fire and Emergency Services (WA)
DMIRS	Department of Mines, Industry Regulation and Safety (WA)
DoEE	Commonwealth Department of Environment and Energy (Cth)
DPaW	Department of Parks and Wildlife (WA)
DPLH	Department of Planning, Lands and Heritage (WA)
E&P	Exploration and Production
ENVID	Environmental Identification
EP	Environment Plan
EPA	Environmental Protection Authority (WA)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPO	Environmental Performance Objective
EPS	Environmental Performance Standard

Acronym	Definition
ERC	Emergency Response Coordinator
ERP	Emergency Response Plan
ERT	Emergency Response Team
ESA	Environmentally Sensitive Area
ESD	Ecologically Sustainable Development
FIFO	Fly-In Fly-Out
GHG	Greenhouse Gas
GPS	Global Positioning System
GSWA	Geological Survey of Western Australia
HSE	Health, Safety and Environment
HSEMS	Health, Safety and Environment Management System
HSMP	Health and Safety Management Plan
IAGC	International Association of Geophysical Contractors
IAP2	International Association for Public Participation
IBRA	Interim Biogeographical Regionalisation for Australia
IMS	Integrated Management System
IVMS	In-Vehicle Monitoring System
JSAs	Job Safety Analysis
KPI	Key Performance Indicator
LoC	Loss of Containment
MNES	Matter of National Environmental Significance
N_2O	Nitrous oxide
NCR	Non-conformance report
NNTT	National Native Title Tribunal
NOPSEMA	National Petroleum Safety and Environmental Management Authority
NO_X	Nitrous Oxides
NZ	New Zealand
OSCP	Oil Spill Contingency Plan
PGERA	*Petroleum and Geothermal Energy Resources Act 1967* (WA)
PPE	Personal Protective Equipment
ROPS	Roll-Over Protection Structure
RTK	Real-Time Kinematic
SEP	Stakeholder Engagement Plan
SIMOP	Simultaneous Operations
SOP	Standard Operating Procedure
SO_X	Sulphur Oxides
SRL	Sheffield Resources Limited
TFB	Total Fire Ban
UCL	Unallocated Crown Land
UNEP IE	United Nations Environment Programme Industry and Environment

Acronym	Definition
WA	Western Australia(n)
WAH	WA Herbarium
WT	Western Titanium Ltd
YMAC	Yamatji Marlpa Aboriginal Corporation

1. Purpose

1.1 Project Summary

Lattice Energy Resources (Perth Basin) Pty Ltd (ABN 43 008 432 479) (Lattice) operates the Beharra Springs Gas Facility (the facility) in Production Licence L11 of the North Perth Basin, Western Australia (WA). The facility incorporates the gas field, gas production plan, sales gas pipeline (PL18) and associated infrastructure. A fundamental component of operation of the facility is exploration for additional gas reserves, as exploration underpins ongoing delivery of domestic gas supply via the facility.

As such, Lattice is proposing to undertake an onshore three-dimensional (3D) seismic survey in Exploration Permit 320 (EP320) in the North Perth Basin, named the Trieste 3D seismic survey (herein referred to as 'the project' or 'the survey') (Figure 1.1). The survey is designed to map geological formations to assist in the search for conventional gas reserves.

The survey area (at its nearest boundary) is located approximately 13 km north of the town of Eneabba and 40 km southeast of the town of Dongara, with an acquisition area of 218 square kilometres (km^2). The entirety of the proposed survey area is located within private properties and Unallocated Crown Land (UCL). All road reserves, environmental reserves and the Arrowsmith River (which intersects the proposed survey area) are excluded from the survey.

The survey is expected to take place over approximately 5 to 7 weeks, and was originally planned for a survey window of May 2018 to October 2018. To provide more optionality on timing, Lattice lodged a suspension application with the regulator. This suspension was granted, and as such, the window for undertaking the survey will be opened for an additional 7 months, meaning that the revised survey window is extended until May 2019 (see Section 3.2). Exact timing is contingent on receipt of environmental approvals, stakeholders' farming activity schedules, weather and ground conditions.

1.2 Proponent

Lattice and AWE (Beharra Springs) Pty Ltd (ABN 20 009 362 645) (as participants in the EP320 Joint Venture) are the holders of EP320. Lattice has been nominated by the EP320 Joint Venture as the operator of exploration activities within the EP320 area. Lattice is a wholly owned subsidiary of Beach Energy Ltd (Beach). Prior to 31 January 2018, Lattice was a wholly owned subsidiary of Origin Energy Limited (Origin).

This ownership change follows on from the announcement made by Origin in December 2016 to divest its conventional upstream oil and gas assets in Australia and New Zealand and the subsequent formation of the Lattice group of companies as owner of the conventional upstream assets.

Lattice is a significant Australian and New Zealand (NZ) exploration and production company, producing gas and liquids from the Perth, Otway, Cooper, Bass and Taranaki Basins. The Company has approximately 370 employees and is a leading producer of gas in eastern Australia, with two offshore production platforms and two gas plants in Victoria. Lattice also operates the Kupe South production platform and gas plant in NZ, which provides gas to the NZ domestic market and well as liquefied natural gas for export.

Formed in 1961 and listed on the ASX in 1962, Beach is an oil and gas exploration and production company headquartered in Adelaide, South Australia. Beach and Origin have a long history of working together through joint ventures and existing gas supply arrangements. Beach is seeking to become Australia's leading mid-cap oil and gas exploration and production company and the recent acquisition of Lattice is an important step on that journey.

In the Perth Basin, Lattice has been active since 1990, when North Yardanogo-1 and South Yardanogo-1 were drilled. In addition to operating EP320, Lattice operates the Beharra Springs Gas Facility, producing from the Beharra, Redback and Tarantula fields. Lattice is also a 50% partner in the Waitsia Gas Project north of Beharra Springs.

Outside of its production areas, Lattice's exploration portfolio includes acreage in the Bonaparte Basin in Australia and Canterbury Basin of New Zealand.

The nominated contact person for this EP is:

Zoe Brooking
Trieste Seismic Survey Project Manager
135 Coronation Drive
Milton, Qld, 4064
Phone: 0455 084 745
Email: zoe.brooking@latticeenergy.com

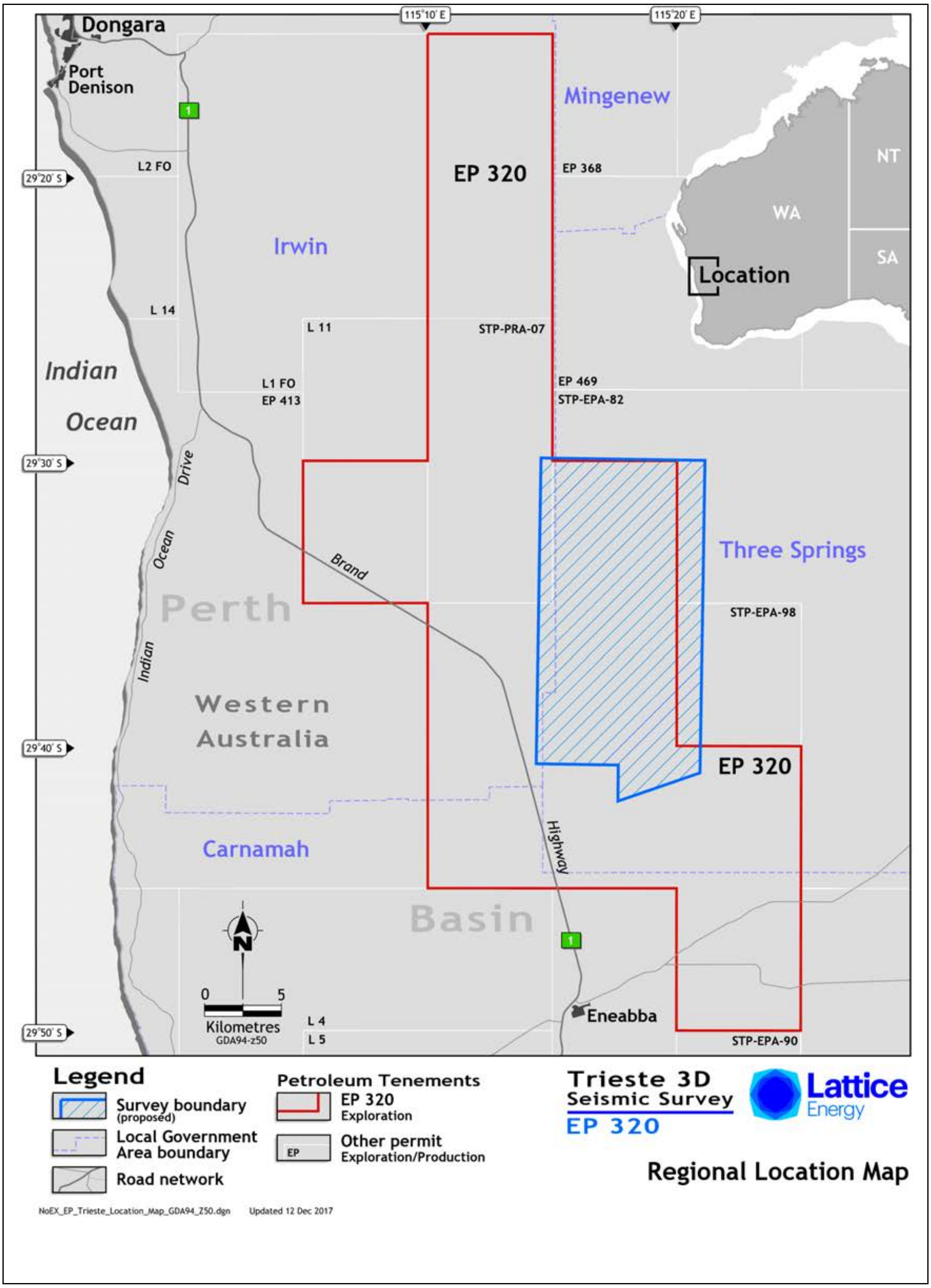


Figure 1.1. Trieste 3D seismic survey location

As the regulator for this project, the WA Department of Mines, Industry Regulation and Safety (DMIRS) will be notified of any change in titleholder, a change in the titleholder's nominated liaison person or a change in the contact details for either the Titleholder or the liaison person as soon as practicable after such change occurs (see Section 8.13).

1.3 Scope of the EP

The proposed Trieste survey in EP320 must obtain environmental approval under WA's *Petroleum and Geothermal Energy Resources Act 1967* (PGERA) and its associated Petroleum and Geothermal Energy Resources (Environment) Regulations 2012 (PGER Environment Regulations). The DMIRS is the regulator for this legislation.

Prior to undertaking any petroleum activity, an Environment Plan (EP) (*this document*) must be prepared that assesses the environmental issues for the activity and ensures that the activity is carried out in a manner consistent with the principles of ecologically sustainable development (ESD). This EP aims to satisfy the requirements of the PGER Regulations in order for approval under the PGERA to be provided to Lattice.

To this effect, the EP contains a description of:

- The activity;
- A description of the legislation, international conventions or agreements and codes of practice relevant to the activity; and
- Stakeholder consultation efforts;
- The existing environment (natural, heritage and socio-economic) that may be affected by the survey (planned and unplanned events);
- Identification of environmental impacts (planned activities) and risks (unplanned events);
- Mitigation measures to ensure that impacts and risks are minimized to as low as reasonably practicable (ALARP);
- Environmental performance objectives, standards and measurement criteria; and
- An Implementation Strategy to ensure that the environmental performance objectives and standards are met (a description of Lattice's Health, Safety and Environment Management System (HSEMS), roles and responsibilities of those involved in the project, monitoring, auditing and management of non-compliance, reporting, monitoring of emissions and discharges, and an Oil Spill Contingency Plan (OSCP)).

1.4 Objectives of this EP

The objective of this EP is to meet the requirements of the PGER Environment Regulations and demonstrate that the known and potential environmental impacts and risks associated with the survey are identified and assessed, and that these impacts and risks are reduced to ALARP.

2. Legislative Framework

In accordance with Regulation 14(6) of the PGER Environment Regulations, this section summarises the key Western Australian and Commonwealth legislation relevant to the proposed survey.

2.1 Environmental Policy

In accordance with Regulation 17(1)(a) of the PGER Environment Regulations, Beach's Environmental Policy is provided in Box 1. The policy provides a public statement of the company's commitment to minimise adverse effects on the environment and to improve environmental performance. Due to the divestment of Lattice to Beach on the 1st of February 2018, the Lattice HSE Policy has been replaced with the Beach Environmental Policy.

Lattice operates under a Health, Safety and Environment (HSE) Management System (HSEMS) to minimise and manage the impacts on employees, contractors, the environment and the communities in which the company operates. The Lattice HSEMS has been developed in accordance with Australian/New Zealand Standard ISO 14001:2004 Environmental Management Systems (described further in Chapter 8).

Lattice has not been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources.

2.2 Legislation

2.2.1 Western Australian Legislation

Table 1.1 presents a summary of WA legislation relevant to the environmental management of the proposed survey.

The PGERA and the PGER Environment Regulations are the key pieces of legislation regulating onshore petroleum exploration and production in WA, and mandates that any petroleum activity is carried out in a manner consistent with the principles of ESD. A concordance table that lists the regulations relevant to the contents of an EP, cross-referenced to the content of this EP, is provided in **Appendix A**.

2.2.2 Commonwealth Legislation

Table 1.2 presents a summary of Commonwealth legislation (including legislation adopting international conventions) relevant to the environmental management of the survey.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the key legislation regulating projects that may have an impact on a Matter of National Environmental Significance (MNES).

Lattice submitted an EPBC Act Referral to the Commonwealth Department of Environment and Energy (DoEE) on the 22nd of December 2017 for a determination against the Act (EPBC Ref 2017/8133). On the 10th of April 2018, the DoEE notified Lattice of a 'controlled action' decision, with the assessment approach to be decided.

Discussions that Lattice has held to date with DMIRS (Compliance Branch, Vegetation Clearing Branch) and the DoEE indicate that the assessment approach is likely to be via a Vegetation Clearing Permit Application using the Bilateral Agreement between the Commonwealth of Australia and the State of Western Australia made under Section 45 of the EPBC Act in 2014. The assessment approach is to be confirmed following submission of the clearing permit application to DMIRS.

Regardless of the assessment approach, the environmental controls to be provided in the EPBC Act Referral will be consistent with those in this EP and Lattice will comply with the conditions set out in the decision notice.

2.2.3 Government Guidelines

The following government-issued guidelines have been applied in the preparation of this EP as relevant:

- Guideline for the Development of Petroleum and Geothermal Environment Plans in Western Australia (DMP, 2016a);
- Guideline for the Development of an Onshore Oil Spill Contingency Plan (DMP, 2016b);
- Environmental Factor Guideline: Factors and Objectives (EPA, 2016a);
- EPBC Act Significant impact guidelines – MNES (2013);
- Environmental Factor Guideline: Terrestrial Fauna (EPA, 2016b);

- Technical Guidance – Terrestrial Fauna Surveys (EPA, 2016c);
- Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA & DEC, 2010);
- EPBC Act Referral Guidelines for three threatened black cockatoos: Carnaby's Cockatoo, Baudin's Cockatoo and Forest Red-tailed Black-Cockatoo (DSEWPC, 2012)
- Environmental Factor Guideline: Flora and Vegetation (EPA, 2016d);
- Technical Guidance – Flora and vegetation surveys for environmental impact assessment (EPA, 2016e).

BEACH ENERGY

Environmental Policy

Beach is committed to conducting operations in an environmentally responsible and sustainable manner.

To fulfil these objectives, to as far as is reasonably practicable, Beach will:

- Maintain and improve the HSE Management System including as appropriate developing applicable environmental standards and procedures;
- Establish environmental objectives and targets and implement programs to achieve them and report on their performance;
- Commit to and comply with relevant laws, regulations and environmental management plans for each activity as required by the appropriate regulating authority, and where adequate laws do not exist, adapting to and applying globally applicable corporate operating standards;
- Commit to identify, assess and control environmental impacts of our operations by achieving proactive management of activities;
- Avoid disturbance of known sites of archaeological, historical and natural significance and protect native flora and fauna in all areas of operation;
- Ensure that incidents, near misses, concerns and complaints are reported adequately, investigated and appropriate procedures implemented;
- Inform all employees and contractors of their environmental and cultural heritage responsibilities including consultation and distribution of appropriate environmental management guidelines, regulations and publications for all relevant activities; and
- Ensure Beach has the resources and the skills necessary to achieve its environmental commitments.
- Application of this policy resides with all employees and contractors sharing responsibility for its implementation.

Operative from: 1 September 2017

Review by: 1 September 2019

Box 1. Beach Environmental Policy

Table 2.1. Summary of key WA legislation relevant to the survey

Legislation/regulation	Scope	Applicability to project	Administering authority
PGERA PGER Environment Regulations 2012	The objectives of the PGER (Environment) Regulations 2012 is to ensure that any petroleum activity carried out in WA is carried out in a manner that is consistent with the principles of ESD and is carried out in accordance with an EP that demonstrates the environmental impacts and risks of the activity will be reduced to ALARP, and has appropriate environmental performance objectives, standards and measurement criteria in place. These regulations are objective-based, with titleholders required to identify risks, measures to control them and the means by which to measure the success of their implementation. The aim of this is to encourage continuous improvement in environmental performance.	The activity triggers the need for environmental approval under the Regulations. This EP has been prepared in accordance with the requirements of the regulations.	DMIRS
Environmental Protection Act 1986 Environmental Protection (Clearing of Native Vegetation) Regulations 2004	Under Part V of the Act, clearing of native vegetation in WA requires a permit. Exemptions from the requirement to obtain a permit to clear are provided in Schedule 6 of the EP Act (Schedule 6 exemptions) and section 5 of the Native Vegetation Regulations 2004. The proposed survey area lies within the Geraldton Sandplains Bioregion, which is prescribed as an Environmentally Sensitive Area (ESA) under section 51B of the Act. As such, all exemptions under the Native Vegetation Regulations do not apply to the survey and a clearing permit application must be submitted.	As the mulching of vegetation is considered ‘clearing’ under the Act, Lattice is applying for a Native Vegetation Clearing Permit and will conduct these activities in accordance with the requirements of the permit, when granted.	DMIRS
Aboriginal Heritage Act 1972	This Act aims to preserve, on behalf of the community, places and objects customarily used by or traditional to the original inhabitants of Australia or their descendants, or associated therewith, and for other purposes incidental thereto.	This Act is triggered if Aboriginal sites are disturbed without prior permission. The relevant database searches have been conducted to ensure Lattice is aware of the location of registered sites.	Department of Planning, Lands and Heritage (DPLH)
Wildlife Conservation Act 1999 Regulations 1970	This Act provides for taxa (species, subspecies and varieties) of native flora and fauna to be specially protected because they are threatened with extinction, are rare, or otherwise in need of special protection. Ecological communities that are at risk of becoming destroyed may also be listed for protection under the Act. Written consent from the Department of Biodiversity, Conservation and Attractions (DBCA) is required to ‘take’ threatened fauna.	This Act is triggered in the event that threatened species are found within the survey area and need to be translocated.	DBCA

Legislation/regulation	Scope	Applicability to project	Administering authority
	The Act defines 'take' as: • In relation to any fauna, "to kill or capture any fauna by any means or to disturb or molest any fauna by any means or to use any method whatsoever to hunt or kill any fauna whether this results in killing or capturing any fauna or not; and also includes every attempt to take fauna and every act of assistance to another person to take fauna and derivatives and inflections have corresponding meaning"; and • In relation to any flora, "to gather, pluck, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means".		
Biodiversity Conservation Act 2016	This Act provides for the conservation and protection of biodiversity and the ecologically sustainable use of biodiversity. It also repeals the *Wildlife Conservation Act 1950*.	Penalties can be applied for the unauthorised clearing of threatened flora or taking of threatened fauna.	DBCA
Animal Welfare Act 2002 Regulations 2003	This Act is established to provide for the welfare, safety and health of animals, to regulate the use of animals for scientific purposes and for related purposes. The Act is focused on prohibiting cruelty to, and other inhumane or improper treatment of, animals.	Not triggered unless unauthorised hunting, trapping or poor treatment of animals takes place.	DBCA
Bush Fires Act 1954	This Act is established to make better provision for diminishing the dangers resulting from bush fires, for the prevention, control and extinguishment of bush fires. The Act provides for the declaration of total fire bans and provides general restrictions, prohibitions and offences relating to fire.	This Act would be triggered in the event that a wildfire is ignited as a result of the proposed survey.	Department of Fire and Emergency Services (DFES)
Conservation and Land Management Act 1984	This Act makes provision for the use, protection and management of certain public lands and waters and the flora and fauna. It establishes authorities responsible for such protection.	This Act would be triggered in the event that a large fire or diesel spill damages a public conservation reserve.	DBCA

Table 2.2. Summary of key Commonwealth legislation relevant to the survey

Legislation/regulation	Scope	Applicability to project	Administering authority
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Protects MNES, provides for Commonwealth environmental assessment and approval processes and provides an integrated system for biodiversity conservation and management of protected areas. There are nine MNES, these being: 1. World heritage properties; 2. National heritage places; 3. Wetlands of international importance (listed under the Ramsar Convention); 4. Listed threatened species and ecological communities; 5. Migratory species protected under international agreements; 6. Commonwealth marine areas; 7. The Great Barrier Reef Marine Park; 8. Nuclear actions (including uranium mines); and 9. A water resource, in relation to CSG development and large coal mining developments.	This Act may be triggered because listed threatened species may be impacted by the mulching of native vegetation. As such, Lattice has submitted an EPBC Referral to the DoEE.	DoEE
Native Title Act 1993	This Act establishes the framework for the recognition and protection of Native Title.	The Act is triggered where lands subject to Native Title determination or claim are traversed by the survey. A portion of the Unallocated Crown Land in the eastern portion of the survey area (and outside EP320) was subject to Native Title, but has been excised out of the survey area. Therefore, Native Title no longer applies to the survey.	National Native Title Tribunal (NNTT)

2.3 Guidelines and Codes of Practice

This section describes the environmental guidelines and codes of practice involved in onshore petroleum activities. They are referenced wherever possible in the demonstration of ALARP for each of the environmental hazards assessed in Chapter 7.

The implementation of control measures that align with these guidelines and codes of practice (in addition to meeting legislative requirements) are considered to demonstrate Best Practice Environmental Management (BPEM), noting however that none of these codes of practice or guidelines have legislative force in Australia.

2.3.1 International

There are few international industry codes of practice or guidelines regarding environmental management for onshore seismic surveys, with additional guidelines available for offshore seismic surveys (such as The World Bank Group's *Environment, Health and Safety Guidelines for Offshore Oil and Gas Development 2015* and the IUCN's *Effective planning strategies for managing environmental risk associated with geophysical and other imaging surveys 2016*). The guidelines that apply to this project are briefly discussed in this section.

Environmental Manual for Worldwide Geophysical Operations (IAGC)

The *Environmental Manual for Worldwide Geophysical Operations* (2013) produced by the International Association of Geophysical Contractors (IAGC) has been referenced to guide various planning aspects of the project. This manual provides broad guidance on environmental issues associated with seismic surveys, with the preparation of a detailed EIA (as contained within this EP) being the key measure in demonstrating that BPEM is applied to a project.

Environmental Management in Oil and Gas Exploration and Production (UNEP)

The United Nations Environment Programme Industry and Environment (UNEP IE) and the Oil Industry International Exploration and Production Forum developed this overview of issues and management approaches for environmental management in oil and gas exploration and production in 1997.

With regard to seismic surveys, it contains a brief and broad list of environmental protection measures, mostly relating to the assessment of impacts (which is met through the preparation of this EP).

2.3.2 Australian

There are few Australian industry codes of practice or guidelines regarding environmental management for seismic surveys. The one that does apply to this project is briefly discussed here.

Code of Environmental Practice (APPEA)

In Australia, the petroleum exploration and production industry operates within an industry code of practice developed by the Australian Petroleum Production and Exploration Association (APPEA); the *Code of Environmental Practice* (CoEP) (2008). This code provides guidelines for activities that are not formally regulated and have evolved from the collective knowledge and experience of the oil and gas industry, both nationally and internationally.

The CoEP covers general environmental objectives for the industry, including planning and design, assessment of environmental risks, emergency response planning, training and inductions, auditing and consultation and communication. It addresses environmental issues relating to geophysical surveys, drilling and development and production.

The CoEP has been used as a reference for the impact and risk assessment to ensure that all necessary environmental issues and controls for seismic surveys have been incorporated into the project design.

3. Activity Description

In accordance with Regulation 14(1) of the PGER Environment Regulations, this chapter provides a comprehensive description of the proposed activity.

3.1 Location

The project is located approximately 13 km to the north of the town of Eneabba, 40 km southeast of the town of Dongara and 40 km west of the town of Three Springs. It is located within onshore exploration permit EP320 (extending into vacant acreage to the east of EP320) in the North Perth Basin. The proposed survey is located almost entirely within the Shire of Three Springs, with a slight overlap into the Shire of Irwin. Table 3.1 lists the geographic coordinates for the boundary of the survey area.

The land to the eastern side of the EP320 is not currently subject to an active petroleum tenement. Lattice will ensure that a DMIRS-approved petroleum access authority is in place for this land prior to the survey commencing pursuant to section 106 of the PGER Act 1967 (this land is included into the overall coordinates for the proposed survey area, and also provided separately in Table 3.1).

The area outside EP320 is separated into three extensions (Figure 3.1), with no seismic surveying to occur in the UCL. No native vegetation needs to be cleared outside of EP320. This area occurs on freehold land where Native Title is extinguished, and is divided as follows:

- Extension one – extending 200 m north of the survey area and the width (east-west) of the survey area (1.0 km^2), and located within STP-EPA-0082. This vacant acreage will be accessed under Section 106 of the PGER Act via the application for grant of an 'access authority', which allows the conduct of petroleum exploration activities outside of the EP320 permit area);
- Extension two – extending 1.8 km to the east of the EP320 eastern boundary (and 3.7 km north-south) in the north-eastern part of the survey area (6.7 km^2), and located within STP-EPA-0082. This vacant acreage will be accessed as described above; and
- Extension three – extending 1.7 km to the east of the EP320 eastern boundary (and 10.6 km north-south) in the south-eastern part of the survey area (17.2 km^2), and located within STP-EPA-0098. This vacant acreage that will be access as described above.

The access authority will allow Lattice to conduct seismic exploration activities associated with the Trieste survey, including:

- Vehicle access across the land, keeping to existing roads and tracks;
- Personnel walking across the land to assess the various relevant landscape features;
- Surveying of seismic lines with the use of wooden pegs & biodegradable marking paint; and
- Placement of GPS base stations (see Section 3.6.1) on the land with no associated disturbance.

The UCL areas to the east of the EP320 will not be included in the access authority application due to the requirement for negotiation of a native title agreement to allow the grant of an access authority.

Table 3.1. Geographic coordinates for the boundary of the survey area

Location (moving clockwise)	Degrees, minutes, seconds	
	Northing	Easting
Northwest corner	29° 29' 56"	115° 14' 38"
Northeast corner	29° 30' 01"	115° 21' 12"
Southeast corner	29° 40' 44"	115° 21' 00"
Southern-most tip	29° 41' 48"	115° 17' 56"
Top of indentation	29° 40' 34"	115° 17' 44"
Southwest corner	29° 40' 27"	115° 14' 27"
Portion outside but adjacent to EP320		
Extension 1 (1.0 km^2)		
Northwest corner	29° 29' 50"	115° 15' 05"

Location (moving clockwise)	Degrees, minutes, seconds	
	Northing	Easting
Northeast corner	29° 29' 54"	115° 20' 05"
Southeast corner	29° 29' 55"	115° 20' 05"
Southwest corner	29° 29' 55"	115° 15' 05"
Extension 2 (6.7 km^2)		
Northwest corner	29° 29' 54"	115° 20' 05"
Northeast corner	29° 29' 54"	115° 21' 12"
Southeast corner	29° 31' 54"	115° 21' 06"
Southwest corner	29° 31' 54"	115° 20' 05"
Extension 3 (17.2 km^2)		
Northwest corner 1	29° 34' 15"	115° 20' 05"
Northwest corner 2	29° 34' 09"	115° 20' 33"
Northeast corner	29° 34' 09"	115° 21' 08"
Southeast corner	29° 39' 55"	115° 21' 02"
Southwest corner	29° 39' 55"	115° 20' 05"

The current survey design is 218 km² of 3D reflection seismic lines (with a potential minimum scope of 150 km²). The survey is situated in a complex landscape of intense cropping and grazing land on freehold, as well as UCL with remnant native vegetation. The survey area comprises 25 major parcels of land held by 13 individual titleholders, including the Crown, as outlined in Table 3.2 and illustrated in Figure 3.2. Lattice will not enter properties unless it has the written agreement of landowners and will avoid surveying in and directly alongside the Arrowsmith River, all road easements and conservations reserves.

Table 3.2. Landowners within the proposed survey area

Landowner name	Property identifier	Primary land use	Area (km^2)
Arawa Farms Pty Ltd	998965, 946317, 999056, 999058, 998967, 998969, 12032270	Cropping	61.5
WA State Crown land	720670, 999008, 1083586, 1356260	Undeveloped (native vegetation) – unallocated crown land (UCL)	45.0
Mallee Land Company Pty Ltd	99902, 99903	Farming for carbon sequestration	19.0
Mary Anne Brenkley	999007, 11426575	Cropping	16.0
Christopher and Robyn Patmore	946307	Sheep grazing	15.0
Peter & Donna Summers	1083788	Sheep grazing	14.5
Kumarina Holdings Pty Ltd	946308	Cattle grazing	13.5
Aiden Wayne Obst	999056	Cropping	9.5
Dianne Morgan	1326305	Cropping	5.5
Sando WA Pty Ltd	999053	Cropping	5.0
Ashley Auld	946377	Cropping	4.0
Catherine Auld &	946376	Cropping	4.0

Landowner name	Property identifier	Primary land use	Area (km^2)
Max and Rosemary Edwards			
IAI Australia Fund II	998971	Cropping	2.0

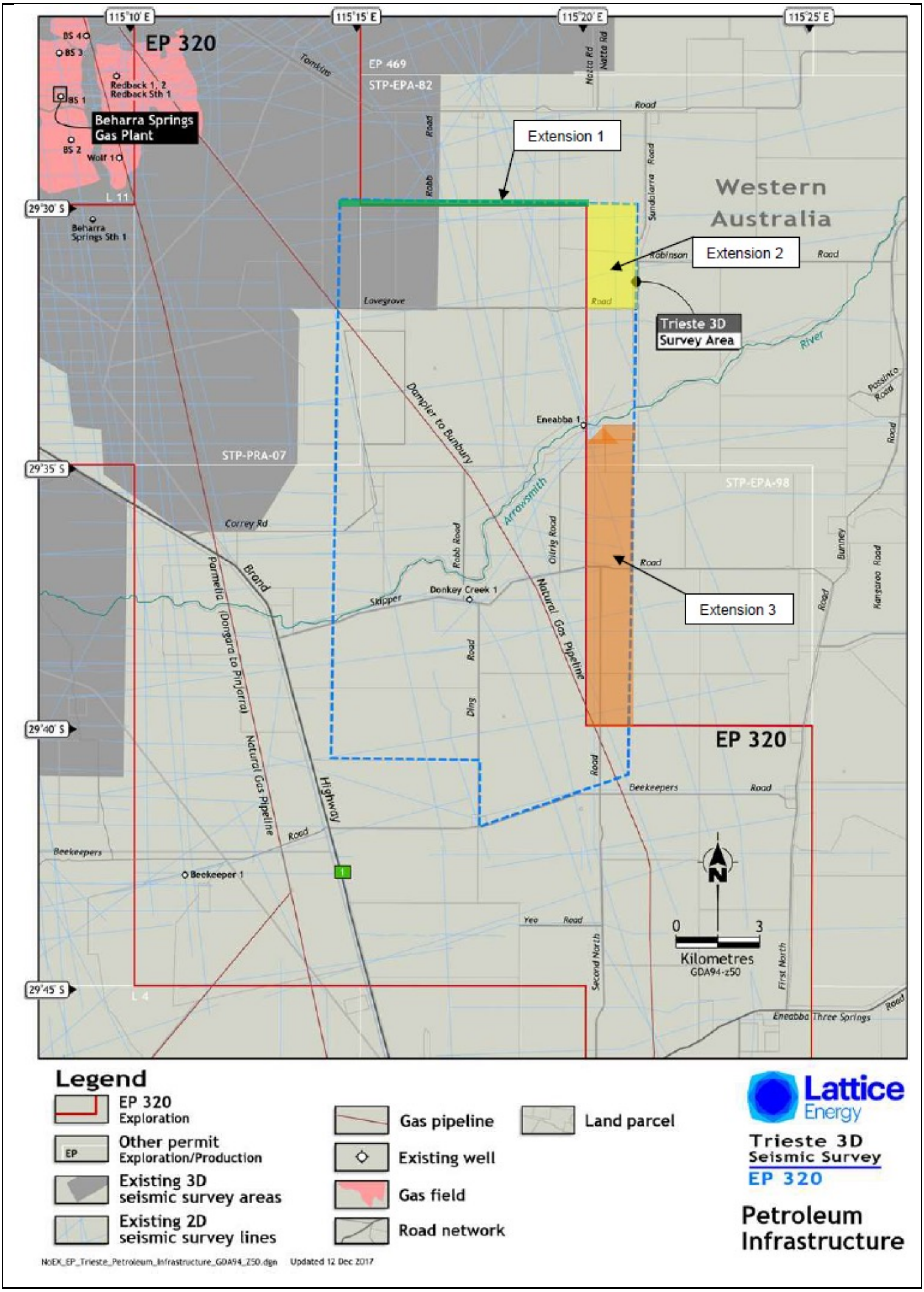


Figure 3.1. Extensions of the survey area beyond the EP320 boundary

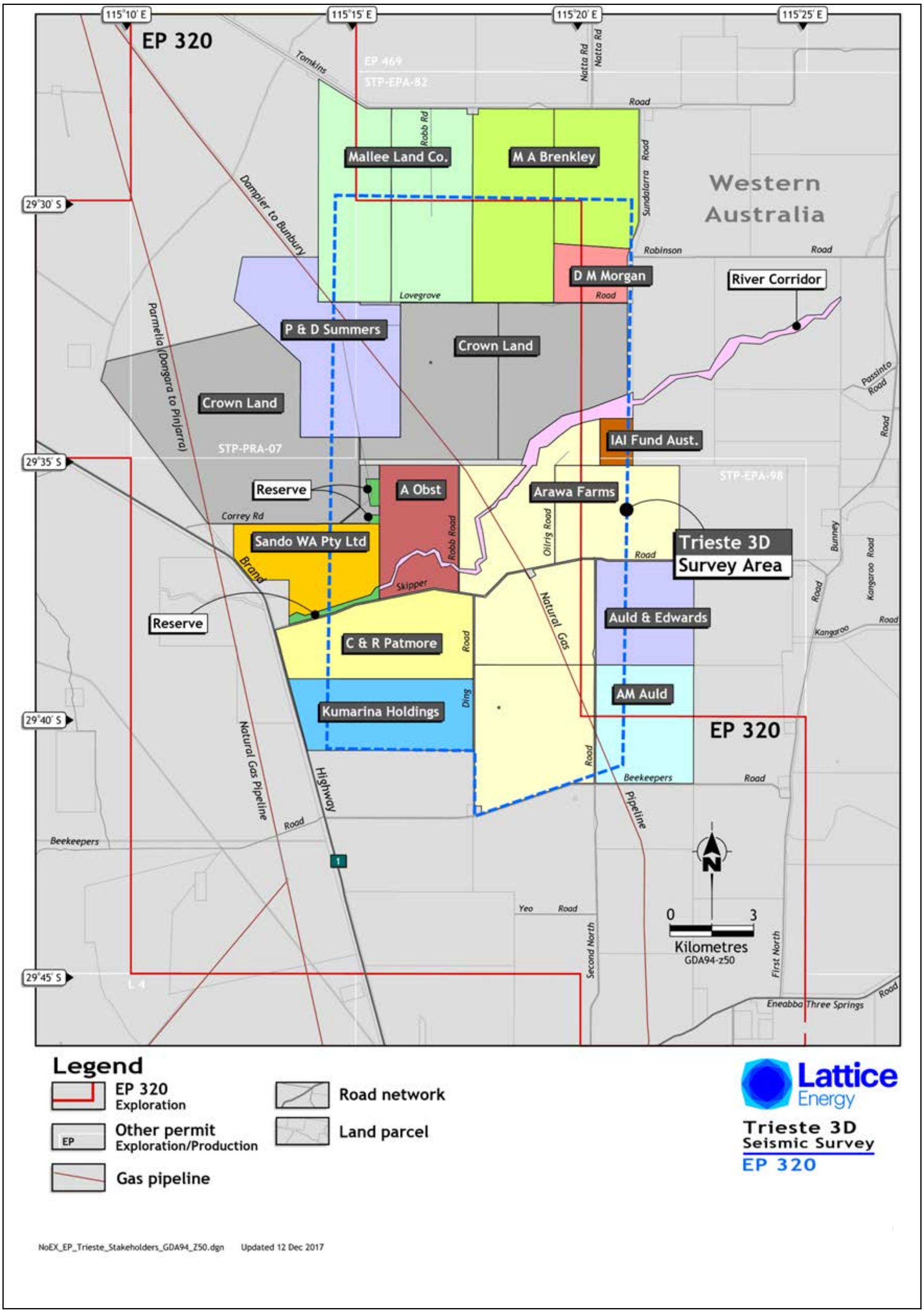


Figure 3.2. Landholders in the proposed survey area

3.2 Timing

The survey is expected to take place over approximately 5 to 7 weeks (~40 days). Work will only be undertaken during daylight hours, with a maximum 12-hour work day enforced. A preferred and alternative window of opportunity to undertake the survey is available to Lattice, as described herein.

3.2.1 Original Survey Window

The originally preferred survey window in which to undertake the survey (including line preparation) was between May 2018 and October 2018 (ideally May and June).

3.2.2 Revised Survey Window

Lattice submitted an application to DMIRS (on the 5th of December 2017) to suspend the second year of the EP320 permit (this seismic survey) by a period of seven months. This is because four of the 12 private landholders were unwilling to negotiate terms of access unless Lattice committed to an acquisition window in the summer of 2018-19 so as to minimise impacts on their farming businesses (i.e., the timing of the survey will impact on cropping cycle, lambing season, weed management and land sale process). The four properties in question form 43% of the survey area and are located where Lattice expects to obtain the most critical information about the subsurface prospects. Without access to these properties, the survey will not meet its primary technical objectives.

The suspension application was granted on the 12th of January 2018. This being the case, the survey window is extended until May 2019. This means the revised survey window is the start of November 2018 to the end of May 2019. Ideally, line preparation will occur during November and/or December 2018 to align with stakeholder expectations regarding minimising disturbance to lambing and cropping seasons.

As a result of the granting of the suspension, one landholder has signed an agreement with Lattice and one landholder has re-commenced negotiations. Unrelated to the suspension, the remaining two landholders are in the process of selling their properties and Lattice will continue to liaise with the new owner(s) upon settlement.

Exact timing is contingent on receipt of environmental approvals (see Section 2.2), landholders' farming activity schedules, weather and ground conditions (as outlined in Figure 3.3).

3.3 Purpose

The purpose of this survey is to map geological formations within the EP320 exploration permit, and forms part of the 100 km^2 second year permit commitment. The data acquired will be used to map geological formations and assess the potential of these formations to hold gas deposits.

The acquisition of a 3D seismic data set in the southern region of permit EP320 will assist with the delineation and de-risking of a number of prospects and leads to the south east of the Beharra Springs Gas Facility. The technical objectives of the survey are to:

- Image the stratigraphic section below the Kockatea Formation from Dongara sandstone to the Holmwood Shale, including the Kingia and Highcliff sandstone intervals;
- Image the Cattamurra Formation interval (secondary target);
- Define the extent of closure updip of existing wells Eneabba-1 and Donkey Creek-1; and
- Delineate faults that have to potential to compartmentalise any hydrocarbon reservoirs.

3.4 Survey Design

This section describes the design of the proposed Trieste 3D seismic survey. Figure 3.4 illustrates the design of the seismic lines.

3.4.1 Survey Contractor

After going through a competitive tender process, Lattice awarded the contract for the survey to Terrex Pty Ltd (Terrex) (http://www.terrexseismic.com). Terrex is Australian owned and operated and has been operating for over 30 years. The company has conducted over 900 seismic surveys in every onshore Australian basin, including 30 of the last 33 surveys in WA over the last 7 years.

Terrex has previously been nominated in WA for the 'Golden Gecko Award' for Environmental Excellence for surveys operated with Buru Energy in the Canning Basin and has been awarded Low Supervision Status for all of its field operations (line preparation, surveying and seismic acquisition) in South Australia (SA) by the SA Department of Statement Development.

Terrex maintains its own fleet of trucks, light vehicles, all-terrain vehicles (ATVs) and mobile office equipment in support of its acquisition services.

Terrex seeks to utilise local subcontractor Central Earth Moving for ancillary line preparation services. CEM works for many local authorities throughout the southwest of WA, providing mulching and slashing services for the DBCA, Department of Parks and Wildlife (DPaW), Department of Fire and Emergency Services (DFES) and maintaining the Dampier-Bunbury Natural Gas Pipeline (DBNGP) corridor, including the section through the proposed Trieste 3D survey area. As a result, CEM has a detailed intimate knowledge of weed and pathogen hygiene requirements particular to WA as well as addressing landholder's concerns regarding crop contamination.

Survey Contractor Selection Process

The selection of Terrex was via a competitive tender process. As Health, Safety and Environmental (HSE) compliance within this process was deemed of such high importance, a gated evaluation method was established. All bidders were required to pass the mandatory Stage 1 requirements of a compliant tender and successful completion of Lattice's HSE Level 1 Pre-Qualification. In addition to pre-qualification, Stage 1 included a HSE evaluation assessment of the proposed HSE controls and procedures relevant to the project outlined in each bid.

Only bidders that successfully passed the Stage 1 criteria were evaluated against the Stage 2 criteria, which consisted of a technical assessment of the proposed solution, indigenous participation and regional supplier engagement.

Stage 3 considered pricing of the bidders successfully passing Stage 2 evaluation criteria to ensure Lattice obtains the best commercial value with the most appropriately suitable supplier.

3.4.2 Source Equipment

Source lines will run in a north-south orientation.

To generate the energy required to image the subsurface, vibroseis buggies are used (the terms buggy and vehicle are used interchangeably). These are fitted with a hydraulic piston and a base plate. The base plate is placed on the ground by the hydraulic piston, which then generates a range of frequencies into the ground through a vibration process. The vibration length and frequency range will be decided at the beginning of the survey following a range of vibe parameter sweep tests.

Due to the high-pressure hydraulic systems and the noise generated by the hydraulic oil cooling fans, a personnel exclusion zone of 10 m is set around the vibroseis buggy. If an unauthorised person approaches the vehicle, it will be 'pressured down' which reduces the noise and pressure.

The vehicle is driven by an experienced operator who carefully drives the vibroseis to each source point position. They are easily steered and can avoid obstacles and sensitive environmental areas.

Once at the source point (located every 20 m along the survey lines), the operator lowers the base plate and the recording truck is informed that it is ready at its position. As long as it is safe to do so, the recording truck then sends a radio signal to start the vibration. Each vibration will last 16 seconds depending on the in-field testing and the frequency range selected to best image the subsurface target reflectors. Once the vibration is complete, the base plate will be raised and the vibroseis vehicle is then driven carefully to the next source point. At all times, the operator can shut down the system for safety reasons (such as a person moving into an exclusion zone). There is minimal footprint left by this action.

The type of vehicle proposed for use on this survey is a heavy vibroseis Inova AHV-IV Commander (Figure 3.5, Plate 3.1). This type of vibroseis vehicle is an articulated 'buggy' with the vibrating piston and hydraulic controls mounted in the centre. They will be fitted with balloon tyres so as to minimise the potential for soil compaction. Technical specifications of a typical heavy vibroseis vehicle to be used on this project is provided in Figure 3.5. The buggies are 10 m long and 3.4 m wide with a maximum peak force of 27,216 kg (60,000 lb). The baseplate has an area of 2.5 m^2 with a clearance of 46 cm. The ambient noise of the heavy vibroseis vehicles is approximately 79 dB(A) 7 m from the vehicles operating at full engine revolutions per minute.

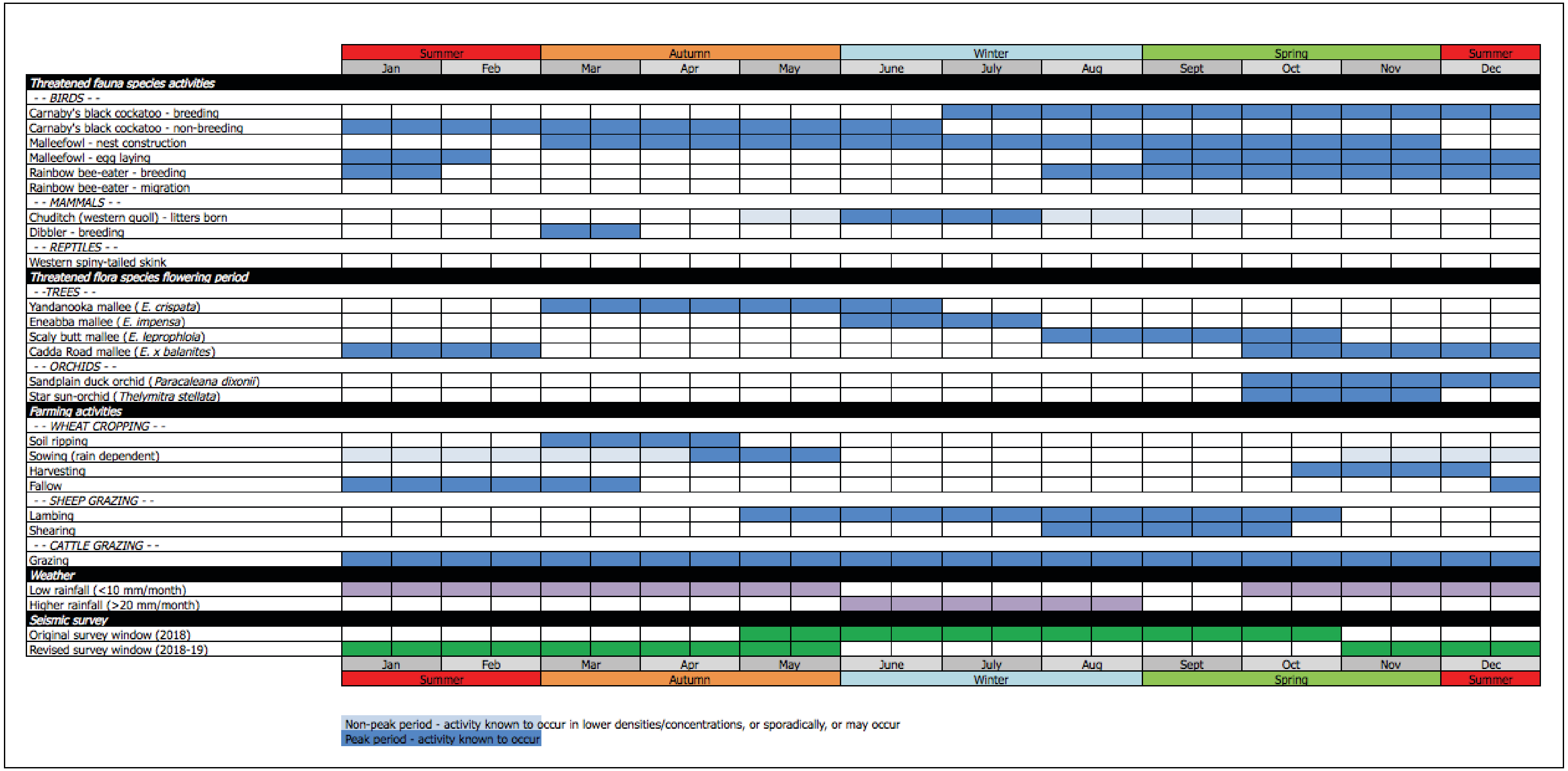


Figure 3.3. Ecological, landuse and weather constraints of the survey area

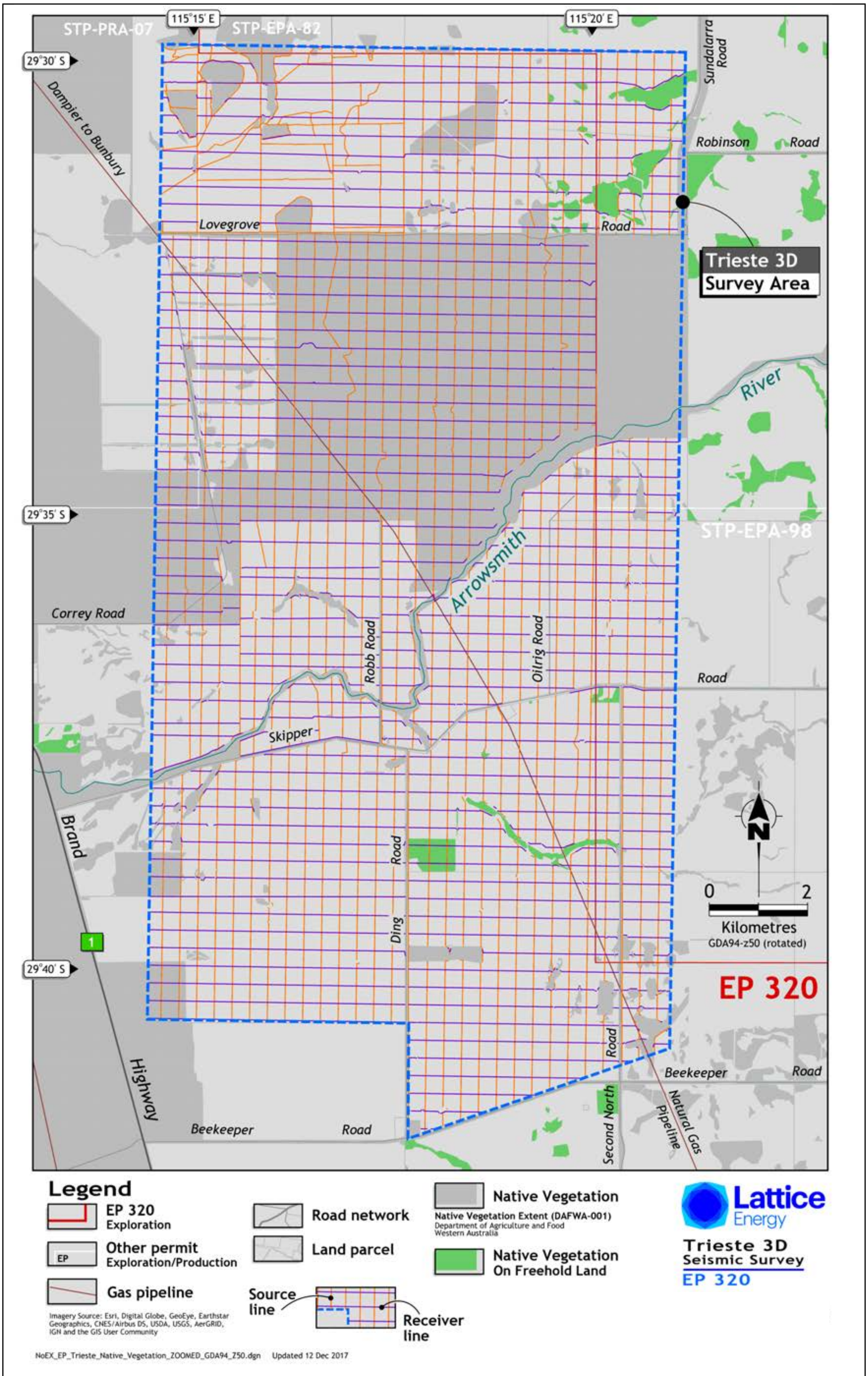


Figure 3.4. Survey source and receiver lines

Source Products

INOVA

AHV-IV™ COMMANDER (PLS-364)

FEATURES

- Accurate weighted-sum ground force estimate
- Stiffer baseplate designed for improved coupling
- Increased force output
- Broad bandwidth
- Lower distortion
- INOVA's Patented Pre-Loaded Stilt Structure prolongs the life of parts
- Simplified Operator Controls
- Improved Operator Visibility
- Certified Roll-Over Protection
- Simplified Hydraulics
- Fewer Hoses & Components
- Articulated, Oscillated Steering

TECHNICAL SPECIFICATIONS - PLS-364 ACTUATOR

Shaker Model:	P-Wave Vibrator; PLS-364
Peak Force:	275 kN (61,800 lb)
Piston Area:	132.9 sq cm (20.6 sq in)
Mass Weight:	4,998 kg (11,020 lb)
Driven Weight:	2,027 kg (4,469 lb)
Useable Stroke:	9.83 cm (3.87 in)
Frequency Limit:	1 Hz to 250 Hz
Mass Accumulators (2):	3.8 L (1.0 gal.) Servo Manifold
Lift Stroke:	97 cm (38 in)
Balance Method:	Airbags
Isolation Method:	Airbags
Hydraulic System:	Closed-loop
Hydraulic System Pumps:	2 x 119 cc (7.25 in^3); Denison P-7
Servo Valve:	Atlas 240H (with DR modification)
Pilot Valve:	MOOG
Filtration:	3-micron absolute servo filter; 3.5-micron absolute, high and low pressure, triple element
Accumulators:	2 x 19 L (5 gal); bladder-type
Heat Exchanger:	Steel core; multi-wing fan; hydraulically-driven
Reservoir:	170 L (45 gal)
Baseplate Type:	Reinforced rectangular
Baseplate Area:	2.5 m^2 (3,864 in^2)
Baseplate Clearance:	46 cm (18 in) - Tires
Winch Capacity:	13,608 kg (30,000 lb)

AHV-IV Commander

Figure 3.5. Specifications for the Inova AHV-IV Commander vibroseis buggy

Photo credit: Terrex.

Plate 3.1. The Inova AHV-IV Commander vibroseis buggy

Photo credit: Terrex.

Plate 3.2. Typical vibroseis buggy nose-to-tail acquisition process (note the balloon tyres)

The survey will involve the use of 2 fleets of 3 vibroseis buggies, positioned on the source line nose-to-tail (example of nose-to-tail travel shown in Plate 3.2). The buggies will be synchronised to acquire each source point simultaneously.

Operation of the buggies will take place only during daylight hours (which in turn will minimise disturbance to nocturnal fauna).

The vibroseis buggies will be fitted with one of the following global positioning system (GPS) acquisition systems: a Trimble BX982 Novatel OEM-V or Novatel OEM-628 that have a manufacturer's specification horizontal accuracy of <10 mm for the Real-Time Kinematic (RTK) navigation system using the UHF radio network, or up to 25 cm using the OmniStar satellite subscription.

3.4.3 Receiver Equipment

Receiver lines will run in an east-west orientation.

The receiver equipment will be in the form of SmartSolo cable-free nodes. Each nodes consists of a single internal geophone sensor, a battery power supply, data storage and GPS timing card. Nodal technology eliminates the need for cables, strings of geophones, line batteries and the requirement for a separate recorder vehicle to follow the vibroseis vehicles. This is a significant reduction in the equipment required for the survey, meaning a smaller line crew and less manual handling during deployment, moving of spread and recovery. Human interaction with vehicles and repetitive tasks are also reduced, further reducing the crew's safety risk profile. Fewer vehicles are required, thereby reducing the exposure to land transport risks and the reducing the survey's environmental footprint.

Nodes are devices typically about the size of a small tin of fruit and are a cable-free way of acquiring seismic data (Plate 3.3). Each node's geophone, electronic circuitry and battery are contained in high-impact rugged casing. They are light-weight devices capable of recording data for up to 50 days (12 hrs/day). The nodes are coupled to the soil via a short spike that is pushed into the soil manually by foot, or where greater ground connectivity is required, they can be inserted completely into the soil so that the top of the node is flush with the soil surface.

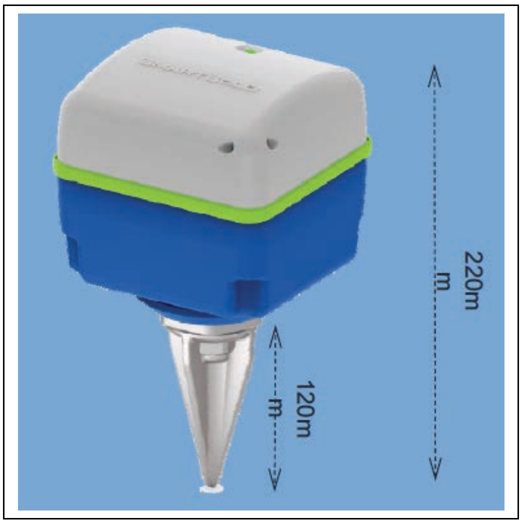


Plate 3.3. Typical receiver node

The nodes will be spaced at 20 m intervals along each planned receiver line location. Deployment of nodes will occur from the back of a four-wheel drive (4WD) deployment vehicle. ATVs with balloon tyres will be used on private farming properties to reduce the potential for soil compaction in cropping lands.

Following the physical placement of the node in the ground, a person with a hand held terminal sets up the node with coordinate information, its station number and a wake-up time.

It is proposed that the nodes be left in the ground for periods of approximately two weeks at a time for the duration of the recording operations at which time they will be collected, data harvested and battery changed. A series of tests is performed on the nodes to ensure each node is functioning correctly before being made available for redeployment. This will reduce the amount of daily vehicle movements required throughout the duration of the survey. Due to the remoteness of the proposed survey area from human settlements, night security (to ensure nodes are not stolen or otherwise interfered with) will not be required.

The buggies acquire survey data by operating centrally to a rectangular group of nodes known as an active patch (Plate 3.4).

Photo credit: Lattice.

Plate 3.4. Vibroseis vehicle working in an active group of nodes

One or more data collection and charging racks are mounted in a suitable facility, typically located at the crew base or designated project laydown area.

3.4.4 Vehicles Used during the Survey

The vehicles required during the seismic acquisition period are outlined in Table 3.3.

Table 3.3. Advance party vehicle requirements

Vehicle purpose	Quantity	Description
Acquisition crew vehicles		
Harvester (Plate 3.5)	1	International Eagle prime mover with 40-foot container on a Skel trailer
Spread movement	4	Kubota diesel RTV-X1120D fitted with roll-over protection structure (ROPS) and in-vehicle monitoring system (IVMS)
Spread checking	2	Kubota diesel RTV-X1120D fitted with ROPS and IVMS
Crew supervisor	2	4WD mine-specification fitted with IVMS, first aid and snake bite kits
Line crew transport	7	4WD mine-specification fitted with IVMS, first aid and snake bite kits
Vibroseis service/fuel	1	4WD vibrator service unit with bulk diesel fuel tank, hydraulic oil tanks, fire extinguishers, spill response kits, tools and spare parts
Equipment transport	1	B-double nodal spread truck
Recording truck/ 15Kva generator (Plate 3.6)	1	4WD recorder truck with air-conditioned 240V generator, fire extinguishers, spill prevention kits, communications mast and spare parts
QC truck (Plate 3.7)	1	Quality control and seismic processing field office
Energy sources		
Vibroseis (see Plate 3.1)	7	AHV-IV PLS-364 60,000lb “Commander” vibroseis buggy fitted with balloon tyres
Source control	1	Seismic source - Universal Encoder II
Vibrator control	7	Seismic source - Force III

Vehicle purpose	Quantity	Description
Source driven guidance	7	Navmini GPS guidance tablets
Hard wire hardware	7	Seismic source
Sandwich Box Mark II QC Hardware/Software with Tough Book Laptop	1	A mobile-independent vibrator QC test system. Sandwich Box is a hardware/software product that acquires and processes vibrator data using independent accelerometers (supplied with the system). Plus maintenance kit and a Pelton accessory kit.

Plate 3.5a. Harvester truck

Plate 3.5b. Harvester and generator set

Plate 3.6. Recording truck

Plate 3.7. QC truck

Photo credits: Terrex.

3.5 Survey Line Preparation

Line preparation for the survey will be restricted to vegetation mulching (and slashing where required). This ensures that no vegetation root mass is removed and aids in rapid regeneration at the completion of the survey.

The line preparation machinery will be fitted with a real-time sub-1 m accuracy positioning solution to allow the line clearing equipment to accurately follow the path of the line data provided. There will be the ability to deviate 40 m either side of the centreline pre-plot data where required to avoid any unsuitable terrain or obstacles such as habitat trees and rocky outcrops, though the requirement to do this is likely to be minimised due to detailed pre-seismic botanical survey work along the planned seismic lines which will have already taken these constraints into account during this work (see Section 5.2.1).

Wherever the survey lines terminate at public road reserves, Lattice will endeavour to design the lines to have 'dog legs', with the length of these doglegs to be determined by the spotting crews (see Section 3.6.2). Doing so aims to eliminate the straight-line corridor effect, which in turn reduces the visual impact associated with line clearing and reduces the potential for third-party traffic (e.g., dirt bikes, tourist vehicles) to access the survey lines.

No fencing will be erected for the survey. Lattice will, however, ensure that a fully equipped fencer and crew is hired to repair any gates or fences inadvertently damaged during the survey.

The vehicles required during this pre-survey (i.e., advanced) work are outlined in Table 3.4. A spill response kit will be on site for this pre-survey work.

No line clearing will take place within or along the verges of any public roads.

Table 3.4. Advance party vehicle requirements

Vehicle purpose	Quantity	Description
Mulcher	2	Universal forestry mulcher 150-290 HP
Slashing	1	Tractor/slasher
Surveying	3	4WD mine-specification, fitted with IVMS, first aid kit and snake bite kit
Fire fighting	2	200-litre water capacity fire-fighting unit
Advance party management	2	4WD mine-specification, fitted with IVMS, first aid kit and snake bite kit
Infield Access - Kubota	6	Kubota diesel RTV-X1120D fitted with ROPS and IVMS

3.5.1 Seismic Line Geometry Selection Process

To meet the sub-surface technical imaging requirements, it was necessary to consider the large range of target depths from 1,500 m to 5,000 m, and the existing 2D seismic data quality that is some of the poorest in the north Perth Basin due to the nature of subsurface geology in this area. Previous 3D seismic survey geometries in the Beharra Springs area have been 240 m x 240 m or 240 m x 480 m. The 240 m x 240 m geometry provides superior subsurface imaging (e.g., Hovea 3D seismic survey). Hence, 240 m x 240 m was the initial preferred geometry for the Trieste 3D project, because it can generate a clearer sub-surface image in poor data areas.

Following an in-depth technical design review of the survey parameters focusing on the minimisation of the survey footprint, Lattice was able to establish a much sparser set of parameters at 360 m x 360 m. Lattice examined vintage 2D data parameters to gauge the field effort required to appropriately image the target. It was clear that the 75-fold vintage data was extremely poor in the zone of interest (Figure 3.6). Fold coverage represents the number of traces (trace density) within a given area (trace being a sound reflection point between a receiver and the source). The higher the number of traces, the higher the fold. It was evident that a 240 m x 240 m design would be the lowest risk option, however Lattice's goal was to design a survey without increasing the equivalent field effort for the 3D survey, and in turn reduce the environmental footprint of the survey. By taking advantage of the following modern technologies, Lattice identified a compromise design that will successfully meet project goals through the use of:

- Improved vibrator technology;
- Larger maximum offsets (offset is the distance between the receivers and the source, whereby large offsets image a deeper target and short offsets image shallow targets);
- 3D noise reduction technology; and
- 3D imaging technology.

Additional measures designed to minimise the project footprint include compensating the reduced field effort with other parameter measures such as the use of more geophones along each line, and adopting a vibrator signal that attempts to compensate for the poor data by adding more low frequency energy into the ground. Data analysis indicates that a 360 m x 360 m line spacing will achieve the minimum imaging objectives while minimising environmental impacts.

The resulting survey design has a very similar overall fold to the vintage 2D. In other words, Lattice is not increasing the equivalent field effort for the 3D survey over the ineffective historic data parameters. Figure 3.7 illustrates the design options considered in arriving at the compromise design.

Even with this carefully considered survey design, there are risks on achieving the desired subsurface image. However, Lattice believes that it has optimised the design to minimise the field impact while avoiding the risk of having to return to acquire additional data as a result of inadequate parameters. It is evident that a sparser seismic grid would fail to achieve the objectives.

The maximum line clearing widths are 4 m. Lattice will endeavour to reduce the width of 20-50% of the receiver lines at the time of line preparation; such width reductions cannot be determined in advance.

No line preparation work will take place within environmentally or culturally significant areas, which includes the riparian vegetation along the Arrowsmith River (within its cadastral boundaries), the conservation reserve in the southwest portion of the survey area and the wandoo woodland in the north-eastern part of the UCL.

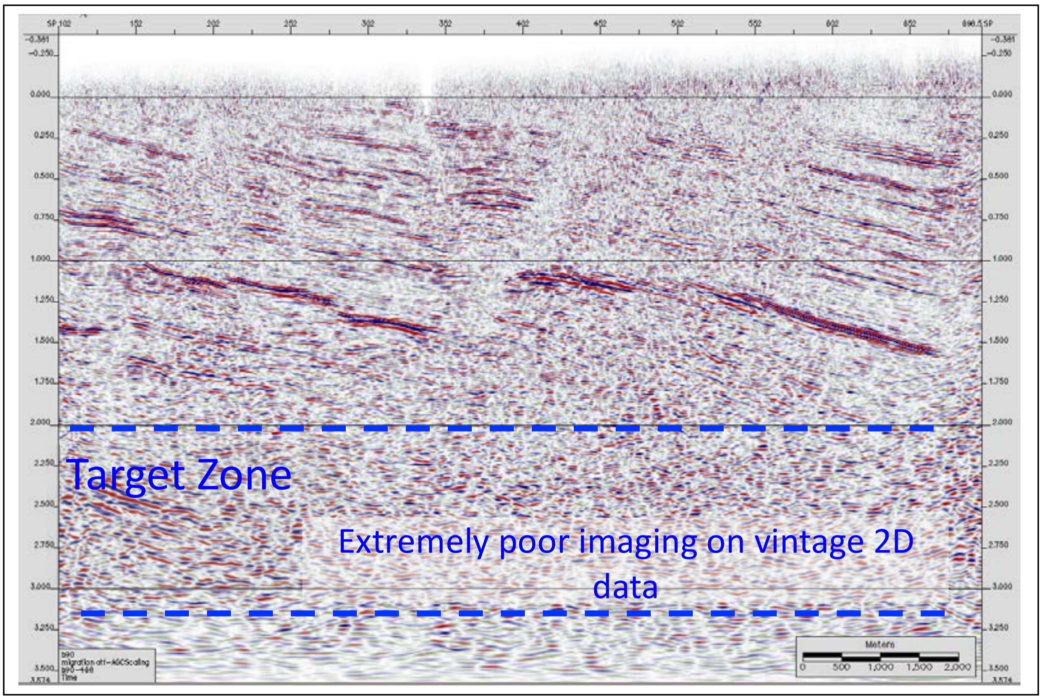
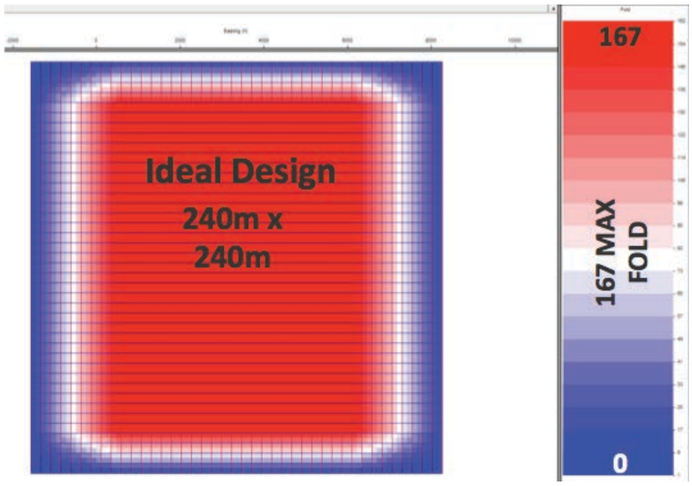
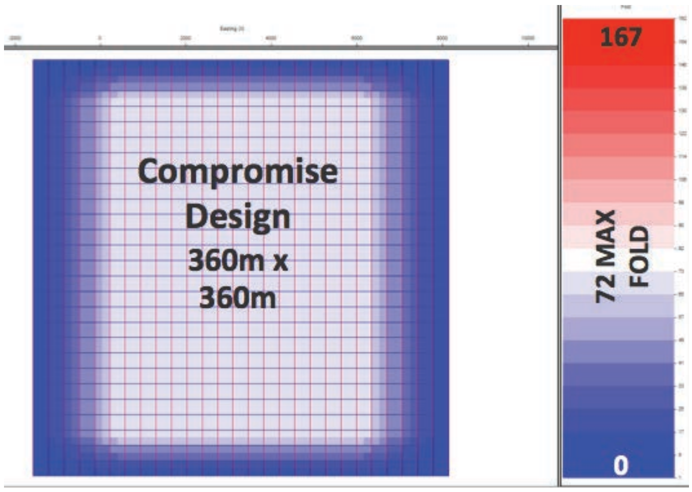


Figure 3.6. Example of vintage 75-fold 2D seismic survey data over the target area



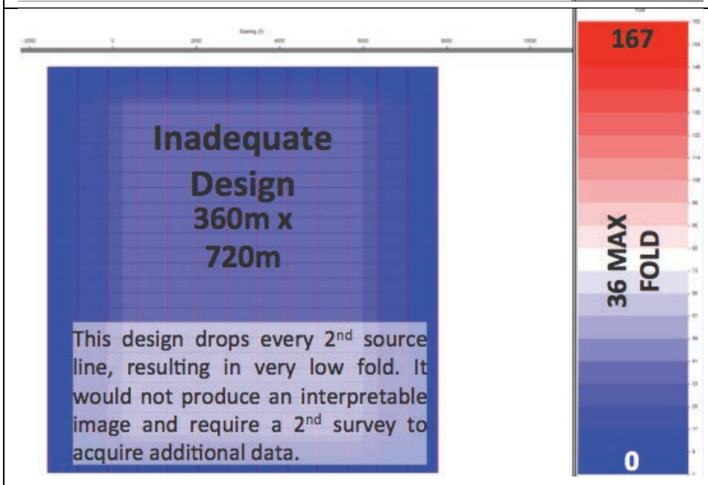
Ideal design

240 m x 240 m design



Compromise design

360 m x 360 m



Inadequate design

360 m x 720 m

This design removes every second source line, resulting in very low fold that would not produce an interpretable image. This would require a second survey to acquire additional data.

Figure 3.7. 3D survey design options considered in reaching the compromise design

3.5.2 Line preparation in Private Farming Properties

Line preparation in areas of sheep and cattle grazing and cropping will not involve vegetation clearing:

- Cropping areas – nodes will only be deployed and surveying undertaken when the land is fallow in order to minimise disruption to farm activities.
- Grazing areas – grazed pasture grasses will be sufficiently low so that slashing is not required to allow access for node deployment and vibroseis vehicle travel.

Line preparation will involve a:

- 4WD tractor fitted with balloon tyres (to reduce soil compaction) with a front attachment to push or move small obstacles;
- Fire tender vehicle (Gator/Mule equivalent) fitted with a minimum 200-litre water capacity fire-fighting unit fitted with a high-pressure pump, hoses and nozzle in order to extinguish any fires that may be ignited (Plate 3.8). The fire tender unit will be present and operational at all times; and
- Tilt tray or equivalent truck to move the machinery to and from properties via the designated wash down facility.

There are five parcels of native vegetation on private farming properties that will be subject to line clearing using the methods outlined in Section 3.5.3, below.

Photo credit: Terrex.

Plate 3.8. Fire tender vehicle

3.5.3 Line Preparation in Crown Land

Mulching will be employed to prepare survey and receiver lines in areas of native vegetation, which occurs predominantly on Crown land (with five small areas in four private farming properties). This will involve a:

- Mulching vehicle (Plate 3.9) capable of mulching seismic lines as required in scrub and bushy areas to a width <4 m (balloon tyres will not be used in Crown land where rough terrain makes such tyres prone to puncturing);
- Fire tender vehicle (Gator/Mule equivalent) fitted with a minimum 500-litre water capacity fire-fighting unit fitted with a high-pressure Onga fire-fighting pump, hose on reel and fire-fighting nozzle (see Plate 3.8) in order to extinguish any fires that may be ignited by the mulching activity. The fire tender unit will be present and operational at all times behind the mulcher during mulching operations; and
- Tilt tray or equivalent truck to move the machinery to and from properties via the designated clean down facility.

Forestry mulchers will be used for this activity, which are able to cut vegetation at or near ground level (generally the mulching height is set to between 5 cm and 10 cm from the ground depending on terrain) and drop the debris back on the soil surface, leaving topsoil and root stock undisturbed. This promotes faster regrowth (particularly with sclerophyllous native vegetation) and removes the need to undertake active revegetation. Vegetation trunks or limbs larger than 20 cm diameter at breast height (DBH) cannot be processed by the mulcher and are therefore avoided. This also results in habitat trees (mature trees and those with nesting hollows) not being cleared. Figure 3.8 illustrates the survey lines that will require mulching.

Lattice has elected to pursue the mulching methodology (essentially ‘mowing’) rather than vegetation rolling (essentially ‘squashing’). Using the expertise of Terrex working in the Perth, Cooper-Eromanga and Surat basins, rolling is not preferred because:

- Rolling still requires a bulldozer or loader doing raised blade clearing, with the remnant vegetation debris being further rolled in order to flatten it to an acceptable level for driving over. In thickly vegetated areas this works to a varying degree, but as often as not, the result is unacceptable to the subsequent users (seismic crew) and the recovery is often patchy. In desert environments, the raised blade technique is used, with the debris swept to the side for raking back in later (this achieves the same end result without the compaction from rolling). With the bulldozer unencumbered by towing the rollers, it is much more manoeuvrable and can be more selective on what vegetation is cleared.

- Rolling results in two possible outcomes:
    1. The rolled plant survives and grows back in a malformed shape, resulting in it taking up much more surface area and possibly hindering the regrowth of nearby vegetation.
    2. The plant dies and the broken vegetation remains aloft from the soil surface, therefore taking longer to breakdown. This retards regrowth by creating a screen and denies the surface organic matter for longer. Quite often more established plants are uprooted.
- Based on experience in the Surat Basin, the rolling method means the lines remain clearly visible at ground level many years after the line was cut and much longer than neighbouring mulched lines, where the immediate return of mulched material and seed to the soil surface produces both erosion protection and nutrients to enhance regrowth.
- Rolling vegetation results in a higher risk to personnel and equipment, as the rolled vegetation creates a trip and spike hazard causing injury to personnel and damage to tyres, radiators, vehicle undersides.
- Rolling produces a poor coupling environment for both the source and receivers. This means much longer time is spent on rolled lines trying to achieve the same level of data quality, greater compaction issues and increasing the need for further active rehab later – nullifying any possible benefit of using rolling in the first place.

On the other hand, mulching is preferred over rolling because:

- Mulching uses conventional agricultural tractors to mulch and distribute the debris evenly across the cut path. It has a smaller surface impact and can be more selective in what vegetation to clear.
- There is no topsoil disturbance, reducing the risks of erosion and impacts on water filtration into the thin topsoil layer containing the seed resource, in turn reducing the potential for weed invasion and establishment.
- The very nature of mulching means operators select a path of avoidance around established vegetation as a matter of necessity, thereby preserving large trees that are important for nesting, roosting and foraging for various bird, possum and bat species.
- Rootstock is much more likely to stay in place than rolling as the plant stem is cut rather than pushed over (particularly true for sandy environments).
- The mulched debris breaks down quickly to return nutrients to the soil.
- Terrex has employed this technique on several seismic surveys in the Perth Basin in the recent past, including the West Erregulla survey and Arrowsmith survey, while government agencies including DPaW and DFES use this technique to create firebreaks and access tracks within parks and reserves. Mulching is also used to maintain vegetation on the Dampier to Bunbury Natural Gas Pipeline (DBNGP) easement.

Photo credit: Terrex.

Plate 3.9. Forestry mulcher vehicle

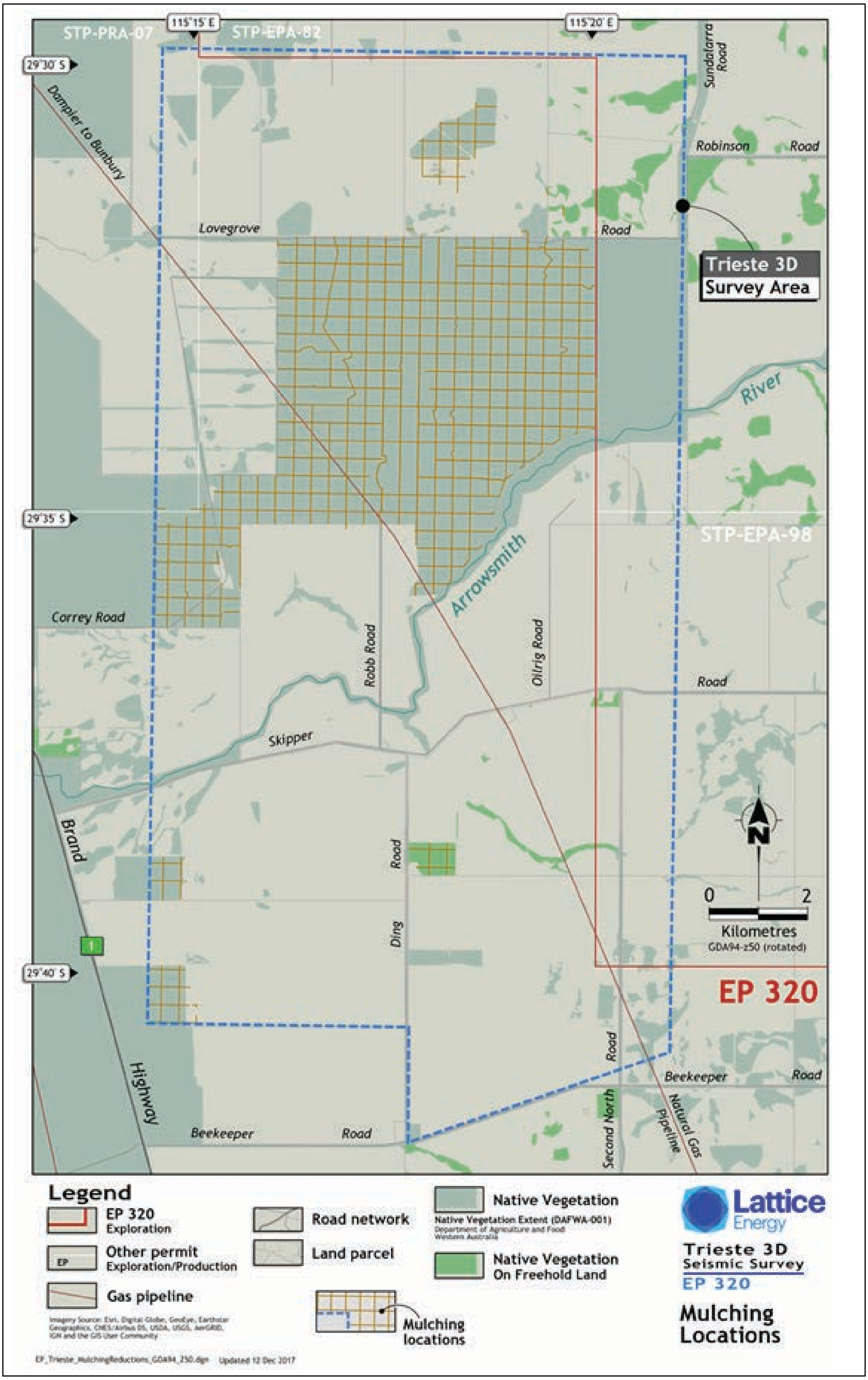


Figure 3.8. Native vegetation mulching locations

The total area of mulching of native vegetation is calculated as:

- Source lines – 152.6 km at a width of 4 m = 61 ha.
- Receiver lines – 157.48 km at a width of 4 m = 63 ha;
- This is a total of 310 line kilometres (**124 ha**) of native vegetation mulching.
- Of the total area of 6,834 ha of native vegetation within the survey area, this represents **1.81%** of native vegetation being mulched.

The following presents the hierarchy of controls regarding environmental management (avoid, mitigate and manage) to demonstrate that all considerations have been taken into account in minimising the amount of native vegetation clearing for the Trieste 3D seismic survey and associated impacts on threatened flora and fauna species.

Avoid	The following areas have been avoided in the survey area: • Unnamed conservation reserve in the southwest corner. • Riparian vegetation along the Arrowsmith River – to avoid potential breeding habitat of the Carnaby's black-cockatoo. • Roadside vegetation. • Wandoo woodland in the northeast part of the UCL – to avoid potential breeding habitat of the Carnaby's black-cockatoo. • Native vegetation within some private properties. • Section of source lines in the mid-western section of the UCL have been removed – to avoid potential damage to threatened orchid species recorded during the flora survey. These measures avoid the need to create 318 line kilometres through native vegetation, equivalent to 127 ha of mulching. Mulching these areas in addition to the existing areas to be mulched would have represented 3.67% of the total area of native vegetation (rather than the current 1.81%), so excluding them represents a reduction in mulching of 50.6%.
Mitigate	• Mulching of vegetation rather than bulldozing – to allow for natural regeneration from retained rootstock (see discussion in Section 3.5.3). • Trees and shrubs with a DBH >20 cm will not be mulched – to minimise losses of potential foraging habitat (and to a lesser extent, breeding habitat) of the Carnaby's black-cockatoo. • The mulchers will be guided by a Line Pointing Surveyor (see Section 3.5.4) – to minimise the risk of mulching in pre-determined sensitive sites (e.g., locations with threatened species, such as orchids). • Line preparation has been reduced from a standard width of 4.5 m to 4 m width. • Further reductions in mulching are expected to be realised by reducing an estimated 20% to 50% of receiver line widths down from 4 m to 2.8m in select locations. These locations will need to be established by Terrex at the time of line preparation to ensure they are implemented in a way that does not create a lack of access for the source vehicles or other operational complexities and safety risks, and meeting the objectives of the survey. For these reasons, these additional mulching reductions have not been factored into the calculated native vegetation mulching figures.
Manage	• Mulchers will be loaded with pre-determined and validated GPS data to ensure that source and receiver lines are prepared in accordance with ecological advice. • Mulched vegetation will be left in situ – to provide a seed source for rehabilitation, minimise soil erosion and compaction, and provide nutrients during the decomposition process for regenerating rootstock. • Rehabilitation monitoring will be undertaken to ensure successful vegetation regeneration (see Section 3.6.12).

Further detail regarding environmental avoidance, mitigation and management measures is presented throughout Chapter 7.

3.5.4 Line Preparation Support Work

A Terrex Line Pointing Surveyor will work closely with the line clearing crew, scouting ahead where possible and on-call throughout the day for assistance in the field.

The locations of the seismic lines will be under the guidance of the Line Pointing Surveyor using GPS navigation and where possible, compass and back sighting methods. The GPS data provided to the line pointer will be pre-loaded with the data provided as a result of the ecological surveys (see Section 5.2) so that threatened species or fauna habitat is avoided (wherever practicable).

The Line Pointing Surveyor is also responsible for the GPS guidance equipment that includes Algiz Tablets (with uBlox7 GPS and external antenna) with a 2.5 m horizontal and 10 m vertical accuracy, and Trimble R1 GPS units that have a 1 m horizontal and 3 m vertical accuracy.

All mulcher line preparation data will be downloaded each afternoon and processed in the survey office in the evening by the Line Pointing Surveyor. Updated maps that include 'No-Go' zones, environmentally sensitive areas, infrastructure and so forth will be uploaded onto the mulcher GPS guidance tablets each morning before the commencement of clearing, thereby ensuring the operator has accurate mapping and data.

The line clearing width will be kept to a minimum (as outlined in the blue box, previous page), thus reducing environmental impacts and landholder disruptions.

3.6 Ancillary Activities

This section describes the activities that are ancillary to undertaking the seismic survey.

3.6.1 Positional Surveying

To achieve source and receiver accuracy for the survey operations, a global positioning system (GPS) base station will need to be established within the proposed survey area (Plate 3.10). This will be established in an area that does not require any vegetation clearing. Such a site is typically no more than a few square meters in size and equipment will be removed at completion of the survey. The base station will not be erected within 10 m horizontally of any electric power cables and only non-conductive poles will be used.

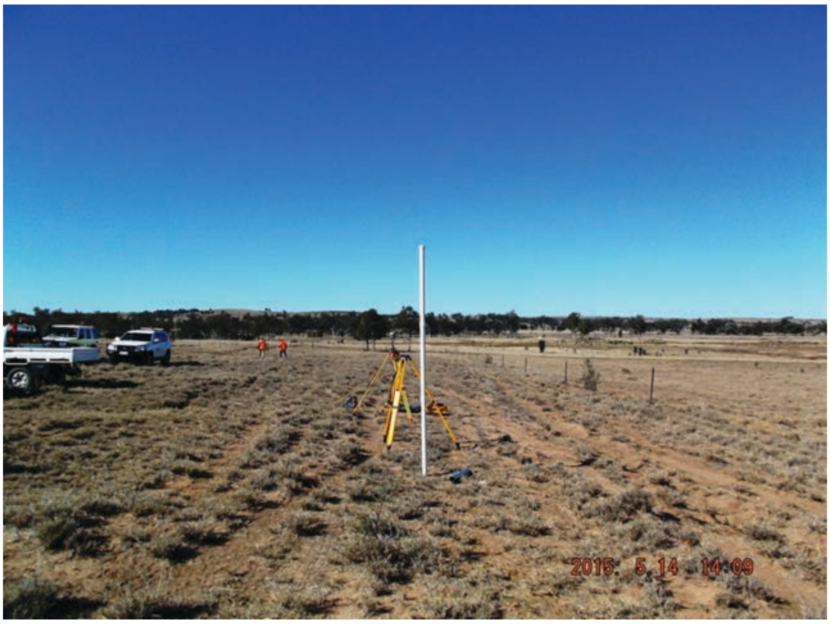


Photo credit: Lattice.

Plate 3.10. GPS base station

A surveyor uses a roving GPS unit, which receives corrections from a base station, to accurately locate pre-determined source and receiver positions. They are marked on the ground with either wooden pegs, biodegradable spray paint or a combination of both. The pre-determined positions are decided from desktop studies and designs based on satellite imagery, however conditions on the ground may dictate that the location of a source or receiver needs to be moved. The surveyors are able to move positions from their planned location if they encounter any environmentally or culturally significant sites or believe there will be safety concerns with the position.

3.6.2 Survey Layout

After the positional survey is completed, spotting crews will place nodes out along the surveyed and marked locations on the survey lines. Layout crews will walk equipment in to receiver positions where required, minimising ground disturbance through non-essential vehicular access.

Each layout crew is equipped with a handheld GPS or tablet PC, configured with line access routes, hazards, exclusion zones and receiver positions to enable efficient operations and precise planting of nodes. Terrex uses the Novatel OEMV/OEM628 GPS acquisition systems. These have a horizontal accuracy of 10 mm (using the RTK UHF radio network) up to 10 cm (using the OmniStar satellite subscription).

3.6.3 Laydown Area

A laydown area for the survey contractor to load, unload and store vehicles and equipment will be required. An area of approximately 50 m x 100 m (0.5 ha) of flat terrain will be secured on private property near the proposed survey area for a laydown area. Pending landholder approval, it is proposed to use space on the 'Riverbend' property gravel pit off Skipper Road (Plate 3.11) as the primary laydown area, and it will not require the clearing of native vegetation.

Photo credit: Lattice.

Plate 3.11. The entrance to the 'Riverbend' property

If required, a second laydown area of approximately 50 m x 100 m (0.5 ha) of flat terrain will be secured on private property in the northern part of the survey area for a secondary laydown area. Pending landholder approval, it is proposed to use space on the Westview property near the property sheds off Tompkins Road (Plate 3.12) and will not require the clearing of native vegetation.

Photo credit: Lattice.

Plate 3.12. The entrance to the 'Westview' property

A portable toilet will be provided at the laydown area, and this will be delivered, maintained and removed by a specialist hygiene company.

3.6.4 Weed Hygiene

All Lattice, Terrex and sub-contractor vehicles and machinery will arrive at the laydown yard (primary and/or secondary) ready to commence operations with a valid Lattice Vehicle and Mobile Plant Hygiene Inspection Report after implementing the weed hygiene protocols, as outlined in Section 7.4 of Terrex's Environmental Management Plan (Version 1, September 2017) and Section 5 of the Terrex Environmental Control Procedure (Rev 10, February 2018). The requirements of these plans and procedures are incorporated into Section 7.2.2 of this EP, and specify that:

- Clean down facilities are provided and used for the duration of the project;
- Blow down occurs in preference to wash down (to minimise the risk of spreading any existing *Phytopthora cinnamomi*, which requires water to spread);
- Not driving over areas other than formed access roads/tracks and survey lines; and
- Inducting all project personnel into weed hygiene management requirements.

Lattice will provide a wash down/blow down facility at the laydown yard, and additional wash down/blow down facilities will be provided within individual properties (depending on landholder requirements) (Plate 3.13).

Iluka Resources Ltd (Iluka) has also agreed to provide Lattice with the use of two automated wash down facilities (one located 3 km north of Eneabba on the Eneabba–Three Springs Road, and the other located at the Iluka Resources Mine Site Operations Centre, 5.2 km south of Eneabba). Lattice has prepared a plan for using the Iluka facilities (WAA-4000-P01-PLN), which will be adhered to by all project personnel. In brief, this plan specifies:

- Eneabba North wash down pad – Terrex will provide a water truck and high-pressure cleaner, as the water tank is not in use. The pad is available for use seven days a week.
- Mine site operations centre - once a vehicle is on the wash pad, high-pressure sprays of water from nozzles located under and beside the vehicle are activated and continue for 60 seconds. There is also a manual wash pad (that utilises high-pressure hoses and sumps) beside the automated pad.

The vehicles will comply with the weed hygiene measures specified in Section 7.2.2, which includes the requirement for all vehicles and machinery on site to be free of organic matter prior to commencing activities within the survey area and to be re-certified should a vehicle be taken off a formed road or track outside of the survey area. Disinfectants will not be used during wash down.

Photo credit: Terrex.

Plate 3.13. Weed blowdown process

Terrex will provide at least three crew members that are suitably trained in accordance with *Clean and Inspect Vehicle and Machinery* (AHCBIO201A) or equivalent.

All vehicles will arrive to the project area clean and certified as such, and before entering a new property, all vehicles will be blown down and re-certified as clean. If blow down is deemed to not meet hygiene certification requirements (e.g. ,after rain where soil has clumped to the vehicle), then the vehicle will be washed down at one of the Iluka wash down facilities or at the on-site temporary wash down station.

Lattice will provide six portable clean down mats (8x5 m bunded PVC) and two high-pressure gurneys for use at property entrance locations. All wash downs or blow downs undertaken on site will occur within these temporary clean down mats, and where water is used, this will be filtered through a weed seed mesh and be discharged to stable land. All organic matter collected in this process will be collected by ToxFree (see following section) and disposed at a contaminated waste disposal facility.

See Section 7.2.2 for the risk assessment relating to the introduction of weeds and pathogens.

3.6.5 Waste Management

Waste facilities will be located at the laydown yard/s (see Section 3.6.3).

Lattice will establish a contract with ToxFree (Geraldton) to supply skip bins for general waste, recyclables and contaminated waste (such as oily rags and used oil filters, contaminated soil from washdowns), collect the waste and dispose of it appropriately. ToxFree is accredited under the ISO 9001 (Quality), ISO 14001 (Environmental management) and AS4801 (Health and safety) certification systems. ToxFree currently services the Beharra Springs Gas Facility and the Cliff Head oil facility at Arrowsmith, conducting a bi-weekly run to Dongara and a weekly run to Eneabba.

Waste will be managed in accordance with Terrex's *Procedure for Housekeeping and Waste Disposal* (TS-PRO-40, Rev 3, Jan 2017). This includes measures such as:

- Establishing and using covered rubbish bins.
- Cleaning up spills immediately.
- Maintaining spill kits on site.
- Washing and maintaining vehicles in contained areas.
- Using recycling facilities where available.

It is expected that only small volumes of waste (several cubic metres per month) will be generated from the project. See Section 7.2.7 for the risk assessment relating to waste.

3.6.6 Chemical and Hydrocarbon Storage

The key sources of chemicals and hydrocarbons for the project will be the survey vehicles and equipment (e.g., fuel and engine oils used in the equipment and vehicles described in Table 3.3). Fuel storage volumes range from 30 litres (ATV) to 757 litres (vibroseis buggies) to 2,000 litres (refuelling truck).

Refuelling of vehicles and equipment will be managed in accordance with Terrex's SOP Refuelling (TS-SOP-GEN019, Rev 4, Jan 2017).

Bulk hydrocarbons and chemicals (i.e., those stored in drums or bulky containers) will be stored in accordance with AS1940 (The storage and handling of flammable and combustible liquids) at the laydown yard/s, though the volumes held are expected to be very low.

An OSCP (submitted with this EP) has been prepared for the project (WAA-4000-ENV-PLN), which outlines:

- Hydrocarbon spill scenarios;
- Spill preparedness;
- Spill response strategies; and
- Notification requirements.

See Section 7.2.8 for the risk assessment relating to hydrocarbon and chemical spills.

3.6.7 Dust Suppression

No dust suppression activities are likely to be required for the project due to the low level of vehicle travel over unsealed roads. However, Lattice requires that a 40 km/hr speed limit be observed on all roads and tracks within private property so as to minimise dust generation. Additional dust suppression controls may be required on individual properties dependent on landholder requirements, such as further speed restrictions or additional buffer zones around homesteads.

3.6.8 Fire Preparedness

Only a small amount of water will be required for the project, primarily to supplement a 200-litre mobile fire tender tank (see Plate 3.8). It is unlikely the fire tender unit will require additional water refills unless the contractor experiences an interaction with fire. Lattice will liaise with the Mid West DFES office in Geraldton to refine fire preparedness and response controls (see Section 7.2.5).

3.6.9 Water Access

Water will be required to wash down vehicles, to fill the fire tender vehicles and for dust suppression (where required).

The Water Corporation in Geraldton has authorised the provision of 4,000 litres every second day from the standpipe in Eneabba (Plate 3.14). The standpipe is located opposite the Eneabba General Store in King Street Eneabba. The secondary water collection point will be Beharra Springs Water Tank at Lattice's Beharra Springs facility.

Photo credit: Lattice.

Plate 3.14. The water standpipe in Eneabba

3.6.10 Workforce Accommodation

Suitable accommodation has been identified at the ESS Banksia Village (370 Johnson Street, Eneabba, 6518). This is located 14 km south of the nearest boundary of the proposed survey area. Two rooms have been set aside as office space for project personnel.

There is ample parking for trucks as well as light vehicles.

3.6.11 Survey Line Remediation

Immediately following completion of all seismic lines on a property, Terrex will undertake a thorough inspection of the lines to ensure that any impacts are noted and photographed and that any survey pegs, flagging, gate signs, equipment or general rubbish will be removed and appropriately disposed of. The Terrex HSE Representative will provide a line clearance report to the Lattice HSE Representative prior to demobilisation from site.

Remediation work will be undertaken as and where required (e.g., to stabilise erosion). Is it expected that very limited remediation will be required as a result of using the methodologies outlined in this chapter. As vegetation will be mulched (or slashed) only (allowing for natural regeneration from the growth of lignotubers or from fallen seed), it is not anticipated that active revegetation of seismic lines will be required.

3.6.12 Rehabilitation Monitoring

Lattice will monitor the rehabilitation of the survey lines using a specialist botanical consultancy for a period of up to five years or until rehabilitation completion criteria are met. It is anticipated that monitoring will be undertaken in year one and year two, and at this point, the frequency of monitoring will be reviewed based on the rehabilitation results. A Rehabilitation Monitoring Plan that outlines the monitoring methods to be used (e.g., photo monitoring, vegetation surveying) will be prepared ahead of the survey, and reviewed (and revised if necessary) at the completion of the survey once the extent of disturbance is confirmed. Lattice will consult with the DBCA during the preparation of the Rehabilitation Monitoring Plan (using experienced botanical and/or rehabilitation consultants) to ensure it addresses all issues of concern to the DBCA.

It is envisaged that the Rehabilitation Monitoring Plan will apply the following principles to rehabilitation monitoring:

- Monitoring will be undertaken annually during spring, with the potential for this to occur in other months to monitor significant flora.
- Several botanists will be used over a period of 1-2 weeks each season.
- About 20% of the seismic lines will be monitored, ensuring sufficient representation between the north-south orientated source lines and east-west orientated receiver lines.
- A range of landforms will be monitored (e.g., laterite ridges and flowlines).
- Areas where populations of the species identified as having the potential to be highly impacted by the survey (see Table 7.2 in Section 7.1.1).
- Transects of 50 m in length will be located within the survey lines, with recordings in 2 m x 2 m quadrats located every 5 m (i.e., 10 quadrats per transect). The same layout will be adopted in adjacent undisturbed vegetation 15 m from the survey lines. Species present in each quadrat and cover of each species will be recorded in order to facilitate statistical comparison between disturbed and undisturbed areas.
- Photos will be taken at the start of each transect and the geographic coordinates of the start and end of each transect will be recorded.
- The recovery of vegetation (e.g., re-sprouting, germination, bare patches) will be noted during the monitoring. The geographic coordinates of any significant flora will be recorded.
- The full suite of vegetation types will be monitored.

The following completion criteria will apply during the rehabilitation monitoring phase (to be reviewed, and revised where necessary, based on the site conditions at the completion of the survey) (which are also provided in Section 7.1.1 as rehabilitation environmental performance standards):

- Landforms are stable, with no erosion channels greater than 1 m long and 30 cm wide.
- No dieback (as a result of *Phytophthora cinnamomi*) is introduced to the survey area as a result of the survey activities.
- No declared or environmental weeds are introduced to the survey area as a result of the survey activities.

- Species richness compared with adjacent vegetation is:
  - 20% within 1 year of survey completion.
  - 40% within 2 years of survey completion.
  - 50% within 5 years of survey completion.
- Foliage cover compared with adjacent vegetation is:
  - 10% within 1 year of survey completion.
  - 20% within 2 years of survey completion.
  - 40% within 5 years of survey completion.

A rehabilitation monitoring report will be completed for each monitoring event. Following receipt of the monitoring report after year 5, if completion criteria are not met after 5 years, Lattice will analyse data to determine the trajectory of species richness (graphing number of species against years). Then if the trend shows:

- Increasing richness – continue rehabilitation monitoring and allow natural rehabilitation to continue.
- A levelling out of richness – seed with native perennial species during favourable establishment months (after first good winter rains).

Should active rehabilitation be required, it is covered by the EIA and ERA in this EP. Rehabilitation activities are limited to vehicle access along existing roads and tracks and foot access within mulched areas of native vegetation, which are addressed in this EP (specifically regarding dust emissions and introduction of weeds and pathogens).

However, Lattice's experience with seismic surveys in the region, including within EP320 itself, indicates that regeneration of mulched lines is successful in the long-term. For example, the Hibbertia 3D seismic survey was undertaken by Origin in EP320 in late 2001. Monitoring of rehabilitation along these mulched survey lines in 2002, 2003, 2015 and 2018 indicates that there were no signs of soil erosion and that many sites exhibited good regeneration very soon after the survey was completed. Thirteen years after the survey, vegetation cover on the majority of survey lines is such that they are not distinguishable from surrounding vegetation.

Any incidental damage to private or public property (e.g., to gates, fences or tracks) will be reported internally, reported to the landholders and restored in consultation with the landholder.

See Section 7.1.1 for the impact assessment regarding rehabilitation.

3.7 Project Alternatives

As the operator of EP320, Lattice is obliged to investigate the hydrocarbon potential of the permit area.

3.7.1 Alternate Locations

There are no alternative locations that will meet Lattice's regulatory obligations relating to the EP320 permit.

The objective of the survey is to image potential new gas field leads that if developed, will assist in securing continued gas supplies for the nearby Beharra Springs Gas Facility.

3.7.2 Alternate Technology

There are no reasonable exploration technology alternatives that will meet Lattice's technical and commercial objectives for the survey, or obligations to the State of WA, to acquire this data.

The alternative to mulching native vegetation is to undertake traditional clearing (which is not environmentally acceptable), or to 'roll' the vegetation. Terrex's experience indicates that vegetation rolling has inferior rehabilitation success to mulching (as discussed in Section 3.5.3).

3.7.3 Alternate Timing

The timing of the survey is linked primarily to the EP320 regulatory permit commitment to undertake a 3D seismic survey, the time required by Lattice to gain all regulatory approvals and third-party agreements and approvals, and consideration of each landholder's agricultural operations (see also Section 3.2).

3.8 Survey Summary

Table 3.5 summarises the proposed Trieste 3D seismic survey parameters.

Table 3.5. Summary of acquisition parameters for the proposed survey

Item	Nominal parameter
Earliest commencement date	Start of November 2018
Latest completion date	End of May 2019
Survey duration	5 to 7 weeks
Survey size	150-218 km^2
Estimated duration	26 days
Survey contractor	Terrex
Seismic source	
Type of vehicle	Heavy vibroseis with lugger tyres (in native vegetation) or balloon tyres (in farmland)
Number of vehicles	7 (2 fleets of 3 vibroseis buggies, plus one spare)
Energy source	AHV-IV vibroseis buggy
Source line orientation	North-south
Source line spacing	360 m
Source point interval	20 m
Seconds per sweep	16 seconds (subject to field testing)
Record length	7 seconds
Sweep bandwidth	3.5-80 Hz (subject to testing)
Receivers	
Acquisition system	Nodal
Sensor type	Geophone DTCC 'Smart Solo'
Receiver array	DT-Solo Single sensor centred on station
Receiver line orientation	East-west
Receiver line spacing	360 m
Receiver point interval	20 m
Line interval	360 m
Patch definition	12 lines x 432

4. Stakeholder Consultation

Lattice developed a Stakeholder Engagement Plan (SEP) for engaging stakeholders in the development of this EP. The SEP provides an operating framework and structured approach to Lattice's interactions with external stakeholders, and is summarised in this chapter.

4.1 Stakeholder Engagement Objectives

The key objectives of the SEP are to contribute to the development of the EP by:

- Identifying stakeholders;
- Facilitating stakeholder engagement, relevant to their interests;
- Ensuring compliance with relevant regulations;
- Meeting legislative requirements of the PGER Environment Regulations regarding stakeholder consultation; and
- Maintaining ongoing engagement with relevant stakeholders.

The SEP is relevant to all phases of the proposed survey, including:

- Development of land access arrangements with affected landholders;
- Development of this EP;
- Post-EP acceptance project planning;
- Survey operations; and
- Post-survey activities (e.g., rehabilitation).

4.2 Regulatory Requirements

The PGER Environment Regulations specify the following with regard to stakeholder consultation:

- Regulation 11(1)(f) – that the EP "demonstrates that there has been an appropriate level of consultation with relevant authorities and interested persons and organisations."
- Regulation 15(11) – that "the implementation strategy must provide for appropriate consultation with relevant authorities and other relevant interested persons or organisations."
- Regulation 17(1)(b) – that the EP must include "a report of all consultations between the operator and relevant authorities and other relevant interested persons and organisations in the course of developing the EP."

Section 3.9 of the *Guideline for the Development of Petroleum and Geothermal Environment Plans in Western Australia* (DMP, 2016a) also outlines the expectations regarding the stakeholder consultation process, stipulating (but not limited to):

- The identification of potential stakeholders must take into account the activity type, location, potential impacts and risks;
- Engagement with stakeholders, including the DMIRS, should be initiated well in advance of the preparation of the EP;
- Stakeholder consultation should be ongoing throughout the planning, approval and operational stages;
- Stakeholders should be provided with sufficient information to allow them to make an informed assessment of the potential consequences of the activity on their functions, interests or activities;
- Stakeholders should be provided with adequate time to review, consider and respond to the information provided; and
- The Principles for Engagement with Communities and Stakeholders (MCMPR, 2005) are followed, these being communication, transparency, collaboration, inclusiveness and integrity.

This chapter outlines how this requirement has been addressed.

4.3 Stakeholder Identification

Other than landholders located within the proposed survey area, stakeholders were initially identified using Lattice's existing stakeholder database, which has been built upon knowledge gained from its ongoing activities in the region since 1992, including:

- Redback-Irwin 3D seismic survey (2012);
- Various wells drilled between 1993 and 2010;
- Beharra Springs 3D seismic survey (1999); and
- Operation of the Beharra Springs Gas Plant (operated by Lattice since 1992, through its predecessors).

Further research was also undertaken to ascertain whether there were any other stakeholders (not previously identified) whom may be impacted by the proposed survey. For example, where potential impacts or activities are unique to this particular project or location, Lattice undertook additional steps to identify and verify whether there were other stakeholders to be engaged.

Table 4.1 lists and categorises the stakeholders consulted for the proposed survey according to the categories defined by DMP (2016a) in the Guideline for the Development of Petroleum and Geothermal EPs in WA. These guidelines state that any person or organisation whose *functions, interests or activities* that may be affected by the proposal must be consulted. In the absence of definitions of these terms in the guidelines, Lattice has adopted the definitions provided in the National Petroleum Safety and Environmental Management Authority's (NOPSEMA) *Assessment of Environment Plans: Deciding on Consultation Requirements Guidelines* (N-04750-GL1629, Rev 0, April 2016), which are:

- Functions – a person or organisation's power, duty, authority or responsibilities;
- Activities – a thing or things that a person or group does or has done; and
- Interests – a person or organisation's rights, advantages, duties and liabilities; or a group or organisation having a common concern.

Table 4.1. Stakeholders identified for the proposed survey

Commonwealth government agencies	
DoEE	Project Assessments West Section, Environment Standards Division, Canberra
WA government agencies	
DMIRS (Perth office)	DBAC (Geraldton office)
DPLH (Perth office)	DFES (Geraldton office)
Department of Water and Environmental Regulation (DWER)	Environmental Protection Authority (EPA), Perth office (independent statutory body)
Person or organisation whose functions, interests or activities may be affected	
Landowners	
As per Table 3.1.	
Local Shire	
Shire of Irwin	Shire of Three Springs
Community, tourism and recreational groups	
Police – Dongara and Three Springs	
Indigenous groups	
Amangu traditional owners	
Petroleum industry	
Dampier-Bunbury Pipeline	APA
BP Kwinana	AWA Energy Ltd
Senex Energy Pty Ltd	Northwest Energy NL
Roc Oil	

4.4 Engagement Approach and Method

This section outlines the approach and methodology in which Lattice has undertaken its stakeholder consultation.

4.4.1 Engagement Approach

Consultation for the proposed survey has been broadly undertaken in line with the International Association for Public Participation (IAP2) spectrum, which is considered best practice for stakeholder engagement. In order of increasing level of public impact, the elements of the spectrum and their goals are:

1. Inform – to provide the public with balanced and objective information to assist them in understanding the problems, alternatives and/or solutions.
2. Consult – to obtain public feedback on analysis, alternatives and/or decisions.
3. Involve – to work directly with stakeholders throughout the process to ensure that public concerns and aspirations are consistently understood and considered.
4. Collaborate – to partner with the public in each aspect of the decisions, including the development of alternatives and the identification of the preferred solution.
5. Empower – to place final decision-making in the hands of the stakeholders.

Elements 1, 2, 3 and 4 are those of relevance to this survey and have been adopted (with element 4 being of relevance to individual landholders). Element 5 is not of relevance given the short-term nature of the survey and given that the low environmental and socio-economic impacts and risks are being managed through the implementation of appropriate controls. The manner in which Lattice has informed, consulted and involved stakeholders with the project are outlined through this section.

4.4.2 Engagement Methodology

Stakeholders were provided a project information pack (including information about the project, a map, a statement outlining the then proposed transition from Origin to Beach and project contact details) during face-to-face interactions with the Lattice Seismic Field Manager (a back-to-back role) (**Appendix B**) and offered additional face-to-face meetings with Lattice's representatives to formally seek feedback, discuss any issues and concerns and provide an opportunity to ask questions. Meetings also enabled Lattice to confirm stakeholders' functions, activities and interests in relation to the proposed survey and to identify further opportunities for engagement.

Lattice proactively sought out meetings with relevant stakeholders. Key stakeholder meetings included:

- Initial meetings to meet the landowners, provide details on the project and obtain property specific information.
- Present the draft agreements and maps showing the proposed seismic lines and commence negotiations.
- Meet with a landowners and a landowner's lawyer to provide specific details on the project to ensure the activities could co-exist and minimise the impacts to landowners.

4.4.3 Distribution of Information

Lattice has maintained and updated its own database of stakeholders in the North Perth Basin and engages directly with stakeholders as required.

An initial letter was provided to stakeholders formally introducing the Lattice Seismic Field Manager, and face-to-face meetings were then initiated, in which a Powerpoint presentation about the project was provided. The contact phone number and email address for the Lattice Seismic Field Manager was provided on all collateral provided to stakeholders to encourage questions and feedback. All consultation is recorded in the stakeholder register.

4.4.4 Individual Landholders

As listed in Table 3.1, Lattice has identified 13 landowners (being 12 private landowners and the WA Government) within the survey area and is actively discussing the planned survey activities with them.

Written Agreements

In accordance with the PGERA, Lattice must enter into a written agreement (Agreement) with the affected landowners prior to undertaking the seismic survey. As part of the engagement process with landowners, Lattice has liaised with the landowners to provide information about the seismic survey and the expected impacts on the land. The Agreement was presented to the landowners early in the discussions so that they had sufficient time to consider the impacts to their business operation and seek additional information from Lattice or reasonable professional advice.

A ‘Terms of Access’, which sets out how Lattice will enter the land to undertake the survey, also forms part of the Agreement and the terms of access can be tailored to each landowner’s specific requirements.

Introduction to Lattice

To commence the consultation process, introductory telephone calls were made to the landowners for the purpose of:

- Introducing the company and its representatives to the landowner;
- Giving the landowner a brief overview of the proposed survey and schedule;
- Establishing an initial perception of the stakeholders feelings toward the industry in general and seismic operations specifically; and
- Requesting a face-to-face meeting to allow the company representatives to discuss the project in detail and to allow the stakeholder to outline any concerns they may have regarding granting the company access to the property for the purpose of conducting the survey.

Following Beach’s acquisition of Lattice, a letter was posted to all landholders in the survey area in early March 2018 to inform them of the new ownership arrangements, but that the key project personnel and contacts they deal with remain unchanged.

Face-to-face Meetings

The Lattice Seismic Field Manager has conducted (and continues to conduct) meetings with each landowner within the proposed survey area with following objectives:

- Developing a working relationship of mutual trust and respect;
- Providing a detailed briefing on seismic surveys, referencing the approved information sheet;
- Sharing the timing schedule for the project;
- Providing a detailed summary of access requirements;
- Conducting a property scout with the landowner;
- Discussing any specific terms of access the landowner may have;
- Discussing the access agreement and compensation schedule with the landowner;
- Ascertaining whether the landowner will seek legal advice;
- Acquiring a signed access agreement with the landowner;
- Obtaining a farm schedule for planning purposes; and
- Establishing protocols for future communications between the company and landowner.

Compensation

A compensation package has been developed to address the expected impacts to each landowner as a result of undertaking the seismic survey. The compensation has been calculated using two rates; the first rate is based on a per square kilometre figure for cropping areas and the second rate is based on a per square kilometre figure for grazing areas.

The area cleared and traversed for the survey equates to 6 linear km at 4 m in width, per square kilometre. The square kilometre compensation rates are made up of a rate per linear kilometre for compaction, with loss of production calculated in grazing and loss of production for the cropping country. This equates to $250/ha and $750/ha of actual disturbance respectively. While there is no legislative requirement to compensate for landowners incurring professional costs as a result of the negotiations, Lattice has proposed to pay landowners an amount towards their professional costs. A contingency per landowner is also available to cover unforeseen costs.

Previous seismic surveys in WA have indicated that rehabilitation and compensation are topical issues with landowners and the drafting of the compensation package for this survey has attempted to mitigate these issues arising post-execution of the Agreement.

4.5 Stakeholder Engagement Register

All stakeholder engagement activities, including actions arising and commitments made, are recorded and tracked via the stakeholder engagement register managed by the Seismic Field Manager. The register is a 'live' document that is updated as consultation activities are undertaken.

4.6 Summary of Stakeholder Consultation

Stakeholder consultation has involved extensive consultation with a broad range of stakeholders, as listed in Table 4.1. The key theme emerging from this consultation was that of avoiding undertaking the survey during important phases of cropping and farming activities. Table 4.2 outlines the key themes and outcomes from this consultation.

Table 4.2. Key themes and outcomes from consultation with impacted landowners

Theme	Outcomes*
The timing of the activities overlaps with and will interfere with the sowing of crops.	Lattice has offered increased compensation for these impacts and is continuing negotiations to reach agreement.
The timing of the activities overlaps with and will interfere with the lambing season.	Lattice has sought to work with the landowner to discuss alternative options, however the landowner has refused to engage until the project timing is amended.
The timing of the activities overlaps with and will interfere with the treatment of existing weeds.	Lattice has sought to work with the landowner to discuss alternative options and has offered increased compensation for the landowner to manage the weeds.

** Property landholder names removed to protect their privacy.*

A summary of key stakeholder consultation undertaken to date (excluding landowners), together with Lattice's assessment of the merit of stakeholder feedback, and Lattice's response is included in Table 4.3. This table focuses on key stakeholders who have been identified as 'relevant persons' whose functions, interests or actives may be affected by the survey. It also includes key stakeholders with whom engagement has taken place to enable Lattice to determine whether they are 'relevant persons' or who have an active interest in the survey.

A summary of the engagement with landowners in the survey area has not been included for privacy reasons however, Lattice will continue to consult with landowners before, during and post the activities and maintain the stakeholder engagement register as required.

4.7 Ongoing Consultation (Post- project approval)

In accordance with the SEP, Lattice will continue engaging with stakeholders after EP approval, in the lead up to, during and at the conclusion of the survey.

4.7.1 Pre-survey Consultation

Consultation post-EP submission and prior to the commencement of the survey includes (but is not limited to):

- Face-to-face consultation with landholders in the survey area;
- Provision of a project update to key stakeholders regarding acceptance of the EP; and
- Provision of another project update to key stakeholders two weeks prior to the commencement of the survey to advise them of the planned start date.

Table 4.3. Summary of stakeholder consultation undertaken for the survey

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
Commonwealth government agencies				
DoEE	Responsible for the administration of the EPBC Act and assessment of EPBC Act Referrals.	19 Dec 2017	Lattice discussed the application process and payment with DoEE Referrals Gateway staff.	Lattice will ensure the required information such as shape files and map are included with the submission and the relevant section is signed.
		22 Dec 2017	Lattice submitted the EPBC Referral. The referral was not uploaded to the DoEE website until 8th January 2018. A receipt of referral was issued from the DoEE to Lattice on the 11th of January 2018.	N/A.
		February 2018	Lattice telephoned the Referrals Gateway to seek an estimate on the date for a decision notice, noting that a decision on the Referral was due on or about the 8th of February. The DoEE advised by email on 14 February that the referral decision process is ongoing and a decision is not imminent due to the current high volume of referrals and assessments.	Lattice notes that a referral decision was due on or about the 8th of February 2018. The uncertainty of the decision timing has implications for the application of a vegetation clearing permit to the WA EPA (see Table 2.1).
		6 Mar 2018	Lattice telephoned DoEE to request an update on the status of the assessment. The assessor said that the review has been completed and handed to the WA group within the department. The assessor generally handles North Queensland-based Referrals, but has assisted the WA group as they have been inundated with work. The assessor passed on the details of the relevant assessor in the WA group.	Lattice will follow up with the WA assessment group.
		6 Mar 2018	Lattice telephoned the WA assessor at DoEE to seek information on the progress of the Referral. The assessor said that a decision is likely at the end of next week (16 March) or early the following week (week commencing 19 March). The assessor stated that there were concerns regarding dieback and rehabilitation success in a dry environment. Lattice asked if it could provide some additional information to allay these concerns. The assessor said that they would be interested in seeing rehabilitation results for previous seismic surveys in the area.	Lattice committed to provide the results of rehabilitation of seismic survey lines in the region to DoEE to demonstrate the success of rehabilitation resulting from mulching, and additional information relating to dieback.

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
DoEE (cont'd)		12 Mar 2018	Lattice provided an information pack to the DoEE detailing how dieback is managed and the success of rehabilitation in the project area resulting from mulching of survey lines for the 2002 Hibbertia 3D seismic survey.	DoEE acknowledged receipt of the information and stated that they will consider it with the Referral.
		13 Mar 2018	Revision 1 of the EP submitted to DoEE to support the Referral and concerns.	DoEE acknowledged receipt of the EP and stated that they will consider it with the Referral.
		3 Apr 2018	Lattice telephoned Acting Director Project Assessments West Section from the DoEE to enquire as to the timeframe for a decision on the Referral. The DoEE stated the Delegate has been caught with higher priority matters.	Lattice thanked the DoEE for the update on progress. A decision was originally due on 24 January 2018 and likely within the coming weeks.
		10 Apr 2018	The DoEE issued their referral decision, assessing the project as a 'controlled action', with the assessment approach to be advised.	Lattice is concerned that the assessment decision is not based on the information as presented in the EPBC Referral and supplementary information, particularly as three of the four species listed in the decision letter will be avoided by the project.
		24 Apr 2018	Lattice telephoned the DoEE Project Manager to discuss the referral decision, but the phone rang out.	N/A.
		27 Apr 2018	Lattice telephoned the DoEE Project Manager to discuss the referral decision but was unable to make contact, and left a message with another staff member.	N/A.
		30 Apr 2018	Lattice telephoned the DoEE Project Manager to discuss the referral decision, but the phone rang out.	N/A.
		1 May 2018	Lattice telephoned the DoEE Project Manager to discuss the referral decision, but the phone rang out. Lattice sent an email to the DoEE Project Manager requesting a discussion on the referral decision.	N/A.
		2 May 2018	The DoEE Project Officer responded by email noting her absence the previous week and stated she is happy to meet with Lattice along with Angela Gillman from DoEE to discuss the decision.	Lattice responded to confirm that a teleconference would be established for the following day.

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
DoEE (cont'd)		3 May 2018	Members of the Lattice project team held a teleconference with the DoEE Project Manager and her supervisor to discuss the reasons for the controlled action decision and to discuss plans for the assessment approach. A discussion was held regarding the potential for assessing a Vegetation Clearing Permit application under the bilateral agreement between the Commonwealth and the WA Government, along with a discussion regarding the potential requirement for environmental offsets if impacts cannot be reduced further. The DoEE stated that they would make contact with DMIRS to determine the assessment approach and provide advice about this to Lattice in the coming weeks.	Lattice appreciates the opportunity to gain an understanding of the assessment decision and will await the outcome of DoEE's discussions with DMIRS regarding the assessment approach.
		15 May 2018	Following a discussion with DMIRS regarding applicability of the clearing permit for bilateral assessment, Lattice telephoned the DoEE Project Officer to discuss DoEE's concerns regarding the potential for native vegetation clearing beyond the EP320 permit (see DMIRS entry, 10 May 2018). Lattice confirmed that no native vegetation clearing would take place beyond EP320 and areas currently off petroleum permit area are of less impact than the current land use. These areas would be covered by an Access Authority (petroleum tenure) at the time fo the survey. DoEE stated they need to consider all actions across the survey area. Lattice offered further information in the form of a map and details on 'actions' in the areas currently off permit. The DoEE Project Officer stated that a final decision on whether the bilateral assessment process would apply would not be made until DMIRS formally submits the projects Native Vegetation Clearing Permit application to DoEE for consideration.	Lattice sent an email to the DoEE Project Officer on 23 May 2018 with an accompanying map to show native vegetation clearing is only occurring on the EP320 permit and further information confirming actions beyond the permit area are considered low impact in comparison to the existing land use (broadacre farming).
		28 May 2018	Lattice provided revised contact details for the Project Manager.	N/A.

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
WA government agencies				
DMIRS	Responsible for the administration and regulation of onshore petroleum tenures.	11 Sep 2017	The Lattice project team met with Environmental Officers from the Petroleum Branch and Native Vegetation Clearing Branch to provide a project briefing and confirm the approvals pathway.	The preparation of this EP (and EPBC Act Referral and Native Vegetation Clearing Permit application) have been prepared taking into account advice received during this meeting.
		21 Dec 2017	Lattice discussed the EP submission process with DMIRS and confirmed that Lattice will also be submitting an EPBC Act Referral.	N/A.
		22 Dec 2017	Lattice submitted the EP via the DMIRS online submissions portal. An application identification of 71457 was allocated to the application.	N/A.
		15 Jan 2018	DMIRS sent an email to Lattice stating that it has received an influx of environmental documents over the past few weeks, and this combined with staffing issues has resulted in assessment timeframes needing to be reviewed. In accordance with Regulation 10(1)(C) of the PGER (Environment) Regulations 2012, DMIRS sought an alternative assessment timeframe for the EP and OPEP, with assessment comments due by no later than 9 February 2018.	Beach notes that under the PGER (Environment) Regulations, a decision on the assessment of an EP must be provided within 30 days of submission (22 January 2018). Beach replied by email to DMIRS stating that it had no objection to the revised assessment timeline.
		9 Jan 2018	DMIRS provided assessment comments on the EP via email to Lattice.	Lattice has taken note of the comments and incorporated them into the EP.
		14 Jan 2018	DMIRS provided assessment comments on the OPEP via email to Lattice.	N/A.
		20 Feb 2018	Several members of the Lattice project team discussed the EP comments with the DMIRS Assessment Officer via a teleconference.	Lattice has taken note of the comments and incorporated them into the EP.
		7 Mar 2018	Lattice telephoned the Lead Assessor to enquire as to whether the assessor had contacted the petroleum hub regarding the access authority application process. No contact had been made, but the assessor said she would speak with them that afternoon.	Lattice emailed on DMIRS on 8 March 2018 to follow up on progress, with the DMIRS assessor saying she hadn't had any luck. Lattice stated that the Access Authority Application was ready to submit.

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
DMIRS (cont'd)		8 Mar 2018	Following a telephone discussion with Lattice, DMIRS advised that the access authority (for the land to the east of the survey area) cannot be granted until the EP and OSCP are approved. DMIRS also asked that that further detail regarding the area to the east of EP320, but proposed for inclusion in the survey, is more thoroughly described.	Lattice amended the wording in Section 3.1 to reflect this.
		9 Mar 2018	Lattice submitted the first revision of the EP via the DMIRS EARS online portal.	N/A.
		21 Mar 2018	DMIRS sent a request to Lattice via email to modify and resubmit the EP provided requesting review of survey source and receiver lines, rehabilitation and timing for the annual report. Revision required by 30 April 2018. Additional comments on the EP were provided to Lattice via email.	Lattice updated the EP in response to DMIRS' request for further information.
		29 Mar 2018	Lattice telephoned the DMIRS Lead Assessor to discuss the request for further information. A message was left on voicemail.	N/A.
		3 Apr 2018	Lattice telephoned DMIRS to speak to the Lead Assessor about the comments provided on the EP. With the Lead Assessor on leave, a general discussion was held with another assessor. The discussion clarified the items within the request were focussed on rehabilitation. The assessor provided a contact for DBCA.	Lattice appreciated the feedback and will update the EP in accordance with the feedback provided. See in particular Section 3.6.11 and Section 7.1.1 of this revision of the EP. Consultation with DBCA recorded within this table..
		24 Apr 2018	Lattice telephoned the Lead Assessor to discuss the proposed approach given the Controlled Action decision from DoEE. The DMIRS Lead Assessor confirmed that the decision doesn't impact on DMIR's acceptance of the EP providing Lattice updates the relevant section with the current status and the consultation section. DMIRS noted that Lattice would be best to refer the project to DWER rather than DMIRS. DMIRS also noted that Lattice can seek an extension of time to submit the EP should it be required.	Lattice to contact DWER to discuss the Referral of the project.

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
DMIRS (cont'd)		27 Apr 2018	Lattice telephoned the DMIRS Lead Assessor to request an additional two weeks to re-submit the EP based on the DoEE 'controlled action' decision and seeking certainty on the assessment approach. The additional time was granted on the same day by reply email.	N/A.
		3 May 2018	The DMIRS Lead Assessor telephoned Lattice to enquire about the status of the Native Vegetation Clearing permit application.	Lattice issued the draft permit application to DMIRS so that DMIRS could determine whether there were any issues.
		8 May 2018	The DMIRS Lead Assessor telephoned Lattice to provide an update on the Native Vegetation Clearing permit application process, suggesting that the bilateral assessment approach with the Commonwealth was likely. The Lead Assessor said DMIRS was in the process of arranging discussions with the DoEE regarding the bilateral assessment process.	Lattice confirmed with DMIRS that it would continue preparing the Native Vegetation Clearing permit application on the assumption that the bilateral assessment approach would be taken.
		10 May 2018	The DMIRS Lead Assessor emailed Lattice advising that she had been in contact with the DoEE and with DMIRS native vegetation assessment branch regarding the native vegetation clearing application and bilateral assessment process. The Lead Assessor confirmed that the bilateral assessment could be applied for this project, provided that the clearing permit covers the same area as that in the EPBC Act Referral submitted to the DoEE. However, DMIRS only has delegated authority to undertake clearing permit assessments within areas covered by mining or petroleum titles. Therefore, as the EPBC Act Referred covered a small area that extends outside of EP320, DMIRS would be unable to assess this extension and the area applied for under the clearing permit would subsequently be different to that submitted to DoEE. DMIRS noted that Lattice could apply to DWER to assess the clearing permit application and may also need to be referred to the DWER for assessment.	Lattice telephoned the DMIRS Lead Assessor on 15 May 2018 to discuss the concerns regarding the bilateral assessment process. The DMIRS Lead Assessor said she had discussed this with the DoEE, and that the decision rests with the DoEE as to whether a bilateral assessment process can be undertaken with DMIRS. Lattice telephoned DoEE and will provide mapping to DMIRS and additional information regarding the off permit areas to DoEE to illustrate that no clearing of native vegetation will take place outside EP320 in order to ensure that DMIRS leads the assessment of the Native Vegetation Clearing permit application in order to minimise potential delays to the current project schedule (refer to DoEE consultation 15/5/18).

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
		14 May 2018	Lattice requested an additional two week extension to submit the revised EP to allow for clarification regarding the Native Vegetation Clearing permit application process and further consultation with DBCA so it can be addressed in this revision of the EP.	N/A.
		15 May 2018	The DMIRS Lead Assessor confirmed the two week extension.	
DWER (formerly EPA)	Responsible for assessment of significant proposals and Native Vegetation Clearing application permits off petroleum tenure.	20 Sept 2017	Following advice from DMIRS, Lattice telephoned DWER to introduce the project and seek any feedback to address regarding the design of the project. Lattice offered a project presentation to support a follow up phone call. Lattice provided a project overview in the form of a project presentation. EPA confirmed the approvals pathway in the event that the project be deemed a controlled action by DoEE.	Lattice to provide a summary of information on the project. Lattice confirmed an EPBC Referral will be submitted for the project.
		21 Sept 2017	Lattice provided a project overview in the form of a project presentation.	Lattice confirmed an EPBC Referral will be submitted for the project.
		26 Sept 2017	Lattice telephoned the DWER Officer to discuss the project presentation provided the week prior. Lattice sent a follow up email to organise a time to discuss.	N/A.
		26 Sept 2017	The DWER Officer sent an email to Lattice stating they have received the information and requested spatial data to better understand the impacts associated with the project. Once they have more information then they will be in a position to advise on a referral to DWER.	On the 5th of October, Lattice emailed the DWER Officer with the spatial details and further information such as a basis of design and avoidance of key environmental values and mitigation of impacts. This complemented the information provided on 21 September.
		12 Oct	Lattice telephoned the DWER Officer and left a message to discuss further information sent and likely next steps.	N/A.
		12 Oct 2017	DWER Officer sent an email requesting further information on completion of the flora and fauna surveys, EMPs for like surveys, line spacing and whether a DoEE Referral will be submitted.	Lattice to provide additional information on the project.

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
DWER (cont'd)		17 Oct 2017	Lattice telephoned the DWER Officer to understand the request on EMPs within email provided on 1210/18. Lattice confirmed that a specific EP is well advanced for the project and expected to be submitted to DMIRS by the end of the year. Lattice confirmed that a Referral would be submitted to DoEE prior to Christmas. Lattice provided an update on progress of the flora and fauna reports and will be included within the EP as separate appendices. DWER were comfortable with us progressing with the DMIRs process and to let DWER know when we have a decision on the EPBC Act Referral. DWER confirmed the options for approvals in the event that the project is deemed a controlled action by DoEE.	Lattice to contact DWER once a decision is received on the EPBC Act Referral.
		22 Dec 2017	Lattice telephoned the DWER officer to provide an update on the project submissions and left a message. Lattice sent an email with an update stating the EP had been submitted to DMIRS and a Referral had been submitted to DoEE.	N/A.
		12 Jan 2018	DWER sent an email thanking Lattice for the update and to call to discuss any further information on the project.	Lattice to contact DWER once a decision is received on the EPBC Act Referral.
		19 Apr 2018	Lattice telephoned the DWER Assessment Officer and left a message. The purpose of the call was to discuss the progress on the project and the DoEE controlled action decision.	N/A.
		24 Apr 2018	Lattice telephoned the DWER Assessment Officer and left a message. The purpose of the call was to discuss progress, referral of the project and the DoEE controlled action decision.	N/A.
		1 May 2018	Lattice telephoned the DWER to provide progress on the project and determine whether the project needed to be referred to the DWER. The Assessment Officer advised that the EP does not need to be referred to the EPA, as the DWER has already provided comments on the EP through the MoU process with DMIRS and was satisfied that all reasonable means had been implemented to	Lattice issued an email of thanks to the DWER the following day and stated that the mitigation hierarchy of controls would be better highlighted in the EP and Lattice will again review the number of source and receiver lines regarding vegetation

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
			reduce the environmental impacts of the project. The DWER suggested that the next step is to prepare and submit a Clearing Permit Application to DMIRS under Part V of the EP Act.	management (see Section 3.5.3).
DWER (cont'd)		2 May 2018	In response to the email from Lattice, the DWER Assessment Officer stated that she had emailed the DMIRS Assessment Officer to reiterate that the project did not need to be referred to the DWER, and that a Clearing Permit Application should be prepared and submitted to the DMIRS.	Lattice will prepare a Clearing Permit Application for submission to the DMIRS.
DPLH	Department responsible for the management of State- owned land (e.g., UCL).	14 May 2107	Lattice (then Origin Energy) sent an email to DPLH requesting access to the UCL.	N/A.
		7 June 2017	DPLH sent Lattice an email regarding the following: i. Outlining the conditions associated with the access request; ii. Lattice must seek approval from: 1. Relevant government departments; 2. The impacted lessee of State land; and 3. Third-party easement holders. Lattice must provide additional information about the proposed activities including their location.	Lattice considers that the conditions are acceptable and Lattice has obtained the approval of the relevant government departments and third-party easement holders. Lattice is still in negotiations for access for the impacted lessee of State land.
		4 July 2017	Lattice sent an email to DPLH providing further information on the proposed activities, excluded areas and updated maps.	N/A.
		20 July 2017	Lattice sent an email to DPLH confirming environmental reserves were excluded from the survey area and provided additional maps.	N/A.
		31 July 2017	Lattice sent emails to DPLH to clarify the property lots that Lattice are requesting access to and provide an update on the negotiations with other key stakeholders.	N/A.
		25 Aug 2017	Lattice sent an email to DPLH requesting that the licence be updated to reflect the change from Origin to Lattice.	N/A.
		10 Oct 2017	Lattice signed the licence for access.	N/A.

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
DBCA (Parks and Wildlife Service)	Responsible for managing State parks and nature reserves.	3 Aug 2017	Lattice met with District Wildlife Officer, Chris Roy, to explain Lattice's botanical scout requirements on Crown Land.	N/A.
		9 Oct 2017	Lattice called Chris Roy to discuss Lattice's access on the Crown Land for the short term.	N/A.
DBCA (Environmental Management Branch)	Responsible for managing State parks and nature reserves.	9 May 2018	Lattice telephoned the Acting Area Manager (North), Murray Baker, to provide a project introduction, an update on the environmental approvals and seek information about DBCA's involvement in the preparation/review/approval of a Rehabilitation Monitoring Plan for the project. Murray was comfortable with the assessment process for the project and said the DBCA didn't need to be directly involved in this process, but referred Lattice to two regional contacts with regard to future liaison regarding development of the Rehabilitation Monitoring Plan.	Lattice will consult with the regional DBCA contacts provided in the preparation of the Rehabilitation Monitoring Plan.
		22 May 2018	Lattice telephoned Beth Chappel (Environmental Officer) who is the contact for mining and large industrial activities in the area. Lattice introduced the project, timeline and project approvals. Beth was interested to receive a copy of the next revision of the EP. Lattice stated the project is a controlled action under the EPBC Act relating to the foraging habitat of Carnaby's Cockatoo. Beth provided some good background information on the cockatoo in the region. Lattice thanked Beth for her time and we will provide a copy of the revised EP early next week once submitted to DMIRS.	Lattice to provide a copy of the revised EP.
		22 May 2018	Lattice telephoned Steven Buitenhuis, Nature Conservation Officer in the region. Lattice introduced the project, timeline and project approvals. Beth was interested to receive a copy of the next revision of the EP. Lattice stated the project is a controlled action under the EPBC Act relating to the foraging habitat of Carnaby's cockatoo. Steven provided information on the presence of the cockatoo in the vicinity of the project area. Steven also noted the success or otherwise of offset programs in the region.	Lattice thanked Steven for his time and said it will provide a copy of the revised EP once it is submitted to DMIRS.

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
DFES	Responsible for managing fire preparedness and response.	24 Oct 2017	Lattice met with the Area Officer Fire Services – Midwest, to discuss the project generally, and co-ordination of the rural fire brigade and mulching during the scheduled activities.	N/A.
Person or organisation whose functions, interests or activities may be affected				
Local governance				
Irwin Shire Council	The Local Government Authority (LGA) within which the majority of the survey area lies.	25 Oct 2017	Lattice met with the Council to provide a summary of the project. Lattice agreed to a further meeting to provide additional information to relevant parties.	N/A.
Three Springs Shire Council	The LGA within which a minority of the survey area lies within.	25 Oct 2017	Lattice met with the Officer in charge to provide a summary of the project. Lattice will meet with the Council again if the situation requires it.	N/A.
Three Springs Police	The police service in the region upon which the activities are conducted	25 Oct 2017	Lattice met with the Officer in charge to provide a summary of the project. Lattice will meet with the police again if the situation requires it.	N/A
Traditional owners				
Amangu traditional owners	Tradition owners of the land upon which the survey is proposed to be undertaken.	28 Nov 2017	Lattice met with the Amangu traditional owners to discuss the project. The traditional owners indicated there are some areas of cultural significance within EP320 that are not included on the heritage register and have shown an interest in scouting some additional areas to determine whether they have cultural significance.	Lattice is working with the traditional owners to identify these culturally significant areas and negotiate an agreement to facilitate access for a representative to scout these areas prior to commencing the survey activities. This is reflected in Section 7.2.3 of the EP.
		April 2018	Lattice sent a draft agreement to the Yamatji Marlpa Aboriginal Corporation (YMAC), the representative body for the traditional owners, for review.	Lattice is awaiting a response from the YMAC to commence discussions.

Stakeholder	Functions, interests and/or activities	Date of contact	Issues raised by stakeholder	Lattice's assessment of merit of stakeholder issues
Other tenement/asset owners				
Dampier Bunbury Pipeline (DBP)	DBP is the owner and operator of the Dampier to Bunbury Natural Gas Pipeline (DBNGP), which is overlapped by the survey area.	7 July 2017	Lattice emailed DBP to provide information regarding access to the pipeline easement for the botanical survey access.	N/A.
		18 July 2017	Lattice emailed DBP to provide further information regarding access to the pipeline easement for the botanical survey access.	N/A.
		25 July 2017	DBP granted permission for access to the pipeline easement for the botanical survey, provided consent is also obtained from landowners.	Lattice is agreeable to this request as it is required under the relevant legislation. Landowner permission was granted and the botanical survey subsequently proceeded.
Sheffield Resources Limited (SRL)	Overlapping tenement holder over which access is required.	13 July 2017	Lattice sent a letter to SRL outlining the project and requesting consent to enter the exploration permit area.	N/A.
		17 July 2017	SRL provided consent to access area of overlapping exploration permit for botanical survey	N/A.
Western Titanium Ltd (WT)	Overlapping tenement holder over which access is required.	13 July 2017	Lattice sent a letter to WT outlining the project and requesting consent to enter the exploration permit area	N/A.
		18 July 2017	WT provided consent to access area of overlapping exploration permit for botanical survey.	N/A.

4.7.2 Consultation during Operations

In accordance with the SEP, Lattice will continue engaging with stakeholders during survey operations. The Lattice Seismic Field Manager will be present in the survey area at all times during the survey and will be available to liaise with landholders.

4.7.3 Complaints Management Process

A complaint is a response from a stakeholder that meets any of the following criteria:

- An expression of concern that is not effectively managed and therefore, results in more than one enquiry about the same issue from the stakeholder;
- An expression of concern about an aspect of the project that is considered irresponsible and is not in accordance with Lattice's business principles; and
- Any communication received from a stakeholder expressing dissatisfaction.

Discretion should be considered with the final point, by assessing the expression of dissatisfaction with empathy and as independently and 'open-mindedly' as possible.

The Seismic Field Manager shall acknowledge a complaint within 24 hours and:

a) Thank the complainant for bringing the matter to Lattice's attention as their feedback is important in helping Lattice to maintain good community relations.

b) Assure the complainant that Lattice take complaints seriously, all complaints are recorded in our internal management system, causes are investigated as necessary and reports prepared for senior management as necessary.

c) Assure the complainant of Lattice's privacy policy – any personal information will be managed confidentially in accordance with our policy (which can be found on our website).

d) In the event of what appears to be a minor complaint or grievance, ask the complainant if they are seeking a response, or only want to make their dissatisfaction known.

e) Take note of name, address, and phone number where a response is requested.

f) Where a response is requested, or the Seismic Field Manager deems a response should be provided, advise the complainant that they shall be kept informed of the status of their complaint and a response shall be provided after a relevant internal investigation has been completed.

g) If the complainant appears to sound distressed, it may be appropriate to offer a visit to the complainant. Any such visit must be carried out with two Lattice personnel, including the Seismic Field Manager.

All expressions of dissatisfaction are by default considered 'bona fide' for the purpose of recording in the enterprise incident management system. Complaints will also be entered into the stakeholder consultation log. The Seismic Field Manager shall advise the Project Manager and may recommend relevant actions for discussion with the Project Manager to agree on a possible resolution. After initial consultation with the Project Manager, the Seismic Field Manager (or other persons agreed with the Project Manager) shall be assigned actions, investigate root cause/s and complete investigation in accordance with Incident Management Directive.

4.7.4 Post-survey Consultation

Consultation at the completion of the survey includes notifying all stakeholders within three days of survey completion.

In all circumstances, engagement will include a mix of methods depending on the stated method preferred by the stakeholder (e.g., mail or email, phone calls or face-to-face meetings). Lattice's Seismic Field Manager remains a presence in the region at all times and is available at short notice to meet with stakeholders face-to-face as required.

5. Existing Environment

Regulation 14(2) of the PGER Environment Regulations requires that the EP describes the existing environment that may be affected by the activity, including details of relevant values and sensitivities of that environment.

In line with the Regulation 4 of the PGER Environment regulations, the 'environment' is defined as:

- Ecosystems and their constituent parts, including people and communities;
- Natural and physical resources;
- The qualities and characteristics of locations, places and areas; and
- The heritage value of places.

This chapter describes the existing environment of the proposed survey area as described in Section 3.1.

5.1 Physical Environment

This section describes the physical environment of the proposed survey area, that is, its climate, geology and geomorphology, landforms, soils and waters, air quality and ambient noise conditions.

5.1.1 Climate

The northern Perth Basin climate region is classified as subtropical (using the Köppen classification scheme), with mild wet winters and hot dry summers (DoW, 2017). Beard (1990) describes the bioclimate of the region as Thermoxeric. This is a mostly dry Mediterranean climate with 7-8 dry months. Mean annual rainfall is mostly about 400-600 mm, predominantly falling in the winter. Hot summer days are characterised by warm north-easterly winds blowing from the interior, and wet winter days associated with cold fronts originating from the Southern Ocean (DoW, 2017). The town of Three Springs has an average annual rainfall of 390 mm while the average annual rainfall in the Shire of Irwin is 440 mm, predominantly received over the winter months (Shire of Three Springs, n.d; Shire of Irwin, 2016).

Mean monthly temperature and rainfall data from the Eneabba meteorological station (008225), the nearest to the proposed survey area (~14 km south) and which commenced observations during 1964, are presented in Figure 5.1. The average annual rainfall is around 500 mm, with the majority of rainfall occurring during the winter months. Summer is typically dry with scattered and irregular thunderstorms that approach from the north-west. The average daily relative humidity is between 40% and 80% with the most humid months being May to September (BoM, 2017).

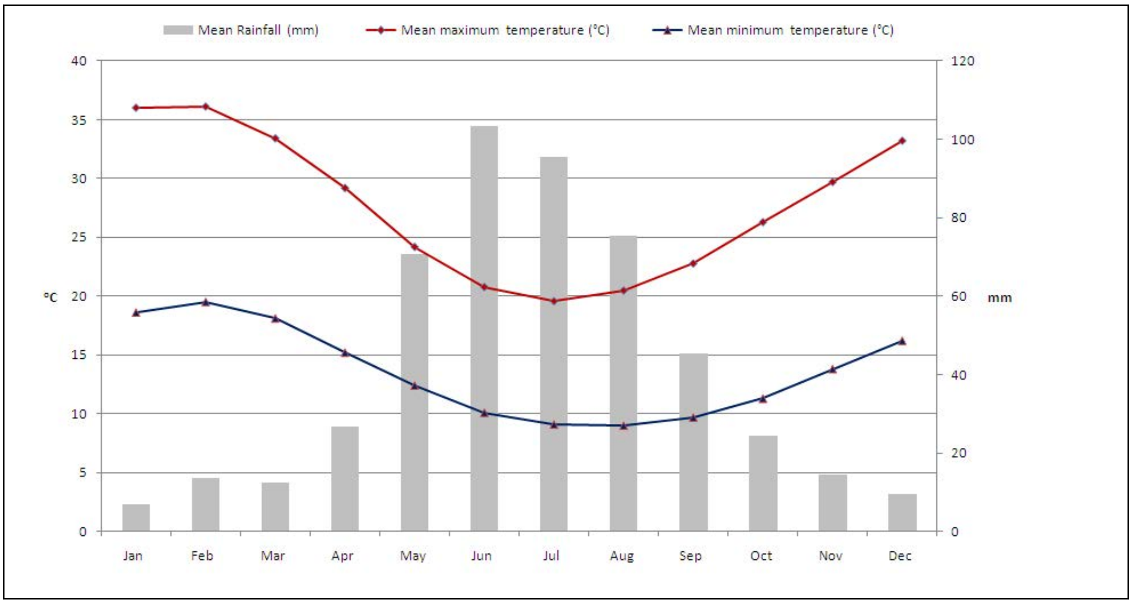


Figure 5.1. Summary of meteorological data for Eneabba

A strong southwest sea breeze is a part of summer weather conditions. The winds generally arrive between 10am and midday and can reach 30 knots. The winds during the winter months are more variable and influenced by the cold fronts coming in from the Indian Ocean (BoM, 2017).

The majority of the western portion of the Shire of Three Springs is highly susceptible to wind erosion. Prefrontal winds in autumn and winter often cause wind erosion on cultivated or unprotected paddocks, with the risk increasing if the front fails to bring any rain. Erosive winds can, however occur at any time of year on soil that has been left open to stripping (Shire of Three Springs Shire, n.d). The Shire of Three Springs (n.d) classifies the survey area as having a 80-100% risk of wind erosion.

5.1.2 Geology

The survey area lies within the sedimentary Perth Basin (Figure 5.2). The Perth Basin is a north to north-northwest trending, onshore and offshore sedimentary basin extending about 1,300 km along the southwestern margin of the Australian continent. This is a large (172,300 km^2), structurally complex basin that formed during the separation of Australia and Greater India in the Permian to Early Cretaceous. It includes a significant onshore component and extends offshore to the edge of continental crust in water depths of up to 4,500 m (Geoscience Australia, 2017).

The Perth Basin is bounded to the east by the Darling Fault, which extends the full length of the basin. The onshore portion of the basin averages 65 km in width and extends from the southern coast to Geraldton in the north. The dominant feature in the northern section of the Perth Basin is the Dandaragan Trough, in which up to 20 km of sediments have been deposited.

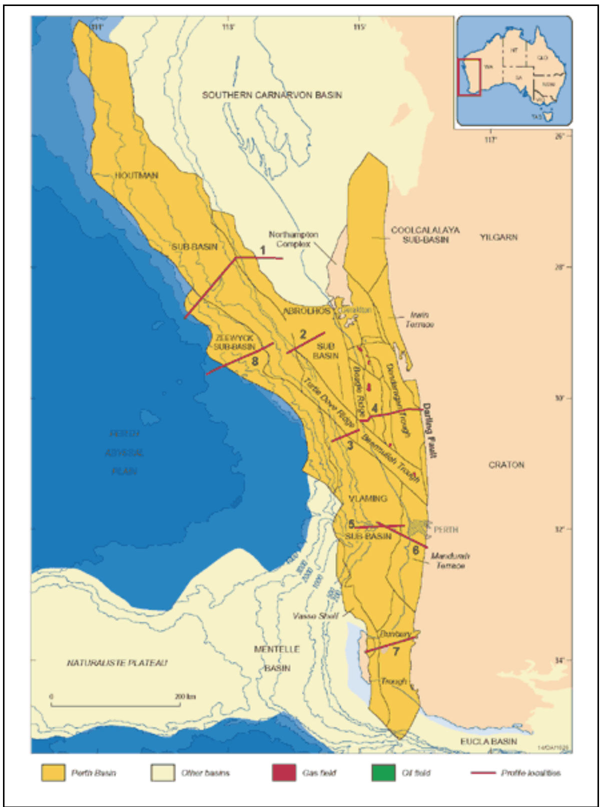


Figure 5.2. Location and extent of the Perth Basin

The Beharra Springs-Mondarra-Yardarino trend forms a terrace along the western flank of the Dandaragan Trough, extending from the Allanooka Fault in the north to the Abrolhos Transfer Zone.

The survey area is situated on the Beharra Springs Terrace. Lattice's nearby Beharra Springs Gas Plan processes gas from the Upper Permian Wagina Sandstone reservoir. This formation is comprised of two units; an upper sandier unit overlying a siltier, less permeable unit. The surface geology in the area consists of non-calcareous Quaternary sands (Qe) reworked by eolian processes, and Quaternary swamp and lacustrine clays, silts and diatomite (Qp).

5.1.3 Geomorphology

The survey area is situated in the geomorphic unit 'Eneabba Plain' (Playford *et al*., 1976). This unit is a lowlying area between the Spearwood Dune System and the Gingin Scarp. The Plain is restricted to the area north of Cockleshell Gully. The plain consists of a series of shoreline, lagoon and dune deposits of early Pleistocene to possibly late Tertiary age, which locally have high concentrations of heavy minerals. These deposits are associated with a series of low alluvial fans fronting the Gingin Scarp (Playford *et al*., 1976). The streams have ill-defined channels and form ephemeral lakes.

5.1.4 Landforms

The proposed survey area is located in the coastal highlands of the Mid West region of WA within the Lesueur Sandplain subregion of the Geraldton Sandplains Bioregion. The Geraldton Sandplains Bioregion (Interim Biogeographical Regionalisation for Australia, Version 7) is composed mainly of proteaceous scrub-heaths, rich in endemics, on the sandy earths of an extensive, undulating, lateritic sandplain mantling Permian to Cretaceous strata (CALM, 2003a). The region is typically low lying and gently undulating. The relief across the survey area is 0.7° west to east, with a high point of 250 above sea level towards the northeast part of the survey area.

Tille (2006) states that most of the Greenough Province (within which the survey area lies) consists of gently undulating plateau surfaces formed on laterite overlying Perth Basin sedimentary rocks. There has been extensive development of sandplains on these plateaux, especially in the north-east and south-east. The northern sandplain has low dunes and some relict drainage systems with long gentle slopes and alluvial surfaces. The western edges of the plateaux are often dissected. The two most dramatic dissections are the hills and mesas of the Moresby Range and around Badgingarra.

5.1.5 Soils

The soils in the Lesueur Sandplain subregion (as classified by CALM, 2003a) range from extensive yellow sandplains in south-eastern parts to alluvials associated with drainage systems (CALM, 2003a). Low natural nutrition as well as agriculture-induced acidity are major soil constraints in the region.

Tille (2006) classifies the soils of the survey area as being part of the Greenough Province, which covers an area of 30,150 km^2, the vast bulk of which is located within the agricultural area. It covers the area between Gingin, Eneabba, Mullewa, Geraldon and the Murchison River. Yellow deep sands are most common in the Greenough Province and dominate the sandplains. Pale deep sands and Gravelly pale deep sands are also present, with some Red deep sands and Yellow sandy earths. Deep sandy gravels, Duplex sandy gravels and Shallow gravels are found on broad crests in the southern sandplains. Red-brown hardpan shallow loams appear on the relict drainage systems in the northern sandplains (Tille, 2006).

In areas of dissected plateaux, shallow gravels occur on the ridges. Pale deep sands, yellow deep sands, gravelly pale deep sands and deep sandy gravels occur on the slopes along with some duplex sandy gravels and grey deep sandy duplexes. On the granitic terrain of the Northampton Complex there are red shallow loamy duplexes, red shallow sandy duplexes, red loamy earths and yellow/brown shallow sandy duplexes (Tille, 2006).

The WA Department of Agriculture and Food (DAF) (2007) classifies soil landscape zones of its West Midlands Region, with the survey area occurring almost evenly over the Geraldton Zone and Arrowsmith Zone. These are described as:

- Geraldton Zone (187,185 ha) – consists of dunes with alluvial plains and sand sheets, with low hills of Pleistocene Tamala Limestone, recent calcareous and siliceous dunes. It has yellow/brown shallow sands, yellow deep sands, calcareous deep and shallow sands and pale deep sands.
- Arrowsmith Zone (387,173 ha) – a dissected lateritic terrain with hills, breakaways and plateau and sandplain remnants. It has sandy and gravelly soils formed in colluvium and weathered in-situ rock. There are also deep sands, ironstone gravely soils and sandy duplex.

Despite the various classification systems, it appears there is broad agreement between the classifications that the proposed survey area contains mostly deep yellow and pale sands with alluvial soils around drainage systems.

Salinity

Widespread clearing of native vegetation has resulted in increased runoff, rising water tables and the transportation of large amounts of salt into receiving waterways and wetlands. Mapping undertaken by the DAF showed a 43% increase in salinity affected land between 1988 and 1998 in the West Midlands Region Catchment (see Section 5.1.5), although this land only comprised 1.1% of the catchment area. On a whole, this catchment area is still generally considered to be at low risk for soil salinity. The Shire of Three Springs (n.d) classifies the proposed survey area as having a 0-20% risk of salinity.

5.1.6 Surface Waters

Catchment

The BoM classifies the survey area as occurring in the Indian Ocean drainage division, and Greenough River basin (BoM, 2001). At a finer scale, the proposed survey area is located in in the Arrowsmith River and Indoon Logue surface water sub-catchments of the West Midlands Region (DoAF, 2007; DoW, 2017) (Figure 5.3 and Figure 5.4).

The porous and permeable soil-landscape system allows rainwater to infiltrate to the water table rather than running off the land surface, giving rise to the paucity of defined watercourses in the region. Consequently surface water movement is only apparent following the wet season (i.e., winter) when the rivers, swamps and lakes are filled (DoAF, 2007; Shire of Irwin, 2016), as can be seen in Photo 5.1.

The Shire of Three Springs (n.d) classifies the proposed survey area as having a 0-20% risk of flooding.

River Systems

The Arrowsmith River (Photo 5.1) runs east to west through the southern part of the survey area. The river's sub-catchment is 183,326 ha (DoAF, 2007) (or 160,400 ha according to the DoE, 2017) and predominately flows in east to west direction into the Dandaragan Plateau across the Urella Fault. The Arrowsmith River has a high density of drainage lines along the Dandaragan Scarp that are incised and form a distinctive dendritic drainage system (DoAF, 2007), and has no defined ocean outlet, terminating in Arrowsmith Lake and flowing into caves in the Tamala Limestone, 9 km inland from Cliff Head (DoW, 2017).

A Department of Water (DoW) streamflow gauge installed on the Arrowsmith River (with a catchment of 810 km^2) indicates it has a mean annual flow of 5 GL/annum (based on 2000-2015 data), with the average stream salinity being 3,000-3,5000 mg/L TDS (classifying it as saline) (DoW, 2017). Monthly streamflow distribution shows a general winter flow pattern with very little to no summer flow (DoW, 2017).

Wetlands

No permanent or ephemeral wetlands exist within the survey area.

5.1.7 Groundwater

The survey area is located within the Perth Basin groundwater province (DoW, 2017).

The larger aquifers located beneath the Arrowsmith Surface catchment Management Zone are the Leederville-Parmelia and Yarragadee Aquifers and the smaller aquifers include the Cattamarra and Eneabba-Lesueur Aquifers which are located west of the catchment (Earth Tech, 2002; DoW, 2017). Figure 5.5 illustrates the geological formations of the region.

The groundwater flow systems in the region are maintained by rainfall recharge, with recharge most likely to occur during heavy rainfall when the process is enhanced by recharge from surface runoff and local flooding. In the coastal plain and coastal plateau region, groundwater discharges from the unconfined aquifers by subsurface flow into river pools, by evapotranspiration, and outflow along the coast (Shire of Irwin, 2016).

The majority of groundwater is found within two major aquifer units, described here.

Yarragadee Aquifer

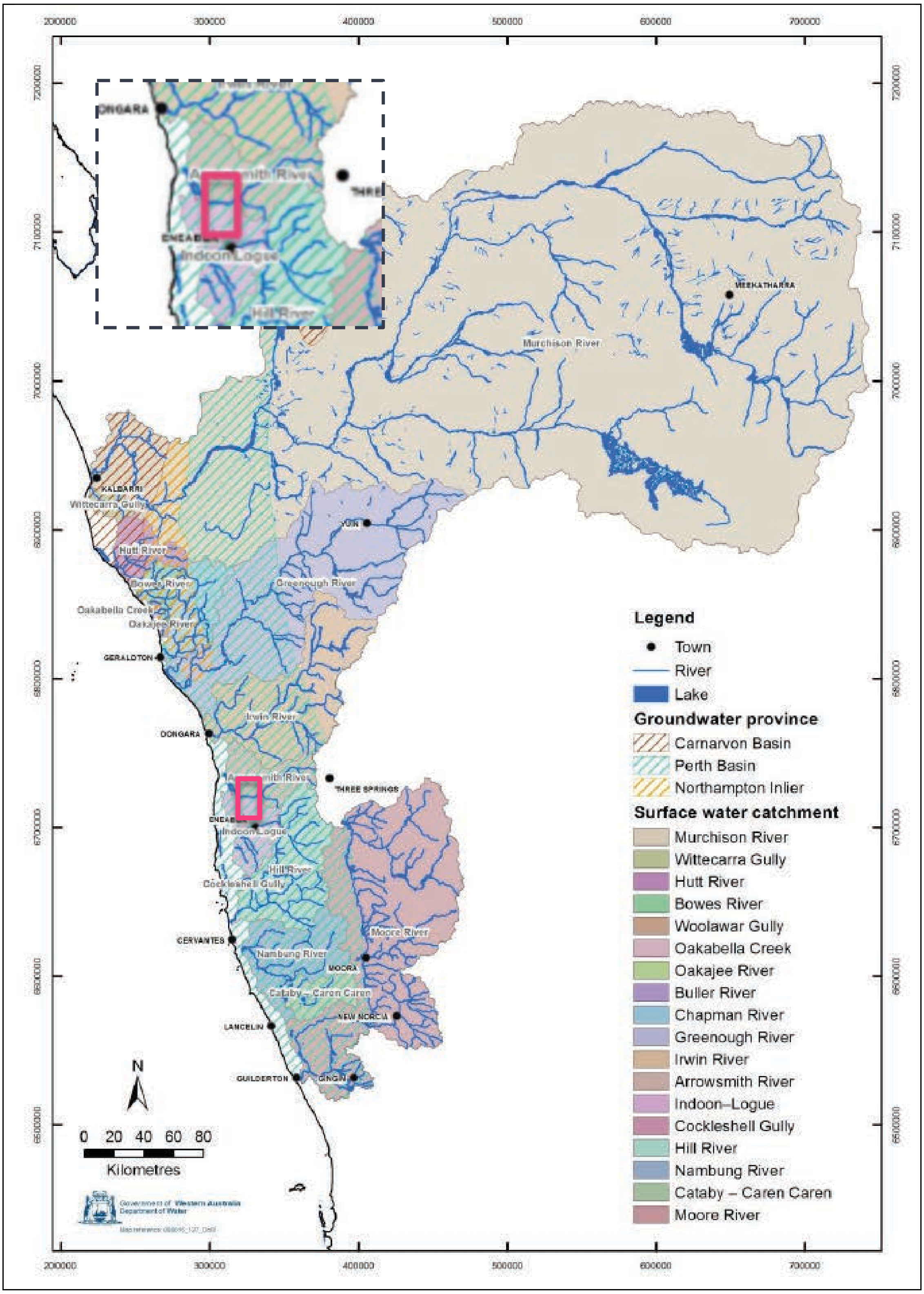
The major aquifer in the region is the Yarragadee Aquifer. The formation is multi-layered and up to 3,000 m thick, with groundwater occurring within beds of fine to course-grained sandstone confined between thick sequences of shale and siltstone (Earth Tech, 2002; Shire of Irwin, 2016). The water table is fairly deep, ranging up to as much as 150 m below the surface. The water table comes to the ground surface in the Hill River valley where the aquifer is artesian around Hill River Spring. Springs, swamps and lakes such as Beharra Spring are areas of evaporative discharge (Earth Tech, 2002).

The direction of flow in the aquifer is predominantly to the west (Shire of Irwin, 2016).

Groundwater salinity is lowest (500-700 mg/L) within the middle of the catchment and highest (1,000-1,500 mg/L) towards the east of the catchment along the boundary with the Urella Fault (Earth Tech, 2002). Areas of higher salinity occur along the Arrowsmith River and the Irwin River due to recharge of brackish runoff water. Groundwater salinity is also known to vary within the different sandstone beds and there is a general trend of increasing salinity with depth (Johnson and Commander, 2006).

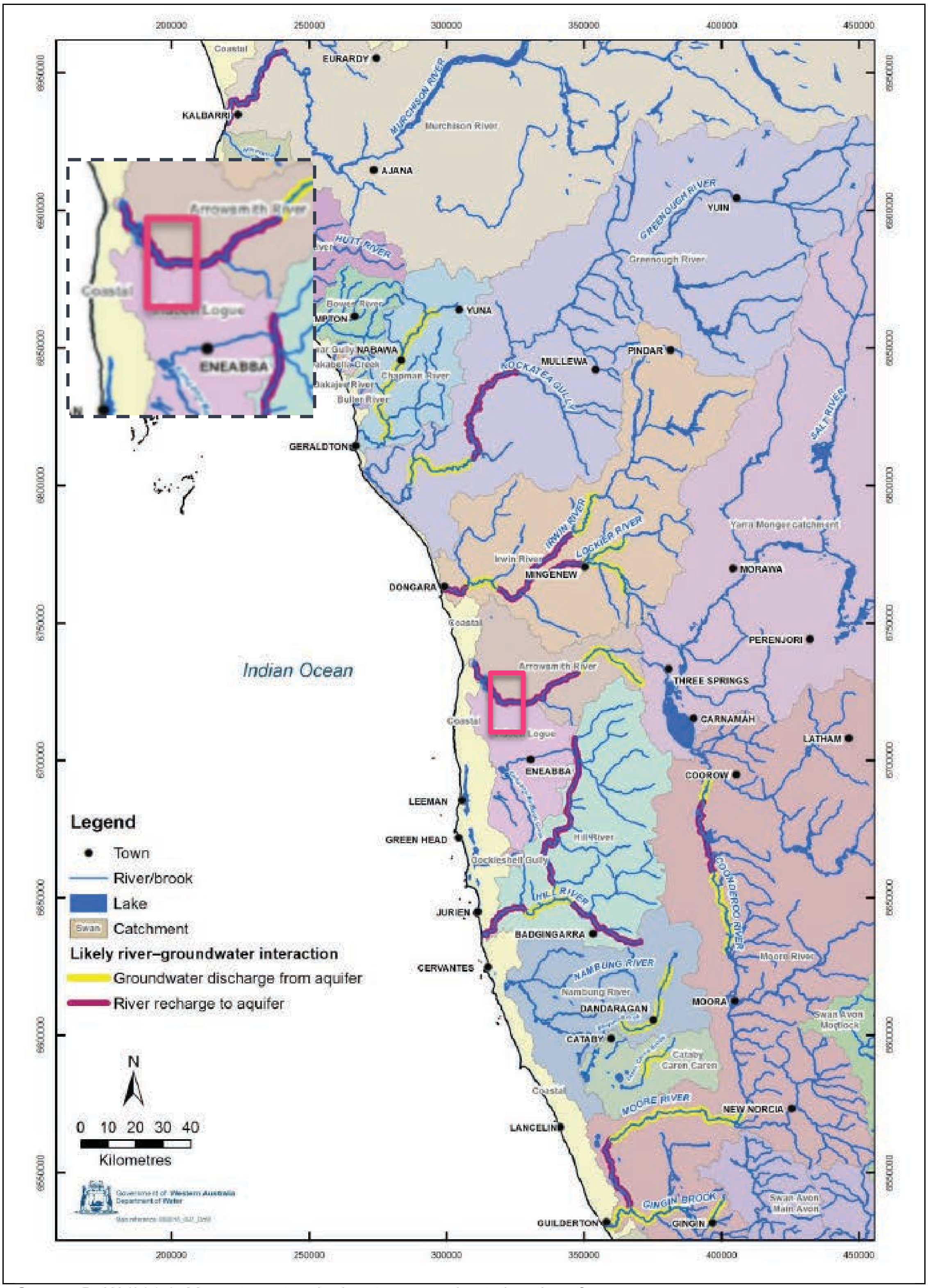
Photo credits: Lattice.

Photo 5.1. View of the Arrowsmith River from the Robb Road causeway, view west (top) and view east (bottom) during autumn 2017



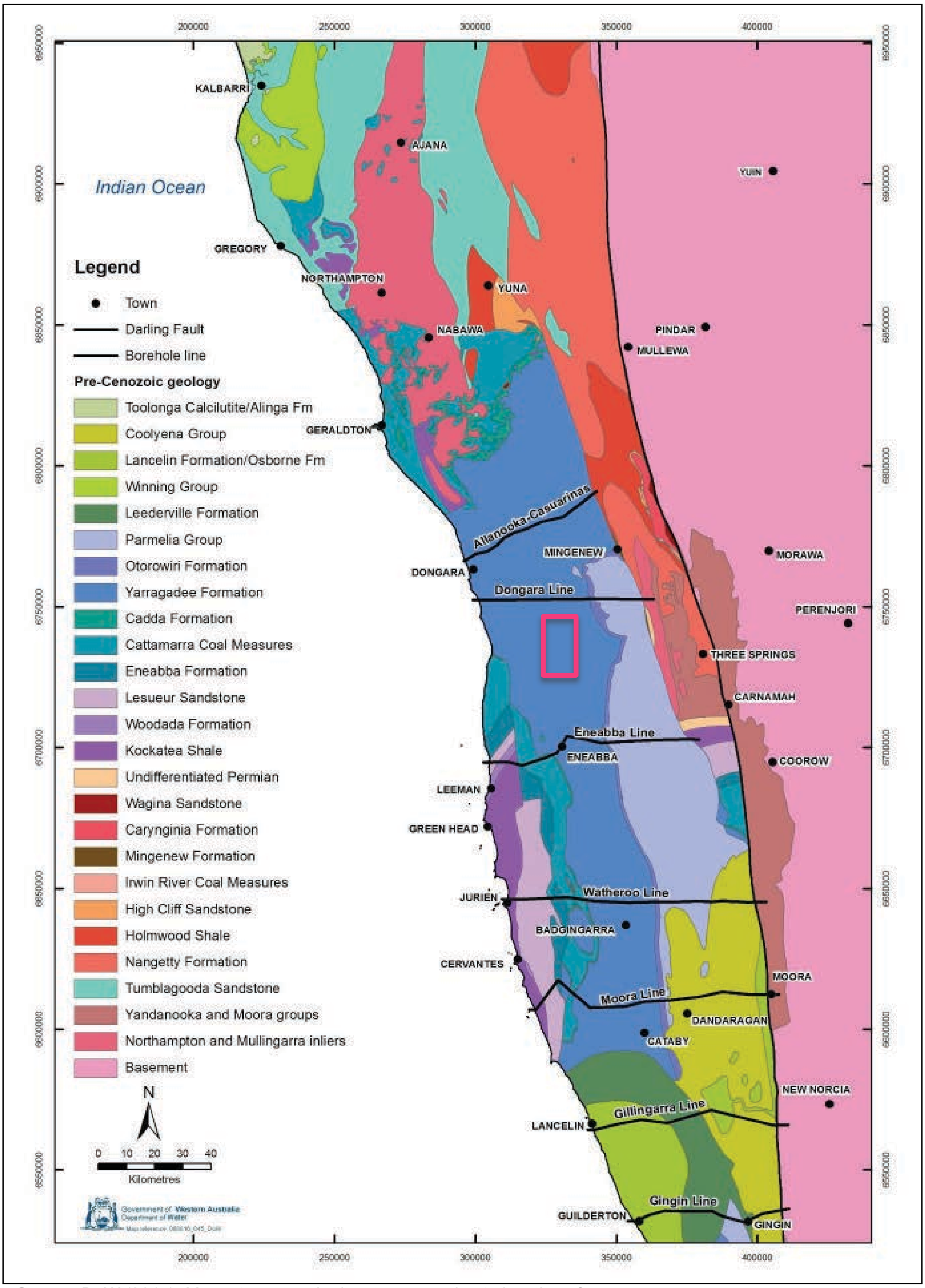
Source: DoW (2017). Magenta rectangle denotes approximate location of survey area.

Figure 5.3. Surface water catchments



Source: DoW (2017). Magenta rectangle denotes approximate location of survey area.

Figure 5.4. Surface water catchments and likely river-groundwater interaction



Source: DoW (2017). Magenta rectangle denotes approximate location of survey area.

Figure 5.5. Regional pre-Cenozoic geology

Potential bore yields are very large with up to 6,000 kL/day achieved at Eneabba (Johnson and Commander, 2006). The major bore fields are at Allanooka supplying Geraldton, and at Eneabba supplying mineral sands operations and town water. The aquifer is also used for town water supply at Badgingarra, Dongara and Denison (Johnson and Commander 2006).

The recharge for this aquifer occurs primarily to the west of the Dandaragan Scarp where the aquifer is unconfined and occurs by direct infiltration of rainfall, downward leakage from the Arrowsmith River and overlying formations. Nidagal (1995) noted that most groundwater discharges from the Yarragadee Formation into the Tamala Limestone with minor discharge in the Cattamarra Coal Measures across the Beagle Fault. Groundwater movement of the aquifer and overlying superficial aquifer is towards the coast (Earth Tech, 2002).

Superficial Aquifer

The superficial aquifer on the Swan Coastal Plain consists of Quaternary and late Tertiary sediments which extend from Geraldton in the north to Busselton in the south. There are several principal formations within this aquifer including the Tamala Limestone. The aquifer consists mainly of quartz sands, calcareous sands and limestone in the Tamala Limestone. The groundwater level is close to the surface in the south and in the centre but may be as much as 60 m below the surface, below the crests of the Tamala Limestone dunes along the coast. The average salinity is 4,224 mg/L and is hypersaline underneath the coastal lakes in the Perth area. The aquifer is developed for the Perth water supply but it is not a significant aquifer in the Dongara to Geraldton area where the groundwater salinity is generally non-potable. It has an average saturated thickness of 20 m and discharges to the ocean (Shire of Irwin, 2016).

Shallow groundwater lenses are located within the Tamala Limestone forming an unconfined aquifer in which the groundwater in mainly recharged from local rainfall (IRC Environment, 2004).

Townwater Supplies

Water for the town of Three Springs, surrounding farms and the nearby talc mine is supplied from two Water Corporation Bores, located within the Dookanooka Water Reserve, 17 km west of Three Springs (Shire of Three Springs, n.d). This water is drawn from the Parmelia Formation, which forms a semi-confined aquifer. The water table is greater than 60 m deep and the bores are screened at a depth of over 200 m, resulting in a low risk of contamination to the water source from agricultural uses (Shire of Three Springs, n.d).

Wells

The following water wells occur near the survey area (Mapcarta, 2017):

- Ngunkakara Well (29° 29' 36.5" (29.4935°) south, 115° 4' 54.1" (115.0817°) east) – 15.7 km to the west of the northern part of the survey area.
- Yardanogo Well (29° 27' 11.6" (29.4532°) south, 115° 4' 30.4" (115.0751°) east) – 17 km to the west of the northern-most part of the survey area.
- Roads Board Well (29° 26' (29.4333°) south, 115° 4' (115.0667°) – 18.7 km west of the northern-most part of the survey area.

Groundwater quality data from these wells has not been able to be accessed.

5.1.8 Air Quality

The proposed survey area is remote from point source air emission facilities such as towns, factories and mines.

Air emissions are generally from diffuse source such as passing road traffic and agricultural practices (e.g., farming machinery and methane emissions from sheep). Dust generated from vehicles travelling along unsealed roads, along with diesel fuel emissions, also contribute particulate matter to the local air shed.

Air emissions from point sources are associated with petroleum infrastructure in the region. These are:

- Lattice's Beharra Springs Gas Plant - located 10.5 km northeast of the survey area. For the 2015/16 financial year, the National Pollution Inventory (NPI) database indicates that total volatile organic compounds (260,000 kg), methanol (150,000 kg) carbon monoxide (80,000 kg) and oxides of nitrogen (38,000 kg) were the main pollutants released to the atmosphere, with small volumes of particulate matter (4,000 kg), n-Hexane (160 kg) and toluene (32 kg) emitted (NPI, 2017).
- Triangle Energy's Cliffhead and Arrowsmith Plant (operated by Roc Oil until mid-2016) - located 24.5 km northwest of the survey area in Dongara. For the 2015/16 financial year, the NPI database indicates that the main pollutants were oxides of nitrogen (260,000 kg), carbon

monoxide (38,000 kg), total volatile organic compounds (20,000 kg), particulate matter (645 kg), benzene (350 kg), n-Hexane (280 kg), and sulfur oxide (230 kg) (NPI, 2017).

- APT Parmelia Gas' pipeline compressor station 1 - located 5 km southwest of the survey area. For the 2013/14 financial year (the latest data available), the NPI database indicates that emissions to the atmosphere were very low, with the highest emissions being 0.028 kg of oxides of nitrogen and 0.0074 kg of carbon monoxide (NPI, 2017).

In general, air emissions in and around the proposed survey area would be expected to be rapidly diffused and dispersed by coastal winds (the coast is 25 km to the west of the proposed survey area) and thus characterised as having good air quality.

5.1.9 Noise

The proposed survey area is remote from ambient sound associated with residential areas and industry. Key ambient sound in the area is likely to result from wind blowing through vegetation (including wheat crops), insects and birds, sheep, low volumes of traffic along the Brand Highway, Skipper Road and Robb Road, farm equipment and water flowing through the Arrowsmith River.

5.2 Biological Environment

5.2.1 Flora

Bioregion

The vegetation of WA has been assigned to bioregions and subregions under the Interim Biogeographical Regionalisation for Australia (IBRA), with the proposed survey area falling within the Lesueur Sandplain subregion of the Geraldton Sandplain region.

The Geraldton Sandplain 3 (GS3 – Lesueur Sandplain subregion) is described as having high floristic diversity and levels of endemism, with vegetation composed mainly of proteaceous scrub-heaths on the sandy earths of an extensive, undulating lateritic sandplain mantling Permian to Cretaceous strata. Extensive york gum (*Eucalyptus loxophleba*) and Jam (*Acacia acuminata*) woodlands occur on outwash plains associated with drainage. The Department of Agriculture and Food (DAF) Western Australian-classified land systems dominant in the proposed survey area include:

- Mount Adams System (224 Ma) – a gently undulating sandplain with low gravel ridges and occasional laterite breakaways;
- Correy System (221 Cy) – broad sandy alluvial fan of the lower Arrowsmith River (a smaller influences); and
- Eneabba Plain System (221 En) – with pale deep sands with Banksia woodlands and heathlands (Figure 5.6).

Landscape of the proposed survey area

Based on aerial photography, it is estimated that 6,834 ha out of a total of 21,820 ha (or 31.3%) of the survey area comprises native vegetation. The largest central remnant vegetation block in the survey area has considerable fire scars, most likely from a fire in the region in 2010 (Landgate, 2017).

Landforms supporting species of conservation significance include the lateritic ridges in the central and north-eastern parts of the UCL, and in the northern private properties, as well as the creekline in the north-eastern portion of the UCL.

The remaining 14,986 ha (68.6%) of the survey area comprises farmland, this being mostly wheat cropping and sheep grazing.

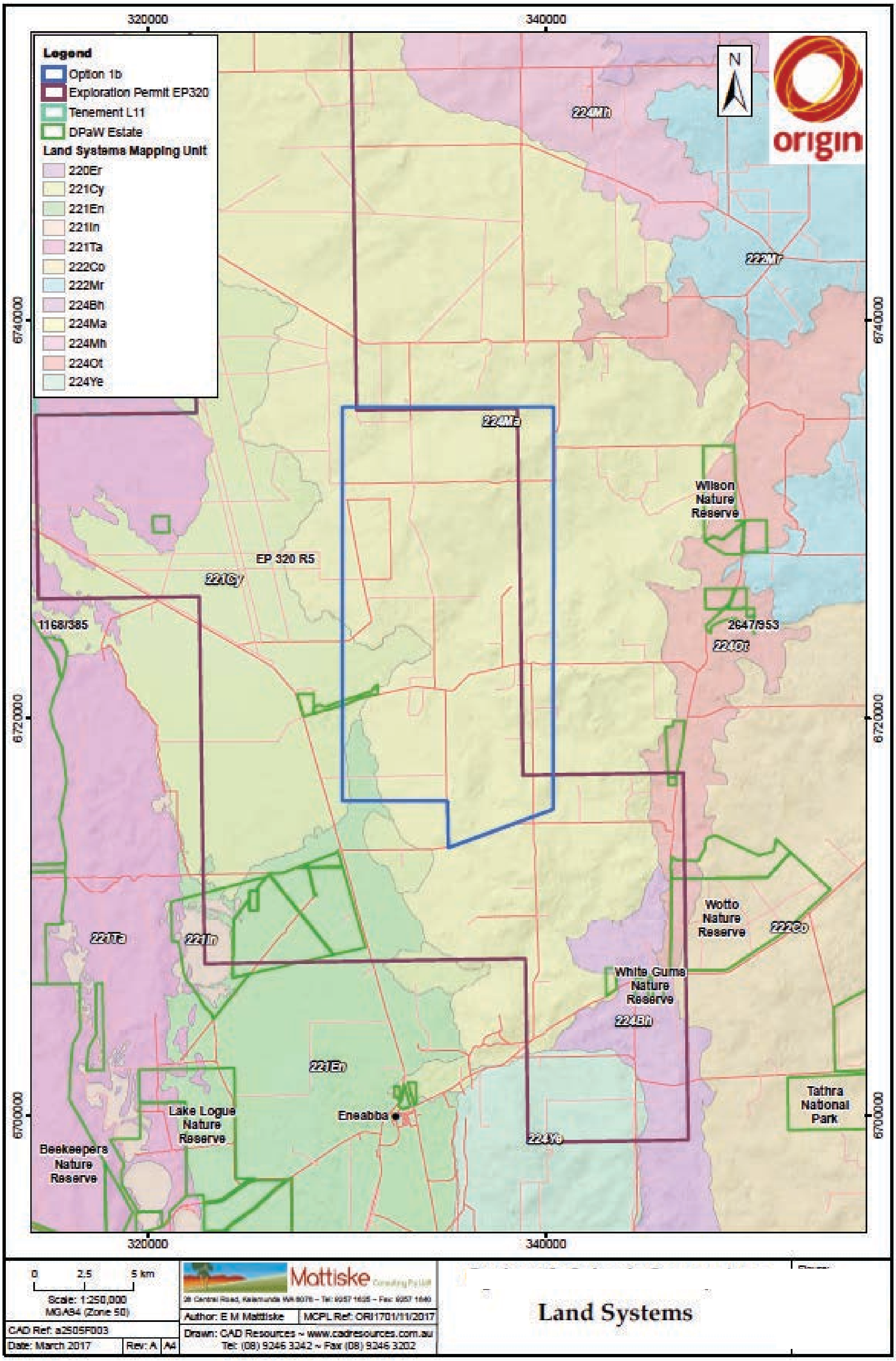
Vegetation

The survey area lies within the Irwin Botanical District of the South-West Botanical Province. Beard (1976) mapped the dominant vegetation association across the survey area as:

- 379: shrublands; scrub-heath on lateritic sandplain in the central Geraldton Sandplain Region (x4SZc).

The survey area also intersects smaller sections of vegetation association:

- 378: shrublands; scrub-heath with scattered *Banksia* spp., *Eucalyptus todtiana* and *Xylomelum angustifolium* on deep sandy flats in the Geraldton Sandplains Region (x5SZc).



Source: Mattiske Consulting (2017a).

Figure 5.6. Land systems of the proposed survey area and surrounds

The vegetation is characterised by Mucina et al (2014) as ‘kwongan heath’, with three dominant forms: myrtaceous-proteaceous kwongan, grasstree kwongan and sedge kwongan. *Banksia* woodlands are also known to be occasionally present in the region. Photos 5.1 to 5.8 provide an indication of the native vegetation structures present in the proposed survey area (all photos courtesy of Western Wildlife).

Photo 5.1. Low shrubland on laterite hills on the UCL

Photo 5.2. Shrubland on laterite hill on private property

Photo 5.3. Low shrubland on gravelly sands on the UCL

Photo 5.4. Low shrubland on sands on the UCL

Photo 5.5. Emergent patch of *Banksia attenuata* on the UCL

Photo 5.6. Open shrubland with *Banksia hookeriana* and *B. attenuata* on private property

Photo 5.7. Open woodland of *Eucalyptus todtiana* over shrubland on sand on the UCL

Photo 5.8. Wandoo woodland in minor creek on the UCL

Structure

The field surveys (see later section) confirm that the vegetation is open heathland (myrtaceous-proteaceous kwongan, grasstree kwongan and sedge kwongan), sometimes with isolated trees (usually coastal blackbutt, *Eucalyptus todtiana* and/or sandplain woody pear [*Xylomelum angustifolium*]). Also present are open woodlands (powderbark wandoo [*Eucalyptus accedens*] and black-stemmed mallee [*E. arachnaea* subsp. *arachnaea*]) and open shrublands (either dominated by hooker's banksia [*Banksia hookeriana*] and slender banksia [*Banksia attenuata*]), or *Allocasuarina campestris*, or Burma Road banksia (*Banksia scabrella*) and *Banksia leptophylla*, often over open heathland or sedgeland (*Mesomelaena* spp.).

Condition

With the exception of some edge effects of weeds from surrounding private properties (and the creekline in the north-east of the UCL), the overall condition of the UCL is assessed as 'pristine or nearly so, with no obvious sign of disturbance or damage caused by human activities since European settlement' (Category 1 using the Keighery, 1994 classification system). Feral animal influences, including goats, foxes and rabbits were noted during the survey.

The remnant vegetation in the three private properties surveyed to the north of the UCL were ranked as category 1 or 2 ('vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species'). The private property visited to the south of the UCL was in similar condition, with weeds evident along the edge of the remnant vegetation block but was otherwise in category 2 to 1.

Threatened Ecological Communities

No threatened or priority ecological communities are listed as occurring within a 10 km buffer of the proposed survey area according to the EPBC PMST or the WA Threatened and Priority Flora Search.

The Shire of Three Springs (n.d) indicates that there are no groundwater dependent ecosystems within the proposed survey area.

Desktop Review

Lattice commissioned Mattiske Consulting Pty Ltd to conduct a desktop vegetation assessment and field survey of the proposed survey area. The information in this section is derived from their report (Mattiske Consulting, 2017) (**Appendix C**).

A desktop assessment was conducted using FloraBase (Western Australian Herbarium, WAH), NatureMap (Department of Parks and Wildlife to identify the possible occurrence of threatened and priority flora and threatened and priority ecological communities. The NatureMap search parameters incorporated a 10 km buffer around the proposed survey area.

The proposed survey area polygon coordinates were used in the EPBC Act Protected Matters Search Tool (PMST) in order to understand what threatened species from the surrounding area may also be observed within the proposed survey area (DoEE, 2017a).

Additionally, historical documentation and vegetation mapping of the region, principally that of Beard (1976, 1990), Desmond and Chant (2001), and Department of Agriculture and Food Western Australia's soil land systems mapping, that provide resource material for the floristics, vegetation and soil of the wider area were reviewed.

Native vegetation extent was based on 2012 aerial imagery and Department of Agriculture and Food Western Australia's Pre-European Native Vegetation Extent data, refined by CAD Resources. This provided the basis for potential habitat areas for threatened and priority flora species.

Field Survey

A targeted field assessment of the flora and vegetation of the proposed survey area was undertaken by seven experienced botanists from Mattiske Consulting between August and November 2017. This was undertaken in accordance with the methods outlined in *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA, 2016b).

Survey methodology consisted of foot traverses along the proposed source lines and then the proposed receiver lines, both to a maximum width of 20 m. These survey lines were refined by Lattice prior to the surveys to avoid wherever possible remnant vegetation within private properties, the course of the Arrowsmith River, and the Nature Reserve R 25495.

Targeted orchid surveys were conducted over potential habitat identified during the initial foot traverses. These surveys in October and November were not just confined to the seismic line corridors and instead targeted vegetation supporting historic records, or identified during foot traverses to be potential habitat. The orchid surveys were focussed mainly around the lateritic ridges along Robb Road, as this is the habitat deemed most suitable for their growth. The width of the potential habitat (ridge or ridge slope) was traversed at approximately 20 m zig-zags. Where the orchids were encountered, the survey intensity was increased in the immediate area (up to 50m).

If suspected or known species of conservation significance were encountered, a specimen was collected and plant numbers were recorded for the population. All plant specimens collected during the field surveys were dried and processed in accordance with the requirements of the WAH. The plant species were identified based on taxonomic literature and through comparison with pressed specimens housed at the WAH. Where appropriate, plant taxonomists with specialist skills were consulted. Nomenclature of the species recorded is in accordance with the WAH.

All source and receiver lines intersecting native vegetation within the UCL were surveyed, and all source and receiver lines intersecting remnant vegetation within the accessible private properties were surveyed, resulting in approximately 300 km of foot traverses.

Line deviation notes were recorded for patches of slow growing species (e.g., trees/large shrubs, grass trees), obstacles (fences, gravel mounds, steep drop offs, inaccessible ridges), bee hive locations, threatened flora locations, and where old firebreaks or tracks were utilised.

Survey timing

According to *Technical guidance – Flora and vegetation surveys for environmental impact assessment* (EPA, 2016b), the primary survey timing for the South-west and Interzone Botanical Province is spring (September-November). The surveys were timed, where possible, to align with peak flowering periods of conservation significant flora with the potential to occur in the proposed survey area. A total of seven experienced botanists undertook the surveys between August and November 2017 over a total of 78 field days. The majority of the surveys (80%) were undertaken during September and October 2017 when the majority of the species of conservation significance were likely to be in flower (and thus more readily identifiable).

Survey Results

A total of 107 threatened and priority flora species were identified in the desktop assessment as having the potential to occur within the project area. Twenty-one (21) of these species were known to occur within the survey area (Table 5.1, Figure 5.7). Further detail on these species is available in Mattiske Consulting (2017). As a result of the extensive foot traverses, a total of 26 threatened and priority flora species were recorded during the 2017 surveys in the Trieste 3D Seismic Project (Table 5.1).

Table 5.1. Comparative numbers of species of conservation significance

Conservation status	Number of species identified in the desktop review (in project area)	Number of species identified during the field surveys
Threatened	16 (3)	4
Priority 1	13 (1)	2
Priority 2	20 (2)	3
Priority 3	39 (7)	11
Priority 4	19 (8)	6

Threatened Species

Table 5.2 lists and describes the 14 EPBC Act-listed species from the EPBC Act PMST database that may occur within the survey area (search conducted 6 April 2017 by Lattice). The field surveys found four threatened species listed under the EPBC Act or *Wildlife Conservation Act 1999* (WA) within the proposed survey area (Figure 5.8), these being *Eucalyptus crispata*, *E. leprophloia*, *Paracaleana dixonii* and *Thelymitra stellata*.

The two threatened eucalypt species are located at a single location, along the edge of a dry creekline associated with wandoo woodland (powerderbark wandoo, *E. accedens*). Only two individuals of *E. crispata* were found, while 22 individuals of *E. leprophloia* were found. Given the discreet occurrence of this species, the wandoo woodland (Figure 5.9) has been excised from the survey area, and these species will not be impacted.

Priority-listed Species

Table 5.3 lists and describes the priority-listed species found during the field surveys.

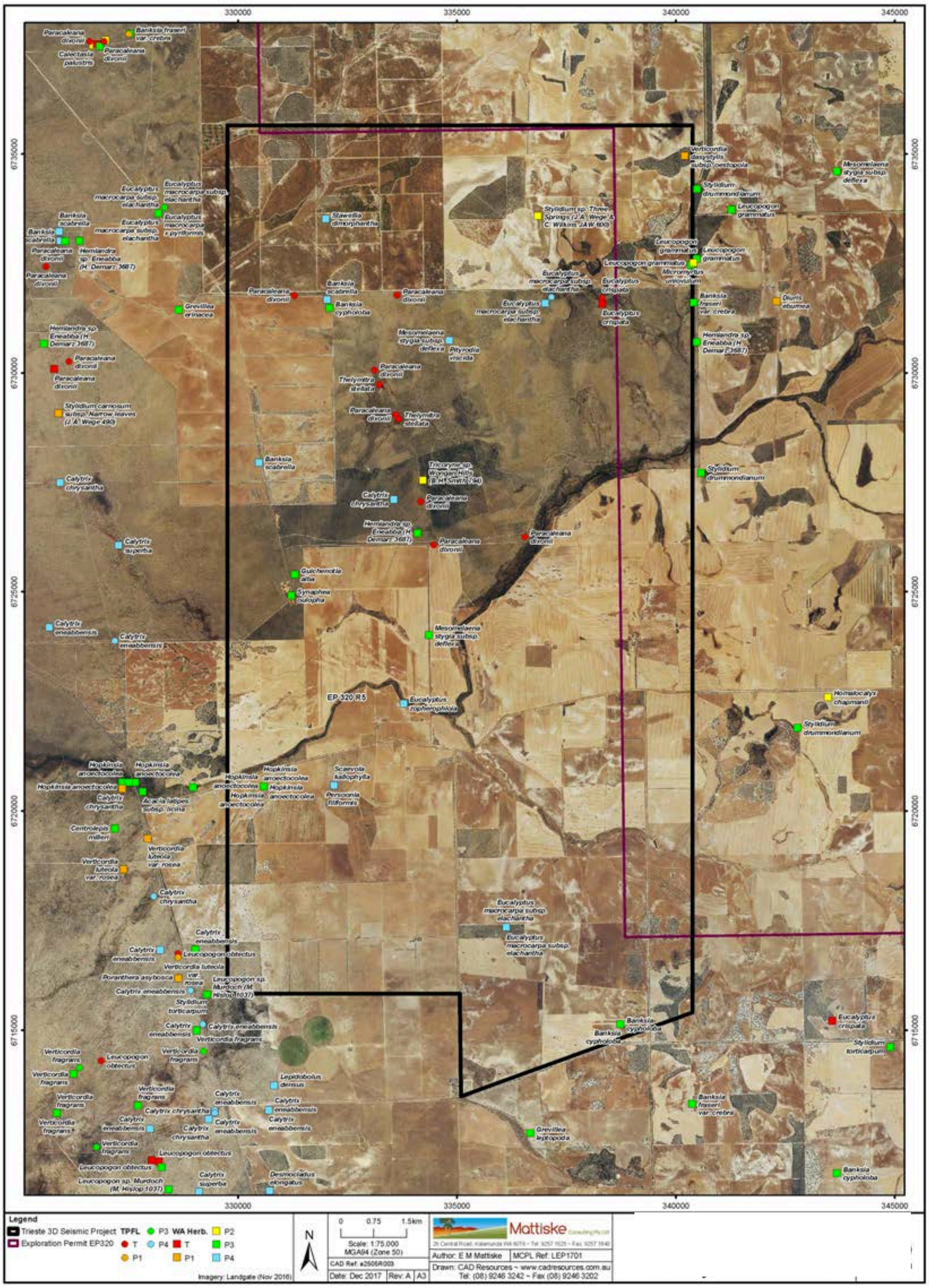
Weeds

The PMST lists the following four weeds as potentially occurring within the proposed survey area:

- Bridal creeper (*Asparagus asparagoides*);
- Buffel grass (*Cenchrus ciliaris*);
- African boxthorn (*Lycium ferocissium*);
- Athel pine (*Tamarix aphylla*);

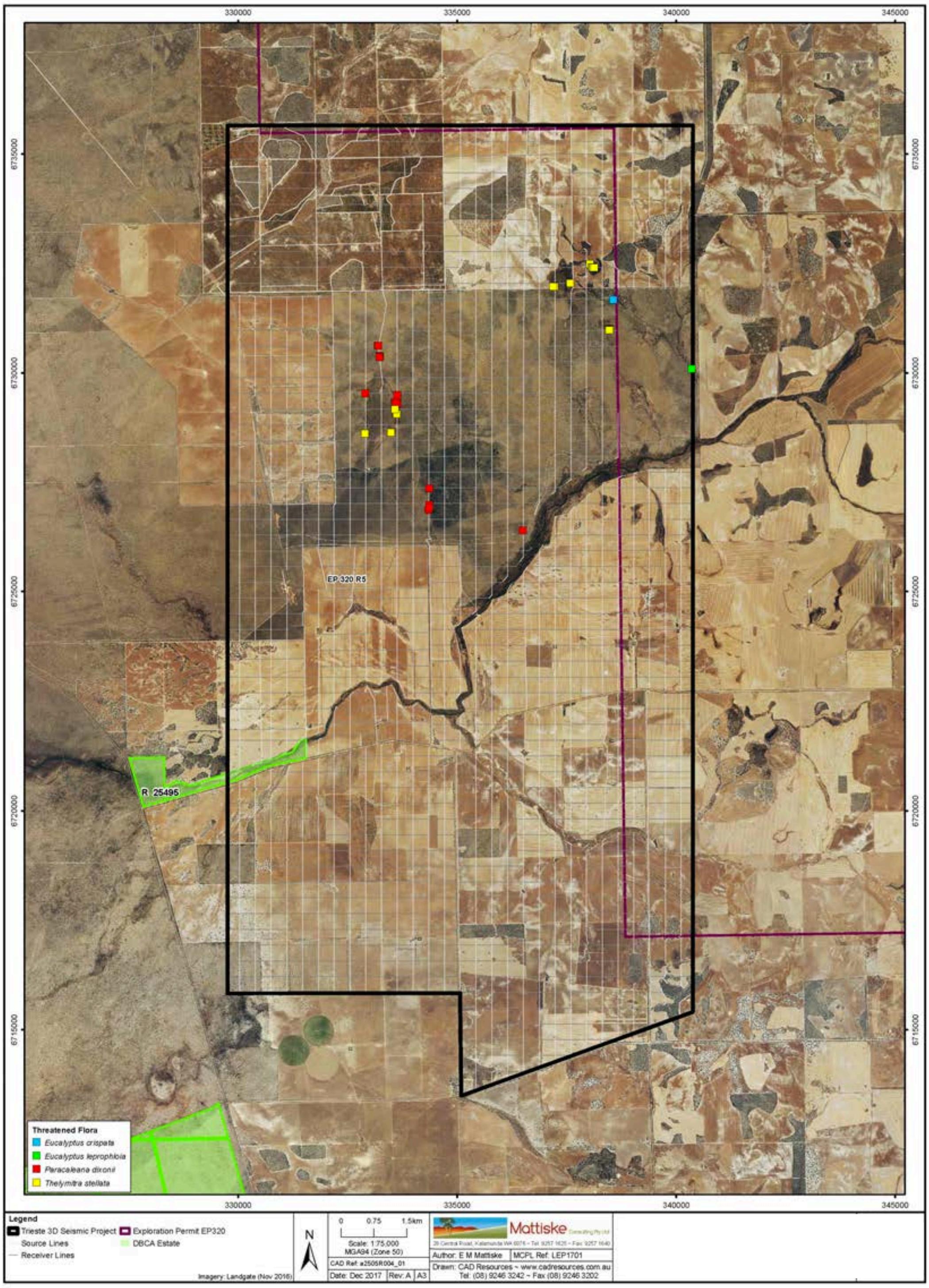
The vegetation survey notes that other that some edge effects of weeds from private properties (and the creekline in the northeast of the UCL), the overall condition of the UCL was very high.

Consultation with landholders in the survey area indicates that one landowner has an infestation of annual ryegrass (*Lolium rigidum*) on his property. The WA Department of Primary Industries and Regional Development (DPIRD) states that this species is one of the most serious and costly weeds of annual winter cropping systems in southern Australia, as it is highly competitive with crops as early as the two-leaf crop stage. It is a winter to spring growing weed that can emerge from late autumn through to early spring, producing an extremely high number of seeds per plant (DPIRD, 2017).



Source: Mattiske Consulting (2017b).

Figure 5.7. Location of previously recorded threatened and priority-listed species



Source: Mattiske Consulting (2017).

Figure 5.8. Location of threatened species recorded during the field survey

Table 5.2. Description of threatened species recorded or that may occur within the proposed survey area

Species	Status		Description	Habitat & distribution	Likelihood of occurrence
	EPBC Act 1999	Wildlife Conservation Act 1950			
Trees					
Eucalyptus crispata Yandanooka mallee	Vulnerable *CA in place*	Threatened (endangered)	An erect or spreading mallee up to 5 m tall, with smooth grey bark on its upper trunk and peeling flakes at the base. It has yellow-cream coloured flowers that bloom from March to June.	Found on yellow sand on the Geraldton Sandplains. Two plants were recorded in a single location around the northeast corner of the survey area along the edge of a dry creekline associated with *E. accadens* (powerbark wandoo) and *E. arachnaea* (black-stemmed mallee).	**Present** Found during the surveys.
Eucalyptus impensa Eneabba mallee	Endangered *CA in place*	Threatened (critically endangered) *IRP in place*	A straggly mallee growing to 1.5 m high with pink coloured flowers that bloom in June and July.	Found on yellow sand on the Geraldton Sandplains.	**Low**
Eucalyptus leprophloia Scaly butt mallee	Endangered *CA in place*	Threatened (endangered) *IRP in place*	An erect mallee growing to 5 m high with scaly, curly bark to 1 m and smooth grey over pale-copper bark above. It has cream-white coloured flowers that bloom from August to October.	Found on white or grey sand over laterite in the Avon Wheatbelt and the Geraldton Sandplains. This species was found in one location (22 plants) in the same association as the *E. crispata*, but in the south-eastern end of the creekline within the UCL.	**Not present** This part of the UCL has been excised from the survey area since the survey took place.
Eucalyptus x balanites Cadda road mallee	Endangered	Threatened (critically endangered) *IRP in place*	A mallee growing to 5 m high with white coloured flowers that bloom from October to February.	Found on sand with lateritic gravel in the Geraldton Sandplains and Swan Coastal Plain. 11 Florabase records.	**Low**
Shrubs					
Chorizema humile Prostrate flame pea	Endangered	Threatened (critically endangered) *RP in place*	A small, prostrate shrub growing to 60 cm in diameter with yellow and red/brown coloured flowers that bloom from July to September. Endemic to WA.	Found in red loam, brown sandy clay with decomposing granite or in clay soils on plains in scrub or open tree mallee in the Avon Wheatbelt and the Geraldton Sandplains.	**Low** These populations are all listed as occurring well east of the proposed

Species	Status		Description	Habitat & distribution	Likelihood of occurrence
	EPBC Act 1999	Wildlife Conservation Act 1950			
				This species has 13 populations that are severely fragmented and in poor habitat quality with key threats to its survival being grazing, trampling, road maintenance activities, weed competition and inappropriate fire regimes.	survey area (east of Coorow and Bindi Bindi) (DEC, 2009).
Daviesia speciosa Beautiful daviesia	Endangered *CA in place*	Threatened (endangered)	A multi-stemmed shrub growing to 80 cm high with red flowers that bloom in April and May. Endemic to WA.	Found on gravelly lateritic soils on undulating plains and rises in the Avon Wheatbelt and Geraldton Sandplains	**Possible** Not found during field survey.
Hemiandra gardneri Red snakebush	Endangered *CA in place*	Threatened (critically endangered) *IRP in place*	A prostrate, pungent shrub growing to 20 cm high with red/pink-red coloured flowers that bloom from August to October.	Found on grey or yellow sand, clayey sand in the Avon Wheatbelt and Geraldton Sandplains 21 Florabase records.	**Possible** Not found during field survey, but another *Hemiandra* species was found.
Leucopogon obtectus Hidden beard-heath	Endangered	Threatened (endangered) *RP in place*	A spindly to dense shrub growing to 1.7 m high with cream-yellow coloured flowers that bloom from August to October.	Found on white-grey/yellow-brown sand. 19 Florabase records.	**Possible** Records exist immediately outside the survey area, with none found during the field survey.
Tetratheca nephelioides	Critically endangered *CA in place*	Threatened (endangered)	A dwarf shrub growing to 30 cm high with purple coloured flowers that bloom in September.	Found on grey sand. 16 Florabase records.	**Possible** Not found during field survey.
Herbs					
Conostylis dielsii subsp. *teres* Irwin's conostylis	Endangered *CA in place*	Threatened (vulnerable) *IRP in place*	A rhizomatous tufted perennial herb growing to 33 cm high. Cream to yellow-coloured flowers that bloom in July and August.	Prefers white, grey or yellow sand or gravel on the Geraldton Sandplains. 24 Florabase records.	**Possible** Not found during field survey.

Species	Status		Description	Habitat & distribution	Likelihood of occurrence
	EPBC Act 1999	Wildlife Conservation Act 1950			
Conostylis micrantha Small-flowered conostylis	Endangered *CA in place*	Threatened (vulnerable) *IRP in place*	A rhizomatous tufted perennial herb growing to 24 cm high. Yellow/cream/red coloured flowers that bloom in July and August.	Found on white or grey sand in the Avon Wheatbelt and Geraldton Sandplains	**Possible** Not found during field survey.
Wurmbea tubulosa Long-reference nancy	Endangered *CA in place*	Threatened (vulnerable) *IRP in place*	A cormous, perennial herb growing to 3 cm high with white-pink coloured flowers that bloom from June to August.	Found on clay, loam in the Avon Wheatbelt and Geraldton Sandplains. 18 Florabase records.	**Possible** Not found during field survey.
Orchids					
Paracaleana dixonii Sandplain duck orchid	Endangered *CA in place*	Threatened (vulnerable)	A tuberous perennial orchid growing to 20 cm high with yellow and brown coloured flowers that bloom from October to December.	Found on grey-white sand over laterite on the Geraldton Sandplains and Swan Coastal Plain. Twenty-nine (29) plants were recorded during the flora surveys at five populations within the UCL. Five historic records were not relocated, however four of the 2017 populations were recorded within 500 m of the historic records.	**Present** Found during the surveys.
Thelymitra stellata Star sun-orchid	Endangered *CA in place*	Threatened (endangered)	A tuberous perennial orchid growing to 25 cm high with yellow and brown coloured flowers that bloom from October to November.	Found on sand, gravel and lateritic loam in the Avon Wheatbelt, Geraldton Sandplains, Jarrah Forest, Mallee and and Swan Coastal Plain. Thirty-eight (38) plants were recorded during the flora surveys at seven locations. Five of these populations were within the UCL, with the other two populations located on private land to the north of the UCL.	**Present** Found during the surveys.

Key is provided on the following page.

Key

CA	Conservation Advice under the *EPBC Act 1999* (Cth).
IRP	Interim Recovery Plan under the *Wildlife Conservation Act 1950* (WA).
RP	Recovery Plan under the *Wildlife Conservation Act 1950* (WA).

EPBC Act Definitions

Listed threatened species:	A native species listed in Section 178 of the EPBC Act as either extinct, extinct in the wild, critically endangered, endangered, and vulnerable or conservation dependent.

WA Conservation codes

Threatened species	
Specially protected under the *Wildlife Conservation Act 1950*, listed under Schedules 1, 2 and 3 of the Wildlife Conservation (Rare Flora) Notice (which may also be referred to as Declared Rare Flora). Taxa which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such. The assessment of the conservation status of these species is based on their national extent.	
Critically endangered	Schedule 1 - taxa that are extant and considered likely to become extinct or rare, as critically endangered flora, and therefore in need of special protection.
Endangered	Schedule 2 - taxa that are extant and considered likely to become extinct or rare, as endangered flora, and therefore in need of special protection.
Vulnerable	Schedule 3 - taxa that are extant and considered likely to become extinct or rare, as vulnerable flora, and therefore in need of special protection.

WA conservation listings current as at 3 February 2017.

Commonwealth conservation listings current as at 30 March 2017.

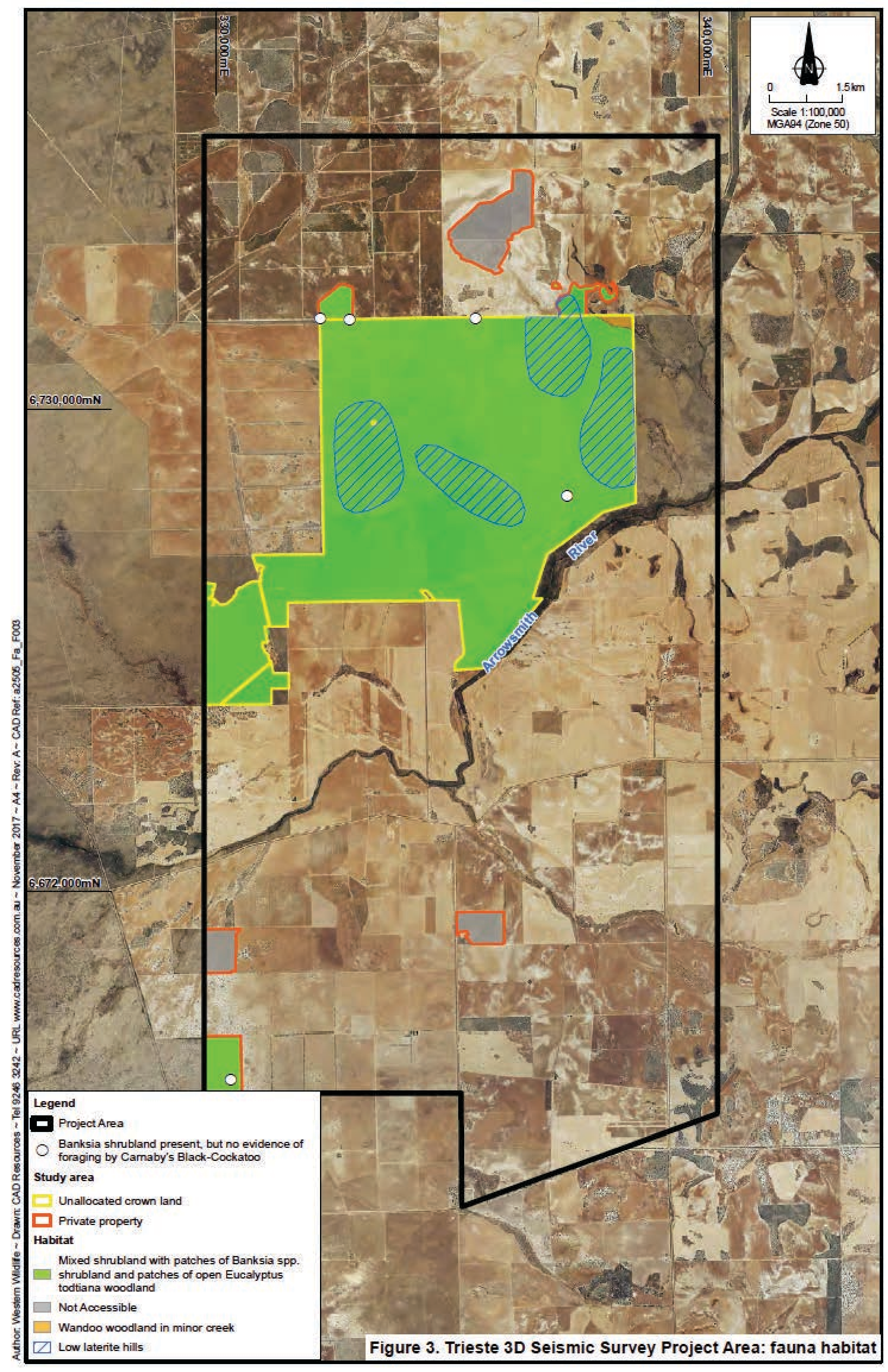
Table 5.3. Description of priority-listed species recorded within the proposed survey area

Species	Description	Habitat	Occurrence within proposed survey area
Priority 1			
Lasiopetalum ogilvieanum	A velvet bush shrub growing to 1.5m tall and flowering between July and October.	Undulating plains and lateritic rises.	Fifty-six (56) plants were recorded from three populations confined to the central UCL area. It was recorded under isolated trees in heathland. It was not recorded in any of the surveyed private properties.
Tricoryne soullierae	A small herb that flowers in October (and likely other months), however limited information is available on this species.	No information available.	Numerous records were scattered across the UCL block, as well as in remnant vegetation blocks of two private properties
Priority 2			
Persoonia filiformis	An erect to spreading lignotuberous shrub to 40 cm tall that flowers from November to December.	Sand over laterite.	One-hundred and fifty-four (154) plants were recorded scattered in heathland in the UCL. It was not recorded in any of the surveyed private properties.
Stylidium pseudocaespitosum	A rosetted perennial herb with tufted leaves growing to 30 cm tall. It flowers from September to November.	Sand over laterite, or on breakaways and hill slopes.	Small populations were recorded scattered in heathland, open woodland or isolated trees over open heathland in the central-northern UCL area. Usually less than five plants were recorded at a location. It was not recorded in any of the surveyed private properties.
Micromyrtus uniovulum	A low and spreading shrub to 40 cm tall that flowers from September to November.	Lateritic rises in sandy soil over laterite.	The specimen collected was from a known historic record south of Sundalara Road, with no plants recorded along the survey lines.
Priority 3			
Grevillea biformis subsp. *cymbiformis*	A shrub to 1.5 m tall that flowers between January to March, or August to December.		A single plant was recorded along a receiver line in the central-eastern portion of the UCL. It was not recorded in any of the surveyed private properties.
Guichenotia alba	A slender, lax, few-branched shrub to 45 cm tall that flowers from July to August.	Sandy clay or gravelly soils, on low-lying flats and depressions that are winter-wet.	Seventy-five (75) plants were recorded at four populations in the central- and south-western UCL area. It was not recorded in any of the surveyed private properties.
Hemiandra sp. Eneabba	A straggly, erect shrub to 90 cm tall that flowers between November and February.	Sand.	Two-hundred and forty-three (243) plants were recorded scattered in low numbers in the UCL, mostly in the south-west area and the south. It was not recorded in any of the surveyed private properties.

Hypocalymma gardneri	A shrub growing to 30 cm tall, flowering between August and September.	Sand or laterite on sandplains, upper slopes and heathland.	Recorded in the UCL at four locations, each of a single plant.
Mesomelaena stygia subsp. *deflexa*	A tufted, perennial sedge to 50 cm tall that flowers from March to October.	Occurs on a variety of soils in heathland.	Recorded in dense numbers on the cream-yellow sands on undulating plains associated with open heathland in the project area. It was not recorded in any of the surveyed private properties. The single historic record from Robb Road in the UCL was relocated, and the population numbers expanded.
Persoonia rudis	An erect, often spreading shrub to 1 m tall that flowers from September to December.	Sand over laterite.	This species was recorded mostly in the central and south-western areas of the UCL as scattered plants (1-2 plants at each location) in heathland.
Stylidium drummondianum	A rosetted perennial herb to 20 cm tall that flowers from August to October.	Lateritic ridges and slopes with gravelly skeletal soils.	Recorded from the central-western lateritic ridges (west of Robb Road) and north-eastern lateritic ridges in the UCL, and the lateritic ridges in the Brickley's and Morgan's private properties. This species was often recorded in similar habitat to the threatened orchids.
Stylidium torticarpum	A caespitose perennial herb with tufted leaves, growing to 27 cm tall. It flowers from September to November.	Sandy clay soils on winter-wet creek margins, adjacent watersheds and depressions or beneath breakaways.	This species was recorded in the damper areas or depressions between lateritic ridges in the south-east UCL as well as the creekline in the north-east UCL.
Synaphea oulopha	A compact shrub to 20 cm tall, flowering from July to October	Lateritic breakaways and rises.	Twenty-five (25) plants were recorded in a confined area (90 x 20 m) in the south-west UCL along a proposed source line.
Verticordia luteola var. *luteola*	A slender shrub to 1.4 m tall that flowers from November to December.	Sand over gravel on flats.	A single plant was recorded along a proposed source line just off Robb Road in the UCL.
Verticordia densiflora var. *roseostella*	An open shrub to 1.3 m tall, flowering from September to December.	Sandy gravelly soils.	Seventy-eight (78) plants were recorded as a single population along a proposed receiver line in the mallee tree farm private property. It was not recorded in the UCL.
Priority 4			
Banksia scabrella Burma Road Banksia	A multi-branched shrub to 2 m tall that flowers from September to December. This species regenerates from seed and is known to be killed by fire.	Sandplains and occasionally on lateritic ridges.	A large population was recorded in the long-unburnt southern-central area of the UCL, as well as scattered in the low heath in the northern UCL. This species was also recorded in the Brickley's private property.
Desmocladus elongatus	Shortly-rhizomatous perennial rush to 50 cm tall, flowering from August to December.	Locally frequent on deep sand over laterite in heath.	This species was recorded scattered in heath and shrubland, usually as single plants, or less than five plants at each location. The majority of the records were from the heathland in the north-western portion of the UCL.

Eucalyptus macrocarpa subsp. *elachantha* Small-leaved mottlecah	A spreading mallee to 4 m tall that flowers from August to September or November to December.	Sand over laterite.	Plants were recorded as scattered in the northern heathland in the UCL and not always directly on a survey line.
Pityrodia viscida	Viscid shrub to 60 cm tall flowers from September to December or January to February.	Lateritic sand.	Five main populations were recorded in the central-northern UCL, mostly along proposed receiver lines.
Schoenus griffinianus	A small, tufted perennial sedge growing to 10 cm tall that flowers from September to October.	White sand, on existing tracks and firebreaks, favouring disturbed sites.	This sedge was recorded in the UCL as scattered plants in low numbers (1-2 plants) along old tracks and firebreaks.

Key to classification of priority species	
Taxa that may be threatened or near threatened, but are data deficient or have not yet been adequately surveyed to be listed under the Wildlife Conservation (Rare Flora) Notice, are added to the Priority Flora List under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status, so that consideration can be given to their declaration as threatened flora. Taxa that are adequately known and are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These taxa require regular monitoring. Assessment of Priority codes is based on the WA distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.	
P1 Poorly known species	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2 Poorly known species	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3 Poorly known species	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4 Rare, near-threatened and other species in need of monitoring	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.



Source: Western Wildlife (2017).

Figure 5.9. Location of wandoo woodland in the survey area

Pathogens

Phytophthora cinnamomi ('cinnamon fungus') is the key pathogen of concern in southwest WA. It is an introduced soil-borne pathogen (a water mould) that invades and destroys the function of the root systems of a large range of plants (CALM, 2003b). It depends on moist conditions for survival, sporulation and dispersal and feeds of host plants via a mass of microscopic thread-like mycelium. These mycelia may be transported in soil and host tissue. Once introduced to an area, it may lead to poor health of host plants (reduced vigour, flowering and seed set) or death. This in turn result may result in localised population declines for the affected species (lost biodiversity), localised extinctions, altered vegetation community structure (e.g., increased dominance of resistant plants such as grasses, rushes and sedges) and reduced feeding and sheltering opportunities for native fauna.

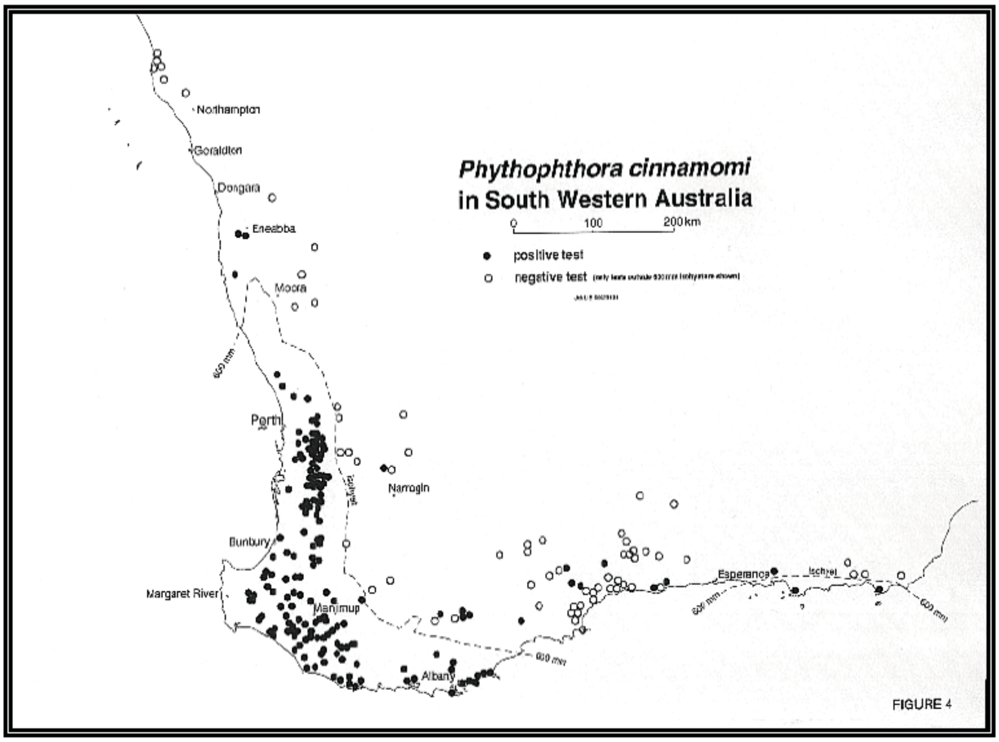
In WA, the presence of this pathogen is:

- More prevalent in that part of the southwest land division that receives mean annual rainfall >800 mm;
- Widespread but less extensive occurrence in the 600-800 mm rainfall zone; and
- Restricted to circumstances where local hydrological effects cause effective rainfall to substantially exceed regional patterns in areas receiving <600 mm rainfall per annum (CALM, 2003b).

The latter category is the zone in which the proposed survey area occurs.

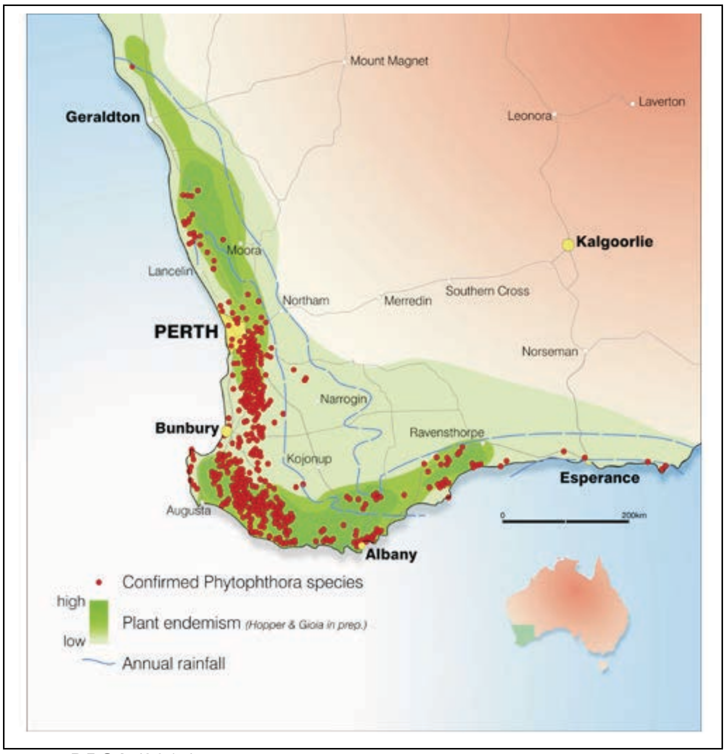
CALM (2003) indicates that there are several positive records of the *Phytophthora cinnamomi* in the Eneabba area (Figure 5.10). Detailed mapping provided in Iluka's Dieback Management Plan (2009) confirms the presence of *Phytophthora* in the Eneabba area, mostly south of the Eneabba–Three Springs Road, with isolated records north of this point and west of the Brand Highway (with all these areas being south of the proposed survey area) (Iluka Resources, 2009). None of the threatened ecological communities listed in DoE (2014) that may be impacted by *Phytophthora cinnamomi* occur within the proposed survey area.

The Department of Biodiversity, Conservation and Attractions (DBCA) indicates that more than 40% of WA's native plants are susceptible to the *Phytophthora*, particularly in the southwest region (DBCA, 2017b) (Figure 5.11). Species belonging to the Proteaceae (including banksias), Epacridaceae, Fabaceae and Myrtaceae families are most affected, while some eucalypt species (such as karri, marri, wandoo and tuart) are highly resistant (CALM, 2003b).



Source: CALM (2003).

Figure 5.10. Distribution of disease in native vegetation caused by *Phytophthora cinnamomi* in WA



Source: DBCA (2017).

Figure 5.11. Spread of *Phytophthora cinnamomi* in WA overlaid with levels of plant endemism

5.2.2 Fauna

Lattice commissioned Western Wildlife to undertake a desktop investigation and Level 1 vertebrate fauna survey in vegetated areas of the proposed survey area (**Attachment D**). This section provides the results of this work. In this section, the term 'study area' is used, and means areas of native vegetation subject to the seismic survey.

Literature Review

Lists of fauna expected to occur in the study area were produced using information from a number of sources. These included publications that provide information on general patterns of distribution of frogs (Tyler *et al*., 2000), reptiles (Storr *et al*., 1983, 1990, 1999 and 2002), birds (Barrett *et al*., 2003; Johnstone and Storr, 1998; 2004) and mammals (Churchill, 1998; Menkhorst and Knight, 2011; Van Dyck and Strahan, 2008).

The databases listed in Table 5.4 were searched for fauna records in and around the study area. In all cases the extent of the database search was larger than the extent of the study area, in order to pick up records of species in the wider area that may also occur in the study area. Some species may occur on database results that are not likely to be present in the study area, usually due to a lack of suitable habitat or the study area being outside the known range of the species as presented in the literature. These species are generally not included in lists of expected fauna unless some discussion is thought to be necessary.

These sources of information were used to create lists of species that potentially occur in the study area. As far as possible, expected species are those that are likely to utilise the study area. The lists exclude species that have been recorded in the general region as vagrants, or for which suitable habitat is absent within the study area.

Table 5.4. Databases used in the preparation of the fauna list

Database	Type of records held	Area searched
WA Museum Specimen Database (DBCA, 2017a)	Records of specimens held in the Western Australian Museum. Includes historical records.	25 km radius around 28°48'28" S, 122°12'37" E
Fauna Survey Returns Database (DBCA, 2017a)	Records collected from fauna surveys carried out in Western Australia. Includes observational and trapping data.	25 km radius around 28°48'28" S, 122°12'37" E
DBCA's Threatened and Priority Fauna Database (DBCA, 2017a)	Information and records on Threatened and Priority species in Western Australia	55 km radius around 335000 S, 6725000 N (Zone 50)
Birds Australia Atlas Database (DBCA, 2017a)	Records of bird observations in Australia, 1998-current.	20 km radius around 28°48'28" S, 122°12'37" E
EPBC Act Protected Matters Search Tool	Records on matters protected under the EPBC Act, including threatened species and ecological communities, migratory species and marine species.	25 km radius around 28°48'28" S, 122°12'37" E

Independently of Western Wildlife's interrogation of the EPBC PMST, Lattice also undertook an equivalent search, using the boundaries of the proposed survey area for the search.

Field Survey

The fauna survey was undertaken in accordance with the following documents:

- Statement of Environmental Principles, Factors and Objectives (EPA, 2016a);
- Environmental Factor Guidelines – Terrestrial Fauna (EPA, 2016b);
- Technical Guide – Terrestrial Fauna Surveys (EPA, 2016c);
- Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA & DEC, 2010); and
- EPBC Act Referral Guidelines for three threatened black cockatoos: Carnaby's Cockatoo, Baudin's Cockatoo and Forest Red-tailed Black-Cockatoo (DSEWPC, 2012).

The field survey was carried out by one zoologist by vehicle and on foot between the 6th and 7th November 2017 and included:

- Identification of broad fauna habitats.
- Opportunistic records of fauna.
- Targeted search for evidence of any conservation significant species, particularly foraging, breeding or roosting habitat for Carnaby's black-cockatoo (*Calyptorhynchus latirostris*).

Species of conservation significance were classified as:

- Conservation Significance 1 (CS1) – listed under the EPBC Act (Cth) or the *Wildlife Conservation Act 1950* (WA).
- Conservation Significance 2 (CS2) – listed as a Priority species by the DBCA (not listed under State or Commonwealth legislation, but may be considered regionally significant). Priorities are defined by the DBCA as:
    - Priority 1 – Poorly known species (on threatened lands).
    - Priority 2 – Poorly known species in few locations (some on conservation lands).
    - Priority 3 – Poorly known species in several locations (some on conservation lands).
    - Priority 4 – Rare, near threatened and other species in need of monitoring.
- Conservation Significance 3 (CS3) – a locally significant species, not listed under legislation or assigned a Priority rating by the DBCA. Such species may be at the limit of their distribution or have a very restricted range.

Taxonomy and nomenclature for fauna species used in this report follow the WA Museum checklists. These were last updated in 2016.

The field study component of a Level 1 fauna survey is primarily to identify the fauna habitats present in the study area. In addition, all vertebrate fauna encountered during the field survey were recorded. The fauna species recorded are usually conspicuous species such as birds, large mammals and large reptiles. The presence of other species may be inferred from evidence such as tracks, burrows, scats or evidence of foraging. Particular attention was paid to searching for evidence of conservation significant species, or habitats likely to support conservation significant species.

Although not all stands of *Banksia* could be visited in a short site visit, several patches were searched for evidence of foraging Carnaby's black-cockatoo. In addition, conspicuous fauna species were recorded if sighted by personnel by Mattiske Consulting Pty Ltd during their flora survey work in the study area for 27 days between August and October 2017.

A summary of the vertebrate fauna potentially occurring in the study area is provided in Table 5.5.

Table 5.5. Summary of the vertebrate fauna potentially occurring in the study area

Taxon	Species	Introduced species	Conservation significant species		
			CS1	CS2	CS3
Amphibians	10	0	-	-	-
Reptiles	64	0	-	2	-
Birds	119	1	5	-	-
Mammals	25	7	1	1	-
TOTAL	**218**	**8**	**6**	**3**	**0**

Threatened Species

Table 5.6 lists and describes the 15 EPBC Act-listed species that may occur within the proposed survey area (EPBC Act PMST database search conducted 6 April 2017). The status of these species under the WA *Wildlife Conservation Act 1950* is also provided (seven species are listed as threatened under this Act). The key reference for this table is the PMST database (DoEE, 2017) unless otherwise indicated. Waterbirds/marine birds listed in the PMST are only briefly described in Table 5.14, as there is no significant waterbird habitat present in the study area.

Table 5.6. EPBC Act and Wildlife Conservation Act-listed fauna species potentially occurring in the proposed survey area

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
Birds					
Marine birds/shorebirds/waterfowl					
Apus pacificus Fork-tailed swift	Listed (migratory, marine)	Migratory bird protected under an international agreement	The fork-tailed swift is a medium to large bird with a length of 18–21 cm, a wingspan of 40–42 cm and weighs around 30–40 g. Breeding This species does not breed in Australia. In their breeding range, they nest on mountain cliffs or island rock caves, inside narrow crevices or in cracks on vertical cliff faces. They usually arrive in Australia around October. Foraging The fork-tailed swift is almost exclusively aerial, flying from less then 1 m to at least 300 m above ground and probably much higher. Their prey species in Australia are not well known, however, they are known to be insectivorous, feeding on small bees, wasps, termites and moths in proximity to cyclonic weather.	The fork-tailed swift is native and vagrant in many countries. They are highly mobile while in Australia, with large flocks often preceding or following low-pressure systems as they cross the country in search of food. In WA, they are common in Broome, with maximum numbers occurring in February. Fork-tailed swifts leave southern Australia from mid-April and depart the Darwin area by the end of April. In WA, there are widespread in coastal and sub-coastal areas between Augusta and Carnarvon. There are sparsely scattered inland records, especially in the Wheatbelt, from Lake Annean and Wittenoom. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand dunes.	**Low** May occur but only as an aerial species overflying the area.
Motacilla cinerea Grey wagtail	Listed (migratory, marine)	Migratory bird protected under an international agreement	The grey wagtail is a small bird, growing to 18 cm, and is distinguished as the only wagtail with pinkish (not black) legs. It has grey plumage with a yellow breast. Breeding This species breeds in Europe from March to August. Some populations are highly migratory and travel south after breeding. Foraging This species feeds on a variety of insects caught from shallow water.	The grey wagtail is widespread cosmopolitan species found in northern Africa, Europe and Asia that prefers fast-moving watercourses. In Australia, it is present in latitudes north of Cairns (Qld).	**Unlikely** Preference for aquatic habitats makes it unlikely to occur within the survey area.

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
Calidris ferruginea Curlew sandpiper	Critically endangered *CA in place*	Vulnerable & Migratory bird protected under an international agreement	A small, slim sandpiper 18–23 cm long and weighing 57 g, with a wingspan of 38–41 cm. It has a long decurved black bill with a slender tip; the legs and neck are also long. It has a square white patch across the lower rump and uppertail-coverts, a prominent flight character in all plumages. The sexes are similar, but females have a slightly larger and longer bill and a slightly paler underbelly in breeding plumage. Breeding The species breeds in Siberia and they live up to 18 years. Foraging Curlew sandpipers forage on mudflats and nearby shallow water. In non-tidal wetlands, they usually wade, mostly in water 15–30 mm. They forage on invertebrates, including worms, molluscs, crustaceans, and insects, as well as seeds. Roosting They roost in open situations with damp substrate, especially on bare shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands.	In Australia, curlew sandpipers occur around the coasts and are also widespread inland, though erratic in their appearance across much of the interior. There are records from all states during the non-breeding period, and also during the breeding season when many non-breeding birds remain in Australia rather than migrating north. They occur mainly on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. In WA, they are widespread around coastal and sub-coastal plains from Cape Arid to the southwest Kimberley. They occur in thousands to tens of thousands at Port Hedland Saltworks, Eighty-mile Beach, Roebuck Bay and Lake Macleod, over 1,000 km northwest of the survey area.	**Unlikely** Preference for wetland foraging sites and shoreline roosting sites makes it unlikely to occur within the survey area.
Numenius madagas-cariensis Eastern curlew	Critically endangered Listed (migratory, marine) *CA in place*	Vulnerable & Migratory bird protected under an international agreement	The eastern curlew is the largest migratory shorebird in the world, with a long neck, long legs, and a very long down-curved bill. Breeding The species breeds in Russia and they live up to 19 years. Foraging The species mainly forages during the non-breeding season on soft sheltered intertidal sandflats or mudflats, open and without	Within Australia, the eastern curlew has a primarily coastal distribution. The species is found in all states. They have a continuous distribution from Barrow Island and Dampier Archipelago in WA, through the Kimberley and along the Northern Territory, Queensland, and NSW coasts and the islands of Torres Strait. They are patchily distributed elsewhere. In WA, the species is a scarce visitor to Houtman Abrolhos and the adjacent mainland, and is also	**Low** Feeds and roosts mainly along the shoreline.

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
			vegetation or covered with seagrass, often near mangroves, on salt flats and in saltmarsh, rockpools and among rubble on coral reefs, and on ocean beaches near the tideline. The eastern curlew is carnivorous during the non-breeding season, mainly eating crustaceans, small molluscs and insects. Roosting This species roosts during high tide periods on sandy spits, sandbars and islets, especially on beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. They occasionally roost on reef-flats, in the shallow water of lagoons and other near-coastal wetlands.	recorded around Shark Bay. During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (Zosteraceae).	
Pandion haliaetus Osprey	Listed (migratory, marine)	Migratory bird protected under an international agreement	The osprey is a medium-sized raptor. They usually occur singly, occasionally in twos, or more rarely in family groups. Osprey can live up to 22 years. Breeding Osprey breed from April to February, with the breeding seasons of individual pairs varying according to latitude (commencing progressively later on a cline from north to south). Foraging Osprey require extensive areas of open fresh, brackish or saline water for foraging where they feed mainly on fish, especially mullet where available, and rarely take molluscs, crustaceans, insects, reptiles, birds and mammals.	The breeding range of the osprey extends around the northern coast of Australia (including many offshore islands) from Albany in WA to Lake Macquarie in NSW, and is considered to be moderately common. The species is most abundant in northern Australia, where high population densities occur in remote areas. The species is rare to uncommon in southern WA. Osprey occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. Adult ospreys are mostly resident or sedentary around breeding territories. They forage more widely but continue to make at least intermittent visits to their breeding grounds in the non-breeding season.	**Unlikely** Preference for open water foraging sites and elevated roosting sites makes it unlikely to occur within the survey area.

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
Haliaeetus leucogaster White-bellied sea-eagle	Listed (marine)	Not listed	The white-bellied sea-eagle is a large raptor that has long, broad wings and a short, wedge-shaped tail. It measures 75–85 cm in length, and has a wingspan of 180–220 cm. Females weigh between 2.8 and 4.2 kg, and are larger than the males, which weigh between 2.5 and 3.7 kg. Breeding Breeding has been recorded from only a relatively small area of the total distribution. Breeding records are patchily distributed, mainly along the coastline, and especially the eastern coast. Foraging The species generally forages over large expanses of open water, feeding on a variety of fish, birds, reptiles, mammals and crustaceans, and on carrion and offal. They hunt from a perch, or whilst in flight, usually launching into a dive or shallow glide to snatch its prey, usually in one foot, from the ground or water surface.	The white-bellied sea-eagle is distributed along the coastline (including offshore islands), around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The inland limits of the species are most restricted in south-central and south-western Australia, where it is confined to a narrow band along the coast. It is considered to be a common species throughout much of its range, and has an estimated global population of more than 10,000 individuals. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats.	**Unlikely** May overfly the proposed survey area, but the absence of large bodies of water make it unlikely there is habitat for this species.
Ardea alba Great egret	Listed (marine)	Not listed	The great egret is a moderately large bird (83–103 cm in length, 700–1,200 g in weight) with white plumage, a black or yellow bill and long reddish and black legs. They often occur solitarily, or in small groups when feeding. They roost in large flocks that may consist of hundreds of birds. The species usually nest in colonies and rarely in solitary pairs. Breeding In Australia, the breeding season of the great egret is variable, depending to some extent on rainfall, but generally extends from November to April (with pairs at southern	The great egret is a widespread species of southern and eastern Asia and Australasia. There has been no systematic survey of the Australian population of the great egret, with a preliminary estimate of 60,000 individuals derived from data on breeding colonies. This is thought to represent 11 to 74% of the total global population. The great egret occurs in a wide range of wetland habitats (e.g., inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial) and includes swamps and marshes, margins of rivers and lakes, damp or flooded grasslands, pastures or agricultural lands, reservoirs, salt	**Possible** More likely along watercourses when water is present.

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
			latitudes breeding in spring and summer, particularly November and December. Breeding sites are located in wooded and shrubby swamps, with melaleuca swamps preferred in southwest WA. Foraging Great egrets have a diverse diet that includes fish, insects, crustaceans, molluscs, frogs, lizards, snakes, small birds and mammals. They mostly forage by standing in shallow to moderately deep water capturing prey that wanders nearby. Prey is taken from water and vegetation but not from sediments.	marshes, streams and so forth. The species usually frequents shallow waters.	
Ardea ibis Cattle egret	Listed (marine)	Migratory bird protected under an international agreement	The cattle egret is small, stocky and mostly white with a short neck and stout yellow-red bill. The name comes from its association with cattle; namely its habit of eating ticks and flies off the backs of livestock. Breeding The cattle egret breeds in colonies, either mono-specific or with other egrets/herons. The principal breeding sites are along the Australian east coast from October to January, with some breeding colonies also observed at Wyndham, WA to Arnhem Land, Northern Territory. Cattle egret roosts in trees, or amongst ground vegetation in or near lakes and swamps. Foraging Cattle egret often forage away from water on low lying grasslands, improved pastures and croplands. Grasshoppers make up the majority of the diet during the breeding season. Other insect	The cattle egret is widespread and common. Two major distributions have been located; from north-east WA to the Top End of the Northern Territory and around south-east Australia. In WA and the Northern Territory, the Cattle Egret is located from Wyndham to Arnhem Land. The population estimate for Australia, New Guinea and New Zealand is 100,000 birds The species occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. It has occasionally been seen in arid and semi-arid regions however this is extremely rare. High numbers have been observed in moist, low-lying poorly drained pastures with an abundance of high grass; it avoids low grass pastures. It is commonly associated with the habitats of farm animals, particularly cattle, but also pigs, sheep, horses and deer.	**Possible** This species habitat preference means it is more likely to be present in farmland than native vegetation.

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
			prey includes cicadas, centipedes, spiders, cattle ticks, frogs, lizards (particularly skinks) and small mammals.		
Terrestrial birds					
Calypto-rhynchus latirostris Carnaby's black-cockatoo	Endangered	Endangered *RP in place*	Carnaby's black-cockatoo is a large, mostly black bird with white cheek patches, large white panels on the tail and a strong curved bill. Adults range from 53-58 cm in length and 520-790 g in weight. It is one of the five Australian endemic black cockatoo species, and is endemic to southwest WA. Carnaby's black-cockatoo was once very numerous in WA, with its decline due to the loss and fragmentation of habitat. Its population in 2010 was estimated at 40,000 birds. <u>Breeding</u> The species is highly mobile and displays a seasonal migratory pattern linked to breeding, and occurs in the inland parts of its range in areas with annual average rainfall of 300-750 mm. It breeds from July/August to January/February in hollows in long-lived trees in woodlands and forests (DSEWPC, 2012). For most preferred breeding trees, hollows form in trees with a diameter at breast height (DBH) of 500 mm, or 300 mm for salmon gum (*Eucalyptus salmonopholia*) and wandoo (*E. wandoo*). Some resident populations do not show breeding migration. During the non-breeding season, the birds migrate to the higher rainfall coastal regions west or south where water is more plentiful. <u>Foraging</u> This species feeds mostly on native seeds,	Occurs in the IBR of Avon Wheatbelt, Esperance Plains, Geraldton Sandplains, Jarrah Forest, Swan Coastal Plain, Warren and Yalgoo. The species has been recorded within 55 km of the study area, including a large flock of 350 just to the north of the study area (Figure 5.12). Habitat critical for the survival of the Carnaby's cockatoo is: • Eucalypt woodlands with nest hollows for breeding combined with nearby vegetation that provides feeding, roosting and watering habitat; • Woodlands; and • Areas with food resources for the non-breeding season. Carnaby's cockatoos nest in the hollows of live or dead eucalypts, primarily the smooth-barked salmon gum and wandoo, though breeding has been reported in other wheatbelt tree species and some tree species on the Coastal Plain. Carnaby's Black-Cockatoo is known to breed in the region, with the nearest breeding records to the east at Three Springs and southeast at Coomallo. The study area falls on the boundary of the known breeding range of this species, as mapped by DoEE (2017b), with no breeding known to occur further west.	**High** <u>Breeding</u> No birds sighted during the fauna (or vegetation) surveys. As these surveys were within the breeding season, it suggests that the species is not using the study area as a foraging resource to support breeding (noting that the absence of records does not necessarily prove an absence). The Wandoo woodland on the minor creek contains trees with a DBH of 30 cm or more, and is therefore considered 'potential breeding

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
			flowers and nectar in kwongan heathland and woodland dominated by *Banksia*, *Dryandra*, *Hakea* and *Grevillea* species (DSEWPC, 2012). With changing habitat, the diet also includes increased amounts of seeds from introduced plant species such as commercial broad-acre crops (e.g., canola) and in the non- breeding part of the species' range, plantation pines. The pine plantations immediately north of Perth have been recognized as an important food resource for this cockatoo for over 60 years. While breeding, the species generally forages within a 6-12 km radius of the nesting site (DSEWPC, 2012). Communal night roosting sites are used, generally for a period of weeks until the local foraging resources are exhausted, in or near riparian environments with permanent water (DSEWPC, 2012). <u>Roosting</u> This species roosts in tall trees, usually in riparian habitats.		habitat'. Woodlands along the Arrowsmith River are also potential breeding habitat. <u>Foraging</u> Contains some foraging habitat, with patches of Banksia shrubland on sands or gravelly sands, and small areas of *Hakea trifurcata* and *Banksia sessilis* on some of the laterite rises. <u>Roosting</u> It may occur along the Arrowsmith River or Irwin River.
Leipoa ocellata Malleefowl	Vulnerable *RP in place*	Vulnerable	The malleefowl is a large, stocky ground-dwelling bird about the size of a domestic chicken with strong feet and a short bill. <u>Breeding</u> Malleefowl are generally monogamous and are thought to pair for life, breeding annually except in drought years. Malleefowl have developed a most sophisticated and elaborate technique of	The malleefowl is the most southerly distributed of three species of megapode that occur in Australia. It is restricted to the mainland and differs from all other extant megapodes in that it inhabits semi-arid and arid habitats (dominated by mallee and/or acacias and associated habitats such as broombush (*Melaleuca uncinata*) and scrub pine (*Callitris verrucosa*)) rather than damp forests across southern Australian. In WA, malleefowl are also occasionally found in woodlands dominated by	**Low** Although some of the shrubland habitats in the study area may be suitable habitat for foraging malleefowl, much of the

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
			incubation, constructing an incubator mound of sand usually 3.5 m in diameter and one metre high. This is constructed during autumn to spring by both members of a pair. Heat for egg incubation comes from microbial decomposition of the litter within the mound early in the season and then from the heat of the sun late in the season. Egg laying usually beings in September with an egg laid every 5-7 days until mid to late summer. The average breeding life is thought to be about 15 years. Apart from rainfall and habitat type, sheep grazing appears to explain different breeding densities; densities in grazed areas are about 10% of those in ungrazed areas. <u>Foraging</u> Malleefowl are generalist feeders, with a diet that is characteristically variable and with different foods being important at different times and locations. Their diet consists of the seeds, flowers and fruits of shrubs (especially legumes), herbs, invertebrates, tubers and fungi.	eucalypts such as wandoo (*E. wandoo*), marri (*Corymbia calophylla*) and mallet (*E. astringens*). A sandy substrate and abundance of leaf litter are required for breeding. Densities of the birds are generally greatest in areas of higher rainfall and on more fertile soils where habitats tend to be thicker and there is an abundance of food plants. The Malleefowl is thought never to have been common in the vicinity of the proposed survey area, with higher density populations occurring to the east of a line between Kalbarri and Wongan Hills. In WA, the malleefowl's range has contracted by 28% since 1981. In WA, occupancy of small remnants in the wheatbelt found that remnants occupied by malleefowl typically possessed a greater amount of litter, greater cover of tall shrubs, greater abundance of food shrubs and a greater soil gravel content than those that were not occupied. There are 15 records of this species within 55 km of the study area. Three of these records are undated historical records, the remainder ranging from 1964 to 2011. The most recent record in 2011 is of a bird on Beekeepers Rd at Arrowsmith, indicating that this species still maintains a presence in the region.	vegetation present is too low and sparse to support breeding and no nesting mounds were recorded during the fauna (and vegetation) surveys. This species potentially occurs at low density in the study area, most likely as occasional dispersing individuals.
Merops ornatus Rainbow bee-eater	Listed (marine)	Migratory bird protected under an international agreement	The rainbow bee-eater is a medium-sized bird, and the only species of bee-eater in Australia. The species is capable of living for up to 24 months in the wild, with no information available on the ages of sexual maturity or natural mortality. <u>Breeding</u> In Australia, the breeding season occurs from August to January. The nest is located in an enlarged chamber at the end of long burrow or tunnel that is excavated by both	The rainbow bee-eater has a very large range and is distributed across much of mainland Australia, and occurs on several near-shore islands. It is thinly distributed in the most arid regions of central and western Australia. Records indicate that the distribution of the species has expanded in south-western Australia. The rainbow bee-eater occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. It usually occurs in open, cleared or lightly-timbered areas that are often, but not always, located in close proximity to	**Present** A common species, which was sighted during the fauna survey.

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
			sexes in flat or sloping ground, in the banks of rivers, creeks or dams, in roadside cuttings, in the walls of gravel pits or quarries, in mounds of gravel, or in cliff-faces. Nesting areas are often re-used and at least some migrant birds return to the same nesting area each year. Foraging Rainbow bee-eaters feed mainly on insects, consisting of bees and wasps along with beetles, moths, butterflies, damselflies, dragonflies, flies, ants and bugs. Most prey is captured in flight, although it also takes food items from the ground and from foliage.	permanent water. The movement patterns of this bird are complex, and are not fully understood. Populations that breed in southern Australia are migratory. After breeding, they move north and remain there for the duration of the Australian winter. However, populations that breed in northern Australia are considered to be resident.	
Mammals					
Dasyurus geoffroii Chuditch, western quoll	Vulnerable *RP in place*	Vulnerable	The chuditch is the largest carnivorous marsupial occurring in WA. At maturity it is about the size of a small domestic cat, with males weighing an average of 1.3 kg and females an average of 0.9 kg. The chuditch is a nocturnal, solitary and nomadic species that is distinguishable from other mammals within its present range by its white spotted brown pelage, large rounded ears, pointed muzzle, large dark eyes and a non-hopping gait. The tail has a black 'brush' over the dorsal surface of the distal portion. Breeding Males and females are sexually mature and can breed in their first year. They are seasonal breeders, with mating occuring in late April to early July. Females can produce up to 50 foetuses, but only 2-6 young successfully attach to the available six nipples. The young are fully weaned at 170 days of age and subsequently disperse.	This species used to occur across much of the continent, but is now restricted to the southwest of WA. Although they used to occupy a range of habitats, the majority of chuditch now occur in the jarrah forest with some wheatbelt/goldfields populations in drier woodlands, heath and mallee shrublands. A population was translocated to Kalbarri National Park, about 200 km north of the proposed survey area. The translocation was successful, and records of the chuditch to the south are presumably individuals dispersing from this area. There is a single record of the chuditch within 55 km of the study area, form Dongara in 2012. The taller shrublands and woodland in the minor creek potentially support chuditch.	**Low** If present, it is likely to be at low densities or represented by a few dispersing individuals.

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
			<u>Foraging</u> Chuditch are opportunistic feeders, foraging primarily on the ground and at night. They may climb trees to obtain prey or to escape from predators. In the forest, insects and other large invertebrates comprise the bulk of their diet, though some mammals, birds and lizards are also consumed. They will also scavenge for food scraps around campsites and consume the remains of roadkill.		
Parantechinus apicalis Dibbler	Endangered	Endangered *CA in place*	The dibbler is a small carnivorous marsupial, readily distinguished by white rings around their eyes, a tapering, hairy tail and the freckled appearance of its fur. <u>Breeding</u> Dibblers are seasonal breeders. They breed in autumn with mating beginning in late March. The mating season is short and intense, typically lasting two to three weeks. Young are typically born from early April to late May as litters of up to eight young. Females produce one litter per year. <u>Foraging</u> The dibbler's diet is dominated by arthropods with some vegetative matter. Scat analysis has identified beetles, cockroaches, grasshoppers, termites, ants and spiders in the diet.	Dibblers were formerly widely distributed in a broad band along the west and southern coasts of Australia. No records of the species were made between 1904 and 1967, when the species was 're-discovered' in a survey at Cheyne Beach, WA. Dibblers are currently restricted to three small offshore islands (Boullanger, Whitlock and Escape Islands near Jurien Bay), Fitzgerald National Park on the WA south coast and at three more reintroduction sites (Peniup Nature Reserve; Stirling Range National Park and three releases into a 380 ha fox and cat-free enclosure in Waychinicup National Park. The mainland habitat is characterised by the presence of long-unburnt heathland, typified by sandy substrates and occasionally lateritic soils.	**Possible** DoEE PMST mapping indicates the proposed survey area may contain the species or its habitat.
Reptiles					
Egernia stokesii badia Western spiny-tailed skink	Endangered *RP in place*	Vulnerable *RP in place*	This subspecies of *E. stokesii* is a stout-bodied skink with well-developed limbs each with 5 digits. It can reach snout-vent lengths of up to 195 mm, with the tail up to a further 45% of this. There are large variations in adult size between populations.	This subspecies occurs in open eucalypt woodlands and *Acacia*-dominated shrublands in semi-arid to arid areas of south-western WA (Geraldton Sandplains and Yalgoo IBRA). It shelters in logs, in cavities in the trunks and branches of shrubs, as well as in houses and ruins,	**Possible** Mapping in DEC (2012) indicates records for this sub-species generally occur

Species	EPBC Act 1999 status	WA Wildlife Conservation Act 1950 status	Description	Habitat & distribution	Likelihood of occurrence
			It is reddish-brown in colour with a strong pattern of blotches or irregular bands of white or cream on the dorsal surface.	especially in accumulations of old corrugated iron.	further inland.
Other					
Idiosoma nigrum Shield-backed trapdoor spider	Vulnerable *CA in place*	Vulnerable	The shield-backed trapdoor spider is a large spider with females up to 30 mm in body length and males up to 18 mm in body length. It is dark brown to black in colour and easily recognisable by the distinctive structure of the abdomen, as the end of the abdomen is flattened and shield-like.	This spider is endemic to WA and known from only a few locations. It typically inhabits eucalypt woodlands or *Acacia* shrublands on clay soils, where it builds a burrow using leaf litter and twigs. There are five records of this species within 55 km of the study area. Two are from Woolaga Creek, Ikewa in 1954 and three are from the Eneabba region in 1987.	**Low** The proposed survey area appears to lack suitable habitat for this species.

Source: SPRAT database (DoEE, 2017b), Western Wildlife (2017).

Definitions

EPBC Act codes	
Listed threatened species:	A native species listed in Section 178 of the EPBC Act as either extinct, extinct in the wild, critically endangered, endangered, and vulnerable or conservation dependent. • Critically endangered – taxa facing an extremely high risk of extinction in the wild in the immediate future. • Endangered – taxa facing a very high risk of extinction in the wild in the near future. • Vulnerable – taxa facing a very high risk of extinction in the wild in the medium-term future.
Listed migratory species:	A native species that from time to time is included in the appendices to the Bonn Convention and the annexes of JAMBA, CAMBA and ROKAMBA, as listed in Section 209 of the EPBC Act.
WA conservation codes	
Critically endangered (Schedule 1)	Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
Endangered (Schedule 2)	Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
Vulnerable	Threatened species considered to be facing a high risk of extinction in the wild.

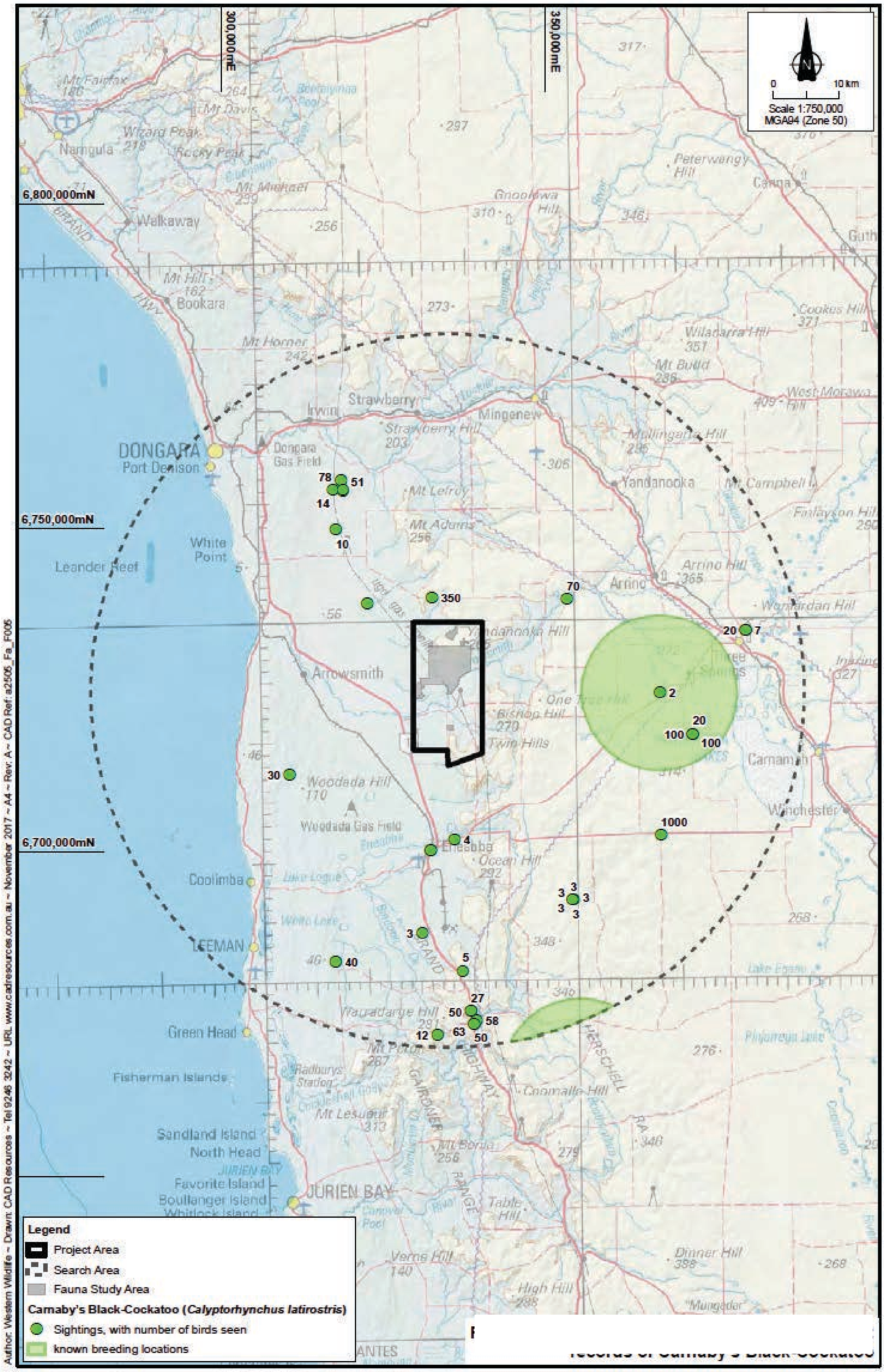
(Schedule 3)	Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
Migratory birds protected under an international agreement (Schedule 5)	Migratory birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.

Key to conservation plans:

CA	Conservation Advice under the *EPBC Act 1999* (Cth).
RP	Recovery Plan under the *EPBC Act 1999* (Cth).

WA conservation listings current as at 3 February 2017.

Commonwealth conservation listings current as at 30 March 2017.



Source: Western Wildlife (2017).

Figure 5.12. Records of Carnaby's black-cockatoo within 55 km of the proposed survey area

Non-threatened Species

A brief description of non-threatened fauna species revealed in database searches or noted during the fauna survey is provided here.

Amphibians

There are 10 frog species that have the potential to occur in the study area (see **Appendix D**). These species are common and widely distributed in either the southwest or arid regions. No frogs were observed during the field survey.

The frogs that potentially occur fall into roughly three groups:

- The first are those species that rely on permanent waters or at least permanently damp habitats (e.g., tree frogs). These species are unlikely to occur in areas of dry shrubland, but are likely to occur within the wider project area on the Arrowsmith River and man-made habitats such as farm dams and tanks.
- The second are burrowing frogs (e.g., moaning frog, *Heleioporus eyrei*). These species require water to breed, and depending on the species, will breed in seasonal creeks, salinity banks, gravel pits and other seasonally wet areas. During the non-breeding season, these species range away from water and can be found in terrestrial habitats where they forage and/or aestivate underground. These species may breed in the study area where water collects, though no significant frog breeding habitat appears to be present.
- The turtle frog is the sole member of the third group. This species does not require free water to breed as the tadpoles develop into frogs within the egg. This species is likely to occur in sandy soils across the study area.

Reptiles

There are 64 species of reptile that have the potential to occur in the study area (see **Appendix D**). The assemblage is dominated by species with a south-western distribution, but also includes arid zone species on the western edge of their range. Only three reptile species were observed during the field survey. The reptile assemblage is likely to be largely intact.

Many of the reptiles present have broad habitat preferences and therefore potentially occur throughout the study area. Some species may favour either the sandy soils, laterite hills or more wooded habitats. Species with a preference for sandy soils include (but are not limited to) the:

- White-spotted ground gecko (*Diplodactylus alboguttatus*);
- Sand-plain worm-Lizard (*Aprasia repens*);
- Southern heath dragon (*Ctenophorus adelaidensis*);
- Broad-banded sand-swimmer (*Eremiascincus richardsonii*);
- South-western orange-tailed slider (*Lerista distinguenda)*; and
- Dotted-line robust slider (*Lerista lineopunctulata*).

Species such as the Stimpson's python (*Antaresia stimpsoni*) are likely to favour rocky habitats, where there is shelter available in rock crevices. However, it should be noted that the laterite hills are relatively low and the breakaways appear to have relatively few crevices. Species that favour more wooded habitats are likely to favour the minor creek and areas of *Eucalyptus todtiana* woodland, including the black-tailed monitor (*Varanus tristis*) and fence skink (*Cryptoblepharus buchananii*).

There are two reptiles of conservation significance that may occur in the study area, as listed and discussed below.

- The woma (*Aspidites ramsayi*, Priority 1) has severely declined in the wheatbelt, with the last confirmed record in 1989 at Watheroo. The woma favours sandplain habitats, however, though it may once have occurred in the region, it is considered highly likely to be locally extinct in the vicinity of the study area.
- The black-striped snake (*Neelaps calonotos*, Priority 3) is a small snake with a coastal distribution from Dongara south to Mandurah. It inhabits coastal dunes and sandplains that support heath or Banksia woodland. The black-striped snake is active at night, spending most of its time in the leaf litter or soil. There are six records of this species within 55 km of the study area. The records are all relatively recent, ranging from 1996 to 2007. This species is likely to occur on the sandy soils of the study area, though it is probably absent from rocky areas.

Birds

There are 119 species of bird that have the potential to occur in the study area, of which 40 were recorded opportunistically during the vertebrate fauna field survey or by Mattiske Consulting Pty Ltd (see **Appendix D**).

The bird assemblage is diverse, with the floristically rich shrublands supporting a variety of nectar-feeding honeyeaters and small insectivores. When seeding, the scattered *Eucalyptus todtiana* and shrubs such as *Acacia* and *Allocasuarina* spp. provide food for granivorous species such as parrots, pigeons and cockatoos. Birds of prey forage over the low shrubland, and may roost or nest in the taller trees and laterite breakaways. Species that rely on eucalypts, such as the weebill (*Smicronis brevirostris*) are likely to favour wandoo woodland in the minor creek and the open *Eucalyptus todtiana* woodland.

Many species are likely to breed in the study area, constructing nests in trees or shrubs in densely vegetated areas. Few nest hollows were observed, though some were present in the wandoo woodland on the minor creek, and small hollows were present in the scattered *Eucalyptus todtiana*. Feral bees (*Apis mellifera*) were present, particularly along the minor creek, rendering some hollows unsuitable for nesting.

Waterbirds, such as ducks, herons, egrets and ibis occur in the region and may occur nearby on farm dams or the Arrowsmith River. However, no waterbirds have been listed in **Appendix D**, as there is no significant waterbird habitat present in the study area.

Birds of conservation significance are listed and described in Table 5.6. In addition to these species, the peregrine falcon (*Falco peregrinus*) is listed under Schedule 7 of the *Wildlife Conservation Act 1950*, and is described here.

- The peregrine falcon is a widespread bird of prey that globally has a very large range and a very large population that appears to be secure. In WA, the population is secure, though this species may experience reductions at a local level due to human disturbance at nesting sites. The peregrine falcon nests mainly on ledges on cliffs or rocky outcrops, and it may also use tall trees. There are three records of this species within 55 km of the study area, including a record at Arrowsmith in 2002. This falcon may occur and forage in the study area, with potential breeding habitat present on breakaways on the low laterite hills.

Mammals

There are 25 mammal species that have the potential to occur in the study area, of which 18 are native and seven introduced (see **Appendix D**). Five species of mammal were recorded opportunistically during the field survey (one native species and four introduced). The native species observed was the western grey kangaroo (*Macropus fuliginosus*), which is likely to be common in the study area, sheltering under larger shrubs during the day. Evidence of feral mammals (foxes, rabbits and goats) was common across the study area, and evidence of livestock (cattle) was present in the private property vegetation remnants.

Several of the mammals that have the potential to occur in the study area are insectivorous bats. These species are likely to forage over the study area at night. Most species roost in tree hollows or crevices, and may roost in the wandoo woodland in the minor creek or in larger *Eucalyptus todtiana* in the open woodlands.

The honey possum is likely to be common across all the floristically diverse shrublands of the study area, and connectivity of habitat is important for this tiny marsupial. The shrublands on sandy soils are also likely to support small native mammals such as dunnarts (*Sminthopsis* spp.), the ash-grey mouse (*Pseudomys albocinereus*) and western bush rat (*Rattus fuscipes*).

Two mammals of conservation significance are listed and described in Table 5.6. In addition to these species, there is one additional mammal of conservation significance that may occur in the study area, described here.

- The western brush wallaby (*Macropus irma*, Priority 4) is endemic to the southwest of WA and occurs in open forests or woodlands. There are three records of this species within 55 km of the study area, including one in 2002 at Mount Adams. This wallaby potentially occurs in the more wooded parts of the study area, from where it may shelter under trees or large shrubs during the day, ranging out onto shorter vegetation to forage at night.

Invertebrates

The fauna survey was primarily concerned with vertebrate fauna. The invertebrate fauna of the study area are more species rich and abundant than the vertebrate fauna, but cataloguing their occurrence was outside the scope of the field survey.

There are six invertebrates of conservation significance recorded within 55 km of the study area on DBCA's Threatened and Priority Fauna Database. This is unlikely to represent all the conservation significant invertebrates in the region, as invertebrates are typically under-studied and not often subject to opportunistic reporting by the general public.

One invertebrate species of conservation significance is listed and described in Table 5.6. In addition, there are five additional invertebrates of conservation significance that may occur in the study area, described here.

- The katydid (*Hemisaga vepreculae*, Priority 3) is a green flightless predatory species endemic to WA. There is a single record of this species within 55 km of the study area, northwest of Eneabba in 1980. This katydid potentially occurs in the shrublands of the study area.

- The katydid (*Phasmodes jeeba*, Priority 2) is a species of 'stick katydid' that occurs in coastal sandplain heaths and is endemic to WA. Stick katydids feed on flowers and pollen, with the adults present in flowering vegetation through spring, feeding during the night and sheltering in vegetation during the day. There is a single record of this species within 55 km of the study area, at Mt Adams in 1984. This katydid potentially occurs in the shrublands of the study area.

- The graceful sun-moth (*Synemon gratiosa*, Priority 4) occurs in coastal heaths and banksia woodlands in a coastal strip from Kalbarri south to Binningup. The larval stage of this species feeds on native sedges *Lomandra hermaphrodita* and *Lomandra maritima*, and populations of the sun-moth occur where these plants occur. The life-cycle is thought to take two years, with the adult sun-moths flying between mid-February and late-March. There are 24 records of this species within 55 km of the study area, all at Coolimba Rd between 2010 and 2011. The moth potentially occurs in the study area, though few *Lomandra* species were noted to occur in the study area.

- The woolybush bee (*Hylaeus globulifera*, Priority 3) is known from records on the west coast (from about Bunbury north to Arrowsmith) and scattered records in the southeast wheatbelt. It is often recorded in association with woolybush (*Adenanthos cygnorum*), with additional records on species of *Grevillea* and *Banksia*. There are two records of this species within 55 km of the study area. Both records are from 1996, one from Arrowsmith and one from Tathra National Park, Eneabba. The woolybush bee potentially occurs in the study area, particularly where woolybush is present on the southern private property, though woolybush is sparse in most parts of the study area.

- The earwig fly (*Austromerope poultoni*, Austromerope poultoni, Priority 2) occurs mainly in the Jarrah forest south of Perth. There is a single record of this species within 55 km of the study area, at Eneabba in 1998. The record at Eneabba represented a 240 km range extension when it was made. This species of earwig fly may possibly occur in the study area.

Habitats

The landforms underlying the study area grade from low laterite hills, some with minor breakaways, to gravelly sands and deeper white sands in the lower lying portion. There is a minor creek in the north-east corner of the UCL. The vegetation is a diverse low to mid shrubland, with emergent patches of Banksia shrubland (*Banksia attenuata*, *Banksia hookeriana*, *Banksia scabrella* and/or *Banksia sphaerocarpa*), woody pear (*Xylomelum angustifolium*) and open low *Eucalyptus todtiana* woodland on the deeper sands (see Photos 5.1 to 5.8). The minor creek is vegetated with a woodland of wandoo (*Eucalyptus wandoo*) over shrubland. The vegetation of the study area has not been mapped, so the fine-scale identification of the extent of, for example, patches of banksia shrubland, was not possible.

There is some disturbance to all habitats, from access tracks, firebreaks, bushfire and gravel extraction. Much of the UCL was burnt in about 2010/2011 and is likely to be still recovering. Some of the structural differences in habitat (e.g., low shrubland compared to mid shrubland) is likely to be due to differences in the post-fire age of the vegetation. The parts of the study area on private property show some disturbance by livestock, including tracks and scats. In these areas, there is some weed invasion at the edges. Overall, the habitats are in excellent condition and likely to support a virtually intact faunal assemblage, lacking only those species that are locally extinct in the Lesueur Sandplains Subregion.

Pests

The PMST lists the following 10 pest species (out of the 20 species of national significance) as potentially occurring within the proposed survey area:

- Domestic dog (*Canis lupus*);

- Goat (*Capra hircus*);
- Domestic cat (*Felis catus*);
- House mouse (*Mus musculus*);
- Rabbit (*Oryctolagus cuniculus*);
- Pig (*Sus scrofa*);
- Red fox (*Vulpes vulpes*);
- Rock pigeon (*Columba livia*);
- Eurasian tree sparrow (*Passer montanus*); and
- Laughing turtle-dove (*Streptopelia senegalensis*).

As noted earlier, the field survey found that evidence of pest species including foxes, rabbits and goats was common across the study area.

5.3 Protected Areas

Protected areas are classified in a number of ways under Commonwealth and State legislation. This section describes those places in or near the proposed survey area that are protected under such legislation.

5.3.1 World Heritage Properties

World Heritage Listed-properties are examples of sites that represent the best examples of the world's cultural and heritage, of which Australia has 19 properties (DoEE, 2017c). In Australia, these properties are protected under Chapter 5, Part 15 of the EPBC Act.

No properties on the World Heritage List occur within or in close proximity to the proposed survey area. There are four such properties in WA, with the nearest site being the Fremantle Prison south of Perth, located 270 km to the south of the proposed survey area.

5.3.2 National Heritage Places

The National Heritage List is Australia's list of natural, historic and Indigenous places of outstanding significance to the nation (DoEE, 2017d). These places are protected under Chapter 5, Part 15 of the EPBC Act.

There are no National Heritage-listed places within or in close proximity to the proposed survey area. There are 15 such sites in WA, with the nearest site being the Lesueur National Park, located 45 km south-southwest of the proposed survey area.

5.3.3 Commonwealth Heritage

Commonwealth Heritage-listed places are natural, indigenous and historic heritage places owned or controlled by the Commonwealth (DoEE, 2017e). These includes places connected to defence, communications, customs and other government activities that also reflect Ausgtralia's development as a nation. In Australia, these properties are protected under Chapter 5, Part 15 of the EPBC Act.

No properties on the Commonwealth Heritage List occur within or in close proximity to the proposed survey area. There are 20 such sites in WA, with the nearest site being the Geraldton Drill Hall complex, located 100 km northwest of the proposed survey area.

5.3.4 Wetlands of International Importance

Australia has 65 Ramsar wetlands (as of September 2017) that cover more than 8.3 million hectares. Ramsar wetlands are those that are representative, rare or unique wetlands, or are important for conserving biological diversity, and are included on the List of Wetlands of International Importance developed under the Ramsar Convention. These wetlands are protected under Chapter 5, Part 15 of the EPBC Act.

There are no wetlands of international importance within or in close proximity to the proposed survey area. There are 12 such sites within WA, with the nearest being the Forrestdale and Thomsons Lakes to the south of Perth, located 283 km south of the proposed survey area (DoEE, 2017f).

5.3.5 Wetlands of National Importance

Nationally important wetlands are considered important for a variety of reasons, including their importance for maintaining ecological and hydrological roles in wetland systems, providing important habitat for animals at a vulnerable stage in their life cycle, supporting 1% or more of the national population of nay native plant or animal taxa or for its outstanding historical or cultural significance (DoEE, 2017g).

There are no nationally important wetlands within or in close proximity to the proposed survey area. The nearest site is Lake Logue/Indoon System on the west side of the Brand Highway, located 20 km southwest of the proposed survey area (DoEE, 2017g).

5.3.6 State Protected Areas

An unnamed nature reserve (WA25495) is located in the southwest corner of the proposed survey area (abutting the eastern side of the Brand Highway and northern side of Skipper Road). It covers 145 ha (1.45 km^2) (Figure 5.13).

The Yardanogo Nature Reserve is located to the immediate north of the proposed survey area and covers an area of about 6,500 ha.

A small unnamed nature reserve (WA47436), 63 ha in size, occurs within EP320 but west of the survey area.

The Wilson Nature Reserve is located to the immediate east of the proposed survey area and overlaps a portion of the Arrowsmith River. This reserve is not intersected by the proposed survey.

Several other unnamed nature reserves are located around the proposed survey area (see Figure 5.13).

5.4 Cultural Heritage

Cultural heritage can be broadly defined as the legacy of physical science artefacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations. Cultural heritage includes:

- Tangible culture - such as buildings, monuments, landscapes, books, works of art, and artefacts;
- Intangible culture – such as folklore, traditions, language, and knowledge; and
- Natural heritage – including culturally significant landscapes.

This section describes the cultural heritage values in and immediately around the proposed survey area, which are broadly categorised as indigenous and non-indigenous heritage.

5.4.1 Indigenous History and Heritage

Aboriginal groups with a strong traditional connection to their own country have inhabited the Mid West region for thousands of years (DoP, 2015). The landscape provides the basis for their spirituality, customs, beliefs and social systems, with Aboriginal cultural heritage encompassing archaeological, historical, ceremonial and mythological sites as well as living cultural practices (DoP, 2015).

The Noongar people occupied and maintained land in the northern Perth Basin. The majority of the Mid West region is known collectively as Yamatji country (DoP, 2015). The Amangu, Yued and Whadjuk groups travelled with the seasons, depending on the availability of food. The songlines (oral maps of the landscape) in the area of the Perth Basin related to water features connected to groundwater, and the people who used these were distinct from the ‘rock-hole’ people further inland (DoW, 2017). Aboriginal peoples used fire as a land management tool, which influenced the structure of the vegetation (DoW, 2017). The Amangu people are the traditional owners of land within the survey area (Shire of Three Springs, n.d).

As defined in section 5 of the *Aboriginal Heritage Act 1972* (WA), an Aboriginal site is:

1. (a) Any place of importance and significance where persons of Aboriginal descent have, or appear to have, left any object, natural or artificial, used for, or made or adapted for use for, any purpose connected with the traditional cultural life of the Aboriginal people, past or present;
2. (b) Any sacred, ritual or ceremonial site, which is of importance and special significance to persons of Aboriginal descent;
3. (c) Any place which, in the opinion of the Committee, is or was associated with the Aboriginal people and which is of historical, anthropological, archaeological or ethnographical interest and should be preserved because of its importance and significance to the cultural heritage of the State; and
4. (d) Any place where objects to which this Act applies are traditionally stored, or to which, under the provisions of this Act, such objects have been taken or removed.

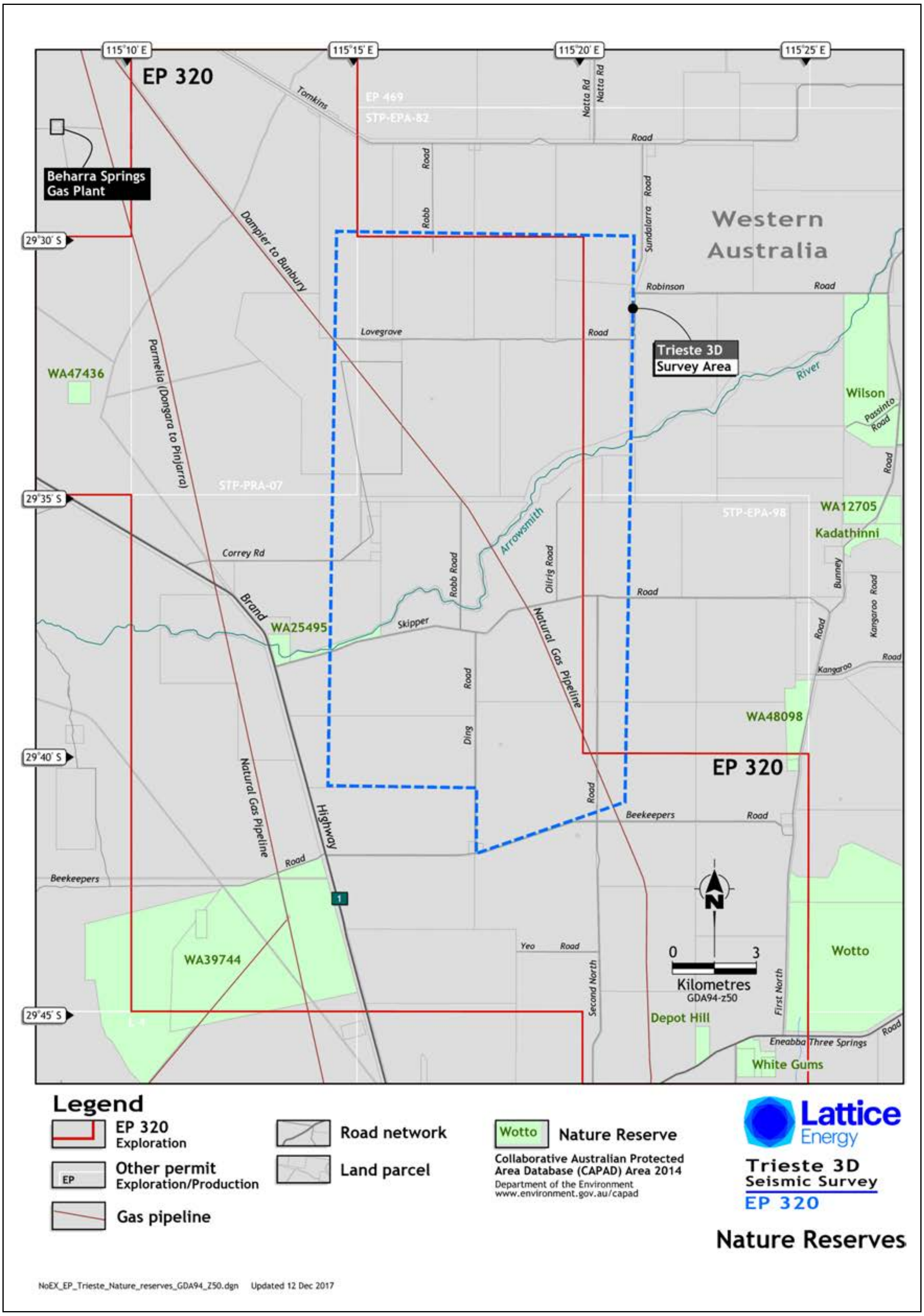


Figure 5.13. Nature reserves in an around the survey area

A search of the WA Department of Planning, Lands and Heritage (DPLH) Aboriginal Heritage Inquiry System (AHIS) in August 2017 (DPLH, 2017a) reveals there are no registered Aboriginal heritage sites within the proposed survey area. However, DoP (2015) indicates that there may be sites that remain undisclosed by the traditional owners.

Two registered Aboriginal sites are overlapped by the northern-most part of EP320 (Figure 5.14), located 24 km north of the northern limit of the survey area (highlighted in magenta). They are:

- Site 18907, Irwin River – registered for its historical, mythological, camp, natural and water source features.
- Site 5682, Stoney Hill – registered for the provision of food resources (yam).

The Shire of Three Springs (n.d) reports two registered sites of Aboriginal heritage significance within the shire, these being the Yarra Yarra Lakes site (~38 km to the east of the proposed survey area) and Bimara (locality unknown).

As outlined in Section 4.6, Lattice has consulted with the traditional owners of the region, who have indicated there are some areas of cultural significance within EP320 that are not included on the heritage register. They have expressed interest in scouting some additional areas to determine whether they have cultural significance. Lattice will work with the traditional owners to identify these culturally significant areas and negotiate an agreement to facilitate access for a traditional owner representative to scout these areas prior to commencing the seismic survey.

Results of archaeological studies elsewhere in WA region conclude that most Aboriginal archaeological sites are adjacent to, or within 1 km of water. Large and extensive sites are normally positioned in high relief areas and in dune swales. Extensive sites are found along the coast in association with adjacent offshore reefs, and continuous artefact scatters are adjacent to major river systems.

5.4.2 Non-indigenous History and Heritage

The Dutch were the first Europeans to make an impact on the Mid West, most famously in 1629 when the Dutch trading ship *Batavia* ran aground at the Houtman Abrolhos Islands off the Mid West Coast. European exploration and settlement of the region began in the early 1800s following the settlement of Perth. Lieutenant George Gray, Robert Austin, and Augustus and Francis Gregory were important figures in early exploration of the region (DoP, 2015).

The region has many examples of homesteads and stations that provide an insight into the significant role that agriculture and mining played in the region. Early settlements in the region included Champion Bay (Geraldton), Northampton and Mullewa (DoP, 2015).

The district of Three Springs received its name from three freshwater springs, situated about one mile north of the town site. The first European people to traverse the Three Springs area were Lieutenant George Grey and his party when they passed through in 1839. The next exploration of the area in 1846 was a government-sponsored trip to seek out new 'runs' for stock, which was undertaken by brothers Augustus, Henry and Francis Gregory (Shire of Three Springs Shire, n.d).

In 1907 the government decided to declare a townsite adjacent to the Three Springs Station, gazetting the town site of Kadathinni in 1908. The town site was also locally known as Three Springs, and in 1946 Kadathinni was changed to Three Springs to conform with local nomenclature (Shire of Three Springs Shire, n.d).

A search of the WA DPLH's State Register of Heritage Places (the 'inHerit' database) in August 2017 (DPLH, 2017b) reveals there are no registered heritage sites within the proposed survey area.

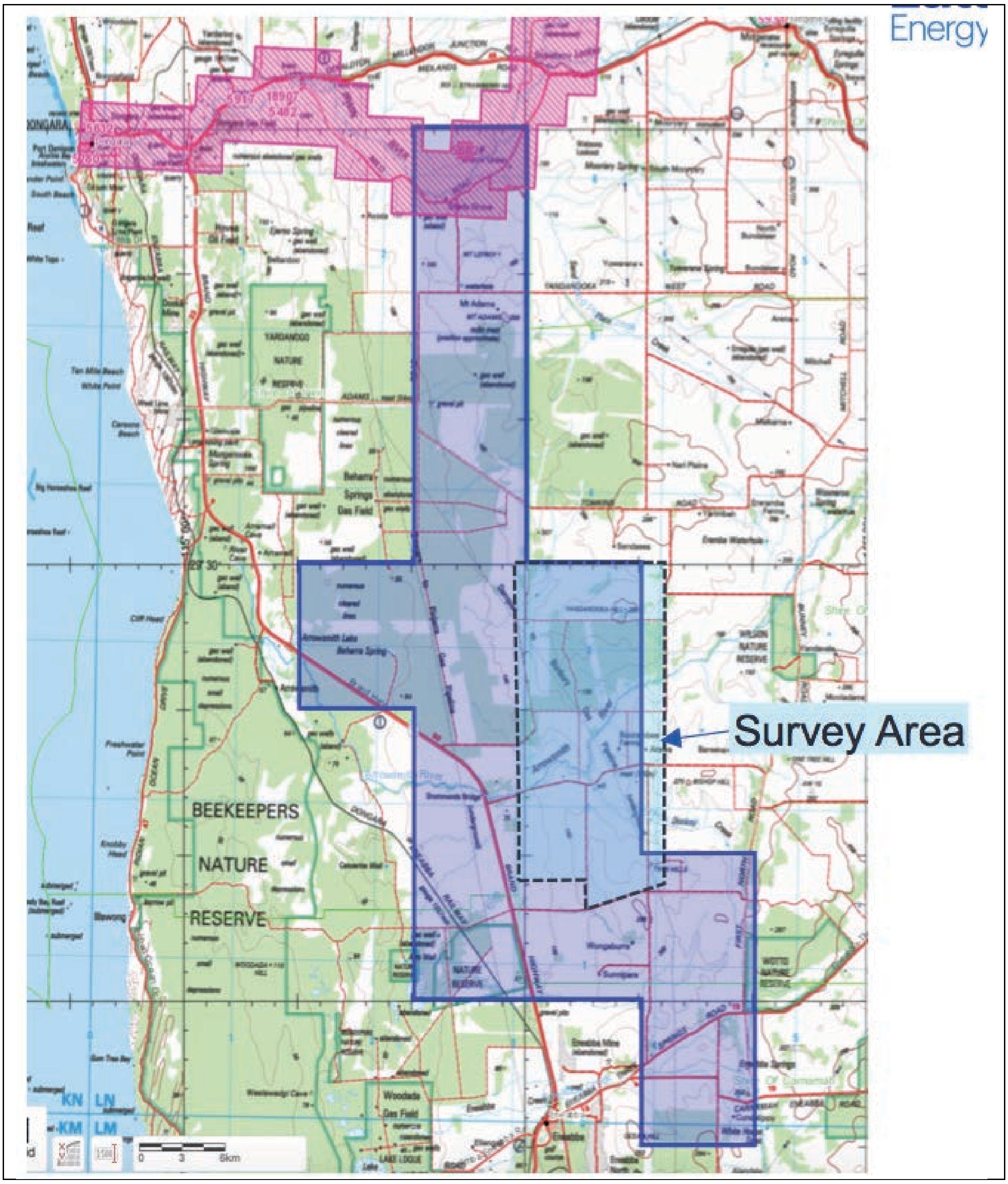
The DPLH (2017c) explains that cultural heritage places are determined by considering various its values outlined below (and taking account of physical condition, integrity and authenticity):

- Aesthetic value – is the place important for what it looks like or its physical characteristics?
- Historic value – is the place important as part of the story of WA's history and development?
- Scientific value – can the place provide information of an archaeological nature or on a technical achievement in construction?
- Social value – is the place important to the community for social, cultural, educational or spiritual reasons?
- Rarity – is the place rare for any reason?
- Representatives – is the place typical of anything – what does it represent?

The nearest registered sites to the proposed survey area are located at the Yarra Yarra Lakes Nature Reserve southwest of Three Springs (38 km east of the proposed survey area), these being:

- Carnamah Railway Station, station master's house and siding (place number 6145); and
- Log causeway at Yarra Yarra Lakes (place number 6168);

Another 40 registered sites are located within the town of Carnamah.



Source: AHIS database (2017).

Figure 5.14. Recorded Aboriginal heritage places in EP320

5.4.3 Geoheritage

A geoheritage site has geological features considered to be unique and of outstanding scientific and educational value within WA.

A State register of all geoheritage sites (currently 150 sites) is managed by the Executive Director of the Geological Survey of Western Australia (GSWA). Western Australia has an extensive and exceptional rock record, making it a popular destination for geotourism and geoscience research. This research includes exploring for evidence of early life on Earth, unusual fossils, and unique and distinctive mineral and rock types.

A search of the DMIRS geoheritage database ('geoVIEW.WA') in August 2017 (DMIRS, 2017) reveals there are no geoheritage sites within the proposed survey area. The nearest such site is 'Enokurra Hill' (Geosite No. 41), located 38 km northeast of the proposed survey area on the east side of the Midlands Highway between Three Springs and Mingenew. Its geological description is that is a type section of the Enokurra Sandstone (Yandnooka Group), with coarse to very coarse quartofeldspathic sandstone with cross-bedding, lenses of polymictic pebbly conglomerate.

5.5 Socio-Economic Environment

This section describes the social and economic environment of the proposed survey area and surrounds.

5.5.1 Settlements

The proposed survey area is located predominantly in the Shire of Three Springs, in the North Midlands region of WA. The western part of EP320 (and the western-most part of the proposed survey area) is overlapped by the Shire of Irwin, and the southern-most portion of EP320 is located within the Shire of Carnamah.

The nearest town to the proposed survey area is Eneabba (in the Shire of Carnamah), which is located 25 km to the south. The 2016 Australian census indicates the following about Eneabba:

- It has a population of 147 people (52% male, 48% female) with a median age of 47;
- The age group with the greatest number of people is 50-54 years (20 people), followed by 16 people in the 10-14 year age group.
- 42 families live in the town;
- There are 120 private dwellings;
- The median weekly household income is $774;
- 47% of the town’s population is married, and 33% have never been married;
- 78% of the population were born in Australia, with 7% born in England and 5% born in New Zealand.

There is insufficient data from the census regarding employment types in the town, though the Shire of Carnamah (2017) indicates that the principal industry is agriculture (grain and sheep farming), with rural suppliers, machinery dealership, automotive and smash repair businesses, primary and high schools and retail outlets.

Small towns located to the east of the proposed survey area include Three Springs (population 381) and Carnamah (population 405), while the larger towns of Dongara (population 1,380) and Port Denison (population 1,410) are located 40 km to the northwest and are located on the coast.

5.5.2 Native Title

A search of the DMIRS ‘geoVIEW.WA’ database in August 2017 (DMIRS, 2017) reveals that the Amangu People have a Native Title Claim (WC2004/002) over a large area of the Mid West region, including the proposed survey area. This claim area stretches from 14 km south of Eneabba to 24 km north of Dongara, as far east as 41 km east of Morawa and includes waters out to 10 km from the coast. The portion of the proposed survey area that overlaps the Native Title Claim has been excised from the survey (as seen by the absence of survey lines in Figure 3.2).

There is a Native Title Application before the Federal Court by the Southern Yamitji (WAD6002/2004) that was registered on the 29th of August 2017 (NNTT WC2017/002). This covers the same area as that described above for the Amangu People.

A claimant application is made by a group of people, a native title claim group, who declare they hold rights and interests in an area of land and/or water according to their traditional laws and customs.

There are no Native Title Determinations or Indigenous Land Use Agreements (ILUAs) over this area.

5.5.3 Land Use

Regional

Clearing of land for agriculture in the northern Perth Basin commenced as early as the 1850s, generally in areas like Dandaragan with more clayey soil types that were most conducive to farming. Significant clearing of sandplain areas started with the War Service Land Settlement Scheme in the 1950s and 1960s. The government bought, improved and subdivided fully and partially developed farms, then sold them to returned soldiers. The scheme was so successful that the government opened it up to general applicants after 1958, and the policy continued until 1969 and is largely responsible for the pattern of present land use (DoW, 2017). About 70 per cent of the natural vegetation has been removed through land clearing (DoW, 2017).

The Shire of Carnamah (2017) and Shire of Three Springs (2017) indicate that the principal industry in the region is agriculture (grain and sheep farming). The DoW (2017) also reports that broadacre agriculture for cereals and pasture is widespread in the region.

Survey area

Within the survey area, the main land use is wheat cropping, sheep grazing (on dryland pasture) for meat and wool, and cattle for beef, with one property in the northwest corner of the survey area dedicated to mallee farming for carbon sequestration (on behalf of Woodside Energy Ltd) (Photos 5.9 to 5.13). One of the sheep grazing properties in the southwest of the proposed survey area is a high-value sheep stud farm.

Consultation with landholders in the survey area indicates that:

- Crop sowing – commences mid-April and is generally completed by the end of May; and
- Lambing – occurs between May and October.

Towns such as Eneabba are farming centres that are also supported by tourism, particularly during the wildflower season (DoW, 2017).

About 6,834 ha of the survey area remains as native vegetation (31.3% of the survey area) (example shown in Photo 5.14).

The Western Flora Caravan Park is located 1.2 km to the west of the proposed survey area. This caravan park is set on 65 ha and is a well-known stop off for those seeking wildflowers, with pathways through the property allowing visitors to get up close with nature and guided tours available during the wildflower season (Photo 5.15).

Photo credit: Lattice.

Photo 5.9. Example of wheat cropping in the survey area (Sando Pty Ltd property)

Photo credit: Lattice.

Photo 5.10. Example of post-wheat harvesting in the survey area (Sando Pty Ltd property)

Photo credit: Lattice.

Photo 5.11. Example of sheep grazing in the survey area (Patmore Farms, south side of Skipper Road)

Photo credit: Lattice.

Photo 5.12. Example of cattle grazing in the survey area (Kumarina Holdings)

Photo credit: Lattice.

Photo 5.13. Mallee farming in the survey area (Mallee Land Company Pty Ltd)

Photo credit: Lattice.

Photo 5.14. Native vegetation typical of that in the UCL

Photo credits: G. Pinzone.

Plate 5.15. The Western Flora Caravan Park

5.5.4 Infrastructure

Key infrastructure associated with the proposed survey area is related to farming, that being farm tracks, fences, sheds, stock watering points and so forth.

5.5.5 Petroleum Exploration and Production

Petroleum Production Facilities

Licence area L11, adjacent to EP320, houses the Beharra Springs Gas Plant (located 10.5 km northwest of the northern-most part of the survey area), which occupies an area of 10.2 ha. This is operated by Lattice and was commissioned in 1992. The facility currently produces gas from six wells (four others are either suspended or shut in), and the facility dries the gas, removes carbon dioxide and hydrogen sulphide from the gas prior to compressing it and pumping it into the 1.64 km-long sales gas pipeline (that is connected to the Parmelia gas pipeline). It includes associated infrastructure such as a condensate storage and load out facility, power generation plant and accommodation camp.

Petroleum Pipelines

The Dampier to Bunbury Natural Gas Pipeline (DBNGP) runs diagonally through the centre of the survey area, for a total length of 19.3 km. The easement for the pipeline varies along its length but is generally 30 m wide. The DBNGP is 1,539 km long (mainline pipeline) with 1,228 km of looped (duplicated) pipeline and 300 km of lateral pipelines and is owned and managed by DBP Transmission. The basis of design registered against the licence document states that the outside diameter of the pipeline is 660 mm in the section comprised in the survey area. It has 10 compressor station sites, with the closest one being Compressor Station 8 located 22 km south of the survey area. Construction of the mainline commenced in 1982 and was connected to Kwinana in 1984, and then extended to connect to Bunbury in 1985. It is expected to be operational for at least the next 50 years (DBP, 2017).

The Parmelia Natural Gas Pipeline runs 416 km from Dongara south to Perth and Pinjarra and at its nearest point is located 2.5 km west of the survey area. This 14-inch diameter pipeline was constructed in 1971 and is owned and operated by the APA Group (APA, 2017).

Wells

Two petroleum wells have been drilled in the survey area, these being:

- Donkey Creek-1 – located adjacent to Skipper Road (29° 37’ 30.6”S, 115° 17’ 30.2”E) and spudded in August 1966 by French Petroleum Co (Australia) Pty Ltd as the operator. This well was plugged and abandoned (P&A).
- Eneabba-1 – located adjacent to the Arrowsmith River (29° 34’ 09.6”S, 115° 20’ 01.2”E) and spudded in June 1961 by West Australian Petroleum (Wapet) Pty Ltd as the operator. This well is also P&A.

Other wells drilled within EP320 but located outside the proposed survey area are:

- Beharra Springs South-1 – spudded by Origin Energy Developments Pty Ltd as the operator in August 2001 and P&A. This well is located 8.8 km west of the survey area.
- Mungenooka-1 – spudded by Boral Energy Resources Ltd as the operator in May 1998 and P&A. This well is located 12.3 km northwest of the survey area.
- Warradong-1 – spudded by Mesa Australia Ltd as the operator in February 1981 and P&A. This well is located 12.5 km southwest of the survey area.
- Beekeeper-1 – spudded by Australian Aquitaine Petroleum Pty Ltd as the operator in November 1981 and P&A. This well is located 6.6 km southwest of the survey area.
- Irwin-1 – spudded by AWE Petroleum Ltd as the operator in March 2015, with the well suspended.

Numerous wells have been drilled in the L11 licence area adjoining EP320, including numerous Beharra Springs well, Reback wells, Tarantula-1, North Yardanogo-1 and South-Yardanogo-1. The Beharra Springs gas plant is located within this licence area.

Previous Seismic Surveys

Numerous seismic surveys have been undertaken over the EP320 permit area and overlap the proposed survey area (Figure 5.15). These include:

- Irwin 3D seismic survey – conducted between February and April 2012;
- Baharra Springs 3D seismic survey was conducted in July and August 1999;
- Numerous 2D seismic lines, including the:

- Woodada Reconnaissance seismic survey (1964, 783 linear km).
- Correy seismic survey (1989, 80 linear km).
- Beharra Springs seismic survey (1987, 177 linear km).
- Yandanooka seismic survey (1992, 263 linear km).

5.5.6 Roads and Traffic

Local Road System

The Brand Highway is the key road linking Perth with Dongara and intersects the western portion of EP320. The highway is located 750 m west of the proposed survey area at its closest point. Traffic data from Main Roads WA for the Mid West-Gascoyne region 2009/10 to 2014/15 indicates that for the portion of the Brand Highway running near the proposed survey (north of Eneabba Three Springs Road), an average of 2,820 vehicles use the road on a typical weekday, with 28% of these being heavy vehicles (MainRoads WA, 2017).

Other roads intersected by or adjacent to the proposed survey area (see Figure 5.15) are:

- Correy Road – runs east-west and intersects with the Brand Highway. This is a maintained but minor road, and central to the survey area.
- Skipper Road – runs east-west and intersects with the Brand Highway. This is a well-maintained unsealed road.
- Beekeeper Road – runs east-west and intersects with the Brand Highway and forms the southern boundary of and southern access point to the survey area. This is a well-maintained unsealed road.
- Robb Road – runs north-south, intersecting with Skipper Road. This is a minor unsealed road that extends to a poorly maintained fire track that continues north past the UCL.
- Ding Road – runs north-south, linking Beekeepers and Robe Roads. It is a well-maintained unsealed road.
- Second North Road – runs north-south and links Skipper Road, Beekeepers Road and Eneabba Three Springs Road. It is a well-maintained unsealed road.

Due to the remote nature of these roads, there is no information regarding traffic types or volumes, though it is assumed that these are low traffic roads used predominantly by local families and farm deliveries.

Regional Road System

The main access route within the Shire of Three Springs is the Midlands Road, which serves as the main route between the Great Northern Highway and Brand Highway linking Bindoon, Moora, Carnamah, Three Springs and Mingenew (Shire of Three Springs, n.d).

Significant local roads include the Eneabba–Three Springs Road (providing access Three Springs to the Brand Highway to the west), and the Morawa–Three Springs Road (providing access from Three Springs east to the Great Northern Highway) (Shire of Three Springs, n.d).

The main road through Three Springs and the main commercial street is the Midlands Road, which attracts high volumes of heavy vehicle traffic as a result of mining and agricultural activities (Shire of Three Springs, n.d).

The Indian Ocean Drive road links Perth and Dongara via a coastal road and is located 26 km west of the proposed survey area (the junction between Indian Ocean Drive and the Brand Highway is located 22 km northwest of the proposed survey area).

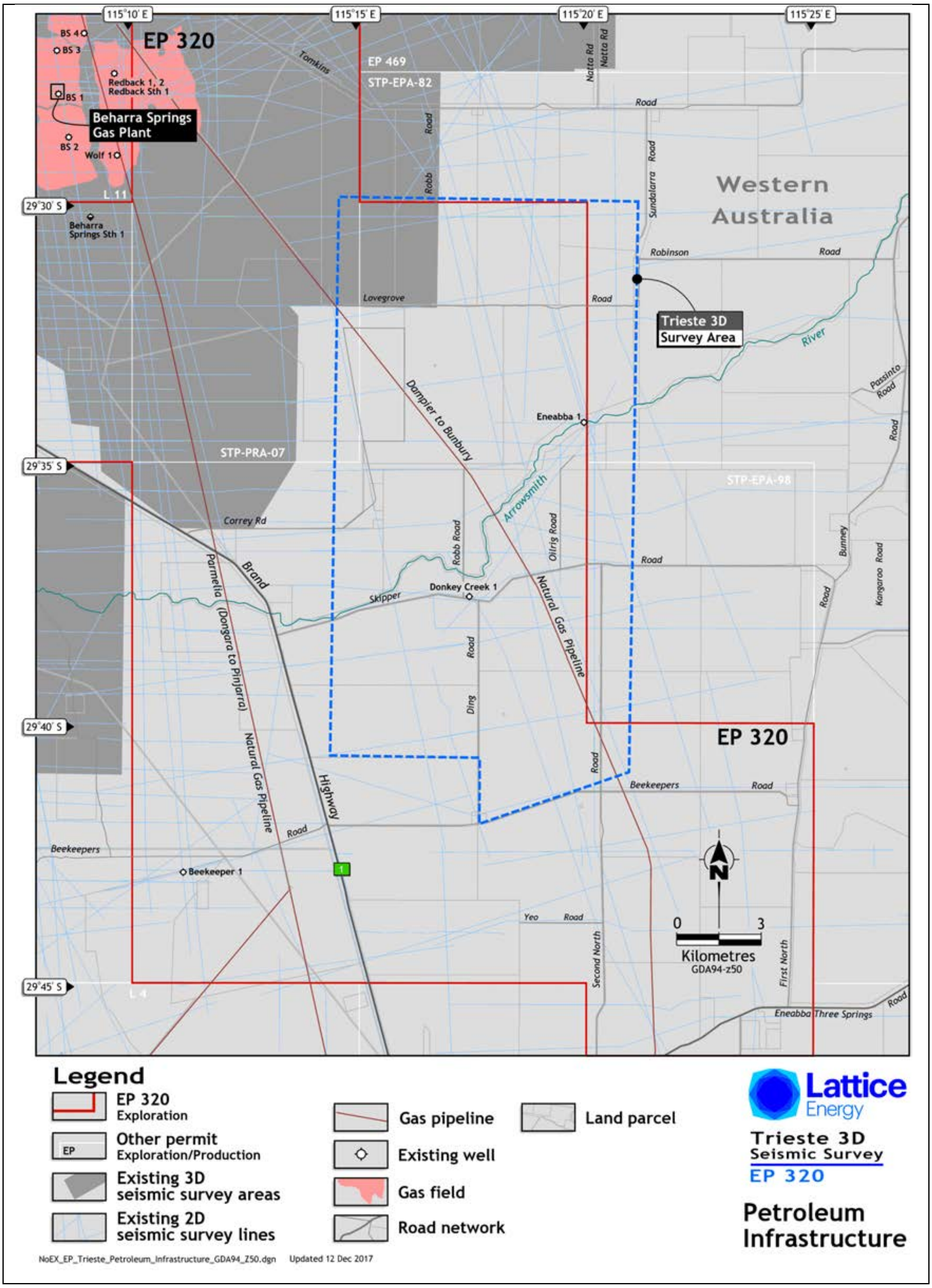


Figure 5.15. Previous seismic surveys undertaken in around the proposed survey area

5.5.7 Tourism

The survey area is mostly private land used for farming with no tourism interests (such as 'bed & breakfasts').

The proposed survey area falls within the WA government's Mid West Tourism Region (North Midlands subregion). This region is marketed predominantly for nature-based tourism, with wildflowers being the region's major drawcard, attracting an average of 729,000 day trip and overnight visitors annually to the Mid West region, mostly during holiday periods and from Autumn to Spring (Evolve Solutions, 2014). The North Midlands accounts for 10% of the domestic overnight visitors out of the approximate 358,000 visitors to the Mid West. The North Midlands also accounts for only 6% of the 47,2000 international visitors to the Mid West region (Evolve Solutions, 2014). The main purpose for domestic and international visitors being in the Mid West region is for holidays/leisure, with the next main reason being for business (domestic) and to visit friends/relatives (international).

Accommodation closest to the proposed survey area is restricted to the Western Flora Caravan Park (see Section 5.5.3). Australian Bureau of Statistics (ABS) data indicates that as of June 2016, there are 21 tourist accommodation facilities (with 15 or more rooms) for the entire Mid West region (ABS, 2017).

Dongara (northwest of the proposed survey area) caters well to tourists, with numerous hotels, motels, bed and breakfasts (B&B) and caravan parks available, along with retail facilities and attractions such as the Port Denison Marina, golf course, ANZAC Memorial Soldiers statues, the Big Western rock lobster and Fishermen's Memorial Lookout. Towns such as Eneabba and Three Springs are predominantly stopover points for passing tourists during the wildflower season in spring

The Brand Highway facilitates significant north-south tourist travel between Perth and towns to the north including Dongara and Geraldton. North of Geraldton, the highway becomes the North West Coastal Highway.

Dongara's airport is mostly for charter and private recreational flights and local aerial services, such as mustering, spraying and surveillance. The nearest commercial airport being Geraldton; most recent growth in passenger numbers to Geraldton is associated with the fly-in fly-out (FIFO) workers associated with mines in the region (Evolve Solutions, 2014).

6. Environment Risk Assessment and Methodology

As required of Regulation 14(3)(c) of the PGER Environment Regulations 2012, this chapter outlines the environmental impact and risk assessment methodology employed for the proposed survey, which uses Lattice's Corporate Risk Assessment Framework and risk toolkit. The methodology utilised is consistent with the Australian Standard for Risk Management (AS/NZS ISO 31000:2009). Figure 6.1 broadly outlines this risk management process.

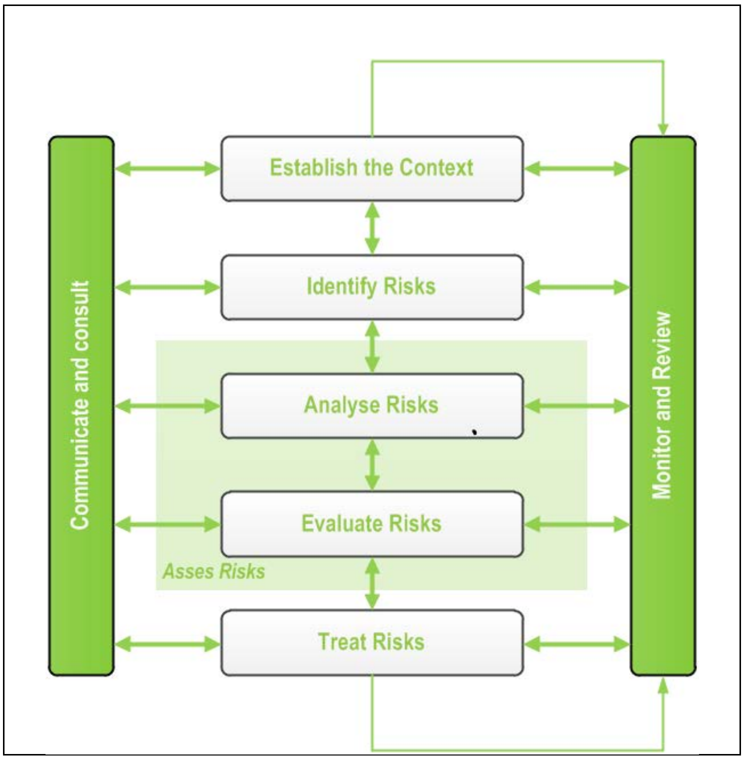


Figure 6.1. The risk assessment process

6.1 Hazard Assessment Methodology

The Corporate Risk Assessment Framework requires the following steps to be implemented to assess risk:

- Identify the activities and the potential impacts associated with them;
- Identify the sensitive environmental resources at risk within and adjacent to the project area;
- Identify the environmental consequences of each potential impact, corresponding to the maximum reasonable impact;
- Identify the likelihood (probability) of occurrence of each potential environmental impact (i.e., the probability of the event occurring);
- Identify applicable control measures; and
- Assign a level of risk to each potential environmental impact using a risk matrix.

In accordance with the Lattice Risk Management Process, all risks must be reduced to a level that is considered to be ALARP (see Section 6.2.3).

An environmental identification and risk assessment (ENVID) workshop was undertaken by Lattice on the 11th of October 2017 to identify the potential environmental hazards and their associated impacts and risks. The workshop involved a multi-disciplinary team including representatives from Lattice's geophysical operations, environment, and risk management teams, along with representatives from Terrex.

Following the identification of each hazard and their associated impacts and risks, control measures were developed to ensure the risk level is reduced to ALARP. An assessment of what is 'reasonably practicable' requires judgements to be made and risks to be assessed as per the residual risk ranking matrix. To make risks ALARP, the advice of technical experts has been considered as well as published standards, availability of mitigation measures and industry practice.

The results of the ENVID workshop are outlined throughout Chapter 7. The findings from the risk assessment workshop have been recorded in the Trieste seismic survey environment risk register.

6.2 Impact and Risk Evaluation

6.2.1 Definitions

Regulation 14(3) of the PGER Environment Regulations state than an EP must include an assessment of the environmental impacts and risks of the petroleum operation and that an assessment of the risks (defined in the Regulations as the "likelihood of a specific, undesired event occurring within a specific period or in specified circumstances") of the potential effects from incidents or events (planned or unplanned) must also be included.

For this activity, Lattice has determined that effects (or impacts) and risks, and planned and unplanned events are defined as follows:

- **Impacts** result from **planned events** (i.e., there *will* be consequences [known or unknown] associated with the event occurring). Impacts are an inherent part of the activity. For example, there will be combustion emissions with associated impacts as a result of vehicle activity. Impacts from planned events are assessed in the EIA of Chapter 6.
- **Risks** result from **unplanned events** (i.e., there *may* be consequences if the unplanned event actually occurs). Risks are not an inherent part of the activity. For example, a hydrocarbon spill may occur if a vehicle fuel tank is punctured during the survey, but this is not a certainty.

Regardless of whether an event is considered to create an impact or risk, Lattice's risk assessment process is applied, which assigns a *consequence* to the hazard and the associated *likelihood* of those consequences being borne (pre-treatment and post-treatment). Results of the risk assessment are provided for each hazard identified during the workshop in Chapter 7.

6.2.2 Impact and Risk Evaluation Process

The purpose of impact and risk evaluation (herein referred to simply as risk assessment) is to assist in making decisions, based on the outcomes of analysis, about the sorts of controls required to reduce an impact or risk to ALARP. Planned and unplanned events are subject to this step in the same manner.

Lattice's risk assessment process is provided in Figure 6.2 and described below:

- Step A – involves identifying and describing the risks, which is outlined in the definition of each hazard in Chapter 7.
- Step B – involves determining the maximum credible impact (to the business or personnel, the natural environment, community/social/cultural heritage, financial, reputation and legal) arising from the impact or risk without regards for controls (Table 6.1). This determination is provided in the risk assessment tables throughout Chapter 6.
- Step C – controls are adopted for each impact or risk, and the effectiveness of each control is assigned a level in accordance with Table 6.2.
- Step D – involves undertaking an assessment of the consequence of the impact or risk, corresponding to the maximum credible impact across the consequence categories (see Table 6.1) taking into account the controls identified and their effectiveness.
- Step E – involves identifying the likelihood of occurrence of those consequences ('remote' through to 'almost certain'), taking into account the controls identified and their effectiveness, as outlined in Table 6.3.
- Step F – the consequence and likelihood are multiplied to determine the overall consequence rating, also outlined in Table 6.3.
- Step G – involves determining the risk treatments required and the escalation required based on the level of risk, as outlined in Table 6.4.

Step A

Identify and describe the risk as follows: "(something happens) leading to outcomes expressed in terms of impact on objectives).

Step B

Assess the potential exposure (maximum credible impact on Lattice Energy arising from a risk without regards for controls).

Step C

Identify existing controls, and assess their effectiveness.

Step D

Identify the consequence rating (1-6) corresponding to the maximum credible impact across the Consequence Categories (may be more than one), given the existing controls and their effectiveness.

Step E

Identify the Likelihood of occurrence ("remote" through to "almost certain") of those consequences at that level, taking into account the current controls and their effectiveness.

Step F

Determine the Level of Risk (Low, medium, High, Severe, Extreme) based on the intersection of the Consequence rating and Likelihood.

Step G

Determine and action (e.g. Risk treatment) and escalation required based on the Level of Risk.

Figure 6.2. Risk matrix process

Table 6.1. Consequence categories

	Impact to Lattice of contract personnel	Natural environment	Community damage/impact/ social/cultural heritage	Financial impact (due to loss of revenue, business)	Damage to reputation, services interruption, customer interruption	Breach of law or criminal prosecution or civil action
6. Catastrophic	Multiple fatalities >4 or severe irreversible disability to a large group of people (>10).	Long-term destruction of highly significant ecosystem or very significant effects on endangered species or habitats.	Multiple community fatalities, complete breakdown of social order, irreparable damage of highly valued items or structures of great cultural significance.	EBIT: Impact, loss or deterioration from expectation greater than $100m. CASH FLOW: severe cash flow crisis, unable to source funds.	Negative international or prolonged national media (e.g., 2 weeks). Continued severe degradation of services to customers > 1 month or > 10,000 customer days.	Potential jail terms for executives and or very high fines for the company. Prolonged multiple litigations.
5. Critical	1-3 fatalities or serious irreversible disability (>30%) to multiple persons (<10).	Major offsite release or spill, significant impact on highly valued species or habitats to the point of eradication or impairment of the ecosystem. Widespread long-term impact.	Community fatality. Significant breakdown of social order. Ongoing serious social issue. Major irreparable damage to highly valuable structures/ items of cultural significance.	EBIT: Impact, loss or deterioration from expectation greater than $30m but less than $100m. CASH FLOW: Severe cash flow crisis, difficulty to source funds. Probable credit rating downgrade.	Negative media national for 2 days or more. Significant public outcry. Severe degradation of services to customers up to 1 month or >5,000 customer days.	Very significant fines and prosecutions. Multiple prosecution and fines.
4. Major	Serious permanent injury/illness or moderate irreversible disability (<30%) to one or more persons.	Offsite release contained or immediately reportable event with very serious environmental effects, such as displacement of species and partial impairment of ecosystem. Widespread medium and some long- term impact.	Serious injury to member of the community, Widespread social impacts. Significant damage to items of cultural significance.	EBIT: Impact, loss or deterioration from expectation greater than $3m but less than $30m. CASH FLOW: Loss of flexibility and/or increase in cost to source funds. Market explanation required.	Negative national media for 1 day. Individual customers or segments disadvantaged up to 1 week. Customer interruption >500 customer days. NGO adverse attention.	Major breach of regulation and significant prosecution including class actions.

	Impact to Lattice of contract personnel	Natural environment	Community damage/impact/ social/cultural heritage	Financial impact (due to loss of revenue, business)	Damage to reputation, services interruption, customer interruption	Breach of law or criminal prosecution or civil action
3. Serious	Serious/reversible/temporary injury/illness (e.g., lost time > 5 days or hospitalisation or alternate/ restricted duties > 1 month).	Moderate effects on biological or physical environment and serious short-term effect to ecosystem functions.	Media attention and heightened concerns by local community and criticism by NGOs. Ongoing social issues. Permanent damage to items of cultural significance.	EBIT: Impact, loss or deterioration from expectation greater than $0.3m but less than $3m. CASH FLOW: Material impact to cash flow.	Negative state media. Heightened concern from local community. Service interruption up to 1 day or > 10 customer days. Criticism by NGOs.	Serious breach of law/regulation with investigation or report to authority with possible prosecution. Performance infringement notice.
2. Moderate	Reversible temporary injury/illness requiring medical treatment (e.g., lost time <5 days or alternate/restricted duties <1 month).	Event contained within site. Minor short-term damage to area of limited significance. Short-term effects but not affecting ecosystem functions.	Medical treatment injury to a member of the community, Minor adverse local public or media attention and complaints. Minor medium term social impact on local population, mostly repairable.	EBIT: Impact or loss greater than $30k but less than $0.3m. CASH FLOW: Impact to project or business unit cash flow.	Public concern restricted to local complaints Negative local media. Internal escalation to senior management. Few hours service interruption. Adverse local public attention.	Breach of law/regulation or non-compliance. Minor legal issues, minor litigation possible.
1. Minor	Injury/illness requiring medical treatment (no lost time, no alternate/restricted duties), first aid, report only.	Minor consequence, local response. No lasting effects. Low-level impacts on biological and physical environment to an area of low significance.	Public concern restricted to local complaints, low level repairable damage to common place structures.	EBIT: Impact or loss greater than $3k but less than $30k. CASH FLOW: No significant impact.	Public concern restricted to local complaints.	Local investigation, minor breach of regulation, on the spot fine or technical non- compliance. Prosecution unlikely.

Table 6.2. Control effectiveness

Fully Effective (100%)	Controls are well designed for the risk, largely prevent the risk from eventuating, and address the root causes. The controls are operating effectively and are reliable at all times. Nothing more to be done except review and monitor the exisitng controls.
Substantially Effective (75%)	Most controls are designed correctly and are in place and effective. Some more work needs to be done to improve operating effectiveness of the Controls, or there are doubts about operational effectiveness and reliability.
Partially Effective (50%)	While the design of controls may be largely correct in that they treat most of the root causes of the risk, they are not currently very effective. There may be an over reliance on reactive controls.
Largely Ineffective (25%)	Significant control gaps. Either controls do not treat root cause or they do not operate effectively at all. Controls, if they exist, are just reactive.
None (0%)	Virtually no credible control. There is little to no confidence that any degree of control is being achieved due to poor control design and/or very limited operational effectiveness of controls.

Table 6.3. Risk matrix

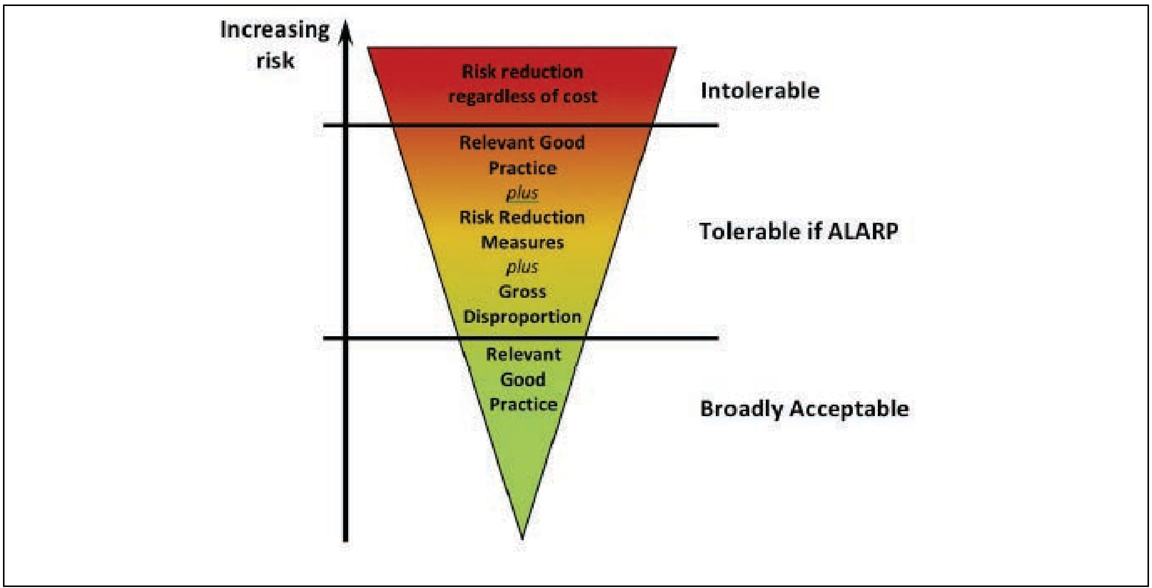
	Remote <1% chance of occurring within the next year. Occurrence requires exceptional circumstances. Only occurs as a 100-year event.	Highly unlikely >1% chance of occurring within the next year. May occur but not anticipated. Could occur in years to decades.	Unlikely >5% chance of occurring within the next year. May occur but not for a while. Could occur within a few years.	Possible >10% chance of occurring within the next year. May occur shortly but a distinct possibility it won't. Could occur within months to years.	Likely >50% chance of occurring within the next year. On balance of probability it will occur. Could occur within weeks to months.	Highly likely 99% chance of occurring within the next year. Impact is occurring now. Could occur within days to weeks.
Catastro-phic	High	High	Severe	Severe	Extreme	Extreme
Critical	Medium	Medium	High	Severe	Severe	Extreme
Major	Medium	Medium	Medium	High	Severe	Severe
Serious	Low	Medium	Medium	Medium	High	Severe
Moderate	Low	Low	Medium	Medium	Medium	High
Minor	Low	Low	Low	Medium	Medium	Medium

Table 6.4. Risk management action

Consequence rating	Action required	Escalation and approval of treatment plans	Acceptance authority
Low	No risk treatment required. Risk reviewed annually by risk owner.	Facilities Manager/ Operations Superintendent	Exco Direct Report – reports (Exco-2)
Medium	Risk treatment may be considered. Risk reviewed annually by risk owner.	Project/Operations Manager	Exco direct report (Exco-1)
High	Risk treatment must be considered. Risk reviewed twice per year by risk owner.	Exco reports for review and approval of associated treatment plan	Exco
Severe	Risk treatment must be considered. Risk reviewed monthly by risk owner.	Exco for review and approval of associated treatment plan (if applicable)	Exco
Extreme	Risk treatment plan must be in place immediately. Risk reviewed monthly by risk owner.	Managing Director and CEO for review and approval of the treatment plan	Managing Director and CEO

6.2.3 Demonstration of the ALARP Principle

The ALARP principle states that it must be possible to demonstrate that the cost involved in reducing the risk further would be grossly disproportionate to the benefit gained. The ALARP principle arises from the fact that infinite time, effort and money could be spent attempting to reduce a risk or impact to zero. This concept is also shown diagrammatically in Figure 6.3.



Source: IPIECA-IOGP (2013).

Figure 6.3. The ALARP Principle

An iterative risk evaluation process is employed until such time as any further reduction in the residual risk ranking is not reasonably practicable to implement. At this point, the impact or risk is reduced to ALARP. The determination of ALARP is outlined in Table 6.5.

Table 6.5. ALARP determination

Risk ranking	Low	Medium	High	Severe	Extreme
ALARP level	Broadly acceptable	Tolerable if ALARP		Intolerable	

Lattice has elected to demonstrate ALARP by adopting the 'Hierarchy of Controls' philosophy. The 'Hierarchy of Controls' is a system used in industry to minimise or eliminate exposure to hazards. The hierarchy of controls is, in order of effectiveness:

- Elimination;
- Substitution;
- Engineering controls; and
- Administrative controls.

Although commonly used in the evaluation of occupational health and safety hazard control, the Hierarchy of Controls (Figure 6.4) philosophy is also a useful framework to evaluate potential environmental controls to ensure reasonable and practicable solutions have not been overlooked. The fifth step in the process, the use of personal protective equipment (PPE), has not been included here as it is specific to the assessment of safety risks rather than environmental management.

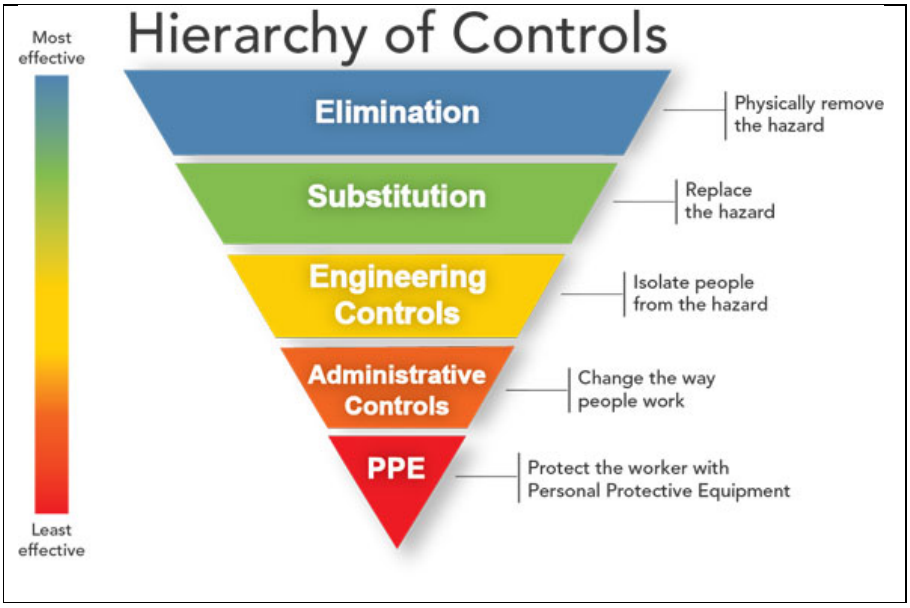


Figure 6.4. Hierarchy of controls

When deciding on whether to implement the proposed impact/risk reduction measure, the following issues are considered:

- Does it provide a clear or measurable reduction in risk?
- Is it technically feasible and can it be implemented?
- Will it be supported and utilised by site personnel?
- Is it consistent with national or industry standards and practices?
- Does it introduce additional risk in other operational areas (e.g., will the implementation of an environmental risk reduction measure have an adverse impact on safety)?
- Will the change be effective taking into account the:
    - Current level of risk i.e. with the existing controls;
    - Amount of additional risk reduction that the control will deliver;
    - Level of confidence that the risk reduction impact will be achieved;

- Resources, schedule and cost required to implement the control.

Reducing impacts to ALARP is an ongoing process and new risk reduction measures may be identified at any time, even during operations. Lattice actively encourages recording and review of observations through the HSE management systems in the enterprise incident management system. Incidents and lessons learned within Lattice and from the wider industry are reviewed and utilised to identify hazards and controls.

6.2.4 Demonstration of Acceptability

Lattice considers a range of factors when evaluating the acceptability of environmental impacts associated with its activities. This evaluation works at several levels, as outlined in Table 6.6. In the absence of an Australian onshore or WA-specific guidance regarding how 'acceptability' should be determined, Lattice has chosen to demonstrate acceptability through its interpretation of the NOPSEMA Guidance Notes for EP Content Requirements (N04750-GN1344, Rev 3, April 2016).

Table 6.6. Acceptability criteria

Test	Question	Acceptability demonstrated
Policy compliance	Is the proposed management of the hazard aligned with Lattice's HSE Policy?	The impact or risk must be compliant with the objectives of the company policies.
Management System Compliance	Is the proposed management of the hazard aligned with Lattice's HSE Management System (HSEMS)?	Where specific Lattice procedures, guidelines, expectations are in place for management of the impact or risk in question, acceptance is demonstrated.
Stakeholder engagement	Have stakeholders raised any concerns about activity impacts or risks, and if so, are measures in place to manage those concerns?	Stakeholder concerns must have been adequately responded to and closed out.
Legislative context	Do the management controls meet the expectations of existing WA or Commonwealth legislation?	The proposed management controls align with legislative requirements.
Industry practice	Do the management controls align with industry practice, such as the Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013) and APPEA CoEP?	The proposed management controls align with relevant industry practices.
Environmental context	Are the management controls aligned with the nature of the receiving environment (e.g., do management controls align with threatened species recovery plans)?	The proposed management controls do not contravene management actions outlined in government plans, and are commensurate with the nature and scale of the activity.
Environmentally Sustainable Development (ESD) Principles*	Are the management controls aligned with the APPEA Principles of Conduct (APPEA, 2003), which includes that ESD principles be integrated into company decision-making?	The overall operations are consistent with the APPEA Principles of Conduct.

* See Table 6.7 for further information.

Principles of Ecologically Sustainable Development

Section 3A of the EPBC Act defines ESD, which is based on Australia's National Strategy for Ecological Sustainable Development (Council of Australian Governments, 1992), as:

> *Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased.*

Section 3(1)(b) of the *Biodiversity Conservation Act 2016* (WA) states that the object of the Act is to promote the ecologically sustainable use of biodiversity components in the state, while Section 3(2) of the Act states that regard must be had to the principles of ESD set out in Section 4 of the Act. Table 6.7

outlines the principles of ESD as defined under the EPBC Act and *Biodiversity Conservation Act 2016* and describes how this EP (and the project) align with these principles.

Table 6.7. Assessment of the proposed Trieste seismic survey against the principles of ecologically sustainable development

Principle		EP demonstration
A	Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.	This principle if inherently met through the EP assessment process.
B	If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	Serious or irreversible environmental damage resulting from this project has been eliminated through the project design (see section 3.5 in particular, regarding seismic line preparation). None of the residual risks is rated higher than medium. Scientific certainty has been maximised by conducting vegetation and fauna field surveys (see Section 5.2).
C	The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	The EP assessment methodology ensures that risks from the proposed survey are ALARP and acceptable.
D	The conservation of biodiversity and ecological integrity should be a fundamental consideration in decision-making.	This principal is considered for each hazard in the adoption of environmental controls (i.e., performance standards) that aim to minimise environmental harm. The ENVID workshop (described in Section 6.1) demonstrates, in part, that Lattice takes the conservation of biodiversity into full consideration in the project decision-making process. There has been a strong focus during project design to conserve biodiversity and ecological integrity by minimising the clearance of native vegetation wherever practicable (see section 3.5 in particular, regarding seismic line preparation).
E	Improved valuation, pricing and incentive mechanisms should be promoted.	This principle is not relevant to the project.

6.3 Monitor and Review

The monitoring and review process encompasses all aspects of the risk management process for the purpose of ensuring that controls are effective and efficient in both design and application.

This is achieved for the proposed Trieste seismic survey through the environmental performance outcomes, standards and measurement criteria that are described for each hazard in Chapter 7.

The additional aspects of the monitor and review process are described in the Implementation Strategy in Chapter 8 and include the following objectives:

- Obtaining further information to improve risk assessment;
- Analysing the lessons learned from incidents, near-misses, changes, trends, successes and failures;
- Detecting changes in the external and internal context, including changes to risk criteria and the risk itself, which can require revision of risk treatments and priorities; and
- Identifying emerging risks.

7. Environment Impact and Risk Assessment

As required of Regulation 14(3)(a) of the PGER Environment Regulations 2012, this chapter outlines the outcomes of the environmental risk assessment (ERA) completed for the proposed survey using the methodology described in Chapter 6. The risks associated with planned events are assessed in Section 7.1 and the risks associated with unplanned events are assessed in Section 7.2.

This chapter also presents the environmental performance outcomes, performance standards and measurement criteria required to address the identified impacts and risks as required of Regulation 10 of the Petroleum Regulations 2011. The terms used for measuring the environmental performance for each hazard are defined below:

- *Environmental performance objective* (EPO) – a measurable level of performance required for the management of environmental aspects of an activity to ensure that environmental impacts and risks will be of an acceptable level.
- *Environmental performance standard* (EPS) – a statement of performance (i.e., a control) required to meet the objective.
- *Measurement criteria* – defines how the application of the performance standard will be verified.

A summary of the residual risk rankings for all impacts and risks identified and assessed in this chapter are summarised in Table 7.1. An EP commitments register is provided in **Appendix E**.

Table 7.1. Trieste 3D seismic survey environmental risk rating summary

ID	Impacts and risks	Inherent risk	Residual risk
Planned events			
1	Loss of native vegetation – excessive clearing	Medium	Low
	Loss of native vegetation – loss of threatened species	Severe	Medium
2	Noise	Medium	Medium
	Vibration	Medium	Medium
3	Disturbance to wildlife – general fauna	High	Medium
	Disturbance to wildlife – threatened fauna	Medium	Low
4	Soil disturbance	Medium	Medium
5	Air emissions (combustion and dust emissions)	Medium	Medium
Unplanned events			
6	Unplanned disturbance to farming activities	Medium	Low
7	Introduction of weeds and pathogens	High	Medium
8	Disturbance to indigenous and non-indigenous cultural heritage	Medium	Low
9	Reduction of visual amenity	Medium	Low
10	Ignition of wildfire - environment	Severe	Medium
	Ignition of wildfire - community	Severe	Medium
11	Damage to third-party infrastructure	Medium	Low
12	Inappropriate waste disposal	Medium	Low
13	Hydrocarbon and chemical spills - small	Medium	Low
	Hydrocarbon and chemical spills - large	Medium	Low

7.1 Planned Events

7.1.1 Loss of Native Vegetation

Hazard

The following activities will result in the loss of (or damage to) native vegetation:

- Mulching of native vegetation along source and receiver lines, including any mulching beyond pre-determined lines due to operator error or GPS errors;
- Mulching of species that were not detected during the botanical surveys (e.g., non-flowering period, not sighted, incorrect identification, meaning they were not GPS-marked for avoidance).
- Fire (see Section 7.2.5); and
- Hydrocarbon spill (see Section 7.2.8).

Environmental Risks

The risks associated with mulching native vegetation are:

- Temporary loss of individuals or populations of common and threatened species;
- Permanent loss of individuals of common and threatened species;
- Further reduction in populations of threatened species, hastening the extinction period; and
- Temporary loss of fauna habitat.

Evaluation of Risks

The mulching of native vegetation has the effect of removing plant biomass. This results in a temporary loss of vegetation and the intrinsic benefits it provides, including fauna habitat, oxygen production, carbon dioxide removal, cooling of the soil and interception of rainfall (reducing erosion potential) among other benefits.

The creation of linear clearances in vegetation also creates an 'edge effect', whereby a block of vegetation with a low 'edge' exposed to un-vegetated area (such as farmland) is then divided into smaller parcels of vegetation, exposing the uncleared vegetation to greater disturbances at the edges and for some distance inside the edge. Increased solar radiation and wind exposure occurring at the edges can lead to changes in the diversity and abundance of native vegetation for short distances inside the edge and favour the introduction and spread of weed and pest species.

In predominantly sclerophyllous heath vegetation such as that of the survey area, these effects are temporary (months to several years) due to the fact that this vegetation readily re-sprouts from its underground roots and lignotubers (a large woody swelling of the stem that occurs at or below the surface). Lignotubers are primarily an adaptation to fire and are a particular feature of mallee eucalypts that regrow from these lignotubers for up to hundreds of years.

Species of conservation significance

Table 7.2 over page lists the species of conservation significance found along the survey lines, and the level of potential impact (based on a percentage of the recorded population that could be subject to disturbance). The overall width of the survey lines surveyed was 20 m, while a maximum width of 4 m will be affected by line clearing and vehicle traffic. As such, the actual impacts to each species listed in Table 7.2 will be less than what has been presented.

Table 7.2. Impact assessment for species of conservation significance recorded during the field survey

Species	WAH specimens	WAH plants (approximation only)	Survey records	Survey plants	Impact (%)	Notes
High impact (30-100% of the recorded population could be subject to disturbance)						
Mesomelaena stygia subsp. *deflexa* (P3)	29	ca. 1,954	2,145	98,696	87.2	Impact will be minimised by hand deploying nodes along receiver lines in the dense populations. This species is likely to extend beyond the 20 m corridor of the survey lines.
Banksia scabrella (P4)	51	ca. 771	695	5,800	85.1	Impact will be minimised by hand deploying nodes along receiver lines in the dense populations. This species is likely to extend beyond the 20 m corridor of the source and receiver lines surveyed.
Persoonia filiformis (P2)	20	ca. 26	119	154	83.9	
Tricoryne soullierae (P1)	3	ca. 55	183	365	82.4	Likely dies back to underground rhizomes post-flowering (seen flowering in late October-November).
Hemiandra sp. Eneabba (H. Demarz 3687) (P3)	33	ca. 70	185	245	74.6	Often scattered in low numbers and are likely to occur throughout the UCL block. These plants are somewhat avoidable.
Desmocladus elongatus (P4)	42	ca. 162	101	146	43.2	Often scattered in low numbers and are likely to occur throughout the UCL block. These plants are somewhat avoidable.
Guichenotia alba (P3)	38	ca. 89	26	75	40.2	
Stylidium pseudocaespitosum (P2)	20	ca. 65	12	39	37.5	
Verticordia densiflora var. *roseostella* (P3)	42	ca. 142	5	78	35.5	Only occurs in the mallee tree farm property along a receiver line. These five plants will be avoided by hand deploying nodes.
Lasiopetalum ogilvieanum (P1)	16	ca. 29	8	56	34.1	These plants can be avoided as it occurs in confined locations under stands of eucalypts.
Moderate impact (10-30% of the recorded population could be subject to disturbance)						
Persoonia rudis (P3)	40	ca. 48	13	15	23.8	Easily avoidable. Scattered in low numbers.

Species	WAH specimens	WAH plants (approximation only)	Survey records	Survey plants	Impact (%)	Notes
Synaphea oulopha (P3)	16	ca. 110	5	25	18.5	
Pityrodia viscida (P4)	25	ca. 2,407	214	542	16.8	Impact can be minimised by deploying nodes by hand in the dense populations.
Stylidium drummondianum (P3)	36	ca. 2,619	264	2,122	12.7	Lateritic ridges.
Low impact (0.1-10% of the recorded population could be subject to disturbance)						
Schoenus griffinianus (P4)	37	ca. 518	23	62	5.9	Often recorded along existing tracks.
Stylidium torticarpum (P3)	48	ca. 1,473	24	406	8.5	Recorded in damper areas or depressions between lateritic ridges in the southeast part of the UCL as well as the creek line in the northeast part of the UCL.
Eucalyptus macrocarpa subsp. *elachantha* (P4)	54	ca. 245	24	61	2.3	Can be avoided as it grows in distinct clumps.
Hypocalymma gardneri (P3)	21	ca. 534	4	4	0.7	Easily avoided as they occur as single plants.
Verticordia luteola var. *luteola* (P3)	20	ca. 265	1	1	0.4	Easily avoided as it occurs as a single plant.
Grevillea biformis subsp. *cymbiformis* (P3)	24	ca. 337	1	1	0.3	Easily avoided as it occurs as a single plant.
No impact						
Eucalyptus crispata (T)	25	45	1	2	0.0	Deviations built into survey design to avoid this species.
Paracaleana dixonii (T)	19	ca. 127	24	29	0.0	Deviations built into survey design to avoid these species. Mulching will occur outside the flowering period, and combined with the height of the mulching device being set at 5-10 cm (thereby avoiding rosettes, if present), it is unlikely these species will be impacted by clearing.
Thelymitra stellata (T)	23	ca. 103	33	38	0.0	

Note: *Eucalytpus leprophloia* (threatened) and *Micromyrtus univulum* (P3) have been excluded from the table as there will be no vegetation mulching in the locations where they were found.

Key

WAH specimens	WA Herbarium – regional total
WAH plants	WA Herbarium – regional total
Survey records	2017 survey results (number of locations where species was found within the surveyed area)
Survey plants	2017 survey results (total number of individuals recorded across all locations)
Impact (%)	Percentage of populations that could be subject to disturbance from the survey

Overall, it is likely that 20 priority-listed species will be impacted to some extent by the proposed survey. The risks to threatened species, and all native vegetation, have been largely avoided or minimised through careful survey line design undertaken as an iterative process with Mattiske Consulting. This includes:

- Removing all originally planned survey lines from the UCL that is subject to Native Title;
- Removing all originally planned survey lines that intersected wandoo woodland (in the northeast part of the UCL);
- Deviating survey lines around threatened eucalypt and orchid species (see Table 7.2).

All recommendations from the Mattiske Consulting report have been adopted by Lattice. Figure 7.1 illustrates measures that have been built into the design of the survey lines in order to minimise risks to native vegetation and threatened species. The culmination of these avoidance measures is highlighted in Figure 7.2, which highlights the difference in original mulching locations against the reduced mulching locations. The zig-zag nature of many of the survey lines within areas of native vegetation illustrated in Figure 7.2 is further evidence of these avoidance and mitigation measures.

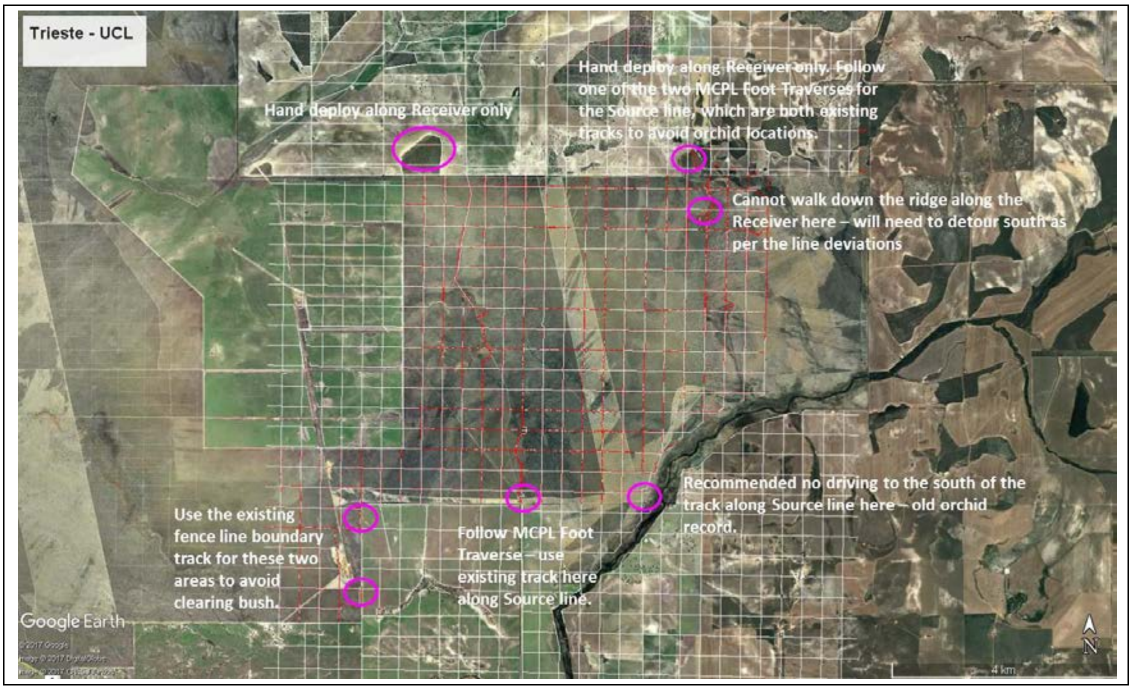


Figure 7.1. Example of mitigation measures built into survey lines to minimise risks to native vegetation and threatened species

Risk Assessment

Table 7.3 presents the risk assessment for loss of native vegetation.

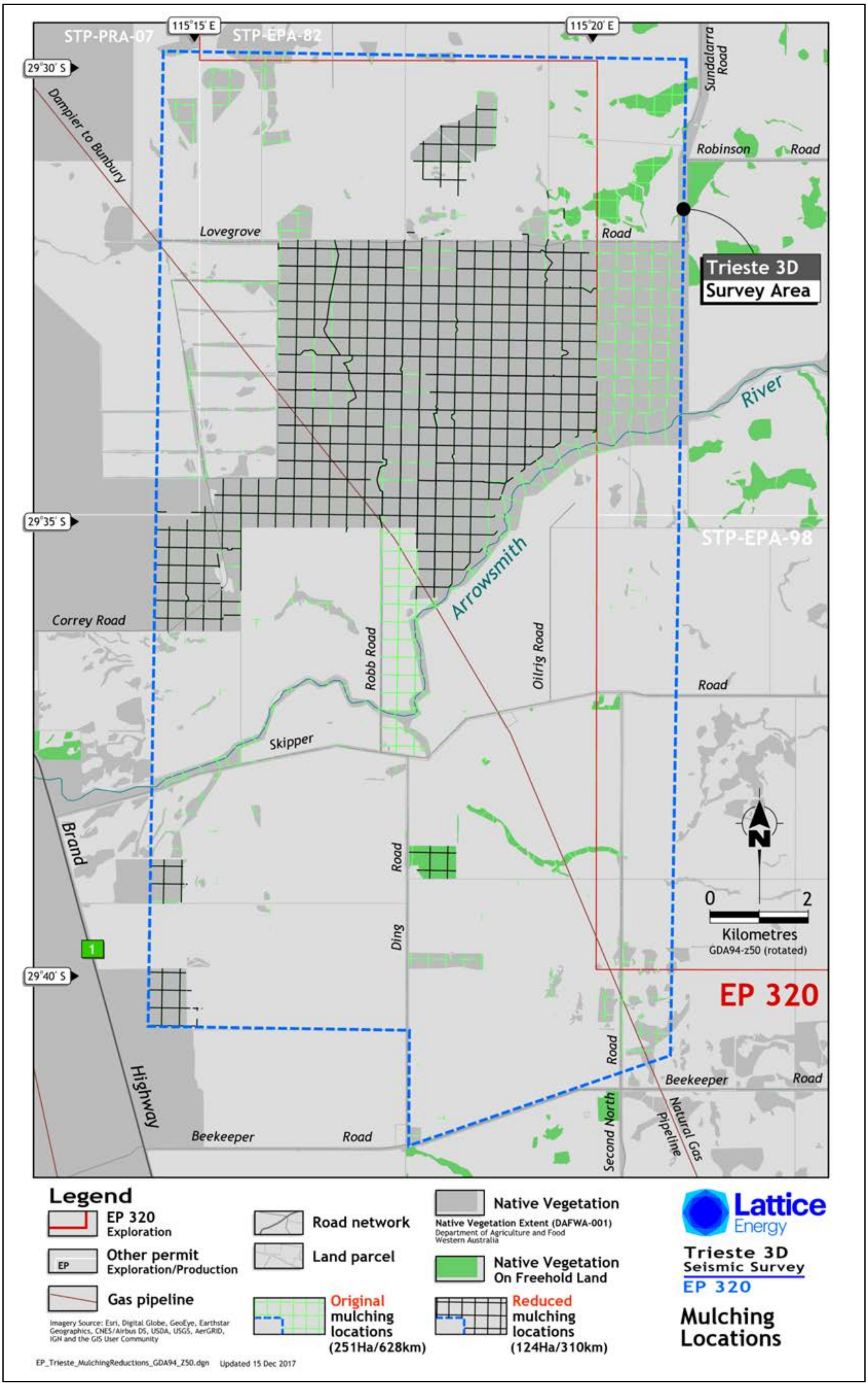


Figure 7.2. Original versus reduced native vegetation mulching locations

Table 7.3. Risk assessment for native vegetation clearing

<table>
<tr><th colspan="4">Summary Details</th></tr>
<tr><td>Hazards</td><td colspan="3">• Mulching of native vegetation.</td></tr>
<tr><td>Risks</td><td colspan="3">• Temporary loss of common and threatened species populations.
• Permanent loss of individuals of common and threatened species.
• Temporary loss of fauna habitat.</td></tr>
<tr><td>Extent of risk</td><td colspan="3">124 ha (1.8%) of native vegetation will be subject to mulching.</td></tr>
<tr><td>Duration of risk</td><td colspan="3">Temporary (the typically mallee and heath vegetation will regrow from rootstock and/or lignotubers).</td></tr>
<tr><th colspan="4">Pre-treatment risk assessment</th></tr>
<tr><th>Category</th><th>Consequence</th><th>Likelihood</th><th>Risk ranking</th></tr>
<tr><td>Excessive vegetation clearing</td><td>Moderate</td><td>Likely</td><td>MEDIUM</td></tr>
<tr><td>Clearing of threatened flora</td><td>Major</td><td>Likely</td><td>SEVERE</td></tr>
<tr><th colspan="4">Environmental Controls and Performance Measurement</th></tr>
<tr><td>Performance objective</td><td colspan="3">Keep vegetation mulching to the minimum amount possible.
Rehabilitation of disturbed areas is successful.</td></tr>
<tr><th colspan="2">Performance standard</th><th colspan="2">Measurement criteria</th></tr>
<tr><td colspan="4">Avoidance</td></tr>
<tr><td colspan="2">Do not undertake any ‘conventional’ vegetation clearing (i.e., removal of vegetation using bulldozers).</td><td colspan="2">Photos of mulchers in action are available.</td></tr>
<tr><td colspan="2">Load the mulchers with pre-determined and validated GPS data to ensure that source and receiver lines are prepared in accordance with botanist advice.</td><td colspan="2">Pre-mulching checklist completed, indicating that GIS data is correctly loaded.</td></tr>
<tr><td colspan="2">Guide the locations for seismic line preparation using GPS navigation (under the guidance of the Line Pointing Surveyor) so as to avoid pre-determined sites of sensitivities (e.g., threatened flora species).</td><td colspan="2">Daily operations reports and photos verify that the Line Pointing Surveyor guides the mulcher during line preparation.</td></tr>
<tr><td colspan="2" rowspan="3">Do not mulch the following areas of defined native vegetation:
• The Nature Conservation Reserve.
• Riparian vegetation along the Arrowsmith River (vegetation outside the cadastral boundary of adjoining private properties).
• Roadside vegetation (the area between road verges and adjacent property boundaries).
• Wandoo woodland in the northeast part of the UCL.
• Mallee trees within the Mallee Land Co property.</td><td colspan="2">Daily operations reports verify no clearing of remnant vegetation.</td></tr>
<tr><td colspan="2">As-completed GIS survey lines verify that no line clearing took place within the wandoo woodland.</td></tr>
<tr><td colspan="2">Statement from the landowner at the completion of the survey verifies that no trees were cleared.</td></tr>
<tr><td colspan="2">Do not mulch or remove trees with a DBH >20 cm in order to preserve potential breeding habitat for Carnaby’s black cockatoo.</td><td colspan="2">Daily operations reports and photos verify trees with DBH >20 cm is retained.</td></tr>
<tr><td colspan="4">Mitigation</td></tr>
<tr><td colspan="2">Leave mulched/slashed material at the point of mulching/slashing to provide a seed source, minimise soil erosion and compaction, and provide nutrients to the remaining rootstock as it decomposes.</td><td colspan="2">Daily operations reports and photos verify vegetation is left on site.</td></tr>
<tr><td colspan="2">Keep a fire tender available with the mulcher to enable any spot fires to be immediately extinguished.</td><td colspan="2">Daily operations reports and photos verify that a fire tender is provided during mulching.</td></tr>
<tr><td colspan="2">Do not permit any off line driving (e.g., for short-cuts).</td><td colspan="2">No incident reports regarding off line driving.</td></tr>
<tr><td colspan="2">Induct all project personnel into the vegetation management requirements prior to the commencement of line clearing.</td><td colspan="2">The project induction includes information regarding the prevention of vegetation clearing.</td></tr>
</table>

	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Damage to any flora species listed under the *EPBC Act 1999* or *Wildlife Conservation Act 1950* will be reported to the DoEE and DEC (as per reporting requirements listed in Table 7.5).	Reportable incident report is available.
Rehabilitation	
A Rehabilitation Monitoring Plan will be developed prior to the survey, which will include a description of (but not be limited to): • Monitoring methodology (frequency, timing, locations, number of botanists, logistics); • Completion criteria (see Section 3.6.12); • Active revegetation works (if required); and • Reporting requirements.	A Rehabilitation Monitoring Plan is available prior to the survey commencing.
The Rehabilitation Monitoring Plan will be implemented upon completion of the survey, with timing dependent on temporal issues (e.g., spring is ideal for surveying to make identification of flowering plants easier).	Reports from the botanical consultant are available to verify that the Rehabilitation Monitoring Plan has been implemented.
The results of rehabilitation monitoring (and revegetation activities, if required) will be reported to DMIRS (as outlined in Section 8.6.2).	Reports to DMIRS, and evidence of transmittal, are available.

Residual risk assessment

Category	Consequence	Likelihood	Risk ranking
Excessive vegetation clearing	Moderate	Highly unlikely	LOW
Clearing of threatened flora	Major	Highly unlikely	MEDIUM

Demonstration of ALARP

'Low' and 'Medium' residual risk ratings are considered to be tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.

Elimination	See the breakout box in Section 3.5.3. Just over 50% of the originally planned extent of native vegetation mulching has eliminated from the project design. A botanical survey has been undertaken, with locations of threatened and priority-listed species marked for avoidance. By selecting the mulching method rather than clearing, Lattice has eliminated impacts associated with clearing root stock, thereby ensuring rapid regrowth of wildlife habitat. Lattice has eliminated the need to mulch through the wandoo woodland in the northeast part of the UCL, which is important Carnaby's black-cockatoo habitat. A significant quantity of the required mulching locations of native vegetation on private land has been eliminated by designing source and receiver lines to go around these vegetation parcels. Clearing of riparian vegetation was eliminated from the project design to recognise the importance of waterways and riparian communities for wildlife in otherwise dry landscapes.
Substitution	Lattice considered a traditional orthogonal survey grid over the survey area that would have resulted in survey lines spaced 240 m x 240 m apart. This has been substituted for the use of a 360m x 360 m grid in order to minimise vegetation clearing. The clearing of native vegetation on Crown land (other than road reserves and the Arrowsmith River corridor) has been substituted with mulching. This ensures that vegetation root stock remains intact, allowing for re-growth and minimising the risk of soil erosion. Line preparation has been reduced from a standard 4.5 m width to 4 m width, and in areas of native vegetation, further reductions in mulching are expected to be realised by reducing an estimated 20% to 50% of receiver line widths down from 4 m to 2.8m in select locations (to be determined at the time of the survey).
Engineering	Highly accurate GPS will be used in the mulcher in order to follow the survey lines that have been designed with input from the botanical survey.
Administrative	Vegetation management controls will be addressed in the project induction.
Demonstration of Acceptability	
Policy compliance	Beach Environmental Policy objectives are met.

<table>
<tr><td rowspan="3">Management system compliance</td><td colspan="2">Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice’s HSEMS and Terrex’s Incident Management System (IMS). The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.</td></tr>
<tr><td>Lattice HSEMS</td><td>• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment.
• HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management.
• Biodiversity Management Directive (LAT-HSE-DVE-021) – Section3, requirements.</td></tr>
<tr><td>Terrex IMS</td><td>• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; minimising disturbance to native flora and fauna.</td></tr>
<tr><td>Stakeholder engagement</td><td colspan="2">Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4).
To date, no stakeholders have raised concerns with regard to vegetation clearing.</td></tr>
<tr><td>Legislative context</td><td colspan="2">The performance standards outlined in this EP align with the requirements of the:
• Biodiversity Conservation Act 2016 (WA).
• Conservation and Land Management Act 1984 (WA).
    ○ Conservation and Land Management Regulations 2002 (Part 2, Protection of the environment, Division 1 Protection of flora and fauna).
• EPBC Act 1999 (Cth).</td></tr>
<tr><td rowspan="4">Industry practice</td><td colspan="2">The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.</td></tr>
<tr><td>Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)</td><td>The performance standards in this table meet these guidelines with regard to:
• Section 2.9 (Vibrators) – consider the use of noise suppressant mufflers, undertake preventative maintenance.</td></tr>
<tr><td>APPEA CoEP (2008)</td><td>The performance standards in this table meet the objectives with regard to:
• Onshore geophysical surveys – reducing the impact of noise to an acceptable level and to reduce the risk of impacts to ALARP.</td></tr>
<tr><td>Environmental management in oil and gas exploration and production (UNEP IE, 1997)</td><td>This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities.
The performance standards in this table meet the objectives regarding onshore seismic operations with regard to:
• Table 5 – using adequate noise attenuation on engines.</td></tr>
<tr><td>Environmental context</td><td>Species Recovery Plans</td><td>The Conservation Advice/Recovery Plans for the following threatened species have been taken into account in the development of the EPS:
• Yandanooka mallee (Eucalyptus crispata) – lists habitat loss, disturbance and modification as threats (DEWHA, 2008a).
• Sandplain duck orchid (Paracaleana dixonii) – lists land clearing as a threat (DEWHA, 2008b).
• Star sun-orchid (Thelymitra stellata) – lists increasing fragmentation of habitat and invasion by exotic weeds as threats (DEWHA, 2008c).
Actions identified in these plans, such as undertaking surveys to identify populations of threatened species, have been adopted by the project to inform the development of appropriate EPS.</td></tr>
<tr><td colspan="3">Environmental Monitoring</td></tr>
</table>

• Field HSE Advisor will monitor for adherence to EP commitments. • GPS waypoints entered into mulcher and vibroseis buggies to ensure they remain on pre-determined paths that avoid sensitivities. • Rehabilitation monitoring is undertaken as outlined in the Rehabilitation Plan.
Record Keeping
• Flora survey report. • Induction presentation and attendance register. • Daily operations reports. • Photos. • GIS survey line data. • Incident reports. • Rehabilitation monitoring.

7.1.2 Noise and Vibration

Hazard

The following activities will generate noise and vibration:

- Engine and road noise from the vibroseis buggies and survey vehicles;
- Vibrations generated by the activation of the base plate on the vibroseis buggies;
- Mulching of vegetation; and
- Generator on the recording vehicles.

Environmental Risks

The risks associated with noise and vibration are:

- Inconvenience/disturbance/annoyance to landholders;
- Disturbance to wild fauna and livestock, exhibiting avoidance behaviour that results in greater energy expenditure than would otherwise be exerted; and
- Disturbance to buildings.

Evaluation of Risks

Fauna and livestock

Fauna living or moving within vegetation adjacent to the survey lines will hear the sound associated with mulching and are likely to detect the noise and vibration generated by the vibroseis buggies and associated vehicles. These disturbances are likely to result in some species temporarily avoiding areas of habitat that are otherwise suitable. Animals with the most contact with the ground (such as lizards and snakes) may be more disturbed than bipeds (e.g., kangaroos) or quadrupeds (e.g., native rodents). Fauna may also experience increased stress and/or expend extra energy in avoidance behaviours. Normal activities (resting, feeding, nesting, breeding) are likely to resume shortly after the disturbance, and as such the impacts are considered temporary.

Should disturbance occur near breeding sites, there is the potential for abandonment of nests or young, though this is unlikely as the disturbance in any one location will be very brief. The impacts of noise and vibration are temporary (the duration of the survey, several weeks) and unlikely to cause a significant impact to fauna populations. The same is likely for livestock.

Landholders

Safe operating distances for the Trieste 3D seismic survey have been established in line with the Ground vibration survey seismic truck excitation (70Q-07-0104-TRP-245047-1) testing undertaken by VIPAC Engineers and Scientists Ltd (VIPAC), commissioned by Origin Energy in 2007 to conduct ground vibration measurements in order to establish safe operating distances for the use of 60,000 lb (27 t) seismic vibrators (the same size as those proposed for this survey). The study determined the PPV outputs at various distances for different quantities of vibrator arrays, as outlined in Table 7.4.

Table 7.4. Predicted ground vibration (PPV mm/s) in hard soil for different size vibroseis buggies

Distance (m)	Ground vibration PPV (mm/s) for an equivalent number/force of Hemi 60 trucks			
	0.5	**1**	**2**	**3**
10	5.8	10.1	17.7	24.5
20	1.9	3.3	5.8	8.0
30	1.0	1.7	3.0	4.2
40	0.6	1.1	1.9	2.6
50	0.4	0.8	1.3	1.8
60	0.3	0.6	1.0	1.4
70	0.3	0.4	0.8	1.1

The safe operating distance that Lattice has adopted is 5 mm/s. It is therefore expected to be safe to operate at a distance of 30 m from dwellings. With these safe operating distances in place, disturbance to landholders within their homes is not expected.

Risk Assessment

Table 7.5 presents the risk assessment for noise and vibration.

Table 7.5. Risk assessment for noise and vibration

Summary Details			
Hazards	• Engine and road noise from the vibroseis and survey vehicles. • Noise and vibration created by mulching vegetation. • Vibrations generated by the activation of the base plate on the vibroseis vehicles.		
Risks	• Nuisance to nearby residents. • Disturbance to wild fauna and livestock.		
Extent of risk	Localised (tens of metres for noise and vibrations).		
Duration of risk	Temporary (minutes to hours in any one location).		
Pre-treatment risk assessment			
Category	**Consequence**	**Likelihood**	**Risk ranking**
Noise	Minor	Almost certain	MEDIUM
Vibration	Minor	Almost certain	MEDIUM
Environmental Controls and Performance Measurement			
Performance objective	Minimise noise and vibration disruption to landholders.		

Performance standard	**Measurement criteria**
Do not operate vibroseis buggies within 30 m of homesteads.	Survey mapping verifies that source lines are >30 m from homesteads.
Do not operate vibroseis buggies within the cadastral boundaries of the Arrowsmith River in order to minimise vibration impacts to riparian habitats and associated fauna.	There are no incident reports regarding breach of no-entry zone.
Maintain vibroseis buggies, mulchers and trucks in accordance with a Planned Maintenance System (PMS) to ensure noise abatement devices (e.g., engines, mufflers) are operating efficiently.	PMS records indicate regular servicing.
Undertake survey activities ONLY during daylight hours in order to minimise the impacts of noise and vibration on native nocturnal fauna.	Daily operations reports list the survey acquisition times, confirming no work outside of daylight hours.
Fit a silencer pack to the generators.	Photos verify that a silencer pack is fitted to the generators.

<table>
<tr><td colspan="2">Consult with local landholders during the planning and operation phases of the project and notify them of the exact timing of the survey once confirmed.</td><td colspan="2">Consultation register confirms the consultation material, meetings and phone calls have taken place with local residents, business and community organisations in a timely fashion.</td></tr>
<tr><td colspan="2" rowspan="2">Induct all project personnel into the noise and vibration management requirements prior to the commencement of line clearing.</td><td colspan="2">The project induction includes information regarding noise and vibration management.</td></tr>
<tr><td colspan="2">Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.</td></tr>
<tr><td colspan="2" rowspan="2">Log complaints regarding noise or vibration in the enterprise incident management system. Undertake follow up investigations (e.g., sound and/or vibration monitoring) as required.</td><td colspan="2">Investigation records are available.</td></tr>
<tr><td colspan="2">Monitoring records are available (if required).</td></tr>
<tr><th colspan="4">Residual risk assessment</th></tr>
<tr><th>Category</th><th>Consequence</th><th>Likelihood</th><th>Risk ranking</th></tr>
<tr><td>Noise</td><td>Minor</td><td>Almost certain</td><td>MEDIUM</td></tr>
<tr><td>Vibration</td><td>Minor</td><td>Almost certain</td><td>MEDIUM</td></tr>
<tr><th colspan="4">Demonstration of ALARP</th></tr>
<tr><td colspan="4">A ‘Minor’ residual risk rating is considered to be tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.</td></tr>
<tr><td>Elimination</td><td colspan="3">Sound and vibration from the seismic source cannot be eliminated – without it, the survey objectives cannot be met.
Sound and vibration from the mulcher and other vehicles also cannot be eliminated.</td></tr>
<tr><td>Substitution</td><td colspan="3">Not applicable.</td></tr>
<tr><td>Engineering</td><td colspan="3">Not applicable.</td></tr>
<tr><td>Administrative</td><td colspan="3">Lattice’s consultation requirements will ensure that affected and potentially affected stakeholders are consulted and made aware of the survey and its known and potential impacts.
Vibroseis buggies, mulchers and large vehicles are subject to PMS in order to ensure their efficient operation (which also minimises noise pollution).
Noise and vibration controls will be addressed in the project induction.</td></tr>
<tr><th colspan="4">Demonstration of Acceptability</th></tr>
<tr><td>Policy compliance</td><td colspan="3">Beach Environmental Policy objectives are met.</td></tr>
<tr><td rowspan="3">Management system compliance</td><td colspan="3">Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice’s HSEMS and Terrex’s IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.</td></tr>
<tr><td>Lattice HSEMS</td><td colspan="2">• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment.
• HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management.
• Environmental Noise Directive (LAT-HSE-DVE-019) – Section 3, requirements.</td></tr>
<tr><td>Terrex IMS</td><td colspan="2">• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls.</td></tr>
<tr><td>Stakeholder engagement</td><td colspan="3">Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4).
To date, no stakeholders have raised concerns with regard to sound and vibration.</td></tr>
<tr><td>Legislative context</td><td colspan="3">The performance standards outlined in this EP align with the requirements of:
• Environmental Protection Act 1986 (WA).
○ Environmental Protection (Noise) Regulations 1997 – Part 2, Division 1 (allowable noise emissions, general provisions).</td></tr>
<tr><td>Industry practice</td><td colspan="3">The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.</td></tr>
</table>

	Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)	The performance standards in this table meet these guidelines with regard to: • Section 2.9 (Vibrators) – consider the use of noise suppressant mufflers, undertake preventative maintenance. • Section 2.11 (Hazardous materials) – service the exhaust systems of vehicles and equipment on a regular basis to ensure that noise is kept to appropriate levels.
	APPEA CoEP (2008)	The performance standards in this table meet the objectives with regard to: • Onshore geophysical surveys – reducing the impact of noise to an acceptable level and to reduce the risk of impacts to ALARP.
	Environmental management in oil and gas exploration and production (UNEP IE, 1997)	This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities. The performance standards in this table meet the objectives regarding onshore seismic operations with regard to: • Table 5 – using adequate noise attenuation on engines.
Environmental context	*Species Recovery Plans*	Not applicable.
Environmental Monitoring		
• Field HSE Advisor will monitor for adherence to EP commitments. • Noise and/or vibration monitoring (in response to non-vexatious complaints).		
Record Keeping		
• Daily operations reports. • Vibroseis vehicle maintenance records. • Induction presentation and attendance register. • Stakeholder consultation register. • Complaints register. • Enterprise incident management system records. • Noise/vibration monitoring results (if required). • As-completed survey line mapping.		

7.1.3 Disturbance to Native Wildlife

Hazard

The following activities may disturb native wildlife:

- Vegetation mulching;
- Vehicle strike; and
- Noise and vibration associated with vibroseis buggies and vehicle travel (see Section 7.1.2).

Environmental Risks

The risks of disturbance to native wildlife and habitat loss are:

- Injury or death of individual animals;
- Temporary loss of habitat, habitat fragmentation and degradation; and
- Interruption of natural wildlife activities (resting, feeding and/or breeding activities).

Evaluation of Risks

Injury or death of wildlife

During the mulching of native vegetation, injury or death of native vertebrate fauna is possible due to direct contact with the mulching equipment, collapse of vegetation they are resting, nesting or feeding in and collision with vehicles as fauna moves out of disturbed areas. Fauna that are most at risk are small species that are likely to hide rather than move away from disturbance. This includes a range of small reptiles (e.g., geckos and legless lizards) and mammals (e.g., honey possum) that shelter in shrubs, many of which are nocturnal. In cool weather, reptiles are less active and therefore less able to move away. In addition, while adult birds are able to disperse away, eggs or unfledged birds in nests are also vulnerable to mortality. Other than flightless or weakly flying invertebrate species, species of conservation significance are relatively mobile and are likely to disperse away from mulching activities.

Vehicle travel through the survey area could result in direct mortality of wildlife due to vehicle strikes on current access tracks and on mulched tracks. Faunal groups at risk include reptiles that bask on tracks (e.g., snakes) and large mammals (e.g., kangaroos). Small reptiles may also be at risk where they shelter in dead mulched vegetation that remains on mulched tracks, when tracks are in use. However, road mortalities are unlikely to negatively impact the conservation status of a fauna species unless the fauna population was small or otherwise fragile. Conservation significant species that are vulnerable to road mortalities include the woma (though this species is likely to be locally extinct), malleefowl (low probability of occurrence), rainbow bee-eater, Carnaby's black-cockatoo and the western brush wallaby. The black-striped snake may be impacted, as though it is nocturnal, it can occur in loose surface soil so may be vulnerable to being crushed. The chuditch is unlikely to be impacted as it is both nocturnal and likely to be very uncommon in the vicinity of the survey area.

The risk of vehicle strike is also pronounced on public roads in the area during dawn and dusk when animals such as kangaroos emerge from bushland and farmland to feed on roadsides. While vehicles associated with the survey are unlikely to be travelling through the survey area during hours of darkness (thereby minimising the duration of risk exposure), or at high speed, there is likely to be travel at dawn (for mobilisation to site from accommodation at Eneabba) and some travel at dusk (for return travel).

Habitat loss and fragmentation

Up to 124 ha of native vegetation will be mulched for the creation of survey lines, resulting in temporary habitat loss. The plant material that remains should allow the tracks to regenerate from lignotubers and seed. The creation of the mulched tracks potentially fragments the relatively large tracts of native vegetation into many smaller areas, particularly in the UCL. However, the tracks are unlikely to consist of bare ground, and the mulched material should provide some cover for dispersal of fauna. It is unlikely that this degree of fragmentation will significantly inhibit fauna dispersal.

Long-term habitat loss and fragmentation may occur if the tracks do not regenerate (e.g., due to use by third parties or through issues such as soil compaction). However, as outlined in Section 3.5, mulching the survey lines rather than rolling them results in better rehabilitation. As such, it is not expected that long-term habitat loss will occur as a result of this survey. The temporary habitat loss is likely to impact on almost all fauna species in the medium-term, until the vegetation regenerates, though this it not likely to be significant for most fauna. No species is likely to become locally extinct within the proposed survey area, and populations affected by the habitat loss are likely to recover as the vegetation recovers.

The clearings may introduce barriers to the movement of some native fauna, particularly ground-dwelling mammals such as quolls and dibblers that prefer ground level vegetation that protects them from prey. Given the distance between the parallel source lines and parallel receiver lines will be 360 m and the narrow width of mulching (a maximum of 4 m), it is unlikely that this barrier effect on native ground-dwelling mammals will present a significant impediment to movement across their habitat given the abundance of large blocks of native vegetation within the survey area and surrounds.

One conservation significant species that may be affected is Carnaby's black-cockatoo, as the proposed survey area contains some foraging habitat for this species. Although the habitat loss is temporary, for the period of time until the mulched tracks regenerate there is likely to be a loss of more than 1 ha of foraging habitat, which is considered to be a 'high risk' of a significant impact under the DSEWPC (2012) guidelines. There is a small amount of potential Carnaby's black-cockatoo breeding habitat (wandoo woodland) in the minor creek in the northeast corner of the UCL (see Figure 5.9); impacts to this habitat will be avoided by not creating survey lines through this vegetation.

Habitat degradation

There is a potential for habitats adjacent to the mulched tracks to be degraded through the introduction of weeds, pathogens (e.g., dieback) and increased access by feral predators. There is also the risk of accidental trampling or crushing of vegetation adjacent to tracks, either by personnel or by vehicles.

Weeds and pathogens modify vegetation communities and therefore fauna habitats. If they are introduced to the proposed survey area, the impacts are potentially long-term.

Feral species, including foxes, goats and rabbits, are present in the proposed survey area. Native species may be more vulnerable to predation by foxes and cats where vegetation is opened up by tracks, as tracks provide access to the feral species and open areas with less shelter to hide from predators. Access by feral predators should be a temporary impact, ameliorated over time as the vegetation regenerates.

Conservation significant fauna potentially impacted by feral predators include the malleefowl (if present), chuditch (if present) and the black-striped snake. Other fauna that may be impacted include small native mammals, reptiles, frogs and small birds.

Risk Assessment

Table 7.6 presents the risk assessment for disturbance to native wildlife.

Table 7.6. Risk assessment for disturbance to native wildlife

<table>
<tr><th colspan="4">Summary Details</th></tr>
<tr><td>Hazards</td><td colspan="3">• Noise and vibration from the vibroseis buggies and survey vehicles.
• Vehicle strike.
• Loss of hollow-bearing trees.</td></tr>
<tr><td>Risks</td><td colspan="3">• Injury or death of native fauna.
• Interruption of resting, feeding and/or breeding activities.</td></tr>
<tr><td>Extent of risk</td><td colspan="3">Localised (local population) for interruption.
Individual animals for injury or death.</td></tr>
<tr><td>Duration of risk</td><td colspan="3">Temporary for direct risks (duration of the survey), to medium-term for risks associated with habitat loss and fragmentation.</td></tr>
<tr><th colspan="4">Pre-treatment risk assessment</th></tr>
<tr><th>Category</th><th>Consequence</th><th>Likelihood</th><th>Risk ranking</th></tr>
<tr><td>Fauna – general</td><td>Moderate</td><td>Almost certain</td><td>HIGH</td></tr>
<tr><td>Fauna - threatened</td><td>Moderate</td><td>Unlikely</td><td>MEDIUM</td></tr>
<tr><th colspan="4">Environmental Controls and Performance Measurement</th></tr>
<tr><td>Performance objective</td><td colspan="3">Avoid injury or death of native wildlife.</td></tr>
<tr><th colspan="3">Performance standard</th><th>Measurement criteria</th></tr>
<tr><td colspan="3">Undertake survey activities ONLY during daylight hours in order to minimise the impacts of noise and vibration on native nocturnal fauna.</td><td>Daily operations reports list the survey acquisition times, confirming no work outside of daylight hours.</td></tr>
<tr><td colspan="3">Do not operate vibroseis buggies within the cadastral boundaries of the Arrowsmith River in order to minimise vibration impacts to riparian habitats and associated fauna.</td><td>There are no incident reports regarding breach of no-entry zone.</td></tr>
<tr><td colspan="3">Limit the speed of survey vehicles (other than vibroseis buggies, which travel at ~15 km/hr) to a speed limit of 40 km/hr when undertaking survey activities (excluding travel on formed roads, when the public speed limit will be observed), in order to minimise the risk of fauna strike.</td><td>There are no incident reports via the In-Vehicle Monitoring System (IVMS) of speed limit breaches.</td></tr>
<tr><td colspan="3">Retain mulched vegetation at the site at which it was mulched so as to provide groundcover for fauna (especially reptiles and small mammals).</td><td>Daily operations reports list the survey acquisition times, confirming no work outside of daylight hours.</td></tr>
<tr><td colspan="3">Do not allow hunting activities (e.g., shotting, trapping).</td><td>There are no incident reports regarding hunting.</td></tr>
<tr><td colspan="3">Do not bring pets to site.</td><td>There are no incident reports regarding pets.</td></tr>
<tr><td colspan="3">Dispose of food waste appropriately (see Section 7.2.7) in order to avoid attracting pest species.</td><td>See Section 7.2.7.</td></tr>
<tr><td colspan="3" rowspan="2">Only personnel trained in fauna handling are permitted to handle fauna, with permits obtained under the Biodiversity Conservation Act 2016 to handle and relocate injured fauna.</td><td>Fauna handling training records verify that experienced people handle injured fauna.</td></tr>
<tr><td>Biodiversity Conservation Act permit to handle and relocate injured fauna is available.</td></tr>
</table>

	Incident reports.
Telephone (24/7) Greenough Wildlife & Bird Park on 08-9926 1171 for assistance with injured wildlife. Alternatively, telephone the Wildcare Helpline (08-9474 9055) for assistance with injured wildlife (they will provide details of the nearest wildlife rehabilitator). See also https://www.dpaw.wa.gov.au/about-us/contact-us/wildcare-helpline.	Incident report records time, location and nature of fauna impact and measures taken to assist.
Induct all project personnel into the wildlife management requirements prior to the commencement of line clearing.	The project induction includes information regarding noise and vibration management. Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Threatened fauna	
Carnaby's black-cockatoo Avoid any mulching within the wandoo woodland (along the creek line in the northeast corner of the UCL) in order to preserve potential breeding habitat.	As-completed GIS survey lines verify that no line clearing took place within the wandoo woodland.
Do not mulch trees (particularly wandoo) and shrubs (particularly banksias) >20 cm DBH so as to preserve potential breeding habitat for the Carnaby's black-cockatoo.	Daily operations reports verify no trees and shrubs >20 cm DBH are mulched.
Malleefowl Create a buffer of 20 m for access around malleefowl nest mounds if found (this is unlikely, as none have been sighted during the botanical and fauna field surveys).	Photos verify that a minimum 20 m buffer is created around malleefowl nest mounds.

Residual risk assessment

Category	Consequence	Likelihood	Risk ranking
Fauna – general	Minor	Likely	MEDIUM
Fauna – threatened	Minor	Unlikely	LOW

Demonstration of ALARP

A 'Minor' residual risk rating is considered to be tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.

Elimination	As per 'Loss of native vegetation' in Section 7.1.1. Lattice has eliminated the need to mulch through the wandoo woodland in the northeast part of the UCL, which is important Carnaby's black-cockatoo habitat.
Substitution	As per 'Loss of native vegetation' in Section 7.1.1.
Engineering	The mulcher is not capable of clearing vegetation greater than 20 cm DBH; this is an in-built engineering feature that will minimise the loss of habitat trees.
Administrative	Wildlife management controls will be addressed in the project induction.

Demonstration of Acceptability

Policy compliance	Beach Environmental Policy objectives are met.	
Management system compliance	Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice's HSEMS and Terrex's IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.	
	Lattice HSEMS	• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment. • HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management. • Biodiversity Management Directive (LAT-HSE-DVE-021) – Section 3, requirements.
	Terrex IMS	• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; minimising disturbance to native flora and fauna.

<table>
<tr><td>Stakeholder engagement</td><td colspan="2">Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4).
To date, no stakeholders have raised concerns with regard to vegetation clearing.</td></tr>
<tr><td>Legislative context</td><td colspan="2">The performance standards outlined in this EP align with the requirements of:
• Biodiversity Conservation Act 2016 (WA).
• Animal Welfare Act 2002 (WA).
• Conservation and Land Management Act 1984 (WA).
○ Conservation and Land Management Regulations 2002 (Part 2, Protection of the environment, Division 1 Protection of flora and fauna).
• EPBC Act 1999 (Cth).</td></tr>
<tr><td rowspan="4">Industry practice</td><td colspan="2">The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.</td></tr>
<tr><td>Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)</td><td>The performance standards in this table meet these guidelines with regard to:
• Section 2.2 (Clearing) – minimising vegetation clearing through selective tree cutting, leaving root stock in place, keep lines away from water bodies
• Section 2.9 (Vibrators) – consider the use of noise suppressant mufflers, undertake preventative maintenance.
• Section 2.12 (Wildlife and stock) – prohibition of hunting, reporting of fauna incidents, increasing fauna awareness of crew.</td></tr>
<tr><td>APPEA CoEP (2008)</td><td>The performance standards in this table meet the objectives with regard to:
• Onshore geophysical surveys – reducing the impact to vegetation and wildlife habitats to an acceptable level and to reduce the risk of impacts to ALARP.</td></tr>
<tr><td>Environmental management in oil and gas exploration and production (UNEP IE, 1997)</td><td>This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities.
The performance standards in this table meet the objectives regarding onshore seismic operations with regard to:
• Table 5 – minimising width of seismic lines, compatible with OHS requirements.
• Table 5 – do not cut trees of a diameter greater than local regulations (or in the absence of local regulations, >20 cm).
• Table 5 – minimise vegetation clearing, keep in place root stock.</td></tr>
</table>

<table>
<tr><td>Environmental context</td><td>Species Recovery Plans</td><td>The Conservation Advice/Recovery Plans for the following threatened species (except for marine birds) have been taken into account in the development of the EPS:
• Carnaby's black-cockatoo (Calyptorhynchus latirostris) - lists loss of breeding habitat, loss of non-breeding foraging and night roosting habitat, tree health, mining, illegal shooting and taking, climate change, disease and collision with vehicles as threats (DPaW, 2013).
    ○ EPBC Act referral guidelines for three threatened black cockatoo species (DSEWPC, 2012) – used to determine level of potential impact based on amount of habitat to be cleared.
• Malleefowl (Leipoa ocellata) - lists habitat clearing, fragmentation and isolation, grazing, predation, fire, disease and climate change as threats (Benshemesh, 2007).
• Chudith (Dasyurus geoffroii) - lists land clearing and habitat alteration as threats (DEC, 2012a).
• Dibbler (Parantechinus apicalis) - lists predation and habitat degradation as threats (TSSC, 2015b).
• Western spiny-tail skink (Egernia stokesii) - lists habitat clearance, grazing, predation, illegal taking, mining activities and climate change as threats (DEC, 2012b).
• Shield-backed trapdoor spider (Idiosoma nigrum) - lists land clearance and habitat fragmentation as threats, as well as grazing of habitat by stock and feral animals (DSEWPC, 2013b).
Actions identified in these plans, such as undertaking surveys to identify populations of threatened species, have been adopted by the project to inform the development of appropriate controls.
None of the EPS adopted contravene existing or proposed conservation measures and/or research priorities in these plans.</td></tr>
<tr><td colspan="3">Environmental Monitoring</td></tr>
<tr><td colspan="3">• Field HSE Advisor will monitor for adherence to EMP commitments.</td></tr>
<tr><td colspan="3">Record Keeping</td></tr>
<tr><td colspan="3">• Daily operations reports.
• Induction presentation and attendance register.
• Fauna handling training records.
• Wildlife permit/s.
• Incident reports.</td></tr>
</table>

7.1.4 Soil Disturbance

Hazard

The following activities will result in disturbance to soil:

- Vibroseis trucks (and other survey vehicles) travelling along natural landforms;
- Vibroseis base plate contact with the soil; and
- Nodes placement into and recovery from soil.

Environmental Risks

The known and potential environmental risks from disturbance to soil are:

- Soil erosion (and resulting sedimentation);
- Soil ruts; and/or
- Soil compaction.

Evaluation of Risks

Vibroseis buggies and associated survey vehicles travelling along natural landforms (i.e., not formed tracks or roads) may result in soil compaction, rutting or erosion if vehicle tyres churn loose soil or trucks become bogged in wet soil. This in turn may result in poor vegetation growth, as erosion results in the loss of soil nutrients and compacting can hamper water infiltrating to the root zone. Given the predominantly sandy nature of the soil in the survey area, compaction is likely to be limited. This would be more likely in riparian zones where loamy soils are present, but such soils are avoided in the proposed survey area by avoiding work along the Arrowsmith River. In areas of native vegetation, the presence of mulched vegetation along the survey lines acts to minimise the potential for soil compaction.

Soil compaction or rutting may result in localised and temporary water ponding. Such water ponding is not expected to be significant enough to divert water flows away from natural drainage lines.

Soil disturbed through the placement of receiver node spikes into the soil will naturally close over once they are removed, especially in sandy soils where holes collapse easily (or they will be backfilled upon the removal of the nodes). Over the space of a few days, these small soil pockets are expected to resume pre-disturbance structures, resulting in no long-term soil disturbance.

Risk Assessment

Table 7.7 presents the risk assessment for soil disturbance.

Table 7.7. Risk assessment for soil disturbance

<table>
<tr><th colspan="5">Summary Details</th></tr>
<tr><td>Hazards</td><td colspan="4">• Vibroseis buggies and other vehicles travelling along the survey lines.
• Vibroseis base plate contact with the soil.
• Placement of nodes into and recovery from the soil.</td></tr>
<tr><td>Impacts</td><td colspan="4">• Soil erosion, ruts and/or compaction.</td></tr>
<tr><td>Extent of Impacts</td><td colspan="4">Localised to survey lines.</td></tr>
<tr><td>Duration of Impacts</td><td colspan="4">Temporary (disturbed soil will resume pre-disturbance structure and form within days to weeks).</td></tr>
<tr><th colspan="5">Pre-treatment risk assessment</th></tr>
<tr><th colspan="2">Consequence</th><th colspan="2">Likelihood</th><th>Risk ranking</th></tr>
<tr><td colspan="2">Minor</td><td colspan="2">Highly likely</td><td>MEDIUM</td></tr>
<tr><th colspan="5">Environmental Controls and Performance Measurement</th></tr>
<tr><td>Performance objective</td><td colspan="4">Avoid soil erosion off the survey lines.</td></tr>
<tr><th colspan="3">Performance standard</th><th colspan="2">Measurement criteria</th></tr>
<tr><td colspan="3">Create source and receiver lines only by mulching (native vegetation) or slashing (crops/pasture), and do not create permanent tracks. The retained plant roots will minimise the potential for mass soil erosion.</td><td colspan="2">Daily operations reports and photos verify only vegetation mulching/slashing takes place (not wholesale clearing).</td></tr>
<tr><td colspan="3">Retain mulched/slashed vegetation in situ to minimise wind or water erosion of the soil.</td><td colspan="2">Daily operations reports and photos verify that mulched/slashed vegetation is retained in situ.</td></tr>
<tr><td colspan="3">Use existing roads and tracks (including farm tracks) wherever possible to provide access to new survey lines.</td><td colspan="2">Survey GIS records/mapping verifies use of existing roads/tracks.</td></tr>
<tr><td colspan="3">Fit balloon tyres to vibroseis buggies for use on farmland to minimise soil compaction.</td><td colspan="2">Photos verify the use of balloon tyres.</td></tr>
<tr><td colspan="3" rowspan="2">Do not travel along survey lines during or immediately after heavy rain. The Field Survey Manager will track weather forecasts to minimise the risk of vehicles being on site during heavy rains.</td><td colspan="2">Daily operations reports and photos verify no vehicle activity during or immediately after heavy rains.</td></tr>
<tr><td colspan="2">Weather forecast logs are available.</td></tr>
<tr><td colspan="3">Do not create survey lines within the Arrowsmith River riparian corridor (cadastral boundaries) in order to minimise the risk of erosion and sedimentation into the river.</td><td colspan="2">Survey GIS records verify that survey lines avoided the riparian vegetation of the Arrowsmith River.</td></tr>
</table>

<table>
<tr><td colspan="3">Use ATVs in private properties (rather than passenger vehicles) in order to minimise soil compaction.</td><td colspan="2">Photos verify the use of ATVs on private properties.</td></tr>
<tr><td colspan="3">Backfill soil divots created during nodes recovery so as to avoid soil pock-marking.</td><td colspan="2">Daily operations reports note that soil divots are backfilled.</td></tr>
<tr><td colspan="3">Undertake a post-survey inspection along the survey lines to ascertain if soil damage has occurred. Remeliorate any soil damage in accordance with landholder requirements.</td><td colspan="2">Post-survey inspection report and photos.
Photos of rehabilitation efforts.</td></tr>
<tr><th colspan="5">Residual risk assessment</th></tr>
<tr><th colspan="2">Consequence</th><th colspan="2">Likelihood</th><th>Risk ranking</th></tr>
<tr><td colspan="2">Minor</td><td colspan="2">Highly likely</td><td>MEDIUM</td></tr>
<tr><th colspan="5">Demonstration of ALARP</th></tr>
<tr><td colspan="5">A ‘Medium’ residual risk rating is considered to be tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.</td></tr>
<tr><td>Elimination</td><td colspan="4">The potential for soil erosion, rutting or compaction cannot be eliminated, but the control measures aim to minimise these risks.
The Arrowsmith River corridor has been eliminated from the survey design to minimise risks of soil erosion in loamy soils and consequential sedimentation of the river.</td></tr>
<tr><td>Substitution</td><td colspan="4">Balloon tyres have been chosen to be fitted to the vibroseis trucks for use in private properties so as to minimise soil compaction. Such tyres are not suitable for use in areas of native vegetation where the risk of puncture (due to rougher ground, rocks, vegetation) is higher.
In private properties, UTVs will be used as a substitute to passenger vehicles (such as 4WD and utes) off the formed roads and tracks in order to minimise soil compaction.
Lattice considered a traditional orthogonal survey grid over the survey area that would have resulted in survey lines spaced 240 m x 240 m apart. This has been substituted for the use of a 360m x 360 m grid in order to minimise vegetation clearing. The associated reduction in vegetation clearing also minimises soil disturbance.</td></tr>
<tr><td>Engineering</td><td colspan="4">Not applicable.</td></tr>
<tr><td>Administrative</td><td colspan="4">Soil disturbance controls will be addressed in the project induction.
Weather forecasts will be obtained to minimise the risk of working in wet weather.</td></tr>
<tr><th colspan="5">Demonstration of Acceptability</th></tr>
<tr><td>Policy compliance</td><td colspan="4">Beach Environmental Policy objectives are met.</td></tr>
<tr><td rowspan="3">Management system compliance</td><td colspan="4">Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice’s HSEMS and Terrex’s IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.</td></tr>
<tr><td>Lattice HSEMS</td><td colspan="3">• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment.
• HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management.
• Land Management Directive (LAT-HSE-DVE-036) – Section 3, requirements.</td></tr>
<tr><td>Terrex IMS</td><td colspan="3">• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; minimising disturbance and avoiding contamination to soil resources.</td></tr>
<tr><td>Stakeholder engagement</td><td colspan="4">Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4).
To date, no stakeholders have raised concerns with regard to soil disturbance.</td></tr>
<tr><td>Legislative context</td><td colspan="4">The performance standards outlined in this EP align with the requirements of:
• Conservation and Land Management Act 1984 (WA).
○ Conservation and Land Management Regulations 2002 (Regulation 31, Damage to naturally occurring features).</td></tr>
<tr><td>Industry practice</td><td colspan="4">The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.</td></tr>
</table>

	Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)	The performance standards in this table meet these guidelines with regard to: • Section 2.2 (Clearing) – minimising vegetation clearing through selective tree cutting, leaving root stock in place, keep lines away from water bodies • Section 2.3 (Travel) – travel on existing roads, tracks wherever practicable, avoid driving on lines after heavy rains to minimise rutting, rehabilitate all ruts. • Section 2.9 (Vibrators) – consider the use of wide, low ground pressure tyres.
	APPEA CoEP (2008)	The performance standards in this table meet the objectives with regard to: • Onshore geophysical surveys – reducing impacts to soils and surface drainage to an acceptable level and to reduce the risk of impacts to ALARP.
	Environmental management in oil and gas exploration and production (UNEP IE, 1997)	This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities. The performance standards in this table meet the objectives regarding onshore seismic operations with regard to: • Table 5 – avoid excessive compaction on soft ground by vehicle access and baseplate. • Table 5 – avoid or minimise road construction/clearing and disturbance. • Table 5 – minimise vegetation clearing, keep in place root stock.
Environmental context	*Species Recovery Plans*	Not applicable.
Environmental Monitoring		
• Field HSE Advisor will monitor for adherence to EP commitments.		
Record Keeping		
• Daily operations reports. • Photos. • Weather reports. • Induction presentation and attendance register. • As-completed survey GIS records. • Complaints register. • Post-survey inspection report and photos.		

7.1.5 Atmospheric and Dust Emissions

Hazard

The following activities will generate atmospheric and dust emissions:

- Vibroseis buggies and associated survey vehicles travelling over natural landforms (i.e., not sealed roads) and unsealed roads; and
- Fuel combustion from the vibroseis buggies, survey vehicles and generators.

Environmental Risks

The known and potential environmental risks of atmospheric and dust emissions are:

- Nuisance to landholders;
- Nuisance to native wildlife and livestock;
- Localised and temporary decrease in air quality (due to particulate matter from dust generation);
- Smothering of native vegetation and crops; and
- Contribution to the global greenhouse gas (GHG) effect.

Evaluation of Risks

Air emissions

The use of fuel to power vibroseis buggies and vehicle engines will result in small volumes of gaseous emissions of GHG such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), along with non-GHG particulate emissions such as sulphur oxides (SO_X) and nitrous oxides (NO_X). These emissions add to the GHG load in the atmosphere, which adds to global warming potential. The emission of non-GHG particulate matter, such as NO_X and SO_X, can lead to a reduction in local air quality.

The emissions from this survey are no different to those from the various forms of light and heavy vehicle traffic that operate in the area (e.g., local road traffic, farm equipment), and in themselves are insignificant and also do not present a significant increase in air emissions over background levels.

Typically strong offshore winds will aid in rapidly dispersing and diffusing gaseous and particulate emissions.

Dust

Dust is likely to be generated by vibroseis buggies and passenger vehicles travelling along unsealed roads and natural landforms (e.g., fallow farmland), the amount of which will relate to the moisture content at the time and speed of the vehicle. Dust will settle on nearby native vegetation, crops/pasture, but is unlikely to create anything more than a temporary reduction in photosynthetic capacity as any subsequent rainfall event will wash the dust off. This is no different from other light and heavy vehicle traffic travelling over such surfaces, and does not present a significant increase in dust generation over background levels given the small number of trucks and vehicles involved in the survey.

This dust is unlikely to result in significant nuisance to local landholders given the sparsely populated nature of the survey area, the low speed limits employed by survey vehicles and maintaining a minimum distance of 30 m from homesteads. Vibroseis buggies will travel slowly and frequently stop, thereby minimising the opportunities for dust generation.

Risk Assessment

Table 7.8 presents the risk assessment for atmospheric and dust emissions.

Table 7.8. Risk assessment for atmospheric and dust emissions

Summary Details		
Hazards	• Vibroseis buggies and assocaited vehicle travel over natural landforms and unsealed roads. • Fuel combustion.	
Impacts	• Nuisance to nearby residents. • Nuisance to native wildlife and livestock. • Localised and temporary decrease in air quality due to particulate matter. • Smothering of native vegetation and crops. • Contribution to the global GHG effect.	
Extent of Impacts	Dust - localised to the immediate area around vehicles. Emissions - confined to the local and regional airsheds.	
Duration of Impacts	Temporary (duration of the survey).	
Pre-treatment risk assessment		
Consequence	**Likelihood**	**Risk ranking**
Minor	Almost certain	MEDIUM
Environmental Controls and Performance Measurement		
Performance objective	No complaints from local residents regarding air and dust emissions creating a nuisance.	
Performance standard		**Measurement criteria**
Dust generation		

Create source and receiver lines only by mulching (native vegetation) or slashing (crops/pasture), and do not create permanent tracks. The retained plant mass will minimise soil exposure and thus the potential for dust generation.	Daily operations reports and photos verify only vegetation mulching/slashing takes place (not wholesale clearing).
Retain mulched/slashed vegetation in situ to minimise dust generation.	Photos verify that mulched/slashed vegetation is left in situ.
Use existing roads and tracks (including farm tracks) wherever possible to provide access to new survey lines.	Photos verify the use of existing roads and tracks as access points.
Abide by local speed limits on all roads, particularly unsealed roads or farmer access roads. Where speed limits are not clearly signposted, a 40 km/hr limit on unsealed roads, and 10 km/hr in the vicinity of homesteads, will be enforced by Lattice to minimise dust generation.	No complaints from local landholders about dust from excessive vehicle speed.
Do not create temporary or permanent unsealed tracks.	Photos verify no unsealed tracks created.
Air emissions	
Undertake maintenance on the vibroseis buggies in accordance with the PMS to ensure optimum combustion efficiency.	PMS records of the vibroseis trucks indicate servicing is up to date.
Record fuel use for all trucks and vehicles to enable quantification of GHG emissions.	Daily operations reports note refuelling volumes.

Residual risk assessment

Consequence	Likelihood	Risk ranking
Minor	Almost certain	MEDIUM

Demonstration of ALARP

A 'Medium' residual risk rating is considered to be tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.

Elimination	The elimination of dust is not possible given the many unsealed roads in the survey area and the dry conditions likely to prevail during the survey. The elimination of gaseous emissions and particulate matter cannot be eliminated as all vibroseis vehicles currently on the market run on conventional diesel fuel. Explosive sources are likely to produce a better technical survey outcome, but the use of explosives has been eliminated in order to minimise environmental impacts such as air, dust and noise emissions. No excavations or construction activities will be undertaken.
Substitution	Lattice considered a traditional orthogonal survey grid over the survey area that would have resulted in survey lines spaced 240 m x 240 m apart. This has been substituted for the use of a 360m x 360 m grid in order to minimise vegetation clearing. The associated reduction in vegetation clearing also minimises dust generation. Mini-vibroseis buggies were considered for this project (they have lower fuel use compared with standard vibroseis trucks), but not deemed suitable given the rough terrain of the survey area (they are better suited to less rough terrain, such as formed roads, desserts, etc). ATVs will be used off formed tracks on private properties rather than larger utilities.
Engineering	All vibroseis buggies will be maintained in accordance with their PMS to ensure they are operating at peak efficiency.
Administrative	Speed limits will be enforced on unsealed roads. Atmospheric and dust controls will be addressed in the project induction.

Demonstration of Acceptability

Policy compliance	Beach Environmental Policy objectives are met.
Management system compliance	Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice's HSEMS and Terrex's IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.

<table>
<tr><td rowspan="2"></td><td>Lattice HSEMS</td><td>• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment.
• HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management.
• Air Emissions Directive (LAT-HSE-DVE-035) – Section 3, requirements.</td></tr>
<tr><td>Terrex IMS</td><td>• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; minimising the impacts on the environment of waste handling and disposal and pollution.</td></tr>
<tr><td>Stakeholder engagement</td><td colspan="2">Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4).
To date, no stakeholders have raised concerns with regard to atmospheric and dust emissions.</td></tr>
<tr><td>Legislative context</td><td colspan="2">The performance standards outlined in this EP align with the requirements of:
• Environmental Protection Act 1986 (WA).
○ Section 49, Causing pollution and unreasonable emissions.
• National Environment Protection (Ambient Air Quality) Measure (2003).
• National Environment Protection (Air Toxics) Measure (2004).</td></tr>
<tr><td rowspan="4">Industry practice</td><td colspan="2">The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.</td></tr>
<tr><td>Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)</td><td>The performance standards in this table meet these guidelines with regard to:
• Section 2.2 (Clearing) – minimising vegetation clearing through selective tree cutting, leaving root stock in place.
• Section 2.3 (Travel) – travel on existing roads, tracks wherever practicable.
• Section 2.11 (Hazardous materials) – service the exhaust systems of vehicles and equipment on a regular basis to ensure that emissions are kept to appropriate levels.</td></tr>
<tr><td>APPEA CoEP (2008)</td><td>The performance standards in this table meet the objectives with regard to:
• Onshore geophysical surveys – reducing impacts to soils and surface drainage to an acceptable level and to reduce the risk of impacts to ALARP.</td></tr>
<tr><td>Environmental management in oil and gas exploration and production (UNEP IE, 1997)</td><td>This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities.
The performance standards in this table meet the objectives regarding onshore seismic operations with regard to:
• Table 5 – minimise vegetation clearing, keep in place root stock.</td></tr>
<tr><td>Environmental context</td><td>Species Recovery Plans</td><td>Not applicable.</td></tr>
<tr><td colspan="3">Environmental Monitoring</td></tr>
<tr><td colspan="3">• Field HSE Advisor will monitor for adherence to EP commitments.
• Records of fuel use for all project vehicles.</td></tr>
<tr><td colspan="3">Record Keeping</td></tr>
<tr><td colspan="3">• Daily operations reports and photos.
• Induction presentation and attendance register.
• Vibroseis buggies and mulcher PMS records.
• Complaints register.
• Fuel records.</td></tr>
</table>

7.2 Unplanned Events

7.2.1 Unplanned Disruption to Farming Activities

Hazard

The following unplanned activities (as distinct from planned activities agreed with landholders and dealt with through compensation agreements) may risk disturbing farming activities:

- Loss of crops or pasture outside of agreed survey lines;
- Vehicle strike with livestock;
- Interference with optimal cropping and sheep shearing seasons;
- Damage to paddocks.

Risks

The risks of unplanned disruptions to farming activities are:

- Injury or death of livestock (and consequential income losses);
- Reduced crop or pasture yields (and consequential income losses); and
- Nuisance and delays to farm activities (such as harvesting).

Evaluation of Risks

Part of the landholder negotiation process in the project planning phase involves financial compensation to landholders for activities known to have impacts on their farming activities. This section assesses the risks of deviations from the agreed impacts.

There is a potential, albeit very low, that errors with the GPS used in the vibroseis buggies or difficulties encountered by the Line Pointing Surveyor may lead to deviations of this equipment outside the survey lines agreed with individual landholders.

Injury or death of livestock

While working on farmland, the vibroseis buggies and associated vehicles will be travelling at a slow speed. The risk of colliding with livestock (and therefore causing injury or death) at slow speeds is reduced significantly compared with travel at road speeds. Injury or death of livestock ultimately results in undue suffering for the animals concerns and loss of income for the landholder.

Depending on the set up of individual properties and landholder negotiations, it may also be possible to exclude livestock from individual paddocks as the survey proceeds. This would avoid any risk of collision with livestock.

Reduced crop or pasture yields

Surveying outside of agreed survey lines has the potential to damage crops (if already planted) or pasture. Where crops are not in place, the additional soil disturbance may impact the following crop season. This may cause additional financial losses.

Nuisance and delays to farm activities

In consultation with landholders, Lattice has timed the survey to be undertaken outside of peak farming activity times (e.g., after crop harvesting and before sowing, and before sheep shearing, which typically occurs from the start of August through to mid-October).

Consultation with Mallee Land Co (for the mallee carbon sequestration property in the northwest of the proposed survey area) has determined that no clearing of mallee trees will be required to establish source and receiver lines and that existing tracks will suffice. This avoids disruption to farming activities (together with avoiding the loss of sequestered carbon).

Consultation with the landholders for two properties (Wildwood and Southpark) in the northeast of the survey area has also resolved to move several source/receiver lines parallel and adjacent to fence lines and existing tracks to minimise disturbance to wheat cropping.

The nuisance created by slow moving traffic (e.g., the low loader mobilising the vibroseis buggies to location) is largely a subjective one, which may depend on an individual’s time priorities.

Given the light traffic in the roads branching off the Brand Highway within the proposed survey area, and the fact that seismic surveying will not take place within road reserves, it is not proposed to implement traffic controls during the survey. As such, there will be no negligible to minimal traffic delays for landholders in the area using these roads.

Risk Assessment

Table 7.9 presents the risk assessment for disruption to traffic and farm movements.

Table 7.9. Risk assessment for unplanned disruptions to farm activities

Summary Details		
Hazards	• Loss of crops outside of agreed survey lines. • Vehicle strike with stock.	
Risks	• Injury or death of stock. • Reduced crop or pasture yields.	
Extent of risks	Localised to the survey lines.	
Duration of risks	Medium- to long-term (lost income).	
Pre-treatment risk assessment (community)		
Consequence	**Likelihood**	**Risk ranking**
Minor	Possible	MEDIUM
Environmental Controls and Performance Measurement		
Performance objective	Avoid unplanned disruption to farming activities.	

Performance standard	**Measurement criteria**
Consult with all landholders within the proposed survey area to determine an optimal time for surveying to take account for key farm activities (e.g., lambing, sowing and harvesting). • Acquisition is planned to occur immediately after the sowing of wheat crops. • Mallee farm source lines have been re-designed to avoid any loss of trees.	Consultation records verify that Lattice has made all attempts to balance landholder considerations with environmental considerations in terms of survey timing.
Provide landholders with the contact details for the Seismic Field Manager to enable direct communications and the prompt issue resolution.	Consultation records verify that the contact details for the Siesmic Field Manager were supplied to all landholders.
Do not undertake survey work along public road reserves, restricting impacts to local landholders to mobilisation and demobilisation only.	GIS survey records verify that no road reserves have been included in the survey.
Guide the locations for survey acquisition using GPS navigation (under the guidance of the Line Pointing Surveyor) so as to avoid moving beyond agreed areas of disturbance.	As-completed GIS data verifies no variation from planned survey lines.
Manage vehicle movements to and from the survey area and the camp through contractor journey management to minimise the number of vehicles on site.	Daily operations reports verify that journey management is implemented.
Handle landowner complaints in accordance with the project-specific SEP (see Chapter 4).	Enterprise incident management system records verify that landowner complaints are handled in accordance with the SEP.
Induct all project personnel into the requirement to avoid undertaking activities off agreed survey lines.	The project induction includes information regarding the prevention of preventing movements off seismic lines.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Conduct a thorough inspection of each property immediately following completion of all seismic lines on a landowner's property, noting and photographing all impact and ensuring that no survey pegs, flagging, gate signs, equipment or general rubbish has been left behind.	A line clearance report signed by the Terrex representative verifies that inspection was undertaken prior to demobilising from site.

Residual risk assessment (community)		
Consequence	**Likelihood**	**Risk ranking**
Minor	Highly unlikely	LOW

Demonstration of ALARP	
A 'Low' residual risk rating is considered to be tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.	
Elimination	Interactions with operating farm machinery (such as grain harvesters) has been eliminated by optimising the timing of the survey through consultation with individual landholders. Other than mobilisation and demobilisation, interactions with the travelling public have been eliminated by excluding road reserves from the survey design.
Substitution	Lattice considered a traditional orthogonal survey grid over the survey area that would have resulted in survey lines spaced 240 m x 240 m apart. This has been substituted for the use of a 360m x 360 m grid in order to minimise impacts on farm operations (as well as native vegetation clearing). This minimises the amount of land surveyed in each property. The application for the Year 2 permit suspension has been submitted because of concerns surrounding potential impacts to land use. If the application is successful, the survey will be undertaken a time that most landholders have stated minimises impacts to the farming operations (see Sections 1.1 and 3.2.2).
Engineering	GPS technology used by the Line Pointer Surveyor and the vibroseis buggies are highly accurate and, except when there is equipment malfunction (e.g., loss of satellite signal) or operator error, will provide the key means for ensuring that there is no deviation of survey lines.
Administrative	Management controls regarding unplanned disruptions to farming operations will be addressed in the project induction.

Demonstration of Acceptability		
Policy compliance	Beach Environmental Policy objectives are met.	
Management system compliance	Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice's HSEMS and Terrex's IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.	
	Lattice HSEMS	• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment. • HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management. • Communities Directive (LAT-HSE-DVE-026) – Section 4, requirements.
	Terrex IMS	• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; minimising disturbance to livestock, pastoral infrastructure and landholders.
Stakeholder engagement	Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4). To date, several landholders have raised concerns with regard to disruption to farming operations. This is outlined in Section 3.2.2 and Section 4.6.	
Legislative context	There performance standards outlined in this EP align with the requirements of: • *PGERA 1967 (WA).* ○ Sections 17-20 – Compensation to owners and occupiers of private land.	
Industry practice	The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.	
	Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)	The performance standards in this table meet these guidelines with regard to: • Section 2.2 (Clearing) – use existing routes as much as practical.

	APPEA CoEP (2008)	The performance standards in this table meet the objectives with regard to: • Onshore geophysical surveys – reducing impacts to other land users to an acceptable level and to reduce the risk of impacts to ALARP.
	Environmental management in oil and gas exploration and production (UNEP IE, 1997)	This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities. The performance standards in this table meet the objectives regarding onshore seismic operations with regard to: • Table 5 – consult with stakeholders regarding preferred location, use existing access if available.
Environmental context	*Species Recovery Plans*	Not applicable.
Environmental Monitoring		
• On-site environmental advisor will monitor for adherence to EP commitments.		
Record Keeping		
• Stakeholder consultation records. • Daily operations reports and photos. • Induction presentation and attendance register. • Survey GIS data. • Complaints register.		

7.2.2 Introduction of Weeds and Pathogens

Hazard

The following activity may risk the introduction of weeds and pathogens to the proposed survey:

- Survey equipment and vehicles (i.e., mulcher, slasher, vibroseis buggies, passenger vehicles) introducing or spreading local or foreign soil or other organic material (e.g., seeds) through farmland or areas of native vegetation;
- Nodes introducing or spreading local or foreign soil or other organic material; and,
- Mulching and/or slashing of native vegetation opens up areas to weed infestation (due to increasing the 'edge effect').

Risks

The risks of weed and pathogen introduction are:

- Disease and/or death of native vegetation (and consequent loss of fauna habitat); and
- Disease, death or reduced productivity of pasture and/or crops (and consequential financial losses); and
- Disease and/or death of livestock (and consequential financial losses).

Evaluation of Risks

Weeds

Weed seeds or other vegetative matter (present on its own or in soil adhered to vehicle and equipment undercarriages and tyres, or nodes) may be dislodged within the survey area. This includes pasture and environmental weeds known in the area (see Section 5.2.1).

Weeds introduced to a new site may establish themselves and spread into existing areas of farmland or native vegetation. The introduction of weed seeds/vegetative matter to an area does not in itself guarantee its spread; it must survive, grow and reproduce in order for it to spread beyond its initial site of introduction.

The spread of weeds into areas of native vegetation previously free of them may alter the composition of native vegetation communities. Increased competition for resources such as nutrients, water and sunlight, in the absence of natural predators, may result in a reduction in native species diversity and abundance, the severity of which is dependent on the nature of the invading species and resilience of the existing native vegetation community. Weed invasion can also alter fire frequency and intensity (e.g., woody weeds and grasses can introduce a higher fuel load than may be naturally present), with subsequent changes to vegetation community structure and composition, and in turn fauna habitat.

If weeds such as annual ryegrass, present in some of the farming properties in the proposed survey area, are spread from infested properties to non-infested properties, or indeed spread to non-infected parts of the same property, there exists the potential to affect crop yields (and thus farm income) if the ryegrass outcompetes wheat crops or pasture. The degree of risk is dependent on several factors, including the success of weed spread. The spread of weeds into pasture previously free of them may alter the composition of the pasture (i.e., reducing the extent and volume of preferred grazing species), thereby reducing the feed available to domesticated grazing stock (e.g., sheep). This may in turn result in a lower stocking density and reduced income for the landholder.

Pathogens

Phytophthora cinnamomi (‘cinnamon fungus’) is the key pathogen of concern in southwest WA (see Section 5.2.1). While the rainfall band (400-600 mm) that the proposed survey area falls within suggests it presents a low risk for the presence of *P. cinnamomi*, there are some historic confirmed records of the pathogen near Eneabba.

Species belonging to the Proteaceae, Epacridaceae, Fabaceae and Myrtaceae families are most affected (CALM, 2003b). Species in these families, such as banksias, are widespread through the heathland typical of the vegetation found in the proposed survey area. This being the case, if this pathogen was introduced to this region, it could have serious impacts on the structure of the local heathland communities and affect the availability of food sources for species such as Carnaby’s cockatoo (and other species dependent on foraging on banksia nectar and seeds).

There are no published records or reports from landholders in the survey area of cinnamon fungus in the survey area.

Several factors combine to ensure that the risk of spreading weeds and pathogens will be low for this project, and therefore the consequences described above have a low likelihood of occurring:

- Climatic and biophysical conditions of the proposed survey area mean there is an inherently low risk of introduction and spread of *P. cinnamomi*:
  - There are no known mapped occurrences of *P. cinnamomi* in the proposed survey area.
  - Low rainfall (with climate change resulting in lower rainfall, making the region even less conducive to pathogen establishment) (DoE, 2014).
  - Calcareous soils (soils dominated by calcium carbonate) (see Section 5.1.5)
  - The survey is avoiding drainage channels (such as the Arrowsmith River). Water (especially flooding) is a known vector of spread of the pathogen.
  - There are no groundwater dependent ecological communities in the proposed survey area. Areas where groundwater remains close to the survey and areas with perched water tables and wetlands present higher risks.
- The risk of mobilising and creating new infestations is low because of the control measures that will be adopted:
  - All equipment and vehicles will be cleaned of organic matter prior to entering the project area and again when moving between properties.
  - Soils within native vegetation areas will be exposed to a minimum of disturbance due to the line preparation techniques employed.
  - Mulched vegetation will be left in situ – it will not be transported throughout or outside of the survey area.
  - No soil needs to be imported to the project area.
  - Landholders’ requests will be adhered to with regard to farm biosecurity.
  - Lattice has provided one landowner (of the ‘Arrow Hills’ property) with 110 litres of herbicide (Glyphosphate 450) to assist in the eradication of an outbreak of African love grass, in line with his normal farm practices.

Risk Assessment

Table 7.10 presents the risk assessment for the introduction of weeds and pathogens.

Table 7.10. Risk assessment for the introduction of weeds and pathogens

Summary Details	
Hazards	• Survey equipment and vehicles introducing foreign, or spreading local soil or other organic material over road verges and other areas. • Nodes introducing or spreading local or foreign soil or other organic material • Slashing of vegetation.
Risks	• Disease and/or death of native vegetation. • Disease, death or reduced productivity of pasture and/or crops.
Extent of risks	May spread beyond the road verges of the survey lines into adjacent vegetation.
Duration of risks	May be long-term if weeds or pathogens become established.

Pre-treatment risk assessment		
Consequence	**Likelihood**	**Risk ranking**
Major	Possible	HIGH

Environmental Controls and Performance Measurement	
Performance objective	Prevent the introduction or spread of weeds or pathogens into or throughout the survey area from survey equipment or vehicles.
Performance standard	**Measurement criteria**
Ensure that all Lattice, Terrex and sub-contractor equipment and vehicles arrive on site ready to commence operations with a valid Vehicle and Mobile Plant Hygiene Inspection Report.	Completed Vehicle and Mobile Plant Hygiene Inspection Reports are available for all equipment and vehicles.
Clean down facilities (for vehicles and footwear) will be available at the laydown sites and Iluka Resources sites (see Section 3.6.4) and available for the duration of the project.	Date-stamped photos verify the establishment and operation of clean down facilities.
All Lattice, contractor and sub-contractor equipment and vehicles will be subject to clean down procedures upon entry to a new property in accordance with landholder requests. • Blow down will occur in preference to wash down where practicable, so as to avoid creating conditions suitable for *Phytopthora cinnamomi* (warm, moist soil conditions). • Mobile clean down stations (for vehicles and footwear) will be provided to facilitate this. • An accredited certifier (trained with Clean and Inspect Vehicle and Machinery certification, AHCBIO201A, or equivalent) will be present to inspect equipment and vehicles and certify them clean prior to proceeding to the next property.	Completed clean down records for all equipment and vehicles are available. Date-stamped photos verify the establishment and operation of mobile clean down facilities. Weed inspection accreditation certification is available for inspectors.
Do not drive over areas other than designated access roads and tracks and survey lines (i.e., not over roadside vegetation or through the riparian vegetation of the Arrowsmith River). • Access across the Arrowsmith River is via existing causeways only.	Daily operations reports verify no vehicle access beyond formed roads, access tracks and survey lines.
Inspect and clean each node prior to deployment.	Daily operations reports verify that nodes are inspected and cleaned prior to each deployment.
Retain mulched/slashed vegetation in situ so as to prevent the potential spread of weeds and pathogens.	Daily operations reports verify mulched/slashed vegetation remains on site.

Avoid preparing survey lines and undertaking survey acquisition avoided during periods of heavy rain (and immediately afterwards, while pooled water is present and ground conditions are too soft) to prevent soil rutting/churning (which in turn promote conditions favouring weed and pathogen invasion).	Daily operations reports verify that line preparation or survey work is avoided during and immediately after heavy rain.
Induct all project personnel into weed and pathogen management requirements prior to the commencement of line clearing.	The project induction includes information regarding weed and pathogen management procedures.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
In the event that plant seedlings are used for active survey line rehabilitation, they will be certified as *Phytophthora*-free.	Certification is provided with seedlings verifying that the growing medium is *Phytophthora*-free.

Residual risk assessment

Consequence	Likelihood	Risk ranking
Major	Highly unlikely	MEDIUM

Demonstration of ALARP

A 'Medium' residual risk rating is considered to be tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.

Elimination	Eliminating the risk of introducing or spreading weeds or pathogens is not possible. However, the need to clear native vegetation for the survey has been minimised as far as practicable (see Section 3.5) and the need to slash pasture or crops has been minimised as far as practicable by aiming to restrict work to times where paddocks are fallow (and thus the risks of introducing or spreading weeds or pathogens greatly reduced). Minimising the amount of clearing reduces the creation of disturbed soil, thus reducing the potential for weed invasion and spread.
Substitution	Not applicable.
Engineering	Mobile clean down facilities are available at the laydown area for the duration of the survey and at individual properties (as required).
Administrative	Completed Vehicle and Mobile Plant Hygiene Inspection Reports will be completed for all equipment and vehicles prior to entering the project area. Weed inspection accreditation certification requirements are in place for inspectors. Weed and pathogen management controls will be addressed in the project induction.

Demonstration of Acceptability

Policy compliance	Beach Environmental Policy objectives are met.	
Management system compliance	Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice's HSEMS and Terrex's IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.	
	Lattice HSEMS	• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment. • HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management. • Biodiversity Management Directive (LAT-HSE-DVE-021) – Section 3, requirements.
	Terrex IMS	• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; avoid the introduction and spread of exotic species.
Stakeholder engagement	Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4). To date, one stakeholders has raised concerns with regard to the spread of annual rye grass on his property as a result of the survey. To minimise the risk of this happening, Lattice has provided this landholder with 110 litres of herbicide to assist in eradicating this weed.	

Legislative context	The performance standards outlined in this EP align with the requirements of: • *Biosecurity and Agriculture Management Act 2007* (WA). • *Biodiversity Conservation Act 2016* (WA). • *Conservation and Land Management Act 1984* (WA).	
Industry practice	The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.	
	Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)	The performance standards in this table meet these guidelines with regard to: • Section 2.2 (Clearing) – minimising vegetation clearing through selective tree cutting, leaving root stock in place. • Section 2.3 (Travel) – travel on existing roads, tracks wherever practicable.
	APPEA CoEP (2008)	The performance standards in this table meet the objectives with regard to: • Onshore geophysical surveys – reducing the risk of introduction (or spread) of weeds, pests and pathogens to an acceptable level and to reduce the risk of impacts to ALARP.
	Environmental management in oil and gas exploration and production (UNEP IE, 1997)	This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities. The performance standards in this table meet the objectives regarding onshore seismic operations with regard to: • Table 5 – minimise vegetation clearing, keep in place root stock.
	Phytophthora cinnamomi and disease caused by it, Volume 1 – Management Guidelines (CALM, 2003b)	The controls outlined in this section take into consideration the management of uninfested and infested areas outlined in Sections 7 & 8 of this document.
	Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomi (DoE, 2014)	The controls outlined in this section take into consideration the measures outlined in 'Managing the threat' in Section 1.4 of this document.

Environmental context	*Species Recovery Plans*	The Conservation Advice/Recovery Plans for the following threatened species have been taken into account in the development of the EPS: • Scaly-butt mallee (*E. leprophloia*) – lists clearing on private land as a threat (TSSC, 2016a). • Irwin's conostylis (*Conostylis dielsii*) - lists weeds and edge effects, along with access for oil drilling, are threats (TSSC, 2016b). • Small-flowered conostylis (*Conostylis micrantha*) - lists edge effects, weed invasion and clearing for oil drilling as threats (TSSC, 2016c). • Red snakebush (*Hemiandra gardneri*) - lists edge effects and weed invasion and competition as threats (TSSC, 2016d). • Long-flowered nancy (*Wurmbea tubulosa*) - lists weed invasion and habitat degradation/loss as threats (TSSC, 2016e). • Yandanooka mallee (*Eucalyptus crispata*) – lists habitat loss, disturbance and modification, and *P. cinnamomi* as threats (DEHWA, 2008a). • Sandplain duck orchid (*Paracaleana dixonii*) – lists land clearing activities and *P. cinnamomi* as threats (though susceptibility is thought to be low) (DEWHA, 2008b). • Star sun-orchid (*Thelymitra stellata*) - lists increasing fragmentation of habitat and invasion by exotic weeds as threats (DEWHA, 2008c). • Eneabba mallee (*E. impensa*) – lists disease (unknown type) as a threat (TSSC, 2015a). • *Tetratheca nephelioides* – lists land clearing for mining as a threat (DSEWPC, 2013a) (DSEWPC, 2013a, 2009). • Prostrate flame flower (*Chorizema humile*) – lists weed competition as a threat (DEC, 2009). • Hidden beard heath (*Leucopogon obtectus*) – lists weed competition as a threat (DEC, 2006). Actions identified in these plans, such as undertaking surveys to identify populations of threatened species, have been adopted by the project to inform the development of appropriate controls. The adoption of hygiene clean down procedures aims to avoid the introduction or spread of weeds and pathogens.
Environmental Monitoring		
• Field HSE Supervisor will monitor for adherence to EP commitments. • Visual monitoring (and clean down) of equipment and vehicles to ensure no introduction of foreign soil or vegetative matter.		
Record Keeping		
• Completed Vehicle and Mobile Plant Hygiene Inspection Reports. • Date-stamped photos. • Daily operations reports. • Induction presentation and attendance register. • Weed inspection accreditation certification. • Completed clean down records.		

7.2.3 Disturbance to Cultural Heritage

Hazard

The following activities risk interference with indigenous and non-indigenous cultural heritage:

- Physical disturbance to intact areas of native vegetation; and
- Soil disturbance for the placement of nodes.

Risks

The risks of interference with indigenous and non-indigenous cultural heritage are:

- Damage to *in situ* cultural heritage sites; and
- Permanent loss of cultural heritage sites.

Evaluation of Risks

Indigenous Cultural Heritage

There are no Aboriginal cultural heritage sites listed on the AHIS (see Section 5.4.1) within or immediately adjacent to the survey area. As such, there will be no impacts to currently registered Aboriginal sites.

The Aboriginal Heritage Due Diligence Guidelines (DAA, v3, April 2013) classifies land clearing over more than a small area as an activity that causes 'significant disturbance' to land. The risk matrix provided in Schedule 2 of the DD (2013) guideline indicates the proposed survey would be classified as a medium risk activity, which triggers the recommendation to refer to the AHIS database (completed), consult with the relevant Aboriginal people (completed) and undertake an Aboriginal heritage survey or modify the project to avoid or minimise impact (completed – avoidance of the Arrowsmith River).

While Lattice acknowledges that unknown/unrecorded artefacts may be uncovered during the course of the survey, as advised during consultation with traditional owners, the risk of this occurring is assessed to be low given that the survey will avoid undertaking activities along the Arrowsmith River (most archaeological sites are located adjacent to, or within 1 km of water).

Non-indigenous Cultural Heritage

There are no non-indigenous cultural heritage sites listed in the DPLH's State Register of Heritage Places (see Section 5.4.2) within or immediately adjacent to the proposed survey area. As such, there will be no impacts to currently registered non-indigenous cultural heritage sites (e.g., buildings, structures).

Unknown artefacts may be uncovered, though the risk of this occurring is considered to be low given the dominance of cropping in the proposed survey area. This is because soil disturbance created by cropping is likely to have previously uncovered or destroyed heritage artefacts (if present).

Risk Assessment

Table 7.11 presents the risk assessment for disturbance to cultural heritage.

Table 7.11. Risk assessment for cultural heritage disturbance

Summary Details		
Hazards	• Physical disturbance to intact areas of native vegetation. • Soil disturbance for the placement of nodes.	
Risks	• Damage to *in situ* cultural heritage sites. • Permanent loss of cultural heritage sites.	
Extent of risks	Localised to cultural heritage site.	
Duration of risks	Permanent (if damaged or permanently lost).	
Pre-treatment risk assessment		
Consequence	**Likelihood**	**Risk ranking**
Serious	Possible	MEDIUM
Environmental Controls and Performance Measurement		
Performance objective	Avoid damage to recorded indigenous and non-indigenous cultural heritage sites occurs.	

<table>
<tr><th>Performance standard</th><th>Measurement criteria</th></tr>
<tr><td>Invite traditional owner representatives to undertake a field inspection prior to or during the survey in order to ascertain and record locations of unlisted cultural heritage significance.
• Where sites of significance are identified, determine measures to protect such sites from the survey.</td><td>Stakeholder consultation records verify that traditional owner representatives have inspected the survey area.</td></tr>
<tr><td>Avoiding undertaking line clearing and survey activities along the Arrowsmith River corridor so as to avoid the potential for encountering unrecorded indigenous cultural heritage sites.</td><td rowspan="2">Daily reports and as-completed GIS data verify no activity within the Arrowsmith River corridor takes place.</td></tr>
<tr><td>Guide the locations for seismic line preparation using GPS navigation (under the guidance of the Line Pointing Surveyor) so as to avoid pre-determined sites of sensitivities (e.g., cadastral boundaries of the Arrowsmith River).</td></tr>
<tr><td rowspan="2">Where unrecorded surface indigenous sites are suspected/noted by survey personnel, the following protocol will be followed:
• Stop work in that location (and 20 m either side of the suspect/known site).
• Erect bunting (or similar) around site to prevent entry.
• Contact Lattice’s Senior Access Advisor (0423 092 774) for advice.
• Report the potential find to the Registrar at the WA Department of Aboriginal Affairs (DAA) (https://www.daa.wa.gov.au/heritage/site-preservation/report-a-site/).
• Prepare observation report and log in the enterprise incident management system.</td><td>Content of project induction verifies that the cultural heritage protocol is addressed.</td></tr>
<tr><td>Incident report is prepared and available in the enterprise incident management system.</td></tr>
<tr><td rowspan="2">Induct all project personnel into the cultural heritage management requirements prior to the commencement of line clearing.</td><td>The project induction includes information regarding the prevention of vegetation clearing.</td></tr>
<tr><td>Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.</td></tr>
</table>

Residual risk assessment

Consequence	Likelihood	Risk ranking
Serious	Remote	LOW

Demonstration of ALARP

A ‘Low’ residual risk rating is considered to be tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.

Elimination	It is impossible to eliminate the possibility that cultural heritage places may be impacted by the survey given that traditional owners have advised that not all sites of cultural heritage significance are registered in public databases. Any places noted as ‘significant’ during the field inspection by the Amangu people will be either recorded and removed from the survey area or navigated around using Amangu people scouting monitors, where possible.
Substitution	Not applicable.
Engineering	Not applicable.
Administrative	Cultural heritage management controls will be addressed in the project induction.

Demonstration of Acceptability

Policy compliance	Beach Environmental Policy objectives are met.
Management system compliance	Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice’s HSEMS and Terrex’s IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.

	Lattice HSEMS	• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment. • HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management. • Cultural Heritage Directive (LAT-HSE-DVE-034) – Section 3, requirements.
	Terrex IMS	• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; avoid disturbance to sites of cultural and heritage significance.
Stakeholder engagement	Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4). The traditional owners have advised Lattice that unregistered cultural heritage places are likely to occur in the survey area.	
Legislative context	The performance standards outlined in this EP align with the requirements of: • *Aboriginal Heritage Act 1972* (WA). ○ *Section 17 – it is an offence to excavate, destroy, damage, conceal or in any way alter an Aboriginal site.* • *Heritage of Western Australia Act 1990* (WA) (may be superseded by the Heritage Act, currently introduced as the Heritage Bill 2017).	
Industry practice	The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.	
	Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)	The performance standards in this table meet these guidelines with regard to: • Section 2.2 (Clearing) – minimising vegetation clearing through selective tree cutting (minimising soil disturbance). • Section 2.3 (Travel) – travel on existing roads, tracks wherever practicable (minimising soil disturbance).
	APPEA CoEP (2008)	The performance standards in this table meet the objectives with regard to: • Onshore geophysical surveys – avoid disturbance of sites of cultural heritage significance where practicable and reduce the risk to cultural heritage value to ALARP and to an acceptable level.
	Environmental management in oil and gas exploration and production (UNEP IE, 1997)	This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities. The performance standards in this table meet the objectives regarding onshore seismic operations with regard to: • Table 5 – minimise vegetation clearing, keep in place root stock (minimising soil disturbance).
Environmental context	*Aboriginal Heritage Due Diligence Guidelines (DAA, v3, April 2013)*	Lattice has reviewed the Aboriginal Heritage Due Diligence Guidelines (DAA, v3, April 2013) and has met the due diligence requirements outlined in Section 2.4: a) Assessed the landscape where the activity is to take place. b) Assessed the proposed activity and the potential impact on the landscape. c) Searched the AHIS. d) Consulted with the relevant Aboriginal people. e) Agreed to an Aboriginal heritage survey (awaiting further consultation with the Amangu traditional owners).
Environmental Monitoring		
• Field HSE Supervisor will monitor for adherence to EP commitments. • Line pointing surveyor will direct line clearing to avoid sites of sensitivity (if flagged by the Amangu traditional owners).		

Record Keeping
• Stakeholder consultation records. • Daily operations reports. • As-completed GIS data. • Induction and attendance records. • Incident reports.

7.2.4 Reduction of Visual Amenity

Hazard

The following activity risks reducing the visual amenity in the proposed survey area:

- Presence of vibroseis buggies, mulcher and associated survey equipment and vehicles;
- Presence of nodes at ground level;
- Mulched (or slashed) vegetation creating interruption in the landscape; and
- Fire (see Section 7.2.6).

Risks

The risks of reduced visual amenity include:

- Visual disturbance to landholders in the proposed survey area and local residents.

Evaluation of Risks

The issue of visual amenity is a subjective one, with one individual likely to have a different opinion to the other. Nevertheless, the presence of the vibroseis buggies and cleared survey lines may reduce local landholder perceptions or experience of the region.

Potential reductions to visual amenity are likely to be higher for landholders within the proposed survey area than the general public given the survey is undertaken predominantly within private properties (and Crown land that is not publicly frequented). As the survey area is located distant from the coastline, survey activity will not interfere with views to or along the coast.

There are limited elevated sites (e.g., rises, hills, mountain ranges) surrounding the proposed survey area that allow views over parts of or all of the survey area. As such, there are limited opportunities for the loss of visual amenity from public vantage points.

Survey lines

Potential risks to the visual experience of local residents and the travelling general public are considered to be minimal and limited to lines of sight created by the mulched north-south orientated source lines south of Lovegrove Road. The length of exposure along Lovegrove Road is about 7 km, which would take 4-5 minutes to traverse by vehicle, depending on the speed of travel. The creation of ‘dog legs’ where survey lines intersect road reserves will minimise this impact to local residents and the travelling public.

Activities will not be visible from nearby tourist attractions, such as the Western Flora Park located off the Brand Highway. The timing of the survey will avoid the peak wildflower flowering season, further minimising potential impacts to tourists and the travelling public at this location and others. Overall, the creation of survey lines is considered to have a low risk of visual disturbance.

Receiver nodes

The nodes are a temporary installation along the receiver lines and will be in place in a given location for periods of the survey until recorded on and moved to the next location. They are unlikely to result in more than a temporary loss of visual amenity. The nodes are low to the ground and will be visible only to landholders within the survey area, so the risk of visual intrusion is low.

Associated activities

The presence of mulchers and associated survey equipment and vehicles will be temporary in any given location, and visible either entirely or mostly only to local landholders (not the public). They are not out of place in an agricultural landscape and are unlikely to create a loss of visual amenity.

Traffic management signage is unlikely to be required given that the survey will be undertaken entirely within private land, so this avoids further visual disturbance along roadways.

Risk Assessment

Table 7.12 presents the risk assessment for the reduction to visual amenity.

Table 7.12. Risk assessment for reduction to visual amenity

<table>
<tr><th colspan="3">Summary Details</th></tr>
<tr><td>Hazards</td><td colspan="2">• Presence of vibroseis buggies, mulcher and associated survey equipment and vehicles.
• Presence of nodes at ground level.
• Mulched (or slashed) vegetation creating interruptions in the landscape.</td></tr>
<tr><td>Risks</td><td colspan="2">• Visual disturbance to landholders and local residents.</td></tr>
<tr><td>Extent of risks</td><td colspan="2">Limited primarily to areas of vegetation mulching/slashing.
Line of sight down source lines visible from Lovegrove Road.</td></tr>
<tr><td>Duration of risks</td><td colspan="2">Temporary – less than a day or two at most locations for survey equipment and nodes.
Long-term) – creation of survey lines through native vegetation will take several years (~5-10) to regrow and attain pre-disturbance cover.</td></tr>
<tr><th colspan="3">Pre-treatment risk assessment (community)</th></tr>
<tr><th>Consequence</th><th>Likelihood</th><th>Risk ranking</th></tr>
<tr><td>Minor</td><td>Possible</td><td>MEDIUM</td></tr>
<tr><th colspan="3">Environmental Controls and Performance Measurement</th></tr>
<tr><td>Performance objective</td><td colspan="2">No complaints from landowners within the survey area or local residents regarding visual amenity.</td></tr>
<tr><th colspan="2">Performance standard</th><th>Measurement criteria</th></tr>
<tr><td colspan="2">Do not undertake vegetation clearing in areas of visibility to the public (e.g., road reserves, conservation reserves).</td><td>As-completed GIS data (and photos) confirms survey lines were not created in areas of public visibility.</td></tr>
<tr><td colspan="2">Mulch vegetation rather than clearing it (i.e., using traditional methods, such as bulldozing) or rolling it to enable rapid regeneration and restoration to its former visual condition.</td><td>Date-stamped photos verify that vegetation was mulched (rather than rolled or bulldozed).</td></tr>
<tr><td colspan="2">Do not create permanent access tracks.</td><td>Date-stamped photos verify that permanent access tracks were not created.</td></tr>
<tr><td colspan="2">Do not install traffic management signage.</td><td>Date-stamped photos verify that traffic management signage was not erected.</td></tr>
<tr><td colspan="2">Recover nodes as soon as practicable upon completion of the source line.</td><td>Daily operations reports verify the rapid recovery of nodes.</td></tr>
<tr><td colspan="2">Create ‘doglegs’ when mulching native vegetation at public road verges (e.g., Lovegrove Road) so as to minimise the line-of-sight distance.</td><td>As-completed GIS data (and photos) confirm the creation of dog legs at public road verges.</td></tr>
<tr><td colspan="2">Record complaints regarding visual intrusion into the enterprise incident management system, and investigate (and where possible, resolve) these in accordance with the Lattice Incident Management Directive (LAT-RMS-DVE-006).</td><td>Complaint is recorded and available in the enterprise incident management system.</td></tr>
<tr><td colspan="2" rowspan="2">Induct all project personnel into the visual amenity management requirements prior to the commencement of line clearing.</td><td>The project induction includes information regarding managing visual amenity.</td></tr>
<tr><td>Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.</td></tr>
<tr><th colspan="3">Residual risk assessment (community)</th></tr>
<tr><th>Consequence</th><th>Likelihood</th><th>Risk ranking</th></tr>
</table>

<table>
<tr><td>Minor</td><td colspan="2">Unlikely</td><td>LOW</td></tr>
<tr><td colspan="4">Demonstration of ALARP</td></tr>
<tr><td colspan="4">A ‘Low’ residual risk rating is considered to be tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.</td></tr>
<tr><td>Elimination</td><td colspan="3">Visual intrusion from the project cannot be entirely eliminated, however the risks to the public are largely eliminated by restricting survey activities to mostly private land (and Crown land that is not publicly frequented).</td></tr>
<tr><td>Substitution</td><td colspan="3">The use of smaller vibroseis buggies (e.g., EnviroVibes) was considered, but in the rugged terrain of the proposed survey, there are limitations in their use and they are unlikely to achieve the technical requirements of the survey. They are not significantly smaller than the proposed vibroseis buggies, and therefore do not significantly reduce visual intrusion.</td></tr>
<tr><td>Engineering</td><td colspan="3">Not applicable.</td></tr>
<tr><td>Administrative</td><td colspan="3">Visual amenity management controls will be addressed in the project induction.</td></tr>
<tr><td colspan="4">Demonstration of Acceptability</td></tr>
<tr><td>Policy compliance</td><td colspan="3">Beach Environmental Policy objectives are met.</td></tr>
<tr><td rowspan="3">Management system compliance</td><td colspan="3">Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice’s HSEMS and Terrex’s IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.</td></tr>
<tr><td>Lattice HSEMS</td><td colspan="2">• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment.
• HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management.
• Land Management Directive (LAT-HSE-DVE-036) – Section 3, requirements.</td></tr>
<tr><td>Terrex IMS</td><td colspan="2">• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; minimise the visual impact of operations.</td></tr>
<tr><td>Stakeholder engagement</td><td colspan="3">Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4).
To date, no stakeholders have expressed concerns with regard to potential reductions in visual amenity.</td></tr>
<tr><td>Legislative context</td><td colspan="3">No applicable legislation.
There are no visual amenity overlays for the proposed survey area under the local planning strategies:
• Shire of Three Springs – no interaction or conflict, as there are no strategies regarding landscape or visual amenity. Farmland is zoned for ‘rural’ and the conservation reserve is zoned ‘environmental conservation reserve.’
• Shire of Irwin – Policy Area D (PD1.3, Protection and enhancement of the landscape quality of the policy area) – no interaction or conflict. Farmland is zoned for ‘general farming’ and the conservation reserve is zoned ‘conservation.’</td></tr>
<tr><td rowspan="3">Industry practice</td><td colspan="3">The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.</td></tr>
<tr><td colspan="2">Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)</td><td>The performance standards in this table meet these guidelines with regard to:
• Section 2.2 (Clearing) – minimising the width of clearing, leave root stock in place to encourage better regeneration, use existing access roads wherever practical.</td></tr>
<tr><td colspan="2">APPEA CoEP (2008)</td><td>The performance standards in this table meet the objectives with regard to:
• Onshore geophysical surveys – reduce visual impacts of seismic survey operations to ALARP and to an acceptable level.</td></tr>
</table>

	Environmental management in oil and gas exploration and production (UNEP IE, 1997)	This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities. The performance standards in this table meet the objectives regarding onshore seismic operations with regard to: • Table 5 – minimise vegetation clearing, minimise survey line width, use 'dog legs' (reducing visual disturbance).
Environmental context	*Local government guidelines*	There are no requirements in the Shire of Three Springs or Shire of Irwin planning schemes regarding visual amenity management (see 'Legislative Context' above).
Environmental Monitoring		
• On-site HSE Supervisor will monitor for adherence to EP commitments.		
Record Keeping		
• Daily operations reports. • As-completed GIS data. • Date-stamped photos. • Induction and attendance records. • Incident reports.		

7.2.5 Ignition of Wildfire

Hazard

The following activities risks fire ignition and creation of a wildfire:

- Hot vehicle mufflers or exhaust igniting dry vegetation (native or pasture);
- Mechanical or electrical failure of equipment;
- Mulching activity; and
- Discharge of lit cigarette butts into cured vegetation.

Risks

The risks associated with wildfire are:

- Injury or death of humans;
- Damage to/loss of infrastructure (e.g., houses, sheds, fencing);
- Loss of grazing pasture and livestock (disturbance to landholder activities and loss of farming income);
- Loss of native vegetation (and fauna habitat);
- Injury or death of native fauna;
- Increased erosion risk from scorched earth;
- Reduced visual amenity (see also Section 7.2.5); and
- Excessive atmospheric emissions (see Section 7.1.5).

Evaluation Risks

While the risks of a fire igniting as a result of the survey are remote, the consequences are high.

Injury or death of humans

Injury or death of humans (primarily project personnel) is always a risk when there is fire ignition and subsequent wildfire. This is primarily an occupational health and safety issue that is addressed in the project Emergency Response Plan (ERP).

Loss of grazing pasture and/or livestock, loss of infrastructure

Fire in the survey area would risk the loss of grazing pasture and livestock. In dry periods, when the water content of pasture grasses is low, fire is likely to spread quickly beyond the ignition site and travel quickly through the environment. This would have obvious financial consequences for farmers in terms of lost pasture and livestock, the cost of replacing livestock and replanting pasture, lost production and the cost of repairing or replacing damaged or burned infrastructure such as sheds, fences, water tanks/troughs, etc. The degree of such losses is dependent on the area affected.

Loss of native vegetation and fauna habitat

The native heathland vegetation in the proposed survey area is dominated by sclerophyllous species (such as banksias and eucalypts) that have a high oil content, making them particularly susceptible to fire. Bushfire is a natural part of the ecosystem. However, too frequent, broad-scale or very hot fires can negatively impact vegetation communities and fauna habitats.

The heathland vegetation communities readily regrow after fire via lignotubers (just below the soil surface) and seed fall (many seeds require fire and/or smoke to germinate). Fire will therefore cause a temporary, albeit potentially widespread, loss of native vegetation communities until vegetation regrows. Post-fire vegetation community composition will vary from those of the pre-fire communities (due to loss of canopy, with more sunlight and water reaching the soil) until such time as canopy cover and other factors return the community to a similar pre-fire composition and condition. Very hot fire (those with a high fuel load) generally kill environmental weeds and allow native pioneer species and others (such as orchids) to thrive in the absence of a dense canopy.

When large areas are impacted by fire, there is a risk of local extinctions or rendering large tracts of habitat as temporarily unsuitable for a particular species or for breeding. For example, both chuditch and malleefowl populations are negatively impacted by broad-scale fire, with malleefowl not breeding for many years after fire (DEC, 2012; Benshemesh, 2007). In a fragmented landscape, negative impacts may be exacerbated, as fauna are less able to move between vegetated patches to recolonize after fire. Slow-moving animals (such as lizards) or animals that are site-restricted or have small home ranges may not be able to move away from a fire front and therefore perish as a result.

Increased erosion risk

The complete or partial removal of vegetation canopy cover resulting from fire means that soil is left exposed to wind and rain, increasing the potential for erosion. The sandy nature of the soil in the proposed survey area (see Section 5.1.4) makes it especially prone to erosion, while the winds of the region (see Section 5.1.1) exacerbates this risk. Given the reasonably flat nature of the majority of the proposed survey area and the absence of permanent water courses, water erosion and sedimentation to waterways is considered to be a low risk.

Reduction of visual amenity

Fire and its effects is ubiquitous in the Australian environment and something that most people are familiar with and accepting of. This is certainly true for the natural environment. In terms of the visual impact of fire on farming properties, this is less so. The visual reminder of the fire (e.g., scorched earth, rubble and so forth), combined with financial impacts of fire, may lead to individuals or families experiencing mental health issues.

Risk Assessment

Table 7.13 presents the risk assessment for the ignition and spread of wildfire.

Table 7.13. Risk assessment for ignition of wildfire

Summary Details	
Hazards	• Hot vehicle mufflers or exhaust igniting dry vegetation (native or pasture). • Mechanical or electrical failure of equipment. • Mulching activity. • Discharge of lit cigarette butts into cured vegetation.
Risks	• Injury or death of humans. • Damage to/loss of infrastructure (e.g., houses, sheds, fencing). • Loss of grazing pasture and livestock (disturbance to landholder activities and loss of farming income). • Loss of native vegetation (and fauna habitat). • Injury or death of native fauna. • Increased erosion risk from scorched earth. • Reduced visual amenity. • Excessive atmospheric emissions.

Extent of risks	Small and localised (for an extinguished spot fire) to extensive (large pasture grass or heathland fire, which may or may not extend beyond the boundary of the proposed survey area).		
Duration of risks	Short-term (the duration of the fire) to medium-term (time required to rebuild lost infrastructure or for vegetation to reestablish).		
Pre-treatment risk assessment			
Category	**Consequence**	**Likelihood**	**Risk ranking**
Environmental	Major	Likely	SEVERE
Community	Major	Likely	SEVERE
Environmental Controls and Performance Measurement			
Performance objective	Avoid wildfire resulting from the survey.		

Performance standard	**Measurement criteria**
Preparedness	
Do not undertake any survey activities during days of declared Total Fire Ban (TFB).	Daily operations report verifies that work was not undertaken during days of TBF.
Monitor local/regional weather conditions on a daily basis through the BoM (e.g., http://www.bom.gov.au/wa/forecasts/central-west.shtml) and WeatherZone (e.g., http://www.weatherzone.com.au/wa/central-west/eneabba) websites.	Daily weather forecasts are available.
Conduct daily toolbox meetings to alert the workforce to the fire risk level for the day and reinforce fire management controls.	Daily operations report verifies that toolbox meeting was conducted.
Keep a fire cart (carrying 500 litres of water and associated pumps and hoses) on site with line clearing equipment at all times. Train personnel in the use of this equipment.	Contract/invoice and photos verify the use of a fire cart during the survey.
Undertake an emergency response drill prior to and/or during the line clearing activities commencing to test personnel knowledge of procedures.	Emergency response report verifies that a drill was undertaken.
Equip vibroseis buggies and all other vehicles with portable fire extinguishers (9 kg water and a 1-2.5 kg dry powder) and shovel/pick.	Photos verify that deployment vehicles are fitted with portable fire extinguishers.
Equip the mulcher operator and fire cart operator with fully operational VHF and/or UHF radio transceivers, with the water cart operator maintaining fire watch on the appropriate channel.	Operational reports note testing of radios to ensure they are operational.
Inspect the underside of viboseis buggies and vehicles when moving between properties and remove any accumulated vegetation.	Completed weed hygiene inspection reports verify inspections (and cleaning) were undertaken.
Consult with the DFES Geraldton office immediately prior to the commencement of the survey, and regularly during the survey, to ensure that they are aware of survey timing and have personnel available to assist with fire fighting at the time of the survey.	Consultation records verify consultation with local fire authorities has taken place.
Establish a call-off contract, agreement (or similar) with an aerial fire-fighting contractor so that access to aerial fire fighting capabilities are readily available to fight a wildfire.	Call-off contract or similar is available.
Do not establish campfires or barbeques within the survey area.	No incident reports of campfires or barbeques started by survey crew in the survey area.
Restrict cigarette smoking to formed roads and tracks, unless landowners request more stringent measures. Provide cigarette butt receptacles to smokers, which are to be stored within vehicles, with the contents then disposed of appropriately at the accommodation or laydown yard.	Photos verify that cigarette butt bins are provided to smokers.
Induct all project personnel into the visual amenity management requirements prior to the commencement of	The project induction includes information regarding managing visual amenity.

<table>
<tr><td colspan="2">line clearing.</td><td colspan="2">Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.</td></tr>
<tr><td colspan="4">Response</td></tr>
<tr><td colspan="2">Apply water from the water cart or use fire extinguishers to extinguish any spot fires.</td><td colspan="2">Incident report verifies that water cart and/or fire extinguishers were used to extinguish fire.</td></tr>
<tr><td colspan="2">Where a spot fire escapes and has the potential to become a wildfire, undertake the following:
• Implement the ERP:
○ Call the DFES Geraldton office (08-9956 6000) and police (131 444).
○ Notify Lattice.
○ Evacuate all personnel from the area, including landholders.
• Place the aerial fire fighting contractor on notice to attend the scene.</td><td colspan="2">Incident report verifies that procedures from the ERP were implemented.</td></tr>
<tr><td colspan="2">Record incidents into the enterprise incident management system, and investigate (and where possible, resolve) these in accordance with the Lattice Incident Management Directive (LAT-RMS-DVE-006).</td><td colspan="2">Incident is recorded and available in the enterprise incident management system.</td></tr>
<tr><th colspan="4">Residual risk assessment</th></tr>
<tr><th>Category</th><th>Consequence</th><th>Likelihood</th><th>Risk ranking</th></tr>
<tr><td>Environmental</td><td>Major</td><td>Unlikely</td><td>MEDIUM</td></tr>
<tr><td>Community</td><td>Major</td><td>Unlikely</td><td>MEDIUM</td></tr>
<tr><th colspan="4">Demonstration of ALARP</th></tr>
<tr><td colspan="4">A ‘Medium’ residual risk rating is considered tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.</td></tr>
<tr><td>Elimination</td><td colspan="3">The risk of fire ignition and wildfire cannot be eliminated entirely. However, the control measures outlined in this table aim to do so.
The cooler months of the year have been selected as the preferred timing for the survey, which eliminates working in the high fire-risk summer months.
The availability of a fire cart, fire extinguishers and access to aerial fire fighting capacity are key measures aimed at eliminating the risk of starting a wildfire.</td></tr>
<tr><td>Substitution</td><td colspan="3">Not applicable.</td></tr>
<tr><td>Engineering</td><td colspan="3">Not applicable.</td></tr>
<tr><td>Administrative</td><td colspan="3">Fire management controls will be addressed in the project induction and daily toolbox talks.
Consultation with fire authorities and a call-off contract with an aerial fire-fighting resource ensures ready measures are in place to fight a wildfire.</td></tr>
<tr><th colspan="4">Demonstration of Acceptability</th></tr>
<tr><td>Policy compliance</td><td colspan="3">Beach Environmental Policy objectives are met.</td></tr>
<tr><td rowspan="3">Management system compliance</td><td colspan="3">Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice’s HSEMS and Terrex’s IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.</td></tr>
<tr><td>Lattice HSEMS</td><td colspan="2">• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment.
• HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management.
• Land Management Directive (LAT-HSE-DVE-036) – Section 3, requirements.</td></tr>
<tr><td>Terrex IMS</td><td colspan="2">• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; minimise risks to the safety of the public, employees and other third parties.</td></tr>
</table>

Stakeholder engagement	Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4). To date, no stakeholders have expressed concerns with regard to the risk of wildfire resulting from the survey.	
Legislative context	The performance standards outlined in this EP align with the requirements of: • *Bush Fire Act 1954* (WA). ○ Section 22B – Lighting of fires prohibited during total fire ban. ○ Section 30 – during restricted/prohibited burning times, a person shall not dispose of a burning cigarette that is likely to set fire to the bush.	
Industry practice	The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.	
	Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)	The performance standards in this table meet these guidelines with regard to: • Section 2.2 (Clearing) – explain smoking hazards and controls and do not build fires when the vegetation is dry.
	APPEA CoEP (2008)	The performance standards in this table meet the objectives with regard to: • Onshore geophysical surveys – reduce the impact on other land users to ALARP and to an acceptable level.
	Environmental management in oil and gas exploration and production (UNEP IE, 1997)	This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities. The performance standards in this table meet the objectives regarding onshore seismic operations with regard to: • Table 5 – prepare contingency plans for fire risk.
Environmental context	*Species recovery plans*	The same Conservation Advice/Recovery Plans for the threatened species presented in Table 7.6 have been taken into account in the development of the EPS.
Environmental Monitoring		
• On-site HSE Supervisor will monitor for adherence to EP commitments. • Water cart and mulcher operators will remain in communications regarding the ignition of spot fires. • Weather and TFB monitoring.		
Record Keeping		
• Daily operations reports. • Daily weather reports. • Call-off contract with aerial fire fighting company. • Stakeholder consultation records. • Date-stamped photos. • Induction and attendance records. • Incident reports.		

7.2.6 Damage to Third-party Infrastructure

Hazard

Infrastructure that has the potential to be damaged includes:

- Fences and gates (private and public);
- Livestock drinking troughs; and
- Buried infrastructure, such as gas pipelines.

The following activities risk damage to third-party infrastructure:

- Infrastructure is not accounted for in mapping/line preparation as a result of poor scouting or research, resulting in vehicle/equipment strike;
- Fire (see Section 7.2.6); and

- Positioning of nodes.

Risks

The risks associated with damage to third-party infrastructure are:

- Damage to/loss of farming infrastructure (and consequential financial losses and disruption to day-to-day activities);
- Damage to the DBNGP; and
- Damage to company reputation.

Evaluation Risks

Damage to or loss of infrastructure

Damage to farm infrastructure such as fences and gates or livestock drinking troughs has a remote likelihood of occurring during the survey.

The consequences of damage to fences and gates include:

- The increased potential for third-party access to private property (and associated malicious damage);
- The increased potential for escape and boxing of livestock (and associated loss of production income); and
- Cost of repairs.

Due to the conspicuous nature of this infrastructure in the landscape, fences and gates have been marked on survey maps during initial survey scouting and are highly unlikely to be damaged.

The consequences of damage to livestock drinking troughs include:

- Additional distance for stock to travel to access water (additional energy expenditure and possible loss of condition); and
- Cost of repairs.

The Donkey Creek-1 and Eneabba-1 wells are P&A and are not considered at risk from the seismic survey.

Damage to the DBNGP

The DBNGP is buried for its entire length within the proposed survey area, with a minimum depth of cover of 90 cm.

Origin commissioned VIPAC Engineers and Scientists Ltd to conduct ground vibration measurements in Queensland in 2007 to determine the safe operating distances for 60,000 lb (27 t) vibroseis buggies to buried and surface infrastructure (VIPAC, 2007). This work consisted of a sinusoidal sweep from 5 to 110 Hz, linearly varying over 6 seconds, using two HEMI 60 vibroseis buggies. Modelling using the data collected indicates that the maximum peak particle velocity (PPV) in mm/s to buried steel pipelines was 15.2 mm/s. The *DIN 4150-3: 1999* (*Structural vibration – effects of vibration on structures*) standard criteria indicates a maximum PPV threshold of 100 mm/s for buried pipelines. The results indicate that PPV from seismic surveying is well below the 100 mm/s threshold, concluding that the operation of 2 HEMI 60 trucks is safe at any distance (including zero metres) for buried pipework. As such, the loss of integrity of the DBNGP or the well casing associated with the P&A wells (leading to explosion) will not occur.

Risk Assessment

Table 7.14 presents the risk assessment for damage to third-party infrastructure.

Table 7.14. Risk assessment for damage to third-party infrastructure

Summary Details	
Hazards	• Infrastructure is not accounted for in mapping/line preparation as a result of poor scouting or research, resulting in vehicle/equipment strike. • Positioning of nodes.

Risks	• Damage to/loss of infrastructure (and consequential financial losses and disruption to day-to-day activities). • Damage to the DBNGP.	
Extent of risks	Highly localised.	
Duration of risks	Short-term (until damage is rectified).	
Pre-treatment risk assessment		
Consequence	**Likelihood**	**Risk ranking**
Minor	Possible	MEDIUM
Environmental Controls and Performance Measurement		
Performance objective	Minimise unplanned damage to third-party infrastructure.	
Performance standard		**Measurement criteria**
Mark all above-ground and buried infrastructure on project mapping. Achieve this by: • Checking aerial photography (e.g., Google Earth). • Checking topographic maps. • Consulting with landholders and conducting property scouting. • Consulting with the DBNGP Operator/s. • Consulting with the Dial Before You Dig service.		Consultation records verify that discussions have taken place with relevant asset owners. Project mapping includes above-ground and buried infrastructure.
Take date-stamped photos of all infrastructure that may be affected by the survey as a record of pre- and post-survey condition.		Date-stamped photos of infrastructure are available.
Load all above-ground and buried infrastructure GIS coordinates into the mulcher GPS navigation system.		Download of GPS inputs verifies that infrastructure is marked.
Avoiding activating the seismic source in the DBNGP easement.		As-completed GIS survey data verifies that no seismic was acquired in the pipeline easement.
Guide the locations for seismic line preparation using GPS navigation (under the guidance of the Line Pointing Surveyor) so as to avoid pre-determined sites of sensitivities (e.g., fences).		Daily operations reports verify that the Line Pointing Surveyor
Induct all project personnel into the requirements for preventing unplanned damage to third-party infrastructure prior to the commencement of line clearing.		The project induction includes information regarding preventing damage to third-party infrastructure. Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Provide all landholders with the contact details for the Lattice Field Survey Manager so that issues regarding potential or actual infrastructure damage can be quickly reported to enable rapid rectification.		Consultation records verify that the Lattice Field Survey Manager contact details have been provided to all landholders.
Record incidents of infrastructure damage into the enterprise incident management system, and investigate (and where possible, resolve) these in accordance with the Lattice Incident Management Directive (LAT-RMS-DVE-006).		Incident is recorded and available in the enterprise incident management system.
Residual risk assessment		
Consequence	**Likelihood**	**Risk ranking**
Minor	Highly unlikely	LOW
Demonstration of ALARP		
A ‘Low’ residual risk rating is considered tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.		
Elimination	The risk of damage to third-party infrastructure cannot be eliminated entirely, as accidents can happen. However, the control measures outlined in this table aim to eliminate the risk.	
Substitution	Not applicable.	

<table>
<tr><td>Engineering</td><td colspan="2">PPV testing of HEMI 60 vibroseis buggies (which are the same weight as those proposed for this survey) verifies that damage to buried steel pipelines from seismic pulses will not occur.</td></tr>
<tr><td>Administrative</td><td colspan="2">Preventing third-party infrastructure damage will be addressed in the project induction and daily toolbox talks.</td></tr>
<tr><td colspan="3">Demonstration of Acceptability</td></tr>
<tr><td>Policy compliance</td><td colspan="2">Beach Environmental Policy objectives are met.</td></tr>
<tr><td rowspan="3">Management system compliance</td><td colspan="2">Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice’s HSEMS and Terrex’s IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.</td></tr>
<tr><td>Lattice HSEMS</td><td>HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment.
HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management.
Communities Directive (LAT-HSE-DVE-026) – Section 4, requirements.</td></tr>
<tr><td>Terrex IMS</td><td>Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; minimise disturbance to livestock, pastoral infrastructure and landholders.</td></tr>
<tr><td>Stakeholder engagement</td><td colspan="2">Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4).
Lattice has consulted with DBP regarding the survey, and has agreed to avoid activating the seismic source in the pipeline easement in order to avoid the potential for pipeline damage.
Lattice is seeking to enter into a deed with the Minister, on behalf of DBNGP, to provide appropriate indemnities to the Minister in relation to undertaking the survey.</td></tr>
<tr><td>Legislative context</td><td colspan="2">The performance standards outlined in this EP align with the requirements of:
PGERA 1967 (WA).
Sections 17-20 – Compensation to owners and occupiers of private land.</td></tr>
<tr><td rowspan="4">Industry practice</td><td colspan="2">The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.</td></tr>
<tr><td>Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)</td><td>There are no guidelines regarding the prevention of damage to third-party infrastructure.</td></tr>
<tr><td>APPEA CoEP (2008)</td><td>The performance standards in this table meet the objectives with regard to:
Onshore geophysical surveys – reduce the impact on other land users to ALARP and to an acceptable level.</td></tr>
<tr><td>Environmental management in oil and gas exploration and production (UNEP IE, 1997)</td><td>This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities.
The performance standards in this table meet the objectives regarding onshore seismic operations with regard to:
Table 5 – consult local authorities and other stakeholders regarding preferred location.</td></tr>
<tr><td>Environmental context</td><td>Species recovery plans</td><td>Not applicable.</td></tr>
<tr><td colspan="3">Environmental Monitoring</td></tr>
<tr><td colspan="3">Field HSE Supervisor will monitor for adherence to EP commitments.
Line Pointing Surveyor guides the mulchers.</td></tr>
<tr><td colspan="3">Record Keeping</td></tr>
</table>

- Daily operations reports.
- Stakeholder consultation records.
- Project mapping.
- Date-stamped photos.
- Induction and attendance records.
- Incident reports.

7.2.7 Inappropriate Waste Disposal

Hazard

The following activities risk the inappropriate disposal of waste:

- Failure to locate (and therefore retrieve) nodes and survey pegs;
- Equipment falling off the vibroseis buggies and other vehicles (such as the back of utes);
- Litter released from personnel (e.g., cigarette butts, food waste and wrappers, empty spray cans, plastic bottles, flagging/bunting); and
- Loss of containment (LoC) of clean down waste.

The WA EPA defines waste as:

- Any substance that is discarded, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment;
- Any discarded, rejected, unwanted, surplus or abandoned substance;
- Any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, reprocessing, recovery, or purification by a separate operation from that which produced the substance; and
- Any substance described in regulations under the *Environmental Protection Act 1986* as waste.

Hazardous materials and wastes are defined as a substance or object that exhibits hazardous characteristics, is no longer fit for its intended use and requires disposal. Some of these hazardous characteristics (as outlined in Annex III to the Basel Convention) include being toxic, flammable, explosive and poisonous.

Generally waste is any material or substance that is of no further use and has been discarded.

Risks

The risks of inappropriate waste disposal are:

- Visual pollution;
- Soil and/or waterway pollution; and
- Injury to wildlife or livestock (choking or ingestion hazard); and
- Acute or chronic damage to vegetation.

Evaluation of Risks

In general, the quantity of waste to be generated by the survey will be minimal, and waste is only likely to create an environmental impact if inappropriately disposed of. Unless there is a hydrocarbon or chemical spill (see Section 7.2.9), potential waste releases are unlikely to be of a hazardous nature. Ultimately, inappropriately disposing of waste that could be reused or recycled is a waste of resources and a waste of money, meaning there is impetus for project personnel to avoid poor waste management practices.

Visual pollution

Waste littered through the environment is visually unpleasant and can detract from landholder experiences of their land or visitor perception of the area (particularly the UCL) as a wild landscape. As with the evaluation of environmental impacts for visual amenity (see Section 7.2.5), perceptions are subjective, but litter is widely regarded as having negative environmental impacts.

If equipment such as nodes or wooden survey pegs are not recovered (e.g., they are lost or have been removed/vandalised), they are unlikely to create significant visual pollution as they will be flat on the ground and are likely to be hidden among pasture, crops or mulched vegetation (the very reason why they could not be relocated at the completion of the survey). However, the high cost of the nodes creates the impetus to recover all nodes, and they are therefore unlikely to remain unrecovered.

Lightweight materials such as food wrappers can easily be dispersed by the wind and rain if not disposed of properly. The chemical composition of plastic waste such as food wrappers means that it takes a substantial period of time to break down in the environment, and is capable of travelling long distances without decomposing.

Soil and/or waterway pollution

Lightweight materials such as food wrappers can easily be dispersed by the wind into waterways (such as the Arrowsmith River) if not disposed of properly. This lightweight material presents a range of hazards for aquatic wildlife (such as fish, frogs, turtles and birds) who can become entangled or choke if they accidentally mistake litter for food. The chemical composition of plastic means that it may not break down in the digestive system and may become stuck, leading to ill health of affected animals.

Other wastes such as cigarette butts (filters) can take many years to decompose (12 months in freshwater and 5 years in seawater). They are composed of the remnants of tobacco, paper and a filter and the residue in the filter contains toxic, soluble chemicals (Clean Up Australia, 2009). The chemicals contained within the filter (such as lead and cadmium) can leach into soil during the degradation processes (aided by rainfall). For any measureable impact to soils or waterways in the proposed survey area, the volume of cigarette butts would need to be significant (likely in the thousands) and concentrated to one area; such methods of disposal will not occur.

The failure of containment methods (e.g., portable bunds) used during the cleandown process may cause localised soil pollution if the cleandown material (e.g., washdown water) contains residual hazardous products such as oil, grease or toxic cleaning agents.

Injury to wildlife or livestock

Depending on the type of waste, it may cause injury or death to wildlife or livestock through ingestion (e.g., plastic) or may smother habitat (e.g., get caught in shrubs or trees, enter burrows, enter waterways, etc). This may be facilitated by the strong winds of the region (see Section 5.1.1).

Lightweight materials such as food wrappers can easily be dispersed by the wind and rain if not disposed of properly. This lightweight material presents a range of hazards for wildlife and livestock who can become entangled or choke if they accidentally mistake litter for food. The chemical composition of plastic means that it may not break down in the digestive system and may become stuck, leading to ill health of affected animals.

Acute or chronic damage to vegetation

The risk of acute or chronic toxicity damage to vegetation is related to the release of hazardous material, such as the leaching of the contents of batteries or paint cans, or release of raw sewage, into soil. Such pollution may slowly or quickly kill plant roots or interfere with the nutrient cycling in the soil. For this survey, such wastes either won't be generated or have a low risk of being disposed of from this survey, so this risk is eliminated (see also Section 7.2.9).

Risk Assessment

Table 7.15 presents the risk assessment for inappropriate waste disposal.

Table 7.15. Risk assessment for inappropriate waste disposal

Summary Details	
Hazards	• Failure to locate receiver nodes and reference pickets. • Equipment falling off the vibroseis and other vehicles (such as the back of utes). • Litter released from personnel (e.g., cigarette butts, food wrappers and waste). • LoC of clean down waste.
Risks	• Visual pollution. • Injury to fauna. • Soil and/or waterway pollution. • Acute or chronic damage to vegetation.

Extent of risks	Highly localised.	
Duration of risks	Temporary to long-term (depending on the nature of the waste).	
Pre-treatment risk assessment		
Consequence	**Likelihood**	**Risk ranking**
Minor	Almost certain	MEDIUM
Environmental Controls and Performance Measurement		
Performance objective	Avoid unplanned release of waste within the survey area.	
Performance standard		**Measurement criteria**
Manage waste in accordance with Terrex's *Procedure for Housekeeping and Waste Disposal (TS-PRO-40, Rev 3, Jan 2017)*. This includes measures such as: • Establishing and using covered rubbish bins. • Cleaning up spills immediately. • Maintaining spill kits on site. • Washing and maintaining vehicles in contained areas. • Using recycling facilities where available.		The Procedure for Housekeeping and Waste Disposal is readily available to project crew. Interviews with crew indicate they are familiar with waste management procedures.
Secure waste and recycling bins with lids will be provided at the project laydown area for the disposal of any waste accumulated.		Photos and waste contract verifies that bins are provided at the laydown yard.
Provide personal cigarette butt receptacles to smokers, to be stored within vehicles, with the contents then disposed of appropriately at accommodation or landholder facilities.		Photos verify the provision of personal cigarette butt receptacles.
Remove clean down waste from site by an appropriately licensed waste contractor and disposed at an appropriate facility.		Waste transport certificates verify the removal of waste by a licensed contractor.
Undertake daily inspections of vehicles and use cargo netting as required to secure contents (e.g., back of utes).		Daily operations report verify that daily checks are undertaken.
Restrict cigarette smoking to formed roads and tracks, unless landowners request more stringent measures. Provide cigarette butt receptacles to smokers, which are to be stored within vehicles, with the contents then disposed of appropriately at the accommodation or laydown yard.		Photos verify that cigarette butt bins are provided to smokers.
Visual inspection is undertaken along survey lines to check for (and retrieve) any wastes at completion of each day's work and at completion of the survey.		Daily operations report and end-of-survey inspection report verifies whether waste was retrieved.
Induct all project personnel into the waste management requirements prior to the commencement of line clearing.		The project induction includes information regarding waste management. Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Record incidents into the enterprise incident management system, and investigate (and where possible, resolve) these in accordance with the Lattice Incident Management Directive (LAT-RMS-DVE-006).		Incident is recorded and available in the enterprise incident management system.
Residual risk assessment		
Consequence	**Likelihood**	**Risk ranking**
Minor	Unlikely	LOW
Demonstration of ALARP		
A 'Low' residual risk rating is considered tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.		
Elimination	Waste generation cannot be entirely eliminated for the survey, but the inappropriate disposal of waste will be.	

Substitution	Not applicable.	
Engineering	Not applicable.	
Administrative	Waste management controls will be addressed in the project induction. The project laydown yard will be the focal point for waste management.	
Demonstration of Acceptability		
Policy compliance	Beach Environmental Policy objectives are met.	
Management system compliance	Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice's HSEMS and Terrex's IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.	
	Lattice HSEMS	• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment. • HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management. • Materials and Waste Directive (LAT-HSE-DVE-020) – Section 3, requirements.
	Terrex IMS	• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; minimise the impact on the environment of waste handling and disposal and pollution.
Stakeholder engagement	Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4). To date, no stakeholders have expressed concerns with regard to the risk of inappropriate waste management.	

Legislative context	The performance standards outlined in this EP align with the requirements of:
	• Conservation and Land Management Regulations 2002.
	  ○ Regulation 21(1) – a person must not cause of allow waste to be discharged or placed on CALM land.
	  ○ Regulation 23(1) – a person must not discharge or place any refuse or any poisonous, noxious or polluting matter, or cause any refuse or any poisonous, noxious or polluting matter to be discharged or placed in any public water catchment on CALM land.
	  ○ Regulation 24(1) – a person must not deposit litter, or cause litter to be deposited on CALM.
	• *Waste Avoidance and Resource Recovery Act 2007* (WA).
	  ○ Section 69 – Waste collection not to be carried out by unauthorised persons.	

Industry practice	The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.	
	Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)	The performance standards in this table meet these guidelines with regard to: • Section 2.2 (Clearing) – explain smoking hazards and controls and do not build fires when the vegetation is dry.
	APPEA CoEP (2008)	The performance standards in this table meet the objectives with regard to: • Onshore geophysical surveys – reduce the volume of waste produced to ALARP and to an acceptable level. Ensure that relevant wastes are disposed of in appropriate facilities.
	Environmental management in oil and gas exploration and production (UNEP IE, 1997)	This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities. The performance standards in this table meet the objectives regarding onshore seismic operations with regard to: • Table 5 – minimise waste, control waste disposal (solids, sewage).

Environmental context	*Western Australian Waste Strategy: Creating the Right Environment (Waste Authority, 2012)*	There are five strategic objectives outlined in the waste strategy, none of which are compromised by the EPS provided.
Environmental Monitoring		
• Field HSE Supervisor will monitor for adherence to EP commitments.		
Record Keeping		
• Procedure for Housekeeping and Waste Disposal. • Daily operations reports. • Date-stamped photos. • Waste management contract. • Waste transport certificates. • End-of-survey inspection report. • Induction and attendance records. • Incident reports.		

7.2.8 Hydrocarbon and Chemical Spills

Hazard

The following activities will risk hydrocarbon and chemical spills:

- Refuelling of vibroseis buggies and other vehicles and equipment on site, which may result in leaks or spills to grade;
- Poorly maintained vehicles and equipment, which may result in fuel, coolant or hydraulic oil leaks;
- Inappropriate bunding for inventory; and
- Vehicle/equipment accident or component failure.

Risks

The risks of hydrocarbon and chemical spills are:

- Localised soil contamination;
- Surface water/groundwater contamination;
- Injury or death of fauna; and
- Acute or chronic damage to vegetation.

Evaluation of Risks

An inventory of diesel and other hydrocarbons present during the survey is presented in Section 2.1 of the OSCP (WAA-4000-ENV-PLN). The most likely reasonable hydrocarbon spill scenario involves a partial loss of containment of the refuelling truck due to an accident or component failure. The risks associated with this are mitigated by tank bunding and emergency shut off valves leaving an estimated volume up to 600 litres (of a total inventory of 2,000 litres) as the most likely potential spill volume that may result in localised soil contamination and damage to vegetation.

Localised soil contamination, damage to vegetation

The vibroseis buggies will be refuelled on site. The AHV-IV buggies proposed for use have a capacity to hold 757 litres of fuel. An incident during refuelling would typically result in the loss of several litres of fuel (tens of litres at most) as a result of poor refuelling practice (e.g., fuel pumping not stopping on time). A larger spill would result from catastrophic failure (e.g., piercing by rock or branch) of a fuel tank or radiator or hoses (leaking coolant or hydraulic oil). All bulk chemicals used during the project are contained in appropriately bunded containers on the crew service truck.

Given the sandy nature of the soil in the proposed survey area, the hydrocarbon or chemical would be quickly absorbed and move through the soil profile. Migration of petroleum hydrocarbons in the subsurface are dependent on several factors including the volume of release, duration of spill, area of infiltration, physical properties of the hydrocarbon, soil properties and subsurface flow dynamics (Testa

& Jacobs, 2014). When a hydrocarbon release occurs on land, its movement through the subsurface is divided into four phases:

1. Seepage into and possibly through the unsaturated zone;
2. Lateral spreading into the zone immediately overlying the water table with development of a 'pancake' layer;
3. Accumulation stability within the capillary zone; and
4. Dissolved phase in groundwater (Testa & Jacobs, 2014).

Depending on the volume spilled and its location, this will result in temporary soil contamination (as the fuel moves through the soil profile) and possibly low-level semi-permanent or permanent contamination (as heavier residues are left behind). Over time, these residues will be consumed by soil bacteria in a natural degradation process. In the interim, the soil contamination may result in acute (instant) or chronic (slow) toxicity effects on surrounding plant life, resulting in instant/near-instant death or long-term poor health on individual plants or a small area of a plant community, depending on the volume of the spill.

Within areas of native vegetation, the loss of plant life would have a resultant effect on the quantity and quality of fauna habitat, though in the context of the survey area, this would have a negligible effect at the community and landscape level. If spilled within farmland (what crops or pasture grasses), the contamination may result in localised areas of plant death and/or reduced future plant growth. This would be ameliorated over time as soil bacteria consume the hydrocarbons or chemicals, and economic losses from small areas of contamination (likely to be no greater than several square metres) would be minor and temporary.

Groundwater contamination

Any small volumes of hydrocarbons or chemicals that find their way to groundwater would be highly unlikely to result in groundwater contamination at detectable levels. The groundwater in the superficial aquifer (see Section 5.1.6) eventually reports to the ocean, where any contaminants will dilute and degrade rapidly. Expressions in local surface waters are unlikely.

Surface water contamination

As the survey will avoid working within the Arrowsmith River corridor, incidents of hydrocarbon or chemical spills reporting to surface waters are highly unlikely. Even if spills were occur adjacent to the river corridor, the wide buffer, generally with a high cover of native vegetation, means that spills would be trapped by the vegetation before having the opportunity to reach the surface water.

Injury or death of fauna

Hydrocarbons or chemicals released to soil would have direct toxicity impacts on fauna that encounter the spill, such as tiny invertebrates. This would have a negligible effect at the population level.

Impacts to larger fauna such as snakes, native rodents and birds would only be affected if the spill resulted in a pool that could be mistaken as a water supply, or if the death of vegetation reduces feeding resources or shelter. Again, given the potential volumes that may be spilled, this would have a negligible effect at the population level of individual species or communities.

Risk Assessment

Table 7.16 presents the risk assessment for hydrocarbon and chemical spills.

Table 7.16. Risk assessment for hydrocarbon and chemical spills

<table>
<tr><th colspan="4">Summary Details</th></tr>
<tr><td>Hazards</td><td colspan="3">• Refuelling of vibroseis buggies and equipment on site.
• Poorly maintained vehicles and equipment.
• Inappropriate bunding for inventory.
• Vehicle/equipment accident or component failure.</td></tr>
<tr><td>Risks</td><td colspan="3">• Localised soil contamination.
• Surface water/groundwater contamination.
• Injury or death of fauna.
• Acute or chronic damage to vegetation.</td></tr>
<tr><td>Extent of risks</td><td colspan="3">Localised to highly localised (depending on volume of spill).</td></tr>
<tr><td>Duration of risks</td><td colspan="3">Short-term (days to weeks for a very small spill where rapid recovery is possible) to medium-term (months or years for a large spill where the substance may persist and/or vegetation die off occurs).</td></tr>
<tr><th colspan="4">Pre-treatment risk assessment</th></tr>
<tr><th>Spill volume</th><th>Consequence</th><th>Likelihood</th><th>Risk ranking</th></tr>
<tr><td>Small (e.g., <100 L)</td><td>Minor</td><td>Possible</td><td>MEDIUM</td></tr>
<tr><td>Large (e.g., 100-750 L)</td><td>Moderate</td><td>Unlikely</td><td>MEDIUM</td></tr>
<tr><th colspan="4">Environmental Controls and Performance Measurement</th></tr>
<tr><td>Performance objective</td><td colspan="3">Avoid release of hydrocarbons or chemicals to grade.</td></tr>
<tr><th colspan="2">Performance standard</th><th colspan="2">Measurement criteria</th></tr>
<tr><td colspan="4">Prevention</td></tr>
<tr><td colspan="2" rowspan="2">Induct all project personnel into hydrocarbon and chemical spill prevention and response requirements prior to the commencement of line clearing.</td><td colspan="2">The project induction includes information regarding hydrocarbon and chemical spill prevention and response.</td></tr>
<tr><td colspan="2">Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.</td></tr>
<tr><td colspan="2">Store bulk quantities of hydrocarbons or chemicals on level terrain within bunding at the laydown yard.</td><td colspan="2">Photos and operations report note equipment stored at the laydown yard.</td></tr>
<tr><td colspan="2">Store hydrocarbons and chemicals in accordance with AS1940 (The storage and handling of flammable and combustible liquids), that is:
• Within appropriate containers (i.e., not damaged or otherwise compromised) that are appropriately labelled.
• Within a bunded area (sized to accommodate at least 110% of the volume of the largest container).
• There is a 3 m radius of combustible-free material around the storage location.</td><td colspan="2">Inspection notes and/or photos verify that fuels and chemicals are appropriate stored.</td></tr>
<tr><td colspan="2">Make available a fully equipped spill kit at the laydown yard (containing absorbent pads, absorbent ‘sausages’, kitty litter, shovels, gloves and so forth).</td><td colspan="2">Photos verify the presence of a spill kit at the laydown yard.</td></tr>
<tr><td colspan="2">Equip each vibroseis buggy and vehicle (excluding ATVs) with a fully-equipped spill kit on board (containing absorbent pads, absorbent ‘sausages’, kitty litter, shovels, gloves and so forth).</td><td colspan="2">Photos verify the presence of spill kits on board each vehicle.</td></tr>
<tr><td colspan="2">Avoid working in the Arrowsmith River corridor.</td><td colspan="2">As-completed GIS records verify that no survey work was conducted in the Arrowsmith River corridor.</td></tr>
</table>

Refuel vibroseis buggies, vehicles and equipment in accordance with Terrex's *SOP Refuelling (TS-SOP-GEN019, Rev 4, Jan 2017*). This includes: • Undertaking refuelling on flat, level ground away from sensitive sites. • Placing a portable bund under the refuelling area. • Immediately cleaning up any spill. • Not refuelling within 1km of any designated watercourse. • Reporting any spill to grade to the Crew Manager and digging up and/or treating the contaminated soil with biodegradable bio-active hydrocarbon absorbent. • Not smoking near the fuel tanker while refuelling. • Ensuring that the tanker compartment safety shut off valve is closed whenever a compartment is not being drawn from and whenever the tanker is to be moved for any reason. • The refuelling operator remaining at the vehicle and holding the fuel nozzle at all times.	Photos verify that spill kits are readily available. For refuelling activities undertaken on site, the following is available. • Completed refuelling checklists. • Completed Job Hazard Analysis (JHA). • Completed Permit to Work (PTW).
Response	
Train all on-ground project personnel in hydrocarbon and chemical spill prevention and response management measures.	Training records verify all on-ground project personnel are trained.
Undertake spill response in accordance with Section 3 of the project-specific OSCP (WAA-4000-ENV-PLN) and the Terrex *SOP Hydrocarbon Spillage and Clean Up (TS-SOP-GEN016, Rev 5, Jan 2016).* The OSCP takes precedence in the event of a spill.	Incident report is available in the enterprise incident management system, verifying that response, reporting and investigation was undertaken in accordance with the OSCP.
Record incidents into the enterprise incident management system, and investigate (and where possible, resolve) these in accordance with the Lattice Incident Management Directive (LAT-RMS-DVE-006).	

Residual risk assessment			
Spill volume	**Consequence**	**Likelihood**	**Risk ranking**
Small (e.g., <100 L)	Minor	Unlikely	LOW
Large (e.g., 100-750 L)	Minor	Highly unlikely	LOW

Demonstration of ALARP	
A 'Low' residual risk rating is considered tolerable if ALARP. The following analysis provides assurance that the ALARP Principal has been met.	
Elimination	The risk of a hydrocarbon or chemical spill cannot be entirely eliminated, but the controls in place aim to reduce the risk. The exclusion of the Arrowsmith River corridor from the survey area eliminates the risk of a spill entering this waterway.
Substitution	Refuelling the vibroseis buggies can occur at commercial premises (e.g., not using mobile refuelling trucks). However, driving vibroseis buggies (or transporting them via low loaders) along public roads would result in significant traffic delays due to their slow speed, and would result in additional atmospheric emissions from fuel combustion. Doing so is not commensurate with the low residual risk of the hazard.
Engineering	The vibroseis buggies have a high ground clearance, minimising the chances of the undercarriage of the vehicle being damaged and leading to a LoC event.
Administrative	Hydrocarbon and chemical spill controls will be addressed in the project induction. Refuelling procedures will be implemented during refuelling, and the OSCP will be implemented in the event of a spill.

Demonstration of Acceptability		
Policy compliance	Beach Environmental Policy objectives are met.	
Management system compliance	Chapter 8 describes the EP implementation strategy to be employed for this survey, outlining Lattice's HSEMS and Terrex's IMS. The following outlines the standards and directives that have been complied with in the development of performance standards and that will be complied with during operations for this specific hazard.	
	Lattice HSEMS	• HSEMS Standard 18 (Environmental Effects and Management) - undertake environmental hazard identification and assessment. • HSE Plan for Exploration & Development, Onshore Geophysical Survey Activities (CDN/ID 15842437) - environmental effects and management. • Land Management Directive (LAT-HSE-DVE-036) – Section 3, requirements.
	Terrex IMS	• Environmental Control Procedure (TS-PRO-11) – Section 5, environmental objectives and controls; minimise disturbance and avoid contamination to soil resources.
Stakeholder engagement	Stakeholder consultation has been undertaken and will be ongoing in the lead up to and during the survey (see Chapter 4). To date, no stakeholders have expressed concerns with regard to the risk of fuel or chemical spills.	

Legislative context	The performance standards outlined in this EP align with the requirements of:
	• *Dangerous Goods Safety Act 2004*:
	  ○ Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007;
	    ▪ Part 4, Division 2, Subdivision 2, risk control measures in relation to dangerous goods.
	    ▪ Part 4, Division 2, Subdivision 4, emergency management and planning.
	• Conservation and Land Management Regulations 2002.
	  ○ Regulation 23(1) – a person must not discharge or place any refuse or any poisonous, noxious or polluting matter, or cause any refuse or any poisonous, noxious or polluting matter to be discharged or placed in any public water catchment on CALM land.	

Industry practice	The consideration and adoption of the controls outlined in the below-listed codes of practice and guidelines demonstrates that BPEM is being implemented for this survey.	
	Environmental Manual for Worldwide Geophysical Operations (IAGC, 2013)	The performance standards in this table meet these guidelines with regard to: • Section 2.3 (Travel) – keep absorbent materials available in case of fuel spills or if fuel is spilled on the ground, remove contaminated soil for proper disposal. Fuel transfer and handling should be done in such as way as to prevent spills.
	APPEA CoEP (2008)	The performance standards in this table meet the objectives with regard to: • Onshore geophysical surveys – reduce impacts on soils and surface drainage to ALARP and to an acceptable level.
	Environmental management in oil and gas exploration and production (UNEP IE, 1997)	This EP addresses the point of undertaking an environmental assessment to identify protected areas and local sensitivities. The performance standards in this table meet the objectives regarding onshore seismic operations with regard to: • Table 5 – ensure proper handling and storage of fuels and hazardous materials, prepare contingency plans for spills.
Environmental context	*Guideline for the Development of an Offshore Oil Spill Contingency Plan*	A project-specific OSCP has been prepared for this survey, and will be implemented in the event of a spill.

Environmental Monitoring
• On-site HSE Supervisor will monitor for adherence to EP commitments. • Visual monitoring for spills/leaks.
Record Keeping
• Project-specific OSCP. • SOP Refuelling. • SOP Hydrocarbon Spillage and Clean Up. • Daily operations reports. • Date-stamped photos. • As-completed GIS records. • Induction and attendance records. • Incident reports. • Training records. • JHA. • PTW. • Completed refuelling checklist.

8. Implementation Strategy

As required of Regulation 15 of the PGER Environment Regulations 2012, this chapter outlines the implementation strategy for the proposed survey.

8.1 The Lattice Health, Safety and Environment Management System

Lattice's HSE Policy commitments are communicated and implemented through the HSEMS. The HSEMS and Standards apply to all HSE-related matters arising out of all activities and operations controlled by Lattice and its related companies (together the company) and the impact of those activities and operations on employees, contractors, the environment and the communities in which the company operates. All of Lattice's businesses are required to provide appropriate information and to take appropriate actions as required by the HSEMS to ensure compliance with the criteria established in the HSEMS.

The HSEMS is premised on the belief that effective management of HSE is based on a systematic approach with appropriate governance structures set in place and that each person has clearly defined and unambiguous accountabilities that must be met to achieve that objective.

Lattice's HSEMS is based on the continual improvement methodology of 'Commit-Plan-Do-Check and Review' (Figure 8.1). The elements of the continual improvement loop are executed through a set of standards that interpret, support and provide further details to the requirements of the HSE Policy. The HSEMS hierarchy is illustrated in Figure 8.2.

The HSEMS is aligned with the requirements of company HSE Policy and recognised international and national standards including ISO 14001 (*Environmental Management*), OHSAS 18001 (*Occupational Health and Safety*), ISO 31000 (*Risk Management*) and AS 4801 (*Occupational Health and Safety Management Systems*) and support the company in its efforts to comply with legal obligations regarding HSE.

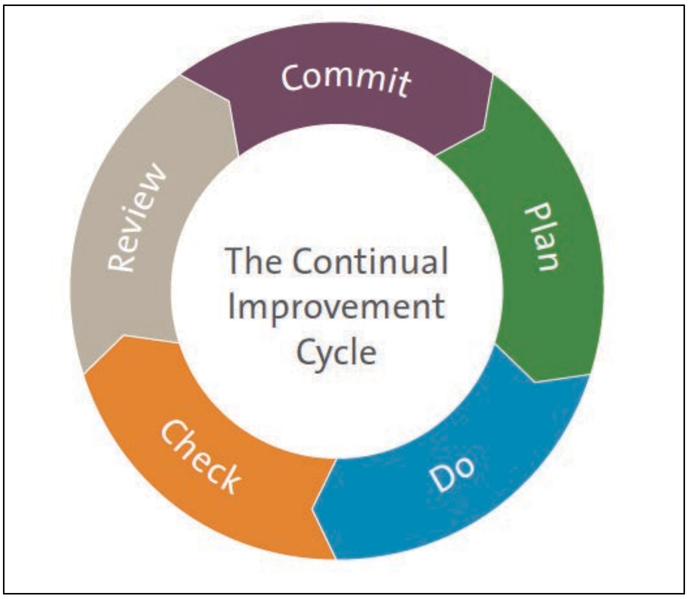


Figure 8.1. Continual improvement cycle

The Lattice HSEMS is the system used during survey scouting and stakeholder consultation, while the Terrex IMS (described in Section 8.2) will be implemented during the survey.

At the core of the Lattice HSEMS are 20 Performance Standards that detail specific performance requirements for the implementation of the HSE Policy and manage potential risks within Operational Units (Table 8.1). Integral to each Performance Standard are a series of HSE Management Processes including Directives, Procedures and other support documents that provide detailed information on requirements for implementation along with specific responsibilities.

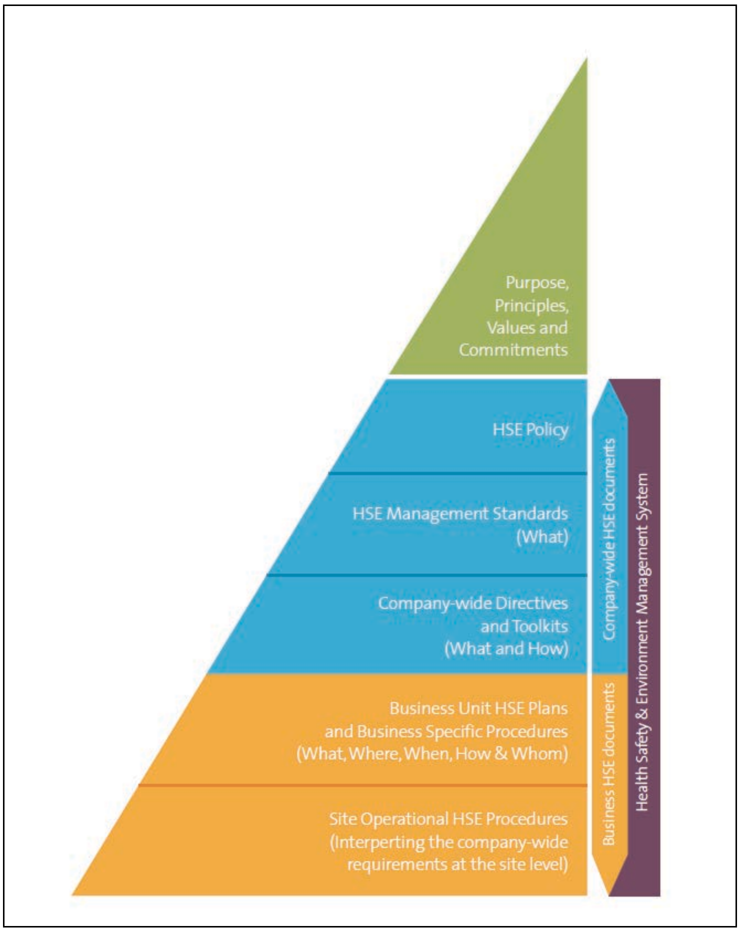


Figure 8.2. Lattice HSEMS hierarchy of elements

Table 8.1. Lattice HSEMS performance standards

#	Standard	#	Standard
1	Leadership and Commitment	11	Management of Change
2	Organisation, Accountability, Responsibility and Authority	12	Facilities Design, Construction, Commissioning and Decommissioning
3	Planning, Objectives and Targets	13	Contractors, Suppliers, Partners and Visitors
4	Legal Requirements, Document Control and Information Management	14	Crisis and Emergency Management
5	Personnel, Competence, Training and Behaviours	15	Plant and Equipment
6	Communication, Consultation and Community Involvement	16	Monitoring of the Working Environment
7	Hazard and Risk Management	17	Health and Fitness for Work
8	Incident Management	18	Environmental Effects and Management
9	Performance Measurement and Reporting	19	Product Stewardship, Conservation and Waste Management
10	Operational Control	20	Audits, Assessments and Review

The HSEMS mandates what must be achieved rather than how to achieve it. Therefore, Business Units have the flexibility to meet the requirements of the standards in a way that best suits their own business while maintaining consistency of approach across the company. To this effect, Lattice has developed an *HSE Plan, Exploration and Development, Onshore Geophysical Survey Activities* (CDN/ID 15842437, November 2017) that provides direction and guidance on how HSE risks are to be eliminated or reduced for onshore seismic surveys.

Each of the Performance Standards listed in Table 8.1 is briefly described in this section.

8.1.1 Commit

Leadership and Commitment

The Board and Executive Management establish the HSE Policy, set expectations and provide resources for successful implementation of the HSE Policy and HSEMS. Directors, managers, supervisors, employees and contractors at all levels demonstrate leadership and commitment to HSE. There are 10 performance requirements under this standard.

Organisation, Accountability, Responsibility and Authority

For directors, managers, supervisors, employees and contractors at all levels, their accountabilities, roles, responsibilities and authority relating to HSE are clearly defined, documented, communicated and understood throughout Lattice. There are seven performance requirements under this standard.

8.1.2 Plan

Planning, Objectives and Targets

A systematic risk based approach to the management of HSE is in place as an integral part of business planning, with HSE goals and targets established and measured. A philosophy of continuous improvement is applied to HSE. There are seven performance requirements under this standard.

Legal Requirements, Document Control and Information Management

Relevant legal and regulatory requirements and voluntary commitments are identified, documented, made accessible, understood and complied with wherever Lattice operates. Effective HSE document control systems are in place to ensure clarity of company expectations and to facilitate efficient and accurate information management. There are 12 performance requirements under this standard.

8.1.3 Do

Personnel, Competence, Training and Behaviours

Employees' fitness for work, competence and appropriate behaviours are critical for the safe control of operations and general company success. Employees are carefully selected, trained and supported. Fitness for work, competence and behaviours are regularly assessed and monitored. Contractors are to provide competent workers and regularly assess and monitor their fitness for work, competence and behaviours. There are seven performance requirements under this standard.

Communication, Consultation and Community Involvement

Effective, transparent and open communication and consultation with stakeholders is valued and undertaken across the company. There are nine performance requirements under this standard.

Hazard and Risk Management

HSE hazards and risks associated with the company's activities are identified, assessed and managed to prevent or reduce the likelihood and consequence of incidents. There are 10 performance requirements under this standard.

Incident Management

HSE incidents, including near-misses, are reported, investigated, and analysed to ensure that preventive actions are taken and learning's are shared throughout the organisation. There are eight performance requirements under this standard.

Operational Control

All works at sites and activities that have the potential to cause harm to the health and safety of people, or the environment, or to cause damage to equipment, are carried out in accordance with plans and documented procedures, so as to ensure safe work practices. There are eight performance requirements under this standard.

Management of Change

All temporary and permanent changes to the organisation, personnel, systems, procedures, equipment, products and materials are identified and managed to ensure HSE risks arising from these changes remain at an acceptable level. There are six performance requirements under this standard.

Facilities Design, Construction, Commissioning and Decommissioning

Assessment and management of HSE risks is an integral part of project design, construction and commissioning to enable sound HSE performance throughout the construction and operational life of the facility. There are nine performance requirements under this standard.

Contractors, Suppliers, Partners and Visitors

Contractors, suppliers and partners are assessed for their capabilities and competencies to perform work on behalf of Lattice, and to ensure their HSE performance is aligned with these standards. Effective arrangements are in place to safeguard the health and safety of visitors to Lattice sites. There are 11 performance requirements under this standard.

Crisis and Emergency Management

Plans, procedures and resources are in place to effectively respond to crisis and emergency situations, to protect the workforce, the environment, the public and customers; and to preserve the company's assets and reputation. There are eight performance requirements under this standard.

Plant and Equipment

Lattice's facilities, plant, equipment, machinery and tools are purchased, designed, constructed, commissioned, decommissioned, modified, operated and maintained in a manner that ensures HSE risks are effectively controlled. There are 10 performance requirements under this standard.

Monitoring the Working Environment

HSE risks to personnel associated with the working environment are eliminated or reduced as far as reasonably practicable. There are seven performance requirements under this standard.

Health and Fitness for Work

Lattice provides workplace facilities that are fit for purpose and offer adequate occupational hygiene and security. Lattice encourages a healthy lifestyle for its employees, and provides appropriate medical treatment, and assistance for return to work in the event of employees sustaining work related injuries. There are seven performance requirements under this standard.

Environmental Effects and Management

Potential adverse environmental effects resulting from the company's operations and activities are identified, assessed and, as far as reasonably practicable, eliminated or minimised. There are six performance requirements under this standard.

Product Stewardship, Conservation and Waste Management

The lifecycle HSE impacts of Lattice's products and services are assessed and communicated to customers and users to enable responsible usage management. Consumption of resources and materials is minimised as far as reasonably practicable. Wastes are eliminated, reduced, recycled and/or reused as far as reasonably practicable or disposed of appropriately. There are six performance requirements under this standard.

8.1.4 Check

Performance Measurement and Reporting

HSE performance data is collected, analysed and reported to monitor and evaluate ongoing HSE performance and drive continual improvement. There are eight performance requirements under this standard.

8.1.5 Review

Audits, Assessment and Review

HSE performance and systems are monitored and assessed through periodic reports and audits to identify trends, measure progress, assess conformance and drive continual improvement. There are 11 performance requirements under this standard.

8.2 Terrex Integrated Management System

Terrex manages the HSE facets of its business and operations using their Integrated Management System (IMS). The IMS is founded on the principles described in AS4801, ISO 18001 and ISO 14001 as detailed in the Terrex HSE Policy and the HSE Manual (Version K).

The Terrex IMS consists of 17 Elements. Every element requires the establishment and maintenance of appropriate documentation and records to ensure its correct implementation. The elements of the HSE Manual take into account prevailing regulatory requirements, client requirements, international standards (e.g., ISO, OSHA), industry guidelines (e.g., OGP, IAGC), best international practices and Terrex's internal practices and procedures. The 17 Elements of the IMS are:

1. Leadership and commitment.
2. Policies and objectives.
3. Organization and responsibility.
4. Risk management.
5. Legislative compliance.
6. Objectives and plans.
7. Employee selection, competency and training.
8. Employee involvement and consultation.
9. Document and data control.
10. Management of change.
11. Emergency response and crisis management.
12. Contractor management.
13. Planning.
14. Implementation and monitoring.
15. Incident reporting and investigation.
16. Injury management and health monitoring.
17. Audits and management system review.

The Terrex IMS has a hierarchy of policies, procedures and standard operating procedures (SOPs), which are divided into general (22), receivers (29) and vibroseis (15) SOPs. The HSEQ Policy is provided in Box 8.1.

TERREX

Health Safety Environment and Quality Policy

Terrex is a Seismic Acquisition and Surveying Contractor providing services to the Oil, Gas, Mineral and Infrastructure Industries.

Our vision is to be one of the world's most operationally efficient, technologically advanced, innovative and safest onshore Seismic Acquisition and Survey service providers.

Our aim is to provide a healthy and safe workplace while minimising the environmental impacts of our activities and satisfying our customers' expectations.

We at Terrex are committed to:

- Providing a healthy and safe workplace for our employees, contractors and the general public.
- Conducting all operations in such a manner as to minimise their impact on the environment.
- Promoting the protection of all Natural and Cultural environments that can be affected by our activities.
- Respecting all forms of indigenous and non-indigenous heritage and maintaining cultural heritage values.
- Seeking to continuously improve in the efficient use of natural resources and energy through recycling and waste management.
- Regularly review and improve our process to minimise health and safety hazards, negative significant impacts to the environment and prevent pollution.
- Establishing measurable objectives and targets for improving our safety and environmental performance.
- Working with our customers, suppliers and employees to seek continual improvement of our activities through consultation and communication.
- Complying with legislation and industry codes of practice wherever we conduct business.

To ensure this commitment we have implemented an Integrated Management System, which meets the requirements of:

- **AS/NZS 4801 Occupational Health and Safety Management Systems**
- **OHSAS 18001 Occupational Health and Safety Management System**
- **AS/NZS ISO 14001 Environmental Management Systems.**

This policy is basic to all Terrex operations and adherence is the prime responsibility of management, every employee and all contractors / sub-contractors.

G Dunlop

Greg Dunlop
Chief Executive Officer

Dated: 10th July 2017

Box 8.1. Terrex HSEQ Policy

At the core of the Terrex IMS are 41 procedures that detail specific performance requirements for the implementation of the IMS (Table 8.2). Those of particular environmental relevance to the project are highlighted in green shading.

Table 8.2. Terrex IMS procedures

#	Standard	#	Standard
1	Management review	21	Manual handling
2	Risk management	22	Journey management
3	Communication and consultation	23	Maintenance management
4	Action tracking register	24	Process control
5	Incident reporting/ investigation/ corrective and preventative action	25	Inspection testing and test status
6	Hazard and observations	26	Inspection measuring test equipment
7	Contractor management	27	Handling, storage, packaging, preservation and delivery
8	Document data and systems records control	28	Control of non-conforming product
9	Management of change	29	Job safety analysis
10	Management system audits	30	General safety rules
11	Environmental control	31	Vehicle driving standard
12	Regulatory compliance	32	Emergency preparedness and response
13	Lockout-tagout for equipment	33	Lifting operations
14	*Superseded*	34	Permit to work
15	Induction and training	35	*In preparation*
16	Hazardous substance control	36	*In preparation*
17	Personal protective equipment	37	Mobile plant and equipment
18	Injury management	38	Heat-related illnesses
19	Drugs and alcohol	39	Workplace inspections
20	Code of conduct	40	Housekeeping and waste disposal
		41	Occupational health surveillance and monitoring

8.3 Key Roles and Responsibilities

As required by Regulation 15(4) of the PGER Environment Regulations 2012, this section establishes the environmental management roles of responsibilities of those involved in the survey. The organisation structure for the survey is illustrated in Figure 8.3 and the roles and responsibilities of project team members are summarised in Table 8.3. This is linked to HSEMS Standard 2 (Organisation, accountability, responsibility and authority).

Day-to-day implementation of the EP will be the responsibility of Terrex, under the guidance of the Lattice Senior Seismic Field Manager. The Lattice Project Manager will have oversight of the performance of the project against the EP and other project plans, and will initiate reviews and audits as required. In the event of an HSE incident, the Lattice Emergency Response Team (ERT) will work together with HSE and technical advisors and government combat agencies as required to respond.

Table 8.3. Seismic survey personnel environmental roles and responsibilities

Role	Environmental responsibilities
Lattice personnel	
Geophysical Operations Manager	• Accountable for ensuring the program delivers the outcomes established for the project. • Provides general guidance and advice to the Survey Project Manager. • Is part of the project assurance team.
Project Manager	• Responsible for all project management aspects including HSE, schedule, budget, scope, quality, risks, incidents and issues. • Provides corporate interface between Lattice and Terrex. • Ensures resources are in place to prepare all required environmental approvals and implement EP commitments. • Ensures resources are in place to support the Senior Seismic Field Manager. • Ensures all Lattice and Terrex personnel are inducted and are aware of their environmental responsibilities. • Supports the Field HSE Supervisor to ensure that inspections and audits against the EP are undertaken. • Reports to the Geophysical Operations Manager.
Senior Seismic Field Manager (back-to-back position)	• Is the senior Lattice representative on site. • Implements the Delivery of Geophysical Operation Projects Procedure (AUS-1000-GOP-PRO-00001). • Prepares and implements the SEP, including undertaking face-to-face meetings and negotiations with landholders ahead of the survey. • Records all consultation outcomes. • Ensures stakeholder feedback is reported to the project team, especially where such feedback may have implications for the project design or management. • Provides field interface between Lattice and Terrex field personnel. • Is responsible for all Lattice personnel on site. • Has the authority to modify survey parameters or data quality control criteria. • Contacts landholders in advance of the operational activities, keeping them informed of survey progress. • Ensures Terrex is made aware of landholder-specific requirements. • Assumes overall onsite command and acts as the Emergency Response Coordinator (ERC). • Ensures Terrex and sub-contractor compliance with the contract. • Develops and submits for approval any project deviations to the Project Manager. • Reports to the Project Manager.
Field HSE Supervisor (back-to-back position)	• Remains on site at all times while survey activity is underway. • Permits Terrex personnel to leave base for work upon signing the toolbox minutes. • Ensures Terrex and sub-contractor HSE compliance with the contract and the Lattice HSE policies and procedures. • Ensures all Lattice, Terrex and sub-contractor personnel are inducted and are aware of their environmental responsibilities. • Ensures equipment is appropriately inspected, certified and fit for purpose. • Leads HSE field inspections. • Promotes a proactive HSE culture with the crew. • Leads HSE incident investigations. • Provides input into daily operations reports regarding environmental issues.

Role	Environmental responsibilities
	• Reports to the Senior Seismic Field Manager.
Senior Environmental Specialist	• Manages the environmental approvals framework for the project. • Engages and manages the environmental consultant, and other contractors, to prepare environmental approvals documentation. • Provides environmental input to the project induction. • Where specific to a condition of approval, prepares external regulatory reports required for the survey. • Prepares the end-of-survey EP compliance report for submission to the DMIRS.
Senior Emergency Response and Security Advisor	• Ensures that the necessary project-specific emergency response plans are developed (and externally approved where required). • Provides and maintains effective emergency response arrangements for the survey.
Terrex personnel	
Crew Supervisor/ Party Manager	• Is the primary point of contact with the Lattice Seismic Field Manager and is on site at all times. • Controls and coordinates all survey operations. • Ensures operations are undertaken in accordance with the EP. • Reports any issues relating to stakeholder activities, concerns, disputes or conflict to the Lattice Seismic Field Manager as soon as possible; • Keeps the Lattice Senior Seismic Field Manager well informed of the progress of operations to allow Lattice to keep landowners well informed of impending operations. • Notifies the Lattice Seismic Field Manager of any HSE incident immediately and assists with incident investigation. • Ensures all daily and monthly reports are completed and issued to Lattice. • Conducts daily toolbox talks and weekly safety meetings, and records minutes of the meetings. • Maintains crew records.
Field HSE Advisor	• Reports to the Lattice HSE Field Supervisor. • Ensures that all HSE requirements are met throughout the survey from the commencement of line preparation until the services, including all restorations, are complete. • Ensures all Terrex and sub-contractor personnel are inducted and are aware of their environmental responsibilities. • Ensures Terrex and sub-contractor compliance with the Lattice contract and Lattice's HSE policies and procedures. • Promotes a proactive HSE culture with the crew. • Conducts field HSE inspections and audits. • Notifies the Terrex Party Manager of any HSE incident immediately. • Investigates and reports on HSE incidents. • Ensures equipment is appropriately inspected, certified and fit for purpose. • Ensures the safety of site visitors. • Collects and reports environmental emissions and discharges monitoring data to the Lattice Field HSE Supervisor.
Seismic surveyors, mechanics, technicians, mulcher operators, vibroseis	• Report to the Survey Party Manager. • Attend all required project inductions and daily toolbox meetings. • Follow directions with regard to implementing EP performance standards and any associated procedures. • Follow good housekeeping procedures and work practices.

Role	Environmental responsibilities
operators, scouts, line and support crew	• Encourage improvement in environmental performance wherever possible. • Immediately report environmental incidents or spillage of hydrocarbons or chemicals to the Survey Party Manager.

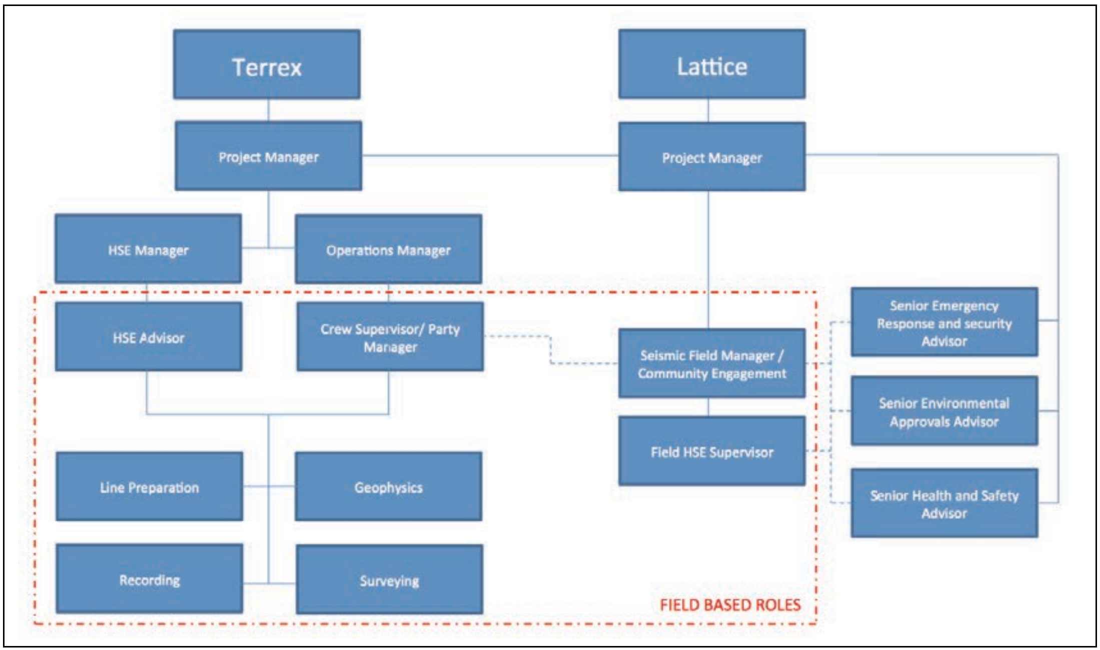


Figure 8.3. Project organisation chart

8.4 Training and Awareness

As required by Regulation 15(5) of the PGER Environment Regulations 2012, this section describes the measures that will be in place to ensure that each employee or contractor working on, or in connection with, the survey is aware of his or her responsibilities in relation to this EP and has the appropriate competencies and training. Training and awareness of project personnel is mandated by HSEMS Standard 5 (Personnel, Competence, Training and Behaviours).

8.4.1 Competence and Training

A competent, fully-resourced organisation and project team is the key component to ensure all personnel are aware of the environmental obligations.

As part of the contractor selection process, Lattice conducted thorough due diligence to ensure that Terrex has in place procedures to ensure the correct selection, placement, training and ongoing assessment of employees, with position descriptions (including a description of HSE responsibilities) for key personnel being readily available. This is linked to HSEMS Standard 13 (Contractors, suppliers, partners and visitors).

Terrex has in place procedures to identify the training needs of individuals to competently perform their roles, including the need to undertake corporate and site inductions. This is managed through the Terrex Induction and Training Procedure (TS-PRO-015), which include guidelines on personnel training, orientation and a ‘green hands’ (new crew) program. All training records are maintained in the online STEMS system administered by the Terrex Corporate HSE Manager.

Terrex maintains a Training Needs Analysis Matrix online called STEMS. STEMS ensures all personnel are appropriately trained in the tasks required to safely and effectively perform in the position they hold. All personnel are supplied and coached through their Job Descriptions that outline the process required to complete the task and the HSE responsibilities and accountabilities that are enforced while doing so.

Terrex will review all personnel training matrices for completion of the minimum Terrex and Lattice training requirements prior to mobilising to the project site. Additional external training is carried out by

Registered Training Organisations for all other training that is required and cannot or should not be conducted internally, such as off-road and defensive driving training.

All project personnel will receive the required information, instruction, training and supervision necessary to ensure a proactive effort is maintained and any constraints imposed on the project are adhered to.

To verify personnel competencies, Terrex follows the process outlined below:

- Personnel assigned to Safety Critical Tasks – Position holders are required to demonstrate the appropriate level of skill and knowledge to be able to safely and effectively perform the task. Acknowledgement of previous experience in the position along with training certification and performance record reviews form the additional assurance components required.
- New personnel – Competence assurance is an ongoing exercise throughout all projects. Any new employees who arrive onsite are immediately initiated into the company's 'Green Hand' program. Each Green Hand is provided a mentor whereby supervision, instruction, information and training can be delivered on an ongoing basis before the 3-month probationary period expires and a review is conducted. Those deemed competent are relinquished of their mentor at this point and commence employment in earnest, as per the next point.
- All Other Personnel: The monthly completion of the Competency and Procedural Compliance (CPC) assessment, for all personnel enables crew management to evaluate existing performance then carry out planned initiatives to ensure the process of continual employee improvement in effectively managed. The CPC assessment forms part of the project KPIs that are closely monitored for completion by Terrex senior management.

Competence assessment is evaluated through Performance Development Plans.

8.4.2 Emergency Response Exercise

Lattice's Trieste 3D Seismic Survey Bridging Emergency Response Plan (ERP) will be tested:

- Prior to the commencement of the survey;
- When there is a significant modification to the Bridging ERP; and
- In accordance with Lattice's Emergency Response Exercise Planning and Reporting Procedure.

This is linked to HSEMS Standard 14 (Crisis and emergency management).

8.4.3 Environmental Inductions

A survey-specific HSE induction for all project personnel will also be undertaken prior to the survey commencing. The environmental component of the induction will be prepared by the Lattice Senior Environmental Advisor (or delegate) and include information on the following environmental issues:

- Description of the environmental sensitivities, heritage and conservation values of the survey area and surrounds;
- Importance of following procedures and using JSAs to identify environmental risks and mitigation measures;
- Procedures for responding to and reporting environmental hazards or incidents;
- Overview of emergency response and spill management procedures;
- Overview of the waste management requirements; and
- Roles and environmental responsibilities of key personnel.

The Lattice Project Manager is responsible for ensuring personnel receive this induction prior to the commencement of the survey. All personnel are required to sign an attendance sheet to confirm their participation in and understanding of the induction.

8.4.4 Meetings

The Terrex *Communication and Consultation Procedure* (TS-PRO-03, January 2017) specifies that the following means of communications will be employed on projects to ensure that all personnel are abreast of HSE matters:

- Daily toolbox meetings – all employees and sub-contractors attend a daily pre-start meeting to discuss the day's activities and any specific hazards associated with these. Hazard observations from the previous day's work can also be discussed. Minutes are recorded for these meetings.
- Weekly safety meetings – held on site, these meetings provide a forum for all employees and contractors to voice their opinions and suggestions on all HSE and operational matters. Industry safety alerts are raised as applicable, HSE presentations are provided and the outcomes of inspections and audits are discussed.
- Weekly crew department head meetings – provide field supervisors a link to management, and include a discussion of HSE matters. Issues such as incidents, identified deficiencies or improvements to the IMS, equipment modifications required, training requirements, results from emergency response drills and operational HSE issues are discussed at these meetings. Minutes are recorded for these meetings.
- Pre-job safety meetings – designed to brief personnel on an upcoming activity and can be facilitated by any person deemed to be the senior person on the job. These meetings are held where the review of a Job Safety Analysis (JSA) for tasks of a non-hazardous nature is not required.

The Lattice Senior Seismic Field Manager and Field HSE Advisor will attend these meetings wherever practicable so that issues of importance can be raised immediately with, and addressed by Lattice.

8.4.5 Spill Response Training

Regular training of the survey crew in oil and chemical spill procedures is a standard requirement for Terrex. Terrex's Induction and Training Procedure (TS-PRO-15, January 2017) defines the methods used to identify the training requirements of its staff and establishes training and development programs in line with legislative requirements and industry best practice. This procedure specifies that pre-employment position suitability assessment is undertaken, and once employed, there is a training needs analysis, a training review, training plans and inductions as required. All Terrex staff and contractors are provided with training in relation to the SOPs.

The Terrex SOP for *Hydrocarbon Spillage and Clean Up* (TS-SOP-GEN016) provides instructions on how to clean up spills.

This is linked to Lattice HSEMS Standard 13 (Contractors, suppliers, partners and visitors).

8.5 SIMOPS

In accordance with HSE Management Standard 7 (Hazard and Risk Management), Lattice undertakes Simultaneous Operations (SIMOPs) assessments where HSE hazards and risks associated with simultaneous activities are identified, so that these risks can be managed to prevent or reduce the likelihood and consequence of incidents.

The most notable potential for SIMOPs is the operation of the seismic survey over the DBNGP. To avoid SIMOPs, the seismic source will not be activated in the pipeline easement.

8.6 Recording and Reporting

Regulation 16, 28, 29 and 30 of the PGER Environment Regulations 2012 state that the EP must include arrangements for recording and reporting information sufficient to enable the Minister to determine whether the EPO and EPS have been met. This section describes how this will be achieved for the Trieste 3D seismic survey.

8.6.1 Internal Reporting

Routine

Routine internal recording and reporting of project HSE matters will encompass the following:

- Daily operations reports – the Lattice Senior Seismic Field Manager will prepare a daily operations report, including data on activities conducted for the day and any HSE issues arising. This will be submitted to the Lattice Project Manager daily and distributed to the extended project team.

Incidents

All environmental incidents (that is, non-compliances with the EP performance standards) must be communicated immediately to Lattice's Seismic Field Manager and Survey Manager. This expectation will be reinforced at the project induction, toolbox meetings and weekly HSE meetings.

Non-compliances with the EP will be recorded in the enterprise incident management system by Lattice's Field HSE Supervisor (or delegate) as soon as reasonably practicable following the incident in accordance with the Incident Management Procedure (LAT-RMS-DIR-006). The Lattice Field HSE Supervisor will lead an investigation into the cause, effects and learnings of the incident as per Lattice's investigation procedures (detailed in HSEMS Standard 8, Incident management). Following an investigation, remedial actions will be developed, with the results communicated to the survey team (and wider organisation, as appropriate) to prevent recurrence. These actions will be tracked to completion.

8.6.2 External Reporting

Routine

Lattice has defined the requirements for routine notifications as outlined in Table 8.4. Unless otherwise stated, all reports are submitted electronically to DMIRS at: petroleum.environment@dmirs.wa.gov.au.

Table 8.4. Routine notification requirements

Requirements	Submission timing and contact
Post-EP acceptance reporting	
Submit vegetation clearing permit annual report.	Annually for the duration of the Vegetation Clearing Permit.
Submit an EP performance report.	Annually (covering the financial year) for the life of the EP (linked to the duration of the Vegetation Clearing Permit), and submitted within 3 months of the end of the financial year.
Submit monthly recordable incident reports (see Table 8.5).	By the 15th of the proceeding month.
Submit emissions and discharges monitoring results (see Table 8.6), including reports for nil emissions and discharges as appropriate.	Quarterly, with the first report due 3 months after acceptance of the EP and until such time that rehabilitation completion criteria have been met.
Pre-start notifications	
Notify the DMIRS with the survey commencement date (commencement is defined as mobilisation).	Two weeks prior, by email to: petroleum.environment@dmirs.wa.gov.au
Notify the shires overlapped by the survey area with the commencement date of activities.	Two weeks prior, by visiting the offices of: • Shire of Three Springs. • Shire of Irwin.
Notify DBAC (Geraldton office) with the commencement date of activities.	Two weeks prior, by visiting the Geraldton office.
Notify DFES (Geraldton office) with the commencement date of activities.	Two weeks prior, by visiting the Geraldton office.
Notify all landowners within the survey area with the commencement date of activities.	Two weeks prior via visit, phone or email/letter drop.
Cessation notifications	
Notify the above-listed agencies and landowners with the survey completion date.	Within one week of survey completion.
An EP close-out report will be submitted to the DMIRS, providing evidence that the EPO and EPS have been complied with.	Within 3 months of completion of the survey.

Incidents

Regulations 16, 28, 29 and 30 of the PGER (Environment) Regulations 2012 define the requirements for incident reporting. Table 8.5 provides the regulatory definitions of reportable and recordable incidents and their reporting requirements.

Table 8.5. Incident reporting requirements

<table>
<tr><th>Incident type</th><th>Reporting requirements</th></tr>
<tr><td colspan="2">Reportable incident</td></tr>
<tr><td rowspan="2">Definition under Regulation 4:
An incident arising from the activity if the incident has caused, or has the potential to cause, an adverse environmental impacts and under the environmental risk assessment process described in the EP, that environmental impact is categorised as moderate or more serious than moderate (this is the equivalent to risk ratings of high, severe or extreme using the Lattice risk matrix shown in Table 6.3).
Incidents assessed in this EP that fit this definition (inherent risk rating) are:
• Loss of threatened species;
• Loss of wildlife;
• Introduction of weeds and pathogens; and
• Ignition of wildfire.</td><td>Verbal (or written) notification
An operator must provide notice within 2 hours of the incident (or from the time of becoming aware of the incident) to the Minister (via DMIRS) that specifies:
• All material facts and circumstance regarding the incident (e.g., date, time, location, nature of the incident); and
• Actions taken to avoid or mitigate any adverse environmental impacts of the incident.</td></tr>
<tr><td>Written report
A written report must be submitted to the Minister (via DMIRS) within 3 days after the first occurrence of the incident that specifies:
• All material facts and circumstance regarding the incident;
• Actions taken to avoid or mitigate any adverse environmental impacts of the incident; and
• Any action taken, or proposed to be taken, to prevent a similar reportable incident.</td></tr>
<tr><td colspan="2">Recordable incident</td></tr>
<tr><td rowspan="2">Definition under Regulation 4:
An incident arising from the activity that breaches an EPO or EPS in the EP and is not a reportable incident.</td><td>Written report
A written report must be submitted to the Minister (via DMIRS) as soon as practicable, and in any case within 3 days after the first occurrence of the incident that specifies:
• All material facts and circumstance regarding the incident;
• Actions taken to avoid or mitigate any adverse environmental impacts of the incident; and
• Any action taken, or proposed to be taken, to prevent a similar reportable incident.</td></tr>
<tr><td>Monthly report
The Operator of an activity must submit a monthly written report of recordable incidents within 15 days after the end of the month to which it relates. The report must specify:
• All material facts and circumstance regarding the incident;
• Actions taken to avoid or mitigate any adverse environmental impacts of the incident; and
• Any action taken, or proposed to be taken, to prevent a similar reportable incident.
If no recordable incidents occurred during the month, the report must include a statement to that effect.</td></tr>
<tr><td colspan="2">Notify incidents via:
Phone: 0419 960 621 (reportable incidents only)
Email: petroleum.environment@dmirs.wa.gov.au</td></tr>
</table>

Incident type	Reporting requirements
	Internet: http://www.dmp.wa.gov.au/Environment/Environment-reports-and-6133.aspx

While the following events do not have a risk rating of high, severe or extreme, they too are considered to be reportable incidents:

- Unauthorised vegetation clearing;
- Hydrocarbon or chemical spill greater than 80 litres to land; and
- Any spill of hydrocarbons, chemicals or regulated wastes directly to waterways.

8.6.3 Industry-wide Reporting

Significant environmental and safety incidents are reported from APPEA-member companies to APPEA on a regular basis, providing the industry representative (and thus the industry as a whole) with accurate data on the type and number of incidents occurring. This allows oil and gas operators, government agencies and APPEA to assess and report industry-wide environment performance. APPEA issues 'alerts' to member companies and individuals to share learning's from HSE incidents.

Lattice participates in this initiative.

8.7 Monitoring

Regulation 34 of the PGER (Environment) Regulations 2012 states than an operator of an activity must monitor all discharges to land, air, groundwater or inland waters resulting from the activity.

The Lattice Field HSE Advisor will be present on site at all times during the survey to ensure compliance with the EPS presented in the EP, and is responsible for collecting monitoring data and reporting it to the Project Manager. During the survey and any ancillary activities, this is facilitated by completing a daily environmental monitoring register, which captures the commitments made in Table 8.6. A summary of these records will be provided to DMIRS in the EP performance report submitted within 3 months of completion of the survey, and quarterly until such time as the rehabilitation completion criteria are met.

Additionally, monitoring results will be provided quarterly to DMIRS post-EP acceptance (as noted in Table 8.5), even if this is a simple 'nil' report because no activities have been undertaken for that three-month period.

Table 8.6. Summary of the Trieste seismic survey environmental monitoring program

Aspect	Monitoring requirement	Frequency
Planned activities		
Loss of native vegetation	Line pointer surveyor guides the mulcher during line preparation to avoid sensitive vegetation and the location of threatened species.	During line preparation.
Vegetation rehabilitation	Monitoring along survey lines to record changes in vegetation as part of the Rehabilitation Monitoring Plan.	Annually, for the duration of the Vegetation Clearing Permit.
Noise and vibration	Noise and/or vibration recording.	In response to non-vexatious complaints.
Disturbance to wildlife	N/A	N/A
Soil disturbance	Photos of rehabilitation efforts.	At survey completion.
Air and dust emissions	Fuel use for all vehicles.	Tallied at end of survey from fuel receipts.
Unplanned activities		
Unplanned	Photos.	Pre- and post-survey.

Aspect	Monitoring requirement	Frequency
disturbance to farming activities		
Introduction of weeds and pathogens	Visual monitoring of vehicles to ensure no introduction of foreign soil or vegetative matter.	Constantly.
Disturbance to indigenous and non-indigenous cultural heritage	Visual monitoring to ensure cultural heritage material is not unearthed. Line pointer surveyor guides the mulcher during line preparation to avoid sensitive sites (if flagged by the Amangu people).	Constantly, but particularly during line preparation.
Disruption to visual amenity	Photos taken of project activities to provide record of visual impacts.	Constantly.
Ignition of wildfire	Weather and TFB monitoring.	Daily.
	Water cart to trail the vegetation mulcher.	During line preparation.
Damage to third-party infrastructure	Line pointer surveyor guides the mulcher to avoid the DBNGP easement.	During line preparation.
	GPS data guides the vibroseis buggies to avoid the DBNGP easement.	During survey acquisition.
Inappropriate waste disposal	Waste transport certificate tracking.	Constantly.
Hydrocarbon and chemical spills	Visual monitoring for spills or leaks.	Constantly.

8.8 Audit and Review

Regulation 15(6) of the PGER (Environment) Regulations 2012 requires that monitoring, audit and review of performance against the EPS and implementation strategy outlined in this EP takes place. This will be undertaken in line with HSEMS Standard 20 (Audits, assessment and review). This standard is implemented to ensure that:

- EPS to achieve the EPO are being implemented, reviewed and where necessary amended;
- Potential non-compliances and opportunities for continuous improvement are identified; and
- All environmental monitoring requirements have been met before completing the activity.

The following arrangements will be established to review environmental performance of the activity:

- Due diligence inspection – an inspection of the vibroseis buggies and mulchers will be carried out prior to the survey to ensure that they can meet the EPS outlined in the EP.
- Internal operations inspections – the Lattice Seismic Field Manager and Field HSE Supervisor will continually supervise the survey, ensuring adherence to the EPS specified in this EP. Regular inspections using an environmental checklist will be completed by the Field HSE Supervisor, and issued to the Project Manager.

Any non-compliance with the EPS outlined in this EP will be subject to investigation and follow-up action as specified in the Lattice Incident Management Directive (LAT-RMS-DVE-006), and ultimately closed out.

The findings from inspections will be documented and communicated to relevant personnel through toolbox meetings and/or weekly HSE meetings to ensure that any opportunities for improvement can be rapidly implemented. Results from the environmental inspections will be summarised in the EP performance report submitted to DMIRS within 3 months of completion of the survey.

8.8.1 Management of Non-compliance

In response to any non-compliances with the EP, a non-conformance report (NCR) is issued by the Lattice Seismic Field Manager (or Field HSE Supervisor) to the Terrex Survey Party Manager, and a corrective action request (CAR) is generated by the Lattice Seismic Field Manager (or Field HSE Supervisor).

The corrective action will specify the remedial action required to fix the breach and prevent its reoccurrence and is delegated to the person deemed most appropriate to fulfil the CAR. The corrective action is closed out only when the remedial action has been verified by Lattice's Seismic Field Manager (or Field HSE Supervisor) and signed off. This process is maintained through the enterprise incident management system.

Lattice will carry forward any non-conformances identified during the project for consideration in future surveys to assist with continuous improvement in environmental management controls and performance outcomes in future operations.

All personnel have the authority to stop work at any time if HSE incidents breach or threaten to breach Lattice's HSE standards and/or the EPS outlined in this EP, or if the Lattice Seismic Field Manager (or Field HSE Supervisor) is not satisfied that measures are in place to avoid a repeat of the incident.

8.9 Emergency Response and Preparedness

Lattice will manage safety and emergency situations through the preparation and implementation of a project Emergency Response Plan (ERP). The ERP will be available prior to the survey commencing.

The ERP will contain instructions for vehicle emergency, medical emergency, search and rescue, reportable incidents, incident notification and emergency contact information. This is linked to Lattice HSEMS Standard 7 (Hazard and risk management) and Standard 14 (Crisis and emergency management).

In the event of an emergency of any type, the Lattice Seismic Field Manager will assume overall onsite command and act as the Emergency Response Coordinator (ERC). All survey personnel will be required to act under the ERC's directions. The Lattice Seismic Field Manager will maintain communications with the Lattice Emergency Team Leader and/or other emergency services in the event of an emergency. Emergency response support will be provided by Lattice as required by the situation.

The survey vehicles will have equipment available for responding to emergencies, including but not limited to medical equipment, fire fighting equipment and hydrocarbon and chemical spill response equipment.

8.10 Hydrocarbon and Chemical Spill Response

A complete outline of the arrangements in place to deal with hydrocarbon or chemical spill incidents associated with the survey is provided in the Trieste 3D Seismic Survey OSCP (WAA-4000-ENV-PLN) (submitted with this EP).

Section 4.3 of the OSCP specifies that it will be tested within one month of being introduced or when a significant modification to the plan has occurred. Response exercises will be undertaken in accordance with Lattice's Emergency Response Exercise Planning Reporting Procedure (14749814).

8.11 Record Keeping

In accordance with Regulation 31 of the PGER (Environment) Regulations 2012, Lattice will store and maintain all relevant documents or records relevant to the survey for a minimum of 5 years. These will be stored and managed on Lattice's computer server in accordance with HSEMS Standard 4 (Legal requirements, document control and information management). Such records include, but are not limited to:

- This EP;
- Inspection reports;
- Stakeholder consultation records;
- Environmental monitoring data;
- Daily operations reports;
- HSE meeting minutes;
- Induction presentations and attendance records;
- Staff and contractor training records; and
- Incident and investigation reports.

These records will be made available to the Minister (via DMIRS or other regulatory authorities) upon request.

8.12 Implementation Strategy Performance Monitoring

As with the commitments outlined throughout Chapter 7, the Implementation Strategy presented in this chapter contains numerous commitments. Regulation 16 of the PGER (Environment) Regulations 2012 requires that the Implementation Strategy is complied with. The Implementation Strategy commitments are listed in Table 8.7 for ease of auditing.

Table 8.7. Summary of the implementation strategy commitments

Section	Performance standard	Measurement criteria
8.4.1	Terrex will review all personnel training matrices for completion of the minimum Terrex and Lattice training requirements prior to mobilising to the project site.	Terrex training matrices and personnel certificates verify that all training requirements are up-to-date prior to the survey commencing.
8.4.1	All project personnel will receive the required information, instruction, training and supervision necessary to ensure a proactive effort is maintained and any constraints imposed on the project are adhered to	Induction attendance records verify that all personnel are inducted into project requirements.
8.4.2	The Bridging ERP will be tested: • Prior to the commencement of the survey; • When there is a significant modification to the Bridging ERP; and • In accordance with Lattice's Emergency Response Exercise Planning and Reporting Procedure.	Exercise report verifies that the ERP was tested prior to the survey commencing.
8.4.3	A survey-specific HSE induction for all project personnel will be undertaken prior to the survey commencing.	Induction attendance records verify that all personnel are inducted into project HSE requirements.
8.4.4	All project personnel are kept aware of HSE matters via: • Daily toolbox meetings; • Weekly safety meetings; • Weekly crew department head meetings; and • Pre-job safety meetings.	Meeting notes verify that all project personnel are briefed on HSE matters.
8.4.5	Regular training of the survey crew in oil and chemical spill procedures will take place.	Dated training matrix/matrices are available to verify that survey personnel have up to date training.
8.6	All reportable and recordable incidents are recorded and reported as per Section 8.6 of the EP.	All incident reports are logged in the enterprise incident management system.
	The end-of-survey EP performance report is prepared and submitted to DMIRS within 3 months of survey completion.	Dated correspondence from Lattice to DMIRS accompanying the end-of-survey EP performance reports verifies the report was issued within 3 months of survey completion.
8.7	Monitoring is undertaken as outlined in Section 8.7.	Environmental monitoring data is available.

Section	Performance standard	Measurement criteria
8.8	Due diligence inspection of the vibroseis buggies and mulchers is undertaken prior to the survey commencing.	Inspection report is available.
	Continuous inspection of the survey activities is undertaken against the EPS.	Completed environmental checklists are available.
	Non-compliances with the EPS are investigated, closed-out and reported internally and externally.	The enterprise incident management system records are available.
8.9	A project-specific ERP will be prepared and tested prior to the survey commencing.	The ERP is available.
		An ERP exercise report verifies that the exercise was undertaken prior to the survey commencing.
	The ERP is implemented in the event of an emergency.	The enterprise incident management system records verify that the ERP was implemented.
8.10	The OSCP is tested prior to the survey commencing.	Exercise report verifies that the OSCP was tested prior to the survey commencing.
8.11	All records pertaining to the survey are stored on Lattice's computer server.	Survey records are logically stored and easily retrieved on the computer server.

8.13 Revision of this EP

The manner in which revisions or proposed revisions to this EP will be managed are outlined in this section.

8.13.1 Revisions triggering EP re-submission

Revision of this EP will be undertaken in accordance with the relevant OPGGS(E) and OPGGS Regulations, as outlined in Table 8.8.

8.13.2 Minor Revisions

Minor revisions to this EP that do not require resubmission to DMIRS will be made:

- Where minor administrative changes are identified that do not impact on the risk assessment or directly on the environment (e.g., document references, contact details, etc.).
- Where a review of the activity and the environmental risks and impacts of the activity do not trigger a requirement for a revision as outlined in Table 8.8.

Using Lattice's document control process (HSEMS Standard 4, Legal requirements, document control and information management) and MoC process (MoC Directive, LAT-HSE-DVE-004), minor revisions to the EP will not be submitted to the regulators for formal assessment. Minor revisions will be tracked and incorporated as required (e.g., in the event of design changes).

Table 8.8. PGER Environment Regulations EP revision requirements

PGER Environment Regulations	Regulation
Change or proposed change or activity or circumstances	
Submit a revised EP before the commencement of any new activity.	18(1)(a)
Submit a revised EP before the commencement of any significant modification of, significant change in, or significant new stage of an existing activity.	18(1)(b)
Submit a revised EP for the activity before or as soon as practicable after a change in the instrument holder for, or operator of, the activity.	18(2)(a)
Submit a revised EP before, or as soon as practicable after, the occurrence of any significant new environmental impact or risk not provided for in the EP.	18(2)(b)(i)
Submit a revised EP before, or as soon as practicable after, any significant increase in an existing environmental impact or risk not provided for in the EP.	18(2)(b)(ii)
Submit a revised EP before, or as soon as practicable after, the occurrence of a series of new environmental impacts or risks which, taken together, amount to the occurrence of a significant new or significant increase in an existing environmental impact or risk not provided for in the EP.	18(2)(c)
Request from the Minister	
Submit a revised EP if written notice from the Minister is provided.	19(1)
Revision every 5 years	
Submit a revised EP at least 14 days before the end of each period of 5 years commencing on the day in which the original and subsequent revisions of the EP is accepted.	20(1)

9. References

ABS. 2017. 2016 Census QuickStats: Eneabba. A WWW database accessed in 2017 at http://www.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC50486?opendocument.

APA. 2017. Parmelia Gas Pipeline. A WWW resource accessed in 2017 at https://www.apa.com.au/our-services/gas-transmission/west-coast-grid/parmelia-gas-pipeline/. APA Group.

APPEA. 2008. Code of Environmental Practice. Australian Petroleum Production and Exploration Association. Canberra.

Beard, J.S. 1990. Plant life of Western Australia. Kangaroo Press, Kenthurst, NSW.

Benshemesh, J. 2007. National Recovery Plan for Malleefowl (*Leipoa ocellata*). Department for Environment and Heritage. South Australia.

BoM. 2001. Australian Drainage Divisions and River Basins map. A WWW database accessed at http://www.bom.gov.au . Bureau of Meteorology.

BoM. 2017. Climate statistics for Australian locations: Eneabba. A WWW database accessed at http://www.bom.gov.au/climate/averages/tables/cw_008225.shtml. Bureau of Meteorology.

CALM. 2003a. A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002. A WWW document accessed in 2017 at https://www.dpaw.wa.gov.au/images/documents/about/science/projects/waaudit/geraldton_sandplains02_p265-292.pdf. Department of Conservation and Land Management. Perth.

CALM. 2003b. *Phytophthora cinnamomi* and Disease Caused By It. Volume 1 – Management Guidelines. Department of Conservation and Land Management. Perth.

CALM. 2004. Cadda Road Mallee (*Eucalyptus balanites*) Interim Recovery Plan 2004-2009. Department of Conservation and Land Management. Perth.

Clean Up Australia. 2009. Cigarette butts factsheet. A WWW document accessed in 2017 at https://www.cleanup.org.au/PDF/au/cleanupaustralia_cigarette_buts_factsheet.pdf. Clean Up Australia Day Ltd.

Council of Australian Governments. 1992. Australia's National Strategy for Ecological Sustainable Development. A WWW document accessed in 2017 at http://www.environment.gov.au/about-us/esd/publications/national-esd-strategy. Department of the Environment and Energy. Canberra.

DAA. 2013. Aboriginal Heritage Due Diligence Guidelines. Version 3. 30 April 2013. A WWW document accessed in 2017 at https://www.daa.wa.gov.au/globalassets/pdf-files/ddg. Department of Aboriginal Affairs, Department of the Premier and Cabinet.

DAF. 2007. West Midlands Region Catchment Appraisal 2007. Resource Management Technical Report 315. A WWW document accessed in 2017 at https://researchlibrary.agric.wa.gov.au/cgi/viewcontent.cgi?referer=https://www.google.com.au/&httpsredir=1&article=1296&context=rmtr. Department of Agriculture and Food. Government of Western Australia.

DBCA. 2017a. Threatened species databases. Department of Biodiversity, Conservation and Attractions. Perth.

DBCA. 2017b. Phytophthora dieback. A WWW database accessed in 2017 at https://www.dpaw.wa.gov.au/management/pests-diseases/phytophthora-dieback. Department of Biodiversity, Conservation and Attractions. Perth.

DBP. 2017. Dampier to Bunbury Natural Gas Pipeline. A WWW resource accessed in 2017 at http://www.dbp.net.au. Dampier Bunbury Pipeline.

DEC. 2006. Hidden Beard Heath (*Leucopogon obtectus*) Interim Recovery Plan 2006-2011. Interim Recovery Plan No. 227. Department of Environment and Conservation. Perth.

DEC. 2009. Prostrate Flame Flower (*Chorizema humile*) Recovery Plan. Department of Environment and Conservation. Perth.

DEC. 2012a. Chuditch (*Dasyurus geoffroii*) Recovery Plan. Wildlife Management Program No. 54. Department of Environment and Conservation. Perth.

DEC. 2012b. Western Spiny-tailed Skink (*Egernia stokesii*) National Recovery Plan. Wildlife Management Program No. 53. Department of Environment and Conservation. Perth.

DEWHA. 2008a. Approved Conservation Advice for *Eucalyptus crispata* (Yandanooka Mallee). Department of Environment, Water, Heritage and the Arts. Canberra.

DEWHA. 2008b. Approved Conservation Advice for *Paracaleana dixonii* (Sandplain Duck Orchid). Department of Environment, Water, Heritage and the Arts. Canberra.

DEWHA. 2008c. Approved Conservation Advice for *Thelymitra stellata* (Star Sun-orchid). Department of Environment, Water, Heritage and the Arts. Canberra.

DMIRS. 2017. Interactive geological map, GeoVIEW.WA. A WWW database accessed in 2017 at http://www.dmp.wa.gov.au/GeoView-WA-Interactive-1467.aspx. Department of Mines, Industry Regulation and Safety.

DMP. 2016. Guideline for the Development of Petroleum and Geothermal Environment Plans in Western Australia. Department of Mines and Petroleum. East Perth. WA.

DMP. 2016b. Guideline for the Development of an Onshore Oil Spill Contingency Plan. Department of Mines and Petroleum. East Perth. WA.

DoAF. 2007. West Midlands region catchment appraisal 2007. 1-2007. A WWW document accessed in 2017 at http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Tech%20guidance-%20Sampling-TV-fauna-Dec2016.pdf. Department of Agriculture and Food. Perth.

DoE. 2014. Threat abatement plan for disease in nature ecosystems caused by *Phytophthora cinnamomi*. Department of the Environment. Canberra. ACT.

DoE. 2013. Matters of National Environmental Significance. Significant impact guidelines 1.1. Department of the Environment. Canberra. ACT.

DoEE. 2017a. Protected Matters Search Tool. A WWW database accessed in 2017 at http://www.environment.gov.au/epbc/protected-matters-search-tool. Department of the Environment and Energy. Canberra.

DoEE. 2017b. Species Profile and Threats Database. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl? Department of the Environment and Energy. Canberra.

DoEE. 2017c. Australia's World Heritage List. A WWW database accessed in 2017 at http://www.environment.gov.au/heritage/places/world-heritage-list. Department of the Environment and Energy. Canberra.

DoEE. 2017d. Australia's National Heritage List. A WWW database accessed in 2017 at http://www.environment.gov.au/heritage/places/national-heritage-list. Department of the Environment and Energy. Canberra.

DoEE. 2017e. Commonwealth Heritage. A WWW database accessed in 2017 at http://www.environment.gov.au/heritage/places/commonwealth-heritage-list. Department of the Environment and Energy. Canberra.

DoEE. 2017f. Wetlands of International Importance. A WWW database accessed in 2017 at http://www.environment.gov.au/water/wetlands/publications/factsheet-australias-ramsar-sites. Department of the Environment and Energy. Canberra.

DoEE. 2017g. Wetlands of National Importance. A WWW database accessed in 2017 at http://www.environment.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands. Department of the Environment and Energy. Canberra.

DoP. 2015. Mid West Regional Planning and Infrastructure Framework. Part A: Regional Strategic Planning. February 2015. Department of Planning. Perth.

DoW. 2017. Northern Perth Basin: Geology, hydrogeology and groundwater resources. Hydrogeological bulletin series. Report no. HB1. January 2017. Department of Water. Perth.

DPaW. 2013. Carnaby's cockatoo (*Calyptorhynchus latirostris*) Recovery Plan. Department of Parks and Wildlife. Perth.

DPIRD. 2017. Annual ryegrass. A WWW database accessed in 2017 at https://www.agric.wa.gov.au/grains-research-development/annual-ryegrass. Department of Primary Industries and Regional Development. Perth.

DPLH. 2017a. inHerit heritage database. A WWW database accessed in 2017 at http://www.inherit.stateheritage.wa.gov.au/Public/. Department of Planning, Lands and Heritage. Perth.

DPLH. 2017b. Aboriginal Heritage Inquiry System. A WWW database accessed in 2017 at https://maps.daa.wa.gov.au/AHIS/. Department of Planning, Lands and Heritage. Perth.

DPLH. 2017c. Aboriginal Heritage Inquiry System. A WWW database accessed in 2017 at http://www.stateheritage.wa.gov.au/state-heritage-register/assessment-nomination. Department of Planning, Lands and Heritage. Perth.

DSEWPC. 2012. EPBC Act Referral Guidelines for three threatened black cockatoos: Carnaby's Cockatoo, Baudin's Cockatoo and Forest Red-tailed Black-Cockatoo. Department of Sustainability, Environment, Water, Population and Communities. Canberra.

DSEWPC. 2013a. Approved Conservation Advice for *Tetratheca nephelioides* (a shrub). Department of Sustainability, Environment, Water, Population and Communities. Canberra.

DSEWPC. 2013b. Approved Conservation Advice for *Idiosoma nigrum* (shield-back spider). Department of Sustainability, Environment, Water, Population and Communities. Canberra.

Earth Tech. 2002. West Midlands Hydrology Project Stage One Report: The Impact of Hydrological Issues on Biodiversity and Agriculture in the West Midlands Region. Prepared by Earth Tech Engineering.

EPA & DEC. 2010. Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment. A WWW document accessed at http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Tech%20guidance-%20Sampling-TV-fauna-Dec2016.pdf. Environmental Protection Authority and Department of Environment and Conservation.

EPA. 2016a. Statement of Environmental Principles, Factors and Objectives. A WWW document accessed in 2017 at http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Statement%20of%20Environmental%20Principles%2C%20factors%20and%20objectives_Dec16_1.pdf. Environmental Protection Authority. Perth.

EPA. 2016b. Environmental Factor Guideline. Terrestrial Fauna. A WWW document accessed in 2017 at http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Guideline-Terrestrial-Fauna-131216_3.pdf. Environmental Protection Authority. Perth.

EPA. 2016c. Technical Guidance. Terrestrial Fauna Surveys. A WWW document accessed in 2017 at http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Tech%20guidance-%20Terrestrial%20Fauna%20Surveys-Dec-2016.pdf. Environmental Protection Authority. Perth.

EPA. 2016d. Environmental Factor Guideline. Flora and Vegetation. A WWW document accessed in 2017 at http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Guideline-Flora-Vegetation-131216_4.pdf. Environmental Protection Authority. Perth.

EPA. 2016e. Technical Guidance. Flora and vegetation surveys for environmental impact assessment. A WWW document accessed at http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Guideline-Flora-Vegetation-131216_4.pdf. Environmental Protection Authority. Perth.

Evolve Solutions. 2014. Mid West Tourism Development Strategy. Evolve Solutions.

Geoscience Australia. 2017. Perth Basin. A WWW database accessed in 2017 at http://www.ga.gov.au/scientific-topics/energy/province-sedimentary-basin-geology/petroleum/offshore-southwest-australia/perth-basin. Geoscience Australia. Canberra.

IAGC. 2013. The Environmental Manual for Worldwide Geophysical Operations. 2013 edition. The International Association of Geophysical Contractors. Houston, Texas.

Iluka Resources Ltd. 2009. Phytophthora Dieback Management Plan. Eneabba Operations. Iluka Resources. Perth.

IRC Environment. 2004. Denison 3D Seismic Survey Public Environmental Review. Prepared by IRC Environment for Arc Energy and Origin Energy.

Johnson, S.L. and Commander, D.P. 2006. Mid West Minerals Province – Groundwater resource Appraisal. Department of Water Hydrogeological Record Series. Report No HG17. August 2006. A WWW document accessed in 2017 at https://www.water.wa.gov.au/__data/assets/pdf_file/0013/5170/79032.PDF.

Landgate. 2017. NoAA Burnt Area Maps – Yearly (2010). GIS layer. A WWW database accessed in 2017 at http://firewatch-pro.landgate.wa.gov.au/.

MainRoads WA. 2015. Mid West-Gascoyne Traffic Digest. 2009/10 – 2014/15. A WWW document accessed at http://reportingcentreresources.mainroads.wa.gov.au/public/data/xrc4111/AADT/traffic_digest.214.pdf. MainRoads Western Australia. Perth.

Mapcarta. 2017. General search over proposed survey area. A WWW database accessed in 2017 at http://www.mapcarta.com.

Mattiske Consulting. 2017. Targeted Flora Survey. Trieste 3D Seismic Project, Arrowsmith. Prepared by Mattiske Consulting Pty Ltd for Lattice Energy. December 2017.

MCMPR. 2005. Principles for Engagement with Communities and Stakeholders. Ministerial Council on Mineral and Petroleum Resources.

Nidagal, V. 1995. Hydrogeology of the coastal plain between Leeman and Dongara, Perth Basin, Record 1994/10. Western Australia Geological Survey, Government of Western Australia, Perth.

NIP. 2017. National Pollution Inventory. A WWW database accessed in 2017 at http://www.npi.gov.au. Department of Environment and Energy. Canberra.

NOPSEMA. 2016. Guidance Notes for EP Content Requirements (N04750-GN1344, Rev 3, April 2016). A WWW document accessed at https://www.nopsema.gov.au/environmental-management/environment-resources/. National Offshore Petroleum Safety and Environmental Management Authority. Perth.

Playford, P.E., Cockbain, A.E. and Low, G.H. 1976. Geology of the Perth Basin Western Australia.

Shire of Irwin, 2016. Local Planning Strategy Review. Parts 1 & 2. June 2016. A WWW document accessed in 2017 at http://www.irwin.wa.gov.au/Profiles/irwin/Assets/ClientData/LPS_Part_1_Report_July_2016.pdf. Shire of Irwin.

Shire of Three Springs. No date. Local Planning Strategy: Background Document. Prepared by Greg Rowe and Associates. A WWW document accessed in 2017 at http://threesprings.wa.gov.au/images/OurCouncil/publicDocuments/Strategy_Background.pdf. Shire of Three Springs. Western Australia.

Testa, S.M and Jacobs, J.A. 2014. Oil Spills& Gas Leaks. Environmental Response, Prevention, and Cost Recvoery. McGraw Hill Education. New York.

Tille, P. 2006. Soil-landscapes of Western Australia's Rangelands and Arid Interior. Resource Management Technical Report 313. A WWW document accessed at http://www.asris.csiro.au/downloads/state_agencies/tr2007_slwarai_ptille_nomaps.pdf. Department of Agriculture and Food. Government of Western Australia.

TSSC. 2015a. Conservation Advice *Eucalyptus impensa* (Eneabba mallee). Threatened Species Scientific Committee. Canberra.

TSSC. 2015b. Conservation Advice *Parantechinus apicalis* (dibbler). Threatened Species Scientific Committee. Canberra.

TSSC. 2016a. Conservation Advice *Eucalytpus leprophloia* (scaly-butt mallee). Threatened Species Scientific Committee. Canberra.

TSSC. 2016b. Conservation Advice *Conostylis dielsii* subsp. *teres* (Irwin's conostylis). Threatened Species Scientific Committee. Canberra.

TSSC. 2016c. Conservation Advice *Conostylis micrantha* (small-flowered conostylis). Threatened Species Scientific Committee. Canberra.

TSSC. 2016d. Conservation Advice *Hemiandra gardneri* (red snakebush). Threatened Species Scientific Committee. Canberra.

TSSC. 2016e. Conservation Advice *Wurmbea tubulosa* (long-flowered nancy). Threatened Species Scientific Committee. Canberra.

UNEP IE. 1997. Environmental management in oil and gas exploration and production. An overview of issues and management approaches. UNEP Industry and Environment. London, U.K.

VIPAC. 2007. Ground vibration survey. Seismic truck excitation. 70Q-07-0104-TRP-245047-1. 21 May 2007. Prepared by Vipac Engineers & Scientists Ltd for Origin Energy Resources Ltd.

Western Australian Herbarium. 1998. FloraBase – the Western Australian flora. A WWW databased accessed in 2017 at https://florabase.dpaw.wa.gov.au. Department of Parks and Wildlife.

Western Wildlife. 2017. Trieste 3D Seismic Survey. Level 1 Vertebrate Fauna Survey and Black-Cockatoo Habitat Survey November 2017. Prepared for Lattice Energy by Western Wildlife. November 2017.

Appendix A

PGER Environment Regulations 2012
concordance table

Petroleum and Geothermal Energy Resources (Environment) Regulations 2012

Version 00-a0-04

(current @ November 2017)

Concordance table for the Trieste 3D seismic survey Environment Plan

Section	Requirement	EP section
Part 2. Environment Plans		
Division 3. Contents of environment plan		
13. Contents of Environment Plan		
	An EP for an activity must include the matters set out in regulations 14, 15, 16 and 17.	This document
14. Environmental Assessment		
(1)	The EP must include a comprehensive description of the activity including the following — (a) the location or locations of the activity; (b) details of the construction and layout of any facility; (c) a description of the operational details of the activity and proposed timetables; (d) any additional information relevant to consideration of the environmental impacts and environmental risks of the activity.	Chapter 3
(2)	The EP must — (a) describe the existing environment that may be affected by the activity; and (b) include details of the particular relevant values and sensitivities (if any) of that environment.	Chapter 5
(3)	The EP must include — (a) details of all environmental impacts and environmental risks of the activity; and (b) an evaluation of those impacts and risks; and (c) a description of the environmental risk assessment process used to evaluate those impacts and risks, including the terms used in that process to categorise the levels of seriousness of those impacts and risks.	Chapter 7 Chapter 6
(4)	For the avoidance of doubt, the evaluation mentioned in subregulation (3)(b) must evaluate all the environmental impacts and environmental risks arising directly or indirectly from — (a) all aspects of the activity; and (b) potential emergency conditions, whether resulting from accident or any other cause.	Chapter 7
(5)	The EP must include — (a) environmental performance objectives that define the goals of the operator in relation to the —	Chapter 7

	(i) processes, policies and practices to be followed; and (ii) equipment to be used; and (iii) actions to be taken, for the purposes of minimising the environmental impacts and environmental risks of the activity; and (b) environmental performance standards — (i) that state the performance required of persons, equipment and procedures for the purposes of managing the environmental impacts and environmental risks of the activity; and (ii) against which the performance of the operator in meeting the environmental performance objectives in the environment plan can be measured; and (c) measurement criteria for the purposes of determining whether — (i) the environmental performance objectives and environmental performance standards in the environment plan have been met; and (ii) the implementation strategy in the environment plan has been complied with.	
(6)	The EP must describe the requirements that — (a) apply to the activity under legislation (including conditions imposed under legislation), international conventions or agreements, or applicable codes of practice; and (b) are relevant to the environmental management of the activity.	Chapter 2 Chapter 7
15. Implementation strategy for environment plan		
(1)	The EP must include an implementation strategy for the activity in accordance with this regulation.	Chapter 8
(2)	The implementation strategy must include measures to ensure that the environmental performance objectives and environmental performance standards in the environment plan are met.	Chapter 8
(3)	The implementation strategy must identify the specific systems, practices and procedures to be used to ensure that — (a) the environmental impacts and environmental risks of the activity are continuously reduced to as low as is reasonably practicable; and (b) the environmental performance objectives and environmental performance standards in the EP are met.	Sections 8.1 & 8.2
(4)	The implementation strategy must establish a clear chain of command, setting out the roles and responsibilities of personnel in relation to the implementation, management and review of the EP.	Section 8.3
(5)	The implementation strategy must include measures to ensure that each employee or contractor working on, or in connection with, the activity is aware of his or her responsibilities in relation to the environment plan and has the appropriate competencies and training.	Section 8.4
(6)	The implementation strategy must provide for the monitoring of, audit of, management of non-compliance with, and review of, the operator's environmental performance and the implementation strategy.	Sections 8.7 & 8.8

(7)	The implementation strategy must provide for — (a) specified emissions and discharges (whether occurring during normal operations or otherwise) to any land, air, marine, seabed, sub-seabed, groundwater, sub-surface or inland waters environment to be monitored and recorded in a way that — (i) is accurate; and (ii) can be audited against the environmental performance standards and measurement criteria in the EP; and (b) the monitoring mentioned in paragraph (a) to be done either continuously or at specified intervals; and (c) tests to assess the performance of the monitoring equipment used for the purposes of paragraph (a) to be conducted at specified intervals.	Section 8.7
(8)	If the activity is a petroleum activity that may involve the injection or re-injection of produced formation water into wells, the implementation strategy must specify the maximum permissible concentration of petroleum in that produced formation water.	N/A
(9)	The implementation strategy must include details of any chemicals or other substances that may be — (a) in, or added to, any treatment fluids to be used for the purposes of drilling or hydraulic fracturing undertaken in the course of the activity; or (b) otherwise introduced into a well, reservoir or subsurface formation in the course of the activity.	N/A
(10)	The implementation strategy must include an oil spill contingency plan that — (a) sets out details of the following — (i) preparations to be made for the possibility of an oil spill; (ii) emergency response arrangements to be implemented if an oil spill occurs; (iii) recovery arrangements to be implemented if an oil spill occurs; (iv) current oil spill trajectory modelling that applies to the activity; and (b) requires the operator to conduct tests of the emergency response arrangements set out in the oil spill contingency plan at specified intervals; and (c) describes the tests mentioned in paragraph (b).	OSCP is provided as a stand-alone document with the EP submission
(11)	The implementation strategy must provide for appropriate consultation with relevant authorities and other relevant interested persons or organisations.	
16. Monitoring, recording and reporting arrangements		
	The EP must include arrangements for — (a) monitoring, and recording information about, the activity that are sufficient to enable the Minister to determine whether —	

	(i) the environmental performance objectives and environmental performance standards in the EP have been met; and (ii) the implementation strategy in the EP has been complied with; and (b) reporting to the Minister on the information recorded under paragraph (a) at intervals agreed with the Minister, but not less often than annually.	Section 8.7 Section 8.6.2
17. Other information in environment plan		
(1)	The EP must include the following — (a) a statement of the operator's corporate environmental policy; (b) a report on all consultations between the operator and relevant authorities and other relevant interested persons and organisations in the course of developing the environment plan; (c) a list of all incidents that are classified as reportable incidents in relation to the activity.	Section 2.1 Section 4.6 Section 8.6
(2)	The EP must classify an incident as a reportable incident if — (a) it could arise from the activity; and (b) it has the potential to cause an environmental impact that is classified, under the environmental risk assessment process described in the EP, as moderate or more serious than moderate.	Section 8.6
Division 4. Revision of environment plan		
18. Revision because of a change, or proposed change, of circumstances or activity		
(1)	The operator of an activity must submit to the Minister a proposed revision of the EP for the activity before the commencement of — (a) any new activity; or (b) any significant modification of, significant change in, or significant new stage of, an existing activity, that is not provided for in the environment plan.	Section 8.13
(2)	The operator of an activity must submit to the Minister a proposed revision of the EP for the activity before or as soon as practicable after — (a) a change in the instrument holder for, or operator of, the activity; or (b) the occurrence of — (i) any significant new environmental impact or environmental risk; or (ii) any significant increase in an existing environmental impact or environmental risk, that is not provided for in the EP for the activity; or (c) the occurrence of a series of new environmental impacts or environmental risks, or a series of increases in existing environmental impacts or environmental risks, which, taken together, amount to the occurrence of — (i) a significant new environmental impact or environmental risk; or (ii) a significant increase in an existing environmental	Section 8.13

	impact or environmental risk, that is not provided for in the EP for the activity.	
19. Revision required by Minister		
(1) - (8)	These regulations are noted.	N/A
20. Revision every 5 years		
(1) – (2)	These regulations are noted.	N/A
21. Form of proposed revision		
	A proposed revision of an EP under regulation 18, 19 or 20 must be in the form of a revised EP or, if the operator and the Minister so agree, a revised part of the EP.	Noted
22. Approval of revised environment plan		
	Regulations 10 and 11 apply to the proposed revision as if — (a) a reference in those regulations to the submission, approval or non-approval of the EP were a reference to the submission, approval or non-approval of the proposed revision; and (b) any other reference in those regulations to the EP were a reference to the plan as revised by the proposed revision.	Noted
23. Additional requirement for revision of oil spill contingency plan		
(1) – (9)	These regulations are noted.	N/A
24. Effect of non-approval of proposed revision		
	If the Minister refuses to approve a proposed revision of an EP, or of an oil spill contingency plan included in an EP, the provisions of the EP in force for the activity immediately before the proposed revision was submitted remain in force, subject to these regulations (in particular, the provisions of Division 5), as if the revision had not been proposed.	Noted
Part 3 – Incidents, reports and records		
28. Notifying reportable incidents		
	The operator of an activity must notify a reportable incident in accordance with this regulation.	Section 8.6.2
	It is a defence to a prosecution for an offence against subregulation (1) if the operator has a reasonable excuse.	Noted
	The notification — (a) must be given to the Minister as soon as practicable, and in any case within 2 hours after — (i) the first occurrence of the reportable incident; or (ii) if the reportable incident is not detected by the operator at the time of the first occurrence — the time the operator becomes aware of the reportable incident; and (b) may be oral or in writing; and (c) must specify — (i) all material facts and circumstances concerning the reportable incident that the operator knows or is able, by	Section 8.6.2

	reasonable search or inquiry, to find out; and (ii) any action taken to avoid or mitigate any adverse environmental impacts of the reportable incident.	
29. Written report of reportable incidents		
(1)	The operator of an activity must submit a written report of a reportable incident in accordance with this regulation.	Section 8.6.2
(2)	It is a defence to a prosecution for an offence against subregulation (1) if the operator has a reasonable excuse.	Noted
(3)	The report — (a) must be submitted to the Minister as soon as practicable, and in any case — (i) within 3 days after the first occurrence of the reportable incident; or (ii) if the Minister specifies, within 3 days after the first occurrence of the reportable incident, another period within which the report must be submitted — within that period; and (b) must specify — (i) all material facts and circumstances concerning the reportable incident that the operator knows or is able, by reasonable search or inquiry, to find out; and (ii) any action taken to avoid or mitigate any adverse environmental impacts of the reportable incident; and (iii) any action taken, or proposed to be taken, to prevent a similar reportable incident.	Section 8.6.2
30. Written report of reportable incidents		
(1)	The operator of an activity must, for each month, submit a written report of recordable incidents in accordance with this regulation.	Section 8.6.2
(2)	It is a defence to a prosecution for an offence against subregulation (1) if the operator has a reasonable excuse.	Noted
(3)	The report must be submitted to the Minister as soon as practicable, and in any case within 15 days, after the end of the month to which it relates.	Section 8.6.2
(4)	If one or more recordable incidents occurred during the month, the report — (a) must include a record of each of those recordable incidents; and (b) must specify — (i) all material facts and circumstances concerning those recordable incidents that the operator knows or is able, by reasonable search or inquiry, to find out; and (ii) any action taken to avoid or mitigate any adverse environmental impacts of those recordable incidents; and (iii) any action taken, or proposed to be taken, to prevent similar recordable incidents.	Section 8.6.2
(5)	If no recordable incidents occurred during the month, the report under subregulation (1) must include a statement to that effect.	Section 8.6.2
31. Storage of records		
(1)	The operator of an activity must store and maintain each document or record mentioned in subregulation (2) —	Section 8.11

	(a) for the period of 5 years from the making of the document or record; and (b) in a way that makes retrieval of the document or record reasonably practicable.	
(2)	For subregulation (1), the documents and records are the following — (a) the EP for the activity; (b) revisions and proposed revisions of the environment plan (including revisions and proposed revisions of the oil spill contingency plan included in the environment plan); (c) written reports (including monitoring, audit and review reports) about environmental performance, or about the implementation strategy, under the EP; (d) records of monitoring and test results made under regulation 34; (e) records of calibration and maintenance of monitoring devices used in accordance with the environment plan; (f) records and copies of — (i) notifications mentioned in regulation 28; and (ii) reports mentioned in regulation 29; and (iii) reports mentioned in regulation 30.	Section 8.11
32. Making records available		
(1)	In this regulation — records means the documents and records mentioned in regulation 31(2).	Noted
(2)	The operator of an activity must make available, in accordance with this regulation, copies of the records for the activity.	Section 8.11
(3)	The operator must make copies of the records available to — (a) the Minister, on request in writing by the Minister; and (b) an inspector, on request in writing by the inspector.	Section 8.11
(4)	If the person making a request under subregulation (3) states that copies of the records must be made available to an agent of the person, the operator must make the copies available to the agent.	Section 8.11
(5)	However, if — (a) a request is made under subregulation (3)(a) by a delegate of the Minister and the operator requests written evidence of the delegation; or (b) a request is made under subregulation (3)(b) and the operator requests the inspector to produce written evidence of the inspector's appointment; or (c) a person making a request under subregulation (3) states= that copies of the records must be made available to an agent of the person and the operator requests the agent to produce written evidence of the appointment of the agent, the operator is not required to make the copies of the records available unless the evidence is produced to the operator.	Noted
(6)	The copies of the records must be made available — (a) in the case of an emergency relating to the activity — as soon	Noted

	as possible (whether or not that is during the emergency); or (b) in any other case — during normal business hours on any day (other than a Saturday, a Sunday or a public holiday).	
(7)	The copies of the records must be made available at the operator's nominated address or, if agreed between the operator and the Minister, at any other place (including by means of electronic transmission to a person at that place).	Noted
(8)	If the records are stored on a computer, the records must be made available in paper form or, if agreed between the operator and the Minister, in electronic form.	Noted
Part 4 – Environmental requirements		
Division 1 — Requirements relating to emissions and discharges		
33. Discharge, injection or re-injection of produced formation water resulting from petroleum activity		
(1) – (5)	Not relevant to this activity.	
33. Monitoring and reporting on emissions and discharges		
(1)	In this regulation — reporting period, in relation to an activity, means — (a) the period of 3 months commencing when the EP for the activity is approved; and (b) each subsequent period of 3 months.	Section 8.7
(2)	The operator of an activity must, in accordance with subregulation (3), monitor all emissions and discharges to any land, air, marine, seabed, sub-seabed, groundwater, sub-surface or inland waters environment that — (a) occur in the course of the activity (whether during normal operations or otherwise); and (b) are specified in the EP for the activity in accordance with regulation 15(7)(a).	Section 8.7
(3)	The monitoring mentioned in subregulation (2) must be done either continuously, or at specified intervals, in accordance with the environment plan for the activity.	Section 8.7
(4)	The operator of an activity must, in accordance with subregulation (5), conduct tests to assess the performance of monitoring equipment used for the purposes of subregulation (2).	Section 8.7
(5)	Tests performed under subregulation (4) must — (a) be sufficient to verify the accuracy of the monitoring equipment; and (b) be conducted at intervals specified in the environment plan for the activity in accordance with regulation 15(7)(c).	Section 8.7
(6)	The operator of an activity must record the results of — (a) the monitoring mentioned in subregulation (2); and (b) the tests mentioned in subregulation (4).	Section 8.7
(7)	The operator of an activity must, for each reporting period, submit a written report of emissions and discharges in accordance with	Section 8.6.2

	subregulation (9).	
(8)	It is a defence to a prosecution for an offence against subregulation (7) if the operator has a reasonable excuse.	Noted
(9)	A report under subregulation (7) — (a) must be submitted to the Minister as soon as practicable, and in any case within 15 days, after the end of the reporting period; and (b) must include a summary of the results of the monitoring mentioned in subregulation (2).	Section 8.6.2
34. Monitoring and reporting on emissions and discharges		
(1)	In this regulation — reporting period, in relation to an activity, means — (a) the period of 3 months commencing when the EP for the activity is approved; and (b) each subsequent period of 3 months.	Section 8.6.2
(2)	A The operator of an activity must, in accordance with subregulation (3), monitor all emissions and discharges to any land, air, marine, seabed, sub-seabed, groundwater, sub-surface or inland waters environment that — (a) occur in the course of the activity (whether during normal operations or otherwise); and (b) are specified in the EP for the activity in accordance with regulation 15(7)(a).	Section 8.7
(3)	The monitoring mentioned in subregulation (2) must be done either continuously, or at specified intervals, in accordance with the environment plan for the activity.	Section 8.7
(4)	The operator of an activity must, in accordance with subregulation (5), conduct tests to assess the performance of monitoring equipment used for the purposes of subregulation (2).	N/A
(5)	Tests performed under subregulation (4) must — (a) be sufficient to verify the accuracy of the monitoring equipment; and (b) be conducted at intervals specified in the EP for the activity in accordance with regulation 15(7)(c).	N/A
(6)	The operator of an activity must record the results of — (a) the monitoring mentioned in subregulation (2); and (b) the tests mentioned in subregulation (4).	Section 8.7
(7)	The operator of an activity must, for each reporting period, submit a written report of emissions and discharges in accordance with subregulation (9).	Section 8.7
(8)	It is a defence to a prosecution for an offence against subregulation (7) if the operator has a reasonable excuse.	Noted
(9)	A report under subregulation (7) — (a) must be submitted to the Minister as soon as practicable, and in any case within 15 days, after the end of the reporting period; and (b) must include a summary of the results of the monitoring mentioned in subregulation (2).	Section 8.7

Appendix B

Landowner consultation letters

14 December 2017

LO Name

Address

Dear Sir/Madam

Proposed 3D Seismic survey – 'Trieste 3D'

Lot numbers

Origin Energy Developments Pty Limited is seeking to engage with you regarding access to your land for the purpose of undertaking activities associated with our proposed seismic survey named the Trieste 3D Seismic Survey. The purpose of the survey is to help Origin better understand the underlying geology within its exploration permit EP320 and assist in the identification of new conventional gas resources. As you may know Origin currently supplies gas to W.A. through the nearby Beharra Springs gas production facility.

By way of introduction we have authorised the following staff members to act on Origin's behalf in providing notification and details of the proposed survey.

- John Mitchell, Senior Seismic Field Manager, 0477 745 635
- Bob Foot, Seismic Field Manager, 0477 747 181

Origin values its landowners and we value your input into the terms of access which sets out how Origin can access your land. A proposed draft of the terms of access will be provided at the first opportunity. Please take the time to consider access requirements to your property and feel free to discuss them with our team.

In accordance with the relevant legislation, known as the *Petroleum and Geothermal Energy Resources Act 1967,* Origin must enter into a written agreement for compensation with you prior to undertaking activities on the land. A draft private landowner agreement will also be provided to you at the first opportunity.

We look forward to working with you.

Yours faithfully

R J Taylor

Randall Taylor

Chief Geophysicist
On behalf of **Origin Energy Developments Pty Ltd**

23 October 2017

To whom it may concern

Proposed 3D Seismic survey – 'Trieste 3D' – Irwin and Three Springs Shires

Lattice Energy Limited ABN 66 007 845 338 is undertaking a 3D seismic survey within its Perth Basin tenement EP 320 and with ingress also required into vacant acreage under petroleum application STP-EPA-0082 and STP-EPA-0098 (UIL Energy).

The survey has been designed with the objective of acquiring high resolution 3D reflection seismic data in a safe and socio-environmentally sustainable manner.

The survey will be conducted in accordance with all applicable Western Australian and Commonwealth legislation and regulations including the *Petroleum and Geothermal Energy Resources Act 1967*.

Site fieldwork will be commencing in October 2017 and the acquisition of the data is scheduled to be undertaken in June 2018.

For further information on this survey please contact either of Lattice's representatives:

John Mitchell
Senior Seismic Field Manager
Mobile: 0477 745 635
Email: john.mitchell@latticeenergy.com

Bob Foot
Seismic Field Manager
Mobile: 0477 747 181
Email: bob.foot@latticeenergy.com

Kind regards

David Dorling

Project Manager
On behalf of **Lattice Energy Resources (Perth Basin) Pty Limited**

Lattice Energy Services Pty Limited • ABN 83 130 545 381 • A wholly owned subsidiary of Lattice Energy Limited.
Level 45 Australia Square 264-278 George Street Sydney NSW 2000 • GPO Box 5376 Sydney NSW 2001 • Telephone (02) 8345 5000

Appendix C

Targeted flora survey report

TARGETED FLORA SURVEY

TRIESTE 3D SEISMIC PROJECT,

ARROWSMITH

Prepared By

Mattiske Consulting Pty Ltd

Prepared For

Lattice Energy

Date

December 2017

DOCUMENT STATUS				
DOCUMENT REFERENCE: LEP1701/033/17				
VERSION	TYPE	AUTHOR/S	REVIEWER/S	DATE DISTRIBUTED
V1	Internal review	N. Murdock	D. Angus	-
V2	Draft for client	N. Murdock	E.M. Mattiske	30/11//17
V3	Revision with client comments	N. Murdock	S. Ruoss	12/12/2017
FINAL	Final report			

Mattiske Consulting Pty Ltd

(ACN 063 507 175, ABN 39 063 507 175)

PO Box 437
Kalamunda WA 6926
Phone: +61 8 9257 1625
Email: admin@mattiske.com.au

TABLE OF CONTENTS

TABLES

FIGURES

PLATES

APPENDICES

LIST OF ABBREVIATIONS

BOM: Bureau of Meteorology

DotEE: Department of the Environment and Energy

DBCA: Department of Biodiversity, Conservation and Attractions

EP Act: *Environmental Protection Act 1986* (WA)

EPA: Environmental Protection Authority

EPBC Act: *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)

Lattice: Lattice Energy

MCPL: Mattiske Consulting Pty Ltd

TPFL: Threatened and priority flora database

UCL: Unallocated Crown Land

WAH: Western Australian Herbarium (PERTH)

WC Act: *Wildlife Conservation Act 1950* (WA)

EXECUTIVE SUMMARY

Mattiske Consulting Pty Ltd was commissioned by Lattice Energy to undertake a targeted threatened and priority flora survey along proposed Source and Receiver lines within the Trieste 3D Seismic Project area. Lattice Energy proposes to conduct seismic surveys within the Trieste 3D Seismic Project, situated within EP320. The Project area lies east of the Brand Highway, between the towns of Eneabba and Dongara, Western Australia.

A desktop assessment for the project, conducted by Mattiske Consulting Pty Ltd, identified areas of native vegetation (namely a large Unallocated Crown Land block accessible by Correy Road), a small portion of Nature Reserve (R 25495) and a section of the Arrowsmith River, with remnant vegetation patches and large areas on private properties. A total of 107 conservation significant species were identified in the desktop assessment as having the potential to occur within the project area.

Over the course of four months (78 field days), over 300 km of Source and Receiver lines were traversed by botanists over a 20 m corridor of lines spaced at 360 m apart. As a result of these extensive foot traverses, a total of 26 threatened and priority flora species were recorded during the surveys in the Trieste 3D Seismic Project. These species included four Threatened species, two Priority 1 species, three Priority 2 species, eleven Priority 3 species and six Priority 4 species:

- *Eucalyptus crispata* (T)
- *Eucalyptus leprophloia* (T)
- *Paracaleana dixonii* (T)
- *Thelymitra stellata* (T)
- *Lasiopetalum ogilvieanum* (P1)
- *Tricoryne soullierae* (P1)
- *Micromyrtus uniovulum* (P2)
- *Persoonia filiformis* (P2)
- *Stylidium pseudocaespitosum* (P2)
- *Grevillea biformis* subsp. *cymbiformis* (P3)
- *Guichenotia alba* (P3)
- *Hemiandra* sp. Eneabba (H. Demarz 3687) (P3)
- *Hypocalymma gardneri* (P3)
- *Mesomelaena stygia* subsp. *deflexa* (P3)
- *Persoonia rudis* (P3)
- *Stylidium drummondianum* (P3)
- *Stylidium torticarpum* (P3)
- *Synaphea oulopha* (P3)
- *Verticordia densiflora* var. *roseostella* (P3)
- *Verticordia luteola* var. *luteola* (P3)
- *Banksia scabrella* (P4)
- *Desmocladus elongatus* (P4)
- *Eucalyptus macrocarpa* subsp. *elachantha* (P4)
- *Hemiandra* sp. Watheroo (S. Hancocks 4) (P4)
- *Pityrodia viscida* (P4)
- *Schoenus griffinianus* (P4)

Based on the available regional information for each of the conservation significant species, ten were given a high impact rating (impacting 30-100% of known records along the Source/Receiver lines), four were given a moderate impact rating (10-30%) and ten were given a low impact rating (0-10%). Two species (*E. leprophloia* and *M. uniovulum*) were not ranked as the records were opportunistic and located outside of any potential impact areas.

Impacts to these species, however, can be minimised or avoided altogether by: 1) hand deploying equipment along Receiver lines through large threatened/priority populations wherever possible; 2) avoiding single plant locations where applicable; 3) using the existing tracks and deviations provided by MCPL to avoid threatened species and to further avoid impacts to potential habitat; 4) conduct the seismic surveys in the UCL outside the known flowering periods of the threatened orchids and Priority 1 *Tricoryne*; and 5) avoiding the other higher conservation significant priority species (*Lasiopetalum ogilvieanum* (P1), *Persoonia filiformis* (P2) and *Stylidium pseudocaespitosum* (P2) wherever possible.

1. INTRODUCTION

Mattiske Consulting Pty Ltd (MCPL) was commissioned in June 2017 by Lattice Energy (Lattice - previously Origin Energy Resources Ltd) to undertake ecological surveys required to support the environmental approvals necessary for the Trieste 3D Seismic Project. More specifically, this survey outlines the methodology and results from a targeted threatened and priority flora survey conducted from August to December 2017 along proposed Source and Receiver lines within the Trieste 3D Seismic Project area, located within EP320.

1.1. Location and Scope of Project

The Trieste 3D Seismic Project lies within the Irwin Botanical District of the South-West Botanical Province (Beard 1990), east of the Brand Highway between the towns Eneabba and Dongara, Western Australia. The Trieste 3D Seismic Project covers 21,820 ha, and includes areas of native vegetation, a small portion of Nature Reserve (R 25495) and a section of the Arrowsmith River, with remnant vegetation patches and large areas on private properties (Figure 1). Remnant vegetation was identified in the desktop assessment (Mattiske Consulting Pty Ltd 2017) and guided the methodology for the current targeted flora survey. The Unallocated Crown Land (UCL; accessible by Correy Road) formed the focus of the targeted threatened and priority flora survey.

1.2. Environmental Legislation and Guidelines

The following key Commonwealth (federal) legislation relevant to this survey is the:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

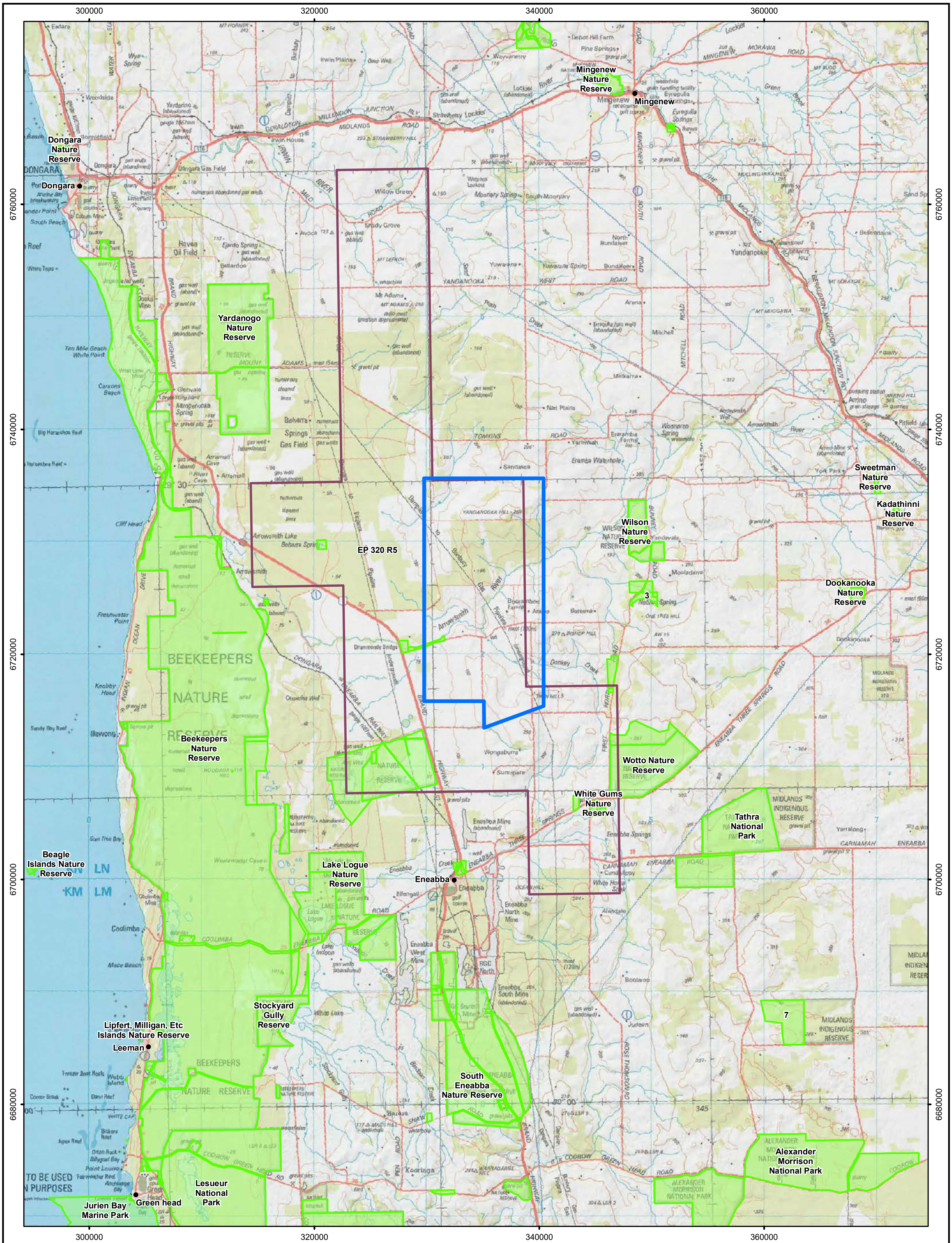
The following key Western Australian (state) legislation relevant to this survey include the:

- *Biodiversity Conservation Act 2016* (BC Act);
- *Environmental Protection Act 1986* (EP Act); and
- *Wildlife Conservation Act 1999* (WC Act).

Furthermore, key Western Australian guidelines relevant to this survey are the:

- *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority [EPA] 2016a);
- *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016b).
- *Survey Guidelines for Australia's Threatened Orchids – Guidelines for detecting orchids listed as 'Threatened' under the Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia 2003).

Definitions of flora and vegetation terminology commonly used throughout this report are provided in Appendix A1-3.



Legend

- Trieste 3D Seismic Project
- Exploration Permit EP320
- DBCA Estate

N

0 3.5 7km

Scale: 1:300,000
MGA94 (Zone 50)

CAD Ref: a2505R001

Date: Dec 2017 | Rev: A | A3

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Mattiske | MCPL Ref: LEP1701

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Treiste 3D Seismic Survey Locality

Figure: 1

2. OBJECTIVES

The objective of this survey was to undertake a targeted threatened and priority flora survey of the Trieste 3D Seismic Project, and included:

- Detect the presence of conservation significant species along proposed Source and Receiver lines within the Trieste 3D Seismic Project, and where present, delineate the extent and abundance of such species; and
- Prepare a report summarising the findings.

3. METHODS

3.1. Field Survey

A targeted field assessment of the flora and vegetation of the Trieste 3D Seismic Survey area (EP320) was undertaken by seven experienced botanists from MCPL, between August and November 2017, in accordance with methods outlined in *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016b). All botanists held valid collection licences to collect flora for scientific purposes, issued under the WC Act.

During the field surveys, botanists had access to all relevant data in the Esri iOS application, *Collector for ArcGIS* on Apple iPads (provided and maintained by CAD Resources). Data layers accessible in the field included the EP320 survey area, historic conservation significant flora records, proposed source and receiver lines (with a 10 m buffer either side of the line) and aerial imagery supplied by CAD Resources.

Survey methodology consisted of foot traverses along 1) proposed Source lines (running north-south) to a maximum width of 20 m; then 2) proposed Receiver lines (running east-west) to a maximum width of 20 m. Source and Receiver lines were gridded over the Trieste 3D Seismic Survey area at 360 m apart and supplied by Lattice Energy. The Source and Receiver lines were refined by Lattice personnel prior to the botanical surveys to avoid wherever possible remnant vegetation within private properties, the course of the Arrowsmith River, and the Nature Reserve R 25495).

Targeted orchid surveys were conducted over potential habitat identified during the initial foot traverses. These surveys in October and November were not just confined to the seismic line corridors and instead targeted vegetation supporting historic records, or identified during foot traverses to be potential habitat. The orchid surveys were focussed mainly around the lateritic ridges along Robb Road. The width of the potential habitat (ridge or ridge slope) was traversed at approximately 20 m zig-zags. Where the orchids were encountered, the survey intensity was increased in the immediate area (up to 50m).

If suspected or known conservation significant flora species were encountered, a specimen was collected and plant numbers were recorded for the population. All plant specimens collected during the field surveys were dried and processed in accordance with the requirements of the Western Australian Herbarium (WAH). The plant species were identified based on taxonomic literature and through comparison with pressed specimens housed at the WAH. Where appropriate, plant taxonomists with specialist skills were consulted. Nomenclature of the species recorded is in accordance with the WAH (1998-). Unless otherwise stated, all photographs used in this report were taken by N. Murdock of MCPL.

During the foot traverses, line deviation notes were recorded for patches of slow growing species (e.g. trees/large shrubs, grasstrees), obstacles (fences, gravel mounds, steep drop offs, inaccessible ridges), bee hive locations, avoidance of threatened flora locations, and where old firebreaks or tracks were utilised.

3.2. Survey Timing

According to Table 3 in the *Technical guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016b), the primary survey timing for the South-west and Interzone Botanical Province is spring (September-November).

The surveys were timed, where possible, to align with peak flowering periods of conservation significant flora with the potential to occur in the Trieste Project area. A total of seven experienced botanists from MCPL, between August and November, were utilised during the field surveys. The survey dates and number of personnel used are summarised in Table 1.

Table 1: Survey timing

SURVEY DATES (2017)	PERSONNEL	DAYS
1-4th August	2	3.5
18-22nd September	2	5
26-29th September	2	4
9-13th October	3	5
16-20th October	4	5
23rd-27th October	2	5
13-17th November	2	4

The majority of the survey work was conducted in September and October (63 total field days) when 63.6% and 58.9% of the potential conservation significant species were likely to be flowering (Table 2). Notable above average rainfall was recorded in August 2017 (over 1.5 times the long term average; Table 2). However, June and July had less than half the respective long-term average monthly rainfalls, indicating that the 2017 winter period was drier and later than usual (Table 2).

Table 2: Monthly comparison of species' flowering periods, rainfall and field survey intensity

Note: Flowering periods are based on information from Western Australian Herbarium (1998-) specimens; **bolded** monthly rainfall records indicate a higher than average rainfall; rainfall data were sourced from Bureau of Meteorology (2017) station 8057.

MONTH	PROPORTION OF CONSERVATION SIGNIFICANT SPECIES FLOWERING (%)	GREEN GROVE MONTHLY TOTAL RAINFALL (mm)	GREEN GROVE LONG-TERM AVERAGE MONTHLY RAINFALL (mm)	SURVEY EFFORT (NO. FIELD DAYS)
JAN	12.1	**16.4**	6.1	0
FEB	7.5	**29.2**	14.9	0
MAR	4.7	1.6	14.5	0
APR	8.4	0.0	26.2	0
MAY	6.5	21.2	76.4	0
JUN	13.1	40.4	107.3	0
JUL	26.2	44.6	93.2	0
AUG	43.0	**123.8**	70.6	7
SEP	63.6	35.2	38.2	18
OCT	58.9	6.6	21.6	45
NOV	36.4	No data available	12.4	8
DEC	24.3	No data available	7.5	0

3.3. Impact Assessment

Regional data used for the impact assessment was primarily based on information from TPFL database searches and WAH specimen notes on population frequencies. Population numbers from WAH specimens were often conservative, or qualitative (e.g. 'few', 'frequent', 'occasional', etc.). Where no population information was provided, it was assumed that at least one plant was present. The numbers used from these records therefore represent a conservative minimum, and it is likely that regionally, there are more plants of each species.

The totals of each threatened and priority flora species encountered during the 2017 surveys were summed, and presented on both a location and plant number basis. Upon agreeance with Lattice personnel, the impact assessment was conducted on records falling within a 10 metre wide corridor along the centre-line of the provided botanical foot traverses. Recommended vehicle exclusion areas and equipment hand deployment areas (not presented) were incorporated into the final seismic lines. The impact assessment was based on the estimated regional number of each species (from WAH records, TPFL database searches and local MCPL records). Three categories were applied to the results: high (30-100% impact to known regional records); moderate (10-30% impact to known regional records; and low (0-10% impact to known regional records).

3.4. Survey Limitations

The contextual information available prior to the 2017 surveys was more than sufficient to inform the methodology and expected flora within the project area. However, the area lacked detailed vegetation mapping. The MCPL botanists were familiarised with the likely threatened and priority flora from the project area, and where present, historic records were revisited for contextual purposes. All seven botanists had prior experience conducting surveys in the Geraldton Sandplains Regions for a variety of clients, especially in the Eneabba-Dongara area.

All threatened and priority flora species were encountered at least once in flower during the duration of the survey. Identifications of the threatened and priority flora were confirmed with comparison to reference material available at the WAH. Where necessary, specialist taxonomists were consulted and specimens were submitted to the WAH for identification.

Access to private property was negotiated by Lattice personnel and at the time of the botanical surveys, properties south of the UCL were unable to be accessed (with the exception of Petro). Therefore any Source or Receiver lines located in these properties were not traversed by botanists. All foot traverses have been provided to Lattice.

All Source and Receiver lines intersecting native vegetation within the UCL were surveyed. All Source and Receiver lines intersecting remnant vegetation within the accessible private properties were surveyed. Approximately 300 km of foot traverses were completed by MCPL Botanists between August and November 2017 for the Trieste 3D Seismic Project. No disturbances that may have affected the results of the survey were noted in the project area.

Regional rainfall records indicated below average rainfall for the area in June and July, with above average rainfall for the area in August. The majority of the survey work was conducted in September and October (63 total field days) when 63.6% and 58.9% of the potential threatened and priority flora species were likely to be flowering. The two threatened orchids were also captured during their short flowering windows. All of this indicates that the surveys were conducted at the appropriate times.

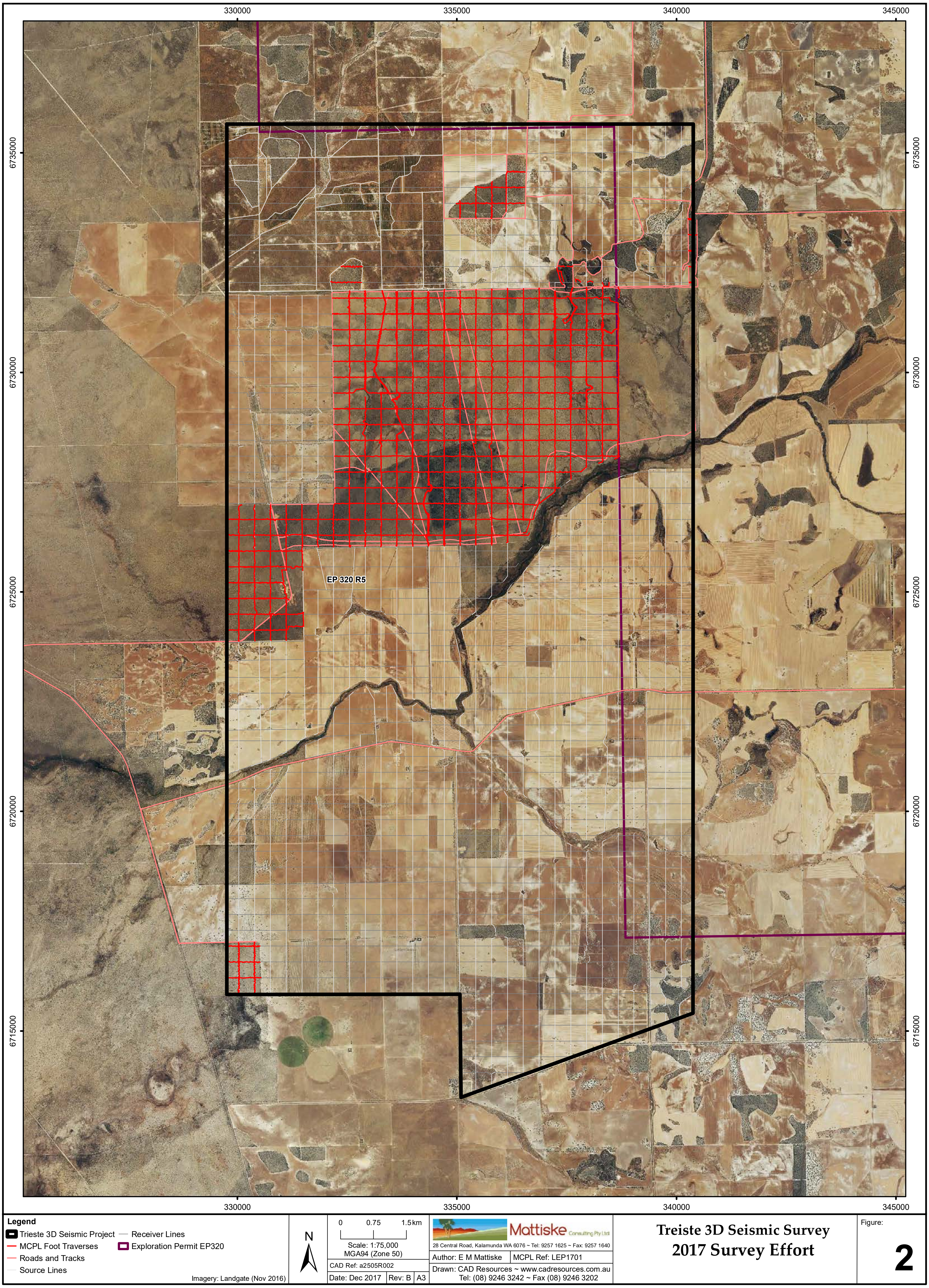
4. RESULTS

The foot traverses between August and November 2017 totalled over 300 km (Figure 2). Line deviation comments are provided in Appendix B.

A total of 107 threatened and priority flora species were identified in the desktop assessment as having the potential to occur within the Trieste 3D Seismic Project area. Furthermore, 21 of these species were known to occur within the Trieste 3D Seismic Project (Table 3; Figure 3). Further detail on these species is available in Mattiske Consulting Pty Ltd (2017). As a result of the extensive foot traverses, a total of 26 threatened and priority flora species were recorded during the 2017 surveys in the Trieste 3D Seismic Project (Table 3). The geographic locations of each threatened and priority flora species recorded during the surveys are listed in Appendix C.

Table 3: Comparative numbers of conservation significant species

CONSERVATION STATUS	NO. SPECIES IDENTIFIED IN THE DESKTOP ASSESSMENT (IN PROJECT AREA)	NO. SPECIES IDENTIFIED IN THE 2017 SURVEYS
Threatened	16 (3)	4
Priority 1	13 (1)	2
Priority 2	20 (2)	3
Priority 3	39 (7)	11
Priority 4	19 (8)	6



CAD Ref: a2505R002

Date: Dec 2017 | Rev: B | A3

Mattiske Consulting Pty Ltd

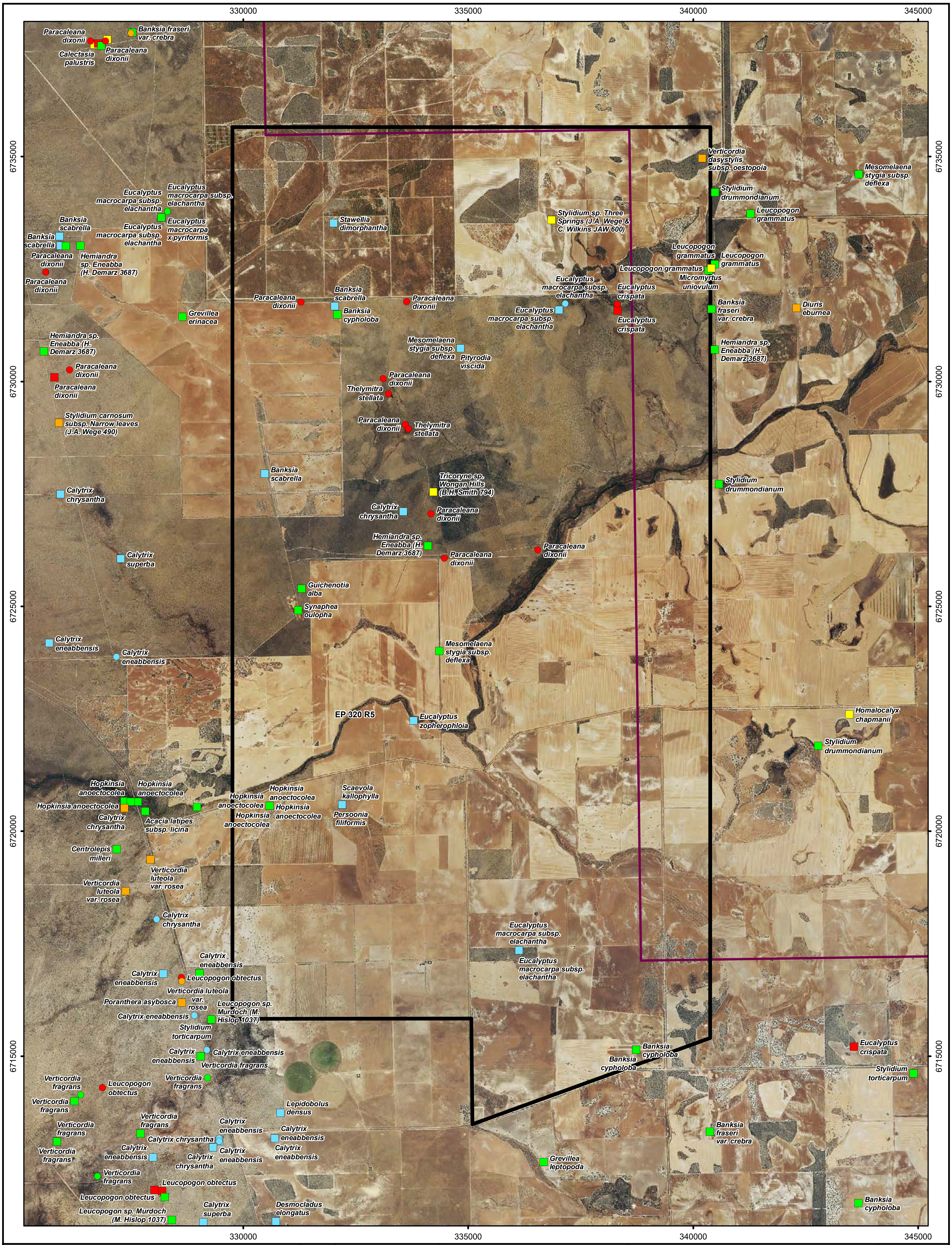
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Mattiske | MCPL Ref: LEP1701

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Treiste 3D Seismic Survey
2017 Survey Effort

Figure: 2



Legend

- Trieste 3D Seismic Project
- Exploration Permit EP320

TPFL		WA Herb.	
T	P3	T	P2
P1	P4	P1	P3
			P4

Imagery: Landgate (Nov 2016)

N

0 0.75 1.5km

Scale: 1:75,000
MGA94 (Zone 50)

CAD Ref: a2505R003
Date: Dec 2017 | Rev: A | A3

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Mattiske | MCPL Ref: LEP1701

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Trieste 3D Seismic Survey
Historic Threatened and Priority Flora Locations

Figure:
3

4.1. Threatened Flora

Four threatened flora species pursuant to subsection (2) of section 23F of the WC Act and as listed by the DBCA (2017), or pursuant to section 179 of the EPBC Act and listed by the DotEE (2017a), were recorded within the Trieste 3D Seismic Project area (Figure 4.1). Brief descriptions of these species are provided below.

4.1.1. *Eucalyptus crispata* (T & Vulnerable) - MYRTACEAE

Eucalyptus crispata (Yandanooka Mallee) is pursuant to subsection (2) of section 23F of the WC Act and is listed by the DBCA (2017). Furthermore, this species is also pursuant to section 179 of the EPBC Act and listed by the DotEE (2017). *Eucalyptus crispata* is described as an erect or spreading mallee up to 5 metres tall, with smooth grey bark on its upper trunk and peeling flakes at the base (Plate 1a; Brooker and Hopper 1991; Threatened Species Scientific Committee 2008a; WAH 1998-). This species is considered to be a possible hybrid between *E. accedens* x *E. arachnaea* (Council Heads of Australasian Herbaria 2014).

Two plants were recorded by MCPL Botanists at a single location. The plants were growing along the edge of a (dry) creekline associated with *Eucalyptus accedens* (Powderbark Wandoo) and *Eucalyptus arachnaea* subsp. *arachnaea* (Black-stemmed Mallee). This location was 260 m to the south-east of the historic TPFL record, and also 260 m to the north-east of the historic WAH specimen record. It is likely that both of these historic records represent location errors, as both were originally collected in 1989.

4.1.2. *Eucalyptus lepropholoia* (T & Endangered) - MYRTACEAE

Eucalyptus leprophloia (Scaly Butt Mallee) is pursuant to subsection (2) of section 23F of the WC Act and is listed by the DBCA (2017). Furthermore, this species is also pursuant to section 179 of the EPBC Act and listed by the DotEE (2017). *Eucalyptus leprophloia* is an erect mallee to 5 metres tall, with scaly, curly bark to 1 metre and smooth grey over pale-copper bark above (Plate 1c; Threatened Species Scientific Committee 2016; WAH 1998-).

A single location of a clump of 22 plants was recorded by MCPL Botanists in association with the same creekline as the *Eucalyptus crispata* (Yandanooka Mallee) records, but in the south-eastern end of the creekline within the UCL. This portion of the creekline was woodland dominated by *Eucalyptus accedens* (Powderbark Wandoo). Since locating this record however, this eastern portion of the UCL has been excised from the Trieste 3D Seismic Project, therefore no impact to this species is expected. Furthermore, *E. leprophloia* was not included in any impact calculations or any subsequent sections in this report.

4.1.3. *Paracaleana dixonii* (T & Endangered) - ORCHIDACEAE

Paracaleana dixonii (Sandplain Duck Orchid) is pursuant to subsection (2) of section 23F of the WC Act and is listed by the DBCA (2017). Furthermore, this species is also pursuant to section 179 of the EPBC Act and listed by the DotEE (2017). *Paracaleana dixonii* is a tuberous perennial herb (orchid) to 20 cm tall. It flowers from October to December (January) and often occurs on grey sand over laterite (Plate 1b; WAH 1998- ; Threatened Species Scientific Committee 2008b).

Twenty-nine plants were recorded by MCPL Botanists at five populations in the UCL. Five historic records of *Paracaleana dixonii* in the UCL were not relocated however four of the 2017 populations were recorded within 500 m of historic records.

4.1.4. *Thelymitra stellata* (T & Endangered) - ORCHIDACEAE

Thelymitra stellata (Star Sun Orchid) is pursuant to subsection (2) of section 23F of the WC Act and is listed by the DBCA (2017). Furthermore, this species is also pursuant to section 179 of the EPBC Act and listed by the DotEE (2017). *Thelymitra stellata* is a tuberous perennial herb (orchid) to 25 cm tall. It flowers from October to November and often occurs on sand, gravel or lateritic loam (Plate 1d; WAH 1998- ; Threatened Species Scientific Committee 2008c).

Thirty-eight plants were recorded by MCPL Botanists at seven populations. Five of these populations (21 plants) were located in the UCL area, and two of these populations (17 plants) were located in the Brickley's and Morgan's private properties to the north of the UCL. Two historic *Thelymitra stellata* records occurred within the UCL just off Robb Road – one at the base of a hill which was not relocated, and another further south along Robb Road which was not relocated. However, two of the populations of *T. stellata* were recorded during this survey at 130 m and 235 m north-west of the latter historic record along Robb Road.

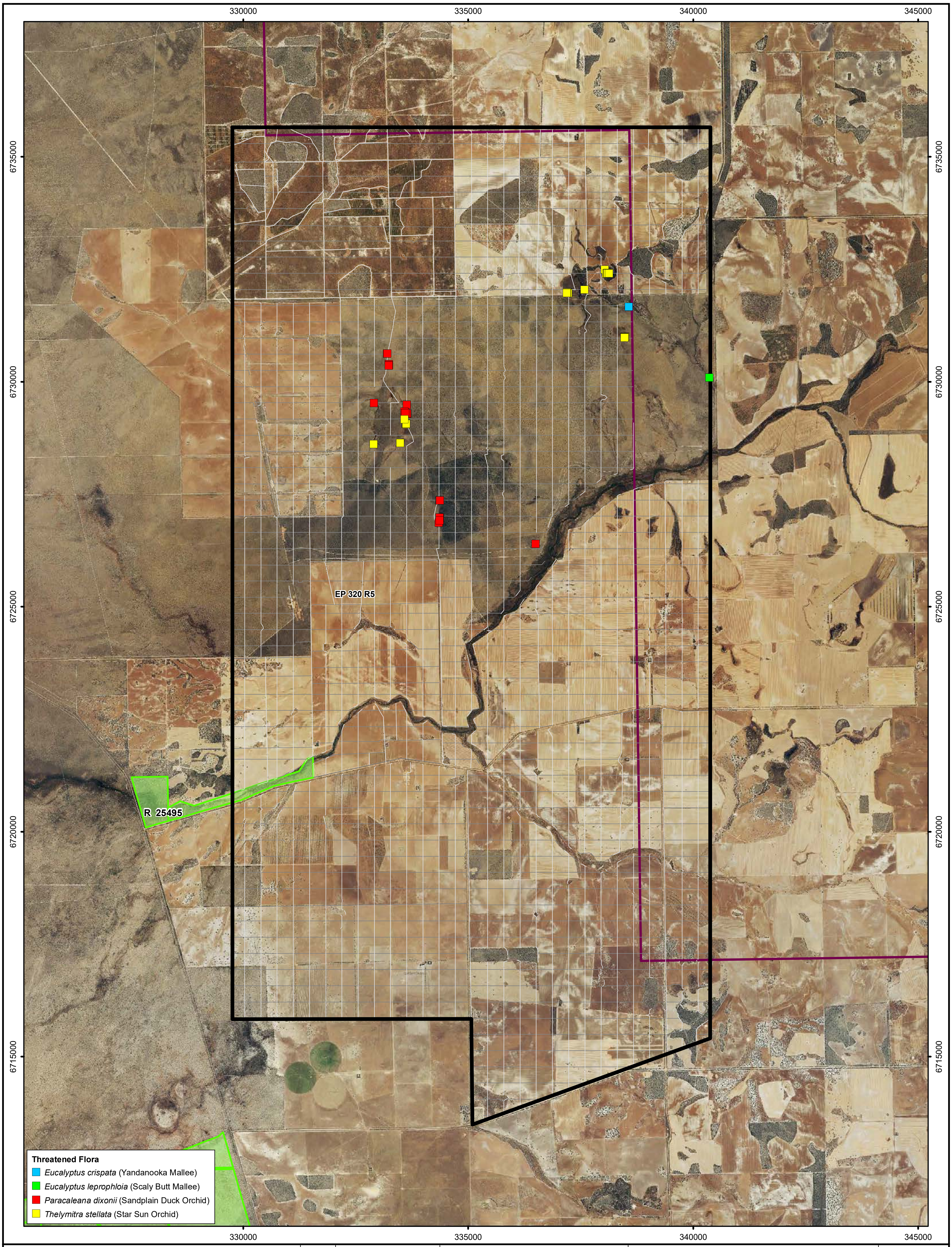
a

b

c

d

Plate 1: **Threatened taxa inflorescences and habit.** **a** *Eucalyptus crispata* (T/VU); **b** *Paracaleana dixonii* (T/EN); **c** *Eucalyptus leprophloia* (T/EN); and **d** *Thelymitra stellata* (T/EN).



Legend

Trieste 3D Seismic Project
Source Lines
Receiver Lines
Exploration Permit EP320
DBCA Estate

Imagery: Landgate (Nov 2016)

N

0 0.75 1.5km
Scale: 1:75,000
MGA94 (Zone 50)

CAD Ref: a2505R004_01
Date: Dec 2017 | Rev: B | A3

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Mattiske | MCPL Ref: LEP1701
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Treiste 3D Seismic Survey
Threatened Flora Locations

Figure:
4.1

4.2. Priority One Flora

Two priority one flora species, as listed by the WAH (1998-), were recorded within the Trieste 3D Seismic Project area (Figure 4.2). A brief description of these species are provided below.

4.2.1. *Lasiopetalum ogilvieanum* (P1) - Malvaceae

Lasiopetalum ogilvieanum is a shrub to 1.5m tall. It flowers between July and October and often occurs on undulating plains and lateritic rises (Plate 2a; WAH 1998-).

Fifty-six plants were recorded from three populations confined to the central UCL area. *Lasiopetalum ogilvieanum* was recorded under isolated trees in heathland and are therefore easily avoidable. Two of the populations were located along Receiver lines and the other along a Source line. *Lasiopetalum ogilvieanum* was not recorded in any of the surveyed private properties.

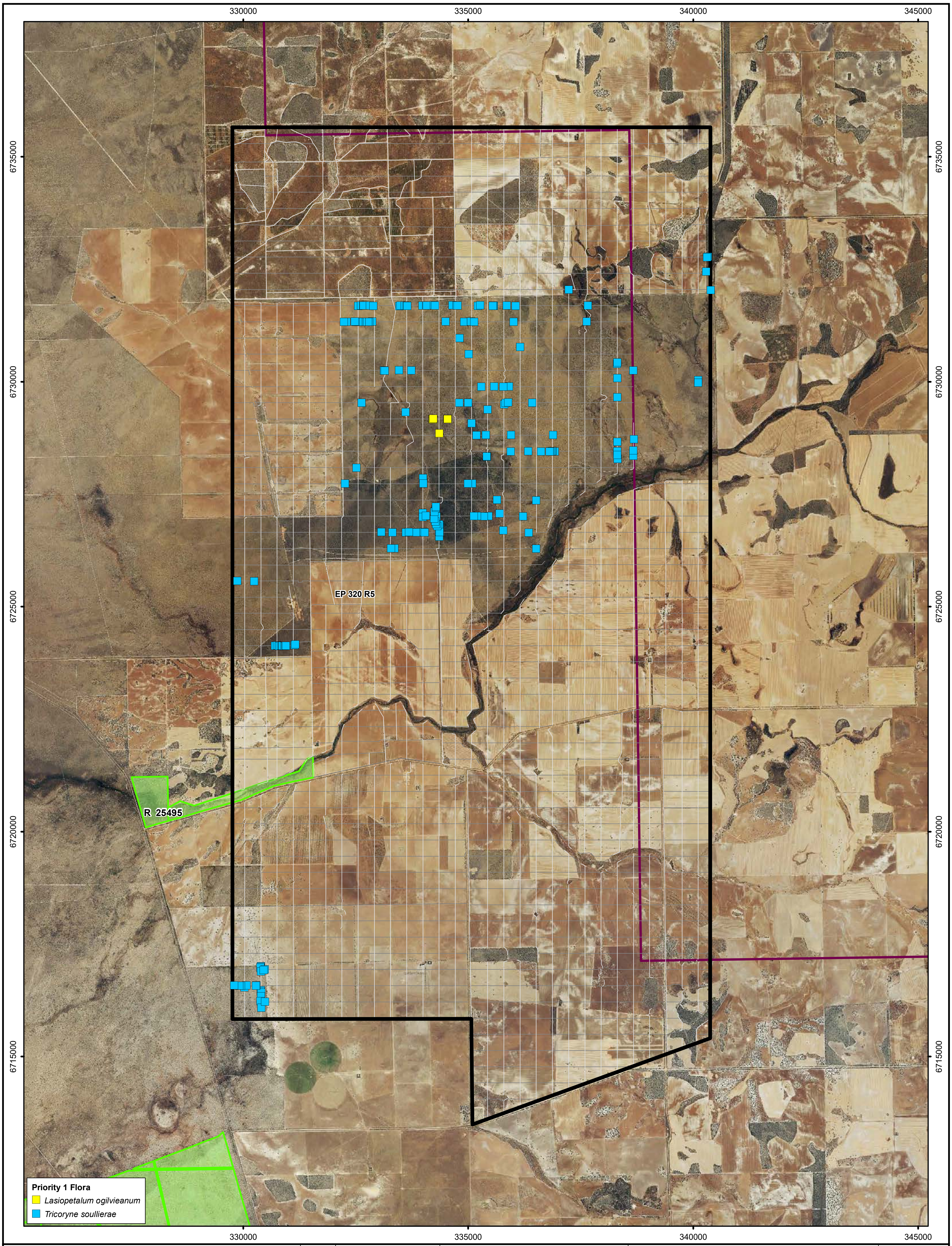
4.2.2. *Tricoryne soullierae* (P1) - Hemerocallidaceae

Tricoryne soullierae is a small herb that flowers in October (and likely other months) however limited information is available on this species (Plate 2b; WAH 1998-). Specialist Terry Macfarlane suspects that most WAH specimens of *Tricoryne* sp. Wongan Hills are in fact *T. soullierae* which is currently only known from three WAH specimens (M. Hislop, pers. comm., 5/12/2017). Numerous records were scattered across the UCL block, as well as in remnant vegetation blocks of two private properties (Figure 4.2).


a


b

Plate 2: Priority one taxa inflorescences and habit. a *Lasiopetalum ogilvieanum*; and **b** *Tricoryne soullierae*.



Legend

- Trieste 3D Seismic Project
- Exploration Permit EP320
- Source Lines
- DBCA Estate
- Receiver Lines

Imagery: Landgate (Nov 2016)

N

0 0.75 1.5km

Scale: 1:75,000
MGA94 (Zone 50)

CAD Ref: a2505R004_02

Date: Dec 2017 | Rev: B | A3

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Mattiske | MCPL Ref: LEP1701

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Treiste 3D Seismic Survey

Priority 1 Flora Locations

Figure:

4.2

4.3. Priority Two Flora

Three priority two flora species, as listed by the WAH (1998-), were recorded within the Trieste 3D Seismic Project area (Figure 4.3). Brief descriptions of these species are provided below.

4.3.1. *Persoonia filiformis* (P2) - PROTEACEAE

Persoonia filiformis is an erect to spreading lignotuberous shrub to 40 cm tall. It flowers from November to December and often occurs on sand over laterite (Plate 3a; WAH 1998-). One-hundred and fifty-four plants were recorded scattered in heathland in the UCL. *Persoonia filiformis* was not recorded in any of the surveyed private properties.

4.3.2. *Stylidium pseudocaespitosum* (P2) - STYLIDIACEAE

Stylidium pseudocaespitosum is a rosetted perennial herb with tufted leaves, to 30 cm tall. It flowers from September to November and occurs on sand over laterite, or on breakaways and hill slopes (Plate 3b; WAH 1998-).

Small populations of *Stylidium pseudocaespitosum* were recorded scattered in heathland, open woodland or isolated trees over open heathland in the central-northern UCL area. Usually less than five plants were recorded at a location. *Stylidium pseudocaespitosum* was not recorded in any of the surveyed private properties.

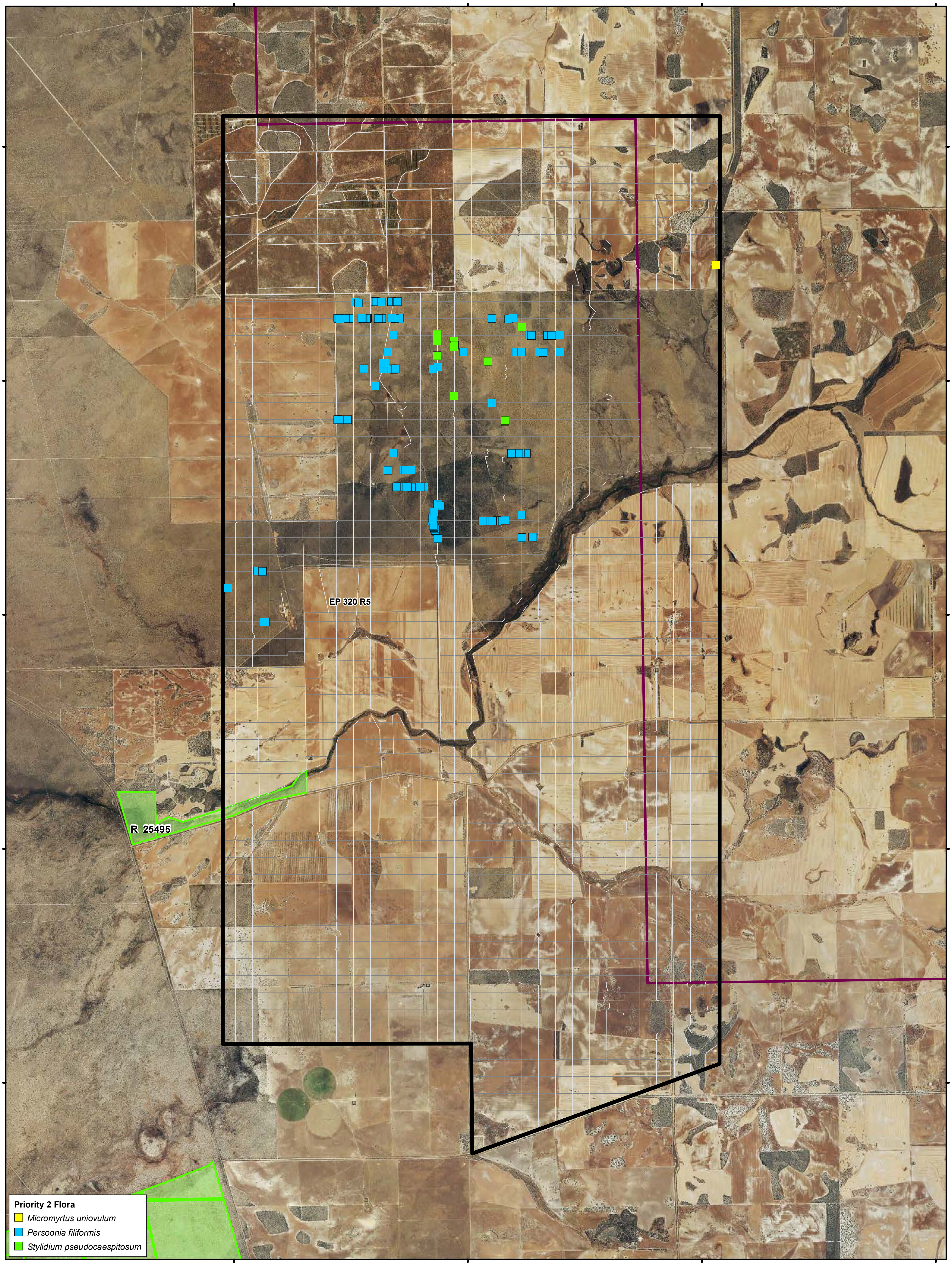
4.3.3. *Micromyrtus uniovulum* (P2) - MYRTACEAE

Micromyrtus uniovulum is a low and spreading shrub to 40 cm tall. It flowers from September to November and often occurs on lateritic rises in sandy soil over laterite (Rye 2002). The specimen collected was from a known historic record south of Sundalara Road (PERTH 07305826; WAH 1998-) and no plants were recorded along the Source or Receiver lines within the Trieste 3D Seismic Project. Furthermore, *M. uniovulum* was not included in any impact calculations or any subsequent sections in this report.

a

b

Plate 3: **Priority two inflorescences and habit.** **a** *Persoonia filiformis*; and **b** *Stylidium pseudocaespitosum*.



Legend
Trieste 3D Seismic Project
Exploration Permit EP320
Source Lines
DBCA Estate
Receiver Lines

Imagery: Landgate (Nov 2016)

N

0 0.75 1.5 km
Scale: 1:75,000
MGA94 (Zone 50)

CAD Ref: a2505R004_03
Date: Dec 2017 | Rev: B | A3

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Mattiske | MCPL Ref: LEP1701
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Treiste 3D Seismic Survey

Priority 2 Flora Locations

Figure:
4.3

4.4. Priority Three Flora

Eleven priority three flora species, as listed by the WAH (1998-), were recorded within the Trieste 3D Seismic Project area (Figure 4.4). Brief descriptions of these species are provided below.

4.4.1. *Grevillea biformis* subsp. *cymbiformis* (P3) - PROTEACEAE

Grevillea biformis subsp. *cymbiformis* is a shrub to 1.5 m tall. It flowers between January to March, or August to December (WAH 1998-). A single plant was recorded along a Receiver line in the central-eastern portion of the UCL. *Grevillea biformis* subsp. *cymbiformis* was not recorded in any of the surveyed private properties.

4.4.2. *Guichenotia alba* (P3) - MALVACEAE

Guichenotia alba is a slender, lax, few-branched shrub to 45 cm tall. It flowers from July to August and occurs on sandy clay or gravelly soils, on low-lying flats and depressions which are winter-wet (Plate 4a; Keighery 1998; WAH 1998-). Seventy-five plants were recorded at four populations in the central- and south-western UCL area. *Guichenotia alba* was not recorded in any of the surveyed private properties.

4.4.3. *Hemiandra* sp. Eneabba (H. Demarz 3687) (P3) - LAMIACEAE

Hemiandra sp. Eneabba (H. Demarz 3687) is a straggly, erect shrub to 90 cm tall. It flowers between November and February and often occurs on sand (WAH 1998-). Two-hundred and forty-three plants were recorded scattered in low numbers in the UCL, mostly in the south-west area and the south. *Hemiandra* sp. Eneabba (H. Demarz 3687) was not recorded in any of the surveyed private properties.

4.4.4. *Hypocalymma gardneri* (P3) - MYRTACEAE

Hypocalymma gardneri is a shrub to 30 cm tall. It flowers between August and September and often occurs on sand or laterite on sandplains, upper slopes and heathland (Plate 4b; WAH 1998-). *Hypocalymma gardneri* was recorded in the UCL at four locations, each of a single plant.

4.4.5. *Mesomelaena stygia* subsp. *deflexa* (P3) - CYPERACEAE

Mesomelaena stygia subsp. *deflexa* is a tufted, perennial sedge to 50 cm tall. It flowers from March to October and occurs on a variety of soils in heathland (Plate 4d; Wilson 1981; WAH 1998-). *Mesomelaena stygia* subsp. *deflexa* was often recorded in dense numbers on the cream-yellow sands on undulating plains associated with open heathland in the Trieste 3D Seismic Project area. It was not recorded in any of the surveyed private properties. The single historic record from Robb Road in the UCL was relocated, and the population numbers expanded.

4.4.6. *Persoonia rudis* (P3) - PROTEACEAE

Persoonia rudis is an erect, often spreading shrub to 1 m tall. It flowers from September to December (January) and often occurs on sand over laterite (Plate 4e; WAH 1998-). It was recorded mostly in the central and south-western areas of the UCL as scattered plants (1-2 plants at each location) in heathland.

4.4.7. *Stylidium drummondianum* (P3) - STYLIDIACEAE

Stylidium drummondianum is a rosetted perennial herb to 20 cm tall. It flowers from August to October and often occurs on lateritic ridges and slopes with gravelly skeletal soils (Plate 4g; WAH 1998-). It was recorded from the central-western lateritic ridges (west of Robb Road) and north-eastern lateritic ridges in the UCL, and the lateritic ridges in the Brickley's and Morgan's private properties. *Stylidium drummondianum* was often recorded in similar habitat to the threatened orchids, therefore a lesser impact is expected due to the deviations around the ridges and hand deployment along Receiver lines.

4.4.8. *Stylidium torticarpum* (P3) - STYLIDIACEAE

Stylidium torticarpum is a caespitose perennial herb with tufted leaves, growing to 27 cm tall. It flowers from September to November and often occurs on sandy clay soils on winter-wet creek margins, adjacent watersheds and depressions or beneath breakaways (Plate 4h; Lowrie and Kenneally 1997; WAH 1998-). *Stylidium torticarpum* was recorded in the damper areas or depressions between lateritic ridges in the south-east UCL as well as the creekline in the north-east UCL.

4.4.9. *Synaphea oulopha* (P3) - PROTEACEAE

Synaphea oulopha is a compact shrub to 20 cm tall. It flowers from July to October and often occurs on lateritic breakaways and rises (Plate 4c; WAH 1998-). Twenty-five plants of *Synaphea oulopha* were recorded in a confined area (90 x 20 m) in the south-west UCL along a Source line.

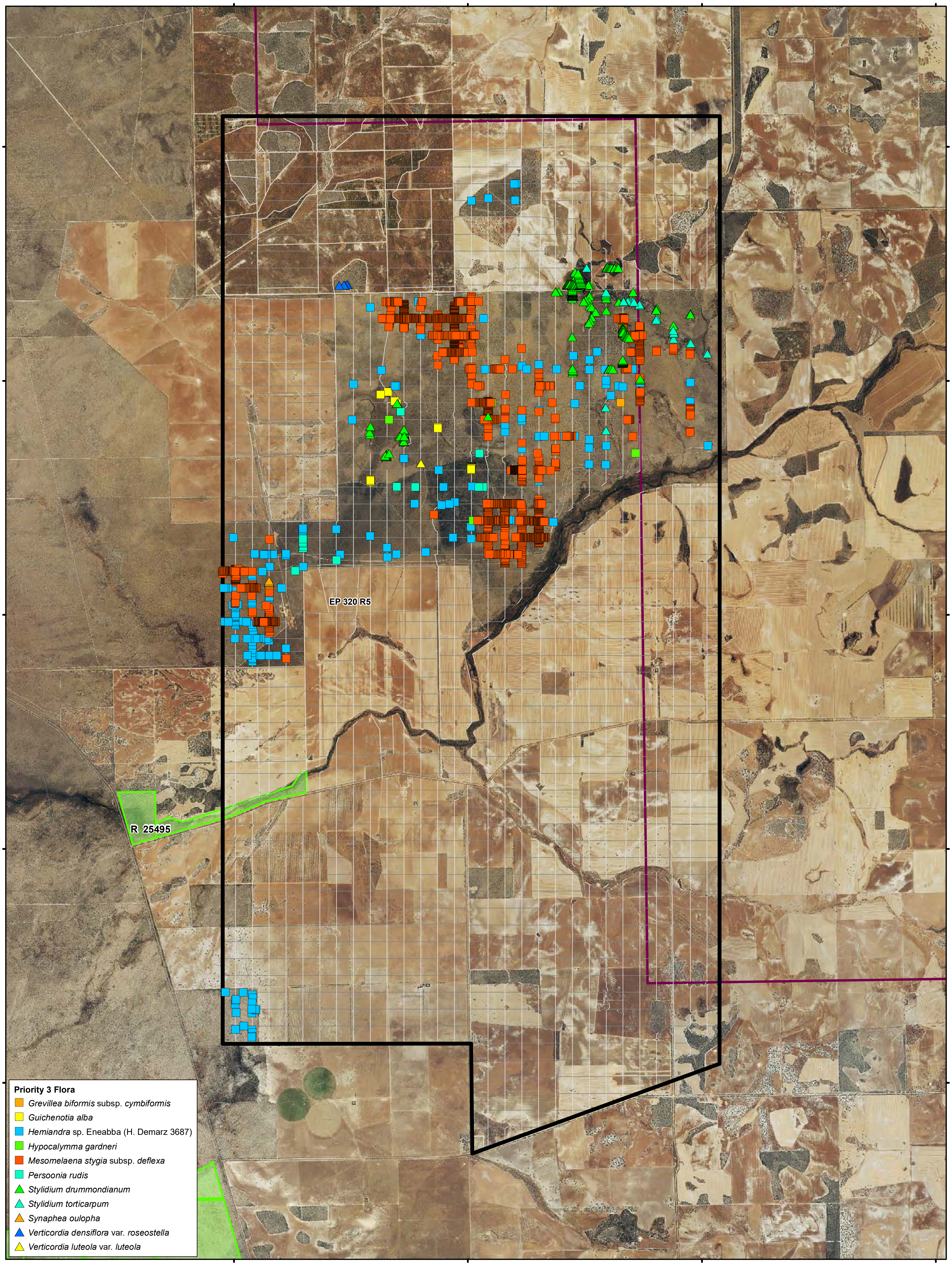
4.4.10. *Verticordia luteola* var. *luteola* (P3) - MYRTACEAE

Verticordia luteola var. *luteola* is a slender shrub to 1.4 m tall. It flowers from November to December and often occurs on sand over gravel on flats (Plate 4f; WAH 1998-). A single plant was recorded along a Source line just off Robb Road in the UCL.

4.4.11. *Verticordia densiflora* var. *roseostella* (P3) - MYRTACEAE

Verticordia densiflora var. *roseostella* is an open shrub to 1.3 m tall. It flowers from September to December and often occurs on sandy gravelly soils (Plate 4i; WAH 1998-). Seventy-eight plants were recorded as a single population along a Receiver line in the Mallee Tree Farm private property. *Verticordia densiflora* var. *roseostella* was not recorded in the UCL.

Plate 4: **Priority three inflorescences and habit. a** *Guichenotia alba*; **b** *Hypocalymma gardneri*; **c** *Synaphea oulopha* (photograph by L. Cockram); **d** *Mesomelaena stygia* subsp. *deflexa* (photograph by S. Ruoss); **e** *Persoonia rudis*; **f** *Verticordia luteola* var. *luteola* (photograph by L. Cockram); **g** *Stylidium drummondianum*; **h** *Stylidium torticarpum*; and **i** *Verticordia densiflora* var. *roseostella*.



Legend

Trieste 3D Seismic Project
Source Lines
Receiver Lines
Exploration Permit EP320
DBCA Estate

Imagery: Landgate (Nov 2016)

N

0 0.75 1.5km
Scale: 1:75,000
MGA94 (Zone 50)

CAD Ref: a2505R004_04
Date: Dec 2017 | Rev: B | A3

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
Author: E M Mattiske | MCPL Ref: LEP1701
Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Treiste 3D Seismic Survey
Priority 3 Flora Locations

Figure:
4.4

4.5. Priority Four Flora

Six priority four flora species, as listed by the WAH (1998-), were recorded within the Trieste 3D Seismic Project area (Figure 4.5). Brief descriptions of these species are provided below.

4.5.1. *Banksia scabrella* (P4) - PROTEACEAE

Banksia scabrella (Burma Road Banksia) is a much-branched shrub to 2 m tall. It flowers from September to December (January) and often occurs on sandplains and occasionally on lateritic ridges (Plate 5a; WAH 1998- ; George 1999). *Banksia scabrella* regenerates from seed and is known to be killed by fire (George 1999).

A large population of *Banksia scabrella* was recorded in the long-unburnt southern-central area of the UCL, as well as scattered in the low heath in the northern UCL. This species was also recorded in the Brickley's private property.

4.5.2. *Desmocladus elongatus* (P4) - RESTIONACEAE

Desmocladus elongatus is a shortly-rhizomatous perennial rush to 50 cm tall. It flowers from August to December and is often locally frequent on deep sand over laterite in heath (Plate 5b; WAH 1998- ; Briggs and Johnson 2001). *Desmocladus elongatus* was recorded scattered in heath and shrubland, usually as single plants, or less than five plants at each location. Majority of the records of this species were from the heathland in the north-western portion of the UCL.

4.5.3. *Eucalyptus macrocarpa* subsp. *elachantha* (P4) - MYRTACEAE

Eucalyptus macrocarpa subsp. *elachantha* (Small-leaved Mottlecah) is a spreading mallee to 4 m tall. It flowers from August to September or November to December and often occurs on sand over laterite (Plate 5c; WAH 1998-). Plants were recorded as scattered in the northern heathland in the UCL and not always directly on a Source or Receiver line. Minimal to no direct impact is expected for the *Eucalyptus macrocarpa* subsp. *elachantha* records.

4.5.4. *Hemiandra* sp. Watheroo (S. Hancocks 4) (P4) - LAMIACEAE

Hemiandra sp. Watheroo (S. Hancocks 4) is a prostrate, decumbent shrub to 50 cm tall. It has been recorded as flowering from November to January (Plate 5f; WAH 1998-). One population was located in the central portion of the UCL block, and four other populations were located in the eastern portion of the UCL block.

4.5.5. *Pityrodia viscida* (P4) - LAMIACEAE

Pityrodia viscida is a viscid shrub to 60 cm tall. It flowers from September to December or January to February and often occurs on lateritic sand (Plate 5d; WAH 1998-). Five main populations of *Pityrodia viscida* were recorded in the central-northern UCL, mostly along Receiver lines.

4.5.6. *Schoenus griffinianus* (P4) - CYPERACEAE

Schoenus griffinianus is a small, tufted perennial sedge growing to 10 cm tall. It flowers from September to October and often occurs on white sand, on existing tracks and firebreaks, favouring disturbed sites (Plate 5e; Wilson 1997; WAH 1998-). *Schoenus griffinianus* was often recorded in the UCL as scattered plants in low numbers (1-2 plants) along old tracks and firebreaks.

a

b

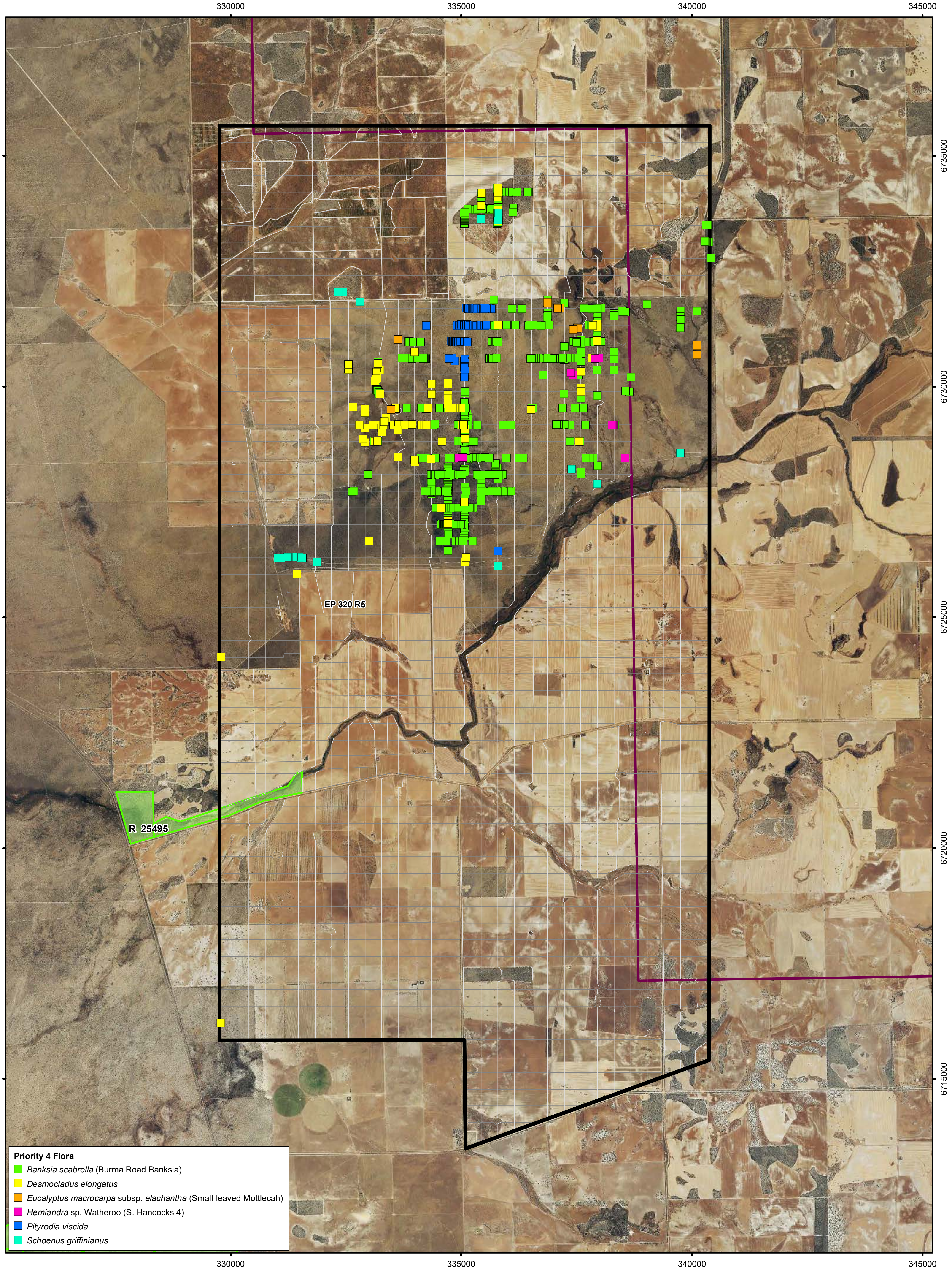
c

d

e

f

Plate 5: **Priority four inflorescences and habit.** **a** *Banksia scabrella*; **b** *Desmocladus elongatus*; **c** *Eucalyptus macrocarpa* subsp. *elachantha*; **d** *Pityrodia viscida*; **e** *Schoenus griffinianus*; and **f** *Hemiandra* sp. Watheroo (S. Hancocks 4) (photograph by S. Ruoss).



Legend
Trieste 3D Seismic Project
Exploration Permit EP320
Source Lines
DBCA Estate
Receiver Lines

Imagery: Landgate (Nov 2016)

N

0 0.75 1.5km

Scale: 1:75,000
MGA94 (Zone 50)

CAD Ref: a2505R004_05

Date: Dec 2017 | Rev: B | A3

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640

Author: E M Mattiske | MCPL Ref: LEP1701

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Treiste 3D Seismic Survey
Priority 4 Flora Locations

Figure:
4.5

4.6. Impact Assessment

A high impact rating was assigned to ten species recorded during the Trieste 3D Seismic Project botanical surveys. This included two Priority 1, two Priority 2, four Priority 3 and two Priority 4 species (Table 4). The highest impact was to 87.25% of known regional records of *Mesomelaena stygia* subsp. *deflexa* (P3; Table 4).

A moderate impact rating was assigned to four species recorded during the Trieste 3D Seismic Project botanical surveys. This included three Priority 3 and one Priority 4 species (Table 4). The impacts in this category ranged from 12.68% for *Stylidium drummondianum* to 23.81% for *Persoonia rudis* (Table 4).

A low impact rating was assigned to ten species recorded during the Trieste 3D Seismic Project botanical surveys. This included three Threatened, four Priority 3 and three Priority 4 species (Table 4). Impacts to the majority of these species were minimal, at less than 5%, with the exception of 5.86% for *Schoenus griffinianus* and 8.46% for *Stylidium torticarpum* (P3; Table 4).

Table 4: Impact assessment of conservation significant species

Note: 'WAH' – Western Australian Herbarium; 'MCPL' – Mattiske Consulting Pty Ltd 2017 survey; *Eucalyptus leprophloia* (T) and *Micromyrtus uniovulum* (P2), although discussed in sections above, were omitted from this table as no impact is expected upon the locations; * indicates that records within the 10m corridor occur along the existing Robb Road track and are not expected to be impacted by the seismic surveys; Red cells indicate a high impact (30-100%); Orange cells indicate a moderate impact (10-30%); Green cells indicate a low impact (0-10%).

SPECIES	NO. WAH SPECIMENS	NO. WAH PLANTS (APPROXIMATION ONLY)	TOTAL NO. MCPL RECORDS	TOTAL NO. MCPL PLANTS	NO. PLANTS WITHIN 10M CORRIDOR	IMPACT (%) TO TOTAL MCPL & WAH PLANT NO.
Eucalyptus crispata (T) Yandanooka Mallee	25	ca. 45	1	2	0	0.0
Paracaleana dixonii (T) Sandplain Duck Orchid	19	ca. 127	24	29	4*	0.0*
Thelymitra stellata (T) Star Sun Orchid	23	ca. 103	33	38	3*	0.0*
Lasiopetalum ogilvieanum (P1)	16	ca. 29	8	56	29	34.1
Tricoryne soullierae (P1)	3	ca. 55	183	388	365	82.4
Persoonia filiformis (P2)	20	ca. 26	119	154	151	83.9
Stylidium pseudocaespitosum (P2)	20	ca. 65	12	39	39	37.5
Grevillea biformis subsp. *cymbiformis* (P3)	24	ca. 337	1	1	1	0.3
Guichenotia alba (P3)	38	ca. 89	26	75	66	40.2
Hemiandra sp. Eneabba (H. Demarz 3687) (P3)	33	ca. 70	185	245	235	74.6
Hypocalymma gardneri (P3)	21	ca. 534	4	4	4	0.7
Mesomelaena stygia subsp. *deflexa* (P3)	29	ca. 1,954	2,145	98,696	87,817	87.2
Persoonia rudis (P3)	40	ca. 48	13	15	15	23.8
Stylidium drummondianum (P3)	36	ca. 2,619	264	2,122	601	12.7
Stylidium torticarpum (P3)	48	ca. 1,473	24	406	159	8.5
Synaphea oulopha (P3)	16	ca. 110	5	25	25	18.5
Verticordia densiflora var. *roseostella* (P3)	42	ca. 142	5	78	78	35.5

SPECIES	NO. WAH SPECIMENS	NO. WAH PLANTS (APPROXIMATION ONLY)	TOTAL NO. MCPL RECORDS	TOTAL NO. MCPL PLANTS	NO. PLANTS WITHIN 10M CORRIDOR	IMPACT (%) TO TOTAL MCPL & WAH PLANT NO.
Verticordia luteola var. *luteola* (P3)	20	ca. 265	1	1	1	0.4
Banksia scabrella (P4) Burma Road Banksia	51	ca. 771	695	5,800	5,593	85.1
Desmocladus elongatus (P4)	42	ca. 162	101	146	133	43.2
Eucalyptus macrocarpa subsp. *elachantha* (P4) Small-leaved Mottlecah	54	ca. 245	24	61	7	2.3
Hemiandra sp. Watheroo (S. Hancocks 4) (P4)	45	ca. 10,374	16	218	214	2.0
Pityrodia viscida (P4)	25	ca. 2,407	214	542	495	16.8
Schoenus griffinianus (P4)	37	ca. 518	23	62	34	5.9

4.7. Vegetation

The Trieste 3D Project lies within the Irwin Botanical District of the South-west Botanical Province (Beard 1990). Vegetation Association 379 of the Tathra System (shrublands; scrub-heath on lateritic sandplain) and Vegetation Association 378 of the Eridoon System (shrublands; scrub-heath with scattered *Banksia* spp., *Eucalyptus todtiana* and *Xylomelum angustifolium* on deep sandy flats) form the dominant vegetation associations of the Project (Beard 1976; Mattiske Consulting Pty Ltd 2017).

Furthermore, the vegetation is characterised by Mucina *et al.* (2014) as kwongan heath, with three dominant forms: myrtaceous-proteaceous kwongan; grasstree kwongan; and sedge kwongan. *Banksia* woodlands are also known to be occasionally present in the region (Mucina *et al.* 2014).

4.7.1. Broad Vegetation Structure

Similarly to the regional vegetation described above, the majority of vegetation encountered in the Trieste 3D Seismic Project area was open heathland (myrtaceous-proteaceous kwongan, grasstree kwongan and sedge kwongan), sometimes with isolated trees (usually *Eucalyptus todtiana* (Coastal Blackbutt) and/or *Xylomelum angustifolium* (Sandplain Woody Pear). Also encountered in the survey area were open woodlands (*Eucalyptus accedens* (Powderbark Wandoo) and *Eucalyptus arachnaea* subsp. *arachnaea* (Black-stemmed Mallee)) and open shrublands (either dominated by *Banksia hookeriana* (Hooker's Banksia) and *Banksia attenuata* (Slender Banksia), or *Allocasuarina campestris*, or *Banksia scabrella* (P4 – Burma Road Banksia) and *Banksia leptophylla*, often over open heathland or sedgeland (*Mesomelaena* spp.).

4.7.2. Vegetation Condition

With the exception of some edge effects of weeds from surrounding private properties (and the creekline in the north-east of the UCL), the overall condition of the UCL was category 1 with minimal human disturbances (See Appendix D for definitions; Keighery 1994). Feral animal influences, including goats, foxes and rabbits were noted during the survey.

The remnant vegetation in the three private properties visited to the north of the UCL were ranked as category 2 to 1, with small weed infestations from surrounding paddocks. The Petro private property visited to the south of the UCL was in similar condition, with weeds evident along the edge of the remnant vegetation block but was otherwise in category 2 to 1.

5. DISCUSSION AND RECOMMENDATIONS

The Trieste 3D Seismic Project lies in a relatively floristically un-surveyed area between Eneabba and Dongara, Western Australia. The UCL block formed the focus of this survey and was mostly made up of native vegetation in a near-pristine (Category 1) condition that provided habitat for numerous threatened and priority flora species. Various aged fire scars and firebreaks existed throughout the UCL. Overall, the Trieste 3D Seismic Project area was largely comprised of open myrtaceous-proteaceous heathland (or kwongan, and to a lesser extent grasstree kwongan and sedge kwongan), sometimes with isolated trees. Other noteworthy landforms supporting different conservation significant species included the lateritic ridges in the central and north-eastern UCL, and in the northern private properties, as well as the creekline in the north-eastern portion of the UCL, both supporting threatened species.

Prior to the botanical survey, Lattice Energy personnel refined the Source and Receiver lines to avoid wherever possible small remnant vegetation blocks in the private properties, the course of the Arrowsmith River and the Nature Reserve (R 25495). Due to landowner access issues, remnant vegetation in the southern private properties (with the exception of the Petro property) were unable to be traversed over the duration of the botanical surveys (Figure 2). All other accessible areas were thoroughly traversed by botanists, resulting in 26 conservation significant flora being identified within the Trieste 3D Seismic Project.

Based on the available regional information, ten species were given a high impact rating (30-100% of known records along the revised 10 m corridor of Source/Receiver lines). These ten species included the two Priority 1, and two Priority 2 taxa (Table 4). However, further efforts can be made to reduce the overall impacts to these species:

- *Lasiopetalum ogilvieanum* (P1) – can be avoided as it occurs in confined locations under stands of eucalypts;
- *Tricoryne soullierae* (P1) – likely dies back to underground rhizomes post-flowering (seen flowering in late October-November). Minimise impact by conducting the seismic survey outside of the vegetative and flowering period (August-December);
- *Banksia scabrella* (P4) – impact has been minimised by hand deploying equipment along Receiver lines in the dense populations. This species is likely to extend beyond the 20 m corridor of the Source and Receiver lines and therefore the potential impact in Table 4 may be much higher than the actual impact due to the localised high survey intensity for this species;
- *Hemiandra* sp. Eneabba (H. Demarz 3687) (P3) and *Desmocladus elongatus* (P4) – often scattered in low numbers and are likely to occur throughout the UCL block; and
- *Mesomelaena stygia* subsp. *deflexa* (P3) – impact has been minimised by hand deploying equipment along Receiver lines in the dense populations. This species is likely to extend beyond the 20 m corridor of the Source and Receiver lines surveyed and therefore the potential impact in Table 4 may be much higher than the actual impact due to the localised high survey intensity for this species.

Based on the available regional information, four species were given a moderate impact rating (10-30% of known records along the Source/Receiver lines). These species include three Priority 3 and one Priority 4 taxa (Table 4). However, further efforts can be made to reduce the overall impacts to these species:

- *Persoonia rudis* (P3) – often scattered in low numbers and with only 13 locations recorded, they can be easily avoided;

Based on the available regional information, ten species were given a low impact rating (0-10% of known records along the Source/Receiver lines). These species included the three Threatened taxa (Table 4). However, further efforts can still be made to reduce the overall impacts to these species:

- *Eucalyptus crispata* (T), *Paracaleana dixonii* (T) and *Thelymitra stellata* (T) – where applicable, use the existing tracks and follow deviations provided by MCPL to avoid these species; and
- *Grevillea biformis* subsp. *cymbiformis* (P3), *Hypocalymma gardneri* (P3) and *Verticordia luteola* var. *luteola* (P3) – can all be easily avoided as they occurred as single plants.
- *Eucalyptus macrocarpa* subsp. *elachantha* (P4) – can be avoided altogether as it often grew as distinct clumps;
- *Pityrodia viscida* (P4) - impact has been minimised by hand deploying equipment along Receiver lines in the dense populations; and
- *Verticordia densiflora* var. *roseostella* (P3) – only occurs in the Mallee Tree Farm property along a Receiver line. Avoid any direct impacts by hand deploying equipment.

Orchids such as *Paracaleana dixonii* (T) and *Thelymitra stellata* (T) have the capacity to persist underground as tubers without emerging for one or more years (Brundrett 2014). This can make surveys for rare orchids difficult as the flowering plants are only a fraction of the plants remaining dormant underground (Brundrett 2014). Other surveying challenges include response (or lack of) to environmental conditions, and a small opportunity for capturing the species in flower – usually being a few weeks. Also, most orchids do not flower every year and flowering plants will likely be in different locations each year (Commonwealth of Australia 2013). Therefore, avoiding lateritic slopes and ridges around the Robb Road area, hand deploying equipment only along Receiver lines on the lateritic ridges in the northern private properties and using existing tracks for Source lines wherever possible (and do not turn around/widen tracks especially within 50 m of threatened orchid locations) is the recommended approach. Due to the presence of threatened orchid species and the potential habitat that occurs within the UCL, it is also recommended that the seismic survey around the orchid locations and surrounding lateritic slopes and ridges off Robb Road be conducted between February and July, outside of the known flowering times of these species.

Four genera identified with numerous conservation significant species in the desktop assessment (Mattiske Consulting Pty Ltd 2017) were expected to be recorded in the Trieste 3D Seismic Project area. Fifteen specimens of *Calytrix*, thirteen specimens of *Leucopogon* and eight specimens of *Scholtzia* were collected during the survey, however no conservation significant species of these genera were identified.

The overall width of the Seismic and Receiver lines surveyed was 20 m. The impact assessment was based on a 10 m corridor that took into consideration all recommended deviations, no-drive areas and hand deploying equipment only areas. This resulted in no impact to any threatened flora species, and minimised the impact to numerous other priority species. Furthermore, it is likely that for the majority of the Source lines, only a portion of this corridor is likely to be impact by vehicles (i.e. the width of the vehicle), therefore the actual impacts to each conservation significant species are likely to be less than what has been outlined in Table 4.

6. CONCLUSION

Overall, it is likely that 22 priority species will be impacted to some extent within the Trieste 3D Seismic Project. However, impacts to these species (and the threatened species) can be minimised or avoided altogether by 1) hand deploying equipment along Receiver lines through large threatened/priority populations wherever possible; 2) avoiding single plant locations where applicable; 3) using the existing tracks and deviations provided by MCPL to avoid threatened species and to further avoid impacts to potential habitat; 4) conduct the seismic surveys in the UCL outside the known flowering periods of the threatened orchids and Priority 1 *Tricoryne*; and 5) avoiding the other higher conservation significant priority species (*Lasiopetalum ogilvieanum* (P1), *Persoonia filiformis* (P2) and *Stylidium pseudocaespitosum* (P2) wherever possible.

7. ACKNOWLEDGEMENTS

The authors would like to thank Kelly Hunt, Bob Foot and John Mitchell from Lattice Energy for their assistance with this project. The authors would also like to thank taxonomists from the Western Australian Herbarium for their plant identification support.

8. PERSONNEL

The following Mattiske Consulting Pty Ltd personnel were involved in this project:

NAME	POSITION	PROJECT INVOLVEMENT	FLORA COLLECTION PERMITS
Dr EM Mattiske	Managing Director & Principal Ecologist	Planning, managing, editing, reporting	N/A
Ms N Murdock	Senior Botanist & Project Leader	Planning, fieldwork, data analysis, reporting	SL012015; Permit to Take Declared Rare Flora 7-1718.
Mr D Angus	Senior Botanist	Fieldwork	SL012014
Mr A Barrett	Experienced Botanist	Fieldwork	SL012020
Ms L Cockram	Experienced Botanist	Fieldwork	SL012083
Mr B Ellery	Experienced Botanist	Fieldwork, plant identification	SL012024
Ms F Riviera	Experienced Botanist	Fieldwork	SL012016
Dr S Ruoss	Experienced Botanist	Fieldwork, report editing	SL012018

9. REFERENCES

Beard, JS 1976, *Vegetation survey of Western Australia: The vegetation of the Dongara area, 1:250,000 series, map and explanatory memoir*, Vegmap Publications, Perth, WA.

Beard, JS 1990, *Plant life of Western Australia*, Kangaroo Press, Kenthurst, NSW.

Biodiversity Conservation Act 2016 (WA)

Briggs, BG, Johnson, LAS 2001, 'The genus *Desmocladus* (Restionaceae) and new species from the south of Western Australia and South Australia', *Telopea*, 9(2), pp. 227-245.

Brooker, MIH, Hopper, SD 1991, 'A taxonomic revision of *Eucalyptus wandoo*, *E. redunca*, and allied species (*Eucalyptus* series Levispermae Maiden – Myrtaceae) in Western Australia', *Nuytsia*, 8 (1), pp. 1-188.

Brundrett, M 2014, *Identification and ecology of southwest Australian orchids*, Western Australia Naturalists' Club Inc., Perth, Western Australia.

Bureau of Meteorology 2017, *Climate data online*, Commonwealth of Australia. Available from: http://www.bom.gov.au/climate/data/?ref=ftr. [22 November 2017].

Commonwealth of Australia 2013, *Survey Guidelines for Australia's Threatened Orchids – Guidelines for detecting orchids listed as 'Threatened' under the Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth of Australia.

Council Heads of Australasian Herbaria 2014, *Eucalyptus crispata* Brooker & Hopper, APC Comment "A possible hybrid involving *E. accedens* and *E. arachnaea* (D. Nicolle, pers. Comm. 2006)". Available from: https://id.biodiversity.org.au/instance/apni/781599. [22nd November 2017].

Department of Biodiversity, Conservation and Attractions 2017a, *Wildlife conservation (rare flora) notice 2016, 6 January 2017*. Minister for the Environment under section 23F (2) of the WC Act. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants. [22 November 2017].

Department of Biodiversity, Conservation and Attractions 2017b, Conservation codes for Western Australian flora and fauna, May 2017, Government of Western Australia. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities. [30 November 2017].

Department of the Environment and Energy 2017, *EPBC Act list of threatened flora*, Commonwealth of Australia. Available from: http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora. [22 November 2017].

Environment Protection and Biodiversity Conservation Act 1999 (Cth)

Environmental Protection Act 1986 (WA)

Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA)

Environmental Protection Authority 2016a, *Environmental Factor Guideline: Flora and Vegetation*, Environmental Protection Authority, Western Australia.

Environmental Protection Authority 2016b, *Technical guidance – flora and vegetation survey for environmental impact assessment*, Environmental Protection Authority, Western Australia.

George, AS 1999, 'Proteaceae – *Banksia* – *Banksia scabrella*' in Flora of Australia, vol. 17B, ABRS, Commonwealth of Australia, p. 242.

Keighery, BJ 1994, Bushland plant survey: a guide to plant community survey for the community, Wildflower Society of WA (Inc.), Western Australia.

Keighery, GJ 1998, 'A new species of *Guichenotia* (Sterculiaceae) from south western Australia', *Nuytsia*, 8(3), pp. 319-321.

Lowrie, A, Kenneally, KF 1997, 'Six new species of triggerplant (Stylidium: Stylidiaceae) from south-west Western Australia', *Nuytsia*, 11(2), pp. 185-198.

Mattiske Consulting Pty Ltd 2017, *Flora and vegetation desktop assessment for Option 1B, within EP320*, unpublished report prepared for Origin Energy, March 2017. [ORI1701/11/2017].

Mucina, L, Laliberté, E, Thiele, KR, Dodson, JR, Harvey, J 2014, 'Chapter 2: Biogeography of kwongan: Origins, diversity, endemism and vegetation patterns' in Plant life on the sandplains in southwest Australia: A global biodiversity hotspot, eds. H Lambers, UWA Publishing, WA.

Rye, BL 2002, 'A revision of south-western Australian species of *Micromyrtus* (Myrtaceae) with five antisepalous ribs on the hypanthium', *Nuytsia*, 15(1), pp. 101-122.

Threatened Species Scientific Committee 2008a, *Approved conservation advice for Eucalyptus crispata (Yandanooka mallee)*, Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/24268-conservation-advice.pdf. [11th September 2017].

Threatened Species Scientific Committee 2008b, *Approved conservation advice for Paracaleana dixonii Hopper & A.P.Br. nom. inval. (sandplain duck orchid)*, Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/82050-conservation-advice.pdf. [14th September 2017].

Threatened Species Scientific Committee 2008c, *Approved conservation advice for Thelymitra stellata (star sun-orchid)*, Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/7060-conservation-advice.pdf. [14th September 2017].

Threatened Species Scientific Committee 2016, *Approved conservation advice for Eucalyptus leprophloia (scaly-butt mallee)*, Commonwealth of Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/56712-conservation-advice-01042016.pdf. [14th September 2017].

Western Australian Herbarium 1998-, *FloraBase – the Western Australian flora*, Department of Biodiversity, Conservation and Attractions. Available from: https://florabase.dpaw.wa.gov.au/. [22 November 2017].

Wildlife Conservation Act 1950 (WA)

Wilson, KL 1981, 'Revision of the genus Mesomelaena (Cyperaceae)', *Telopea*, 2 (2), pp. 181-195.

Wilson, KL 1997, 'New species of Cyperaceae in Western Australia', *Nuytsia*, 11 (2), pp. 278-280.

APPENDIX A1: THREATENED AND PRIORITY FLORA DEFINITIONS

Under section 179 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), **threatened flora** are categorised as extinct, extinct in the wild, critically endangered, endangered, vulnerable and conservation dependent (Table A1.1).

Table A1.1 Federal definition of threatened flora species

Note: Adapted from section 179 of the EPBC Act.

CODE	CATEGORY	DEFINITION
Ex	**Extinct**	Species which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	**Extinct in the Wild**	Species which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	**Critically Endangered**	Species which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	**Endangered**	Species which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	**Vulnerable**	Species which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	**Conservation Dependent**	Species which at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

The *Wildlife Conservation Act 1950* (WC Act) provides for (amongst other things) the protection of flora likely to become extinct or rare or otherwise in need of special protection in Western Australia under section 23F. **Threatened** (or **rare**) **flora** are listed in the *Wildlife Conservation (Rare Flora) Notice 2016* (under section 23F(2) of the WC Act; Department of Biodiversity, Conservation and Attractions 2017a) and are categorised under Schedules 1-4 as critically endangered, endangered, vulnerable or extinct, respectively. Threatened flora are defined as "likely to become extinct or is rare, or otherwise in need of special protection", pursuant to section 23F(2) of the WC Act. Threatened species are categorised as critically endangered, endangered, vulnerable and presumed extinct (Table A1.2).

Table A1.2 State definition of threatened flora species

Note: Adapted from Department of Biodiversity, Conservation and Attractions (2017b).

CODE	CATEGORY	DEFINITION
CR	**Critically endangered**	Species considered to be facing an extremely high risk of becoming extinct in the wild (listed under Schedule 1 of the *Wildlife Conservation (Rare Flora) Notice 2016*).
EN	**Endangered**	Species considered to be facing a very high risk of becoming extinct in the wild (listed under Schedule 2 of the *Wildlife Conservation (Rare Flora) Notice 2016*).
VU	**Vulnerable**	Species considered to be facing a high risk of becoming extinct in the wild (listed under Schedule 3 of the *Wildlife Conservation (Rare Flora) Notice 2016*).
EX	**Presumed extinct species**	Species that have been adequately searched for and there is no reasonable doubt that the last individual has died (listed under Schedule 4 of the *Wildlife Conservation (Rare Flora) Notice 2016*).

Priority flora species are defined as "possibly threatened species that do not meet the survey criteria, or are otherwise data deficient; or are adequately known, are rare but not threatened, meet criteria for near threatened or have recently been removed from the threatened species list for other than taxonomic reasons" (Department of Biodiversity, Conservation and Attractions 2017b). **Priority species are not afforded any protection under state or federal legislation**, however are considered significant under the Environmental Protection Authority's *Environmental Factor Guideline: Flora and Vegetation*. The Department of Biodiversity, Conservation and Attractions categorises priority flora into four categories: Priority 1; Priority 2, Priority 3 and Priority 4 (Table A1.3).

Table A1.3: State definition of priority flora species

Note: Adapted from Department of Biodiversity, Conservation and Attractions (2017b).

CODE	CATEGORY	DEFINITION
P1	**Priority 1:** Poorly-known species	Known from one or a few locations (< 5) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation; or are otherwise under threat of habitat destruction or degradation. In urgent need of further survey.
P2	**Priority 2:** Poorly-known species	Known from one or a few locations (< 5). Some occurrences are on lands managed primarily for nature conservation. In urgent need of further survey.
P3	**Priority 3:** Poorly-known species	Known from several locations and the species does not appear to be under imminent threat; or from few but widespread locations with either a large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. In need of further survey.
P4	**Priority 4:** Rare, Near Threatened, and other species in need of monitoring	**a) Rare -** Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. **b) Near Threatened -** Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. **c) Other -** Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

APPENDIX A2: OTHER DEFINITIONS

Environmentally sensitive areas

Environmentally sensitive areas are declared by the State Minister under section 51B of the *Environmental Protection Act 1986* (EP Act) and are listed in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*, gazetted 8 April 2005. Specific environmentally sensitive areas relevant to this report include: a defined wetland and the area within 50 metres of the wetland; the area covered by vegetation within 50 metres of rare flora; the area covered by a threatened ecological community; a Bush Forever site – further areas and information are described in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*.

Conservation significant flora

Under the *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a), flora may be considered significant for a range of reasons, including, but not limited to the following:

- being identified as threatened or priority species;
- locally endemic or associated with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems);
- new species or anomalous features that indicate a potential new species;
- representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range);
- unusual species, including restricted subspecies, varieties or naturally occurring hybrids; or
- relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

Conservation significant vegetation

Under the *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a), vegetation may be considered significant for a range of reasons, including, but not limited to the following:

- being identified as threatened or priority ecological communities;
- restricted distribution;
- degree of historical impact from threatening processes;
- a role as a refuge; or
- providing an important function required to maintain ecological integrity of a significant ecosystem.

APPENDIX B: SOURCE AND RECEIVER LINE COMMENTS FROM BOTANICAL FOOT TRAVERSES

This appendix is to be read in conjunction with the shapefile provided to Lattice Energy: MCPL_Foot_Traverses_FINAL.shp.

Table B.1: SOURCE LINE DEVIATIONS AND COMMENTS

ID	EASTING (GDA94 Z50)	NORTHING (GDA94 Z50)	ISSUE	DEVIATE TO	COMMENTS
1	330398	6724460	Trees	East	Clump of eucalypts and woody pears, follow GPS track.
2	330753	6726195	Other	West	Monitoring peg - difficult to see - be cautious.
3	330749	6726702	Slow Growing spp	East	Avoid grasstrees through here wherever possible.
4	330390	6726289	Slow Growing spp	West	Avoid grasstrees through here wherever possible.
5	331483	6726145	Slow Growing spp	West	Avoid grasstrees, follow old firebreak.
6	332904	6729734	Trees		Woody pear trees, weave through.
7	333281	6728453	Other Obstacle	West	Lateritic ridge. Follow ridge west for easier slope, breakaway at top here.
8	333259	6728380	Other Obstacle	West	Lateritic ridge. Descend here.
9	330771	6723892	Other	East	Start line here for easy access between shrubs.
10	331113	6724796	Other		Bee hive in stockpile, in hole in ground.
11	331085	6724972	Other		Bee hive in rocky stockpile in ground.
12	331067	6725109	Other Obstacle	West	Tall shrubs and large soil stockpile.
13	331045	6725164	Other Obstacle	West	Large stockpile, drive around west side.
14	331049	6725217	Other Obstacle	West	Follow GPS track.
15	331113	6725690	Slow Growing spp		Avoid grasstrees through here wherever possible.
16	331122	6726767	Trees	East	
17	333381	6731572	Other		Use existing track to the south (Robb Road).
18	332910	6729604	Other Obstacle		Stop line here. Access top of ridge from the south.
19	332909	6728553	Other Obstacle	West	Follow GPS track to west on top of ridge.
20	332849	6728605	Other		Follow very old overgrown track to the NE along ridge top.
21	332913	6728757	Other Obstacle	West	Ridge. Follow GPS track around the top.
22	332913	6728843	Other Obstacle	West	Follow GPS tracks to west to follow ridge top.
23	332874	6728883	Other	East	Follow GPS track back to the line.
24	331509	6724219	Fence	East	Use fence line track (west side) to the north.
25	334339	6731742	Trees	West	
26	334344	6731698	Trees	West	
27	334359	6731650	Slow Growing spp		Many low grass trees and evenly scattered eucalypts over broad area. Weave through carefully.
28	334704	6729315	Trees	West	Keep west of dense tree and shrub patch.
29	334696	6729226	Trees	West	Keep west of dense tree and shrub patch.
30	334355	6726289	Other	West	Follow Receiver Line to the west to Robb Rd and continue south along Robb Rd.
31	337958	6729614	Other	East	Too steep for vehicle, head east.

ID	EASTING (GDA94 Z50)	NORTHING (GDA94 Z50)	ISSUE	DEVIATE TO	COMMENTS
32	337957	6729645	Other Obstacle	East	Steep drop off.
33	337600	6731610	Other	East	Getting steep, deviate to east.
34	337593	6731240	Other	East	Getting steep, ridge. Deviate to east.
35	337604	6731179	Other	East	Deviate to east.
36	337590	6731094	Other	East	Deviate to east.
37	337595	6729925	Other		Bee hive in hole in ground.
38	337948	6731892	Trees		Weave through eucalypts.
39	335428	6728788	Other		Weave through the 2m tall shrubs.
40	335428	6728544	T&P Sml Popn	West	
41	335424	6728489	Other Obstacle	East	Steep slope.
42	335418	6728460	Other Obstacle	East	Steep slope.
43	335434	6728382	Other	West	Head west to existing track, then continue south on existing track.
44	335070	6728489	Trees	West	Follow track around large thicket of wattle.
45	335071	6728415	Trees	West	Follow track around large thicket of wattle.
46	335782	6727462	Other	West	Use existing old track.
47	335794	6727554	Other	West	Use existing old track.
48	335780	6728236	Other Obstacle	West	Deviate west around the ridge.
49	335788	6728388	Other Obstacle	West	Deviate west around the ridge.
50	335804	6730057	Trees	East	
51	335795	6730134	Trees	East	
52	335801	6730219	Trees	East	
53	335797	6730329	Trees	East	
54	336872	6727016	Other		Use existing track.
55	336874	6731831	T&P Sml Popn	East	
56	336871	6731801	T&P Sml Popn	East	
57	336875	6729840	Trees	East	
58	336881	6729888	Trees	East	
59	337230	6730193	Other Obstacle	East	Slope, follow track.
60	338675	6731251	T&P Sml Popn	East	
61	338681	6731175	T&P Sml Popn	East	
62	338673	6731701	Other	East	Bee hive in dead tree.
63	338699	6731777	Other	West	Bee hive in dead tree.
64	338718	6731835	Other	West	Bee hive in dead tree.
65	338678	6731910	Trees	East	
66	330395	6716875	Other Obstacle		Farm trough.
67	330037	6716126	Slow Growing spp	West	Avoid Macrozamia.
68	330022	6716477	Other Obstacle	East	Bee hive in a rabbit hole.
69	338309	6728679	Other		Bee hive in grasstree stump.
70	335803	6734349	Other		Enter bush from here.

ID	EASTING (GDA94 Z50)	NORTHING (GDA94 Z50)	ISSUE	DEVIATE TO	COMMENTS
71	335436	6734243	Other	West	Bee hives in tree.
72	337631	6732557	Other		Drop off. Cannot drive.
73	337954	6732371	Other Obstacle		Stop here. Steep slope and cliff. Do not drive. Hand deploy only.
74	337957	6732605	Other Obstacle		Stop here. Steep slope and cliff. Do not drive.
75	333634	6729543	T&P Sml Popn	East	
76	333627	6729429	T&P Sml Popn	East	
77	333635	6729380	T&P Sml Popn	West	
78	333632	6729226	T&P Sml Popn	West	Go onto Robb Road.
79	333197	6730625	T&P Sml Popn	East	Stay on Robb Road - do not turn vehicles around in this area.
80	333444	6729531	Other	West	Continue the Source line by driving along the Receiver.
81	334363	6727296	T&P Sml Popn	East	Follow gps track.
82	334351	6727440	T&P Sml Popn	East	Follow gps track.
83	334355	6726775	T&P Sml Popn	West	Sandplain Duck Orchid - multiple records on ridge. Avoid by detouring to the west.
84	334354	6727317	T&P Sml Popn	West	Sandplain Duck Orchid - multiple records on ridge. Avoid by detouring to the west.
85	336517	6726340	T&P Sml Popn	East	Stop. Do not continue south. Historic Sandplain Duck Orchid record.
86	336514	6726649	T&P Sml Popn	East	Stop. Do not continue south. Sandplain Duck Orchid record. Drive east to main track.

Table B.2: RECEIVER LINE DEVIATIONS AND COMMENTS

ID	EASTING (GDA94 Z50)	NORTHING (GDA94 Z50)	ISSUE	DEVIATE TO	COMMENTS
87	338232	6732407	Other		Stop. Drop off. Hand deploy to west only.
88	338042	6732410	Other		Stop. Drop off. Hand deploy to east only.
89	330094	6725935	Slow Growing spp	North	Small patch of grasstrees.
90	331474	6724507	Trees		Stop Receiver line here. Large shrubs and tree at the end.
91	331257	6725568	Slow Growing spp	South	Large patch of grasstrees.
92	331309	6725570	Slow Growing spp	South	
93	332772	6726287	Slow Growing spp		Grass trees, weave through.
94	332683	6726296	Slow Growing spp		Grass trees, weave through.
95	331747	6726295	Other Obstacle		Small bee hive in ground.
96	334380	6727018	Other		Steep drop off, ok to carefully walk down.
97	332933	6728812	Other Obstacle	North	Steep cliff drop off.
98	332932	6728829	Other Obstacle		Steep gully, ok to walk down with care.
99	332965	6728804	Other Obstacle	North	Steep cliff drop off.
100	332972	6729537	Other Obstacle	North	Hand deploy over the ridge or else follow tracks around.
101	332639	6729534	Other Obstacle	North	Hand deploy over the ridge or else follow tracks around.
102	337567	6731330	Other Obstacle	South	Stop here. Ridge too steep to even walk down. Follow track south.
103	337630	6731334	Other Obstacle	South	Stop here. Ridge too steep to even walk up. Follow track south.
104	338484	6731702	T&P Sml Popn	South	
105	337488	6731692	Other Obstacle	North	Follow track around ridge.
106	337610	6731685	Other Obstacle	North	Follow track around ridge.
107	335876	6726661	Other		Follow the existing vehicle track.
108	336410	6727003	Other	South	Use very old track.
109	330034	6724850	Trees	North	
110	330042	6724849	Trees	North	
111	330481	6724850	Trees	North	
112	330490	6724852	Trees	North	
113	338087	6730969	Trees	North	Clump of trees and large shrubs.
114	338114	6730972	Trees	North	
115	337338	6727732	Trees	North	
116	337362	6727731	Trees	North	
117	330859	6726645	Other Obstacle		Gravel mound.
118	330922	6726649	Other Obstacle		Gravel mound.
119	330935	6726647	Other Obstacle		Gravel mound.
120	333324	6728449	Other Obstacle		Steep. Low rise.
121	333339	6728447	Other Obstacle		Steep drop.

ID	EASTING (GDA94 Z50)	NORTHING (GDA94 Z50)	ISSUE	DEVIATE TO	COMMENTS
122	335053	6728457	Trees		
123	335074	6728454	Trees		
124	337739	6729529	Other Obstacle		Steep drop off, low ridge.
125	337751	6729527	Other Obstacle		Low ridge.
126	337808	6729172	Trees		
127	337788	6729173	Trees		
128	337751	6729169	Other Obstacle		Rocky slope.
129	340391	6732036	Other Obstacle		Bee hive.
130	336127	6734214	Fence		
131	335411	6734210	Trees	North	
132	335811	6733843	Trees	North	
133	336128	6733848	Fence		
134	332425	6732417	Other Obstacle	South	Bee hive.
135	337536	6732058	Other Obstacle		Bee hive in rock.
136	337517	6732058	Other Obstacle		Cliff face, do not continue west. Hand deploy to the east only
137	338372	6730971	T&P Sml Popn		Recommend hand deployment over ridge.
138	338560	6730970	T&P Sml Popn		Recommend hand deployment over ridge.
139	340272	6733140	Trees	North	Start line here.
140	337438	6732049	Other Obstacle		Stop here. Cliff to east. Hand deploy only to the west.
141	337103	6732050	T&P Sml Popn		Hand deploy only to the east.
142	337310	6732421	Other		Hand deploy to east only.
143	337633	6732416	Other		Hand deploy to west only.
144	338295	6732410	Other Obstacle		Stop here. Steep ridge. Hand deploy only.

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Eucalyptus crispata	T/VU	2	338568.10	6731666.95
Eucalyptus leprophloia	T/EN	6	340356.20	6730093.21
Paracaleana dixonii	T/EN	1	332904.39	6729524.89
Paracaleana dixonii	T/EN	1	333630.65	6729488.54
Paracaleana dixonii	T/EN	1	333632.68	6729490.55
Paracaleana dixonii	T/EN	1	333643.89	6729289.67
Paracaleana dixonii	T/EN	2	333643.38	6729288.71
Paracaleana dixonii	T/EN	1	333640.13	6729287.89
Paracaleana dixonii	T/EN	1	333637.94	6729288.53
Paracaleana dixonii	T/EN	2	333585.14	6729333.46
Paracaleana dixonii	T/EN	1	333601.42	6729307.15
Paracaleana dixonii	T/EN	2	333600.11	6729305.97
Paracaleana dixonii	T/EN	1	333197.39	6730622.23
Paracaleana dixonii	T/EN	1	333199.14	6730625.05
Paracaleana dixonii	T/EN	1	333230.92	6730388.19
Paracaleana dixonii	T/EN	1	333236.85	6730368.00
Paracaleana dixonii	T/EN	2	333233.55	6730357.39
Paracaleana dixonii	T/EN	1	334362.59	6727357.79
Paracaleana dixonii	T/EN	1	334367.01	6727359.47
Paracaleana dixonii	T/EN	1	334344.95	6726864.17
Paracaleana dixonii	T/EN	2	334368.76	6726976.15
Paracaleana dixonii	T/EN	1	334367.71	6726973.95
Paracaleana dixonii	T/EN	1	334365.35	6726981.72
Paracaleana dixonii	T/EN	1	334364.46	6726982.25
Paracaleana dixonii	T/EN	1	334363.89	6726919.06
Paracaleana dixonii	T/EN	1	336497.76	6726393.69
Thelymitra stellata	T/EN	1	333611.27	6729063.45
Thelymitra stellata	T/EN	1	333612.66	6729059.06
Thelymitra stellata	T/EN	2	333613.79	6729060.56
Thelymitra stellata	T/EN	1	333616.45	6729061.88
Thelymitra stellata	T/EN	1	333619.61	6729066.60
Thelymitra stellata	T/EN	2	333621.27	6729065.16
Thelymitra stellata	T/EN	1	338483.26	6730998.10
Thelymitra stellata	T/EN	1	338480.13	6730996.08
Thelymitra stellata	T/EN	1	338480.53	6730994.25
Thelymitra stellata	T/EN	2	338481.73	6730993.15
Thelymitra stellata	T/EN	1	338485.09	6730995.34
Thelymitra stellata	T/EN	1	338486.09	6730990.67
Thelymitra stellata	T/EN	1	338474.24	6730987.67
Thelymitra stellata	T/EN	2	338470.80	6730981.84
Thelymitra stellata	T/EN	1	337221.60	6731971.85
Thelymitra stellata	T/EN	1	337221.36	6731975.10
Thelymitra stellata	T/EN	1	337221.36	6731975.10
Thelymitra stellata	T/EN	1	337215.04	6731970.42
Thelymitra stellata	T/EN	1	337220.83	6731969.62
Thelymitra stellata	T/EN	1	337218.56	6731970.81
Thelymitra stellata	T/EN	1	337198.36	6731981.22
Thelymitra stellata	T/EN	1	337190.84	6731972.90
Thelymitra stellata	T/EN	1	337581.36	6732049.09
Thelymitra stellata	T/EN	1	333582.13	6729167.27
Thelymitra stellata	T/EN	1	333488.84	6728640.17
Thelymitra stellata	T/EN	1	338032.87	6732489.41
Thelymitra stellata	T/EN	1	338071.08	6732403.32

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Thelymitra stellata	T/EN	1	338065.99	6732402.45
Thelymitra stellata	T/EN	2	338088.46	6732416.38
Thelymitra stellata	T/EN	1	338093.93	6732414.76
Thelymitra stellata	T/EN	1	338100.61	6732408.09
Thelymitra stellata	T/EN	1	338131.87	6732409.72
Thelymitra stellata	T/EN	1	332894.95	6728612.53
Lasiopetalum ogilvieanum	P1	13	334358.80	6728855.85
Lasiopetalum ogilvieanum	P1	15	334206.89	6729172.14
Lasiopetalum ogilvieanum	P1	5	334209.71	6729166.05
Lasiopetalum ogilvieanum	P1	12	334223.52	6729175.20
Lasiopetalum ogilvieanum	P1	1	334536.73	6729169.09
Lasiopetalum ogilvieanum	P1	1	334537.69	6729168.49
Lasiopetalum ogilvieanum	P1	4	334542.00	6729169.53
Lasiopetalum ogilvieanum	P1	5	334538.94	6729167.96
Tricoryne soullierae	P1	2	335420.31	6728331.66
Tricoryne soullierae	P1	4	335412.91	6728338.16
Tricoryne soullierae	P1	2	335074.37	6729076.86
Tricoryne soullierae	P1	9	335797.23	6729496.62
Tricoryne soullierae	P1	1	336153.28	6730771.86
Tricoryne soullierae	P1	1	340111.10	6730035.91
Tricoryne soullierae	P1	5	340107.83	6729974.11
Tricoryne soullierae	P1	5	330705.41	6724127.65
Tricoryne soullierae	P1	3	330751.11	6724132.95
Tricoryne soullierae	P1	1	330791.33	6724123.09
Tricoryne soullierae	P1	5	330795.50	6724122.68
Tricoryne soullierae	P1	2	330840.49	6724130.70
Tricoryne soullierae	P1	7	330861.85	6724129.86
Tricoryne soullierae	P1	4	330872.89	6724125.73
Tricoryne soullierae	P1	3	330914.96	6724123.75
Tricoryne soullierae	P1	3	330942.70	6724126.15
Tricoryne soullierae	P1	2	330947.08	6724130.21
Tricoryne soullierae	P1	1	331140.52	6724140.45
Tricoryne soullierae	P1	1	331157.85	6724160.08
Tricoryne soullierae	P1	1	330243.56	6725566.45
Tricoryne soullierae	P1	2	329866.79	6725569.46
Tricoryne soullierae	P1	5	332554.45	6731688.32
Tricoryne soullierae	P1	1	332616.12	6731689.22
Tricoryne soullierae	P1	1	332670.81	6731689.78
Tricoryne soullierae	P1	1	332673.04	6731692.23
Tricoryne soullierae	P1	2	332816.32	6731689.27
Tricoryne soullierae	P1	1	332891.36	6731685.09
Tricoryne soullierae	P1	2	332863.39	6731333.25
Tricoryne soullierae	P1	5	332800.86	6731331.11
Tricoryne soullierae	P1	2	332777.13	6731331.15
Tricoryne soullierae	P1	3	332632.69	6731329.32
Tricoryne soullierae	P1	1	332579.76	6731332.65
Tricoryne soullierae	P1	1	332552.71	6731331.26
Tricoryne soullierae	P1	1	332495.32	6731328.44
Tricoryne soullierae	P1	2	332477.23	6731334.44
Tricoryne soullierae	P1	2	332292.83	6731332.73
Tricoryne soullierae	P1	4	332234.28	6731332.07
Tricoryne soullierae	P1	10	332260.81	6727733.34
Tricoryne soullierae	P1	2	332514.14	6728086.85

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Tricoryne soullierae	P1	1	335184.12	6728809.94
Tricoryne soullierae	P1	1	335391.29	6728813.19
Tricoryne soullierae	P1	1	333357.83	6726293.07
Tricoryne soullierae	P1	1	333282.72	6726294.67
Tricoryne soullierae	P1	1	333065.49	6726654.28
Tricoryne soullierae	P1	1	333315.89	6726649.80
Tricoryne soullierae	P1	2	333611.52	6726647.88
Tricoryne soullierae	P1	4	333681.36	6726653.34
Tricoryne soullierae	P1	1	333856.24	6726649.38
Tricoryne soullierae	P1	1	334005.13	6726658.84
Tricoryne soullierae	P1	3	334032.23	6726650.21
Tricoryne soullierae	P1	1	334361.95	6726653.95
Tricoryne soullierae	P1	2	334995.99	6729533.80
Tricoryne soullierae	P1	2	334804.03	6729529.70
Tricoryne soullierae	P1	5	332627.04	6729534.24
Tricoryne soullierae	P1	3	335640.22	6727375.98
Tricoryne soullierae	P1	2	336218.49	6727005.26
Tricoryne soullierae	P1	1	335090.04	6727734.99
Tricoryne soullierae	P1	1	334991.68	6727732.30
Tricoryne soullierae	P1	1	333127.85	6730248.52
Tricoryne soullierae	P1	1	333145.09	6730244.88
Tricoryne soullierae	P1	1	333461.25	6730256.43
Tricoryne soullierae	P1	1	333735.24	6730249.00
Tricoryne soullierae	P1	2	338670.97	6730252.14
Tricoryne soullierae	P1	1	335909.62	6729893.97
Tricoryne soullierae	P1	2	335779.30	6729889.95
Tricoryne soullierae	P1	1	335575.69	6729897.36
Tricoryne soullierae	P1	3	335287.90	6729888.57
Tricoryne soullierae	P1	1	334907.51	6731330.03
Tricoryne soullierae	P1	3	335062.42	6731334.98
Tricoryne soullierae	P1	2	335064.40	6731337.44
Tricoryne soullierae	P1	2	335129.52	6731328.98
Tricoryne soullierae	P1	1	336008.05	6731332.73
Tricoryne soullierae	P1	2	337632.42	6731333.35
Tricoryne soullierae	P1	1	337657.83	6731691.60
Tricoryne soullierae	P1	1	334495.48	6731333.50
Tricoryne soullierae	P1	1	336507.51	6726287.97
Tricoryne soullierae	P1	2	335833.57	6729528.57
Tricoryne soullierae	P1	2	335890.16	6729536.39
Tricoryne soullierae	P1	4	336419.54	6729532.24
Tricoryne soullierae	P1	1	335009.55	6730613.94
Tricoryne soullierae	P1	1	338311.01	6728455.72
Tricoryne soullierae	P1	1	334807.86	6730966.25
Tricoryne soullierae	P1	2	336882.09	6728813.30
Tricoryne soullierae	P1	4	335951.49	6728813.62
Tricoryne soullierae	P1	2	336346.13	6726642.91
Tricoryne soullierae	P1	1	335778.43	6726694.07
Tricoryne soullierae	P1	6	336922.33	6728447.00
Tricoryne soullierae	P1	2	336872.15	6728452.67
Tricoryne soullierae	P1	2	336858.49	6728449.98
Tricoryne soullierae	P1	1	336827.29	6728447.77
Tricoryne soullierae	P1	1	336805.94	6728449.04
Tricoryne soullierae	P1	1	336619.04	6728449.14

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Tricoryne soullierae	P1	1	336331.96	6728453.71
Tricoryne soullierae	P1	1	335945.69	6728446.67
Tricoryne soullierae	P1	2	335695.20	6727071.27
Tricoryne soullierae	P1	2	335446.63	6727011.58
Tricoryne soullierae	P1	2	335349.49	6727005.57
Tricoryne soullierae	P1	2	335193.26	6727009.31
Tricoryne soullierae	P1	2	335127.46	6727013.17
Tricoryne soullierae	P1	2	336510.29	6727362.43
Tricoryne soullierae	P1	2	336050.02	6731687.73
Tricoryne soullierae	P1	3	335858.69	6731690.74
Tricoryne soullierae	P1	3	335569.07	6731684.35
Tricoryne soullierae	P1	1	335555.22	6731688.92
Tricoryne soullierae	P1	1	335543.02	6731688.21
Tricoryne soullierae	P1	2	333470.12	6731678.94
Tricoryne soullierae	P1	1	333493.34	6731694.51
Tricoryne soullierae	P1	1	333585.96	6731689.14
Tricoryne soullierae	P1	1	333630.98	6731688.66
Tricoryne soullierae	P1	1	333644.35	6731687.96
Tricoryne soullierae	P1	4	333982.21	6731691.35
Tricoryne soullierae	P1	1	334062.33	6731689.36
Tricoryne soullierae	P1	2	334074.87	6731689.16
Tricoryne soullierae	P1	2	334236.59	6731696.31
Tricoryne soullierae	P1	1	334262.22	6731693.47
Tricoryne soullierae	P1	3	334646.35	6731695.23
Tricoryne soullierae	P1	1	334740.07	6731691.03
Tricoryne soullierae	P1	2	334764.75	6731693.01
Tricoryne soullierae	P1	3	335216.96	6731687.11
Tricoryne soullierae	P1	1	335263.25	6731697.92
Tricoryne soullierae	P1	3	338666.39	6728354.54
Tricoryne soullierae	P1	1	338669.25	6728471.48
Tricoryne soullierae	P1	1	338682.39	6728722.54
Tricoryne soullierae	P1	1	340390.54	6732036.57
Tricoryne soullierae	P1	1	340329.35	6732776.07
Tricoryne soullierae	P1	1	340305.09	6732764.71
Tricoryne soullierae	P1	3	338316.92	6728279.38
Tricoryne soullierae	P1	1	338314.44	6728368.57
Tricoryne soullierae	P1	1	338314.40	6728662.40
Tricoryne soullierae	P1	3	338316.58	6729655.23
Tricoryne soullierae	P1	1	338312.50	6730081.66
Tricoryne soullierae	P1	4	338307.75	6730395.32
Tricoryne soullierae	P1	1	338315.98	6730428.59
Tricoryne soullierae	P1	2	340289.02	6732447.00
Tricoryne soullierae	P1	2	337233.42	6732050.61
Tricoryne soullierae	P1	1	330395.81	6717004.36
Tricoryne soullierae	P1	6	330390.92	6716988.62
Tricoryne soullierae	P1	4	330383.45	6716967.93
Tricoryne soullierae	P1	2	330391.70	6716887.34
Tricoryne soullierae	P1	2	330395.33	6716467.97
Tricoryne soullierae	P1	1	330388.77	6716441.02
Tricoryne soullierae	P1	1	330398.27	6716418.67
Tricoryne soullierae	P1	1	330395.03	6716333.04
Tricoryne soullierae	P1	1	330382.40	6716226.89
Tricoryne soullierae	P1	1	330403.47	6716083.87

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Tricoryne soullierae	P1	2	330027.41	6716530.50
Tricoryne soullierae	P1	3	330478.09	6716933.75
Tricoryne soullierae	P1	3	330449.94	6716917.15
Tricoryne soullierae	P1	5	330481.66	6716212.39
Tricoryne soullierae	P1	4	330291.47	6716575.49
Tricoryne soullierae	P1	4	330282.67	6716572.05
Tricoryne soullierae	P1	2	330070.33	6716578.02
Tricoryne soullierae	P1	2	329948.63	6716569.54
Tricoryne soullierae	P1	7	329912.33	6716573.84
Tricoryne soullierae	P1	1	329798.65	6716575.75
Tricoryne soullierae	P1	1	333609.91	6729322.37
Tricoryne soullierae	P1	2	333994.74	6727853.05
Tricoryne soullierae	P1	2	333998.91	6727733.43
Tricoryne soullierae	P1	1	333985.68	6727083.41
Tricoryne soullierae	P1	1	333987.48	6726995.44
Tricoryne soullierae	P1	3	334061.58	6727020.53
Tricoryne soullierae	P1	3	334292.19	6727002.44
Tricoryne soullierae	P1	3	334310.76	6726791.82
Tricoryne soullierae	P1	5	334284.56	6726836.06
Tricoryne soullierae	P1	3	334266.88	6726889.58
Tricoryne soullierae	P1	3	334241.30	6726957.40
Tricoryne soullierae	P1	3	334250.79	6727105.32
Tricoryne soullierae	P1	3	334278.24	6727196.92
Tricoryne soullierae	P1	3	334279.14	6727222.03
Tricoryne soullierae	P1	2	335433.61	6729383.03
Micromyrtus uniovulum	P2	3	340303.55	6732475.19
Persoonia filiformis	P2	5	333405.19	6728451.56
Persoonia filiformis	P2	1	334056.60	6727734.48
Persoonia filiformis	P2	2	333997.51	6727734.75
Persoonia filiformis	P2	1	333982.33	6727732.14
Persoonia filiformis	P2	1	333794.71	6727728.71
Persoonia filiformis	P2	1	333780.16	6727722.61
Persoonia filiformis	P2	1	333708.65	6727733.03
Persoonia filiformis	P2	1	333702.33	6727735.34
Persoonia filiformis	P2	1	333674.41	6727731.67
Persoonia filiformis	P2	2	333619.42	6728097.05
Persoonia filiformis	P2	2	333670.07	6728093.13
Persoonia filiformis	P2	2	333763.96	6728097.77
Persoonia filiformis	P2	2	333783.39	6728090.50
Persoonia filiformis	P2	2	335517.34	6729527.47
Persoonia filiformis	P2	1	334909.88	6730621.08
Persoonia filiformis	P2	3	336032.75	6730611.24
Persoonia filiformis	P2	1	336115.57	6730612.36
Persoonia filiformis	P2	1	336149.66	6730612.99
Persoonia filiformis	P2	1	336522.85	6730610.00
Persoonia filiformis	P2	1	336606.24	6730608.90
Persoonia filiformis	P2	1	336972.71	6730610.33
Persoonia filiformis	P2	2	336251.09	6728446.12
Persoonia filiformis	P2	2	336122.33	6728450.91
Persoonia filiformis	P2	1	336081.85	6728446.14
Persoonia filiformis	P2	2	335934.84	6728448.26
Persoonia filiformis	P2	2	335622.71	6727014.00
Persoonia filiformis	P2	2	335625.88	6727001.80

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Persoonia filiformis	P2	2	335569.32	6727006.57
Persoonia filiformis	P2	2	335523.28	6727008.06
Persoonia filiformis	P2	2	335468.22	6727001.93
Persoonia filiformis	P2	1	335347.73	6727004.32
Persoonia filiformis	P2	1	335315.58	6727003.22
Persoonia filiformis	P2	1	334354.67	6730292.25
Persoonia filiformis	P2	1	336144.64	6727131.29
Persoonia filiformis	P2	1	329870.46	6725567.81
Persoonia filiformis	P2	2	330504.52	6725932.87
Persoonia filiformis	P2	1	330512.29	6725929.20
Persoonia filiformis	P2	1	330609.12	6725924.05
Persoonia filiformis	P2	2	330673.12	6724846.35
Persoonia filiformis	P2	1	330643.19	6724848.03
Persoonia filiformis	P2	2	332582.35	6731688.14
Persoonia filiformis	P2	1	332659.70	6731660.34
Persoonia filiformis	P2	1	333016.10	6731688.83
Persoonia filiformis	P2	1	333042.13	6731692.14
Persoonia filiformis	P2	1	333154.03	6731685.50
Persoonia filiformis	P2	1	333157.91	6731329.49
Persoonia filiformis	P2	1	333086.09	6731329.56
Persoonia filiformis	P2	1	332853.75	6731337.89
Persoonia filiformis	P2	2	332831.05	6731329.86
Persoonia filiformis	P2	1	332765.74	6731329.26
Persoonia filiformis	P2	3	332749.43	6731328.23
Persoonia filiformis	P2	2	332735.90	6731333.31
Persoonia filiformis	P2	1	332732.03	6731333.89
Persoonia filiformis	P2	1	332455.90	6731329.75
Persoonia filiformis	P2	1	332385.09	6731328.90
Persoonia filiformis	P2	1	332216.30	6729168.54
Persoonia filiformis	P2	1	332245.83	6729170.95
Persoonia filiformis	P2	1	332425.61	6729172.15
Persoonia filiformis	P2	1	333291.76	6730613.38
Persoonia filiformis	P2	1	333395.10	6730972.80
Persoonia filiformis	P2	1	332219.74	6731333.85
Persoonia filiformis	P2	1	332229.59	6731332.93
Persoonia filiformis	P2	1	332229.86	6731331.61
Persoonia filiformis	P2	2	332258.89	6731323.39
Persoonia filiformis	P2	1	332776.22	6730256.89
Persoonia filiformis	P2	1	335792.16	6727018.99
Persoonia filiformis	P2	1	333515.48	6727733.71
Persoonia filiformis	P2	1	333473.20	6727734.92
Persoonia filiformis	P2	1	333270.23	6728089.00
Persoonia filiformis	P2	1	333275.28	6728090.06
Persoonia filiformis	P2	1	333295.23	6728084.80
Persoonia filiformis	P2	1	333183.50	6730250.20
Persoonia filiformis	P2	1	333376.86	6730252.14
Persoonia filiformis	P2	1	333398.24	6730258.56
Persoonia filiformis	P2	1	333424.94	6730246.58
Persoonia filiformis	P2	1	333453.88	6730255.04
Persoonia filiformis	P2	1	334249.38	6730247.47
Persoonia filiformis	P2	1	333008.13	6729890.03
Persoonia filiformis	P2	1	335513.51	6731328.28
Persoonia filiformis	P2	1	335866.13	6731326.48

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Persoonia filiformis	P2	1	335965.45	6731334.26
Persoonia filiformis	P2	1	333552.72	6731321.96
Persoonia filiformis	P2	1	333536.49	6731334.55
Persoonia filiformis	P2	1	333443.87	6731327.20
Persoonia filiformis	P2	1	333374.99	6731334.85
Persoonia filiformis	P2	1	333355.19	6731684.83
Persoonia filiformis	P2	1	333365.66	6731689.96
Persoonia filiformis	P2	1	336315.06	6730971.79
Persoonia filiformis	P2	2	336357.41	6730970.79
Persoonia filiformis	P2	1	336703.25	6730970.88
Persoonia filiformis	P2	1	336789.06	6730967.25
Persoonia filiformis	P2	1	336974.89	6730972.59
Persoonia filiformis	P2	1	336386.04	6726652.69
Persoonia filiformis	P2	1	333474.85	6731684.38
Persoonia filiformis	P2	1	333495.72	6731693.46
Persoonia filiformis	P2	1	334318.48	6726781.68
Persoonia filiformis	P2	1	334287.37	6726829.53
Persoonia filiformis	P2	1	334276.05	6726864.74
Persoonia filiformis	P2	1	334238.79	6727003.84
Persoonia filiformis	P2	1	334243.40	6727061.14
Persoonia filiformis	P2	1	334274.14	6727184.97
Persoonia filiformis	P2	1	336154.74	6726651.50
Persoonia filiformis	P2	1	333229.47	6730386.00
Persoonia filiformis	P2	1	333182.01	6730378.19
Persoonia filiformis	P2	1	334352.29	6727358.64
Persoonia filiformis	P2	1	334366.20	6727358.84
Persoonia filiformis	P2	1	334407.50	6727320.91
Persoonia filiformis	P2	1	334409.91	6727327.83
Persoonia filiformis	P2	1	334361.15	6726630.84
Persoonia filiformis	P2	2	334316.20	6726801.48
Persoonia filiformis	P2	2	334307.28	6726804.66
Persoonia filiformis	P2	2	334296.02	6726828.57
Persoonia filiformis	P2	3	334290.86	6726837.40
Persoonia filiformis	P2	1	334281.14	6726864.78
Persoonia filiformis	P2	1	334278.94	6726874.68
Persoonia filiformis	P2	2	334273.05	6726882.81
Persoonia filiformis	P2	1	334263.43	6726906.74
Persoonia filiformis	P2	1	334251.99	6727052.26
Persoonia filiformis	P2	1	334282.56	6727197.50
Stylidium pseudocaespitosum	P2	1	334346.38	6730993.73
Stylidium pseudocaespitosum	P2	2	334347.50	6730849.78
Stylidium pseudocaespitosum	P2	1	334341.39	6730533.92
Stylidium pseudocaespitosum	P2	7	334704.14	6730846.62
Stylidium pseudocaespitosum	P2	4	334703.02	6730827.56
Stylidium pseudocaespitosum	P2	3	334711.63	6730757.36
Stylidium pseudocaespitosum	P2	12	334706.72	6730722.74
Stylidium pseudocaespitosum	P2	1	334709.32	6729681.70
Stylidium pseudocaespitosum	P2	2	335431.47	6730415.32
Stylidium pseudocaespitosum	P2	2	335793.11	6729129.85
Stylidium pseudocaespitosum	P2	3	335793.99	6729148.69
Stylidium pseudocaespitosum	P2	1	336154.20	6731147.22
Grevillea biformis subsp. *cymbiformis*	P3	1	338265.64	6729530.47
Guichenotia alba	P3	2	333291.99	6729759.70

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Guichenotia alba	P3	7	333131.16	6729701.67
Guichenotia alba	P3	1	332918.97	6727858.04
Guichenotia alba	P3	1	332919.06	6727877.12
Guichenotia alba	P3	1	332916.34	6727878.82
Guichenotia alba	P3	1	332915.96	6727877.32
Guichenotia alba	P3	2	334351.86	6729005.52
Guichenotia alba	P3	2	334354.93	6728987.73
Guichenotia alba	P3	4	335075.24	6728165.84
Guichenotia alba	P3	2	335071.61	6728165.62
Guichenotia alba	P3	2	335075.69	6728161.93
Guichenotia alba	P3	5	335075.11	6728158.45
Guichenotia alba	P3	2	335076.60	6728156.07
Guichenotia alba	P3	3	335076.42	6728155.11
Guichenotia alba	P3	5	335073.05	6728153.53
Guichenotia alba	P3	5	335068.41	6728154.93
Guichenotia alba	P3	2	335062.32	6728154.80
Guichenotia alba	P3	6	335070.41	6728147.12
Guichenotia alba	P3	4	335079.52	6728142.29
Guichenotia alba	P3	4	335081.83	6728136.58
Guichenotia alba	P3	4	335078.56	6728128.13
Guichenotia alba	P3	1	335070.89	6728111.65
Guichenotia alba	P3	3	335074.36	6728099.48
Guichenotia alba	P3	2	335071.10	6728109.47
Guichenotia alba	P3	2	333481.60	6729519.55
Guichenotia alba	P3	2	333439.14	6729567.21
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	334096.13	6726335.74
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330396.74	6724001.06
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330387.61	6724049.79
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330392.21	6724070.04
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	5	330388.12	6724192.81
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	3	330395.99	6724256.31
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330392.50	6724348.54
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330393.59	6724426.41
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330413.36	6724597.02
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330398.75	6724740.46
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	10	330390.74	6724796.36
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	4	330390.93	6725215.25
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330390.47	6725268.34
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	4	330388.67	6725359.27
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	331017.44	6725568.04
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	3	330750.38	6724448.73
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	3	330738.81	6724518.56
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330752.58	6724557.99
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330753.12	6724579.52
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	4	330752.79	6724588.99
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330749.91	6724667.52
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330749.52	6724677.45
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330750.04	6724699.94
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330749.98	6725358.08
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330754.09	6725383.24
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330760.16	6726025.75
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	4	330390.33	6725827.88
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330400.75	6725677.18

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	331471.44	6726540.21
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	331469.86	6726775.12
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	331473.47	6726813.02
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	331471.81	6726846.59
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	332529.27	6729167.10
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	332552.26	6729925.76
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	332916.59	6731570.88
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	333997.15	6730973.33
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	332906.62	6726679.49
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	333277.92	6726231.87
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	333270.68	6726436.32
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	332184.25	6726828.17
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330036.22	6724770.35
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330034.92	6724797.15
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330031.35	6724837.17
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330031.67	6724841.21
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330031.03	6724861.76
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330030.61	6724932.71
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330031.04	6724949.25
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330026.17	6724967.82
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330028.16	6724974.17
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330034.08	6725023.52
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330030.90	6725150.67
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330029.36	6725177.39
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	331113.27	6724283.17
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	331108.47	6726269.87
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	333634.13	6728337.22
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	331477.29	6726027.16
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	334716.01	6727405.89
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336149.47	6726118.10
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336161.19	6726906.81
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336153.17	6728550.09
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	3	336156.40	6729147.43
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336146.89	6729210.97
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336153.37	6730313.97
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335067.59	6726624.25
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335062.82	6726880.96
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335785.54	6726096.43
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335792.57	6726736.69
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335793.82	6728907.54
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335792.77	6729063.57
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336517.71	6730345.45
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	336521.34	6729362.41
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336517.46	6728805.73
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336519.88	6728232.44
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336518.55	6727854.01
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337945.50	6728206.48
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337957.13	6728611.12
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	338051.15	6729684.72
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337597.03	6728746.07
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337592.18	6728562.41
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337590.73	6728219.95
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	337949.94	6729918.90

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337949.67	6730008.97
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336870.83	6728188.91
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337593.63	6730444.05
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337597.41	6730236.37
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	339752.13	6729961.61
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	339751.25	6729552.13
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	340130.09	6728609.26
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330696.98	6724488.40
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330573.15	6724488.26
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330529.40	6724495.04
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330487.64	6724488.61
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330461.08	6724491.15
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330323.85	6724490.97
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330283.12	6724493.34
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330017.15	6724489.54
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330841.39	6726285.94
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330699.11	6726290.87
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330685.23	6726290.46
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330641.16	6726286.91
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330447.74	6726301.40
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330555.60	6724130.94
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330577.06	6724129.99
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330755.41	6724128.76
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330917.47	6724126.67
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	329987.74	6726652.56
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	332269.64	6726288.05
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	331109.72	6726298.64
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	334605.52	6727366.31
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	333859.20	6727373.04
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330283.75	6724129.91
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	329994.22	6725571.27
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	3	329882.86	6725566.68
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	329866.72	6725567.62
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	329816.99	6725570.53
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	329784.53	6725571.84
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330611.02	6725923.65
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330832.83	6724854.48
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330089.26	6725212.86
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330072.77	6725212.06
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	329973.09	6725204.77
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	329802.57	6724852.23
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	329882.55	6724845.53
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330195.70	6724855.89
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330268.29	6724846.36
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	333475.77	6726295.55
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	334679.10	6726650.40
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335367.36	6730245.34
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335809.86	6727373.97
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336227.95	6727010.51
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335914.39	6727018.56
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335871.79	6727022.11
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335723.41	6727026.32
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335090.21	6727739.29

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	334477.07	6727726.03
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	334373.88	6728092.79
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	333470.70	6729888.15
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	333443.91	6729890.72
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336258.50	6730249.92
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336896.41	6730250.17
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337933.82	6730246.81
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	338517.80	6730252.45
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	338216.78	6729888.60
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337390.14	6729891.90
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337761.02	6730619.18
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335080.57	6731320.29
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335334.49	6731328.61
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337282.42	6729511.50
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337276.38	6728815.20
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336965.56	6728817.69
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336632.57	6728813.09
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336278.36	6726654.11
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336828.49	6726979.11
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	333943.76	6731694.96
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	338684.58	6729956.73
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	338677.39	6730426.12
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	338678.93	6730582.71
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	338312.31	6729870.29
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336027.91	6734216.16
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335991.81	6734207.08
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335072.45	6733842.74
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	336010.50	6733854.37
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	335434.85	6733903.51
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330390.42	6716872.77
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330403.24	6716812.35
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330388.08	6716703.70
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330384.78	6716486.73
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330383.04	6716123.35
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330389.45	6716068.87
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330389.32	6715986.59
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330384.59	6715973.38
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330029.38	6716139.06
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330042.51	6716491.50
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330026.97	6716678.67
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	2	330033.37	6716761.11
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330043.07	6716783.58
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330209.63	6716209.30
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330468.93	6716552.29
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330451.26	6716562.69
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330381.10	6716568.84
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	329818.89	6716930.21
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	330199.59	6716926.60
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	337250.79	6730536.87
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	333149.37	6730226.42
Hemiandra sp. Eneabba (H. Demarz 3687)	P3	1	334436.42	6727343.84
Hypocalymma gardneri	P3	1	333316.38	6729169.84
Hypocalymma gardneri	P3	1	335517.29	6729524.73

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Hypocalymma gardneri	P3	1	338581.87	6728452.47
Hypocalymma gardneri	P3	1	335105.04	6727012.22
Mesomelaena stygia subsp. *deflexa*	P3	10	334821.82	6730744.36
Mesomelaena stygia subsp. *deflexa*	P3	16	334829.05	6730742.68
Mesomelaena stygia subsp. *deflexa*	P3	7	334834.18	6730745.11
Mesomelaena stygia subsp. *deflexa*	P3	4	334841.46	6730747.87
Mesomelaena stygia subsp. *deflexa*	P3	22	334837.49	6730755.82
Mesomelaena stygia subsp. *deflexa*	P3	20	334847.24	6730751.69
Mesomelaena stygia subsp. *deflexa*	P3	13	334858.43	6730756.04
Mesomelaena stygia subsp. *deflexa*	P3	1	334855.81	6730781.05
Mesomelaena stygia subsp. *deflexa*	P3	8	334850.28	6730783.18
Mesomelaena stygia subsp. *deflexa*	P3	35	334846.03	6730776.27
Mesomelaena stygia subsp. *deflexa*	P3	14	334853.49	6730771.96
Mesomelaena stygia subsp. *deflexa*	P3	6	334832.85	6730766.66
Mesomelaena stygia subsp. *deflexa*	P3	33	334816.07	6730746.66
Mesomelaena stygia subsp. *deflexa*	P3	22	334804.72	6730728.27
Mesomelaena stygia subsp. *deflexa*	P3	36	334798.15	6730726.45
Mesomelaena stygia subsp. *deflexa*	P3	38	334795.60	6730718.87
Mesomelaena stygia subsp. *deflexa*	P3	24	334801.93	6730708.47
Mesomelaena stygia subsp. *deflexa*	P3	37	334805.53	6730700.71
Mesomelaena stygia subsp. *deflexa*	P3	17	334816.29	6730693.50
Mesomelaena stygia subsp. *deflexa*	P3	7	330390.21	6725033.66
Mesomelaena stygia subsp. *deflexa*	P3	5	330397.31	6725059.91
Mesomelaena stygia subsp. *deflexa*	P3	35	330381.26	6725402.73
Mesomelaena stygia subsp. *deflexa*	P3	1300	330386.03	6725570.22
Mesomelaena stygia subsp. *deflexa*	P3	2	330748.54	6724602.54
Mesomelaena stygia subsp. *deflexa*	P3	2	330760.94	6724649.42
Mesomelaena stygia subsp. *deflexa*	P3	8	330749.27	6724703.37
Mesomelaena stygia subsp. *deflexa*	P3	18	330750.01	6724715.71
Mesomelaena stygia subsp. *deflexa*	P3	30	330746.79	6724737.42
Mesomelaena stygia subsp. *deflexa*	P3	50	330749.67	6724764.05
Mesomelaena stygia subsp. *deflexa*	P3	50	330756.03	6724782.48
Mesomelaena stygia subsp. *deflexa*	P3	25	330750.33	6724804.64
Mesomelaena stygia subsp. *deflexa*	P3	30	330750.76	6724823.07
Mesomelaena stygia subsp. *deflexa*	P3	50	330751.10	6724854.15
Mesomelaena stygia subsp. *deflexa*	P3	30	330753.19	6724876.47
Mesomelaena stygia subsp. *deflexa*	P3	30	330750.92	6724903.75
Mesomelaena stygia subsp. *deflexa*	P3	30	330742.12	6724930.91
Mesomelaena stygia subsp. *deflexa*	P3	50	330750.48	6724951.77
Mesomelaena stygia subsp. *deflexa*	P3	50	330756.00	6724965.05
Mesomelaena stygia subsp. *deflexa*	P3	50	330753.90	6724986.47
Mesomelaena stygia subsp. *deflexa*	P3	50	330750.79	6725008.13
Mesomelaena stygia subsp. *deflexa*	P3	50	330754.57	6725033.80
Mesomelaena stygia subsp. *deflexa*	P3	50	330758.32	6725055.78
Mesomelaena stygia subsp. *deflexa*	P3	8	330765.72	6725081.30
Mesomelaena stygia subsp. *deflexa*	P3	2	330757.39	6725113.38
Mesomelaena stygia subsp. *deflexa*	P3	6	330750.30	6725149.63
Mesomelaena stygia subsp. *deflexa*	P3	2	330754.35	6725467.51
Mesomelaena stygia subsp. *deflexa*	P3	15	330756.41	6725477.44
Mesomelaena stygia subsp. *deflexa*	P3	1	330754.99	6726613.19
Mesomelaena stygia subsp. *deflexa*	P3	2	330386.80	6725923.18
Mesomelaena stygia subsp. *deflexa*	P3	15	330394.88	6725646.42
Mesomelaena stygia subsp. *deflexa*	P3	50	330392.48	6725628.67

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	50	330393.95	6725606.91
Mesomelaena stygia subsp. *deflexa*	P3	50	330392.79	6725591.69
Mesomelaena stygia subsp. *deflexa*	P3	50	330388.74	6725574.65
Mesomelaena stygia subsp. *deflexa*	P3	20	333999.12	6731634.94
Mesomelaena stygia subsp. *deflexa*	P3	8	333993.21	6731614.80
Mesomelaena stygia subsp. *deflexa*	P3	2	333990.48	6731571.39
Mesomelaena stygia subsp. *deflexa*	P3	6	333991.22	6731324.52
Mesomelaena stygia subsp. *deflexa*	P3	16	333998.99	6731313.65
Mesomelaena stygia subsp. *deflexa*	P3	5	333992.64	6731285.62
Mesomelaena stygia subsp. *deflexa*	P3	5	333987.53	6731269.60
Mesomelaena stygia subsp. *deflexa*	P3	35	333992.65	6731246.09
Mesomelaena stygia subsp. *deflexa*	P3	24	333980.34	6731221.18
Mesomelaena stygia subsp. *deflexa*	P3	12	333990.32	6731178.06
Mesomelaena stygia subsp. *deflexa*	P3	15	333993.78	6731142.70
Mesomelaena stygia subsp. *deflexa*	P3	16	333988.11	6731107.06
Mesomelaena stygia subsp. *deflexa*	P3	6	333990.33	6731087.34
Mesomelaena stygia subsp. *deflexa*	P3	5	330021.70	6725241.79
Mesomelaena stygia subsp. *deflexa*	P3	10	330021.75	6725246.61
Mesomelaena stygia subsp. *deflexa*	P3	12	330026.68	6725252.75
Mesomelaena stygia subsp. *deflexa*	P3	11	330031.51	6725255.91
Mesomelaena stygia subsp. *deflexa*	P3	8	330034.72	6725414.28
Mesomelaena stygia subsp. *deflexa*	P3	3	330036.26	6725418.01
Mesomelaena stygia subsp. *deflexa*	P3	6	330037.02	6725682.34
Mesomelaena stygia subsp. *deflexa*	P3	2	330038.03	6725717.78
Mesomelaena stygia subsp. *deflexa*	P3	12	330044.17	6725715.86
Mesomelaena stygia subsp. *deflexa*	P3	5	330044.40	6725718.06
Mesomelaena stygia subsp. *deflexa*	P3	5	330032.51	6725733.76
Mesomelaena stygia subsp. *deflexa*	P3	10	330028.76	6725734.24
Mesomelaena stygia subsp. *deflexa*	P3	7	330028.39	6725743.25
Mesomelaena stygia subsp. *deflexa*	P3	9	330029.44	6725744.87
Mesomelaena stygia subsp. *deflexa*	P3	8	330028.46	6725747.61
Mesomelaena stygia subsp. *deflexa*	P3	8	330033.18	6725750.99
Mesomelaena stygia subsp. *deflexa*	P3	5	330037.57	6725754.60
Mesomelaena stygia subsp. *deflexa*	P3	6	330035.90	6725759.83
Mesomelaena stygia subsp. *deflexa*	P3	12	330039.24	6725763.97
Mesomelaena stygia subsp. *deflexa*	P3	9	330042.80	6725767.59
Mesomelaena stygia subsp. *deflexa*	P3	6	330044.62	6725770.49
Mesomelaena stygia subsp. *deflexa*	P3	8	330045.84	6725776.35
Mesomelaena stygia subsp. *deflexa*	P3	4	330040.72	6725779.20
Mesomelaena stygia subsp. *deflexa*	P3	14	330034.88	6725779.60
Mesomelaena stygia subsp. *deflexa*	P3	12	330029.74	6725780.87
Mesomelaena stygia subsp. *deflexa*	P3	1	330025.82	6725775.32
Mesomelaena stygia subsp. *deflexa*	P3	2	330027.04	6725778.52
Mesomelaena stygia subsp. *deflexa*	P3	6	330024.55	6725784.18
Mesomelaena stygia subsp. *deflexa*	P3	5	330024.03	6725788.10
Mesomelaena stygia subsp. *deflexa*	P3	2	330028.71	6725790.50
Mesomelaena stygia subsp. *deflexa*	P3	5	330033.71	6725795.94
Mesomelaena stygia subsp. *deflexa*	P3	11	330037.94	6725795.09
Mesomelaena stygia subsp. *deflexa*	P3	10	330042.75	6725795.27
Mesomelaena stygia subsp. *deflexa*	P3	5	330044.18	6725804.49
Mesomelaena stygia subsp. *deflexa*	P3	5	330035.82	6725812.17
Mesomelaena stygia subsp. *deflexa*	P3	4	330037.08	6725815.13
Mesomelaena stygia subsp. *deflexa*	P3	3	330035.84	6725817.69

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	1	330022.53	6725833.72
Mesomelaena stygia subsp. *deflexa*	P3	2	330039.58	6725833.08
Mesomelaena stygia subsp. *deflexa*	P3	12	330032.93	6725872.85
Mesomelaena stygia subsp. *deflexa*	P3	3	330040.25	6725871.98
Mesomelaena stygia subsp. *deflexa*	P3	5	330043.10	6725871.48
Mesomelaena stygia subsp. *deflexa*	P3	8	330071.61	6725927.11
Mesomelaena stygia subsp. *deflexa*	P3	6	330089.44	6725930.77
Mesomelaena stygia subsp. *deflexa*	P3	7	330094.27	6725929.44
Mesomelaena stygia subsp. *deflexa*	P3	7	330108.10	6725935.26
Mesomelaena stygia subsp. *deflexa*	P3	9	330112.62	6725936.33
Mesomelaena stygia subsp. *deflexa*	P3	13	330117.74	6725932.45
Mesomelaena stygia subsp. *deflexa*	P3	8	330121.04	6725926.67
Mesomelaena stygia subsp. *deflexa*	P3	15	330125.79	6725924.37
Mesomelaena stygia subsp. *deflexa*	P3	8	330130.46	6725923.70
Mesomelaena stygia subsp. *deflexa*	P3	10	330136.85	6725933.05
Mesomelaena stygia subsp. *deflexa*	P3	4	330138.78	6725931.46
Mesomelaena stygia subsp. *deflexa*	P3	8	330143.02	6725925.39
Mesomelaena stygia subsp. *deflexa*	P3	10	330149.58	6725925.38
Mesomelaena stygia subsp. *deflexa*	P3	14	330153.88	6725926.92
Mesomelaena stygia subsp. *deflexa*	P3	7	330158.42	6725928.57
Mesomelaena stygia subsp. *deflexa*	P3	9	330159.80	6725924.31
Mesomelaena stygia subsp. *deflexa*	P3	12	330163.96	6725928.01
Mesomelaena stygia subsp. *deflexa*	P3	5	330167.70	6725933.69
Mesomelaena stygia subsp. *deflexa*	P3	1	330171.52	6725935.11
Mesomelaena stygia subsp. *deflexa*	P3	4	330175.97	6725931.90
Mesomelaena stygia subsp. *deflexa*	P3	3	331115.68	6724063.71
Mesomelaena stygia subsp. *deflexa*	P3	8	330028.12	6725973.36
Mesomelaena stygia subsp. *deflexa*	P3	10	330025.95	6725966.89
Mesomelaena stygia subsp. *deflexa*	P3	13	330033.98	6725961.44
Mesomelaena stygia subsp. *deflexa*	P3	12	330037.07	6725957.83
Mesomelaena stygia subsp. *deflexa*	P3	13	330034.37	6725952.49
Mesomelaena stygia subsp. *deflexa*	P3	15	330037.79	6725943.91
Mesomelaena stygia subsp. *deflexa*	P3	88	330090.76	6725975.98
Mesomelaena stygia subsp. *deflexa*	P3	3	333340.74	6731684.70
Mesomelaena stygia subsp. *deflexa*	P3	7	333343.57	6731681.66
Mesomelaena stygia subsp. *deflexa*	P3	3	333351.38	6731676.35
Mesomelaena stygia subsp. *deflexa*	P3	4	333346.82	6731658.64
Mesomelaena stygia subsp. *deflexa*	P3	6	333351.96	6731658.74
Mesomelaena stygia subsp. *deflexa*	P3	10	333351.65	6731651.62
Mesomelaena stygia subsp. *deflexa*	P3	3	333352.65	6731641.24
Mesomelaena stygia subsp. *deflexa*	P3	6	333361.92	6731636.60
Mesomelaena stygia subsp. *deflexa*	P3	1	333356.79	6731633.75
Mesomelaena stygia subsp. *deflexa*	P3	4	333359.81	6731628.97
Mesomelaena stygia subsp. *deflexa*	P3	2	333360.01	6731493.73
Mesomelaena stygia subsp. *deflexa*	P3	2	333347.12	6731395.55
Mesomelaena stygia subsp. *deflexa*	P3	14	333331.84	6731322.77
Mesomelaena stygia subsp. *deflexa*	P3	25	333326.79	6731323.11
Mesomelaena stygia subsp. *deflexa*	P3	18	333329.72	6731312.37
Mesomelaena stygia subsp. *deflexa*	P3	1	333333.71	6731314.92
Mesomelaena stygia subsp. *deflexa*	P3	29	333339.36	6731312.19
Mesomelaena stygia subsp. *deflexa*	P3	1	333332.52	6731307.71
Mesomelaena stygia subsp. *deflexa*	P3	3	333328.38	6731301.67
Mesomelaena stygia subsp. *deflexa*	P3	2	333330.05	6731295.50

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	5	333323.92	6731262.57
Mesomelaena stygia subsp. *deflexa*	P3	20	333316.20	6731247.05
Mesomelaena stygia subsp. *deflexa*	P3	2	333323.60	6731247.20
Mesomelaena stygia subsp. *deflexa*	P3	6	333324.07	6731230.57
Mesomelaena stygia subsp. *deflexa*	P3	16	333321.90	6731214.96
Mesomelaena stygia subsp. *deflexa*	P3	11	333316.66	6731203.23
Mesomelaena stygia subsp. *deflexa*	P3	4	333311.36	6731149.85
Mesomelaena stygia subsp. *deflexa*	P3	9	333634.90	6731639.56
Mesomelaena stygia subsp. *deflexa*	P3	17	333636.06	6731634.11
Mesomelaena stygia subsp. *deflexa*	P3	26	333628.48	6731629.36
Mesomelaena stygia subsp. *deflexa*	P3	29	333627.91	6731624.23
Mesomelaena stygia subsp. *deflexa*	P3	20	333619.84	6731620.42
Mesomelaena stygia subsp. *deflexa*	P3	17	333628.79	6731613.73
Mesomelaena stygia subsp. *deflexa*	P3	34	333637.61	6731618.67
Mesomelaena stygia subsp. *deflexa*	P3	45	333635.66	6731626.67
Mesomelaena stygia subsp. *deflexa*	P3	22	333646.18	6731618.58
Mesomelaena stygia subsp. *deflexa*	P3	28	333643.38	6731608.66
Mesomelaena stygia subsp. *deflexa*	P3	60	333634.88	6731607.11
Mesomelaena stygia subsp. *deflexa*	P3	65	333633.22	6731600.24
Mesomelaena stygia subsp. *deflexa*	P3	45	333641.05	6731596.30
Mesomelaena stygia subsp. *deflexa*	P3	45	333635.32	6731589.64
Mesomelaena stygia subsp. *deflexa*	P3	50	333626.04	6731591.29
Mesomelaena stygia subsp. *deflexa*	P3	45	333623.39	6731581.69
Mesomelaena stygia subsp. *deflexa*	P3	31	333630.39	6731578.50
Mesomelaena stygia subsp. *deflexa*	P3	45	333641.75	6731577.13
Mesomelaena stygia subsp. *deflexa*	P3	70	333638.41	6731565.81
Mesomelaena stygia subsp. *deflexa*	P3	40	333640.55	6731559.05
Mesomelaena stygia subsp. *deflexa*	P3	60	333632.03	6731555.01
Mesomelaena stygia subsp. *deflexa*	P3	80	333625.78	6731556.13
Mesomelaena stygia subsp. *deflexa*	P3	85	333622.63	6731546.84
Mesomelaena stygia subsp. *deflexa*	P3	110	333629.78	6731539.95
Mesomelaena stygia subsp. *deflexa*	P3	70	333639.09	6731535.26
Mesomelaena stygia subsp. *deflexa*	P3	95	333636.54	6731524.85
Mesomelaena stygia subsp. *deflexa*	P3	50	333628.59	6731518.20
Mesomelaena stygia subsp. *deflexa*	P3	10	333626.18	6731514.83
Mesomelaena stygia subsp. *deflexa*	P3	17	333632.81	6731510.68
Mesomelaena stygia subsp. *deflexa*	P3	26	333642.36	6731511.82
Mesomelaena stygia subsp. *deflexa*	P3	16	333641.04	6731501.95
Mesomelaena stygia subsp. *deflexa*	P3	18	333636.90	6731503.00
Mesomelaena stygia subsp. *deflexa*	P3	14	333626.77	6731500.45
Mesomelaena stygia subsp. *deflexa*	P3	45	333624.01	6731493.51
Mesomelaena stygia subsp. *deflexa*	P3	4	333629.51	6731490.02
Mesomelaena stygia subsp. *deflexa*	P3	16	333635.02	6731483.81
Mesomelaena stygia subsp. *deflexa*	P3	12	333642.40	6731476.76
Mesomelaena stygia subsp. *deflexa*	P3	15	333635.75	6731468.18
Mesomelaena stygia subsp. *deflexa*	P3	50	333626.91	6731471.03
Mesomelaena stygia subsp. *deflexa*	P3	10	333624.10	6731458.70
Mesomelaena stygia subsp. *deflexa*	P3	3	333630.13	6731453.00
Mesomelaena stygia subsp. *deflexa*	P3	4	333636.37	6731441.89
Mesomelaena stygia subsp. *deflexa*	P3	6	333637.25	6731431.55
Mesomelaena stygia subsp. *deflexa*	P3	10	333627.22	6731434.51
Mesomelaena stygia subsp. *deflexa*	P3	19	333621.64	6731430.30
Mesomelaena stygia subsp. *deflexa*	P3	7	333630.55	6731420.84

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	40	333634.27	6731409.72
Mesomelaena stygia subsp. *deflexa*	P3	17	333644.03	6731409.85
Mesomelaena stygia subsp. *deflexa*	P3	10	333638.16	6731401.43
Mesomelaena stygia subsp. *deflexa*	P3	14	333629.06	6731397.44
Mesomelaena stygia subsp. *deflexa*	P3	12	333627.65	6731389.35
Mesomelaena stygia subsp. *deflexa*	P3	30	333635.25	6731382.22
Mesomelaena stygia subsp. *deflexa*	P3	40	333638.35	6731377.38
Mesomelaena stygia subsp. *deflexa*	P3	19	333632.63	6731372.00
Mesomelaena stygia subsp. *deflexa*	P3	55	333626.28	6731366.36
Mesomelaena stygia subsp. *deflexa*	P3	45	333628.31	6731357.76
Mesomelaena stygia subsp. *deflexa*	P3	80	333635.82	6731355.91
Mesomelaena stygia subsp. *deflexa*	P3	60	333642.85	6731353.85
Mesomelaena stygia subsp. *deflexa*	P3	70	333638.86	6731346.02
Mesomelaena stygia subsp. *deflexa*	P3	90	333631.13	6731343.17
Mesomelaena stygia subsp. *deflexa*	P3	95	333625.01	6731336.37
Mesomelaena stygia subsp. *deflexa*	P3	60	333631.96	6731329.62
Mesomelaena stygia subsp. *deflexa*	P3	70	333639.24	6731319.86
Mesomelaena stygia subsp. *deflexa*	P3	120	333632.94	6731315.66
Mesomelaena stygia subsp. *deflexa*	P3	90	333626.52	6731310.38
Mesomelaena stygia subsp. *deflexa*	P3	130	333634.69	6731301.41
Mesomelaena stygia subsp. *deflexa*	P3	80	333641.21	6731293.35
Mesomelaena stygia subsp. *deflexa*	P3	110	333628.13	6731285.05
Mesomelaena stygia subsp. *deflexa*	P3	90	333634.01	6731275.67
Mesomelaena stygia subsp. *deflexa*	P3	85	333641.22	6731272.63
Mesomelaena stygia subsp. *deflexa*	P3	50	333633.35	6731264.30
Mesomelaena stygia subsp. *deflexa*	P3	100	333633.26	6731250.86
Mesomelaena stygia subsp. *deflexa*	P3	85	333642.73	6731251.34
Mesomelaena stygia subsp. *deflexa*	P3	55	333638.58	6731245.43
Mesomelaena stygia subsp. *deflexa*	P3	65	333626.37	6731240.86
Mesomelaena stygia subsp. *deflexa*	P3	80	333632.53	6731232.47
Mesomelaena stygia subsp. *deflexa*	P3	120	333642.36	6731226.99
Mesomelaena stygia subsp. *deflexa*	P3	90	333635.55	6731219.37
Mesomelaena stygia subsp. *deflexa*	P3	120	333629.07	6731210.23
Mesomelaena stygia subsp. *deflexa*	P3	140	333639.01	6731204.51
Mesomelaena stygia subsp. *deflexa*	P3	130	333637.68	6731193.98
Mesomelaena stygia subsp. *deflexa*	P3	80	333628.16	6731193.89
Mesomelaena stygia subsp. *deflexa*	P3	30	333627.39	6731184.00
Mesomelaena stygia subsp. *deflexa*	P3	35	333635.40	6731183.93
Mesomelaena stygia subsp. *deflexa*	P3	4	333644.06	6731181.89
Mesomelaena stygia subsp. *deflexa*	P3	8	333636.05	6731173.74
Mesomelaena stygia subsp. *deflexa*	P3	3	333636.21	6731164.59
Mesomelaena stygia subsp. *deflexa*	P3	25	333629.63	6731160.89
Mesomelaena stygia subsp. *deflexa*	P3	40	333627.50	6731151.39
Mesomelaena stygia subsp. *deflexa*	P3	70	333635.66	6731150.97
Mesomelaena stygia subsp. *deflexa*	P3	40	333640.01	6731143.46
Mesomelaena stygia subsp. *deflexa*	P3	50	333629.82	6731139.42
Mesomelaena stygia subsp. *deflexa*	P3	1	333632.24	6731129.74
Mesomelaena stygia subsp. *deflexa*	P3	25	334358.52	6731416.46
Mesomelaena stygia subsp. *deflexa*	P3	30	334359.73	6731401.36
Mesomelaena stygia subsp. *deflexa*	P3	30	334356.77	6731385.47
Mesomelaena stygia subsp. *deflexa*	P3	100	334346.40	6731363.09
Mesomelaena stygia subsp. *deflexa*	P3	100	334356.85	6731343.08
Mesomelaena stygia subsp. *deflexa*	P3	100	334344.67	6731311.18

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	100	334352.45	6731281.77
Mesomelaena stygia subsp. *deflexa*	P3	100	334360.37	6731251.18
Mesomelaena stygia subsp. *deflexa*	P3	35	334343.32	6731228.60
Mesomelaena stygia subsp. *deflexa*	P3	35	334353.88	6731207.57
Mesomelaena stygia subsp. *deflexa*	P3	35	334354.23	6731181.06
Mesomelaena stygia subsp. *deflexa*	P3	50	334345.32	6731163.52
Mesomelaena stygia subsp. *deflexa*	P3	20	334356.19	6731137.12
Mesomelaena stygia subsp. *deflexa*	P3	60	334354.57	6731114.74
Mesomelaena stygia subsp. *deflexa*	P3	12	334347.40	6731088.64
Mesomelaena stygia subsp. *deflexa*	P3	8	334358.37	6731066.60
Mesomelaena stygia subsp. *deflexa*	P3	10	334357.85	6731046.80
Mesomelaena stygia subsp. *deflexa*	P3	25	334351.81	6731021.06
Mesomelaena stygia subsp. *deflexa*	P3	15	334344.88	6731000.54
Mesomelaena stygia subsp. *deflexa*	P3	35	334360.90	6730982.28
Mesomelaena stygia subsp. *deflexa*	P3	60	334352.91	6730955.08
Mesomelaena stygia subsp. *deflexa*	P3	60	334351.13	6730932.99
Mesomelaena stygia subsp. *deflexa*	P3	100	334345.92	6730908.08
Mesomelaena stygia subsp. *deflexa*	P3	50	334363.81	6730885.51
Mesomelaena stygia subsp. *deflexa*	P3	1	334342.58	6730533.00
Mesomelaena stygia subsp. *deflexa*	P3	9	335076.59	6731804.61
Mesomelaena stygia subsp. *deflexa*	P3	30	335072.30	6731783.52
Mesomelaena stygia subsp. *deflexa*	P3	30	335067.23	6731764.24
Mesomelaena stygia subsp. *deflexa*	P3	30	335076.79	6731737.12
Mesomelaena stygia subsp. *deflexa*	P3	4	335075.37	6731694.90
Mesomelaena stygia subsp. *deflexa*	P3	12	335066.46	6731666.91
Mesomelaena stygia subsp. *deflexa*	P3	8	335078.25	6731646.86
Mesomelaena stygia subsp. *deflexa*	P3	8	335077.78	6731607.31
Mesomelaena stygia subsp. *deflexa*	P3	4	335062.16	6731518.27
Mesomelaena stygia subsp. *deflexa*	P3	10	335070.82	6731511.58
Mesomelaena stygia subsp. *deflexa*	P3	4	335071.75	6731467.72
Mesomelaena stygia subsp. *deflexa*	P3	7	335070.30	6731447.21
Mesomelaena stygia subsp. *deflexa*	P3	21	335077.14	6731419.84
Mesomelaena stygia subsp. *deflexa*	P3	14	335070.49	6731381.43
Mesomelaena stygia subsp. *deflexa*	P3	4	335076.56	6731105.84
Mesomelaena stygia subsp. *deflexa*	P3	3	335065.59	6731028.58
Mesomelaena stygia subsp. *deflexa*	P3	25	335079.78	6731004.53
Mesomelaena stygia subsp. *deflexa*	P3	40	335069.70	6730977.14
Mesomelaena stygia subsp. *deflexa*	P3	40	335072.60	6730957.24
Mesomelaena stygia subsp. *deflexa*	P3	40	335076.80	6730938.03
Mesomelaena stygia subsp. *deflexa*	P3	40	335063.05	6730914.16
Mesomelaena stygia subsp. *deflexa*	P3	60	335076.05	6730888.59
Mesomelaena stygia subsp. *deflexa*	P3	20	335066.19	6730867.86
Mesomelaena stygia subsp. *deflexa*	P3	10	335071.19	6730830.97
Mesomelaena stygia subsp. *deflexa*	P3	2	334360.30	6730334.34
Mesomelaena stygia subsp. *deflexa*	P3	20	334716.57	6731609.92
Mesomelaena stygia subsp. *deflexa*	P3	7	334710.31	6731598.74
Mesomelaena stygia subsp. *deflexa*	P3	15	334721.06	6731596.59
Mesomelaena stygia subsp. *deflexa*	P3	21	334728.52	6731601.02
Mesomelaena stygia subsp. *deflexa*	P3	4	334710.42	6731586.16
Mesomelaena stygia subsp. *deflexa*	P3	19	334703.67	6731580.28
Mesomelaena stygia subsp. *deflexa*	P3	23	334717.79	6731573.91
Mesomelaena stygia subsp. *deflexa*	P3	18	334716.07	6731567.32
Mesomelaena stygia subsp. *deflexa*	P3	27	334704.76	6731563.03

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	45	334709.63	6731552.67
Mesomelaena stygia subsp. *deflexa*	P3	50	334719.44	6731551.38
Mesomelaena stygia subsp. *deflexa*	P3	35	334721.39	6731542.18
Mesomelaena stygia subsp. *deflexa*	P3	55	334711.82	6731538.77
Mesomelaena stygia subsp. *deflexa*	P3	60	334702.70	6731531.47
Mesomelaena stygia subsp. *deflexa*	P3	35	334710.13	6731525.15
Mesomelaena stygia subsp. *deflexa*	P3	45	334718.39	6731519.60
Mesomelaena stygia subsp. *deflexa*	P3	75	334717.45	6731511.69
Mesomelaena stygia subsp. *deflexa*	P3	45	334711.98	6731509.57
Mesomelaena stygia subsp. *deflexa*	P3	70	334702.86	6731502.00
Mesomelaena stygia subsp. *deflexa*	P3	55	334710.08	6731498.39
Mesomelaena stygia subsp. *deflexa*	P3	40	334718.49	6731495.31
Mesomelaena stygia subsp. *deflexa*	P3	110	334713.64	6731485.47
Mesomelaena stygia subsp. *deflexa*	P3	90	334704.97	6731482.25
Mesomelaena stygia subsp. *deflexa*	P3	60	334705.63	6731471.41
Mesomelaena stygia subsp. *deflexa*	P3	55	334710.07	6731465.93
Mesomelaena stygia subsp. *deflexa*	P3	35	334720.02	6731469.46
Mesomelaena stygia subsp. *deflexa*	P3	35	334716.18	6731456.37
Mesomelaena stygia subsp. *deflexa*	P3	40	334707.51	6731457.66
Mesomelaena stygia subsp. *deflexa*	P3	55	334706.89	6731447.60
Mesomelaena stygia subsp. *deflexa*	P3	24	334717.26	6731443.15
Mesomelaena stygia subsp. *deflexa*	P3	50	334707.54	6731440.48
Mesomelaena stygia subsp. *deflexa*	P3	60	334705.47	6731429.27
Mesomelaena stygia subsp. *deflexa*	P3	45	334713.76	6731427.19
Mesomelaena stygia subsp. *deflexa*	P3	23	334717.83	6731421.29
Mesomelaena stygia subsp. *deflexa*	P3	40	334715.92	6731407.19
Mesomelaena stygia subsp. *deflexa*	P3	60	334708.12	6731407.27
Mesomelaena stygia subsp. *deflexa*	P3	40	334705.24	6731396.29
Mesomelaena stygia subsp. *deflexa*	P3	45	334716.44	6731394.72
Mesomelaena stygia subsp. *deflexa*	P3	25	334714.39	6731383.36
Mesomelaena stygia subsp. *deflexa*	P3	35	334708.79	6731380.13
Mesomelaena stygia subsp. *deflexa*	P3	10	334705.84	6731375.20
Mesomelaena stygia subsp. *deflexa*	P3	11	334713.27	6731370.04
Mesomelaena stygia subsp. *deflexa*	P3	19	334719.17	6731364.49
Mesomelaena stygia subsp. *deflexa*	P3	12	334709.85	6731361.88
Mesomelaena stygia subsp. *deflexa*	P3	3	334704.05	6731359.06
Mesomelaena stygia subsp. *deflexa*	P3	16	334708.71	6731355.62
Mesomelaena stygia subsp. *deflexa*	P3	20	334714.82	6731349.98
Mesomelaena stygia subsp. *deflexa*	P3	30	334718.48	6731344.57
Mesomelaena stygia subsp. *deflexa*	P3	45	334714.48	6731339.41
Mesomelaena stygia subsp. *deflexa*	P3	25	334707.04	6731336.27
Mesomelaena stygia subsp. *deflexa*	P3	22	334701.76	6731329.58
Mesomelaena stygia subsp. *deflexa*	P3	45	334709.01	6731323.88
Mesomelaena stygia subsp. *deflexa*	P3	29	334714.97	6731318.55
Mesomelaena stygia subsp. *deflexa*	P3	40	334716.42	6731310.99
Mesomelaena stygia subsp. *deflexa*	P3	55	334708.13	6731310.24
Mesomelaena stygia subsp. *deflexa*	P3	60	334702.07	6731308.52
Mesomelaena stygia subsp. *deflexa*	P3	35	334706.77	6731302.22
Mesomelaena stygia subsp. *deflexa*	P3	40	334712.40	6731299.49
Mesomelaena stygia subsp. *deflexa*	P3	35	334719.38	6731296.04
Mesomelaena stygia subsp. *deflexa*	P3	25	334712.98	6731290.86
Mesomelaena stygia subsp. *deflexa*	P3	13	334703.32	6731285.32
Mesomelaena stygia subsp. *deflexa*	P3	25	334706.17	6731278.49

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	16	334716.15	6731275.23
Mesomelaena stygia subsp. *deflexa*	P3	35	334716.18	6731268.53
Mesomelaena stygia subsp. *deflexa*	P3	22	334710.25	6731262.82
Mesomelaena stygia subsp. *deflexa*	P3	20	334706.37	6731257.86
Mesomelaena stygia subsp. *deflexa*	P3	45	334717.72	6731252.47
Mesomelaena stygia subsp. *deflexa*	P3	17	334717.82	6731245.19
Mesomelaena stygia subsp. *deflexa*	P3	35	334707.64	6731239.00
Mesomelaena stygia subsp. *deflexa*	P3	27	334714.56	6731234.38
Mesomelaena stygia subsp. *deflexa*	P3	25	334722.83	6731231.39
Mesomelaena stygia subsp. *deflexa*	P3	45	334714.64	6731221.66
Mesomelaena stygia subsp. *deflexa*	P3	40	334709.44	6731213.98
Mesomelaena stygia subsp. *deflexa*	P3	30	334717.12	6731208.11
Mesomelaena stygia subsp. *deflexa*	P3	45	334720.09	6731198.99
Mesomelaena stygia subsp. *deflexa*	P3	35	334715.69	6731192.04
Mesomelaena stygia subsp. *deflexa*	P3	13	334700.33	6731183.65
Mesomelaena stygia subsp. *deflexa*	P3	22	334711.09	6731146.86
Mesomelaena stygia subsp. *deflexa*	P3	35	334704.59	6731138.77
Mesomelaena stygia subsp. *deflexa*	P3	35	334709.19	6731129.05
Mesomelaena stygia subsp. *deflexa*	P3	35	334701.46	6731123.13
Mesomelaena stygia subsp. *deflexa*	P3	50	334710.98	6731116.60
Mesomelaena stygia subsp. *deflexa*	P3	14	334716.55	6731113.99
Mesomelaena stygia subsp. *deflexa*	P3	25	334717.86	6731107.84
Mesomelaena stygia subsp. *deflexa*	P3	7	334718.19	6731098.71
Mesomelaena stygia subsp. *deflexa*	P3	26	334708.68	6731091.89
Mesomelaena stygia subsp. *deflexa*	P3	32	334701.72	6731085.18
Mesomelaena stygia subsp. *deflexa*	P3	12	334714.03	6731081.01
Mesomelaena stygia subsp. *deflexa*	P3	24	334712.56	6731073.58
Mesomelaena stygia subsp. *deflexa*	P3	20	334708.83	6731065.87
Mesomelaena stygia subsp. *deflexa*	P3	15	334709.64	6731057.94
Mesomelaena stygia subsp. *deflexa*	P3	7	334719.66	6731051.72
Mesomelaena stygia subsp. *deflexa*	P3	4	334717.00	6731044.56
Mesomelaena stygia subsp. *deflexa*	P3	4	334709.14	6731042.71
Mesomelaena stygia subsp. *deflexa*	P3	8	334712.24	6731034.91
Mesomelaena stygia subsp. *deflexa*	P3	16	334713.60	6731024.41
Mesomelaena stygia subsp. *deflexa*	P3	3	334728.73	6731018.73
Mesomelaena stygia subsp. *deflexa*	P3	4	334714.60	6731009.51
Mesomelaena stygia subsp. *deflexa*	P3	15	334706.73	6730978.76
Mesomelaena stygia subsp. *deflexa*	P3	18	334711.92	6730959.49
Mesomelaena stygia subsp. *deflexa*	P3	15	334709.64	6730947.76
Mesomelaena stygia subsp. *deflexa*	P3	13	334698.17	6730828.78
Mesomelaena stygia subsp. *deflexa*	P3	35	334709.48	6730826.49
Mesomelaena stygia subsp. *deflexa*	P3	20	334716.27	6730824.89
Mesomelaena stygia subsp. *deflexa*	P3	13	334717.14	6730816.56
Mesomelaena stygia subsp. *deflexa*	P3	30	334704.90	6730814.83
Mesomelaena stygia subsp. *deflexa*	P3	40	334705.26	6730805.09
Mesomelaena stygia subsp. *deflexa*	P3	23	334715.36	6730804.91
Mesomelaena stygia subsp. *deflexa*	P3	18	334713.95	6730793.36
Mesomelaena stygia subsp. *deflexa*	P3	40	334706.25	6730790.53
Mesomelaena stygia subsp. *deflexa*	P3	30	334705.91	6730781.01
Mesomelaena stygia subsp. *deflexa*	P3	15	334715.83	6730778.33
Mesomelaena stygia subsp. *deflexa*	P3	20	334711.37	6730769.87
Mesomelaena stygia subsp. *deflexa*	P3	13	334704.37	6730765.08
Mesomelaena stygia subsp. *deflexa*	P3	9	334710.34	6730758.12

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	18	334720.60	6730754.41
Mesomelaena stygia subsp. *deflexa*	P3	45	334710.34	6730744.92
Mesomelaena stygia subsp. *deflexa*	P3	40	334702.94	6730742.43
Mesomelaena stygia subsp. *deflexa*	P3	50	334710.23	6730736.16
Mesomelaena stygia subsp. *deflexa*	P3	45	334718.31	6730733.45
Mesomelaena stygia subsp. *deflexa*	P3	35	334716.79	6730725.99
Mesomelaena stygia subsp. *deflexa*	P3	55	334708.32	6730723.25
Mesomelaena stygia subsp. *deflexa*	P3	30	334699.93	6730718.84
Mesomelaena stygia subsp. *deflexa*	P3	12	334703.08	6730713.44
Mesomelaena stygia subsp. *deflexa*	P3	12	334709.56	6730710.69
Mesomelaena stygia subsp. *deflexa*	P3	30	334700.87	6730701.33
Mesomelaena stygia subsp. *deflexa*	P3	18	334710.21	6730693.86
Mesomelaena stygia subsp. *deflexa*	P3	10	334715.94	6730692.48
Mesomelaena stygia subsp. *deflexa*	P3	30	334707.71	6730682.20
Mesomelaena stygia subsp. *deflexa*	P3	45	334703.11	6730677.37
Mesomelaena stygia subsp. *deflexa*	P3	20	334709.94	6730671.85
Mesomelaena stygia subsp. *deflexa*	P3	8	334710.01	6730665.21
Mesomelaena stygia subsp. *deflexa*	P3	25	334702.99	6730663.43
Mesomelaena stygia subsp. *deflexa*	P3	22	334710.20	6730653.77
Mesomelaena stygia subsp. *deflexa*	P3	30	334718.89	6730650.13
Mesomelaena stygia subsp. *deflexa*	P3	50	334715.40	6730640.98
Mesomelaena stygia subsp. *deflexa*	P3	19	334707.07	6730636.37
Mesomelaena stygia subsp. *deflexa*	P3	45	334710.68	6730629.42
Mesomelaena stygia subsp. *deflexa*	P3	55	334717.61	6730627.79
Mesomelaena stygia subsp. *deflexa*	P3	38	334710.35	6730618.40
Mesomelaena stygia subsp. *deflexa*	P3	60	334703.22	6730614.61
Mesomelaena stygia subsp. *deflexa*	P3	75	334706.52	6730607.18
Mesomelaena stygia subsp. *deflexa*	P3	45	334715.88	6730605.37
Mesomelaena stygia subsp. *deflexa*	P3	60	334709.90	6730597.04
Mesomelaena stygia subsp. *deflexa*	P3	70	334703.55	6730595.14
Mesomelaena stygia subsp. *deflexa*	P3	85	334706.31	6730584.88
Mesomelaena stygia subsp. *deflexa*	P3	60	334718.69	6730581.92
Mesomelaena stygia subsp. *deflexa*	P3	85	334715.87	6730574.30
Mesomelaena stygia subsp. *deflexa*	P3	55	334708.15	6730571.15
Mesomelaena stygia subsp. *deflexa*	P3	65	334711.12	6730562.01
Mesomelaena stygia subsp. *deflexa*	P3	50	334719.71	6730555.11
Mesomelaena stygia subsp. *deflexa*	P3	70	334711.74	6730548.42
Mesomelaena stygia subsp. *deflexa*	P3	85	334706.77	6730541.04
Mesomelaena stygia subsp. *deflexa*	P3	70	334717.90	6730534.77
Mesomelaena stygia subsp. *deflexa*	P3	80	334716.47	6730526.53
Mesomelaena stygia subsp. *deflexa*	P3	65	334709.94	6730525.48
Mesomelaena stygia subsp. *deflexa*	P3	70	334703.30	6730520.87
Mesomelaena stygia subsp. *deflexa*	P3	105	334709.26	6730506.84
Mesomelaena stygia subsp. *deflexa*	P3	150	334719.03	6730503.14
Mesomelaena stygia subsp. *deflexa*	P3	110	334713.88	6730492.56
Mesomelaena stygia subsp. *deflexa*	P3	35	334704.09	6730483.71
Mesomelaena stygia subsp. *deflexa*	P3	60	334703.55	6730481.28
Mesomelaena stygia subsp. *deflexa*	P3	60	334713.54	6730472.41
Mesomelaena stygia subsp. *deflexa*	P3	35	334717.13	6730463.24
Mesomelaena stygia subsp. *deflexa*	P3	25	334703.20	6730462.44
Mesomelaena stygia subsp. *deflexa*	P3	20	334704.19	6730453.71
Mesomelaena stygia subsp. *deflexa*	P3	3	335430.66	6729566.43
Mesomelaena stygia subsp. *deflexa*	P3	8	335423.22	6729564.48

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	11	335425.06	6729559.68
Mesomelaena stygia subsp. *deflexa*	P3	4	335435.68	6729553.90
Mesomelaena stygia subsp. *deflexa*	P3	14	335439.07	6729547.26
Mesomelaena stygia subsp. *deflexa*	P3	12	335429.34	6729543.33
Mesomelaena stygia subsp. *deflexa*	P3	30	335426.38	6729536.65
Mesomelaena stygia subsp. *deflexa*	P3	40	335430.38	6729531.43
Mesomelaena stygia subsp. *deflexa*	P3	45	335441.11	6729529.88
Mesomelaena stygia subsp. *deflexa*	P3	45	335433.26	6729522.24
Mesomelaena stygia subsp. *deflexa*	P3	35	335427.16	6729519.79
Mesomelaena stygia subsp. *deflexa*	P3	50	335427.52	6729511.89
Mesomelaena stygia subsp. *deflexa*	P3	60	335436.10	6729508.50
Mesomelaena stygia subsp. *deflexa*	P3	25	335436.63	6729501.90
Mesomelaena stygia subsp. *deflexa*	P3	30	335431.01	6729497.95
Mesomelaena stygia subsp. *deflexa*	P3	35	335426.15	6729493.43
Mesomelaena stygia subsp. *deflexa*	P3	35	335431.64	6729486.05
Mesomelaena stygia subsp. *deflexa*	P3	45	335437.67	6729481.81
Mesomelaena stygia subsp. *deflexa*	P3	60	335436.43	6729471.45
Mesomelaena stygia subsp. *deflexa*	P3	40	335428.54	6729470.48
Mesomelaena stygia subsp. *deflexa*	P3	50	335426.76	6729464.41
Mesomelaena stygia subsp. *deflexa*	P3	55	335434.84	6729459.27
Mesomelaena stygia subsp. *deflexa*	P3	40	335430.19	6729451.68
Mesomelaena stygia subsp. *deflexa*	P3	55	335424.43	6729448.00
Mesomelaena stygia subsp. *deflexa*	P3	40	335428.04	6729441.05
Mesomelaena stygia subsp. *deflexa*	P3	50	335438.86	6729444.76
Mesomelaena stygia subsp. *deflexa*	P3	35	335441.79	6729432.05
Mesomelaena stygia subsp. *deflexa*	P3	13	335068.90	6730779.70
Mesomelaena stygia subsp. *deflexa*	P3	13	335062.69	6730735.98
Mesomelaena stygia subsp. *deflexa*	P3	20	335068.77	6730699.75
Mesomelaena stygia subsp. *deflexa*	P3	20	335077.16	6730657.40
Mesomelaena stygia subsp. *deflexa*	P3	60	335066.55	6730292.16
Mesomelaena stygia subsp. *deflexa*	P3	80	335068.87	6730271.65
Mesomelaena stygia subsp. *deflexa*	P3	80	335069.18	6730252.95
Mesomelaena stygia subsp. *deflexa*	P3	80	335072.67	6730235.29
Mesomelaena stygia subsp. *deflexa*	P3	80	335077.77	6730215.98
Mesomelaena stygia subsp. *deflexa*	P3	80	335072.14	6730200.07
Mesomelaena stygia subsp. *deflexa*	P3	80	335064.09	6730182.76
Mesomelaena stygia subsp. *deflexa*	P3	80	335071.10	6730161.27
Mesomelaena stygia subsp. *deflexa*	P3	80	335076.00	6730140.15
Mesomelaena stygia subsp. *deflexa*	P3	40	335072.58	6730122.96
Mesomelaena stygia subsp. *deflexa*	P3	80	335075.73	6729947.48
Mesomelaena stygia subsp. *deflexa*	P3	30	335077.55	6729929.16
Mesomelaena stygia subsp. *deflexa*	P3	12	335434.07	6729430.35
Mesomelaena stygia subsp. *deflexa*	P3	12	335426.64	6729419.64
Mesomelaena stygia subsp. *deflexa*	P3	15	335435.20	6729413.60
Mesomelaena stygia subsp. *deflexa*	P3	6	335437.53	6729405.56
Mesomelaena stygia subsp. *deflexa*	P3	9	335430.81	6729400.49
Mesomelaena stygia subsp. *deflexa*	P3	5	335426.29	6729391.70
Mesomelaena stygia subsp. *deflexa*	P3	10	335436.81	6729389.69
Mesomelaena stygia subsp. *deflexa*	P3	2	335441.28	6729373.80
Mesomelaena stygia subsp. *deflexa*	P3	1	335430.66	6729358.15
Mesomelaena stygia subsp. *deflexa*	P3	9	335424.58	6729356.31
Mesomelaena stygia subsp. *deflexa*	P3	8	335431.11	6729344.28
Mesomelaena stygia subsp. *deflexa*	P3	11	335435.93	6729339.52

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	18	335426.96	6729337.63
Mesomelaena stygia subsp. *deflexa*	P3	20	335426.94	6729329.81
Mesomelaena stygia subsp. *deflexa*	P3	30	335435.15	6729325.95
Mesomelaena stygia subsp. *deflexa*	P3	13	335440.15	6729319.59
Mesomelaena stygia subsp. *deflexa*	P3	35	335429.84	6729314.93
Mesomelaena stygia subsp. *deflexa*	P3	65	335425.62	6729305.63
Mesomelaena stygia subsp. *deflexa*	P3	45	335434.84	6729302.81
Mesomelaena stygia subsp. *deflexa*	P3	17	335440.40	6729294.72
Mesomelaena stygia subsp. *deflexa*	P3	22	335431.66	6729291.71
Mesomelaena stygia subsp. *deflexa*	P3	16	335428.49	6729281.06
Mesomelaena stygia subsp. *deflexa*	P3	23	335435.66	6729276.53
Mesomelaena stygia subsp. *deflexa*	P3	27	335440.73	6729267.18
Mesomelaena stygia subsp. *deflexa*	P3	60	335433.78	6729262.97
Mesomelaena stygia subsp. *deflexa*	P3	60	335429.49	6729257.11
Mesomelaena stygia subsp. *deflexa*	P3	45	335427.59	6729246.96
Mesomelaena stygia subsp. *deflexa*	P3	25	335436.22	6729239.53
Mesomelaena stygia subsp. *deflexa*	P3	20	335437.46	6729230.10
Mesomelaena stygia subsp. *deflexa*	P3	30	335427.33	6729226.39
Mesomelaena stygia subsp. *deflexa*	P3	20	335428.63	6729217.71
Mesomelaena stygia subsp. *deflexa*	P3	65	335438.55	6729215.97
Mesomelaena stygia subsp. *deflexa*	P3	55	335441.14	6729204.79
Mesomelaena stygia subsp. *deflexa*	P3	55	335432.91	6729202.88
Mesomelaena stygia subsp. *deflexa*	P3	45	335425.76	6729197.16
Mesomelaena stygia subsp. *deflexa*	P3	30	335433.30	6729190.43
Mesomelaena stygia subsp. *deflexa*	P3	35	335442.95	6729184.14
Mesomelaena stygia subsp. *deflexa*	P3	50	335434.96	6729178.04
Mesomelaena stygia subsp. *deflexa*	P3	17	335429.36	6729169.21
Mesomelaena stygia subsp. *deflexa*	P3	5	335432.93	6729162.64
Mesomelaena stygia subsp. *deflexa*	P3	9	335441.14	6729162.66
Mesomelaena stygia subsp. *deflexa*	P3	2	335440.40	6729154.14
Mesomelaena stygia subsp. *deflexa*	P3	8	335430.24	6729125.63
Mesomelaena stygia subsp. *deflexa*	P3	1	335432.12	6728967.78
Mesomelaena stygia subsp. *deflexa*	P3	28	335432.63	6728875.33
Mesomelaena stygia subsp. *deflexa*	P3	45	335434.61	6727384.09
Mesomelaena stygia subsp. *deflexa*	P3	60	335438.44	6727365.37
Mesomelaena stygia subsp. *deflexa*	P3	100	335426.04	6727361.46
Mesomelaena stygia subsp. *deflexa*	P3	50	335429.93	6727349.61
Mesomelaena stygia subsp. *deflexa*	P3	100	335426.35	6727338.27
Mesomelaena stygia subsp. *deflexa*	P3	150	335440.32	6727322.72
Mesomelaena stygia subsp. *deflexa*	P3	100	335424.57	6727309.22
Mesomelaena stygia subsp. *deflexa*	P3	100	335429.68	6727293.00
Mesomelaena stygia subsp. *deflexa*	P3	120	335430.07	6727277.34
Mesomelaena stygia subsp. *deflexa*	P3	150	335440.12	6727259.43
Mesomelaena stygia subsp. *deflexa*	P3	150	335433.46	6727241.47
Mesomelaena stygia subsp. *deflexa*	P3	100	335426.14	6727230.64
Mesomelaena stygia subsp. *deflexa*	P3	125	335430.03	6727214.69
Mesomelaena stygia subsp. *deflexa*	P3	100	335439.62	6727204.50
Mesomelaena stygia subsp. *deflexa*	P3	100	335430.17	6727191.81
Mesomelaena stygia subsp. *deflexa*	P3	150	335433.93	6727175.18
Mesomelaena stygia subsp. *deflexa*	P3	100	335436.52	6727162.42
Mesomelaena stygia subsp. *deflexa*	P3	100	335436.85	6727146.18
Mesomelaena stygia subsp. *deflexa*	P3	100	335440.72	6727129.15
Mesomelaena stygia subsp. *deflexa*	P3	100	335428.64	6727121.14

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	100	335426.96	6727106.50
Mesomelaena stygia subsp. *deflexa*	P3	75	335434.00	6727090.40
Mesomelaena stygia subsp. *deflexa*	P3	80	335430.39	6727069.00
Mesomelaena stygia subsp. *deflexa*	P3	75	335438.61	6727053.07
Mesomelaena stygia subsp. *deflexa*	P3	60	335426.05	6727024.89
Mesomelaena stygia subsp. *deflexa*	P3	100	335432.13	6727004.64
Mesomelaena stygia subsp. *deflexa*	P3	75	335443.34	6726986.34
Mesomelaena stygia subsp. *deflexa*	P3	75	335437.11	6726971.72
Mesomelaena stygia subsp. *deflexa*	P3	50	335438.79	6726949.70
Mesomelaena stygia subsp. *deflexa*	P3	30	335443.00	6726934.73
Mesomelaena stygia subsp. *deflexa*	P3	20	335439.54	6726915.09
Mesomelaena stygia subsp. *deflexa*	P3	30	335431.21	6726901.97
Mesomelaena stygia subsp. *deflexa*	P3	20	335432.68	6726829.85
Mesomelaena stygia subsp. *deflexa*	P3	20	335430.46	6726783.84
Mesomelaena stygia subsp. *deflexa*	P3	20	335426.38	6726772.88
Mesomelaena stygia subsp. *deflexa*	P3	20	335425.48	6726762.37
Mesomelaena stygia subsp. *deflexa*	P3	50	335430.43	6726708.83
Mesomelaena stygia subsp. *deflexa*	P3	30	335433.68	6726690.41
Mesomelaena stygia subsp. *deflexa*	P3	50	335431.16	6726678.16
Mesomelaena stygia subsp. *deflexa*	P3	40	335435.96	6726670.89
Mesomelaena stygia subsp. *deflexa*	P3	30	335440.02	6726656.34
Mesomelaena stygia subsp. *deflexa*	P3	75	335431.06	6726643.22
Mesomelaena stygia subsp. *deflexa*	P3	50	335434.10	6726627.64
Mesomelaena stygia subsp. *deflexa*	P3	75	335435.57	6726612.17
Mesomelaena stygia subsp. *deflexa*	P3	75	336148.24	6726088.68
Mesomelaena stygia subsp. *deflexa*	P3	80	336157.35	6726104.89
Mesomelaena stygia subsp. *deflexa*	P3	80	336151.53	6726129.34
Mesomelaena stygia subsp. *deflexa*	P3	100	336154.53	6726149.73
Mesomelaena stygia subsp. *deflexa*	P3	100	336142.51	6726165.12
Mesomelaena stygia subsp. *deflexa*	P3	100	336145.31	6726185.60
Mesomelaena stygia subsp. *deflexa*	P3	75	336155.26	6726204.30
Mesomelaena stygia subsp. *deflexa*	P3	100	336158.41	6726225.83
Mesomelaena stygia subsp. *deflexa*	P3	75	336147.75	6726233.79
Mesomelaena stygia subsp. *deflexa*	P3	100	336147.20	6726254.45
Mesomelaena stygia subsp. *deflexa*	P3	75	336145.26	6726277.12
Mesomelaena stygia subsp. *deflexa*	P3	75	336151.21	6726309.04
Mesomelaena stygia subsp. *deflexa*	P3	75	336148.69	6726330.55
Mesomelaena stygia subsp. *deflexa*	P3	80	336151.28	6726353.10
Mesomelaena stygia subsp. *deflexa*	P3	75	336159.67	6726365.58
Mesomelaena stygia subsp. *deflexa*	P3	80	336158.87	6726393.79
Mesomelaena stygia subsp. *deflexa*	P3	60	336141.79	6726402.18
Mesomelaena stygia subsp. *deflexa*	P3	80	336136.48	6726425.45
Mesomelaena stygia subsp. *deflexa*	P3	75	336151.05	6726440.88
Mesomelaena stygia subsp. *deflexa*	P3	80	336140.91	6726463.64
Mesomelaena stygia subsp. *deflexa*	P3	100	336146.07	6726487.55
Mesomelaena stygia subsp. *deflexa*	P3	80	336153.99	6726507.02
Mesomelaena stygia subsp. *deflexa*	P3	80	336148.89	6726526.78
Mesomelaena stygia subsp. *deflexa*	P3	60	336149.59	6726545.21
Mesomelaena stygia subsp. *deflexa*	P3	80	336159.09	6726563.65
Mesomelaena stygia subsp. *deflexa*	P3	80	336161.72	6726583.78
Mesomelaena stygia subsp. *deflexa*	P3	75	336160.11	6726606.40
Mesomelaena stygia subsp. *deflexa*	P3	80	336145.28	6726628.53
Mesomelaena stygia subsp. *deflexa*	P3	80	336150.67	6726652.42

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	80	336146.31	6726672.18
Mesomelaena stygia subsp. *deflexa*	P3	80	336148.41	6726698.17
Mesomelaena stygia subsp. *deflexa*	P3	80	336143.02	6726720.12
Mesomelaena stygia subsp. *deflexa*	P3	65	336156.06	6726737.62
Mesomelaena stygia subsp. *deflexa*	P3	80	336156.14	6726758.94
Mesomelaena stygia subsp. *deflexa*	P3	75	336149.34	6726775.69
Mesomelaena stygia subsp. *deflexa*	P3	75	336148.19	6726799.32
Mesomelaena stygia subsp. *deflexa*	P3	75	336157.65	6726816.04
Mesomelaena stygia subsp. *deflexa*	P3	80	336149.37	6726845.57
Mesomelaena stygia subsp. *deflexa*	P3	75	336155.26	6726869.77
Mesomelaena stygia subsp. *deflexa*	P3	75	336163.40	6726901.60
Mesomelaena stygia subsp. *deflexa*	P3	75	336156.68	6726916.31
Mesomelaena stygia subsp. *deflexa*	P3	75	336151.48	6726935.84
Mesomelaena stygia subsp. *deflexa*	P3	75	336162.78	6726954.06
Mesomelaena stygia subsp. *deflexa*	P3	75	336156.74	6726969.11
Mesomelaena stygia subsp. *deflexa*	P3	75	336160.56	6726980.71
Mesomelaena stygia subsp. *deflexa*	P3	60	336153.08	6726992.99
Mesomelaena stygia subsp. *deflexa*	P3	60	336150.21	6727008.44
Mesomelaena stygia subsp. *deflexa*	P3	60	336149.87	6727026.39
Mesomelaena stygia subsp. *deflexa*	P3	60	336160.98	6727041.84
Mesomelaena stygia subsp. *deflexa*	P3	60	336151.28	6727055.80
Mesomelaena stygia subsp. *deflexa*	P3	60	336137.67	6727068.66
Mesomelaena stygia subsp. *deflexa*	P3	60	336148.96	6727085.51
Mesomelaena stygia subsp. *deflexa*	P3	40	336157.86	6727099.07
Mesomelaena stygia subsp. *deflexa*	P3	50	336159.65	6727118.85
Mesomelaena stygia subsp. *deflexa*	P3	60	336139.75	6727141.72
Mesomelaena stygia subsp. *deflexa*	P3	60	336143.59	6727156.28
Mesomelaena stygia subsp. *deflexa*	P3	60	336156.56	6727171.21
Mesomelaena stygia subsp. *deflexa*	P3	50	336160.50	6727184.54
Mesomelaena stygia subsp. *deflexa*	P3	60	336159.28	6727207.70
Mesomelaena stygia subsp. *deflexa*	P3	60	336138.10	6727222.25
Mesomelaena stygia subsp. *deflexa*	P3	50	336154.03	6727233.43
Mesomelaena stygia subsp. *deflexa*	P3	50	336168.09	6727244.06
Mesomelaena stygia subsp. *deflexa*	P3	50	336157.23	6727266.27
Mesomelaena stygia subsp. *deflexa*	P3	50	336148.72	6727285.15
Mesomelaena stygia subsp. *deflexa*	P3	50	336152.14	6727302.60
Mesomelaena stygia subsp. *deflexa*	P3	40	336156.89	6727835.37
Mesomelaena stygia subsp. *deflexa*	P3	30	336150.72	6727850.44
Mesomelaena stygia subsp. *deflexa*	P3	40	336161.27	6727861.91
Mesomelaena stygia subsp. *deflexa*	P3	40	336162.17	6727876.46
Mesomelaena stygia subsp. *deflexa*	P3	40	336152.41	6727892.01
Mesomelaena stygia subsp. *deflexa*	P3	50	336143.67	6727918.12
Mesomelaena stygia subsp. *deflexa*	P3	40	336142.36	6727938.11
Mesomelaena stygia subsp. *deflexa*	P3	40	336146.93	6727950.86
Mesomelaena stygia subsp. *deflexa*	P3	50	336154.39	6727965.74
Mesomelaena stygia subsp. *deflexa*	P3	40	336155.58	6727992.79
Mesomelaena stygia subsp. *deflexa*	P3	40	336164.41	6728010.08
Mesomelaena stygia subsp. *deflexa*	P3	8	336163.19	6728083.63
Mesomelaena stygia subsp. *deflexa*	P3	20	336143.57	6728108.87
Mesomelaena stygia subsp. *deflexa*	P3	20	336151.61	6728130.07
Mesomelaena stygia subsp. *deflexa*	P3	30	336154.48	6728152.32
Mesomelaena stygia subsp. *deflexa*	P3	25	336150.70	6728170.41
Mesomelaena stygia subsp. *deflexa*	P3	30	336170.40	6728277.59

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	20	336158.29	6728302.18
Mesomelaena stygia subsp. *deflexa*	P3	30	336155.22	6728670.11
Mesomelaena stygia subsp. *deflexa*	P3	30	336152.07	6729367.97
Mesomelaena stygia subsp. *deflexa*	P3	12	335795.74	6726093.96
Mesomelaena stygia subsp. *deflexa*	P3	13	335786.19	6726095.04
Mesomelaena stygia subsp. *deflexa*	P3	19	335792.36	6726112.69
Mesomelaena stygia subsp. *deflexa*	P3	30	335789.07	6726120.14
Mesomelaena stygia subsp. *deflexa*	P3	55	335800.29	6726122.07
Mesomelaena stygia subsp. *deflexa*	P3	25	335799.07	6726135.12
Mesomelaena stygia subsp. *deflexa*	P3	35	335784.73	6726137.74
Mesomelaena stygia subsp. *deflexa*	P3	40	335791.05	6726148.42
Mesomelaena stygia subsp. *deflexa*	P3	16	335795.83	6726148.69
Mesomelaena stygia subsp. *deflexa*	P3	65	335801.20	6726164.42
Mesomelaena stygia subsp. *deflexa*	P3	28	335789.40	6726161.64
Mesomelaena stygia subsp. *deflexa*	P3	55	335790.32	6726168.61
Mesomelaena stygia subsp. *deflexa*	P3	90	335800.14	6726172.75
Mesomelaena stygia subsp. *deflexa*	P3	8	335801.36	6726199.14
Mesomelaena stygia subsp. *deflexa*	P3	27	335795.62	6726198.43
Mesomelaena stygia subsp. *deflexa*	P3	17	335788.81	6726205.10
Mesomelaena stygia subsp. *deflexa*	P3	12	335798.43	6726228.31
Mesomelaena stygia subsp. *deflexa*	P3	6	335794.81	6726277.27
Mesomelaena stygia subsp. *deflexa*	P3	28	335793.19	6726307.94
Mesomelaena stygia subsp. *deflexa*	P3	5	335795.55	6726345.62
Mesomelaena stygia subsp. *deflexa*	P3	15	335802.53	6726359.28
Mesomelaena stygia subsp. *deflexa*	P3	2	335791.79	6726370.31
Mesomelaena stygia subsp. *deflexa*	P3	8	335796.46	6726378.15
Mesomelaena stygia subsp. *deflexa*	P3	13	335792.04	6726424.30
Mesomelaena stygia subsp. *deflexa*	P3	3	335797.14	6726449.02
Mesomelaena stygia subsp. *deflexa*	P3	8	335794.52	6726469.31
Mesomelaena stygia subsp. *deflexa*	P3	7	335794.22	6726479.05
Mesomelaena stygia subsp. *deflexa*	P3	30	335790.14	6726481.94
Mesomelaena stygia subsp. *deflexa*	P3	25	335794.49	6726494.16
Mesomelaena stygia subsp. *deflexa*	P3	13	335784.09	6726496.72
Mesomelaena stygia subsp. *deflexa*	P3	13	335795.98	6726580.26
Mesomelaena stygia subsp. *deflexa*	P3	4	335795.99	6726666.81
Mesomelaena stygia subsp. *deflexa*	P3	2	335788.20	6726710.30
Mesomelaena stygia subsp. *deflexa*	P3	9	335798.76	6726739.28
Mesomelaena stygia subsp. *deflexa*	P3	13	335790.10	6726900.50
Mesomelaena stygia subsp. *deflexa*	P3	11	335795.62	6726945.35
Mesomelaena stygia subsp. *deflexa*	P3	9	335792.47	6726953.67
Mesomelaena stygia subsp. *deflexa*	P3	20	335784.09	6726960.27
Mesomelaena stygia subsp. *deflexa*	P3	35	335801.20	6726978.29
Mesomelaena stygia subsp. *deflexa*	P3	26	335787.01	6726977.21
Mesomelaena stygia subsp. *deflexa*	P3	25	335795.02	6726990.13
Mesomelaena stygia subsp. *deflexa*	P3	25	335784.31	6726992.98
Mesomelaena stygia subsp. *deflexa*	P3	5	335800.09	6727002.54
Mesomelaena stygia subsp. *deflexa*	P3	14	335785.20	6727012.24
Mesomelaena stygia subsp. *deflexa*	P3	14	335792.99	6727032.17
Mesomelaena stygia subsp. *deflexa*	P3	7	335781.02	6727050.33
Mesomelaena stygia subsp. *deflexa*	P3	10	335790.79	6727056.42
Mesomelaena stygia subsp. *deflexa*	P3	18	335785.41	6727076.34
Mesomelaena stygia subsp. *deflexa*	P3	40	335791.96	6727088.65
Mesomelaena stygia subsp. *deflexa*	P3	55	335787.18	6727098.14

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	60	335800.56	6727100.28
Mesomelaena stygia subsp. *deflexa*	P3	60	335794.98	6727111.64
Mesomelaena stygia subsp. *deflexa*	P3	50	335782.87	6727108.49
Mesomelaena stygia subsp. *deflexa*	P3	55	335786.49	6727117.27
Mesomelaena stygia subsp. *deflexa*	P3	35	335796.44	6727123.96
Mesomelaena stygia subsp. *deflexa*	P3	12	335792.56	6727147.42
Mesomelaena stygia subsp. *deflexa*	P3	45	335802.35	6727150.22
Mesomelaena stygia subsp. *deflexa*	P3	7	335781.51	6727166.22
Mesomelaena stygia subsp. *deflexa*	P3	25	335796.14	6727167.87
Mesomelaena stygia subsp. *deflexa*	P3	35	335797.51	6727182.62
Mesomelaena stygia subsp. *deflexa*	P3	85	335789.28	6727187.92
Mesomelaena stygia subsp. *deflexa*	P3	35	335791.40	6727196.97
Mesomelaena stygia subsp. *deflexa*	P3	40	335800.23	6727202.07
Mesomelaena stygia subsp. *deflexa*	P3	60	335796.01	6727211.86
Mesomelaena stygia subsp. *deflexa*	P3	35	335785.27	6727216.00
Mesomelaena stygia subsp. *deflexa*	P3	35	335788.24	6727224.91
Mesomelaena stygia subsp. *deflexa*	P3	1	335784.11	6727242.95
Mesomelaena stygia subsp. *deflexa*	P3	15	335794.91	6727259.01
Mesomelaena stygia subsp. *deflexa*	P3	45	335785.61	6727262.26
Mesomelaena stygia subsp. *deflexa*	P3	43	335792.44	6727277.04
Mesomelaena stygia subsp. *deflexa*	P3	55	335801.18	6727286.05
Mesomelaena stygia subsp. *deflexa*	P3	70	335794.20	6727296.98
Mesomelaena stygia subsp. *deflexa*	P3	60	335785.65	6727305.05
Mesomelaena stygia subsp. *deflexa*	P3	35	335792.84	6727310.30
Mesomelaena stygia subsp. *deflexa*	P3	8	335798.84	6727326.97
Mesomelaena stygia subsp. *deflexa*	P3	25	335789.92	6727335.12
Mesomelaena stygia subsp. *deflexa*	P3	20	335785.79	6727347.62
Mesomelaena stygia subsp. *deflexa*	P3	50	335437.15	6726596.25
Mesomelaena stygia subsp. *deflexa*	P3	40	335436.74	6726571.55
Mesomelaena stygia subsp. *deflexa*	P3	40	335434.32	6726555.06
Mesomelaena stygia subsp. *deflexa*	P3	25	335438.83	6726530.53
Mesomelaena stygia subsp. *deflexa*	P3	30	335421.07	6726513.66
Mesomelaena stygia subsp. *deflexa*	P3	25	335427.38	6726492.49
Mesomelaena stygia subsp. *deflexa*	P3	10	335442.44	6726474.60
Mesomelaena stygia subsp. *deflexa*	P3	30	335428.91	6726462.36
Mesomelaena stygia subsp. *deflexa*	P3	50	335429.39	6726442.51
Mesomelaena stygia subsp. *deflexa*	P3	40	335446.88	6726414.59
Mesomelaena stygia subsp. *deflexa*	P3	40	335430.40	6726395.26
Mesomelaena stygia subsp. *deflexa*	P3	30	335443.05	6726363.42
Mesomelaena stygia subsp. *deflexa*	P3	20	335436.21	6726346.49
Mesomelaena stygia subsp. *deflexa*	P3	30	335430.63	6726321.62
Mesomelaena stygia subsp. *deflexa*	P3	1	335791.60	6729187.41
Mesomelaena stygia subsp. *deflexa*	P3	9	335793.37	6729351.41
Mesomelaena stygia subsp. *deflexa*	P3	5	335797.48	6729359.29
Mesomelaena stygia subsp. *deflexa*	P3	9	335792.89	6729374.64
Mesomelaena stygia subsp. *deflexa*	P3	8	335790.84	6729393.16
Mesomelaena stygia subsp. *deflexa*	P3	10	335797.98	6729401.08
Mesomelaena stygia subsp. *deflexa*	P3	22	335802.14	6729702.81
Mesomelaena stygia subsp. *deflexa*	P3	5	336518.08	6726529.16
Mesomelaena stygia subsp. *deflexa*	P3	9	336513.14	6726538.21
Mesomelaena stygia subsp. *deflexa*	P3	5	336524.04	6726542.98
Mesomelaena stygia subsp. *deflexa*	P3	15	336518.73	6726546.22
Mesomelaena stygia subsp. *deflexa*	P3	16	336527.48	6726567.75

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	15	336517.33	6726588.03
Mesomelaena stygia subsp. *deflexa*	P3	8	336511.27	6726591.28
Mesomelaena stygia subsp. *deflexa*	P3	17	336502.25	6726598.54
Mesomelaena stygia subsp. *deflexa*	P3	27	336512.02	6726603.20
Mesomelaena stygia subsp. *deflexa*	P3	22	336519.96	6726612.19
Mesomelaena stygia subsp. *deflexa*	P3	43	336514.30	6726620.67
Mesomelaena stygia subsp. *deflexa*	P3	22	336507.65	6726624.99
Mesomelaena stygia subsp. *deflexa*	P3	35	336514.86	6726630.86
Mesomelaena stygia subsp. *deflexa*	P3	25	336519.21	6726641.60
Mesomelaena stygia subsp. *deflexa*	P3	35	336510.53	6726645.35
Mesomelaena stygia subsp. *deflexa*	P3	40	336514.43	6726660.25
Mesomelaena stygia subsp. *deflexa*	P3	50	336520.55	6726667.40
Mesomelaena stygia subsp. *deflexa*	P3	65	336513.16	6726671.81
Mesomelaena stygia subsp. *deflexa*	P3	80	336505.30	6726679.64
Mesomelaena stygia subsp. *deflexa*	P3	60	336512.81	6726688.05
Mesomelaena stygia subsp. *deflexa*	P3	60	336522.88	6726693.58
Mesomelaena stygia subsp. *deflexa*	P3	70	336514.55	6726701.89
Mesomelaena stygia subsp. *deflexa*	P3	40	336508.93	6726710.65
Mesomelaena stygia subsp. *deflexa*	P3	55	336512.43	6726717.16
Mesomelaena stygia subsp. *deflexa*	P3	50	336517.76	6726726.15
Mesomelaena stygia subsp. *deflexa*	P3	70	336516.93	6726736.79
Mesomelaena stygia subsp. *deflexa*	P3	75	336508.10	6726733.73
Mesomelaena stygia subsp. *deflexa*	P3	45	336510.01	6726742.42
Mesomelaena stygia subsp. *deflexa*	P3	80	336517.15	6726752.01
Mesomelaena stygia subsp. *deflexa*	P3	70	336511.13	6726760.39
Mesomelaena stygia subsp. *deflexa*	P3	50	336507.05	6726767.95
Mesomelaena stygia subsp. *deflexa*	P3	75	336495.07	6726773.62
Mesomelaena stygia subsp. *deflexa*	P3	60	336511.44	6726778.73
Mesomelaena stygia subsp. *deflexa*	P3	100	336520.56	6726778.55
Mesomelaena stygia subsp. *deflexa*	P3	110	336526.87	6726787.16
Mesomelaena stygia subsp. *deflexa*	P3	80	336515.20	6726789.96
Mesomelaena stygia subsp. *deflexa*	P3	60	336506.96	6726800.32
Mesomelaena stygia subsp. *deflexa*	P3	55	336512.00	6726810.31
Mesomelaena stygia subsp. *deflexa*	P3	85	336522.19	6726816.97
Mesomelaena stygia subsp. *deflexa*	P3	70	336520.26	6726830.14
Mesomelaena stygia subsp. *deflexa*	P3	70	336508.52	6726828.98
Mesomelaena stygia subsp. *deflexa*	P3	90	336508.75	6726840.50
Mesomelaena stygia subsp. *deflexa*	P3	90	336519.34	6726844.47
Mesomelaena stygia subsp. *deflexa*	P3	110	336514.48	6726855.36
Mesomelaena stygia subsp. *deflexa*	P3	80	336506.40	6726863.72
Mesomelaena stygia subsp. *deflexa*	P3	75	336511.97	6726874.63
Mesomelaena stygia subsp. *deflexa*	P3	50	336523.39	6726880.96
Mesomelaena stygia subsp. *deflexa*	P3	70	336518.48	6726889.97
Mesomelaena stygia subsp. *deflexa*	P3	60	336508.57	6726895.01
Mesomelaena stygia subsp. *deflexa*	P3	45	336514.12	6726903.38
Mesomelaena stygia subsp. *deflexa*	P3	65	336525.01	6726912.82
Mesomelaena stygia subsp. *deflexa*	P3	45	336513.70	6726915.24
Mesomelaena stygia subsp. *deflexa*	P3	65	336507.85	6726927.01
Mesomelaena stygia subsp. *deflexa*	P3	60	336513.58	6726937.98
Mesomelaena stygia subsp. *deflexa*	P3	80	336523.24	6726947.16
Mesomelaena stygia subsp. *deflexa*	P3	60	336515.60	6726954.50
Mesomelaena stygia subsp. *deflexa*	P3	45	336508.53	6726966.29
Mesomelaena stygia subsp. *deflexa*	P3	55	336511.12	6726979.76

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	100	336517.62	6726983.64
Mesomelaena stygia subsp. *deflexa*	P3	45	336519.34	6726997.85
Mesomelaena stygia subsp. *deflexa*	P3	60	336511.21	6727001.46
Mesomelaena stygia subsp. *deflexa*	P3	45	336509.38	6727015.46
Mesomelaena stygia subsp. *deflexa*	P3	40	336517.24	6727019.62
Mesomelaena stygia subsp. *deflexa*	P3	70	336514.37	6727031.95
Mesomelaena stygia subsp. *deflexa*	P3	55	336507.12	6727039.77
Mesomelaena stygia subsp. *deflexa*	P3	80	336517.50	6727049.00
Mesomelaena stygia subsp. *deflexa*	P3	40	336516.38	6727058.97
Mesomelaena stygia subsp. *deflexa*	P3	25	336511.42	6727063.10
Mesomelaena stygia subsp. *deflexa*	P3	20	336519.31	6727071.99
Mesomelaena stygia subsp. *deflexa*	P3	1	336507.99	6727081.88
Mesomelaena stygia subsp. *deflexa*	P3	1	336513.91	6727181.11
Mesomelaena stygia subsp. *deflexa*	P3	8	336522.46	6727224.48
Mesomelaena stygia subsp. *deflexa*	P3	15	336512.72	6727227.98
Mesomelaena stygia subsp. *deflexa*	P3	5	336510.82	6727237.06
Mesomelaena stygia subsp. *deflexa*	P3	22	336523.12	6727241.14
Mesomelaena stygia subsp. *deflexa*	P3	50	336514.26	6727253.75
Mesomelaena stygia subsp. *deflexa*	P3	12	336504.43	6727258.01
Mesomelaena stygia subsp. *deflexa*	P3	16	336514.60	6727269.08
Mesomelaena stygia subsp. *deflexa*	P3	10	336521.65	6727280.86
Mesomelaena stygia subsp. *deflexa*	P3	13	336512.05	6727287.37
Mesomelaena stygia subsp. *deflexa*	P3	29	336507.62	6727297.06
Mesomelaena stygia subsp. *deflexa*	P3	18	336515.27	6727303.89
Mesomelaena stygia subsp. *deflexa*	P3	8	336519.01	6727315.00
Mesomelaena stygia subsp. *deflexa*	P3	12	336505.18	6727318.44
Mesomelaena stygia subsp. *deflexa*	P3	22	336513.21	6727325.41
Mesomelaena stygia subsp. *deflexa*	P3	21	336519.96	6727334.70
Mesomelaena stygia subsp. *deflexa*	P3	14	336512.40	6727341.08
Mesomelaena stygia subsp. *deflexa*	P3	11	336510.54	6727350.72
Mesomelaena stygia subsp. *deflexa*	P3	17	336516.80	6727360.69
Mesomelaena stygia subsp. *deflexa*	P3	30	336514.39	6730172.28
Mesomelaena stygia subsp. *deflexa*	P3	10	336515.14	6730140.52
Mesomelaena stygia subsp. *deflexa*	P3	25	336515.23	6730088.18
Mesomelaena stygia subsp. *deflexa*	P3	15	336516.99	6730063.89
Mesomelaena stygia subsp. *deflexa*	P3	2	336515.95	6729968.69
Mesomelaena stygia subsp. *deflexa*	P3	12	336516.04	6729952.53
Mesomelaena stygia subsp. *deflexa*	P3	20	336519.36	6729916.76
Mesomelaena stygia subsp. *deflexa*	P3	25	336517.66	6729901.75
Mesomelaena stygia subsp. *deflexa*	P3	40	336521.66	6729883.36
Mesomelaena stygia subsp. *deflexa*	P3	80	336515.45	6729868.11
Mesomelaena stygia subsp. *deflexa*	P3	80	336522.70	6729854.70
Mesomelaena stygia subsp. *deflexa*	P3	100	336518.49	6729846.47
Mesomelaena stygia subsp. *deflexa*	P3	100	336522.12	6729835.33
Mesomelaena stygia subsp. *deflexa*	P3	100	336513.08	6729829.53
Mesomelaena stygia subsp. *deflexa*	P3	100	336515.02	6729819.13
Mesomelaena stygia subsp. *deflexa*	P3	25	336511.76	6729803.57
Mesomelaena stygia subsp. *deflexa*	P3	15	336517.46	6729782.13
Mesomelaena stygia subsp. *deflexa*	P3	25	336518.81	6729745.56
Mesomelaena stygia subsp. *deflexa*	P3	50	336519.15	6729336.23
Mesomelaena stygia subsp. *deflexa*	P3	10	336515.77	6728346.27
Mesomelaena stygia subsp. *deflexa*	P3	40	336522.01	6728191.71
Mesomelaena stygia subsp. *deflexa*	P3	50	336513.82	6728175.41

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	20	336524.48	6728145.79
Mesomelaena stygia subsp. *deflexa*	P3	40	336520.97	6728125.81
Mesomelaena stygia subsp. *deflexa*	P3	30	336523.03	6728111.40
Mesomelaena stygia subsp. *deflexa*	P3	40	336522.08	6728105.75
Mesomelaena stygia subsp. *deflexa*	P3	30	336516.14	6728092.62
Mesomelaena stygia subsp. *deflexa*	P3	50	336519.00	6728078.34
Mesomelaena stygia subsp. *deflexa*	P3	60	336515.46	6728067.06
Mesomelaena stygia subsp. *deflexa*	P3	80	336514.82	6728054.53
Mesomelaena stygia subsp. *deflexa*	P3	80	336509.80	6728041.84
Mesomelaena stygia subsp. *deflexa*	P3	50	336519.34	6728031.83
Mesomelaena stygia subsp. *deflexa*	P3	20	336524.32	6728014.36
Mesomelaena stygia subsp. *deflexa*	P3	40	336517.10	6727998.71
Mesomelaena stygia subsp. *deflexa*	P3	30	336509.76	6727965.55
Mesomelaena stygia subsp. *deflexa*	P3	20	336516.99	6727906.77
Mesomelaena stygia subsp. *deflexa*	P3	70	336513.02	6727466.46
Mesomelaena stygia subsp. *deflexa*	P3	30	336514.46	6727409.37
Mesomelaena stygia subsp. *deflexa*	P3	60	336515.37	6727385.70
Mesomelaena stygia subsp. *deflexa*	P3	40	336515.27	6727363.96
Mesomelaena stygia subsp. *deflexa*	P3	14	336146.09	6730687.89
Mesomelaena stygia subsp. *deflexa*	P3	2	335790.02	6730450.49
Mesomelaena stygia subsp. *deflexa*	P3	8	336869.22	6728152.15
Mesomelaena stygia subsp. *deflexa*	P3	13	336876.49	6728164.39
Mesomelaena stygia subsp. *deflexa*	P3	15	336876.09	6728172.75
Mesomelaena stygia subsp. *deflexa*	P3	17	336867.28	6728198.98
Mesomelaena stygia subsp. *deflexa*	P3	18	336864.61	6728208.45
Mesomelaena stygia subsp. *deflexa*	P3	9	336870.79	6728221.61
Mesomelaena stygia subsp. *deflexa*	P3	10	336868.67	6728234.77
Mesomelaena stygia subsp. *deflexa*	P3	4	336872.33	6728244.24
Mesomelaena stygia subsp. *deflexa*	P3	23	336873.00	6728496.58
Mesomelaena stygia subsp. *deflexa*	P3	16	336869.50	6728549.40
Mesomelaena stygia subsp. *deflexa*	P3	8	336875.49	6728553.72
Mesomelaena stygia subsp. *deflexa*	P3	6	336868.47	6729183.35
Mesomelaena stygia subsp. *deflexa*	P3	3	336863.50	6729202.63
Mesomelaena stygia subsp. *deflexa*	P3	60	339033.70	6730658.54
Mesomelaena stygia subsp. *deflexa*	P3	100	339034.06	6730641.44
Mesomelaena stygia subsp. *deflexa*	P3	100	339032.30	6730623.90
Mesomelaena stygia subsp. *deflexa*	P3	100	339395.30	6730641.47
Mesomelaena stygia subsp. *deflexa*	P3	100	339392.65	6730657.30
Mesomelaena stygia subsp. *deflexa*	P3	80	339392.57	6730674.24
Mesomelaena stygia subsp. *deflexa*	P3	50	339390.67	6730698.79
Mesomelaena stygia subsp. *deflexa*	P3	6	338311.08	6731346.73
Mesomelaena stygia subsp. *deflexa*	P3	17	338304.67	6731350.19
Mesomelaena stygia subsp. *deflexa*	P3	35	338303.18	6731341.31
Mesomelaena stygia subsp. *deflexa*	P3	50	338309.91	6731334.86
Mesomelaena stygia subsp. *deflexa*	P3	80	338318.32	6731328.54
Mesomelaena stygia subsp. *deflexa*	P3	60	338311.63	6731319.83
Mesomelaena stygia subsp. *deflexa*	P3	35	338301.98	6731322.40
Mesomelaena stygia subsp. *deflexa*	P3	105	338309.29	6731310.31
Mesomelaena stygia subsp. *deflexa*	P3	70	338317.31	6731302.63
Mesomelaena stygia subsp. *deflexa*	P3	70	338313.01	6731292.68
Mesomelaena stygia subsp. *deflexa*	P3	50	338304.62	6731293.89
Mesomelaena stygia subsp. *deflexa*	P3	90	338310.56	6731282.23
Mesomelaena stygia subsp. *deflexa*	P3	80	338318.82	6731274.32

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	75	338319.97	6731261.72
Mesomelaena stygia subsp. *deflexa*	P3	110	338309.56	6731260.36
Mesomelaena stygia subsp. *deflexa*	P3	50	338307.15	6731251.61
Mesomelaena stygia subsp. *deflexa*	P3	80	338315.66	6731250.16
Mesomelaena stygia subsp. *deflexa*	P3	60	338314.78	6731239.77
Mesomelaena stygia subsp. *deflexa*	P3	56	338305.41	6731243.73
Mesomelaena stygia subsp. *deflexa*	P3	60	338308.93	6731231.53
Mesomelaena stygia subsp. *deflexa*	P3	3	338315.09	6731221.88
Mesomelaena stygia subsp. *deflexa*	P3	8	338314.12	6731212.91
Mesomelaena stygia subsp. *deflexa*	P3	8	338313.10	6731203.36
Mesomelaena stygia subsp. *deflexa*	P3	23	338305.11	6731203.31
Mesomelaena stygia subsp. *deflexa*	P3	26	338307.32	6731192.20
Mesomelaena stygia subsp. *deflexa*	P3	14	338315.98	6731189.19
Mesomelaena stygia subsp. *deflexa*	P3	17	338314.49	6731178.11
Mesomelaena stygia subsp. *deflexa*	P3	10	338307.61	6731181.04
Mesomelaena stygia subsp. *deflexa*	P3	12	338314.07	6731162.43
Mesomelaena stygia subsp. *deflexa*	P3	12	338309.66	6731151.39
Mesomelaena stygia subsp. *deflexa*	P3	14	338311.24	6731141.87
Mesomelaena stygia subsp. *deflexa*	P3	8	338321.09	6731137.95
Mesomelaena stygia subsp. *deflexa*	P3	5	338313.19	6731132.99
Mesomelaena stygia subsp. *deflexa*	P3	7	338317.60	6731117.42
Mesomelaena stygia subsp. *deflexa*	P3	2	338308.38	6731118.62
Mesomelaena stygia subsp. *deflexa*	P3	90	338671.62	6730956.92
Mesomelaena stygia subsp. *deflexa*	P3	120	338684.89	6730961.54
Mesomelaena stygia subsp. *deflexa*	P3	100	338678.72	6730973.89
Mesomelaena stygia subsp. *deflexa*	P3	60	338668.21	6730984.31
Mesomelaena stygia subsp. *deflexa*	P3	60	338673.98	6731001.18
Mesomelaena stygia subsp. *deflexa*	P3	80	338683.06	6730996.57
Mesomelaena stygia subsp. *deflexa*	P3	60	338678.24	6731011.50
Mesomelaena stygia subsp. *deflexa*	P3	90	338665.31	6731011.99
Mesomelaena stygia subsp. *deflexa*	P3	80	338668.51	6731026.53
Mesomelaena stygia subsp. *deflexa*	P3	70	338681.44	6731030.31
Mesomelaena stygia subsp. *deflexa*	P3	90	338677.20	6731042.87
Mesomelaena stygia subsp. *deflexa*	P3	130	338667.57	6731045.80
Mesomelaena stygia subsp. *deflexa*	P3	100	338668.63	6731057.05
Mesomelaena stygia subsp. *deflexa*	P3	110	338680.82	6731057.41
Mesomelaena stygia subsp. *deflexa*	P3	80	338679.34	6731068.06
Mesomelaena stygia subsp. *deflexa*	P3	120	338670.37	6731069.32
Mesomelaena stygia subsp. *deflexa*	P3	110	338670.10	6731081.13
Mesomelaena stygia subsp. *deflexa*	P3	70	338679.34	6731082.21
Mesomelaena stygia subsp. *deflexa*	P3	70	338674.04	6731091.89
Mesomelaena stygia subsp. *deflexa*	P3	60	338668.39	6731094.22
Mesomelaena stygia subsp. *deflexa*	P3	33	338678.54	6731098.47
Mesomelaena stygia subsp. *deflexa*	P3	15	338682.12	6731103.46
Mesomelaena stygia subsp. *deflexa*	P3	35	338668.36	6731110.43
Mesomelaena stygia subsp. *deflexa*	P3	45	338664.35	6731121.40
Mesomelaena stygia subsp. *deflexa*	P3	40	338674.24	6731123.15
Mesomelaena stygia subsp. *deflexa*	P3	3	338679.42	6731125.59
Mesomelaena stygia subsp. *deflexa*	P3	7	338684.78	6731147.79
Mesomelaena stygia subsp. *deflexa*	P3	45	338681.43	6731156.52
Mesomelaena stygia subsp. *deflexa*	P3	30	338672.92	6731160.47
Mesomelaena stygia subsp. *deflexa*	P3	20	338666.01	6731165.43
Mesomelaena stygia subsp. *deflexa*	P3	28	338671.35	6731173.41

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	80	339750.27	6730610.98
Mesomelaena stygia subsp. *deflexa*	P3	60	339751.60	6730590.06
Mesomelaena stygia subsp. *deflexa*	P3	30	339749.19	6730576.22
Mesomelaena stygia subsp. *deflexa*	P3	50	339751.08	6730564.11
Mesomelaena stygia subsp. *deflexa*	P3	20	339754.44	6729419.87
Mesomelaena stygia subsp. *deflexa*	P3	50	339749.59	6729410.40
Mesomelaena stygia subsp. *deflexa*	P3	40	339754.77	6729397.81
Mesomelaena stygia subsp. *deflexa*	P3	60	339755.82	6729387.47
Mesomelaena stygia subsp. *deflexa*	P3	80	339747.95	6729382.64
Mesomelaena stygia subsp. *deflexa*	P3	50	339749.96	6729368.21
Mesomelaena stygia subsp. *deflexa*	P3	40	339754.32	6729311.38
Mesomelaena stygia subsp. *deflexa*	P3	30	339749.88	6729302.51
Mesomelaena stygia subsp. *deflexa*	P3	40	339751.04	6729276.40
Mesomelaena stygia subsp. *deflexa*	P3	30	339752.90	6729265.55
Mesomelaena stygia subsp. *deflexa*	P3	30	339750.11	6728914.53
Mesomelaena stygia subsp. *deflexa*	P3	20	339748.35	6728904.29
Mesomelaena stygia subsp. *deflexa*	P3	20	339750.09	6728894.95
Mesomelaena stygia subsp. *deflexa*	P3	70	330484.30	6725564.28
Mesomelaena stygia subsp. *deflexa*	P3	60	330473.01	6725576.68
Mesomelaena stygia subsp. *deflexa*	P3	80	330468.65	6725565.38
Mesomelaena stygia subsp. *deflexa*	P3	90	330451.99	6725568.71
Mesomelaena stygia subsp. *deflexa*	P3	60	330450.74	6725581.47
Mesomelaena stygia subsp. *deflexa*	P3	70	330434.78	6725575.11
Mesomelaena stygia subsp. *deflexa*	P3	75	330426.94	6725564.03
Mesomelaena stygia subsp. *deflexa*	P3	60	330413.42	6725568.40
Mesomelaena stygia subsp. *deflexa*	P3	35	330406.38	6725577.77
Mesomelaena stygia subsp. *deflexa*	P3	40	330396.11	6725570.23
Mesomelaena stygia subsp. *deflexa*	P3	50	330387.45	6725563.22
Mesomelaena stygia subsp. *deflexa*	P3	36	330376.51	6725571.06
Mesomelaena stygia subsp. *deflexa*	P3	50	330366.78	6725577.09
Mesomelaena stygia subsp. *deflexa*	P3	25	330362.99	6725561.45
Mesomelaena stygia subsp. *deflexa*	P3	60	330351.23	6725569.71
Mesomelaena stygia subsp. *deflexa*	P3	30	330337.89	6725574.28
Mesomelaena stygia subsp. *deflexa*	P3	45	330331.29	6725562.47
Mesomelaena stygia subsp. *deflexa*	P3	20	330318.75	6725570.42
Mesomelaena stygia subsp. *deflexa*	P3	45	330308.67	6725579.45
Mesomelaena stygia subsp. *deflexa*	P3	60	330293.51	6725568.39
Mesomelaena stygia subsp. *deflexa*	P3	30	330282.22	6725574.91
Mesomelaena stygia subsp. *deflexa*	P3	15	330276.67	6725561.88
Mesomelaena stygia subsp. *deflexa*	P3	12	330265.26	6725567.72
Mesomelaena stygia subsp. *deflexa*	P3	14	330255.10	6725577.56
Mesomelaena stygia subsp. *deflexa*	P3	16	330243.36	6725565.51
Mesomelaena stygia subsp. *deflexa*	P3	22	330237.75	6725577.68
Mesomelaena stygia subsp. *deflexa*	P3	25	330228.63	6725565.38
Mesomelaena stygia subsp. *deflexa*	P3	7	330204.09	6725573.00
Mesomelaena stygia subsp. *deflexa*	P3	6	330190.38	6725568.47
Mesomelaena stygia subsp. *deflexa*	P3	35	330175.87	6725571.61
Mesomelaena stygia subsp. *deflexa*	P3	30	330166.90	6725561.78
Mesomelaena stygia subsp. *deflexa*	P3	25	330149.49	6725569.08
Mesomelaena stygia subsp. *deflexa*	P3	250	329754.28	6725880.88
Mesomelaena stygia subsp. *deflexa*	P3	23	329757.04	6725932.68
Mesomelaena stygia subsp. *deflexa*	P3	40	329767.81	6725919.74
Mesomelaena stygia subsp. *deflexa*	P3	30	329776.65	6725927.30

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	12	329788.16	6725936.42
Mesomelaena stygia subsp. *deflexa*	P3	18	329800.70	6725929.75
Mesomelaena stygia subsp. *deflexa*	P3	40	329806.73	6725941.64
Mesomelaena stygia subsp. *deflexa*	P3	24	329821.80	6725933.78
Mesomelaena stygia subsp. *deflexa*	P3	18	329825.00	6725922.29
Mesomelaena stygia subsp. *deflexa*	P3	35	329841.61	6725923.45
Mesomelaena stygia subsp. *deflexa*	P3	17	329851.01	6725934.49
Mesomelaena stygia subsp. *deflexa*	P3	20	329860.08	6725927.72
Mesomelaena stygia subsp. *deflexa*	P3	32	329873.65	6725924.42
Mesomelaena stygia subsp. *deflexa*	P3	20	329872.93	6725939.67
Mesomelaena stygia subsp. *deflexa*	P3	26	329892.92	6725931.07
Mesomelaena stygia subsp. *deflexa*	P3	25	329900.47	6725921.29
Mesomelaena stygia subsp. *deflexa*	P3	18	329908.04	6725936.68
Mesomelaena stygia subsp. *deflexa*	P3	40	329916.94	6725922.44
Mesomelaena stygia subsp. *deflexa*	P3	12	329928.73	6725931.01
Mesomelaena stygia subsp. *deflexa*	P3	23	329936.98	6725937.99
Mesomelaena stygia subsp. *deflexa*	P3	20	329942.28	6725926.20
Mesomelaena stygia subsp. *deflexa*	P3	40	329956.23	6725925.92
Mesomelaena stygia subsp. *deflexa*	P3	32	329959.48	6725936.67
Mesomelaena stygia subsp. *deflexa*	P3	65	329970.48	6725934.61
Mesomelaena stygia subsp. *deflexa*	P3	25	329972.40	6725922.71
Mesomelaena stygia subsp. *deflexa*	P3	60	329982.34	6725925.57
Mesomelaena stygia subsp. *deflexa*	P3	50	329990.66	6725935.99
Mesomelaena stygia subsp. *deflexa*	P3	12	329994.82	6725924.98
Mesomelaena stygia subsp. *deflexa*	P3	5	330010.43	6725925.61
Mesomelaena stygia subsp. *deflexa*	P3	16	330004.31	6725935.05
Mesomelaena stygia subsp. *deflexa*	P3	20	330017.09	6725935.43
Mesomelaena stygia subsp. *deflexa*	P3	9	330034.40	6725926.33
Mesomelaena stygia subsp. *deflexa*	P3	17	330213.59	6725931.13
Mesomelaena stygia subsp. *deflexa*	P3	11	330223.92	6725923.29
Mesomelaena stygia subsp. *deflexa*	P3	2	330887.27	6724853.81
Mesomelaena stygia subsp. *deflexa*	P3	40	330879.00	6724860.10
Mesomelaena stygia subsp. *deflexa*	P3	40	330872.62	6724842.41
Mesomelaena stygia subsp. *deflexa*	P3	45	330858.28	6724843.68
Mesomelaena stygia subsp. *deflexa*	P3	60	330860.20	6724854.99
Mesomelaena stygia subsp. *deflexa*	P3	48	330846.82	6724851.72
Mesomelaena stygia subsp. *deflexa*	P3	35	330839.97	6724841.14
Mesomelaena stygia subsp. *deflexa*	P3	45	330833.51	6724854.95
Mesomelaena stygia subsp. *deflexa*	P3	40	330823.39	6724843.90
Mesomelaena stygia subsp. *deflexa*	P3	28	330812.62	6724850.92
Mesomelaena stygia subsp. *deflexa*	P3	20	330801.53	6724860.17
Mesomelaena stygia subsp. *deflexa*	P3	40	330796.41	6724845.62
Mesomelaena stygia subsp. *deflexa*	P3	35	330784.99	6724847.91
Mesomelaena stygia subsp. *deflexa*	P3	25	330785.87	6724858.72
Mesomelaena stygia subsp. *deflexa*	P3	30	330772.32	6724854.44
Mesomelaena stygia subsp. *deflexa*	P3	50	330762.28	6724851.51
Mesomelaena stygia subsp. *deflexa*	P3	40	330762.06	6724860.69
Mesomelaena stygia subsp. *deflexa*	P3	25	330747.09	6724845.93
Mesomelaena stygia subsp. *deflexa*	P3	45	330734.52	6724843.24
Mesomelaena stygia subsp. *deflexa*	P3	40	330729.50	6724850.46
Mesomelaena stygia subsp. *deflexa*	P3	45	330718.08	6724856.94
Mesomelaena stygia subsp. *deflexa*	P3	50	330714.11	6724844.67
Mesomelaena stygia subsp. *deflexa*	P3	40	330704.68	6724847.35

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	40	330696.69	6724841.66
Mesomelaena stygia subsp. *deflexa*	P3	45	330692.11	6724854.62
Mesomelaena stygia subsp. *deflexa*	P3	30	330684.72	6724850.38
Mesomelaena stygia subsp. *deflexa*	P3	40	330684.43	6724839.82
Mesomelaena stygia subsp. *deflexa*	P3	26	330674.37	6724846.33
Mesomelaena stygia subsp. *deflexa*	P3	20	330667.46	6724855.10
Mesomelaena stygia subsp. *deflexa*	P3	22	330659.63	6724846.53
Mesomelaena stygia subsp. *deflexa*	P3	25	330649.76	6724839.33
Mesomelaena stygia subsp. *deflexa*	P3	23	330643.60	6724854.01
Mesomelaena stygia subsp. *deflexa*	P3	3	333242.66	6731687.65
Mesomelaena stygia subsp. *deflexa*	P3	3	333280.23	6731688.43
Mesomelaena stygia subsp. *deflexa*	P3	2	333329.12	6731687.26
Mesomelaena stygia subsp. *deflexa*	P3	6	333335.01	6731684.72
Mesomelaena stygia subsp. *deflexa*	P3	30	333329.33	6731331.36
Mesomelaena stygia subsp. *deflexa*	P3	40	333322.96	6731337.47
Mesomelaena stygia subsp. *deflexa*	P3	80	333314.18	6731329.80
Mesomelaena stygia subsp. *deflexa*	P3	80	333309.40	6731322.55
Mesomelaena stygia subsp. *deflexa*	P3	90	333301.00	6731339.17
Mesomelaena stygia subsp. *deflexa*	P3	50	333298.58	6731328.62
Mesomelaena stygia subsp. *deflexa*	P3	80	333290.53	6731323.00
Mesomelaena stygia subsp. *deflexa*	P3	65	333281.47	6731331.74
Mesomelaena stygia subsp. *deflexa*	P3	90	333270.15	6731338.58
Mesomelaena stygia subsp. *deflexa*	P3	55	333263.10	6731326.84
Mesomelaena stygia subsp. *deflexa*	P3	120	333252.90	6731320.39
Mesomelaena stygia subsp. *deflexa*	P3	130	333246.10	6731329.62
Mesomelaena stygia subsp. *deflexa*	P3	90	333237.98	6731339.27
Mesomelaena stygia subsp. *deflexa*	P3	85	333232.65	6731330.12
Mesomelaena stygia subsp. *deflexa*	P3	95	333226.66	6731322.71
Mesomelaena stygia subsp. *deflexa*	P3	110	333216.12	6731327.43
Mesomelaena stygia subsp. *deflexa*	P3	30	333209.70	6731337.24
Mesomelaena stygia subsp. *deflexa*	P3	25	333203.78	6731327.68
Mesomelaena stygia subsp. *deflexa*	P3	12	333191.20	6731324.32
Mesomelaena stygia subsp. *deflexa*	P3	7	333184.33	6731334.79
Mesomelaena stygia subsp. *deflexa*	P3	4	333162.67	6731328.90
Mesomelaena stygia subsp. *deflexa*	P3	55	330689.44	6725194.71
Mesomelaena stygia subsp. *deflexa*	P3	1	330489.66	6724851.72
Mesomelaena stygia subsp. *deflexa*	P3	6	330491.30	6724850.58
Mesomelaena stygia subsp. *deflexa*	P3	2	330491.21	6724851.66
Mesomelaena stygia subsp. *deflexa*	P3	3	330494.30	6724839.58
Mesomelaena stygia subsp. *deflexa*	P3	8	330496.98	6724837.53
Mesomelaena stygia subsp. *deflexa*	P3	14	330500.35	6724835.92
Mesomelaena stygia subsp. *deflexa*	P3	28	330505.71	6724840.41
Mesomelaena stygia subsp. *deflexa*	P3	8	330497.79	6724856.68
Mesomelaena stygia subsp. *deflexa*	P3	4	330498.18	6724859.90
Mesomelaena stygia subsp. *deflexa*	P3	35	330513.57	6724844.63
Mesomelaena stygia subsp. *deflexa*	P3	8	330524.77	6724854.14
Mesomelaena stygia subsp. *deflexa*	P3	4	330527.25	6724853.20
Mesomelaena stygia subsp. *deflexa*	P3	4	330530.87	6724851.85
Mesomelaena stygia subsp. *deflexa*	P3	4	330534.56	6724858.35
Mesomelaena stygia subsp. *deflexa*	P3	1	330534.58	6724855.32
Mesomelaena stygia subsp. *deflexa*	P3	8	330536.78	6724853.29
Mesomelaena stygia subsp. *deflexa*	P3	8	330537.04	6724849.10
Mesomelaena stygia subsp. *deflexa*	P3	6	330535.79	6724844.64

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	2	330538.96	6724841.05
Mesomelaena stygia subsp. *deflexa*	P3	2	330543.47	6724845.38
Mesomelaena stygia subsp. *deflexa*	P3	3	330546.45	6724851.92
Mesomelaena stygia subsp. *deflexa*	P3	4	330545.96	6724859.21
Mesomelaena stygia subsp. *deflexa*	P3	9	330568.18	6724845.38
Mesomelaena stygia subsp. *deflexa*	P3	4	330572.38	6724849.29
Mesomelaena stygia subsp. *deflexa*	P3	4	330571.43	6724853.10
Mesomelaena stygia subsp. *deflexa*	P3	7	330578.23	6724854.29
Mesomelaena stygia subsp. *deflexa*	P3	8	330574.81	6724856.47
Mesomelaena stygia subsp. *deflexa*	P3	3	330584.03	6724847.33
Mesomelaena stygia subsp. *deflexa*	P3	5	330583.60	6724841.77
Mesomelaena stygia subsp. *deflexa*	P3	5	330590.28	6724845.12
Mesomelaena stygia subsp. *deflexa*	P3	6	330594.12	6724847.85
Mesomelaena stygia subsp. *deflexa*	P3	6	330593.07	6724852.29
Mesomelaena stygia subsp. *deflexa*	P3	3	330594.30	6724857.97
Mesomelaena stygia subsp. *deflexa*	P3	19	330601.93	6724848.97
Mesomelaena stygia subsp. *deflexa*	P3	12	330604.45	6724845.80
Mesomelaena stygia subsp. *deflexa*	P3	15	330602.98	6724840.00
Mesomelaena stygia subsp. *deflexa*	P3	13	330612.29	6724844.66
Mesomelaena stygia subsp. *deflexa*	P3	7	330613.90	6724853.06
Mesomelaena stygia subsp. *deflexa*	P3	15	330614.18	6724854.97
Mesomelaena stygia subsp. *deflexa*	P3	6	330621.61	6724855.51
Mesomelaena stygia subsp. *deflexa*	P3	6	330625.46	6724852.78
Mesomelaena stygia subsp. *deflexa*	P3	9	330630.19	6724854.18
Mesomelaena stygia subsp. *deflexa*	P3	4	330630.78	6724848.74
Mesomelaena stygia subsp. *deflexa*	P3	14	330633.14	6724844.99
Mesomelaena stygia subsp. *deflexa*	P3	7	330637.94	6724841.06
Mesomelaena stygia subsp. *deflexa*	P3	5	330638.08	6724846.76
Mesomelaena stygia subsp. *deflexa*	P3	20	335412.35	6728814.40
Mesomelaena stygia subsp. *deflexa*	P3	40	335437.01	6728806.22
Mesomelaena stygia subsp. *deflexa*	P3	50	335970.71	6728090.64
Mesomelaena stygia subsp. *deflexa*	P3	45	335958.84	6728087.40
Mesomelaena stygia subsp. *deflexa*	P3	50	335943.53	6728089.75
Mesomelaena stygia subsp. *deflexa*	P3	25	335917.90	6728084.25
Mesomelaena stygia subsp. *deflexa*	P3	30	335809.98	6726289.82
Mesomelaena stygia subsp. *deflexa*	P3	20	335790.90	6726287.57
Mesomelaena stygia subsp. *deflexa*	P3	10	335777.36	6726289.70
Mesomelaena stygia subsp. *deflexa*	P3	10	335703.81	6726287.20
Mesomelaena stygia subsp. *deflexa*	P3	20	335686.15	6726297.12
Mesomelaena stygia subsp. *deflexa*	P3	15	335630.84	6726287.12
Mesomelaena stygia subsp. *deflexa*	P3	30	335614.97	6726282.78
Mesomelaena stygia subsp. *deflexa*	P3	20	335601.62	6726290.82
Mesomelaena stygia subsp. *deflexa*	P3	20	335587.82	6726291.69
Mesomelaena stygia subsp. *deflexa*	P3	15	335574.47	6726293.60
Mesomelaena stygia subsp. *deflexa*	P3	40	335556.70	6726293.74
Mesomelaena stygia subsp. *deflexa*	P3	30	335541.06	6726294.29
Mesomelaena stygia subsp. *deflexa*	P3	40	335529.50	6726287.46
Mesomelaena stygia subsp. *deflexa*	P3	30	335515.62	6726287.67
Mesomelaena stygia subsp. *deflexa*	P3	30	335495.72	6726291.85
Mesomelaena stygia subsp. *deflexa*	P3	50	335479.40	6726297.14
Mesomelaena stygia subsp. *deflexa*	P3	20	335455.46	6726294.17
Mesomelaena stygia subsp. *deflexa*	P3	20	335268.79	6726648.45
Mesomelaena stygia subsp. *deflexa*	P3	30	335279.23	6726650.79

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	60	335291.37	6726656.88
Mesomelaena stygia subsp. *deflexa*	P3	50	335307.24	6726649.56
Mesomelaena stygia subsp. *deflexa*	P3	75	335323.04	6726649.06
Mesomelaena stygia subsp. *deflexa*	P3	50	335343.91	6726647.96
Mesomelaena stygia subsp. *deflexa*	P3	50	335354.34	6726653.59
Mesomelaena stygia subsp. *deflexa*	P3	75	335365.52	6726644.80
Mesomelaena stygia subsp. *deflexa*	P3	80	335377.40	6726650.08
Mesomelaena stygia subsp. *deflexa*	P3	100	335394.82	6726651.72
Mesomelaena stygia subsp. *deflexa*	P3	100	335409.26	6726650.81
Mesomelaena stygia subsp. *deflexa*	P3	50	335427.88	6726650.36
Mesomelaena stygia subsp. *deflexa*	P3	40	335454.28	6726653.84
Mesomelaena stygia subsp. *deflexa*	P3	30	335464.56	6726654.02
Mesomelaena stygia subsp. *deflexa*	P3	25	335478.56	6726648.64
Mesomelaena stygia subsp. *deflexa*	P3	20	335493.09	6726653.76
Mesomelaena stygia subsp. *deflexa*	P3	30	335510.46	6726648.21
Mesomelaena stygia subsp. *deflexa*	P3	30	335529.55	6726644.64
Mesomelaena stygia subsp. *deflexa*	P3	20	335549.40	6726649.98
Mesomelaena stygia subsp. *deflexa*	P3	30	335018.18	6730254.55
Mesomelaena stygia subsp. *deflexa*	P3	75	335032.00	6730249.29
Mesomelaena stygia subsp. *deflexa*	P3	75	335051.14	6730257.76
Mesomelaena stygia subsp. *deflexa*	P3	60	335085.27	6730254.25
Mesomelaena stygia subsp. *deflexa*	P3	20	335561.95	6730256.69
Mesomelaena stygia subsp. *deflexa*	P3	15	335572.29	6730250.55
Mesomelaena stygia subsp. *deflexa*	P3	40	335586.55	6730247.17
Mesomelaena stygia subsp. *deflexa*	P3	30	335602.53	6730253.60
Mesomelaena stygia subsp. *deflexa*	P3	30	335615.19	6730247.08
Mesomelaena stygia subsp. *deflexa*	P3	60	335629.40	6730248.94
Mesomelaena stygia subsp. *deflexa*	P3	75	335643.99	6730242.68
Mesomelaena stygia subsp. *deflexa*	P3	60	335655.80	6730254.59
Mesomelaena stygia subsp. *deflexa*	P3	1	335071.75	6729535.26
Mesomelaena stygia subsp. *deflexa*	P3	20	335612.26	6727373.74
Mesomelaena stygia subsp. *deflexa*	P3	40	335623.65	6727364.66
Mesomelaena stygia subsp. *deflexa*	P3	25	335629.98	6727374.00
Mesomelaena stygia subsp. *deflexa*	P3	30	335643.21	6727364.32
Mesomelaena stygia subsp. *deflexa*	P3	12	335655.37	6727363.39
Mesomelaena stygia subsp. *deflexa*	P3	35	335655.64	6727374.33
Mesomelaena stygia subsp. *deflexa*	P3	22	335663.85	6727368.50
Mesomelaena stygia subsp. *deflexa*	P3	45	335677.07	6727367.89
Mesomelaena stygia subsp. *deflexa*	P3	30	335683.55	6727376.71
Mesomelaena stygia subsp. *deflexa*	P3	20	335696.05	6727373.42
Mesomelaena stygia subsp. *deflexa*	P3	18	335699.68	6727360.45
Mesomelaena stygia subsp. *deflexa*	P3	15	335708.23	6727376.77
Mesomelaena stygia subsp. *deflexa*	P3	3	335718.13	6727370.77
Mesomelaena stygia subsp. *deflexa*	P3	3	335734.49	6727369.53
Mesomelaena stygia subsp. *deflexa*	P3	2	335748.97	6727373.09
Mesomelaena stygia subsp. *deflexa*	P3	17	335762.24	6727370.91
Mesomelaena stygia subsp. *deflexa*	P3	15	335777.25	6727374.03
Mesomelaena stygia subsp. *deflexa*	P3	20	335786.88	6727372.00
Mesomelaena stygia subsp. *deflexa*	P3	2	335803.22	6727360.24
Mesomelaena stygia subsp. *deflexa*	P3	9	335804.83	6727375.82
Mesomelaena stygia subsp. *deflexa*	P3	4	335827.07	6727371.98
Mesomelaena stygia subsp. *deflexa*	P3	11	335831.04	6727364.66
Mesomelaena stygia subsp. *deflexa*	P3	8	335840.41	6727370.02

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	8	335849.55	6727379.44
Mesomelaena stygia subsp. *deflexa*	P3	15	335856.94	6727365.11
Mesomelaena stygia subsp. *deflexa*	P3	8	335866.98	6727376.46
Mesomelaena stygia subsp. *deflexa*	P3	5	335868.87	6727372.82
Mesomelaena stygia subsp. *deflexa*	P3	8	335877.22	6727364.32
Mesomelaena stygia subsp. *deflexa*	P3	26	335885.02	6727364.73
Mesomelaena stygia subsp. *deflexa*	P3	30	335885.34	6727373.28
Mesomelaena stygia subsp. *deflexa*	P3	16	335896.77	6727379.13
Mesomelaena stygia subsp. *deflexa*	P3	30	335898.35	6727371.08
Mesomelaena stygia subsp. *deflexa*	P3	18	335912.35	6727366.41
Mesomelaena stygia subsp. *deflexa*	P3	19	335924.37	6727375.89
Mesomelaena stygia subsp. *deflexa*	P3	45	335933.56	6727370.66
Mesomelaena stygia subsp. *deflexa*	P3	50	335934.30	6727363.24
Mesomelaena stygia subsp. *deflexa*	P3	25	335946.02	6727366.57
Mesomelaena stygia subsp. *deflexa*	P3	15	335949.73	6727377.34
Mesomelaena stygia subsp. *deflexa*	P3	40	335961.01	6727370.89
Mesomelaena stygia subsp. *deflexa*	P3	55	335969.18	6727364.96
Mesomelaena stygia subsp. *deflexa*	P3	55	335979.14	6727373.04
Mesomelaena stygia subsp. *deflexa*	P3	25	335988.74	6727378.58
Mesomelaena stygia subsp. *deflexa*	P3	28	335989.66	6727368.72
Mesomelaena stygia subsp. *deflexa*	P3	40	336003.99	6727365.66
Mesomelaena stygia subsp. *deflexa*	P3	35	336006.93	6727373.49
Mesomelaena stygia subsp. *deflexa*	P3	30	336015.15	6727379.20
Mesomelaena stygia subsp. *deflexa*	P3	40	336026.56	6727370.08
Mesomelaena stygia subsp. *deflexa*	P3	40	336037.57	6727362.94
Mesomelaena stygia subsp. *deflexa*	P3	25	336042.92	6727378.84
Mesomelaena stygia subsp. *deflexa*	P3	30	336056.90	6727367.10
Mesomelaena stygia subsp. *deflexa*	P3	45	336068.74	6727369.27
Mesomelaena stygia subsp. *deflexa*	P3	30	336069.25	6727380.93
Mesomelaena stygia subsp. *deflexa*	P3	38	336082.41	6727362.10
Mesomelaena stygia subsp. *deflexa*	P3	40	336095.07	6727367.51
Mesomelaena stygia subsp. *deflexa*	P3	40	336096.49	6727377.98
Mesomelaena stygia subsp. *deflexa*	P3	21	336107.33	6727374.20
Mesomelaena stygia subsp. *deflexa*	P3	5	336121.23	6727373.37
Mesomelaena stygia subsp. *deflexa*	P3	6	336132.83	6727360.31
Mesomelaena stygia subsp. *deflexa*	P3	7	336265.98	6727007.74
Mesomelaena stygia subsp. *deflexa*	P3	40	336260.19	6727014.81
Mesomelaena stygia subsp. *deflexa*	P3	6	336252.00	6727005.98
Mesomelaena stygia subsp. *deflexa*	P3	40	336236.24	6727016.64
Mesomelaena stygia subsp. *deflexa*	P3	10	336222.07	6727001.96
Mesomelaena stygia subsp. *deflexa*	P3	20	336218.75	6727018.55
Mesomelaena stygia subsp. *deflexa*	P3	50	336210.82	6727012.01
Mesomelaena stygia subsp. *deflexa*	P3	29	336200.62	6727000.05
Mesomelaena stygia subsp. *deflexa*	P3	8	336197.12	6727018.23
Mesomelaena stygia subsp. *deflexa*	P3	25	336188.26	6727013.32
Mesomelaena stygia subsp. *deflexa*	P3	1	336177.54	6727010.12
Mesomelaena stygia subsp. *deflexa*	P3	6	336131.99	6727010.84
Mesomelaena stygia subsp. *deflexa*	P3	2	336107.88	6727012.47
Mesomelaena stygia subsp. *deflexa*	P3	1	336096.41	6727008.47
Mesomelaena stygia subsp. *deflexa*	P3	4	335781.24	6727020.42
Mesomelaena stygia subsp. *deflexa*	P3	1	335728.54	6727030.55
Mesomelaena stygia subsp. *deflexa*	P3	20	335708.66	6727033.22
Mesomelaena stygia subsp. *deflexa*	P3	8	335697.60	6727029.82

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	1	335689.77	6727029.20
Mesomelaena stygia subsp. *deflexa*	P3	15	334677.48	6731330.89
Mesomelaena stygia subsp. *deflexa*	P3	26	334688.09	6731338.29
Mesomelaena stygia subsp. *deflexa*	P3	30	334690.67	6731325.62
Mesomelaena stygia subsp. *deflexa*	P3	55	334718.58	6731330.10
Mesomelaena stygia subsp. *deflexa*	P3	60	334727.04	6731323.85
Mesomelaena stygia subsp. *deflexa*	P3	40	334732.35	6731332.43
Mesomelaena stygia subsp. *deflexa*	P3	90	334740.97	6731340.04
Mesomelaena stygia subsp. *deflexa*	P3	85	334745.39	6731325.10
Mesomelaena stygia subsp. *deflexa*	P3	40	334753.62	6731330.41
Mesomelaena stygia subsp. *deflexa*	P3	100	334762.19	6731338.76
Mesomelaena stygia subsp. *deflexa*	P3	50	334772.33	6731329.56
Mesomelaena stygia subsp. *deflexa*	P3	60	334783.08	6731324.08
Mesomelaena stygia subsp. *deflexa*	P3	70	334788.57	6731336.12
Mesomelaena stygia subsp. *deflexa*	P3	70	334800.99	6731335.96
Mesomelaena stygia subsp. *deflexa*	P3	80	334799.22	6731326.21
Mesomelaena stygia subsp. *deflexa*	P3	70	334810.36	6731325.33
Mesomelaena stygia subsp. *deflexa*	P3	65	334812.60	6731336.50
Mesomelaena stygia subsp. *deflexa*	P3	60	334824.18	6731332.17
Mesomelaena stygia subsp. *deflexa*	P3	70	334834.87	6731323.53
Mesomelaena stygia subsp. *deflexa*	P3	90	334837.58	6731337.59
Mesomelaena stygia subsp. *deflexa*	P3	80	334849.11	6731330.90
Mesomelaena stygia subsp. *deflexa*	P3	65	334860.34	6731322.82
Mesomelaena stygia subsp. *deflexa*	P3	80	334867.12	6731337.82
Mesomelaena stygia subsp. *deflexa*	P3	60	334874.35	6731331.85
Mesomelaena stygia subsp. *deflexa*	P3	60	334877.78	6731320.09
Mesomelaena stygia subsp. *deflexa*	P3	50	334887.59	6731330.73
Mesomelaena stygia subsp. *deflexa*	P3	50	334898.77	6731336.60
Mesomelaena stygia subsp. *deflexa*	P3	40	335240.88	6729537.47
Mesomelaena stygia subsp. *deflexa*	P3	20	335246.67	6729527.79
Mesomelaena stygia subsp. *deflexa*	P3	100	335263.83	6729531.04
Mesomelaena stygia subsp. *deflexa*	P3	300	335280.29	6729536.56
Mesomelaena stygia subsp. *deflexa*	P3	300	335287.12	6729525.92
Mesomelaena stygia subsp. *deflexa*	P3	300	335298.45	6729526.14
Mesomelaena stygia subsp. *deflexa*	P3	300	335308.36	6729538.09
Mesomelaena stygia subsp. *deflexa*	P3	300	335320.46	6729524.22
Mesomelaena stygia subsp. *deflexa*	P3	300	335328.06	6729537.05
Mesomelaena stygia subsp. *deflexa*	P3	200	335336.28	6729524.44
Mesomelaena stygia subsp. *deflexa*	P3	100	335344.57	6729537.36
Mesomelaena stygia subsp. *deflexa*	P3	300	335353.20	6729523.68
Mesomelaena stygia subsp. *deflexa*	P3	200	335365.00	6729536.54
Mesomelaena stygia subsp. *deflexa*	P3	100	335372.04	6729523.54
Mesomelaena stygia subsp. *deflexa*	P3	20	335991.80	6728090.32
Mesomelaena stygia subsp. *deflexa*	P3	17	335994.49	6728083.81
Mesomelaena stygia subsp. *deflexa*	P3	17	335995.80	6728095.72
Mesomelaena stygia subsp. *deflexa*	P3	21	335997.91	6728090.43
Mesomelaena stygia subsp. *deflexa*	P3	31	336002.72	6728085.36
Mesomelaena stygia subsp. *deflexa*	P3	19	336005.07	6728099.19
Mesomelaena stygia subsp. *deflexa*	P3	30	336009.49	6728093.39
Mesomelaena stygia subsp. *deflexa*	P3	8	336010.02	6728084.25
Mesomelaena stygia subsp. *deflexa*	P3	23	336017.20	6728090.86
Mesomelaena stygia subsp. *deflexa*	P3	34	336017.10	6728096.02
Mesomelaena stygia subsp. *deflexa*	P3	7	336019.11	6728083.05

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	9	336023.18	6728088.39
Mesomelaena stygia subsp. *deflexa*	P3	10	336020.98	6728096.40
Mesomelaena stygia subsp. *deflexa*	P3	9	336026.75	6728098.95
Mesomelaena stygia subsp. *deflexa*	P3	9	336028.32	6728086.17
Mesomelaena stygia subsp. *deflexa*	P3	12	336029.86	6728083.18
Mesomelaena stygia subsp. *deflexa*	P3	4	336033.84	6728082.34
Mesomelaena stygia subsp. *deflexa*	P3	10	336036.59	6728089.15
Mesomelaena stygia subsp. *deflexa*	P3	12	336035.58	6728091.97
Mesomelaena stygia subsp. *deflexa*	P3	4	336033.23	6728097.83
Mesomelaena stygia subsp. *deflexa*	P3	8	336037.55	6728100.65
Mesomelaena stygia subsp. *deflexa*	P3	9	336038.37	6728096.29
Mesomelaena stygia subsp. *deflexa*	P3	9	336041.21	6728090.54
Mesomelaena stygia subsp. *deflexa*	P3	8	336042.02	6728086.18
Mesomelaena stygia subsp. *deflexa*	P3	9	336048.79	6728085.63
Mesomelaena stygia subsp. *deflexa*	P3	4	336049.47	6728091.63
Mesomelaena stygia subsp. *deflexa*	P3	4	336048.28	6728097.10
Mesomelaena stygia subsp. *deflexa*	P3	2	336051.70	6728097.41
Mesomelaena stygia subsp. *deflexa*	P3	1	336056.00	6728097.44
Mesomelaena stygia subsp. *deflexa*	P3	3	336061.15	6728090.27
Mesomelaena stygia subsp. *deflexa*	P3	8	336061.20	6728086.98
Mesomelaena stygia subsp. *deflexa*	P3	6	336061.61	6728081.91
Mesomelaena stygia subsp. *deflexa*	P3	5	336064.53	6728088.22
Mesomelaena stygia subsp. *deflexa*	P3	15	336065.83	6728098.87
Mesomelaena stygia subsp. *deflexa*	P3	4	336070.12	6728100.07
Mesomelaena stygia subsp. *deflexa*	P3	14	336072.02	6728092.73
Mesomelaena stygia subsp. *deflexa*	P3	6	336073.54	6728081.29
Mesomelaena stygia subsp. *deflexa*	P3	12	336078.54	6728084.85
Mesomelaena stygia subsp. *deflexa*	P3	11	336077.52	6728088.27
Mesomelaena stygia subsp. *deflexa*	P3	28	336077.58	6728094.45
Mesomelaena stygia subsp. *deflexa*	P3	3	336079.03	6728100.29
Mesomelaena stygia subsp. *deflexa*	P3	2	336080.63	6728095.46
Mesomelaena stygia subsp. *deflexa*	P3	12	336080.98	6728090.89
Mesomelaena stygia subsp. *deflexa*	P3	12	336085.66	6728090.65
Mesomelaena stygia subsp. *deflexa*	P3	12	336083.31	6728084.11
Mesomelaena stygia subsp. *deflexa*	P3	37	336090.39	6728085.08
Mesomelaena stygia subsp. *deflexa*	P3	16	336090.88	6728086.30
Mesomelaena stygia subsp. *deflexa*	P3	7	336093.45	6728093.91
Mesomelaena stygia subsp. *deflexa*	P3	2	336091.49	6728097.42
Mesomelaena stygia subsp. *deflexa*	P3	14	336095.95	6728100.75
Mesomelaena stygia subsp. *deflexa*	P3	9	336097.39	6728097.35
Mesomelaena stygia subsp. *deflexa*	P3	9	336100.31	6728090.98
Mesomelaena stygia subsp. *deflexa*	P3	9	336099.92	6728084.27
Mesomelaena stygia subsp. *deflexa*	P3	13	336103.73	6728082.76
Mesomelaena stygia subsp. *deflexa*	P3	16	336103.78	6728086.55
Mesomelaena stygia subsp. *deflexa*	P3	20	336104.22	6728098.80
Mesomelaena stygia subsp. *deflexa*	P3	6	336109.44	6728094.77
Mesomelaena stygia subsp. *deflexa*	P3	12	336110.28	6728087.99
Mesomelaena stygia subsp. *deflexa*	P3	31	336110.38	6728080.31
Mesomelaena stygia subsp. *deflexa*	P3	14	336115.17	6728082.47
Mesomelaena stygia subsp. *deflexa*	P3	5	336114.27	6728086.97
Mesomelaena stygia subsp. *deflexa*	P3	5	336113.10	6728099.46
Mesomelaena stygia subsp. *deflexa*	P3	12	336120.57	6728096.91
Mesomelaena stygia subsp. *deflexa*	P3	5	336118.76	6728087.82

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	8	336124.55	6728080.69
Mesomelaena stygia subsp. *deflexa*	P3	15	336127.54	6728084.54
Mesomelaena stygia subsp. *deflexa*	P3	7	336125.78	6728090.71
Mesomelaena stygia subsp. *deflexa*	P3	5	336128.42	6728097.26
Mesomelaena stygia subsp. *deflexa*	P3	12	336128.32	6728095.04
Mesomelaena stygia subsp. *deflexa*	P3	3	336134.00	6728090.24
Mesomelaena stygia subsp. *deflexa*	P3	2	336135.13	6728098.79
Mesomelaena stygia subsp. *deflexa*	P3	13	336139.17	6728099.41
Mesomelaena stygia subsp. *deflexa*	P3	13	336140.09	6728095.30
Mesomelaena stygia subsp. *deflexa*	P3	10	336141.26	6728092.62
Mesomelaena stygia subsp. *deflexa*	P3	10	336140.77	6728085.86
Mesomelaena stygia subsp. *deflexa*	P3	14	336149.09	6728078.34
Mesomelaena stygia subsp. *deflexa*	P3	16	336147.01	6728089.40
Mesomelaena stygia subsp. *deflexa*	P3	1	336150.72	6728103.99
Mesomelaena stygia subsp. *deflexa*	P3	18	336151.63	6728099.85
Mesomelaena stygia subsp. *deflexa*	P3	39	336150.04	6728094.52
Mesomelaena stygia subsp. *deflexa*	P3	24	336151.14	6728087.72
Mesomelaena stygia subsp. *deflexa*	P3	14	336151.86	6728083.56
Mesomelaena stygia subsp. *deflexa*	P3	12	336162.27	6728093.28
Mesomelaena stygia subsp. *deflexa*	P3	32	334768.28	6730975.21
Mesomelaena stygia subsp. *deflexa*	P3	15	334767.97	6730969.06
Mesomelaena stygia subsp. *deflexa*	P3	56	334768.39	6730970.33
Mesomelaena stygia subsp. *deflexa*	P3	66	334780.08	6730977.57
Mesomelaena stygia subsp. *deflexa*	P3	78	334784.79	6730967.64
Mesomelaena stygia subsp. *deflexa*	P3	38	334788.52	6730976.71
Mesomelaena stygia subsp. *deflexa*	P3	14	334801.16	6730966.79
Mesomelaena stygia subsp. *deflexa*	P3	50	335675.20	6730251.58
Mesomelaena stygia subsp. *deflexa*	P3	40	335690.97	6730250.29
Mesomelaena stygia subsp. *deflexa*	P3	30	335948.08	6730253.18
Mesomelaena stygia subsp. *deflexa*	P3	30	338355.12	6730250.52
Mesomelaena stygia subsp. *deflexa*	P3	50	338366.97	6730249.83
Mesomelaena stygia subsp. *deflexa*	P3	40	338378.68	6730246.80
Mesomelaena stygia subsp. *deflexa*	P3	15	338393.95	6730252.19
Mesomelaena stygia subsp. *deflexa*	P3	10	338416.82	6730262.68
Mesomelaena stygia subsp. *deflexa*	P3	30	336775.93	6729893.26
Mesomelaena stygia subsp. *deflexa*	P3	50	336762.78	6729889.53
Mesomelaena stygia subsp. *deflexa*	P3	30	336749.63	6729889.65
Mesomelaena stygia subsp. *deflexa*	P3	25	336667.36	6729889.48
Mesomelaena stygia subsp. *deflexa*	P3	20	336654.62	6729888.00
Mesomelaena stygia subsp. *deflexa*	P3	40	336582.06	6729893.76
Mesomelaena stygia subsp. *deflexa*	P3	100	336570.38	6729891.02
Mesomelaena stygia subsp. *deflexa*	P3	80	336554.59	6729891.46
Mesomelaena stygia subsp. *deflexa*	P3	120	336538.15	6729890.85
Mesomelaena stygia subsp. *deflexa*	P3	30	335268.04	6729889.82
Mesomelaena stygia subsp. *deflexa*	P3	40	335243.11	6729892.65
Mesomelaena stygia subsp. *deflexa*	P3	20	335206.94	6729888.73
Mesomelaena stygia subsp. *deflexa*	P3	40	338659.82	6730613.43
Mesomelaena stygia subsp. *deflexa*	P3	65	338648.05	6730605.32
Mesomelaena stygia subsp. *deflexa*	P3	80	338637.68	6730610.62
Mesomelaena stygia subsp. *deflexa*	P3	50	338626.37	6730619.23
Mesomelaena stygia subsp. *deflexa*	P3	60	338618.16	6730612.74
Mesomelaena stygia subsp. *deflexa*	P3	50	338604.61	6730609.09
Mesomelaena stygia subsp. *deflexa*	P3	100	338589.72	6730607.42

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	75	338574.81	6730613.75
Mesomelaena stygia subsp. *deflexa*	P3	50	338560.62	6730616.80
Mesomelaena stygia subsp. *deflexa*	P3	30	338544.70	6730609.85
Mesomelaena stygia subsp. *deflexa*	P3	50	338531.01	6730603.46
Mesomelaena stygia subsp. *deflexa*	P3	45	338516.71	6730611.64
Mesomelaena stygia subsp. *deflexa*	P3	30	338504.73	6730616.08
Mesomelaena stygia subsp. *deflexa*	P3	30	338491.36	6730614.60
Mesomelaena stygia subsp. *deflexa*	P3	20	338478.88	6730610.26
Mesomelaena stygia subsp. *deflexa*	P3	15	338522.35	6728810.92
Mesomelaena stygia subsp. *deflexa*	P3	40	334907.62	6731322.08
Mesomelaena stygia subsp. *deflexa*	P3	60	334918.82	6731329.68
Mesomelaena stygia subsp. *deflexa*	P3	40	334918.97	6731339.79
Mesomelaena stygia subsp. *deflexa*	P3	35	334929.93	6731335.34
Mesomelaena stygia subsp. *deflexa*	P3	40	334939.94	6731328.38
Mesomelaena stygia subsp. *deflexa*	P3	30	334947.30	6731336.42
Mesomelaena stygia subsp. *deflexa*	P3	12	334960.53	6731335.93
Mesomelaena stygia subsp. *deflexa*	P3	12	334957.50	6731322.14
Mesomelaena stygia subsp. *deflexa*	P3	10	334967.77	6731332.66
Mesomelaena stygia subsp. *deflexa*	P3	10	334979.59	6731327.16
Mesomelaena stygia subsp. *deflexa*	P3	9	334995.92	6731335.71
Mesomelaena stygia subsp. *deflexa*	P3	5	335000.42	6731320.04
Mesomelaena stygia subsp. *deflexa*	P3	2	335013.02	6731329.85
Mesomelaena stygia subsp. *deflexa*	P3	15	335028.21	6731330.78
Mesomelaena stygia subsp. *deflexa*	P3	15	335031.13	6731320.39
Mesomelaena stygia subsp. *deflexa*	P3	22	335039.57	6731331.04
Mesomelaena stygia subsp. *deflexa*	P3	16	335044.75	6731320.24
Mesomelaena stygia subsp. *deflexa*	P3	3	335056.51	6731332.50
Mesomelaena stygia subsp. *deflexa*	P3	3	338201.57	6731331.32
Mesomelaena stygia subsp. *deflexa*	P3	8	338232.27	6731329.83
Mesomelaena stygia subsp. *deflexa*	P3	5	338260.41	6731330.37
Mesomelaena stygia subsp. *deflexa*	P3	30	338293.55	6731334.23
Mesomelaena stygia subsp. *deflexa*	P3	25	338297.31	6731321.78
Mesomelaena stygia subsp. *deflexa*	P3	50	338328.22	6731320.97
Mesomelaena stygia subsp. *deflexa*	P3	25	338333.91	6731332.30
Mesomelaena stygia subsp. *deflexa*	P3	45	338346.50	6731330.26
Mesomelaena stygia subsp. *deflexa*	P3	30	338352.99	6731323.10
Mesomelaena stygia subsp. *deflexa*	P3	25	334666.99	6731331.07
Mesomelaena stygia subsp. *deflexa*	P3	40	334655.16	6731338.03
Mesomelaena stygia subsp. *deflexa*	P3	80	334646.70	6731327.15
Mesomelaena stygia subsp. *deflexa*	P3	70	334635.14	6731329.95
Mesomelaena stygia subsp. *deflexa*	P3	60	334631.77	6731337.57
Mesomelaena stygia subsp. *deflexa*	P3	50	334622.99	6731326.09
Mesomelaena stygia subsp. *deflexa*	P3	35	334611.61	6731331.16
Mesomelaena stygia subsp. *deflexa*	P3	60	334604.17	6731336.35
Mesomelaena stygia subsp. *deflexa*	P3	70	334598.13	6731325.91
Mesomelaena stygia subsp. *deflexa*	P3	60	334585.43	6731327.89
Mesomelaena stygia subsp. *deflexa*	P3	50	334584.90	6731339.37
Mesomelaena stygia subsp. *deflexa*	P3	90	334576.42	6731331.26
Mesomelaena stygia subsp. *deflexa*	P3	40	334567.42	6731324.68
Mesomelaena stygia subsp. *deflexa*	P3	35	334560.59	6731336.18
Mesomelaena stygia subsp. *deflexa*	P3	100	334552.09	6731327.76
Mesomelaena stygia subsp. *deflexa*	P3	90	334538.11	6731330.88
Mesomelaena stygia subsp. *deflexa*	P3	80	334526.00	6731337.16

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	90	334519.57	6731326.43
Mesomelaena stygia subsp. *deflexa*	P3	80	334508.73	6731332.40
Mesomelaena stygia subsp. *deflexa*	P3	70	334497.53	6731338.87
Mesomelaena stygia subsp. *deflexa*	P3	70	334489.73	6731324.09
Mesomelaena stygia subsp. *deflexa*	P3	80	334480.52	6731335.87
Mesomelaena stygia subsp. *deflexa*	P3	90	334466.15	6731329.62
Mesomelaena stygia subsp. *deflexa*	P3	100	334456.77	6731324.52
Mesomelaena stygia subsp. *deflexa*	P3	90	334450.67	6731336.49
Mesomelaena stygia subsp. *deflexa*	P3	60	334438.96	6731325.98
Mesomelaena stygia subsp. *deflexa*	P3	60	334430.45	6731337.96
Mesomelaena stygia subsp. *deflexa*	P3	75	334420.55	6731327.04
Mesomelaena stygia subsp. *deflexa*	P3	75	334411.90	6731339.87
Mesomelaena stygia subsp. *deflexa*	P3	70	334402.02	6731326.74
Mesomelaena stygia subsp. *deflexa*	P3	90	334391.77	6731338.18
Mesomelaena stygia subsp. *deflexa*	P3	100	334380.31	6731329.13
Mesomelaena stygia subsp. *deflexa*	P3	100	334371.15	6731338.06
Mesomelaena stygia subsp. *deflexa*	P3	50	334360.99	6731328.73
Mesomelaena stygia subsp. *deflexa*	P3	70	334350.62	6731332.66
Mesomelaena stygia subsp. *deflexa*	P3	110	334338.38	6731324.45
Mesomelaena stygia subsp. *deflexa*	P3	100	334330.21	6731337.15
Mesomelaena stygia subsp. *deflexa*	P3	130	334320.59	6731328.17
Mesomelaena stygia subsp. *deflexa*	P3	90	334308.74	6731324.59
Mesomelaena stygia subsp. *deflexa*	P3	120	334307.92	6731337.71
Mesomelaena stygia subsp. *deflexa*	P3	130	334297.97	6731329.45
Mesomelaena stygia subsp. *deflexa*	P3	130	334284.62	6731321.34
Mesomelaena stygia subsp. *deflexa*	P3	90	334283.05	6731335.27
Mesomelaena stygia subsp. *deflexa*	P3	90	334272.88	6731325.58
Mesomelaena stygia subsp. *deflexa*	P3	95	334259.34	6731328.26
Mesomelaena stygia subsp. *deflexa*	P3	120	334259.16	6731338.62
Mesomelaena stygia subsp. *deflexa*	P3	140	334249.26	6731322.83
Mesomelaena stygia subsp. *deflexa*	P3	90	334239.78	6731336.48
Mesomelaena stygia subsp. *deflexa*	P3	110	334226.51	6731323.99
Mesomelaena stygia subsp. *deflexa*	P3	90	334220.30	6731336.55
Mesomelaena stygia subsp. *deflexa*	P3	70	334212.94	6731326.44
Mesomelaena stygia subsp. *deflexa*	P3	90	334199.83	6731335.35
Mesomelaena stygia subsp. *deflexa*	P3	90	334188.42	6731325.56
Mesomelaena stygia subsp. *deflexa*	P3	100	334177.17	6731334.48
Mesomelaena stygia subsp. *deflexa*	P3	100	334167.84	6731325.63
Mesomelaena stygia subsp. *deflexa*	P3	140	334158.28	6731337.12
Mesomelaena stygia subsp. *deflexa*	P3	120	334147.44	6731325.09
Mesomelaena stygia subsp. *deflexa*	P3	90	334139.05	6731337.19
Mesomelaena stygia subsp. *deflexa*	P3	90	334134.63	6731322.80
Mesomelaena stygia subsp. *deflexa*	P3	90	334126.35	6731335.05
Mesomelaena stygia subsp. *deflexa*	P3	70	334118.79	6731327.11
Mesomelaena stygia subsp. *deflexa*	P3	50	334106.27	6731329.38
Mesomelaena stygia subsp. *deflexa*	P3	70	334104.90	6731340.75
Mesomelaena stygia subsp. *deflexa*	P3	65	334091.88	6731324.34
Mesomelaena stygia subsp. *deflexa*	P3	45	334084.30	6731336.90
Mesomelaena stygia subsp. *deflexa*	P3	80	334071.34	6731324.89
Mesomelaena stygia subsp. *deflexa*	P3	30	334062.87	6731328.51
Mesomelaena stygia subsp. *deflexa*	P3	28	334055.07	6731338.27
Mesomelaena stygia subsp. *deflexa*	P3	50	334043.48	6731331.35
Mesomelaena stygia subsp. *deflexa*	P3	25	334035.99	6731323.06

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	12	334029.63	6731331.82
Mesomelaena stygia subsp. *deflexa*	P3	25	334020.03	6731329.90
Mesomelaena stygia subsp. *deflexa*	P3	30	334016.69	6731322.58
Mesomelaena stygia subsp. *deflexa*	P3	10	334007.40	6731324.64
Mesomelaena stygia subsp. *deflexa*	P3	2	333997.65	6731337.79
Mesomelaena stygia subsp. *deflexa*	P3	9	333992.29	6731325.22
Mesomelaena stygia subsp. *deflexa*	P3	35	333905.43	6731328.57
Mesomelaena stygia subsp. *deflexa*	P3	35	333899.47	6731337.65
Mesomelaena stygia subsp. *deflexa*	P3	90	333888.61	6731322.39
Mesomelaena stygia subsp. *deflexa*	P3	70	333881.38	6731336.09
Mesomelaena stygia subsp. *deflexa*	P3	95	333870.40	6731325.38
Mesomelaena stygia subsp. *deflexa*	P3	80	333864.05	6731337.75
Mesomelaena stygia subsp. *deflexa*	P3	110	333853.87	6731326.16
Mesomelaena stygia subsp. *deflexa*	P3	60	333845.98	6731329.90
Mesomelaena stygia subsp. *deflexa*	P3	80	333840.43	6731339.87
Mesomelaena stygia subsp. *deflexa*	P3	110	333831.92	6731327.64
Mesomelaena stygia subsp. *deflexa*	P3	80	333818.95	6731335.24
Mesomelaena stygia subsp. *deflexa*	P3	80	333812.68	6731325.54
Mesomelaena stygia subsp. *deflexa*	P3	90	333801.22	6731323.39
Mesomelaena stygia subsp. *deflexa*	P3	110	333801.35	6731338.16
Mesomelaena stygia subsp. *deflexa*	P3	80	333790.63	6731330.66
Mesomelaena stygia subsp. *deflexa*	P3	50	333780.62	6731322.75
Mesomelaena stygia subsp. *deflexa*	P3	70	333772.88	6731340.69
Mesomelaena stygia subsp. *deflexa*	P3	55	333765.31	6731328.38
Mesomelaena stygia subsp. *deflexa*	P3	70	333752.22	6731325.00
Mesomelaena stygia subsp. *deflexa*	P3	60	333751.86	6731338.29
Mesomelaena stygia subsp. *deflexa*	P3	60	333741.14	6731327.02
Mesomelaena stygia subsp. *deflexa*	P3	50	333731.68	6731333.07
Mesomelaena stygia subsp. *deflexa*	P3	60	333721.54	6731334.27
Mesomelaena stygia subsp. *deflexa*	P3	110	333715.54	6731322.94
Mesomelaena stygia subsp. *deflexa*	P3	60	333709.90	6731335.36
Mesomelaena stygia subsp. *deflexa*	P3	70	333699.87	6731330.49
Mesomelaena stygia subsp. *deflexa*	P3	60	333688.41	6731325.48
Mesomelaena stygia subsp. *deflexa*	P3	50	333682.71	6731335.92
Mesomelaena stygia subsp. *deflexa*	P3	90	333670.78	6731327.49
Mesomelaena stygia subsp. *deflexa*	P3	60	333659.55	6731332.47
Mesomelaena stygia subsp. *deflexa*	P3	50	333649.97	6731335.23
Mesomelaena stygia subsp. *deflexa*	P3	50	333651.69	6731322.51
Mesomelaena stygia subsp. *deflexa*	P3	40	333622.69	6731319.94
Mesomelaena stygia subsp. *deflexa*	P3	60	333612.66	6731332.35
Mesomelaena stygia subsp. *deflexa*	P3	30	333602.33	6731334.39
Mesomelaena stygia subsp. *deflexa*	P3	35	333598.30	6731322.24
Mesomelaena stygia subsp. *deflexa*	P3	25	333585.41	6731333.62
Mesomelaena stygia subsp. *deflexa*	P3	80	333573.75	6731322.94
Mesomelaena stygia subsp. *deflexa*	P3	60	333567.61	6731336.88
Mesomelaena stygia subsp. *deflexa*	P3	40	333555.97	6731331.20
Mesomelaena stygia subsp. *deflexa*	P3	120	333537.59	6731331.52
Mesomelaena stygia subsp. *deflexa*	P3	30	333526.19	6731331.51
Mesomelaena stygia subsp. *deflexa*	P3	60	333520.44	6731324.27
Mesomelaena stygia subsp. *deflexa*	P3	65	333511.36	6731328.69
Mesomelaena stygia subsp. *deflexa*	P3	50	333505.18	6731339.45
Mesomelaena stygia subsp. *deflexa*	P3	40	333499.40	6731325.12
Mesomelaena stygia subsp. *deflexa*	P3	70	333486.97	6731329.67

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	25	333477.27	6731339.88
Mesomelaena stygia subsp. *deflexa*	P3	30	333471.16	6731329.22
Mesomelaena stygia subsp. *deflexa*	P3	35	333459.54	6731321.15
Mesomelaena stygia subsp. *deflexa*	P3	30	333453.80	6731337.19
Mesomelaena stygia subsp. *deflexa*	P3	30	333448.10	6731329.89
Mesomelaena stygia subsp. *deflexa*	P3	18	333433.83	6731335.31
Mesomelaena stygia subsp. *deflexa*	P3	25	333422.77	6731325.55
Mesomelaena stygia subsp. *deflexa*	P3	20	333413.29	6731336.39
Mesomelaena stygia subsp. *deflexa*	P3	40	333402.06	6731330.90
Mesomelaena stygia subsp. *deflexa*	P3	70	333393.10	6731323.13
Mesomelaena stygia subsp. *deflexa*	P3	60	333387.63	6731332.60
Mesomelaena stygia subsp. *deflexa*	P3	40	333374.99	6731334.85
Mesomelaena stygia subsp. *deflexa*	P3	60	333369.56	6731324.73
Mesomelaena stygia subsp. *deflexa*	P3	70	333365.15	6731336.29
Mesomelaena stygia subsp. *deflexa*	P3	60	333356.77	6731326.56
Mesomelaena stygia subsp. *deflexa*	P3	35	333348.31	6731334.57
Mesomelaena stygia subsp. *deflexa*	P3	45	333340.95	6731325.90
Mesomelaena stygia subsp. *deflexa*	P3	16	333349.57	6731696.11
Mesomelaena stygia subsp. *deflexa*	P3	7	333364.42	6731686.73
Mesomelaena stygia subsp. *deflexa*	P3	1	335915.40	6726293.53
Mesomelaena stygia subsp. *deflexa*	P3	3	335982.56	6726288.80
Mesomelaena stygia subsp. *deflexa*	P3	3	336000.10	6726285.38
Mesomelaena stygia subsp. *deflexa*	P3	14	336050.55	6726290.15
Mesomelaena stygia subsp. *deflexa*	P3	4	336056.45	6726295.78
Mesomelaena stygia subsp. *deflexa*	P3	5	336065.41	6726289.88
Mesomelaena stygia subsp. *deflexa*	P3	3	336069.66	6726284.92
Mesomelaena stygia subsp. *deflexa*	P3	16	336655.70	6726652.56
Mesomelaena stygia subsp. *deflexa*	P3	50	336645.31	6726657.84
Mesomelaena stygia subsp. *deflexa*	P3	70	336643.34	6726645.55
Mesomelaena stygia subsp. *deflexa*	P3	50	336629.60	6726653.32
Mesomelaena stygia subsp. *deflexa*	P3	60	336620.47	6726655.27
Mesomelaena stygia subsp. *deflexa*	P3	40	336617.53	6726642.91
Mesomelaena stygia subsp. *deflexa*	P3	50	336612.08	6726653.36
Mesomelaena stygia subsp. *deflexa*	P3	80	336602.29	6726641.82
Mesomelaena stygia subsp. *deflexa*	P3	200	335388.49	6729538.17
Mesomelaena stygia subsp. *deflexa*	P3	200	335395.73	6729524.86
Mesomelaena stygia subsp. *deflexa*	P3	300	335406.97	6729536.76
Mesomelaena stygia subsp. *deflexa*	P3	200	335417.78	6729525.49
Mesomelaena stygia subsp. *deflexa*	P3	300	335432.44	6729534.57
Mesomelaena stygia subsp. *deflexa*	P3	300	335440.84	6729523.73
Mesomelaena stygia subsp. *deflexa*	P3	300	335453.60	6729538.36
Mesomelaena stygia subsp. *deflexa*	P3	300	335464.20	6729526.19
Mesomelaena stygia subsp. *deflexa*	P3	200	335470.23	6729536.91
Mesomelaena stygia subsp. *deflexa*	P3	200	335476.14	6729525.75
Mesomelaena stygia subsp. *deflexa*	P3	100	335489.67	6729537.78
Mesomelaena stygia subsp. *deflexa*	P3	100	335493.35	6729529.67
Mesomelaena stygia subsp. *deflexa*	P3	20	336800.77	6729535.21
Mesomelaena stygia subsp. *deflexa*	P3	200	338468.00	6729168.36
Mesomelaena stygia subsp. *deflexa*	P3	200	338457.15	6729163.20
Mesomelaena stygia subsp. *deflexa*	P3	200	338453.32	6729176.38
Mesomelaena stygia subsp. *deflexa*	P3	300	338438.38	6729163.71
Mesomelaena stygia subsp. *deflexa*	P3	300	338432.99	6729176.86
Mesomelaena stygia subsp. *deflexa*	P3	300	338420.98	6729166.32

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	300	338417.97	6729177.20
Mesomelaena stygia subsp. *deflexa*	P3	200	338404.39	6729165.76
Mesomelaena stygia subsp. *deflexa*	P3	200	335593.44	6729173.97
Mesomelaena stygia subsp. *deflexa*	P3	200	335577.06	6729167.13
Mesomelaena stygia subsp. *deflexa*	P3	200	335560.99	6729175.29
Mesomelaena stygia subsp. *deflexa*	P3	200	335552.51	6729165.04
Mesomelaena stygia subsp. *deflexa*	P3	300	335536.93	6729171.45
Mesomelaena stygia subsp. *deflexa*	P3	300	335524.48	6729176.64
Mesomelaena stygia subsp. *deflexa*	P3	300	335516.31	6729164.06
Mesomelaena stygia subsp. *deflexa*	P3	300	335500.25	6729175.43
Mesomelaena stygia subsp. *deflexa*	P3	400	335489.78	6729163.63
Mesomelaena stygia subsp. *deflexa*	P3	400	335475.91	6729174.65
Mesomelaena stygia subsp. *deflexa*	P3	400	335461.55	6729163.90
Mesomelaena stygia subsp. *deflexa*	P3	400	335446.72	6729177.61
Mesomelaena stygia subsp. *deflexa*	P3	400	335435.42	6729164.04
Mesomelaena stygia subsp. *deflexa*	P3	200	335421.01	6729175.66
Mesomelaena stygia subsp. *deflexa*	P3	100	335405.82	6729163.65
Mesomelaena stygia subsp. *deflexa*	P3	100	335388.75	6729165.01
Mesomelaena stygia subsp. *deflexa*	P3	100	335350.30	6729168.28
Mesomelaena stygia subsp. *deflexa*	P3	200	334901.24	6730612.68
Mesomelaena stygia subsp. *deflexa*	P3	100	334974.67	6730608.48
Mesomelaena stygia subsp. *deflexa*	P3	100	335095.38	6730612.16
Mesomelaena stygia subsp. *deflexa*	P3	19	334810.30	6730969.74
Mesomelaena stygia subsp. *deflexa*	P3	4	334824.38	6730964.95
Mesomelaena stygia subsp. *deflexa*	P3	71	334830.82	6730976.72
Mesomelaena stygia subsp. *deflexa*	P3	5	334835.05	6730966.75
Mesomelaena stygia subsp. *deflexa*	P3	26	334838.50	6730974.74
Mesomelaena stygia subsp. *deflexa*	P3	8	334850.14	6730974.12
Mesomelaena stygia subsp. *deflexa*	P3	8	334846.55	6730973.66
Mesomelaena stygia subsp. *deflexa*	P3	8	334858.74	6730962.64
Mesomelaena stygia subsp. *deflexa*	P3	62	334885.47	6730977.12
Mesomelaena stygia subsp. *deflexa*	P3	15	334895.33	6730967.41
Mesomelaena stygia subsp. *deflexa*	P3	2	334989.73	6730970.83
Mesomelaena stygia subsp. *deflexa*	P3	7	335056.86	6730965.86
Mesomelaena stygia subsp. *deflexa*	P3	11	335074.63	6730973.53
Mesomelaena stygia subsp. *deflexa*	P3	8	335093.43	6730975.81
Mesomelaena stygia subsp. *deflexa*	P3	42	335105.36	6730967.08
Mesomelaena stygia subsp. *deflexa*	P3	49	335114.99	6730970.09
Mesomelaena stygia subsp. *deflexa*	P3	60	335117.19	6730976.59
Mesomelaena stygia subsp. *deflexa*	P3	52	335125.51	6730972.08
Mesomelaena stygia subsp. *deflexa*	P3	25	335126.10	6730965.86
Mesomelaena stygia subsp. *deflexa*	P3	20	335136.73	6730972.79
Mesomelaena stygia subsp. *deflexa*	P3	14	335140.12	6730980.16
Mesomelaena stygia subsp. *deflexa*	P3	11	335156.87	6730975.94
Mesomelaena stygia subsp. *deflexa*	P3	12	338523.33	6730970.03
Mesomelaena stygia subsp. *deflexa*	P3	9	338529.93	6730974.60
Mesomelaena stygia subsp. *deflexa*	P3	22	338547.11	6730977.67
Mesomelaena stygia subsp. *deflexa*	P3	27	338557.63	6730972.93
Mesomelaena stygia subsp. *deflexa*	P3	45	338569.90	6730971.88
Mesomelaena stygia subsp. *deflexa*	P3	43	338576.25	6730964.16
Mesomelaena stygia subsp. *deflexa*	P3	32	338585.26	6730962.60
Mesomelaena stygia subsp. *deflexa*	P3	41	338587.87	6730972.21
Mesomelaena stygia subsp. *deflexa*	P3	55	338599.24	6730977.50

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	86	338609.45	6730966.70
Mesomelaena stygia subsp. *deflexa*	P3	108	338622.18	6730966.14
Mesomelaena stygia subsp. *deflexa*	P3	90	338621.11	6730977.55
Mesomelaena stygia subsp. *deflexa*	P3	56	338634.60	6730971.68
Mesomelaena stygia subsp. *deflexa*	P3	28	338648.97	6730963.42
Mesomelaena stygia subsp. *deflexa*	P3	46	338645.60	6730976.28
Mesomelaena stygia subsp. *deflexa*	P3	32	338661.19	6730975.97
Mesomelaena stygia subsp. *deflexa*	P3	64	338671.42	6730966.74
Mesomelaena stygia subsp. *deflexa*	P3	24	338686.32	6730966.46
Mesomelaena stygia subsp. *deflexa*	P3	48	338676.87	6730979.26
Mesomelaena stygia subsp. *deflexa*	P3	78	338695.55	6730977.23
Mesomelaena stygia subsp. *deflexa*	P3	78	338707.38	6730964.95
Mesomelaena stygia subsp. *deflexa*	P3	28	338720.40	6730966.35
Mesomelaena stygia subsp. *deflexa*	P3	24	338714.95	6730976.49
Mesomelaena stygia subsp. *deflexa*	P3	12	338725.88	6730974.79
Mesomelaena stygia subsp. *deflexa*	P3	40	334822.34	6730613.92
Mesomelaena stygia subsp. *deflexa*	P3	28	334817.72	6730602.13
Mesomelaena stygia subsp. *deflexa*	P3	40	334812.33	6730614.49
Mesomelaena stygia subsp. *deflexa*	P3	26	334805.37	6730605.62
Mesomelaena stygia subsp. *deflexa*	P3	35	334793.60	6730615.58
Mesomelaena stygia subsp. *deflexa*	P3	24	334783.68	6730605.52
Mesomelaena stygia subsp. *deflexa*	P3	18	334781.44	6730617.41
Mesomelaena stygia subsp. *deflexa*	P3	38	334768.62	6730605.45
Mesomelaena stygia subsp. *deflexa*	P3	70	334761.03	6730615.72
Mesomelaena stygia subsp. *deflexa*	P3	33	334752.03	6730605.57
Mesomelaena stygia subsp. *deflexa*	P3	36	334738.92	6730616.98
Mesomelaena stygia subsp. *deflexa*	P3	54	334740.79	6730604.84
Mesomelaena stygia subsp. *deflexa*	P3	63	334721.96	6730607.91
Mesomelaena stygia subsp. *deflexa*	P3	54	334712.60	6730618.68
Mesomelaena stygia subsp. *deflexa*	P3	105	334698.14	6730615.41
Mesomelaena stygia subsp. *deflexa*	P3	84	334697.84	6730601.93
Mesomelaena stygia subsp. *deflexa*	P3	94	334678.77	6730608.42
Mesomelaena stygia subsp. *deflexa*	P3	74	334667.02	6730618.85
Mesomelaena stygia subsp. *deflexa*	P3	94	334661.35	6730605.87
Mesomelaena stygia subsp. *deflexa*	P3	96	334651.39	6730615.91
Mesomelaena stygia subsp. *deflexa*	P3	90	334645.53	6730602.64
Mesomelaena stygia subsp. *deflexa*	P3	104	334636.82	6730616.40
Mesomelaena stygia subsp. *deflexa*	P3	112	334629.12	6730605.19
Mesomelaena stygia subsp. *deflexa*	P3	84	334619.74	6730616.82
Mesomelaena stygia subsp. *deflexa*	P3	102	334616.11	6730603.84
Mesomelaena stygia subsp. *deflexa*	P3	120	334605.73	6730614.56
Mesomelaena stygia subsp. *deflexa*	P3	124	334597.85	6730605.32
Mesomelaena stygia subsp. *deflexa*	P3	94	334586.89	6730614.36
Mesomelaena stygia subsp. *deflexa*	P3	135	334575.92	6730605.30
Mesomelaena stygia subsp. *deflexa*	P3	86	334567.21	6730616.84
Mesomelaena stygia subsp. *deflexa*	P3	84	334560.90	6730604.78
Mesomelaena stygia subsp. *deflexa*	P3	88	334549.60	6730616.61
Mesomelaena stygia subsp. *deflexa*	P3	102	334541.91	6730603.72
Mesomelaena stygia subsp. *deflexa*	P3	54	334533.82	6730615.62
Mesomelaena stygia subsp. *deflexa*	P3	127	334518.34	6730605.36
Mesomelaena stygia subsp. *deflexa*	P3	106	334509.05	6730616.57
Mesomelaena stygia subsp. *deflexa*	P3	106	334500.88	6730605.83
Mesomelaena stygia subsp. *deflexa*	P3	78	334487.46	6730617.13

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	68	334477.38	6730604.23
Mesomelaena stygia subsp. *deflexa*	P3	32	334470.02	6730616.21
Mesomelaena stygia subsp. *deflexa*	P3	10	334462.38	6730608.38
Mesomelaena stygia subsp. *deflexa*	P3	30	334245.52	6730973.53
Mesomelaena stygia subsp. *deflexa*	P3	30	334257.53	6730965.56
Mesomelaena stygia subsp. *deflexa*	P3	110	334290.15	6730975.47
Mesomelaena stygia subsp. *deflexa*	P3	90	334309.69	6730965.23
Mesomelaena stygia subsp. *deflexa*	P3	80	334338.43	6730972.28
Mesomelaena stygia subsp. *deflexa*	P3	90	334359.62	6730975.75
Mesomelaena stygia subsp. *deflexa*	P3	50	334399.52	6730970.35
Mesomelaena stygia subsp. *deflexa*	P3	50	334436.71	6730958.88
Mesomelaena stygia subsp. *deflexa*	P3	40	334494.66	6730966.41
Mesomelaena stygia subsp. *deflexa*	P3	68	334522.30	6730971.52
Mesomelaena stygia subsp. *deflexa*	P3	86	334537.66	6730969.73
Mesomelaena stygia subsp. *deflexa*	P3	54	334555.79	6730968.57
Mesomelaena stygia subsp. *deflexa*	P3	76	334568.44	6730972.67
Mesomelaena stygia subsp. *deflexa*	P3	102	334581.92	6730964.96
Mesomelaena stygia subsp. *deflexa*	P3	98	334605.71	6730973.60
Mesomelaena stygia subsp. *deflexa*	P3	78	334627.49	6730964.57
Mesomelaena stygia subsp. *deflexa*	P3	62	334652.12	6730975.36
Mesomelaena stygia subsp. *deflexa*	P3	78	334665.28	6730963.19
Mesomelaena stygia subsp. *deflexa*	P3	106	334679.94	6730977.11
Mesomelaena stygia subsp. *deflexa*	P3	56	334704.78	6730974.43
Mesomelaena stygia subsp. *deflexa*	P3	24	334724.98	6730971.90
Mesomelaena stygia subsp. *deflexa*	P3	76	334741.61	6730965.58
Mesomelaena stygia subsp. *deflexa*	P3	30	336480.85	6728092.44
Mesomelaena stygia subsp. *deflexa*	P3	8	336497.88	6728090.40
Mesomelaena stygia subsp. *deflexa*	P3	5	336508.81	6728097.38
Mesomelaena stygia subsp. *deflexa*	P3	28	336521.12	6728086.36
Mesomelaena stygia subsp. *deflexa*	P3	60	336531.27	6728096.30
Mesomelaena stygia subsp. *deflexa*	P3	76	336548.54	6728084.95
Mesomelaena stygia subsp. *deflexa*	P3	80	336561.50	6728096.71
Mesomelaena stygia subsp. *deflexa*	P3	90	336575.99	6728087.36
Mesomelaena stygia subsp. *deflexa*	P3	4	336769.21	6728087.49
Mesomelaena stygia subsp. *deflexa*	P3	3	337223.99	6728814.12
Mesomelaena stygia subsp. *deflexa*	P3	5	337184.19	6728813.04
Mesomelaena stygia subsp. *deflexa*	P3	30	337174.23	6728812.29
Mesomelaena stygia subsp. *deflexa*	P3	40	337163.75	6728810.13
Mesomelaena stygia subsp. *deflexa*	P3	20	337155.39	6728812.57
Mesomelaena stygia subsp. *deflexa*	P3	20	337143.07	6728818.26
Mesomelaena stygia subsp. *deflexa*	P3	10	337134.69	6728806.00
Mesomelaena stygia subsp. *deflexa*	P3	25	337120.77	6728809.49
Mesomelaena stygia subsp. *deflexa*	P3	5	337103.62	6728817.48
Mesomelaena stygia subsp. *deflexa*	P3	40	336896.33	6728814.88
Mesomelaena stygia subsp. *deflexa*	P3	50	336845.13	6728814.80
Mesomelaena stygia subsp. *deflexa*	P3	80	335596.84	6727368.00
Mesomelaena stygia subsp. *deflexa*	P3	120	335585.41	6727375.61
Mesomelaena stygia subsp. *deflexa*	P3	120	335573.35	6727362.98
Mesomelaena stygia subsp. *deflexa*	P3	150	335559.68	6727364.06
Mesomelaena stygia subsp. *deflexa*	P3	120	335548.04	6727370.35
Mesomelaena stygia subsp. *deflexa*	P3	120	335536.50	6727378.88
Mesomelaena stygia subsp. *deflexa*	P3	120	335525.05	6727370.03
Mesomelaena stygia subsp. *deflexa*	P3	120	335507.63	6727362.35

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	100	335498.29	6727369.16
Mesomelaena stygia subsp. *deflexa*	P3	100	335486.80	6727376.41
Mesomelaena stygia subsp. *deflexa*	P3	75	335471.26	6727373.19
Mesomelaena stygia subsp. *deflexa*	P3	60	335461.47	6727367.41
Mesomelaena stygia subsp. *deflexa*	P3	75	335448.07	6727374.42
Mesomelaena stygia subsp. *deflexa*	P3	5	335406.09	6727373.90
Mesomelaena stygia subsp. *deflexa*	P3	70	336596.61	6726657.08
Mesomelaena stygia subsp. *deflexa*	P3	60	336581.21	6726646.10
Mesomelaena stygia subsp. *deflexa*	P3	50	336574.05	6726658.76
Mesomelaena stygia subsp. *deflexa*	P3	70	336566.25	6726650.01
Mesomelaena stygia subsp. *deflexa*	P3	80	336551.98	6726644.33
Mesomelaena stygia subsp. *deflexa*	P3	100	336550.70	6726657.58
Mesomelaena stygia subsp. *deflexa*	P3	60	336539.45	6726644.47
Mesomelaena stygia subsp. *deflexa*	P3	50	336535.55	6726655.27
Mesomelaena stygia subsp. *deflexa*	P3	40	336522.64	6726650.68
Mesomelaena stygia subsp. *deflexa*	P3	25	336501.35	6726654.94
Mesomelaena stygia subsp. *deflexa*	P3	30	336492.09	6726645.59
Mesomelaena stygia subsp. *deflexa*	P3	55	336486.60	6726658.07
Mesomelaena stygia subsp. *deflexa*	P3	45	336473.02	6726647.00
Mesomelaena stygia subsp. *deflexa*	P3	50	336465.48	6726656.65
Mesomelaena stygia subsp. *deflexa*	P3	30	336459.50	6726643.88
Mesomelaena stygia subsp. *deflexa*	P3	35	336450.73	6726652.24
Mesomelaena stygia subsp. *deflexa*	P3	70	336440.75	6726657.84
Mesomelaena stygia subsp. *deflexa*	P3	40	336434.82	6726645.22
Mesomelaena stygia subsp. *deflexa*	P3	40	336422.19	6726653.28
Mesomelaena stygia subsp. *deflexa*	P3	60	336417.14	6726643.93
Mesomelaena stygia subsp. *deflexa*	P3	45	336412.26	6726657.14
Mesomelaena stygia subsp. *deflexa*	P3	40	336402.08	6726648.79
Mesomelaena stygia subsp. *deflexa*	P3	40	336388.32	6726641.93
Mesomelaena stygia subsp. *deflexa*	P3	60	336386.00	6726652.70
Mesomelaena stygia subsp. *deflexa*	P3	30	336373.88	6726655.83
Mesomelaena stygia subsp. *deflexa*	P3	60	336362.71	6726646.24
Mesomelaena stygia subsp. *deflexa*	P3	35	336360.05	6726654.62
Mesomelaena stygia subsp. *deflexa*	P3	80	336346.62	6726642.02
Mesomelaena stygia subsp. *deflexa*	P3	40	336340.37	6726653.40
Mesomelaena stygia subsp. *deflexa*	P3	60	336329.61	6726646.75
Mesomelaena stygia subsp. *deflexa*	P3	70	336323.04	6726657.46
Mesomelaena stygia subsp. *deflexa*	P3	70	336315.00	6726648.28
Mesomelaena stygia subsp. *deflexa*	P3	70	336303.03	6726643.04
Mesomelaena stygia subsp. *deflexa*	P3	14	336304.39	6726656.18
Mesomelaena stygia subsp. *deflexa*	P3	40	336296.48	6726651.90
Mesomelaena stygia subsp. *deflexa*	P3	50	336285.87	6726640.61
Mesomelaena stygia subsp. *deflexa*	P3	60	336275.97	6726655.48
Mesomelaena stygia subsp. *deflexa*	P3	70	336270.42	6726646.04
Mesomelaena stygia subsp. *deflexa*	P3	90	336260.96	6726658.21
Mesomelaena stygia subsp. *deflexa*	P3	80	336255.14	6726641.76
Mesomelaena stygia subsp. *deflexa*	P3	80	336246.22	6726651.21
Mesomelaena stygia subsp. *deflexa*	P3	80	336234.78	6726656.31
Mesomelaena stygia subsp. *deflexa*	P3	70	336233.61	6726641.65
Mesomelaena stygia subsp. *deflexa*	P3	100	336222.88	6726652.13
Mesomelaena stygia subsp. *deflexa*	P3	85	336212.62	6726658.84
Mesomelaena stygia subsp. *deflexa*	P3	100	336209.21	6726643.43
Mesomelaena stygia subsp. *deflexa*	P3	60	336199.36	6726648.05

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	60	336196.32	6726658.44
Mesomelaena stygia subsp. *deflexa*	P3	80	336188.08	6726642.31
Mesomelaena stygia subsp. *deflexa*	P3	30	336182.69	6726654.51
Mesomelaena stygia subsp. *deflexa*	P3	60	336176.19	6726644.53
Mesomelaena stygia subsp. *deflexa*	P3	60	336164.01	6726656.52
Mesomelaena stygia subsp. *deflexa*	P3	50	336156.96	6726642.95
Mesomelaena stygia subsp. *deflexa*	P3	50	336147.68	6726652.69
Mesomelaena stygia subsp. *deflexa*	P3	40	336132.13	6726647.00
Mesomelaena stygia subsp. *deflexa*	P3	40	336123.65	6726656.60
Mesomelaena stygia subsp. *deflexa*	P3	50	336117.18	6726645.39
Mesomelaena stygia subsp. *deflexa*	P3	65	336111.20	6726653.87
Mesomelaena stygia subsp. *deflexa*	P3	60	336102.42	6726643.63
Mesomelaena stygia subsp. *deflexa*	P3	70	336095.52	6726655.18
Mesomelaena stygia subsp. *deflexa*	P3	60	336082.93	6726652.50
Mesomelaena stygia subsp. *deflexa*	P3	35	336077.46	6726643.81
Mesomelaena stygia subsp. *deflexa*	P3	80	336069.02	6726650.04
Mesomelaena stygia subsp. *deflexa*	P3	60	336061.92	6726658.33
Mesomelaena stygia subsp. *deflexa*	P3	40	336057.05	6726645.72
Mesomelaena stygia subsp. *deflexa*	P3	50	336047.33	6726657.39
Mesomelaena stygia subsp. *deflexa*	P3	60	336038.71	6726648.21
Mesomelaena stygia subsp. *deflexa*	P3	20	336029.77	6726643.59
Mesomelaena stygia subsp. *deflexa*	P3	5	336018.35	6726658.67
Mesomelaena stygia subsp. *deflexa*	P3	3	335778.05	6726691.54
Mesomelaena stygia subsp. *deflexa*	P3	30	336277.89	6727012.48
Mesomelaena stygia subsp. *deflexa*	P3	12	336290.54	6727008.13
Mesomelaena stygia subsp. *deflexa*	P3	22	336295.36	6727018.18
Mesomelaena stygia subsp. *deflexa*	P3	24	336306.27	6727008.74
Mesomelaena stygia subsp. *deflexa*	P3	16	336315.71	6727009.11
Mesomelaena stygia subsp. *deflexa*	P3	35	336328.09	6727014.96
Mesomelaena stygia subsp. *deflexa*	P3	22	336335.97	6727008.04
Mesomelaena stygia subsp. *deflexa*	P3	20	336349.13	6727016.88
Mesomelaena stygia subsp. *deflexa*	P3	16	336359.94	6727006.52
Mesomelaena stygia subsp. *deflexa*	P3	30	336368.77	6727016.56
Mesomelaena stygia subsp. *deflexa*	P3	20	336372.50	6727010.49
Mesomelaena stygia subsp. *deflexa*	P3	17	336382.41	6727005.83
Mesomelaena stygia subsp. *deflexa*	P3	40	336394.68	6727011.54
Mesomelaena stygia subsp. *deflexa*	P3	25	336403.25	6727019.07
Mesomelaena stygia subsp. *deflexa*	P3	24	336410.32	6727002.73
Mesomelaena stygia subsp. *deflexa*	P3	8	336417.96	6726995.24
Mesomelaena stygia subsp. *deflexa*	P3	30	336421.68	6726992.35
Mesomelaena stygia subsp. *deflexa*	P3	6	336430.04	6727000.05
Mesomelaena stygia subsp. *deflexa*	P3	4	336447.11	6726995.25
Mesomelaena stygia subsp. *deflexa*	P3	6	336456.43	6726997.10
Mesomelaena stygia subsp. *deflexa*	P3	8	336462.74	6726993.02
Mesomelaena stygia subsp. *deflexa*	P3	8	336467.45	6726997.44
Mesomelaena stygia subsp. *deflexa*	P3	10	336475.19	6726997.13
Mesomelaena stygia subsp. *deflexa*	P3	24	336482.83	6726990.72
Mesomelaena stygia subsp. *deflexa*	P3	3	336484.39	6726997.19
Mesomelaena stygia subsp. *deflexa*	P3	22	336489.04	6727000.46
Mesomelaena stygia subsp. *deflexa*	P3	2	336494.70	6726996.97
Mesomelaena stygia subsp. *deflexa*	P3	8	336500.39	6726995.00
Mesomelaena stygia subsp. *deflexa*	P3	8	336504.75	6726999.17
Mesomelaena stygia subsp. *deflexa*	P3	3	336513.17	6726993.21

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	25	336524.47	6726988.56
Mesomelaena stygia subsp. *deflexa*	P3	12	336533.05	6726988.36
Mesomelaena stygia subsp. *deflexa*	P3	4	336533.90	6726994.15
Mesomelaena stygia subsp. *deflexa*	P3	50	336534.25	6726998.93
Mesomelaena stygia subsp. *deflexa*	P3	50	336540.91	6727001.96
Mesomelaena stygia subsp. *deflexa*	P3	6	336546.40	6726995.11
Mesomelaena stygia subsp. *deflexa*	P3	4	336551.28	6726995.40
Mesomelaena stygia subsp. *deflexa*	P3	7	336556.80	6726996.03
Mesomelaena stygia subsp. *deflexa*	P3	16	336565.21	6726989.07
Mesomelaena stygia subsp. *deflexa*	P3	16	336573.38	6726989.02
Mesomelaena stygia subsp. *deflexa*	P3	18	336578.06	6726988.48
Mesomelaena stygia subsp. *deflexa*	P3	3	336581.46	6726992.49
Mesomelaena stygia subsp. *deflexa*	P3	2	336584.72	6726994.13
Mesomelaena stygia subsp. *deflexa*	P3	17	336585.13	6726987.39
Mesomelaena stygia subsp. *deflexa*	P3	20	336589.80	6726989.80
Mesomelaena stygia subsp. *deflexa*	P3	13	336595.74	6726996.43
Mesomelaena stygia subsp. *deflexa*	P3	1	336598.66	6726993.64
Mesomelaena stygia subsp. *deflexa*	P3	5	336611.94	6726991.48
Mesomelaena stygia subsp. *deflexa*	P3	10	336615.18	6726996.40
Mesomelaena stygia subsp. *deflexa*	P3	2	336622.68	6726992.35
Mesomelaena stygia subsp. *deflexa*	P3	3	336629.82	6726991.09
Mesomelaena stygia subsp. *deflexa*	P3	200	336487.17	6728450.01
Mesomelaena stygia subsp. *deflexa*	P3	100	335677.16	6727003.45
Mesomelaena stygia subsp. *deflexa*	P3	200	335660.64	6727013.71
Mesomelaena stygia subsp. *deflexa*	P3	200	335658.10	6727001.11
Mesomelaena stygia subsp. *deflexa*	P3	200	335644.76	6727015.70
Mesomelaena stygia subsp. *deflexa*	P3	200	335642.17	6727000.38
Mesomelaena stygia subsp. *deflexa*	P3	100	335624.45	6727015.12
Mesomelaena stygia subsp. *deflexa*	P3	70	335625.88	6727001.80
Mesomelaena stygia subsp. *deflexa*	P3	50	335611.56	6727015.75
Mesomelaena stygia subsp. *deflexa*	P3	150	335607.67	6727003.38
Mesomelaena stygia subsp. *deflexa*	P3	100	335596.87	6727014.45
Mesomelaena stygia subsp. *deflexa*	P3	50	335589.90	6727004.80
Mesomelaena stygia subsp. *deflexa*	P3	150	335580.96	6727017.15
Mesomelaena stygia subsp. *deflexa*	P3	40	335574.13	6727005.42
Mesomelaena stygia subsp. *deflexa*	P3	40	335559.15	6727012.20
Mesomelaena stygia subsp. *deflexa*	P3	40	335533.69	6727005.84
Mesomelaena stygia subsp. *deflexa*	P3	100	335523.28	6727008.06
Mesomelaena stygia subsp. *deflexa*	P3	50	335512.94	6727016.88
Mesomelaena stygia subsp. *deflexa*	P3	100	335495.78	6727011.23
Mesomelaena stygia subsp. *deflexa*	P3	100	335480.11	6727003.70
Mesomelaena stygia subsp. *deflexa*	P3	100	335474.36	6727015.34
Mesomelaena stygia subsp. *deflexa*	P3	100	335468.22	6727001.93
Mesomelaena stygia subsp. *deflexa*	P3	100	335459.45	6727018.09
Mesomelaena stygia subsp. *deflexa*	P3	50	335453.72	6727001.71
Mesomelaena stygia subsp. *deflexa*	P3	50	335442.56	6727016.99
Mesomelaena stygia subsp. *deflexa*	P3	50	335436.93	6727003.17
Mesomelaena stygia subsp. *deflexa*	P3	200	335423.84	6727015.59
Mesomelaena stygia subsp. *deflexa*	P3	100	335416.02	6727002.67
Mesomelaena stygia subsp. *deflexa*	P3	100	335402.89	6727015.23
Mesomelaena stygia subsp. *deflexa*	P3	100	335393.90	6727002.32
Mesomelaena stygia subsp. *deflexa*	P3	100	335383.28	6727014.85
Mesomelaena stygia subsp. *deflexa*	P3	100	335374.07	6727003.12

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	100	335364.60	6727013.35
Mesomelaena stygia subsp. *deflexa*	P3	100	335353.84	6727004.59
Mesomelaena stygia subsp. *deflexa*	P3	100	335339.41	6727014.87
Mesomelaena stygia subsp. *deflexa*	P3	100	335333.68	6727004.38
Mesomelaena stygia subsp. *deflexa*	P3	100	335324.73	6727014.70
Mesomelaena stygia subsp. *deflexa*	P3	100	335321.41	6727001.55
Mesomelaena stygia subsp. *deflexa*	P3	100	335307.05	6727016.51
Mesomelaena stygia subsp. *deflexa*	P3	200	335296.80	6727002.73
Mesomelaena stygia subsp. *deflexa*	P3	100	335282.02	6727017.33
Mesomelaena stygia subsp. *deflexa*	P3	100	335272.44	6727002.27
Mesomelaena stygia subsp. *deflexa*	P3	100	335260.98	6727018.41
Mesomelaena stygia subsp. *deflexa*	P3	100	335253.43	6727002.77
Mesomelaena stygia subsp. *deflexa*	P3	50	335244.78	6727015.79
Mesomelaena stygia subsp. *deflexa*	P3	5	335208.91	6727010.41
Mesomelaena stygia subsp. *deflexa*	P3	20	336490.30	6727363.59
Mesomelaena stygia subsp. *deflexa*	P3	8	336503.63	6727370.09
Mesomelaena stygia subsp. *deflexa*	P3	20	336510.29	6727362.43
Mesomelaena stygia subsp. *deflexa*	P3	18	336525.32	6727374.16
Mesomelaena stygia subsp. *deflexa*	P3	30	336536.71	6727365.28
Mesomelaena stygia subsp. *deflexa*	P3	26	336554.98	6727369.34
Mesomelaena stygia subsp. *deflexa*	P3	5	336572.33	6727372.03
Mesomelaena stygia subsp. *deflexa*	P3	6	336578.02	6727364.14
Mesomelaena stygia subsp. *deflexa*	P3	3	333420.85	6731688.63
Mesomelaena stygia subsp. *deflexa*	P3	15	333428.37	6731689.69
Mesomelaena stygia subsp. *deflexa*	P3	6	333436.71	6731689.72
Mesomelaena stygia subsp. *deflexa*	P3	8	333447.33	6731695.10
Mesomelaena stygia subsp. *deflexa*	P3	10	333449.61	6731687.62
Mesomelaena stygia subsp. *deflexa*	P3	11	333464.10	6731693.70
Mesomelaena stygia subsp. *deflexa*	P3	7	333475.88	6731696.27
Mesomelaena stygia subsp. *deflexa*	P3	5	333466.63	6731680.41
Mesomelaena stygia subsp. *deflexa*	P3	15	333484.21	6731690.20
Mesomelaena stygia subsp. *deflexa*	P3	14	333491.47	6731683.23
Mesomelaena stygia subsp. *deflexa*	P3	16	333492.99	6731698.14
Mesomelaena stygia subsp. *deflexa*	P3	2	333507.53	6731686.48
Mesomelaena stygia subsp. *deflexa*	P3	2	334016.16	6731688.85
Mesomelaena stygia subsp. *deflexa*	P3	16	334024.46	6731689.54
Mesomelaena stygia subsp. *deflexa*	P3	1	334778.13	6731695.49
Mesomelaena stygia subsp. *deflexa*	P3	5	334786.69	6731703.09
Mesomelaena stygia subsp. *deflexa*	P3	16	334790.11	6731692.66
Mesomelaena stygia subsp. *deflexa*	P3	35	334794.95	6731683.24
Mesomelaena stygia subsp. *deflexa*	P3	50	334801.85	6731697.82
Mesomelaena stygia subsp. *deflexa*	P3	60	334808.43	6731685.55
Mesomelaena stygia subsp. *deflexa*	P3	55	334817.78	6731696.53
Mesomelaena stygia subsp. *deflexa*	P3	70	334826.25	6731685.59
Mesomelaena stygia subsp. *deflexa*	P3	50	334837.67	6731692.83
Mesomelaena stygia subsp. *deflexa*	P3	70	334845.99	6731685.66
Mesomelaena stygia subsp. *deflexa*	P3	18	334993.62	6731696.50
Mesomelaena stygia subsp. *deflexa*	P3	60	335004.26	6731684.51
Mesomelaena stygia subsp. *deflexa*	P3	50	335010.92	6731698.44
Mesomelaena stygia subsp. *deflexa*	P3	60	335022.05	6731689.54
Mesomelaena stygia subsp. *deflexa*	P3	36	335034.73	6731688.06
Mesomelaena stygia subsp. *deflexa*	P3	70	335035.28	6731698.85
Mesomelaena stygia subsp. *deflexa*	P3	50	335048.46	6731687.51

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	60	335057.50	6731699.92
Mesomelaena stygia subsp. *deflexa*	P3	8	335066.97	6731689.17
Mesomelaena stygia subsp. *deflexa*	P3	4	335074.72	6731700.44
Mesomelaena stygia subsp. *deflexa*	P3	3	335225.81	6731696.63
Mesomelaena stygia subsp. *deflexa*	P3	24	338673.41	6729551.53
Mesomelaena stygia subsp. *deflexa*	P3	45	338676.22	6729566.91
Mesomelaena stygia subsp. *deflexa*	P3	45	338679.23	6729578.60
Mesomelaena stygia subsp. *deflexa*	P3	35	338680.08	6729599.46
Mesomelaena stygia subsp. *deflexa*	P3	29	338679.20	6729588.92
Mesomelaena stygia subsp. *deflexa*	P3	35	338677.85	6729613.06
Mesomelaena stygia subsp. *deflexa*	P3	35	338679.66	6729634.60
Mesomelaena stygia subsp. *deflexa*	P3	30	338672.93	6729650.04
Mesomelaena stygia subsp. *deflexa*	P3	30	338673.90	6729664.08
Mesomelaena stygia subsp. *deflexa*	P3	30	338673.59	6729679.21
Mesomelaena stygia subsp. *deflexa*	P3	30	338672.88	6729691.13
Mesomelaena stygia subsp. *deflexa*	P3	30	338672.11	6729701.56
Mesomelaena stygia subsp. *deflexa*	P3	30	338674.21	6729710.57
Mesomelaena stygia subsp. *deflexa*	P3	30	338672.47	6729723.01
Mesomelaena stygia subsp. *deflexa*	P3	20	338672.23	6729735.13
Mesomelaena stygia subsp. *deflexa*	P3	30	338675.89	6729744.53
Mesomelaena stygia subsp. *deflexa*	P3	20	338679.32	6729761.02
Mesomelaena stygia subsp. *deflexa*	P3	5	338680.20	6730010.96
Mesomelaena stygia subsp. *deflexa*	P3	2	338669.64	6730059.30
Mesomelaena stygia subsp. *deflexa*	P3	10	338674.08	6730433.46
Mesomelaena stygia subsp. *deflexa*	P3	26	338678.86	6730465.20
Mesomelaena stygia subsp. *deflexa*	P3	5	338681.08	6730502.47
Mesomelaena stygia subsp. *deflexa*	P3	12	338684.54	6730538.41
Mesomelaena stygia subsp. *deflexa*	P3	4	338676.27	6730593.73
Mesomelaena stygia subsp. *deflexa*	P3	9	338674.40	6730610.29
Mesomelaena stygia subsp. *deflexa*	P3	23	338676.56	6730619.39
Mesomelaena stygia subsp. *deflexa*	P3	35	338677.87	6730634.27
Mesomelaena stygia subsp. *deflexa*	P3	35	338678.01	6730645.06
Mesomelaena stygia subsp. *deflexa*	P3	35	338675.06	6730659.17
Mesomelaena stygia subsp. *deflexa*	P3	21	338677.26	6730669.14
Mesomelaena stygia subsp. *deflexa*	P3	43	338676.86	6730680.44
Mesomelaena stygia subsp. *deflexa*	P3	18	338677.18	6730693.62
Mesomelaena stygia subsp. *deflexa*	P3	32	338677.23	6730705.49
Mesomelaena stygia subsp. *deflexa*	P3	32	338676.32	6730717.23
Mesomelaena stygia subsp. *deflexa*	P3	36	338678.45	6730733.04
Mesomelaena stygia subsp. *deflexa*	P3	36	338673.13	6730743.55
Mesomelaena stygia subsp. *deflexa*	P3	36	338667.59	6730755.49
Mesomelaena stygia subsp. *deflexa*	P3	36	338665.66	6730767.10
Mesomelaena stygia subsp. *deflexa*	P3	33	338670.29	6730779.29
Mesomelaena stygia subsp. *deflexa*	P3	33	338666.04	6730791.21
Mesomelaena stygia subsp. *deflexa*	P3	33	338668.24	6730806.27
Mesomelaena stygia subsp. *deflexa*	P3	33	338673.11	6730817.63
Mesomelaena stygia subsp. *deflexa*	P3	33	338674.43	6730831.64
Mesomelaena stygia subsp. *deflexa*	P3	33	338671.26	6730843.62
Mesomelaena stygia subsp. *deflexa*	P3	33	338665.88	6730853.46
Mesomelaena stygia subsp. *deflexa*	P3	38	338668.52	6730861.93
Mesomelaena stygia subsp. *deflexa*	P3	38	338668.06	6730874.24
Mesomelaena stygia subsp. *deflexa*	P3	38	338669.53	6730886.71
Mesomelaena stygia subsp. *deflexa*	P3	38	338667.23	6730897.42

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Mesomelaena stygia subsp. *deflexa*	P3	38	338662.96	6730907.81
Mesomelaena stygia subsp. *deflexa*	P3	38	338666.34	6730917.19
Mesomelaena stygia subsp. *deflexa*	P3	38	338669.45	6730932.08
Mesomelaena stygia subsp. *deflexa*	P3	38	338670.35	6730941.04
Mesomelaena stygia subsp. *deflexa*	P3	38	338673.01	6730951.53
Mesomelaena stygia subsp. *deflexa*	P3	52	338674.13	6730961.36
Mesomelaena stygia subsp. *deflexa*	P3	52	338673.75	6730976.33
Mesomelaena stygia subsp. *deflexa*	P3	6	338304.98	6730988.63
Mesomelaena stygia subsp. *deflexa*	P3	11	338310.60	6730997.13
Mesomelaena stygia subsp. *deflexa*	P3	19	338317.80	6731001.51
Mesomelaena stygia subsp. *deflexa*	P3	9	338312.84	6731008.08
Mesomelaena stygia subsp. *deflexa*	P3	4	338392.87	6730943.02
Mesomelaena stygia subsp. *deflexa*	P3	8	338429.76	6730918.41
Mesomelaena stygia subsp. *deflexa*	P3	1	338469.26	6730909.71
Mesomelaena stygia subsp. *deflexa*	P3	2	338517.90	6730882.27
Mesomelaena stygia subsp. *deflexa*	P3	35	338532.85	6730901.31
Mesomelaena stygia subsp. *deflexa*	P3	40	338542.20	6730902.64
Mesomelaena stygia subsp. *deflexa*	P3	60	338539.72	6730915.21
Mesomelaena stygia subsp. *deflexa*	P3	70	338553.85	6730916.04
Mesomelaena stygia subsp. *deflexa*	P3	60	338560.53	6730921.75
Mesomelaena stygia subsp. *deflexa*	P3	50	338550.85	6730931.71
Mesomelaena stygia subsp. *deflexa*	P3	50	338564.04	6730932.34
Mesomelaena stygia subsp. *deflexa*	P3	60	338564.34	6730948.43
Mesomelaena stygia subsp. *deflexa*	P3	70	338571.63	6730946.04
Mesomelaena stygia subsp. *deflexa*	P3	50	338581.52	6730956.55
Mesomelaena stygia subsp. *deflexa*	P3	60	338572.18	6730964.35
Mesomelaena stygia subsp. *deflexa*	P3	20	334273.05	6727140.46
Persoonia rudis	P3	2	331475.30	6726421.98
Persoonia rudis	P3	1	331478.66	6726458.12
Persoonia rudis	P3	1	331477.92	6726523.57
Persoonia rudis	P3	1	331472.68	6726550.12
Persoonia rudis	P3	2	331471.39	6726618.63
Persoonia rudis	P3	1	332192.21	6726166.07
Persoonia rudis	P3	1	331308.13	6725937.50
Persoonia rudis	P3	1	335246.33	6728447.55
Persoonia rudis	P3	1	335324.98	6727730.09
Persoonia rudis	P3	1	335231.70	6727728.84
Persoonia rudis	P3	1	333877.50	6727731.16
Persoonia rudis	P3	1	333477.96	6727732.43
Persoonia rudis	P3	1	333561.46	6729340.91
Stylidium drummondianum	P3	25	332910.60	6728855.14
Stylidium drummondianum	P3	30	332897.53	6728901.69
Stylidium drummondianum	P3	15	332918.10	6729018.00
Stylidium drummondianum	P3	6	332915.38	6729027.85
Stylidium drummondianum	P3	36	333281.86	6728457.36
Stylidium drummondianum	P3	17	333258.06	6728436.14
Stylidium drummondianum	P3	11	333250.59	6728417.98
Stylidium drummondianum	P3	20	333249.69	6728408.98
Stylidium drummondianum	P3	35	333256.47	6728403.21
Stylidium drummondianum	P3	25	333264.51	6728404.24
Stylidium drummondianum	P3	16	333261.88	6728379.44
Stylidium drummondianum	P3	12	333252.88	6728381.49
Stylidium drummondianum	P3	15	333241.12	6728388.82

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Stylidium drummondianum	P3	12	333235.30	6728400.25
Stylidium drummondianum	P3	8	333630.25	6728693.09
Stylidium drummondianum	P3	11	333633.86	6728699.99
Stylidium drummondianum	P3	7	333622.13	6728700.45
Stylidium drummondianum	P3	18	333625.02	6728704.94
Stylidium drummondianum	P3	28	333633.32	6728840.97
Stylidium drummondianum	P3	10	333637.73	6728853.38
Stylidium drummondianum	P3	14	333624.72	6728845.85
Stylidium drummondianum	P3	31	333618.51	6728852.34
Stylidium drummondianum	P3	33	333627.46	6728855.27
Stylidium drummondianum	P3	13	333631.75	6728860.02
Stylidium drummondianum	P3	17	333638.40	6728861.33
Stylidium drummondianum	P3	19	333637.81	6728871.13
Stylidium drummondianum	P3	21	333628.78	6728868.51
Stylidium drummondianum	P3	7	333625.44	6728876.12
Stylidium drummondianum	P3	6	333630.67	6728882.65
Stylidium drummondianum	P3	5	333640.20	6728884.67
Stylidium drummondianum	P3	1	333627.16	6728894.00
Stylidium drummondianum	P3	5	333633.17	6728899.83
Stylidium drummondianum	P3	11	333634.66	6728927.05
Stylidium drummondianum	P3	3	333639.82	6728931.83
Stylidium drummondianum	P3	8	333633.10	6728941.37
Stylidium drummondianum	P3	3	333634.03	6728948.71
Stylidium drummondianum	P3	9	333633.17	6728959.28
Stylidium drummondianum	P3	6	335430.07	6729243.38
Stylidium drummondianum	P3	11	337598.04	6731824.60
Stylidium drummondianum	P3	3	337601.22	6731829.77
Stylidium drummondianum	P3	4	337596.46	6731808.33
Stylidium drummondianum	P3	5	337592.75	6731697.18
Stylidium drummondianum	P3	5	337610.57	6731600.38
Stylidium drummondianum	P3	6	337649.33	6731568.87
Stylidium drummondianum	P3	4	337731.81	6731469.32
Stylidium drummondianum	P3	7	337648.48	6731354.45
Stylidium drummondianum	P3	2	337612.22	6731272.28
Stylidium drummondianum	P3	3	337957.29	6731500.49
Stylidium drummondianum	P3	10	337958.50	6731751.62
Stylidium drummondianum	P3	2	337959.13	6731760.20
Stylidium drummondianum	P3	2	337950.22	6731817.31
Stylidium drummondianum	P3	2	337948.23	6731842.34
Stylidium drummondianum	P3	1	339033.05	6731556.50
Stylidium drummondianum	P3	15	339025.97	6731529.59
Stylidium drummondianum	P3	50	339027.53	6731511.37
Stylidium drummondianum	P3	20	339391.75	6731184.86
Stylidium drummondianum	P3	7	337199.93	6731875.40
Stylidium drummondianum	P3	33	336942.70	6731908.63
Stylidium drummondianum	P3	4	336877.80	6731911.50
Stylidium drummondianum	P3	17	336870.91	6731900.11
Stylidium drummondianum	P3	4	337232.24	6730173.38
Stylidium drummondianum	P3	1	337247.29	6730202.69
Stylidium drummondianum	P3	3	337245.07	6730209.73
Stylidium drummondianum	P3	2	337238.11	6730226.49
Stylidium drummondianum	P3	4	337234.22	6730264.99
Stylidium drummondianum	P3	6	337228.21	6730942.67

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Stylidium drummondianum	P3	1	337233.16	6731755.79
Stylidium drummondianum	P3	3	337233.85	6731799.06
Stylidium drummondianum	P3	4	337229.29	6731798.18
Stylidium drummondianum	P3	3	337232.67	6731802.03
Stylidium drummondianum	P3	4	337233.37	6731803.06
Stylidium drummondianum	P3	7	337238.10	6731803.56
Stylidium drummondianum	P3	4	337241.15	6731802.40
Stylidium drummondianum	P3	7	337235.84	6731809.41
Stylidium drummondianum	P3	2	337232.68	6731811.70
Stylidium drummondianum	P3	3	337237.12	6731812.62
Stylidium drummondianum	P3	4	337238.86	6731816.26
Stylidium drummondianum	P3	4	337236.64	6731817.73
Stylidium drummondianum	P3	5	337231.73	6731817.80
Stylidium drummondianum	P3	5	337227.67	6731818.49
Stylidium drummondianum	P3	7	337223.21	6731821.80
Stylidium drummondianum	P3	4	337226.60	6731824.45
Stylidium drummondianum	P3	4	337236.36	6731824.36
Stylidium drummondianum	P3	1	337238.95	6731826.89
Stylidium drummondianum	P3	3	337238.80	6731830.53
Stylidium drummondianum	P3	4	337226.35	6731839.64
Stylidium drummondianum	P3	8	337230.35	6731842.44
Stylidium drummondianum	P3	7	337236.78	6731842.08
Stylidium drummondianum	P3	2	337225.41	6731846.81
Stylidium drummondianum	P3	4	337230.96	6731852.56
Stylidium drummondianum	P3	1	337232.89	6731852.80
Stylidium drummondianum	P3	1	337228.14	6731858.42
Stylidium drummondianum	P3	2	337225.29	6731862.34
Stylidium drummondianum	P3	2	337243.20	6731851.67
Stylidium drummondianum	P3	6	337233.40	6731864.48
Stylidium drummondianum	P3	6	337234.84	6731868.12
Stylidium drummondianum	P3	2	337231.12	6731869.21
Stylidium drummondianum	P3	15	337228.10	6731872.28
Stylidium drummondianum	P3	5	337234.46	6731877.65
Stylidium drummondianum	P3	8	337237.48	6731879.23
Stylidium drummondianum	P3	6	337241.32	6731882.89
Stylidium drummondianum	P3	10	337241.31	6731886.65
Stylidium drummondianum	P3	4	337237.83	6731885.31
Stylidium drummondianum	P3	7	337229.88	6731885.73
Stylidium drummondianum	P3	9	337228.34	6731897.21
Stylidium drummondianum	P3	7	337239.45	6731894.03
Stylidium drummondianum	P3	9	337240.27	6731903.49
Stylidium drummondianum	P3	8	337234.45	6731908.67
Stylidium drummondianum	P3	12	337227.93	6731914.69
Stylidium drummondianum	P3	8	337234.15	6731919.13
Stylidium drummondianum	P3	8	337239.56	6731921.61
Stylidium drummondianum	P3	9	337236.37	6731923.35
Stylidium drummondianum	P3	10	337231.52	6731922.54
Stylidium drummondianum	P3	120	338528.38	6731895.73
Stylidium drummondianum	P3	7	338309.91	6731172.36
Stylidium drummondianum	P3	2	338318.57	6731159.78
Stylidium drummondianum	P3	1	338312.74	6731140.89
Stylidium drummondianum	P3	10	338306.49	6731132.84
Stylidium drummondianum	P3	17	338308.89	6731128.15

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Stylidium drummondianum	P3	10	338318.44	6731121.05
Stylidium drummondianum	P3	1	338299.60	6731112.68
Stylidium drummondianum	P3	4	338305.17	6731109.23
Stylidium drummondianum	P3	5	338314.41	6731108.50
Stylidium drummondianum	P3	8	338315.94	6731098.61
Stylidium drummondianum	P3	5	338309.17	6731093.74
Stylidium drummondianum	P3	7	338318.77	6731084.71
Stylidium drummondianum	P3	4	338309.36	6731051.30
Stylidium drummondianum	P3	4	338311.94	6731046.47
Stylidium drummondianum	P3	6	339757.61	6731429.21
Stylidium drummondianum	P3	2	339753.14	6731422.00
Stylidium drummondianum	P3	12	333529.74	6728807.26
Stylidium drummondianum	P3	15	333549.85	6728809.60
Stylidium drummondianum	P3	12	333636.90	6728816.89
Stylidium drummondianum	P3	8	333501.65	6729513.72
Stylidium drummondianum	P3	7	333489.95	6729521.69
Stylidium drummondianum	P3	3	333314.11	6728449.24
Stylidium drummondianum	P3	5	338003.28	6730251.47
Stylidium drummondianum	P3	3	338010.04	6730248.54
Stylidium drummondianum	P3	6	338017.28	6730249.64
Stylidium drummondianum	P3	6	338061.86	6730253.97
Stylidium drummondianum	P3	18	338098.31	6730253.00
Stylidium drummondianum	P3	2	337580.26	6731235.59
Stylidium drummondianum	P3	10	338224.21	6731684.85
Stylidium drummondianum	P3	3	337516.05	6731728.57
Stylidium drummondianum	P3	12	337487.70	6731690.93
Stylidium drummondianum	P3	6	337475.23	6731690.03
Stylidium drummondianum	P3	12	338390.69	6730973.40
Stylidium drummondianum	P3	3	338399.47	6730969.05
Stylidium drummondianum	P3	1	338402.90	6730968.35
Stylidium drummondianum	P3	4	338404.44	6730963.22
Stylidium drummondianum	P3	2	338408.41	6730963.78
Stylidium drummondianum	P3	3	338408.26	6730967.26
Stylidium drummondianum	P3	6	338407.49	6730975.35
Stylidium drummondianum	P3	5	338407.37	6730976.85
Stylidium drummondianum	P3	35	338685.18	6730018.24
Stylidium drummondianum	P3	35	338683.02	6730030.88
Stylidium drummondianum	P3	15	338683.31	6730048.19
Stylidium drummondianum	P3	3	338310.47	6730372.16
Stylidium drummondianum	P3	5	338302.92	6730372.93
Stylidium drummondianum	P3	7	338300.53	6730378.15
Stylidium drummondianum	P3	4	338309.31	6730381.47
Stylidium drummondianum	P3	4	338316.88	6730389.77
Stylidium drummondianum	P3	8	338314.15	6730394.87
Stylidium drummondianum	P3	7	338321.52	6730403.15
Stylidium drummondianum	P3	6	338304.80	6730404.69
Stylidium drummondianum	P3	2	338310.15	6730410.66
Stylidium drummondianum	P3	4	338315.15	6730410.86
Stylidium drummondianum	P3	6	338322.39	6730414.60
Stylidium drummondianum	P3	5	338318.32	6730419.55
Stylidium drummondianum	P3	8	338309.53	6730418.79
Stylidium drummondianum	P3	12	338304.00	6730419.99
Stylidium drummondianum	P3	4	338304.17	6730426.18

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Stylidium drummondianum	P3	6	338313.11	6730425.76
Stylidium drummondianum	P3	5	338316.70	6730427.94
Stylidium drummondianum	P3	11	338314.62	6730428.91
Stylidium drummondianum	P3	9	338309.78	6730429.68
Stylidium drummondianum	P3	12	338306.33	6730438.33
Stylidium drummondianum	P3	5	338308.86	6730456.40
Stylidium drummondianum	P3	10	338304.95	6731018.95
Stylidium drummondianum	P3	6	338310.67	6731023.98
Stylidium drummondianum	P3	2	338306.06	6731030.72
Stylidium drummondianum	P3	4	338318.09	6731028.16
Stylidium drummondianum	P3	8	338315.95	6731037.51
Stylidium drummondianum	P3	7	338307.76	6731041.36
Stylidium drummondianum	P3	4	338308.39	6731045.83
Stylidium drummondianum	P3	3	338317.14	6731040.55
Stylidium drummondianum	P3	5	338358.95	6730974.83
Stylidium drummondianum	P3	3	338368.83	6730959.72
Stylidium drummondianum	P3	4	338389.14	6730952.28
Stylidium drummondianum	P3	4	338397.75	6730938.80
Stylidium drummondianum	P3	9	338401.85	6730932.62
Stylidium drummondianum	P3	3	338426.96	6730926.98
Stylidium drummondianum	P3	2	338449.09	6730915.72
Stylidium drummondianum	P3	8	337234.76	6731936.22
Stylidium drummondianum	P3	8	337235.39	6731965.40
Stylidium drummondianum	P3	5	337286.13	6732005.85
Stylidium drummondianum	P3	5	337322.92	6732003.76
Stylidium drummondianum	P3	5	337359.55	6732002.55
Stylidium drummondianum	P3	3	337391.48	6732028.42
Stylidium drummondianum	P3	8	337388.02	6732035.60
Stylidium drummondianum	P3	3	337354.82	6732080.02
Stylidium drummondianum	P3	3	337333.50	6732169.59
Stylidium drummondianum	P3	6	337321.36	6732201.52
Stylidium drummondianum	P3	6	337316.71	6732241.82
Stylidium drummondianum	P3	4	337290.93	6732310.51
Stylidium drummondianum	P3	16	337290.65	6732324.78
Stylidium drummondianum	P3	2	337609.88	6732051.95
Stylidium drummondianum	P3	4	337583.50	6732047.38
Stylidium drummondianum	P3	4	337574.98	6732045.26
Stylidium drummondianum	P3	8	337951.79	6732408.95
Stylidium drummondianum	P3	12	337967.05	6732410.63
Stylidium drummondianum	P3	25	337977.91	6732420.86
Stylidium drummondianum	P3	3	338000.33	6732409.46
Stylidium drummondianum	P3	5	338018.39	6732410.80
Stylidium drummondianum	P3	3	338042.93	6732406.33
Stylidium drummondianum	P3	3	338051.42	6732412.15
Stylidium drummondianum	P3	8	338055.42	6732408.48
Stylidium drummondianum	P3	2	338078.87	6732412.37
Stylidium drummondianum	P3	4	338133.75	6732420.03
Stylidium drummondianum	P3	42	338136.41	6732405.33
Stylidium drummondianum	P3	4	338199.50	6732418.31
Stylidium drummondianum	P3	4	338216.88	6732407.28
Stylidium drummondianum	P3	1	337114.94	6732042.96
Stylidium drummondianum	P3	5	337115.96	6732047.78
Stylidium drummondianum	P3	6	337114.93	6732059.66

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Stylidium drummondianum	P3	1	337122.36	6732054.04
Stylidium drummondianum	P3	3	337131.64	6732046.12
Stylidium drummondianum	P3	5	337138.76	6732044.15
Stylidium drummondianum	P3	5	337141.45	6732051.17
Stylidium drummondianum	P3	7	337140.53	6732058.61
Stylidium drummondianum	P3	6	337148.18	6732057.60
Stylidium drummondianum	P3	4	337155.79	6732050.97
Stylidium drummondianum	P3	3	337159.61	6732045.10
Stylidium drummondianum	P3	4	337162.33	6732058.24
Stylidium drummondianum	P3	4	337169.83	6732051.11
Stylidium drummondianum	P3	3	337177.20	6732061.47
Stylidium drummondianum	P3	4	337218.53	6732045.24
Stylidium drummondianum	P3	2	337224.39	6732054.28
Stylidium drummondianum	P3	1	337229.03	6732057.29
Stylidium drummondianum	P3	4	337230.63	6732055.83
Stylidium drummondianum	P3	5	337243.86	6732042.04
Stylidium drummondianum	P3	3	337250.12	6732052.98
Stylidium drummondianum	P3	1	337263.10	6732043.69
Stylidium drummondianum	P3	2	337268.60	6732055.30
Stylidium drummondianum	P3	2	337293.98	6732059.05
Stylidium drummondianum	P3	5	337300.18	6732049.70
Stylidium drummondianum	P3	6	337331.94	6732041.30
Stylidium drummondianum	P3	7	337344.29	6732057.35
Stylidium drummondianum	P3	2	337356.30	6732050.19
Stylidium drummondianum	P3	5	337387.13	6732056.24
Stylidium drummondianum	P3	4	337392.82	6732057.07
Stylidium drummondianum	P3	6	337417.21	6732058.34
Stylidium drummondianum	P3	6	337430.99	6732064.74
Stylidium drummondianum	P3	5	337422.92	6732092.64
Stylidium drummondianum	P3	18	337419.49	6732105.55
Stylidium drummondianum	P3	5	337412.13	6732131.02
Stylidium drummondianum	P3	7	337403.38	6732155.74
Stylidium drummondianum	P3	8	337397.34	6732175.34
Stylidium drummondianum	P3	1	337389.13	6732190.04
Stylidium drummondianum	P3	3	337383.82	6732204.69
Stylidium drummondianum	P3	2	337376.42	6732243.04
Stylidium drummondianum	P3	2	337373.71	6732261.14
Stylidium drummondianum	P3	6	337370.82	6732273.02
Stylidium drummondianum	P3	4	337355.08	6732301.64
Stylidium torticarpum	P3	23	337949.21	6728943.11
Stylidium torticarpum	P3	2	337945.16	6729430.60
Stylidium torticarpum	P3	23	337966.45	6731875.99
Stylidium torticarpum	P3	2	337951.08	6731895.28
Stylidium torticarpum	P3	3	338522.03	6731704.77
Stylidium torticarpum	P3	35	339029.00	6731343.00
Stylidium torticarpum	P3	70	339023.22	6731307.35
Stylidium torticarpum	P3	45	339392.43	6730900.91
Stylidium torticarpum	P3	17	339395.36	6731009.24
Stylidium torticarpum	P3	10	339396.47	6731023.13
Stylidium torticarpum	P3	30	339388.02	6731081.88
Stylidium torticarpum	P3	2	338670.24	6731618.52
Stylidium torticarpum	P3	1	338672.22	6731631.72
Stylidium torticarpum	P3	8	339746.95	6730816.32

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Stylidium torticarpum	P3	5	339758.49	6730802.70
Stylidium torticarpum	P3	10	340114.89	6730578.91
Stylidium torticarpum	P3	1	338460.42	6731698.64
Stylidium torticarpum	P3	12	338434.62	6731698.29
Stylidium torticarpum	P3	16	338414.15	6731698.84
Stylidium torticarpum	P3	26	338338.15	6731699.97
Stylidium torticarpum	P3	45	338333.62	6731702.53
Stylidium torticarpum	P3	7	338328.26	6731701.30
Stylidium torticarpum	P3	4	337538.64	6732417.18
Stylidium torticarpum	P3	9	338545.78	6731682.47
Synaphea oulopha	P3	3	330756.64	6725648.39
Synaphea oulopha	P3	2	330754.77	6725676.06
Synaphea oulopha	P3	6	330751.66	6725690.23
Synaphea oulopha	P3	6	330748.20	6725705.61
Synaphea oulopha	P3	8	330747.85	6725729.00
Verticordia densiflora var. *roseostella*	P3	25	332427.71	6732057.64
Verticordia densiflora var. *roseostella*	P3	19	332409.35	6732050.83
Verticordia densiflora var. *roseostella*	P3	20	332370.80	6732042.73
Verticordia densiflora var. *roseostella*	P3	5	332348.30	6732048.57
Verticordia densiflora var. *roseostella*	P3	9	332245.66	6732039.73
Verticordia luteola var. *luteola*	P3	1	333997.04	6728235.26
Banksia scabrella	P4	11	334352.67	6728052.82
Banksia scabrella	P4	15	334350.58	6728021.64
Banksia scabrella	P4	19	334718.96	6728250.44
Banksia scabrella	P4	16	334715.03	6728236.27
Banksia scabrella	P4	12	334707.19	6728220.34
Banksia scabrella	P4	22	334708.84	6728205.70
Banksia scabrella	P4	18	334710.96	6728188.84
Banksia scabrella	P4	22	334711.98	6728173.85
Banksia scabrella	P4	13	334710.75	6728159.39
Banksia scabrella	P4	10	334717.55	6728140.13
Banksia scabrella	P4	11	334710.24	6728123.78
Banksia scabrella	P4	11	334710.28	6728104.31
Banksia scabrella	P4	22	334712.07	6728084.42
Banksia scabrella	P4	19	334710.30	6728061.18
Banksia scabrella	P4	15	334711.20	6728046.58
Banksia scabrella	P4	1	334715.92	6728027.04
Banksia scabrella	P4	4	334717.40	6728020.81
Banksia scabrella	P4	2	334712.35	6728007.61
Banksia scabrella	P4	7	334713.22	6728001.81
Banksia scabrella	P4	4	334710.93	6727986.66
Banksia scabrella	P4	7	334717.70	6727985.94
Banksia scabrella	P4	8	334711.13	6727972.36
Banksia scabrella	P4	2	334701.68	6727968.97
Banksia scabrella	P4	11	334711.35	6727958.98
Banksia scabrella	P4	15	334712.67	6727949.77
Banksia scabrella	P4	18	334712.51	6727932.36
Banksia scabrella	P4	23	334715.80	6727915.48
Banksia scabrella	P4	17	334710.00	6727905.66
Banksia scabrella	P4	26	334712.69	6727889.82
Banksia scabrella	P4	18	334713.74	6727872.57
Banksia scabrella	P4	15	334712.35	6727855.45
Banksia scabrella	P4	22	334717.36	6727833.45

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	20	334715.52	6727811.37
Banksia scabrella	P4	17	334716.91	6727795.88
Banksia scabrella	P4	5	334711.74	6727772.24
Banksia scabrella	P4	1	334706.19	6727759.61
Banksia scabrella	P4	1	334711.86	6727750.96
Banksia scabrella	P4	1	334714.16	6727723.57
Banksia scabrella	P4	2	334718.80	6727724.21
Banksia scabrella	P4	3	334713.17	6727691.85
Banksia scabrella	P4	3	334708.36	6727687.86
Banksia scabrella	P4	4	334709.49	6727685.27
Banksia scabrella	P4	1	334708.22	6727675.87
Banksia scabrella	P4	1	334705.59	6727673.43
Banksia scabrella	P4	3	334711.22	6727657.10
Banksia scabrella	P4	4	334711.39	6727649.13
Banksia scabrella	P4	1	334703.21	6727618.93
Banksia scabrella	P4	7	334705.47	6727577.66
Banksia scabrella	P4	1	334711.84	6727534.46
Banksia scabrella	P4	14	334711.55	6727458.70
Banksia scabrella	P4	7	334709.96	6727443.42
Banksia scabrella	P4	10	334707.15	6727432.04
Banksia scabrella	P4	8	334713.50	6727410.94
Banksia scabrella	P4	8	334710.14	6727376.69
Banksia scabrella	P4	7	334711.55	6727356.80
Banksia scabrella	P4	4	334708.11	6727327.83
Banksia scabrella	P4	8	334707.21	6727297.32
Banksia scabrella	P4	12	334707.47	6727264.66
Banksia scabrella	P4	24	334712.36	6727242.58
Banksia scabrella	P4	18	334714.41	6727203.91
Banksia scabrella	P4	2	334709.69	6727144.11
Banksia scabrella	P4	2	334709.61	6727136.45
Banksia scabrella	P4	4	334713.20	6727109.31
Banksia scabrella	P4	4	334710.88	6727072.49
Banksia scabrella	P4	22	334715.66	6726987.94
Banksia scabrella	P4	16	334718.01	6726955.72
Banksia scabrella	P4	3	334709.60	6726920.53
Banksia scabrella	P4	2	334715.26	6726842.25
Banksia scabrella	P4	2	334716.19	6726788.66
Banksia scabrella	P4	5	334713.05	6726448.09
Banksia scabrella	P4	15	334355.52	6727666.23
Banksia scabrella	P4	10	334352.18	6727685.54
Banksia scabrella	P4	8	334352.79	6727704.01
Banksia scabrella	P4	27	334363.95	6727719.75
Banksia scabrella	P4	25	334358.41	6727737.95
Banksia scabrella	P4	18	334355.35	6727752.73
Banksia scabrella	P4	9	334358.08	6727775.54
Banksia scabrella	P4	23	334353.25	6727827.74
Banksia scabrella	P4	17	334347.81	6727860.76
Banksia scabrella	P4	6	334358.33	6727937.06
Banksia scabrella	P4	11	334353.51	6727971.04
Banksia scabrella	P4	1	335075.18	6729855.77
Banksia scabrella	P4	7	335068.51	6729652.32
Banksia scabrella	P4	8	335076.01	6729524.68
Banksia scabrella	P4	8	335102.00	6729512.58

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	10	335104.05	6729496.57
Banksia scabrella	P4	4	335100.12	6729472.71
Banksia scabrella	P4	5	335085.11	6729457.86
Banksia scabrella	P4	3	335083.49	6729441.06
Banksia scabrella	P4	2	335083.59	6729409.94
Banksia scabrella	P4	3	335121.29	6729399.57
Banksia scabrella	P4	20	335143.22	6729343.81
Banksia scabrella	P4	20	335146.56	6729311.62
Banksia scabrella	P4	5	335426.08	6727988.01
Banksia scabrella	P4	10	335431.67	6727953.32
Banksia scabrella	P4	18	335424.01	6727924.30
Banksia scabrella	P4	6	335434.87	6727896.75
Banksia scabrella	P4	6	335426.61	6727809.50
Banksia scabrella	P4	2	335421.57	6727710.45
Banksia scabrella	P4	1	335429.63	6727677.96
Banksia scabrella	P4	7	335430.58	6727611.56
Banksia scabrella	P4	8	335437.30	6727556.23
Banksia scabrella	P4	10	335428.43	6727518.74
Banksia scabrella	P4	10	335072.43	6729511.95
Banksia scabrella	P4	8	335071.47	6729495.30
Banksia scabrella	P4	3	335070.30	6729440.81
Banksia scabrella	P4	5	335071.35	6729419.33
Banksia scabrella	P4	2	335075.75	6729285.96
Banksia scabrella	P4	1	335071.61	6729280.64
Banksia scabrella	P4	9	335073.99	6729250.73
Banksia scabrella	P4	15	335075.95	6729236.83
Banksia scabrella	P4	10	335084.89	6729227.34
Banksia scabrella	P4	12	335067.44	6729223.90
Banksia scabrella	P4	17	335074.37	6729202.75
Banksia scabrella	P4	22	335074.19	6729189.99
Banksia scabrella	P4	26	335068.03	6729169.76
Banksia scabrella	P4	17	335074.65	6729145.17
Banksia scabrella	P4	33	335072.76	6729119.23
Banksia scabrella	P4	14	335072.65	6729101.12
Banksia scabrella	P4	16	335072.86	6729080.24
Banksia scabrella	P4	10	335072.17	6729075.57
Banksia scabrella	P4	12	335069.53	6729031.35
Banksia scabrella	P4	22	335071.60	6729008.84
Banksia scabrella	P4	18	335072.53	6728993.63
Banksia scabrella	P4	11	335069.81	6728969.80
Banksia scabrella	P4	10	335072.40	6728934.16
Banksia scabrella	P4	15	335076.69	6728917.25
Banksia scabrella	P4	12	335072.26	6728893.78
Banksia scabrella	P4	9	335072.63	6728870.16
Banksia scabrella	P4	4	335067.70	6728830.42
Banksia scabrella	P4	1	335069.97	6728812.51
Banksia scabrella	P4	2	335064.75	6728813.19
Banksia scabrella	P4	4	335076.47	6728794.16
Banksia scabrella	P4	2	335070.57	6728750.40
Banksia scabrella	P4	2	335073.40	6728614.02
Banksia scabrella	P4	1	335071.16	6728210.15
Banksia scabrella	P4	4	335075.93	6728207.48
Banksia scabrella	P4	15	335073.44	6728194.75

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	18	335064.86	6728179.55
Banksia scabrella	P4	4	335075.40	6728161.87
Banksia scabrella	P4	7	335063.31	6728149.35
Banksia scabrella	P4	10	335072.20	6726765.49
Banksia scabrella	P4	20	335066.79	6726802.88
Banksia scabrella	P4	25	335061.32	6726836.16
Banksia scabrella	P4	10	335064.88	6726878.47
Banksia scabrella	P4	30	335068.52	6726908.41
Banksia scabrella	P4	50	335073.20	6726942.45
Banksia scabrella	P4	10	335071.01	6726975.99
Banksia scabrella	P4	20	335065.63	6727008.02
Banksia scabrella	P4	15	335071.18	6727043.97
Banksia scabrella	P4	20	335066.14	6727071.73
Banksia scabrella	P4	30	335073.65	6727124.96
Banksia scabrella	P4	15	335068.79	6727147.89
Banksia scabrella	P4	10	335065.81	6727171.30
Banksia scabrella	P4	20	335065.42	6727197.84
Banksia scabrella	P4	20	335067.73	6727218.99
Banksia scabrella	P4	5	335069.67	6727259.05
Banksia scabrella	P4	1	335077.23	6727292.27
Banksia scabrella	P4	20	335070.69	6727328.59
Banksia scabrella	P4	20	335076.69	6727379.01
Banksia scabrella	P4	10	335070.56	6727415.78
Banksia scabrella	P4	40	335069.59	6727497.18
Banksia scabrella	P4	10	335083.07	6727592.15
Banksia scabrella	P4	2	335076.13	6727826.52
Banksia scabrella	P4	8	335793.82	6728000.79
Banksia scabrella	P4	5	335793.54	6728095.61
Banksia scabrella	P4	1	335790.11	6728109.94
Banksia scabrella	P4	2	335794.27	6728115.02
Banksia scabrella	P4	6	335792.55	6728136.69
Banksia scabrella	P4	20	335784.90	6728181.59
Banksia scabrella	P4	12	335787.05	6728195.07
Banksia scabrella	P4	14	335782.88	6728215.32
Banksia scabrella	P4	8	335787.78	6728224.46
Banksia scabrella	P4	3	335780.39	6728235.68
Banksia scabrella	P4	12	335740.75	6728280.03
Banksia scabrella	P4	11	335737.19	6728305.42
Banksia scabrella	P4	9	335738.26	6728316.48
Banksia scabrella	P4	13	335738.55	6728331.59
Banksia scabrella	P4	3	337590.95	6728143.75
Banksia scabrella	P4	11	337593.83	6728101.10
Banksia scabrella	P4	2	337955.21	6728284.55
Banksia scabrella	P4	2	336873.44	6731878.84
Banksia scabrella	P4	1	336870.64	6731588.37
Banksia scabrella	P4	1	336871.73	6731537.43
Banksia scabrella	P4	1	336867.90	6731501.18
Banksia scabrella	P4	3	337594.96	6731011.96
Banksia scabrella	P4	4	337597.58	6730986.02
Banksia scabrella	P4	3	337599.21	6730955.81
Banksia scabrella	P4	5	337601.13	6730937.62
Banksia scabrella	P4	4	337596.62	6730891.96
Banksia scabrella	P4	2	337594.07	6730755.62

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	3	337594.85	6730724.05
Banksia scabrella	P4	2	337599.14	6730544.45
Banksia scabrella	P4	3	337586.61	6729739.64
Banksia scabrella	P4	2	337953.62	6729807.24
Banksia scabrella	P4	1	337944.87	6730351.19
Banksia scabrella	P4	2	337950.55	6730983.36
Banksia scabrella	P4	1	337947.95	6731170.93
Banksia scabrella	P4	1	337951.01	6731222.54
Banksia scabrella	P4	2	337947.03	6731277.37
Banksia scabrella	P4	4	337953.20	6731327.16
Banksia scabrella	P4	20	337951.58	6731380.73
Banksia scabrella	P4	4	337957.03	6731529.54
Banksia scabrella	P4	5	337952.35	6731580.29
Banksia scabrella	P4	2	337952.59	6731626.86
Banksia scabrella	P4	2	337956.73	6731656.14
Banksia scabrella	P4	3	337947.87	6731683.66
Banksia scabrella	P4	15	337951.97	6731705.86
Banksia scabrella	P4	2	339025.93	6731782.67
Banksia scabrella	P4	1	337228.88	6729844.28
Banksia scabrella	P4	1	337233.65	6730586.25
Banksia scabrella	P4	1	337238.69	6730859.29
Banksia scabrella	P4	6	337233.35	6730859.12
Banksia scabrella	P4	4	337234.26	6730867.92
Banksia scabrella	P4	1	337234.58	6731812.85
Banksia scabrella	P4	2	338313.29	6731579.77
Banksia scabrella	P4	2	338311.11	6731539.28
Banksia scabrella	P4	1	338305.48	6731535.64
Banksia scabrella	P4	8	338309.47	6731527.36
Banksia scabrella	P4	8	338306.11	6731518.61
Banksia scabrella	P4	2	339754.95	6731634.21
Banksia scabrella	P4	1	339752.84	6731572.90
Banksia scabrella	P4	3	339752.76	6731548.59
Banksia scabrella	P4	4	339750.21	6731515.57
Banksia scabrella	P4	2	339752.52	6731469.13
Banksia scabrella	P4	5	339752.85	6731451.94
Banksia scabrella	P4	1	339749.40	6731273.17
Banksia scabrella	P4	1	340114.01	6731628.64
Banksia scabrella	P4	25	334564.13	6727010.91
Banksia scabrella	P4	30	334587.96	6727023.29
Banksia scabrella	P4	20	334610.29	6727019.34
Banksia scabrella	P4	40	334635.10	6727009.84
Banksia scabrella	P4	30	334658.58	6727010.31
Banksia scabrella	P4	30	334683.31	6727013.90
Banksia scabrella	P4	20	334701.77	6727011.98
Banksia scabrella	P4	10	334701.39	6727361.52
Banksia scabrella	P4	25	334678.61	6727374.72
Banksia scabrella	P4	15	334653.74	6727375.07
Banksia scabrella	P4	10	334629.85	6727363.99
Banksia scabrella	P4	20	334571.79	6727368.80
Banksia scabrella	P4	7	334485.11	6727376.14
Banksia scabrella	P4	5	334448.27	6727370.83
Banksia scabrella	P4	25	332628.91	6727720.91
Banksia scabrella	P4	15	332665.57	6727730.83

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	1	333105.24	6728812.96
Banksia scabrella	P4	1	333195.30	6728807.50
Banksia scabrella	P4	1	334935.06	6728817.48
Banksia scabrella	P4	3	335023.10	6728812.95
Banksia scabrella	P4	6	335056.25	6728813.65
Banksia scabrella	P4	30	335087.07	6728814.60
Banksia scabrella	P4	60	335109.84	6728813.64
Banksia scabrella	P4	60	335140.36	6728816.56
Banksia scabrella	P4	45	335164.87	6728813.63
Banksia scabrella	P4	15	335186.14	6728810.90
Banksia scabrella	P4	14	335210.92	6728809.05
Banksia scabrella	P4	8	335244.18	6728806.40
Banksia scabrella	P4	4	335273.50	6728806.09
Banksia scabrella	P4	15	335906.19	6728086.57
Banksia scabrella	P4	20	335891.30	6728093.36
Banksia scabrella	P4	15	335863.73	6728089.73
Banksia scabrella	P4	10	335843.60	6728076.89
Banksia scabrella	P4	5	335804.54	6728086.59
Banksia scabrella	P4	8	335735.52	6728090.18
Banksia scabrella	P4	7	335707.23	6728088.53
Banksia scabrella	P4	5	335671.85	6728088.65
Banksia scabrella	P4	2	335630.38	6728089.32
Banksia scabrella	P4	1	335596.27	6728088.14
Banksia scabrella	P4	7	334537.73	6726649.06
Banksia scabrella	P4	2	334666.94	6726653.21
Banksia scabrella	P4	10	334885.16	6726645.78
Banksia scabrella	P4	12	334962.99	6726645.34
Banksia scabrella	P4	15	334999.93	6726642.78
Banksia scabrella	P4	15	335031.23	6726649.72
Banksia scabrella	P4	2	335247.21	6726651.85
Banksia scabrella	P4	1	334183.30	6729168.67
Banksia scabrella	P4	1	334400.29	6729170.86
Banksia scabrella	P4	1	334431.69	6729186.18
Banksia scabrella	P4	2	334934.08	6729174.22
Banksia scabrella	P4	1	334990.85	6729171.32
Banksia scabrella	P4	3	335008.67	6729168.69
Banksia scabrella	P4	8	335020.46	6729171.21
Banksia scabrella	P4	17	335029.80	6729176.62
Banksia scabrella	P4	16	335038.84	6729168.56
Banksia scabrella	P4	15	335047.82	6729161.53
Banksia scabrella	P4	12	335050.41	6729171.38
Banksia scabrella	P4	14	335063.74	6729164.15
Banksia scabrella	P4	24	335084.50	6729175.91
Banksia scabrella	P4	13	335102.39	6729174.01
Banksia scabrella	P4	9	335123.31	6729168.74
Banksia scabrella	P4	2	335139.01	6729171.59
Banksia scabrella	P4	8	335092.60	6729532.91
Banksia scabrella	P4	1	334984.62	6729534.57
Banksia scabrella	P4	1	334979.22	6729531.61
Banksia scabrella	P4	3	334952.75	6729531.25
Banksia scabrella	P4	3	334620.35	6729528.09
Banksia scabrella	P4	2	334598.12	6729531.23
Banksia scabrella	P4	2	334531.32	6729534.65

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	1	334242.71	6729522.46
Banksia scabrella	P4	1	334137.31	6729531.48
Banksia scabrella	P4	1	333815.60	6729537.00
Banksia scabrella	P4	2	334123.51	6728450.20
Banksia scabrella	P4	1	334228.85	6728447.05
Banksia scabrella	P4	4	334437.06	6728449.92
Banksia scabrella	P4	1	334734.61	6728446.33
Banksia scabrella	P4	8	334909.36	6728454.61
Banksia scabrella	P4	20	334992.46	6728448.93
Banksia scabrella	P4	2	335167.36	6728442.20
Banksia scabrella	P4	20	335272.20	6728457.81
Banksia scabrella	P4	10	335294.01	6728454.26
Banksia scabrella	P4	10	335329.21	6728456.51
Banksia scabrella	P4	50	335420.65	6728448.74
Banksia scabrella	P4	50	335458.07	6728449.33
Banksia scabrella	P4	50	335490.15	6728454.85
Banksia scabrella	P4	20	335518.07	6728456.66
Banksia scabrella	P4	5	335608.34	6728454.25
Banksia scabrella	P4	30	336073.86	6727737.65
Banksia scabrella	P4	10	336032.14	6727725.86
Banksia scabrella	P4	10	336006.40	6727728.78
Banksia scabrella	P4	20	335918.05	6727722.97
Banksia scabrella	P4	40	335888.52	6727727.63
Banksia scabrella	P4	20	335860.27	6727733.83
Banksia scabrella	P4	40	335819.14	6727733.87
Banksia scabrella	P4	40	335785.88	6727725.19
Banksia scabrella	P4	10	335752.68	6727735.01
Banksia scabrella	P4	20	335712.69	6727726.44
Banksia scabrella	P4	10	335662.97	6727730.00
Banksia scabrella	P4	5	335485.81	6727723.19
Banksia scabrella	P4	8	335457.46	6727726.96
Banksia scabrella	P4	5	335429.86	6727715.55
Banksia scabrella	P4	2	335099.50	6727731.81
Banksia scabrella	P4	4	334703.13	6727734.83
Banksia scabrella	P4	15	334665.31	6727731.95
Banksia scabrella	P4	1	334483.17	6727724.76
Banksia scabrella	P4	20	334443.41	6727733.30
Banksia scabrella	P4	40	334391.34	6727730.16
Banksia scabrella	P4	40	334354.72	6727734.04
Banksia scabrella	P4	40	334316.80	6727733.97
Banksia scabrella	P4	40	334274.86	6727729.89
Banksia scabrella	P4	20	334240.52	6727728.19
Banksia scabrella	P4	20	334212.42	6727729.79
Banksia scabrella	P4	1	332970.70	6728093.60
Banksia scabrella	P4	10	334352.40	6728093.54
Banksia scabrella	P4	5	334418.26	6728090.02
Banksia scabrella	P4	20	334440.26	6728086.57
Banksia scabrella	P4	20	334476.13	6728087.72
Banksia scabrella	P4	10	334508.29	6728088.04
Banksia scabrella	P4	20	334544.46	6728086.33
Banksia scabrella	P4	20	334580.91	6728082.93
Banksia scabrella	P4	20	334604.76	6728088.95
Banksia scabrella	P4	15	334695.42	6728089.43

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	40	334725.93	6728089.80
Banksia scabrella	P4	60	334760.14	6728095.55
Banksia scabrella	P4	80	334793.65	6728094.45
Banksia scabrella	P4	80	334844.64	6728086.45
Banksia scabrella	P4	60	334881.32	6728078.89
Banksia scabrella	P4	40	334941.60	6728090.02
Banksia scabrella	P4	15	334977.50	6728086.35
Banksia scabrella	P4	30	335011.24	6728091.11
Banksia scabrella	P4	30	335344.86	6728088.60
Banksia scabrella	P4	80	335382.57	6728086.61
Banksia scabrella	P4	80	335424.94	6728087.81
Banksia scabrella	P4	1	336767.89	6730247.84
Banksia scabrella	P4	1	337535.86	6730252.97
Banksia scabrella	P4	2	338643.73	6729885.17
Banksia scabrella	P4	14	338561.10	6729899.92
Banksia scabrella	P4	1	335078.16	6729892.42
Banksia scabrella	P4	4	337531.69	6730614.56
Banksia scabrella	P4	1	337404.32	6730616.83
Banksia scabrella	P4	4	337367.27	6730618.91
Banksia scabrella	P4	3	337344.29	6730611.76
Banksia scabrella	P4	3	337304.30	6730616.26
Banksia scabrella	P4	1	335650.54	6731327.92
Banksia scabrella	P4	1	335731.95	6731325.40
Banksia scabrella	P4	2	335776.00	6731329.41
Banksia scabrella	P4	1	335982.85	6731334.99
Banksia scabrella	P4	1	336174.11	6731329.54
Banksia scabrella	P4	1	336460.94	6731321.61
Banksia scabrella	P4	1	336484.27	6731331.54
Banksia scabrella	P4	1	336641.06	6731332.15
Banksia scabrella	P4	1	336723.84	6731326.09
Banksia scabrella	P4	1	336911.08	6731327.57
Banksia scabrella	P4	4	337776.06	6731330.20
Banksia scabrella	P4	3	337793.91	6731327.57
Banksia scabrella	P4	6	337810.21	6731330.05
Banksia scabrella	P4	8	337827.46	6731330.06
Banksia scabrella	P4	5	337890.16	6731322.10
Banksia scabrella	P4	3	337927.77	6731328.48
Banksia scabrella	P4	1	338564.13	6731609.64
Banksia scabrella	P4	1	338557.91	6731616.11
Banksia scabrella	P4	8	338536.70	6731615.26
Banksia scabrella	P4	2	338528.15	6731621.57
Banksia scabrella	P4	7	338509.40	6731622.77
Banksia scabrella	P4	7	338491.97	6731637.58
Banksia scabrella	P4	4	338030.88	6731695.69
Banksia scabrella	P4	5	337949.76	6731689.65
Banksia scabrella	P4	2	337839.45	6731687.79
Banksia scabrella	P4	1	337666.79	6731689.93
Banksia scabrella	P4	2	336321.23	6731687.10
Banksia scabrella	P4	3	336531.30	6729532.28
Banksia scabrella	P4	3	336551.17	6729529.65
Banksia scabrella	P4	1	337192.77	6729534.12
Banksia scabrella	P4	1	337466.61	6729532.52
Banksia scabrella	P4	10	337598.54	6729528.77

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	2	337644.96	6729528.68
Banksia scabrella	P4	2	338327.27	6729171.01
Banksia scabrella	P4	1	337691.35	6729170.65
Banksia scabrella	P4	2	337356.61	6729172.28
Banksia scabrella	P4	8	337308.58	6729166.94
Banksia scabrella	P4	18	337270.24	6729173.07
Banksia scabrella	P4	25	337237.13	6729174.56
Banksia scabrella	P4	20	337154.88	6729164.63
Banksia scabrella	P4	10	337106.04	6729177.73
Banksia scabrella	P4	10	337059.51	6729175.88
Banksia scabrella	P4	1	336068.71	6729162.67
Banksia scabrella	P4	1	336056.41	6729171.71
Banksia scabrella	P4	5	336041.68	6729169.41
Banksia scabrella	P4	8	335903.09	6729169.54
Banksia scabrella	P4	8	335345.06	6729170.85
Banksia scabrella	P4	1	335612.51	6730608.88
Banksia scabrella	P4	4	335652.90	6730614.18
Banksia scabrella	P4	2	335675.84	6730610.12
Banksia scabrella	P4	4	335703.76	6730606.09
Banksia scabrella	P4	1	335765.81	6730610.22
Banksia scabrella	P4	1	336504.09	6730605.81
Banksia scabrella	P4	6	336623.53	6730606.85
Banksia scabrella	P4	15	336693.70	6730611.60
Banksia scabrella	P4	12	336737.81	6730611.09
Banksia scabrella	P4	6	336784.17	6730611.55
Banksia scabrella	P4	6	336832.45	6730604.98
Banksia scabrella	P4	6	336871.85	6730611.60
Banksia scabrella	P4	6	337003.64	6730609.05
Banksia scabrella	P4	6	337035.30	6730605.46
Banksia scabrella	P4	4	337148.58	6730606.50
Banksia scabrella	P4	4	337194.60	6730614.60
Banksia scabrella	P4	2	335674.10	6730971.86
Banksia scabrella	P4	1	335722.26	6730974.84
Banksia scabrella	P4	1	335740.87	6730969.49
Banksia scabrella	P4	1	335754.39	6730974.83
Banksia scabrella	P4	1	335756.41	6730974.44
Banksia scabrella	P4	1	335756.07	6730972.09
Banksia scabrella	P4	1	335754.92	6730970.72
Banksia scabrella	P4	1	335758.53	6730965.09
Banksia scabrella	P4	1	335768.33	6730972.77
Banksia scabrella	P4	3	335790.27	6730960.02
Banksia scabrella	P4	1	337433.48	6730970.50
Banksia scabrella	P4	1	337435.80	6730971.52
Banksia scabrella	P4	1	337502.75	6730972.57
Banksia scabrella	P4	1	337504.41	6730958.02
Banksia scabrella	P4	1	337673.43	6730967.80
Banksia scabrella	P4	1	337764.02	6730965.33
Banksia scabrella	P4	1	337869.33	6730972.05
Banksia scabrella	P4	1	337872.41	6730973.91
Banksia scabrella	P4	1	337889.47	6730969.96
Banksia scabrella	P4	1	337973.29	6730971.72
Banksia scabrella	P4	13	337978.62	6730970.56
Banksia scabrella	P4	1	337981.59	6730967.29

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	1	337987.59	6730964.30
Banksia scabrella	P4	1	337988.02	6730962.01
Banksia scabrella	P4	1	337989.60	6730967.21
Banksia scabrella	P4	1	337992.53	6730971.32
Banksia scabrella	P4	1	337991.09	6730978.02
Banksia scabrella	P4	5	337990.05	6730981.38
Banksia scabrella	P4	5	337985.32	6730980.35
Banksia scabrella	P4	1	337996.52	6730966.40
Banksia scabrella	P4	1	338000.08	6730969.63
Banksia scabrella	P4	2	338002.38	6730966.40
Banksia scabrella	P4	1	338006.14	6730966.60
Banksia scabrella	P4	1	338005.05	6730968.56
Banksia scabrella	P4	1	338008.21	6730968.14
Banksia scabrella	P4	1	338009.21	6730971.17
Banksia scabrella	P4	1	338012.18	6730976.89
Banksia scabrella	P4	1	338008.21	6730980.46
Banksia scabrella	P4	1	338023.00	6730974.33
Banksia scabrella	P4	1	338023.83	6730974.40
Banksia scabrella	P4	1	338023.83	6730974.40
Banksia scabrella	P4	1	338023.57	6730972.19
Banksia scabrella	P4	1	338030.53	6730973.83
Banksia scabrella	P4	1	338027.91	6730978.18
Banksia scabrella	P4	2	338026.01	6730981.97
Banksia scabrella	P4	1	338025.47	6730981.64
Banksia scabrella	P4	1	338036.60	6730976.32
Banksia scabrella	P4	1	334223.14	6730601.04
Banksia scabrella	P4	1	334223.45	6730605.73
Banksia scabrella	P4	1	334218.49	6730605.21
Banksia scabrella	P4	1	334216.11	6730606.84
Banksia scabrella	P4	1	334212.58	6730610.97
Banksia scabrella	P4	2	334211.47	6730617.07
Banksia scabrella	P4	2	334214.21	6730618.02
Banksia scabrella	P4	1	334202.94	6730607.17
Banksia scabrella	P4	1	334207.77	6730606.53
Banksia scabrella	P4	1	334201.84	6730609.17
Banksia scabrella	P4	1	334199.90	6730604.17
Banksia scabrella	P4	1	334196.05	6730602.44
Banksia scabrella	P4	1	334193.40	6730607.79
Banksia scabrella	P4	2	334190.88	6730611.09
Banksia scabrella	P4	1	334190.48	6730616.97
Banksia scabrella	P4	1	334186.57	6730613.39
Banksia scabrella	P4	1	334184.09	6730619.51
Banksia scabrella	P4	1	334178.27	6730615.43
Banksia scabrella	P4	1	334174.06	6730616.52
Banksia scabrella	P4	1	334171.87	6730614.99
Banksia scabrella	P4	1	334173.25	6730612.23
Banksia scabrella	P4	1	334173.67	6730609.93
Banksia scabrella	P4	1	334171.45	6730609.78
Banksia scabrella	P4	1	334176.34	6730603.15
Banksia scabrella	P4	1	334173.21	6730608.52
Banksia scabrella	P4	1	334173.21	6730608.52
Banksia scabrella	P4	1	334172.29	6730610.87
Banksia scabrella	P4	1	334171.88	6730612.73

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	1	334167.43	6730612.20
Banksia scabrella	P4	1	334084.99	6730610.48
Banksia scabrella	P4	2	333939.34	6730617.24
Banksia scabrella	P4	2	333931.35	6730614.64
Banksia scabrella	P4	2	333936.61	6730609.49
Banksia scabrella	P4	1	333936.21	6730604.73
Banksia scabrella	P4	1	333931.68	6730606.35
Banksia scabrella	P4	1	333932.97	6730612.68
Banksia scabrella	P4	1	333880.65	6730609.96
Banksia scabrella	P4	1	333772.86	6730612.90
Banksia scabrella	P4	1	333771.06	6730615.36
Banksia scabrella	P4	1	333718.47	6730611.95
Banksia scabrella	P4	1	333853.48	6730972.85
Banksia scabrella	P4	1	333858.77	6730975.03
Banksia scabrella	P4	1	333865.77	6730971.25
Banksia scabrella	P4	1	333872.47	6730972.09
Banksia scabrella	P4	1	333876.68	6730968.02
Banksia scabrella	P4	1	333877.15	6730963.35
Banksia scabrella	P4	1	333965.46	6730968.07
Banksia scabrella	P4	1	334113.34	6730965.63
Banksia scabrella	P4	1	337571.43	6728808.02
Banksia scabrella	P4	1	337363.13	6728805.59
Banksia scabrella	P4	2	335254.41	6727374.66
Banksia scabrella	P4	6	335232.35	6727369.16
Banksia scabrella	P4	10	335200.77	6727367.99
Banksia scabrella	P4	15	335179.27	6727373.61
Banksia scabrella	P4	10	335147.64	6727368.97
Banksia scabrella	P4	20	335123.61	6727368.54
Banksia scabrella	P4	3	337861.70	6728455.29
Banksia scabrella	P4	2	337787.50	6728449.35
Banksia scabrella	P4	2	337730.68	6728448.84
Banksia scabrella	P4	1	337700.61	6728452.12
Banksia scabrella	P4	1	336346.99	6728452.93
Banksia scabrella	P4	3	336251.09	6728446.12
Banksia scabrella	P4	1	335982.62	6728453.11
Banksia scabrella	P4	3	335968.67	6728446.90
Banksia scabrella	P4	5	335057.21	6727001.08
Banksia scabrella	P4	5	335033.29	6727008.00
Banksia scabrella	P4	10	335012.62	6727010.06
Banksia scabrella	P4	20	334988.31	6727012.78
Banksia scabrella	P4	20	334945.60	6727008.22
Banksia scabrella	P4	20	334905.02	6727014.14
Banksia scabrella	P4	10	334868.97	6727009.01
Banksia scabrella	P4	10	334827.26	6727011.63
Banksia scabrella	P4	10	334757.21	6727014.71
Banksia scabrella	P4	20	334710.95	6727011.46
Banksia scabrella	P4	10	334706.75	6727375.63
Banksia scabrella	P4	20	334741.46	6727369.08
Banksia scabrella	P4	20	334791.10	6727370.59
Banksia scabrella	P4	20	334829.42	6727367.98
Banksia scabrella	P4	20	334884.13	6727368.83
Banksia scabrella	P4	20	334933.80	6727370.60
Banksia scabrella	P4	10	335012.16	6727372.99

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	10	335053.80	6727375.19
Banksia scabrella	P4	20	335102.04	6727369.26
Banksia scabrella	P4	1	336105.82	6731683.44
Banksia scabrella	P4	1	335703.02	6731879.89
Banksia scabrella	P4	1	338679.37	6730198.97
Banksia scabrella	P4	5	340412.28	6732783.83
Banksia scabrella	P4	2	340358.20	6733498.21
Banksia scabrella	P4	3	340338.85	6733495.85
Banksia scabrella	P4	10	340304.98	6733502.34
Banksia scabrella	P4	1	338307.19	6730357.13
Banksia scabrella	P4	1	338312.26	6730593.21
Banksia scabrella	P4	1	338315.58	6730749.98
Banksia scabrella	P4	2	340373.69	6733131.76
Banksia scabrella	P4	1	340360.38	6733125.94
Banksia scabrella	P4	2	340319.06	6733130.29
Banksia scabrella	P4	3	340314.92	6733126.02
Banksia scabrella	P4	7	340311.08	6733132.70
Banksia scabrella	P4	4	340296.43	6733133.26
Banksia scabrella	P4	3	340283.60	6733139.87
Banksia scabrella	P4	4	340278.86	6733145.26
Banksia scabrella	P4	4	336457.03	6734211.25
Banksia scabrella	P4	1	336437.88	6734212.65
Banksia scabrella	P4	1	336202.33	6734211.19
Banksia scabrella	P4	1	336167.83	6734213.73
Banksia scabrella	P4	1	336113.16	6734213.99
Banksia scabrella	P4	1	336083.90	6734209.27
Banksia scabrella	P4	8	336035.55	6734217.65
Banksia scabrella	P4	5	336005.26	6734215.64
Banksia scabrella	P4	2	335953.25	6734213.10
Banksia scabrella	P4	4	335938.77	6734215.57
Banksia scabrella	P4	1	335906.62	6734216.72
Banksia scabrella	P4	8	335874.94	6734211.63
Banksia scabrella	P4	6	335845.48	6734222.54
Banksia scabrella	P4	5	335784.56	6734217.39
Banksia scabrella	P4	1	335137.62	6733842.30
Banksia scabrella	P4	1	335304.44	6733835.64
Banksia scabrella	P4	1	335353.58	6733845.41
Banksia scabrella	P4	9	335388.59	6733854.20
Banksia scabrella	P4	2	335426.11	6733844.31
Banksia scabrella	P4	12	335461.27	6733849.52
Banksia scabrella	P4	8	335515.45	6733841.75
Banksia scabrella	P4	15	335553.22	6733855.35
Banksia scabrella	P4	7	335585.01	6733841.29
Banksia scabrella	P4	3	335609.43	6733855.19
Banksia scabrella	P4	5	335630.77	6733839.16
Banksia scabrella	P4	5	335664.25	6733854.61
Banksia scabrella	P4	3	335706.68	6733849.47
Banksia scabrella	P4	3	336127.26	6733866.88
Banksia scabrella	P4	1	336119.32	6733775.13
Banksia scabrella	P4	2	335781.42	6733531.04
Banksia scabrella	P4	5	335785.90	6733536.99
Banksia scabrella	P4	2	335790.96	6733547.19
Banksia scabrella	P4	2	335794.70	6733551.12

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	4	335801.23	6733559.59
Banksia scabrella	P4	3	335798.69	6733575.02
Banksia scabrella	P4	4	335802.08	6733582.18
Banksia scabrella	P4	5	335790.35	6733591.28
Banksia scabrella	P4	3	335795.73	6733600.75
Banksia scabrella	P4	1	335805.46	6733607.70
Banksia scabrella	P4	2	335794.77	6733611.52
Banksia scabrella	P4	1	335789.74	6733622.86
Banksia scabrella	P4	3	335800.81	6733629.62
Banksia scabrella	P4	4	335795.70	6733638.37
Banksia scabrella	P4	5	335785.57	6733647.14
Banksia scabrella	P4	4	335798.82	6733656.48
Banksia scabrella	P4	3	335788.35	6733663.74
Banksia scabrella	P4	5	335795.56	6733672.22
Banksia scabrella	P4	5	335794.05	6733687.05
Banksia scabrella	P4	6	335787.60	6733697.37
Banksia scabrella	P4	2	335801.07	6733703.73
Banksia scabrella	P4	3	335797.38	6733711.48
Banksia scabrella	P4	6	335788.00	6733722.31
Banksia scabrella	P4	2	335784.80	6733737.48
Banksia scabrella	P4	4	335779.96	6733754.63
Banksia scabrella	P4	4	335788.70	6733763.14
Banksia scabrella	P4	1	335798.84	6733938.65
Banksia scabrella	P4	4	335807.89	6734032.91
Banksia scabrella	P4	2	335800.87	6734053.15
Banksia scabrella	P4	1	335792.09	6734133.37
Banksia scabrella	P4	2	335789.37	6734168.39
Banksia scabrella	P4	3	335799.89	6734183.21
Banksia scabrella	P4	2	335804.44	6734187.35
Banksia scabrella	P4	3	335790.27	6734214.21
Banksia scabrella	P4	3	335788.84	6734228.76
Banksia scabrella	P4	1	335789.94	6734238.58
Banksia scabrella	P4	4	335792.50	6734248.22
Banksia scabrella	P4	2	335795.41	6734254.84
Banksia scabrella	P4	4	335803.51	6734255.07
Banksia scabrella	P4	6	335796.22	6734265.20
Banksia scabrella	P4	3	335795.25	6734273.06
Banksia scabrella	P4	3	335782.72	6734288.37
Banksia scabrella	P4	5	335777.33	6734301.57
Banksia scabrella	P4	2	335430.47	6734140.49
Banksia scabrella	P4	2	335442.52	6734127.11
Banksia scabrella	P4	2	335425.82	6734048.31
Banksia scabrella	P4	2	335430.58	6734008.54
Banksia scabrella	P4	3	335436.62	6733977.57
Banksia scabrella	P4	3	335434.95	6733958.32
Banksia scabrella	P4	1	335433.60	6733888.58
Banksia scabrella	P4	3	335430.51	6733853.48
Banksia scabrella	P4	2	335067.73	6733513.43
Banksia scabrella	P4	1	335069.59	6733534.67
Banksia scabrella	P4	4	335071.57	6733562.70
Banksia scabrella	P4	2	335066.61	6733579.03
Banksia scabrella	P4	2	335070.92	6733596.90
Banksia scabrella	P4	2	335076.33	6733603.35

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Banksia scabrella	P4	5	335074.18	6733616.30
Banksia scabrella	P4	3	335067.81	6733622.96
Banksia scabrella	P4	5	335071.97	6733626.24
Banksia scabrella	P4	8	335080.55	6733633.76
Banksia scabrella	P4	6	335070.53	6733643.47
Banksia scabrella	P4	4	335076.32	6733653.69
Banksia scabrella	P4	11	335083.18	6733660.89
Banksia scabrella	P4	6	335068.27	6733671.65
Banksia scabrella	P4	2	335073.21	6733680.54
Banksia scabrella	P4	4	335081.77	6733682.31
Banksia scabrella	P4	9	335073.55	6733692.20
Banksia scabrella	P4	2	335074.25	6733700.60
Banksia scabrella	P4	3	335084.03	6733705.28
Banksia scabrella	P4	5	335073.05	6733712.53
Banksia scabrella	P4	3	335068.35	6733726.25
Banksia scabrella	P4	5	335081.53	6733727.24
Banksia scabrella	P4	4	335073.00	6733738.81
Banksia scabrella	P4	3	335061.88	6733753.52
Banksia scabrella	P4	4	335074.50	6733774.59
Banksia scabrella	P4	1	333195.62	6730524.80
Banksia scabrella	P4	3	333150.62	6729969.41
Banksia scabrella	P4	1	333157.60	6729949.74
Banksia scabrella	P4	2	333165.12	6729930.45
Banksia scabrella	P4	1	333182.67	6729915.86
Banksia scabrella	P4	3	333206.30	6729868.10
Banksia scabrella	P4	1	333220.17	6729841.61
Banksia scabrella	P4	3	333230.96	6729841.35
Desmocladus elongatus	P4	2	332554.26	6730372.53
Desmocladus elongatus	P4	2	332553.12	6730477.35
Desmocladus elongatus	P4	2	333988.67	6730751.19
Desmocladus elongatus	P4	2	333992.05	6728362.26
Desmocladus elongatus	P4	1	333989.10	6728409.93
Desmocladus elongatus	P4	2	332911.08	6729434.37
Desmocladus elongatus	P4	2	332910.62	6729515.67
Desmocladus elongatus	P4	2	332914.11	6728789.60
Desmocladus elongatus	P4	2	332869.28	6728869.01
Desmocladus elongatus	P4	1	332913.13	6729096.09
Desmocladus elongatus	P4	1	333084.82	6729165.44
Desmocladus elongatus	P4	1	333196.65	6729171.46
Desmocladus elongatus	P4	1	333269.48	6729100.17
Desmocladus elongatus	P4	2	333274.80	6729011.44
Desmocladus elongatus	P4	1	333630.50	6728471.73
Desmocladus elongatus	P4	3	334357.73	6730044.86
Desmocladus elongatus	P4	6	334359.88	6729828.30
Desmocladus elongatus	P4	1	334346.49	6728428.39
Desmocladus elongatus	P4	1	331433.40	6725929.75
Desmocladus elongatus	P4	1	334709.10	6730076.26
Desmocladus elongatus	P4	1	334712.99	6730057.34
Desmocladus elongatus	P4	1	334712.58	6729822.91
Desmocladus elongatus	P4	1	334707.28	6729732.77
Desmocladus elongatus	P4	2	334714.84	6729616.29
Desmocladus elongatus	P4	2	334711.65	6727092.61
Desmocladus elongatus	P4	2	334712.41	6727027.61

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Desmocladus elongatus	P4	3	335072.86	6729080.24
Desmocladus elongatus	P4	2	335072.18	6728871.73
Desmocladus elongatus	P4	2	335071.99	6726198.68
Desmocladus elongatus	P4	1	335070.51	6727501.19
Desmocladus elongatus	P4	1	336516.34	6729502.63
Desmocladus elongatus	P4	1	335793.51	6731332.30
Desmocladus elongatus	P4	1	337604.57	6730324.52
Desmocladus elongatus	P4	1	337594.72	6729966.24
Desmocladus elongatus	P4	1	337945.48	6730995.18
Desmocladus elongatus	P4	2	337954.94	6731290.00
Desmocladus elongatus	P4	1	337948.44	6731358.14
Desmocladus elongatus	P4	1	334564.44	6727366.63
Desmocladus elongatus	P4	1	329793.39	6724131.82
Desmocladus elongatus	P4	1	332785.92	6729172.34
Desmocladus elongatus	P4	1	333123.68	6728809.44
Desmocladus elongatus	P4	1	333185.37	6728813.98
Desmocladus elongatus	P4	1	334587.66	6728808.69
Desmocladus elongatus	P4	1	335100.61	6726290.75
Desmocladus elongatus	P4	1	333003.47	6726651.49
Desmocladus elongatus	P4	3	332795.53	6729168.85
Desmocladus elongatus	P4	2	333315.28	6729171.53
Desmocladus elongatus	P4	3	333528.88	6729169.49
Desmocladus elongatus	P4	1	333638.34	6729172.51
Desmocladus elongatus	P4	1	333637.33	6729175.43
Desmocladus elongatus	P4	1	333770.93	6729172.70
Desmocladus elongatus	P4	1	333935.38	6729178.36
Desmocladus elongatus	P4	1	334137.32	6729172.19
Desmocladus elongatus	P4	1	334202.97	6729168.31
Desmocladus elongatus	P4	1	334246.47	6729163.56
Desmocladus elongatus	P4	1	335019.71	6729169.19
Desmocladus elongatus	P4	1	335048.20	6729173.37
Desmocladus elongatus	P4	1	334994.22	6729535.37
Desmocladus elongatus	P4	2	334978.37	6729530.60
Desmocladus elongatus	P4	1	334934.54	6729530.63
Desmocladus elongatus	P4	2	334905.43	6729525.96
Desmocladus elongatus	P4	1	334869.98	6729531.15
Desmocladus elongatus	P4	3	334860.20	6729530.03
Desmocladus elongatus	P4	3	334856.45	6729527.59
Desmocladus elongatus	P4	1	334847.53	6729528.42
Desmocladus elongatus	P4	1	334844.74	6729534.91
Desmocladus elongatus	P4	3	334812.19	6729528.80
Desmocladus elongatus	P4	4	334734.57	6729533.63
Desmocladus elongatus	P4	2	334275.02	6729527.96
Desmocladus elongatus	P4	1	333582.49	6729523.01
Desmocladus elongatus	P4	1	333574.26	6729525.75
Desmocladus elongatus	P4	1	332657.42	6729550.83
Desmocladus elongatus	P4	1	337597.74	6729894.92
Desmocladus elongatus	P4	1	337829.74	6730612.31
Desmocladus elongatus	P4	1	337851.40	6731322.61
Desmocladus elongatus	P4	1	337559.97	6728810.02
Desmocladus elongatus	P4	2	333621.53	6729064.97
Desmocladus elongatus	P4	1	335796.48	6733575.02
Desmocladus elongatus	P4	2	335797.68	6733610.96

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Desmocladus elongatus	P4	1	335788.56	6733646.73
Desmocladus elongatus	P4	1	335794.27	6733688.38
Desmocladus elongatus	P4	1	335797.38	6733711.48
Desmocladus elongatus	P4	1	335789.95	6733716.61
Desmocladus elongatus	P4	1	335794.85	6733829.75
Desmocladus elongatus	P4	1	335791.33	6734110.93
Desmocladus elongatus	P4	1	335788.48	6734110.84
Desmocladus elongatus	P4	1	335797.32	6734203.25
Desmocladus elongatus	P4	1	335794.10	6734302.82
Desmocladus elongatus	P4	1	335443.44	6734196.90
Desmocladus elongatus	P4	1	335434.45	6733922.52
Desmocladus elongatus	P4	2	329783.19	6716207.75
Desmocladus elongatus	P4	1	333233.52	6730356.69
Desmocladus elongatus	P4	1	333195.25	6730495.33
Desmocladus elongatus	P4	1	333160.15	6730306.89
Desmocladus elongatus	P4	1	333169.39	6730232.98
Desmocladus elongatus	P4	1	333178.26	6730177.82
Desmocladus elongatus	P4	1	333150.72	6730165.39
Desmocladus elongatus	P4	1	333128.09	6730119.08
Desmocladus elongatus	P4	2	333242.22	6729839.69
Desmocladus elongatus	P4	1	333365.62	6729315.56
Desmocladus elongatus	P4	1	333333.35	6729242.31
Eucalyptus macrocarpa subsp. *elachantha*	P4	2	333632.70	6731018.47
Eucalyptus macrocarpa subsp. *elachantha*	P4	2	336872.02	6731820.71
Eucalyptus macrocarpa subsp. *elachantha*	P4	1	336863.64	6731824.21
Eucalyptus macrocarpa subsp. *elachantha*	P4	1	336877.85	6731815.36
Eucalyptus macrocarpa subsp. *elachantha*	P4	1	336872.82	6731811.83
Eucalyptus macrocarpa subsp. *elachantha*	P4	3	340102.76	6730890.14
Eucalyptus macrocarpa subsp. *elachantha*	P4	3	340102.19	6730898.14
Eucalyptus macrocarpa subsp. *elachantha*	P4	2	340114.03	6730687.70
Eucalyptus macrocarpa subsp. *elachantha*	P4	10	333481.31	6729500.85
Eucalyptus macrocarpa subsp. *elachantha*	P4	3	337521.44	6731269.75
Eucalyptus macrocarpa subsp. *elachantha*	P4	1	337523.26	6731267.17
Eucalyptus macrocarpa subsp. *elachantha*	P4	2	337521.42	6731263.50
Eucalyptus macrocarpa subsp. *elachantha*	P4	1	337526.79	6731259.62
Eucalyptus macrocarpa subsp. *elachantha*	P4	4	337425.81	6731227.94
Eucalyptus macrocarpa subsp. *elachantha*	P4	2	337424.98	6731233.03
Eucalyptus macrocarpa subsp. *elachantha*	P4	4	337417.06	6731236.91
Eucalyptus macrocarpa subsp. *elachantha*	P4	7	337429.62	6731234.84
Eucalyptus macrocarpa subsp. *elachantha*	P4	3	337118.95	6731699.18
Eucalyptus macrocarpa subsp. *elachantha*	P4	1	337132.26	6731698.03
Eucalyptus macrocarpa subsp. *elachantha*	P4	3	337138.22	6731700.17
Eucalyptus macrocarpa subsp. *elachantha*	P4	1	337100.02	6731702.39
Eucalyptus macrocarpa subsp. *elachantha*	P4	1	337100.74	6731699.00
Eucalyptus macrocarpa subsp. *elachantha*	P4	2	337092.97	6731693.88
Eucalyptus macrocarpa subsp. *elachantha*	P4	1	337089.39	6731695.03
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	20	334940.91	6728445.19
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	10	334955.11	6728446.72
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	20	334966.57	6728449.73
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	20	334999.45	6728448.68
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	20	335017.80	6728457.50
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	30	335038.43	6728460.60
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	14	337416.54	6730250.28

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	6	337985.34	6730610.73
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	4	337969.87	6730609.40
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	1	337900.82	6730604.36
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	5	338300.26	6729170.39
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	20	338291.38	6729171.68
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	20	338276.29	6729166.41
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	20	338263.07	6729173.20
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	4	338557.41	6728446.84
Hemiandra sp. Watheroo (S. Hancocks 4)	P4	4	337373.79	6730299.39
Pityrodia viscida	P4	47	334858.35	6730554.62
Pityrodia viscida	P4	9	335071.90	6730585.76
Pityrodia viscida	P4	3	335069.78	6730547.90
Pityrodia viscida	P4	1	335071.75	6730502.15
Pityrodia viscida	P4	8	335073.26	6730433.16
Pityrodia viscida	P4	8	335070.52	6730412.88
Pityrodia viscida	P4	2	335079.17	6730341.84
Pityrodia viscida	P4	2	335069.81	6730197.62
Pityrodia viscida	P4	2	335796.48	6726435.18
Pityrodia viscida	P4	2	334903.44	6731334.42
Pityrodia viscida	P4	1	334904.24	6731326.50
Pityrodia viscida	P4	1	334931.51	6731327.75
Pityrodia viscida	P4	1	334961.67	6731327.01
Pityrodia viscida	P4	4	334973.94	6731337.58
Pityrodia viscida	P4	6	334977.21	6731333.98
Pityrodia viscida	P4	7	334978.57	6731324.46
Pityrodia viscida	P4	5	334991.64	6731327.23
Pityrodia viscida	P4	3	334991.27	6731334.55
Pityrodia viscida	P4	3	334996.42	6731332.12
Pityrodia viscida	P4	2	335004.17	6731340.90
Pityrodia viscida	P4	2	335009.58	6731339.02
Pityrodia viscida	P4	2	335017.10	6731336.85
Pityrodia viscida	P4	1	335026.22	6731331.38
Pityrodia viscida	P4	3	335043.99	6731328.02
Pityrodia viscida	P4	4	335056.36	6731333.06
Pityrodia viscida	P4	4	335069.54	6731336.84
Pityrodia viscida	P4	6	335074.78	6731322.96
Pityrodia viscida	P4	6	335083.18	6731319.78
Pityrodia viscida	P4	2	335108.13	6731331.06
Pityrodia viscida	P4	3	335112.36	6731330.68
Pityrodia viscida	P4	4	335121.17	6731333.45
Pityrodia viscida	P4	6	335123.37	6731339.51
Pityrodia viscida	P4	7	335128.76	6731328.26
Pityrodia viscida	P4	2	335140.47	6731326.32
Pityrodia viscida	P4	9	335152.88	6731331.97
Pityrodia viscida	P4	2	335160.36	6731327.82
Pityrodia viscida	P4	1	335166.81	6731332.14
Pityrodia viscida	P4	8	335191.29	6731322.66
Pityrodia viscida	P4	3	335257.80	6731326.81
Pityrodia viscida	P4	3	335264.45	6731325.82
Pityrodia viscida	P4	2	335274.36	6731325.14
Pityrodia viscida	P4	1	335279.45	6731328.57
Pityrodia viscida	P4	1	335303.73	6731332.59
Pityrodia viscida	P4	1	335316.09	6731331.31

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Pityrodia viscida	P4	2	335327.05	6731331.62
Pityrodia viscida	P4	2	335335.85	6731324.53
Pityrodia viscida	P4	1	335341.66	6731321.87
Pityrodia viscida	P4	2	335420.59	6731332.29
Pityrodia viscida	P4	2	335437.10	6731327.27
Pityrodia viscida	P4	2	335493.68	6731335.26
Pityrodia viscida	P4	3	335507.36	6731330.51
Pityrodia viscida	P4	3	335518.87	6731325.05
Pityrodia viscida	P4	1	335542.43	6731334.07
Pityrodia viscida	P4	9	334240.94	6731322.83
Pityrodia viscida	P4	3	334797.34	6730966.72
Pityrodia viscida	P4	1	334796.78	6730974.28
Pityrodia viscida	P4	1	334796.82	6730979.98
Pityrodia viscida	P4	1	334797.00	6730982.79
Pityrodia viscida	P4	1	334793.97	6730979.73
Pityrodia viscida	P4	1	334791.51	6730982.38
Pityrodia viscida	P4	1	334792.59	6730981.78
Pityrodia viscida	P4	1	334788.03	6730977.65
Pityrodia viscida	P4	1	334785.01	6730981.24
Pityrodia viscida	P4	1	334781.59	6730979.77
Pityrodia viscida	P4	1	334814.43	6730969.14
Pityrodia viscida	P4	1	334813.05	6730964.73
Pityrodia viscida	P4	1	334814.47	6730964.29
Pityrodia viscida	P4	1	334814.56	6730961.89
Pityrodia viscida	P4	3	334807.80	6730964.12
Pityrodia viscida	P4	2	334807.86	6730966.25
Pityrodia viscida	P4	1	334807.88	6730970.91
Pityrodia viscida	P4	1	334807.41	6730976.86
Pityrodia viscida	P4	1	334810.87	6730979.65
Pityrodia viscida	P4	1	334812.30	6730979.48
Pityrodia viscida	P4	1	334813.56	6730973.65
Pityrodia viscida	P4	1	334828.15	6730966.02
Pityrodia viscida	P4	2	334829.08	6730966.26
Pityrodia viscida	P4	1	334825.54	6730966.18
Pityrodia viscida	P4	1	334825.94	6730966.75
Pityrodia viscida	P4	1	334817.65	6730968.45
Pityrodia viscida	P4	1	334816.74	6730970.00
Pityrodia viscida	P4	2	334816.66	6730977.29
Pityrodia viscida	P4	1	334817.82	6730975.09
Pityrodia viscida	P4	1	334819.11	6730977.89
Pityrodia viscida	P4	1	334820.08	6730974.77
Pityrodia viscida	P4	1	334821.80	6730973.02
Pityrodia viscida	P4	1	334821.80	6730973.02
Pityrodia viscida	P4	1	334828.07	6730973.97
Pityrodia viscida	P4	1	334827.59	6730972.69
Pityrodia viscida	P4	1	334831.33	6730971.88
Pityrodia viscida	P4	1	334833.93	6730968.63
Pityrodia viscida	P4	1	334837.91	6730967.75
Pityrodia viscida	P4	1	334830.60	6730963.27
Pityrodia viscida	P4	1	334827.51	6730963.39
Pityrodia viscida	P4	1	334830.36	6730968.50
Pityrodia viscida	P4	1	334834.16	6730972.34
Pityrodia viscida	P4	1	334835.11	6730974.79

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Pityrodia viscida	P4	1	334834.12	6730976.62
Pityrodia viscida	P4	1	334837.73	6730976.42
Pityrodia viscida	P4	1	334845.26	6730972.57
Pityrodia viscida	P4	1	334843.96	6730972.87
Pityrodia viscida	P4	1	334844.74	6730966.01
Pityrodia viscida	P4	1	334842.36	6730961.36
Pityrodia viscida	P4	1	334847.64	6730963.12
Pityrodia viscida	P4	1	334847.91	6730962.84
Pityrodia viscida	P4	1	334850.44	6730964.89
Pityrodia viscida	P4	1	334851.03	6730967.57
Pityrodia viscida	P4	1	334851.77	6730967.95
Pityrodia viscida	P4	2	334852.62	6730966.62
Pityrodia viscida	P4	1	334845.85	6730978.46
Pityrodia viscida	P4	1	334845.58	6730981.26
Pityrodia viscida	P4	1	334845.39	6730979.81
Pityrodia viscida	P4	1	334863.27	6730970.30
Pityrodia viscida	P4	1	334861.86	6730969.33
Pityrodia viscida	P4	1	334861.33	6730968.47
Pityrodia viscida	P4	1	334857.56	6730969.56
Pityrodia viscida	P4	1	334852.06	6730966.34
Pityrodia viscida	P4	2	334854.73	6730961.91
Pityrodia viscida	P4	1	334852.52	6730958.61
Pityrodia viscida	P4	1	334860.46	6730962.21
Pityrodia viscida	P4	1	334862.85	6730972.42
Pityrodia viscida	P4	1	334862.43	6730975.18
Pityrodia viscida	P4	1	334860.07	6730981.00
Pityrodia viscida	P4	1	334858.18	6730979.83
Pityrodia viscida	P4	1	334855.02	6730978.21
Pityrodia viscida	P4	1	334853.25	6730979.99
Pityrodia viscida	P4	1	334875.31	6730969.52
Pityrodia viscida	P4	1	334874.51	6730968.61
Pityrodia viscida	P4	2	334871.86	6730966.36
Pityrodia viscida	P4	1	334875.70	6730964.12
Pityrodia viscida	P4	1	334874.86	6730961.06
Pityrodia viscida	P4	1	334869.26	6730969.14
Pityrodia viscida	P4	1	334868.98	6730968.45
Pityrodia viscida	P4	1	334867.04	6730968.48
Pityrodia viscida	P4	1	334865.72	6730976.92
Pityrodia viscida	P4	1	334875.58	6730978.58
Pityrodia viscida	P4	1	334875.58	6730978.58
Pityrodia viscida	P4	2	334876.96	6730977.01
Pityrodia viscida	P4	1	334873.99	6730974.61
Pityrodia viscida	P4	1	334875.31	6730973.69
Pityrodia viscida	P4	1	334875.33	6730969.30
Pityrodia viscida	P4	1	334877.98	6730967.62
Pityrodia viscida	P4	1	334880.28	6730961.95
Pityrodia viscida	P4	1	334880.23	6730962.03
Pityrodia viscida	P4	1	334880.23	6730962.03
Pityrodia viscida	P4	2	334882.58	6730974.54
Pityrodia viscida	P4	1	334890.01	6730980.47
Pityrodia viscida	P4	4	334891.81	6730976.96
Pityrodia viscida	P4	5	334891.99	6730974.79
Pityrodia viscida	P4	2	334894.11	6730974.65

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Pityrodia viscida	P4	1	334889.61	6730962.89
Pityrodia viscida	P4	1	334888.79	6730959.42
Pityrodia viscida	P4	1	334896.59	6730961.53
Pityrodia viscida	P4	1	334897.91	6730964.21
Pityrodia viscida	P4	1	334898.85	6730965.85
Pityrodia viscida	P4	2	334899.55	6730968.70
Pityrodia viscida	P4	13	334901.44	6730975.31
Pityrodia viscida	P4	1	334912.08	6730965.31
Pityrodia viscida	P4	7	334916.84	6730966.86
Pityrodia viscida	P4	1	334940.39	6730976.01
Pityrodia viscida	P4	3	334941.84	6730976.56
Pityrodia viscida	P4	1	334942.08	6730969.88
Pityrodia viscida	P4	6	334949.39	6730969.58
Pityrodia viscida	P4	1	334986.11	6730971.75
Pityrodia viscida	P4	1	335057.06	6730961.92
Pityrodia viscida	P4	1	335068.86	6730973.29
Pityrodia viscida	P4	2	335132.01	6730964.00
Pityrodia viscida	P4	12	334794.41	6730614.61
Pityrodia viscida	P4	8	334738.92	6730616.98
Pityrodia viscida	P4	1	334735.79	6730606.25
Pityrodia viscida	P4	4	335650.66	6731686.86
Pityrodia viscida	P4	9	335617.31	6731684.85
Pityrodia viscida	P4	3	335584.89	6731691.39
Pityrodia viscida	P4	1	335559.30	6731685.58
Pityrodia viscida	P4	1	335542.88	6731688.60
Pityrodia viscida	P4	3	335098.64	6731695.44
Pityrodia viscida	P4	1	335105.65	6731696.65
Pityrodia viscida	P4	6	335128.40	6731698.68
Pityrodia viscida	P4	3	335134.69	6731695.57
Pityrodia viscida	P4	4	335140.27	6731701.12
Pityrodia viscida	P4	2	335148.96	6731689.87
Pityrodia viscida	P4	3	335154.61	6731689.76
Pityrodia viscida	P4	1	335156.34	6731685.32
Pityrodia viscida	P4	3	335174.43	6731683.92
Pityrodia viscida	P4	2	335172.73	6731691.82
Pityrodia viscida	P4	1	335183.79	6731694.20
Pityrodia viscida	P4	3	335188.85	6731700.22
Pityrodia viscida	P4	2	335199.68	6731696.30
Pityrodia viscida	P4	4	335206.45	6731689.83
Pityrodia viscida	P4	3	335216.03	6731686.75
Pityrodia viscida	P4	2	335227.20	6731694.60
Pityrodia viscida	P4	1	335227.47	6731701.82
Pityrodia viscida	P4	4	335231.15	6731696.89
Pityrodia viscida	P4	2	335237.47	6731689.90
Pityrodia viscida	P4	4	335244.78	6731695.13
Pityrodia viscida	P4	5	335253.02	6731704.21
Pityrodia viscida	P4	3	335256.95	6731692.30
Pityrodia viscida	P4	5	335265.99	6731699.18
Pityrodia viscida	P4	6	335273.44	6731687.55
Pityrodia viscida	P4	2	335281.98	6731698.56
Pityrodia viscida	P4	3	335291.83	6731691.76
Pityrodia viscida	P4	2	335296.86	6731688.00
Pityrodia viscida	P4	2	335298.43	6731698.44

APPENDIX C: GEOGRAPHIC LOCATIONS OF CONSERVATION SIGNIFICANT TAXA RECORDED IN THE TRIESTE 3D SEISMIC PROJECT

Note: CC refers to conservation code (State/Federal); T denotes threatened flora; EN denotes endangered flora; VU denotes vulnerable flora; P1-P4 denote priority flora (DBCA 2017).

SPECIES	CC	No. INDIVIDUALS	LOCATION (GDA94 Z50)	
			EASTING (mE)	NORTHING (mN)
Pityrodia viscida	P4	6	335308.84	6731694.37
Pityrodia viscida	P4	3	335313.71	6731701.38
Pityrodia viscida	P4	4	335324.67	6731701.29
Pityrodia viscida	P4	4	335335.41	6731682.30
Pityrodia viscida	P4	2	335344.90	6731691.00
Pityrodia viscida	P4	1	335444.00	6731686.28
Pityrodia viscida	P4	4	335476.00	6731685.57
Pityrodia viscida	P4	3	335481.07	6731680.59
Pityrodia viscida	P4	3	335487.45	6731696.42
Pityrodia viscida	P4	3	335504.52	6731683.33
Pityrodia viscida	P4	1	335518.23	6731697.60
Schoenus griffinianus	P4	6	331866.77	6726197.92
Schoenus griffinianus	P4	7	331876.21	6726198.91
Schoenus griffinianus	P4	2	335791.17	6726102.58
Schoenus griffinianus	P4	5	337951.47	6727896.55
Schoenus griffinianus	P4	2	337390.09	6728205.37
Schoenus griffinianus	P4	2	339749.64	6728557.87
Schoenus griffinianus	P4	3	331553.62	6726282.02
Schoenus griffinianus	P4	1	331529.98	6726286.98
Schoenus griffinianus	P4	1	331483.30	6726301.11
Schoenus griffinianus	P4	1	331368.10	6726303.41
Schoenus griffinianus	P4	1	331331.24	6726303.89
Schoenus griffinianus	P4	1	331291.90	6726308.53
Schoenus griffinianus	P4	5	331281.07	6726307.94
Schoenus griffinianus	P4	2	331251.57	6726304.77
Schoenus griffinianus	P4	2	331233.44	6726301.18
Schoenus griffinianus	P4	1	331084.58	6726289.94
Schoenus griffinianus	P4	1	331024.09	6726289.71
Schoenus griffinianus	P4	1	335792.47	6733612.07
Schoenus griffinianus	P4	1	335806.96	6733764.88
Schoenus griffinianus	P4	1	335427.72	6733637.82
Schoenus griffinianus	P4	11	332804.64	6731836.37
Schoenus griffinianus	P4	4	332433.61	6732054.36
Schoenus griffinianus	P4	1	332331.67	6732050.12

APPENDIX D: DEFINITION OF VEGETATION CONDITION SCALE FOR THE SOUTH WEST AND INTERZONE BOTANICAL PROVINCES

Vegetation condition ratings relate to vegetation structure, level of disturbance at each structural layer and the ability of the vegetation unit to regenerate (Table D.1). Vegetation condition provides complementary information for assessing the significance of potential impacts.

Table D.1: Definition of vegetation condition categories

Note: Adapted from Keighery (1994).

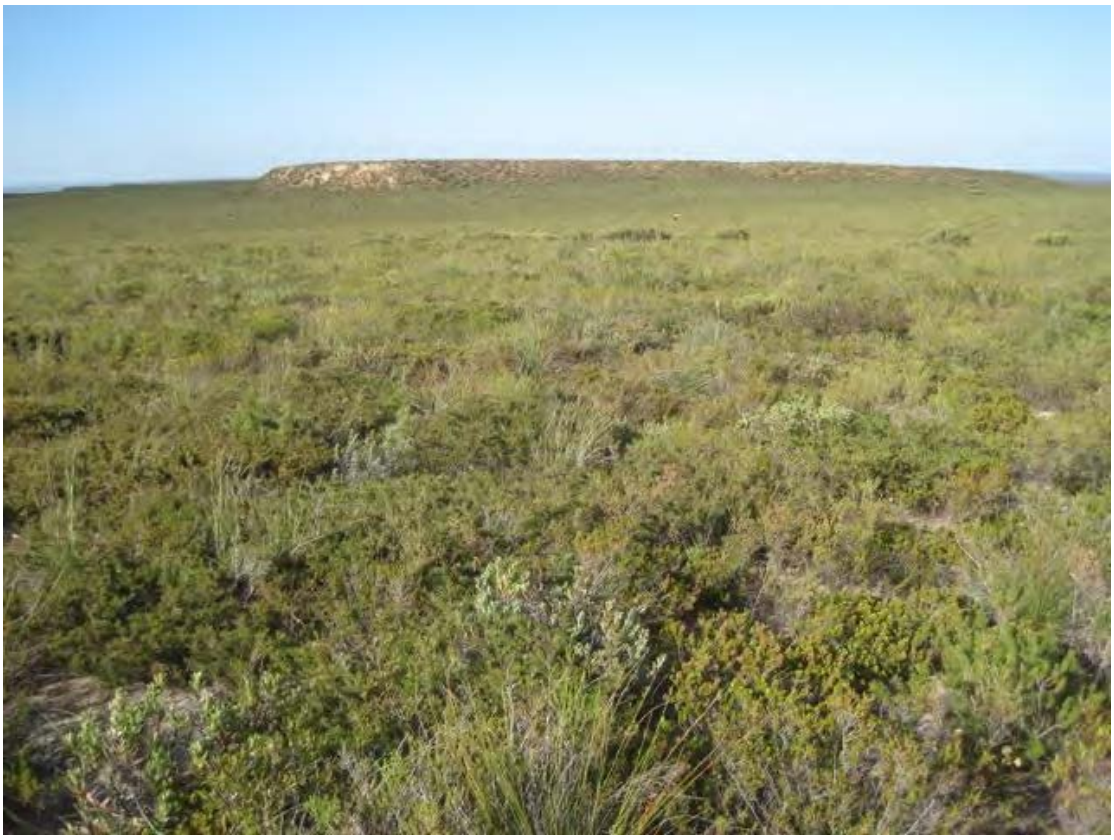
CATEGORY	DEFINITION
1	Pristine or nearly so, no obvious sign of disturbance or damage caused by human activities since European settlement.
2	Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
3	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
4	Vegetation structure significantly altered by obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
5	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
6	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix D

Vertebrate fauna survey report

Trieste 3D Seismic Survey:

Level 1 Vertebrate Fauna Survey and Black-Cockatoo Habitat Survey November 2017



Study area

Prepared for: Lattice Energy Services Pty Limited

Prepared by: Western Wildlife
8 Ridgeway Pl
Mahogany Creek WA 6072
Ph: 0427 510 934

November 2017

Executive Summary

Introduction

Lattice Energy Pty Limited (Lattice) is proposing to undertake an onshore three-dimensional (3D) seismic survey in Exploration Permit 320 in the North Perth Basin, Western Australia. The proposed survey is named the Trieste 3D Seismic Survey, and has the purpose of aiding in the identification of conventional gas reserves through mapping geological formations. On behalf of Lattice, Mattiske Consulting Pty Ltd commissioned Western Wildlife to carry out a Level 1 vertebrate fauna survey of key areas of native vegetation within the seismic survey project area. The objectives of the Level 1 vertebrate fauna survey were to:

- Identify the fauna habitats present in the study areas.
- List the vertebrate fauna that were recorded in the study area and/or have the potential to occur in the study areas.
- Identify species of conservation significance, or habitats of particular importance for fauna, that may occur in the study areas.
- Identify the potential impacts the proposed seismic survey may have on fauna, particularly on fauna of conservation significance.

This report details the findings of the fauna survey conducted in November 2017.

Methods

The fauna survey was undertaken in accordance with Environmental Protection Authority (EPA) Statement of Environmental Principles, Factors and Objectives (EPA 2016a), Environmental Factor Guidelines – Terrestrial Fauna (EPA 2016b), Technical Guide – Terrestrial Fauna Surveys (EPA 2016c), Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA & DEC 2010) and EPBC Act Referral Guidelines for three threatened black cockatoos: Carnaby's Cockatoo, Baudin's Cockatoo and Forest Red-tailed Black-Cockatoo (DSEWPaC 2012).

The field survey was carried out by one zoologist between the 6th and 7th November 2017. The field study included:

- Identification of broad fauna habitats.
- Opportunistic records of fauna.
- Targeted search for evidence of any conservation significant species, particularly foraging, breeding or roosting habitat for Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*).

Species of conservation significance were classified as: Conservation Significance 1 (CS1) if listed under *The Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or *The Western Australian Wildlife Conservation Act 1950* (WC Act); Conservation Significance 2 (CS2) if listed as a Priority species by the Department of Biodiversity, Conservation and Attractions; or Conservation Significance 3 (CS3) if a locally significant species.

Results and Discussion

The landforms underlying the study area grade from low laterite hills, some with minor breakaways, to gravelly sands and deeper white sands in the lower lying portion. The vegetation is a diverse low to mid shrubland, with emergent patches of Banksia shrubland (*Banksia attenuata*, *Banksia hookeriana*, *Banksia scabrella* and/or *Banksia sphaerocarpa*), Woody Pear (*Xylomelum angustifolium*) and open low *Eucalyptus todtiana* woodland on the deeper sands. There is a minor creek vegetated with a woodland of Wandoo (*Eucalyptus accedens*) over shrubland. The habitats present are generally in excellent condition.

The study area has the potential to support up to ten frog, 64 reptile, 119 bird and 25 mammal (18 native mammal) species. During the site visit three reptiles, 38 birds and five mammals were recorded opportunistically. A total of 15 fauna species of conservation significance have the potential to occur in the study area, nine vertebrate species and six invertebrates.

The seven species of CS1 that may occur are the:

- Malleefowl (*Leipoa ocellata*) - EPBC Act (Vulnerable), WC Act (Schedule 3)
- Fork-tailed Swift (*Apus pacificus*) – EPBC Act (Migratory), WC Act (Schedule 5)
- Rainbow Bee-eater (*Merops ornatus*) – EPBC Act (Migratory), WC Act (Schedule 5)
- Peregrine Falcon (*Falco peregrinus*) – WC Act (Schedule 7)
- Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) – EPBC Act (Endangered), WC Act (Schedule 2)
- Chuditch (*Dasyurus geoffroii*) – EPBC Act (Vulnerable), WC Act (Schedule 3)
- Shield-backed Trapdoor Spider (*Idiosoma nigrum*) – EPBC Act (Vulnerable), WC Act (Schedule 3)

Of these, the Rainbow Bee-eater was recorded in the study area and is likely to be a regular breeding visitor, but as its population is large and stable this species is unlikely to be significantly impacted by the seismic survey. The Malleefowl and Chuditch have a low likelihood of occurring, as they are not generally known to occur in the region, though a few dispersing individuals may occur. The study area lacks habitats suitable for the Shield-backed Trapdoor Spider, so this species is also unlikely to be present. The Peregrine Falcon may forage over the project area, but only potentially breeds on the larger laterite breakaways. The Fork-tailed Swift is likely to overfly the study area on occasion, but unlikely to be affected by changes to study area habitats.

Carnaby's Black-Cockatoo is likely to occur as a seasonal foraging visitor to the study area. The study area contains patches of *Banksia* shrubland that is potential foraging habitat, though no evidence of foraging was noted during the site visit. A small area of Wandoo woodland in a minor creek is potential breeding habitat.

The eight species of CS2 that may occur are the:

- Woma (*Aspidites ramsayi*) – Priority 1
- Black-striped Snake (*Neelaps calonotos*) – Priority 3
- Western Brush Wallaby (*Macropus irma*) – Priority 4
- A katydid (*Hemisaga vepreculae*) – Priority 3
- A katydid (*Phasmodes jeeba*) – Priority 2
- Graceful Sun-moth (*Synemon gratiosa*) – Priority 4
- Woolybush Bee (*Hylaeus globulifera*) – Priority 3
- An earwig fly (*Austromerope poultoni*) – Priority 2

Of these, the Woma is likely to be locally extinct and, so these species have a very low likelihood of occurring. The Black-striped Snake is known from sandy habitats in the region and is likely to be present, and the Western Brush Wallaby and two katydid species are moderately likely to occur in the shrublands of the study area. The Woolybush Bee may occur where Woolybush (*Adenanthos cygnorum*) is present, particularly in the southern private property. The Graceful Sun-moth has a low likelihood of occurrence, as the larval food-plants appear to be absent, or at least very uncommon. The earwig fly is only known from one nearby record, with most records of this species from the Jarrah forest.

No species of Conservation Significance 3 were identified for the study area.

The Trieste 3D Seismic Survey is proposed to be completed within a 5 – 7 week period between May and October 2018. When considering potential impacts on fauna, the Trieste 3D Seismic Survey is divided into two key activities:

- Mulching of tracks to access the source and receiver lines for the seismic survey.
- During the data collection several personnel and vehicles will be operating in the study area. Operations will be during daytime hours only.

Based on these activities, the most likely potential impacts on fauna and fauna habitats are:

- Direct mortality of fauna during mulching of tracks or through vehicle strike.
- Loss of fauna habitat (about 100.82 ha), and increased habitat fragmentation in the medium-term through mulching of tracks.
- Habitat degradation in the vicinity of access tracks through the introduction of dieback or weeds, by increased access by feral fauna or by trampling or crushing of adjacent vegetation.
- Temporary disturbance to fauna in the vicinity of works, through noise, light or vibration.
- Increased risk of fire.
- Increased risk of third party access, exacerbating other impacts by preventing the rehabilitation of tracks.

Recommendations have been provided with the aim of minimising or mitigating impacts of the seismic survey, in order to avoid significant impacts to fauna or fauna habitats.

- Avoid mulching tracks during late winter and spring when birds have eggs and unfledged young in the nest.
- Avoid mulching tracks in very cool weather when practicable, as warmer weather allows for more reptiles to disperse from the area being mulched.
- Develop and implement procedure to deal with injured wildlife.
- Induction training to include awareness of fauna that may occur on roads and reporting requirements with regards to incidents.
- Low speed limits for all vehicles in vegetated areas.
- Minimise disturbance footprint during the planning phase and ensure that mulching only occurs in the approved areas.
- Avoid clearing any potential Carnaby's Black-Cockatoo breeding habitat (Wandoo woodland) and divert seismic lines around large stands of *Banksia attenuata* (foraging habitat) where practicable.
- Develop and implement a *weed management plan* and *Dieback management plan*. The plans should include strategies to:
  - Reduce the risk of weed or Dieback introductions to the study area.
  - Manage any existing weeds or areas of Dieback to avoid their spread.

  - Control any weed or Dieback outbreaks.
  - Monitor for weeds or Dieback after track closures.

- Ensure that all food waste is appropriately disposed of to avoid attracting feral fauna.
- No feeding of any fauna on site.
- Ensure that all personnel restrict activities to tracks and do not walk or drive over adjacent native vegetation.
- Minimise the number of personnel and vehicles required on site for operations.
- Ensure equipment is maintained and operated within manufacturers specifications, to eliminate likelihood of excessive noise or vibration.
- If operating in the breeding season for Carnaby's Black-Cockatoo (July – December), maintain a buffer from areas of Wandoo woodland that may support breeding or ascertain that no breeding cockatoos are present prior to the seismic survey.
- Develop and implement a *fire management plan*. The plan should include strategies for:
  - Fire prevention
  - Fighting small spot-fires (e.g. raking or shoveling by hand, provision and use of appropriate fire extinguishers).
  - Fire emergency response procedure.
- Restrict smoking to designated areas, away from native vegetation.
- Develop and implement a *track rehabilitation plan*, ensuring the rehabilitation of mulched tracks to an appropriate standard. The plan should include strategies for:
  - Preventing third party access to the mulched tracks, e.g. through the use of 'dog-legs' at track entrances to reduce their visibility to passing traffic.
  - Monitoring of closed tracks for third party access.
  - Monitoring of closed tracks for introduction of weeds or dieback.
  - Remedial actions to be taken in the event that rehabilitation targets are not met.

The majority of the faunal assemblage, including conservation significant species, is unlikely to be significantly impacted by the seismic survey. Of key concern is Carnaby's Black-Cockatoo, as the study area contains foraging habitat and a small area of potential breeding habitat for this species. The referral guidelines for this species indicate a high risk of a significant impact when more than 1ha of foraging habitat or any potential breeding habitat is disturbed (DSEWPaC 2012). Although the impacts of the seismic survey are likely to be temporary, several hectares of potential foraging habitat will be removed by mulching and unavailable to foraging birds for the medium-term. It is therefore recommended that the seismic survey is referred under the EPBC Act.

Table of Contents

Tables, Figures and Plates

1. Introduction

Lattice Energy Pty Limited (Lattice) is proposing to undertake an onshore three-dimensional (3D) seismic survey in Exploration Permit 320 in the North Perth Basin, Western Australia. The proposed survey is named the Trieste 3D Seismic Survey, and has the purpose of aiding in the identification of conventional gas reserves through mapping geological formations. On behalf of Lattice, Mattiske Consulting Pty Ltd commissioned Western Wildlife to carry out a Level 1 vertebrate fauna survey of key areas of native vegetation within the seismic survey project area. The objectives of the Level 1 vertebrate fauna survey were to:

- Identify the fauna habitats present in the study areas.
- List the vertebrate fauna that were recorded in the study area and/or have the potential to occur in the study areas.
- Identify species of conservation significance, or habitats of particular importance for fauna, that may occur in the study areas.
- Identify the potential impacts the proposed seismic survey may have on fauna, particularly on fauna of conservation significance.

This report details the findings of the fauna survey conducted in November 2017.

2. Background

2.1 Regional Context

The Trieste 3D Seismic Survey Project Area comprises 21,874 ha, situated on onshore permit area EP320 on the Perth Basin in Western Australia. The project area is located about 25 km north of Eneabba and 41 km south-east of Dongara, to the east of the Brand Highway and in the Shire of Irwin (Figure 1).

The project area falls within the Interim Biogeographic Regionalisation of Australia ('IBRA') Bioregion Geraldton Sandplain 3 – Lesueur Sandplain Subregion (DEWHA 2004, Desmond and Chant 2001). The subregion has a Mediterranean climate, and the primary land-use is dryland agriculture (69.34%), with smaller areas of conservation (17.6%) and Unallocated Crown Land (UCL) and Crown reserves (12.5%) (Desmond and Chant 2001). The vegetation in the subregion is dominated by endemic-rich shrub-heaths on a mosaic of sandplains, lateritic mesas, coastal sands and limestones, with heath on laterised sandplains on the north-eastern edges of the subregion (Desmond and Chant 2001).

There are several large nature reserves on the west coast, from about 12 km to the west of the project area. These include Beekeepers Nature Reserve, Lake Logue Nature Reserve, Yardanogo Nature Reserve and several unnamed Nature Reserves (Figure 1). To the east are some smaller Nature Reserves, including Wotto and Wilson Nature Reserves. There are also large areas of native vegetation in UCL to the north and west of the project area (Figure 1).

2.2 Fauna Survey Study Area

Much of the project area is farmland and likely to support only a few generalist fauna species. Some areas of native vegetation have been excluded from the seismic survey area, including an unnamed Nature Reserve and vegetation along the Arrowsmith River (Figure 2). The remaining areas of native vegetation on private property and Unallocated Crown Land (UCL) are designated the 'study area' and were the focus of the fauna survey. The study area totals 4,598.5 ha, of which 4,108 ha are the UCL and 490.5 ha native vegetation on private property.

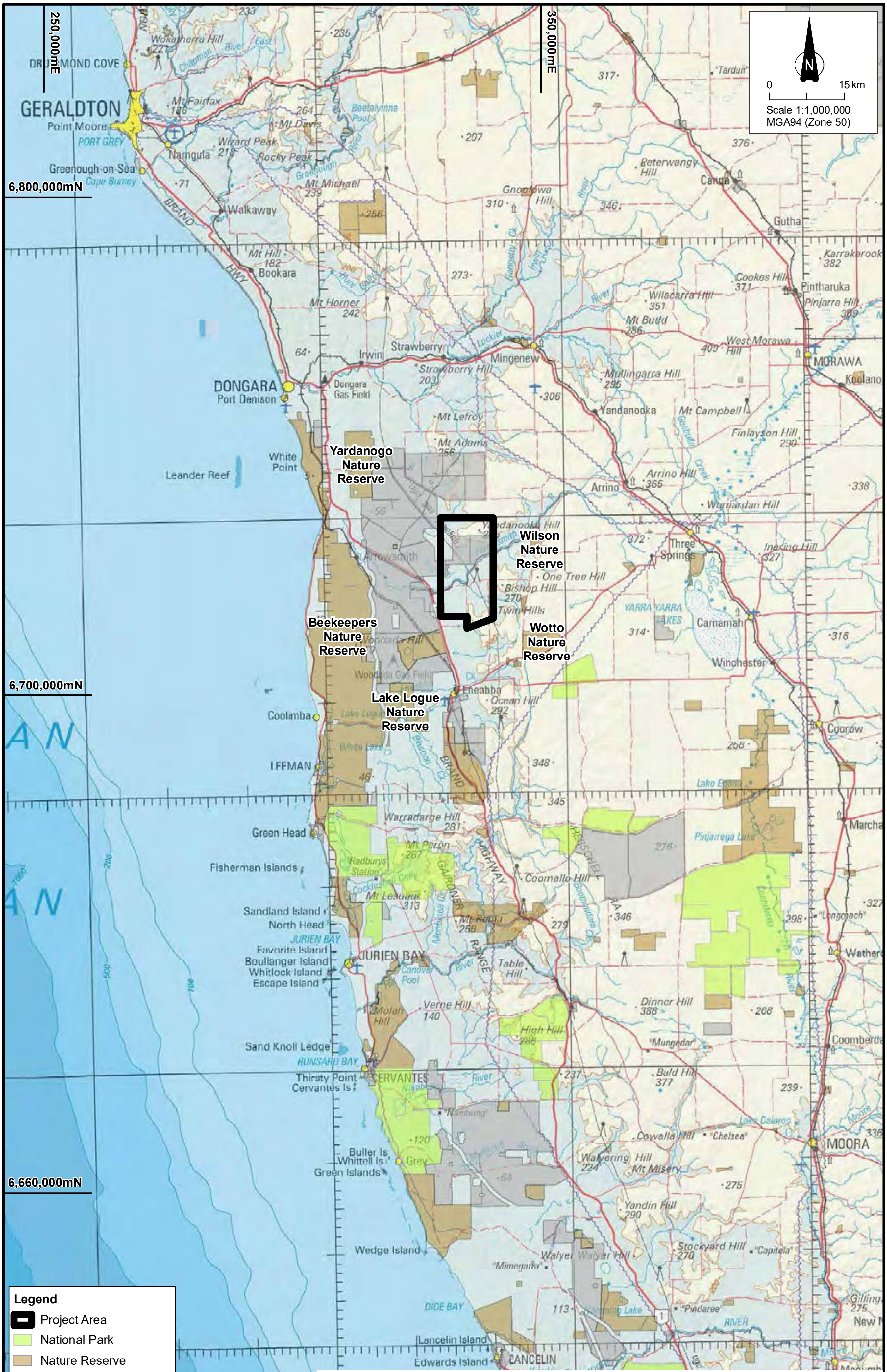


Figure 1. Trieste 3D Seismic Survey Project Area: regional location

Author: Western Wildlife ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ November 2017 ~ A4 ~ Rev: A ~ CAD Ref: a2505_Fa_F001

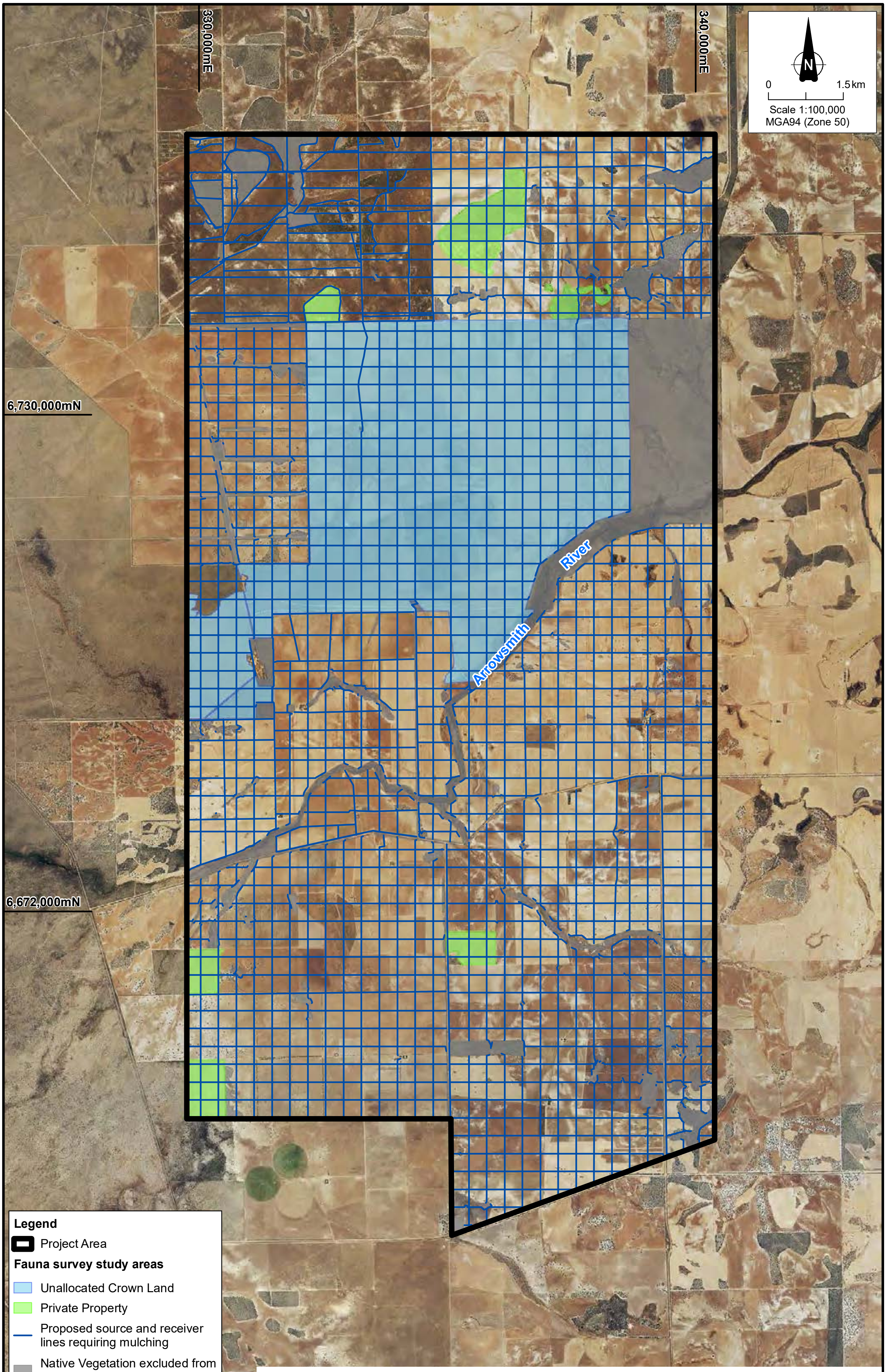


Figure 2. Trieste 3D Seismic Survey Project Area: fauna survey study area

Author: Western Wildlife ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ November 2017 ~ A4 ~ Rev: A ~ CAD Ref: a2505_Fa_F002

3. Methods

A Level 1 vertebrate fauna survey with a targeted Carnaby's Black-Cockatoo habitat survey was undertaken. The survey was conducted with reference to the following documents:

- Statement of environmental principles, factors and objectives (Environmental Protection Authority (EPA) 2016a)
- Environmental factor guideline – terrestrial fauna (EPA 2016b)
- Technical guidance – terrestrial fauna surveys (EPA 2016c)
- Technical Guide: terrestrial vertebrate fauna surveys for environmental impact assessment (EPA and DEC 2010)
- EPBC Act Referral Guidelines for three threatened black cockatoos: Carnaby's Cockatoo, Baudin's Cockatoo and Forest Red-tailed Black-Cockatoo (DSEWPaC 2012).

The fauna survey included a search of available literature and databases (a desk-top study), and a brief site visit. The data collected in the field serve to put the desk-top study into context, as well as allowing for the identification of fauna habitats and likely fauna assemblages of the site.

It was considered that a Level 1 fauna survey was sufficient to characterise the fauna habitats, vertebrate faunal assemblage and the likely conservation significant fauna using the study area. Although a Level 2 fauna survey involving trapping would be likely to add to the list of vertebrate fauna species known to occur in the project area, particularly of reptiles and small mammals, it is unlikely to provide extra information useful in managing potential impacts on fauna.

3.1 Personnel

Ms Jenny Wilcox (*BSc.Biol./Env.Sci., Hons.Biol.*) undertook the fieldwork and prepared this report. Jenny has 17 years' experience with fauna surveys in Western Australia. Some additional data on the presence of particular plant species were supplied by Mattiske Consulting Pty Ltd.

3.2 Taxonomy and Nomenclature

Taxonomy and nomenclature for fauna species used in this report follow the Western Australian Museum checklists. These were last updated in 2016. In the text, common names are used where appropriate, and all scientific names are given in species lists (Appendices 1 – 4). Where a species lacks a common name, they are referred to by their scientific name.

3.3 Mapping

Habitat mapping was necessarily broad, as no vegetation mapping was available for the study area. Maps were produced using a combination of examination of aerial photography and notes made in the field. Maps showing records of conservation significant fauna species in the region use data extracted from the Department of Biodiversity, Conservation and Attraction (DBCA)s Threatened and Priority Fauna Database. CAD Resources produced the maps from information provided by Western Wildlife.

3.4 Literature Review

Lists of fauna expected to occur in the study area were produced using information from a number of sources. These included publications that provide information on general patterns of distribution of frogs (Tyler *et al*. 2000), reptiles (Storr *et al*. 1983, 1990, 1999 and 2002), birds (Barrett *et al*. 2003; Johnstone and Storr 1998 and 2004) and mammals (Churchill 1998, Menkhorst and Knight 2011; Van Dyck and Strahan 2008).

The databases listed in Table 1 were searched for fauna records in and around the study area. In all cases the extent of the database search was larger than the extent of the study area, in order to pick up records of species in the wider area that may also occur in the study area. Some species may occur on database results that are not likely to be present in the study area, usually due to a lack of suitable habitat or the study area being outside the known range of the species as presented in the literature. These species are generally not included in lists of expected fauna unless some discussion is thought to be necessary.

Table 1. Databases used in the preparation of Appendices 1 - 4.

Database	Type of records held on database	Area searched
WA Museum Specimen Database (DPAW 2007-)	Records of specimens held in the Western Australian Museum. Includes historical records.	25km radius around 28º48'28" S, 122º12'37" E
Fauna Survey Returns Database (DPAW 2007-)	Records collected from fauna surveys carried out in Western Australia. Includes observational and trapping data.	25km radius around 28º48'28" S, 122º12'37" E
DBCA's Threatened and Priority Fauna Database (DPAW 2007-)	Information and records on Threatened and Priority species in Western Australia	55km radius around 335000 S, 6725000 N (Zone 50)
Birds Australia Atlas Database (DPAW 2007-)	Records of bird observations in Australia, 1998-current.	20km radius around 28º48'28" S, 122º12'37" E
EPBC Act Protected Matters Search Tool	Records on matters protected under the EPBC Act, including threatened species and ecological communities, migratory species and marine species.	25km radius around 28º48'28" S, 122º12'37" E

These sources of information were used to create lists of species that potentially occur in the study area. As far as possible, expected species are those that are likely to utilise the study area. The lists exclude species that have been recorded in the general region as vagrants, or for which suitable habitat is absent within the study area.

3.5 Site Visit

The site visit was carried out between 6th - 7th November 2017. The UCL was surveyed by vehicle and on foot, and those areas of private property that were accessible were visited on foot.

The field study component of a Level 1 fauna survey is primarily to identify the fauna habitats present in the study area. In addition, all vertebrate fauna encountered during the field survey were recorded. The fauna species recorded are usually conspicuous species such as birds, large mammals and large reptiles. The presence of other species may be inferred from evidence such as tracks, burrows, scats or evidence of foraging. Particular attention was paid to searching for evidence of conservation significant species, or habitats likely to support conservation significant species.

Although not all stands of *Banksia* could be visited in a short site visit, several patches were searched for evidence of foraging Carnaby's Black-Cockatoo.

In addition, conspicuous fauna species were recorded if sighted by personnel by Mattiske Consulting Pty Ltd during their flora survey work in the study area for 27 days between August and October 2017 (specifically 1^{st} -4^{th} August, 18^{th} -22^{nd} and 26^{th} -29^{th} September and 9^{th} -13^{th}, 16^{th} -20^{th} and 23^{rd} - 27^{th} October 2017). Conspicuous fauna included Carnaby's Black-Cockatoo, Malleefowl and Western Brush Wallaby.

3.6 Survey Limitations

Various factors can limit the effectiveness of a fauna survey. Pursuant to EPA Technical Guidance (EPA 2016c), these factors have been identified and their potential to impact on the effectiveness of the surveys has been assessed in Table 2 below. All fauna surveys have limitations, and not all fauna species present on the site are likely to be sampled during a survey. Fauna may not be recorded because they are rare, they are difficult to trap or observe, or because they are only present on the site for part of the year.

Table 2. Fauna survey limitations.

Potential Limitation	Extent of limitation for the fauna survey	
Experience of fauna personnel	Not limiting:	The supervising zoologist has over 17 years' experience in fauna consulting.
Types of traps or other survey methods used	Not limiting:	No trapping was undertaken as this was a Level 1 survey. This restricts fauna records to opportunistic observations.
Number of trapping sites	Not limiting:	As above.
Ability to survey all habitats present	Not limiting:	All habitats present were surveyed during the fauna survey.
Availability of fauna information for the area in literature and on databases	Not limiting:	Moderate amount of fauna information available on databases and in the literature.
Effects of weather during the survey	Not limiting:	Weather during the field survey was hot and humid. Weather conditions are unlikely to affect the outcomes of a Level 1 fauna survey.
Seasonal effects	Not limiting:	Seasonal effects are not taken into account with a Level 1 survey, as the primary function is habitat assessment.
Disturbance to site such as recent fires, cattle grazing	Minor limitation:	Parts of the site are disturbed due to grazing (on vegetation in private properties), fire and the presence of feral fauna (fox, rabbit, goat).
Ease of access to site	Not limiting:	Site access is generally good with numerous tracks to all habitat types. Entirety of site is accessible on foot.

3.7 Assessment of Conservation Significance

Three levels of conservation significance are used within this report to indicate the level of significance of fauna species. These are described in the following sub-sections.

3.7.1 Conservation Significance 1

Conservation Significance 1 (CS1) is the highest level of conservation significance, describing species that are protected under State or Commonwealth legislation. These species are considered to be of state and/or national conservation significance, and some species (e.g. some migratory species) may be considered of international significance.

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is the Commonwealth Government's primary piece of environmental legislation. Listed under Part 3 of the EPBC Act are 'Matters of National Environmental Significance'. These include threatened species, threatened ecological communities and migratory species.

Fauna species are assessed against categories based on International Union for Conservation of Nature (IUCN) criteria. These criteria are as follows:

Extinct:	Taxa not definitely located in the wild during the past 50 years.
Extinct in the wild:	Taxa known to survive only in captivity.
Critically Endangered:	Taxa facing an extremely high risk of extinction in the wild in the immediate future.
Endangered:	Taxa facing a very high risk of extinction in the wild in the near future.
Vulnerable:	Taxa facing a very high risk of extinction in the wild in the medium-term future.
Conservation Dependent:	Taxa whose survival depends upon ongoing conservation measures. Without these measures, a conservation dependent taxon would be classed as Vulnerable or more severely threatened.

Of the above, only fauna classified as 'extinct in the wild' 'critically endangered', 'endangered' or 'vulnerable' are listed as Matters of National Environmental Significance.

The migratory species listed under the EPBC Act are those recognised under international agreements. These agreements are the China-Australia Migratory Bird Agreement (CAMBA), the Japan-Australia Migratory Bird Agreement (JAMBA), the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA), or species listed under the Bonn Convention for which Australia is a range state.

Reports on the conservation status of most vertebrate fauna species have been produced by the Department of Environment and Energy (DEE) in the form of Action Plans. An Action Plan is a review of the conservation status of a taxonomic group against IUCN categories. Action Plans have been prepared for amphibians (Tyler 1998), reptiles (Cogger *et al*. 1993), birds (Garnett *et al*. 2011) and mammals (Woinarski *et al*. 2012). These publications also use categories similar to those used by the EPBC Act. The information presented in some of the earlier Action Plans may be out of date due to changes since publication.

The *Western Australian Wildlife Conservation Act 1950* (WC Act) is State legislation for fauna protection administered by the Department of Biodiversity, Conservation and Attractions (DBCA). The WC Act lists species under a set of Schedules, as listed below.

Schedule 1:	Fauna that is rare or likely to become extinct (critically endangered fauna)
Schedule 2:	Fauna that is rare or likely to become extinct (endangered fauna)
Schedule 3:	Fauna that is rare or likely to become extinct (vulnerable fauna)
Schedule 4:	Fauna presumed to be extinct
Schedule 5:	Migratory birds protected under an international agreement
Schedule 6:	Fauna that is of special conservation need (conservation dependent fauna)
Schedule 7:	Other specially protected fauna

3.7.2 Conservation Significance 2

Species of Conservation Significance 2 (CS2) are not listed under State or Commonwealth Acts, but are listed as Priority species by DBCA. These species may be considered to be regionally significant. In Western Australia, DBCA maintains a list of Priority Fauna made up of species that are not considered Threatened under the WC Act, but for which DBCA feels there is cause for concern. There are four levels of Priority as defined by DBCA, as listed below.

Priority 1:	Poorly known species (on threatened lands)
Priority 2:	Poorly known species in few locations (some on conservation lands)
Priority 3:	Poorly known species in several locations (some on conservation lands)
Priority 4:	Rare, near threatened and other species in need of monitoring

3.7.3 Conservation Significance 3

Conservation Significance 3 (CS3) species are not listed under State or Commonwealth Acts or in publications on threatened fauna or as Priority species by DBCA, but are considered by the author to potentially be of local significance because they are at the limit of their distribution in the area, they have a very restricted range or they occur in breeding colonies (e.g. some waterbirds). This level of significance has no legislative recognition and is based on interpretation of information on the species patterns of distribution. For example, the Government of Western Australia (2000) used this sort of interpretation to identify significant bird species in the Perth metropolitan area as part of Bush Forever. Recognition of such species is consistent with the aim of preserving regional biodiversity.

4. Habitats of the Study Area

The fauna habitats in the study area (Figure 3), were identified on the basis of observations made in the field, interpretation of aerial photography and notes provided by Mattiske Consulting Pty Ltd.

The landforms underlying the study area grade from low laterite hills, some with minor breakaways, to gravelly sands and deeper white sands in the lower lying portion. There is a minor creek in the north-east corner of the Unallocated Crown Land (UCL). The vegetation is a diverse low to mid shrubland, with emergent patches of Banksia shrubland (*Banksia attenuata*, *Banksia hookeriana*, *Banksia scabrella* and/or *Banksia sphaerocarpa*), Woody Pear (*Xylomelum angustifolium*) and open low *Eucalyptus todtiana* woodland on the deeper sands (Plates 1 – 7). The minor creek is vegetated with a woodland of Wandoo (*Eucalyptus accedens*) over shrubland (Plate 8). Note that the vegetation of the study area has not been mapped, so the fine-scale identification of the extent of, for example, patches of *Banksia* shrubland, was not possible.

There is some disturbance to all habitats, from access tracks, firebreaks, bushfire and gravel extraction. Much of the UCL was burnt in about 2010/2011 and is likely to be still recovering. Some of the structural differences in habitat (e.g. low shrubland compared to mid shrubland) is likely to be due to differences in the post-fire age of the vegetation. The parts of the study area on private property (see Figure 2) show some disturbance by livestock, including tracks and scats. In these areas on edges there is some weed invasion (Plate 9). Overall the habitats are in excellent condition and likely to support a virtually intact faunal assemblage, lacking only those species that are locally extinct in the Lesueur Sandplains Subregion.

Plate 1. Low shrubland on laterite hills on the UCL.

Plate 2. Shrubland on laterite hill on private property.

Plate 3. Low shrubland on gravelly sands on the UCL.

Plate 4. Low shrubland on sands on the UCL.

Plate 5. Emergent patch of *Banksia attenuata* shrubland on the UCL.

Plate 6. Open shrubland with *Banksia hookeriana* and *B. attenuata* on private property.

Plate 7. Open woodland of *Eucalyptus todtiana* over shrubland on sand on the UCL.

Plate 8. Wandoo woodland in minor creek on the UCL.

Plate 9. Weed invasion on edges of vegetation on private property.

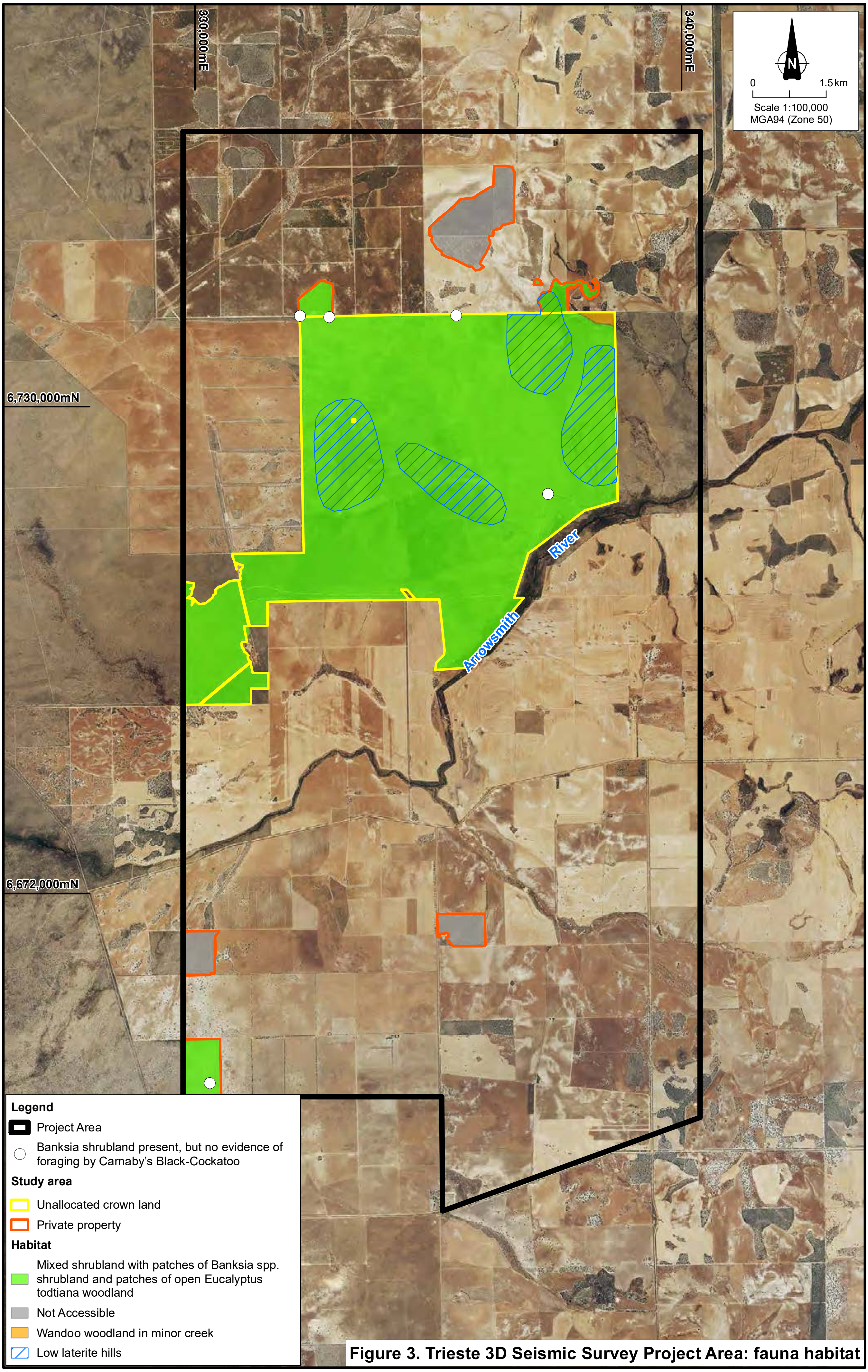


Figure 3. Trieste 3D Seismic Survey Project Area: fauna habitat

5. Vertebrate Fauna of the Study Area

The numbers of vertebrate species potentially occurring in the study area are summarised below in Table 3. The amphibians, reptiles, birds and mammals that have the potential to occur in the study area are listed in Appendices 1 - 4. Indicated in each table are the species recorded:

- In the study area by Western Wildlife during the 2017 site visit.
- In the wider area on the WA Museum Specimen Database (see Table 1).
- In the wider area on the Birds Australia Atlas Database (see Table 1).
- In the wider area on DBCA's Threatened and Priority Fauna Database (see Table 1).
- In the wider area on the EPBC Protected Matters Search Tool (see Table 1).

Table 3. Summary of vertebrate fauna potentially occurring in the study area.

Taxon	Total species	Introduced species	Conservation significant species		
			CS1	CS2	CS3
Amphibians	10	0	-	-	-
Reptiles	64	0	-	2	-
Birds	119	1	5	-	-
Mammals	25	7	1	1	-
Totals:	**218**	**8**	**6**	**3**	**0**

Fauna of conservation significance (including invertebrates fauna of conservation significance) are discussed in the sections below and are summarised in Table 4. Records of conservation significant fauna from DBCA's Threatened and Priority Fauna Database (excluding shorebirds, wetland and marine species) and are presented in Figures 4 - 6. The results of the EPBC Act Protected Matters Search Tool extract are given in Appendix 5.

5.1 Amphibians

There are ten species of frog that have the potential to occur in the study area (Appendix 1). No frogs were observed in the study area in November 2017, as expected during a brief site visit. In general, the frog species that occur in the study area are common and widely distributed in either the southwest or arid regions.

The frogs that potentially occur fall into roughly three groups. The first are those species that rely on permanent waters or at least permanently damp habitats (e.g. tree frogs). These species are unlikely to occur in areas of dry shrubland, but are likely to occur within the wider project area on the Arrowsmith River and man-made habitats such as farm dams and tanks. The second are burrowing frogs (e.g. the Moaning Frog, *Heleioporus eyrei*). These species require water to breed, and depending on the species, will breeding in seasonal creeks, salinity banks, gravel pits and other seasonally wet areas. During the non-breeding season, these species range away from water and be found in terrestrial habitats where they forage and/or aestivate underground. These species may breed in the study area where water collects, though no significant frog breeding habitat appears to be present. The Turtle Frog is the sole member of the third group. The Turtle Frog does not require free water to breed as the tadpoles develop into frogs within the egg. This species is likely to occur in sandy soils across the study area.

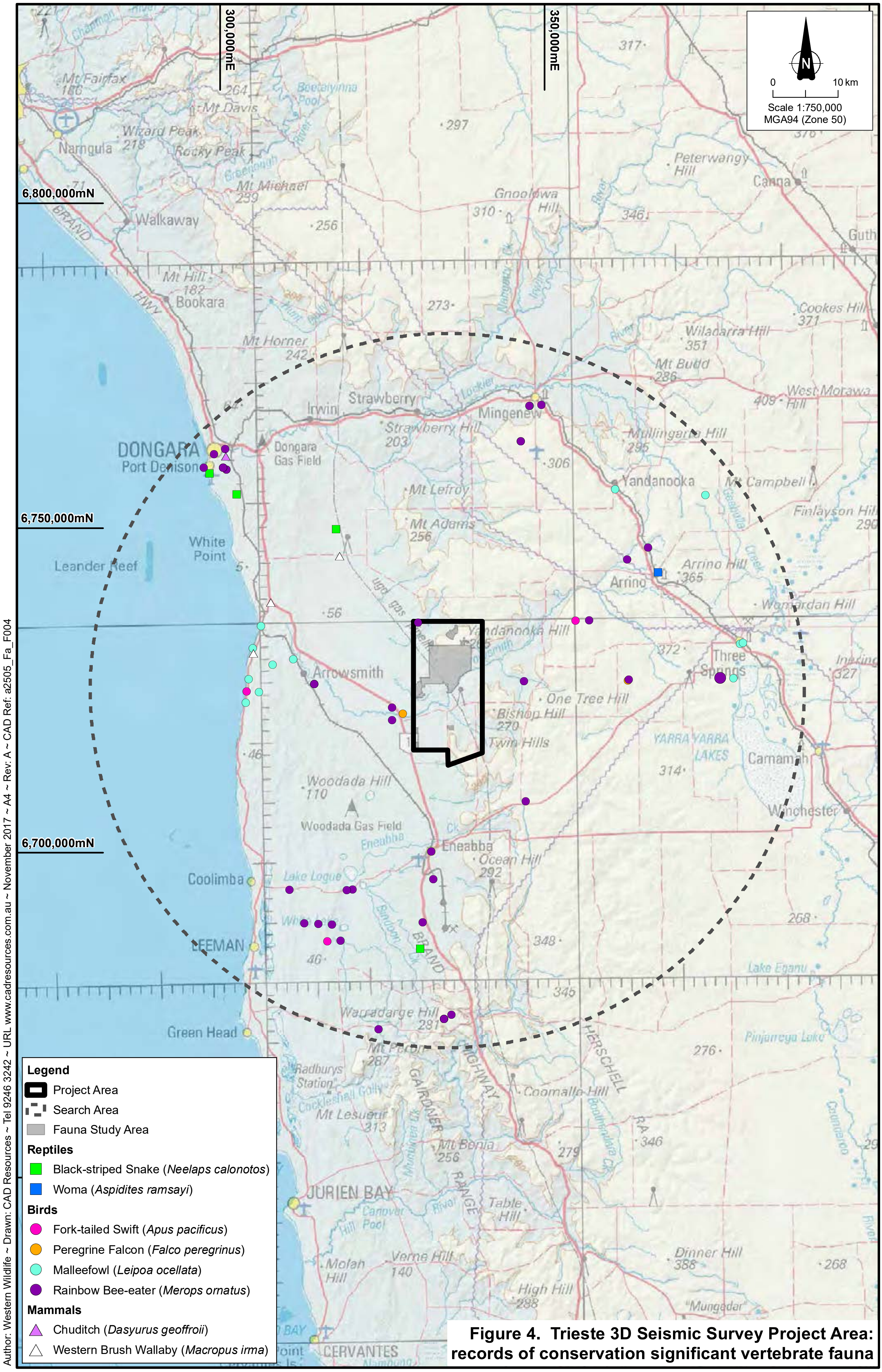


Figure 4. Trieste 3D Seismic Survey Project Area: records of conservation significant vertebrate fauna

5.1.1 Amphibians of Conservation Significance

No frogs of conservation significance are likely to be present in the study area.

5.2 Reptiles

There are 64 species of reptile that have the potential to occur in the study area (Appendix 2). Only three reptile species were observed in the study area in November 2017, though this is not unexpected during a brief site visit. The reptile assemblage is likely to be largely intact. The assemblage is dominated by species with a southwestern distribution, but also includes arid zone species on the western edge of their range.

Many of the reptiles present have broad habitat preferences and therefore potentially occur throughout the study area. Some species may favour either the sandy soils, laterite hills or more wooded habitats. Species with a preference for sandy soils include (but are not limited to) the White-spotted Ground Gecko (*Diplodactylus alboguttatus*), Sand-plain Worm-Lizard (*Aprasia repens*), Southern Heath Dragon (*Ctenophorus adelaidensis*), Broad-banded Sand-swimmer (*Eremiascincus richardsonii*), *Lerista distinguenda* and *Lerista lineopunctulata*. Species such as the Stimpson's Python (*Antaresia stimpsoni*) are likely to favour rocky habitats, where there is shelter available in rock crevices. However, it should be noted that the laterite hills are relatively low and the breakaways appear to have relatively few crevices. Species that favour more wooded habitats are likely to favour the minor creek and areas of *Eucalyptus todtiana* woodland, including the Black-tailed Monitor (*Varanus tristis*) and Fence Skink (*Cryptoblepharus buchananii*).

5.2.1 Reptiles of Conservation Significance

There are two reptiles of conservation significance that may occur in the study area, as listed and discussed below.

Conservation Significance 2

Woma *Aspidites ramsayi*
This species is listed as Priority 1 by DBCA.

Black-striped Snake *Neelaps calonotos*
This species is listed as Priority 3 by DBCA.

The **Woma** has severely declined in the wheatbelt, with the last confirmed record in 1989 at Watheroo (Bush *et al*. 2007). The only record within 55 km of the study area on DBCA's Threatened and Priority Fauna Database is of an undated historical specimen collected from Dudawa (Figure 4). The Woma favours sandplain habitats, however, though it may once have occurred in the region, it is considered highly likely to be locally extinct in the vicinity of the study area.

The **Black-striped Snake** is a small snake with a coastal distribution from Dongara south to Mandurah. It inhabits coastal dunes and sandplains that support heath or *Banksia* woodland (Bush *et al*. 2007). The Black-striped Snake is active at night, spending most of its time in the leaf litter or soil. There are six records of this species within 55 km of the study area on DBCA's Threatened and Priority Fauna Database (Figure 4). The records are all relatively recent, ranging from 1996 to 2007. This species is likely to occur on the sandy soils of the study area, though it is probably absent from rocky areas.

5.3 Birds

There are 119 species of bird that have the potential to occur in the study area, of which 40 were recorded opportunistically during the 2017 site visit or by Mattiske Consulting Pty Ltd (Appendix 3).

The bird assemblage is diverse, with the floristically rich shrublands supporting a variety of nectar-feeding honeyeaters and small insectivores. When seeding, the scattered *Eucalyptus todtiana* and shrubs such as *Acacia* and *Allocasuarina spp.* provide food for granivorous species such as parrots, pigeons and cockatoos. Birds of prey forage over the low shrubland, and may roost or nest in the taller trees and laterite breakaways. Species that rely on eucalypts, such as the Weebill (*Smicronis brevirostris*) are likely to favour Wandoo woodland in the minor creek and the open *Eucalyptus todtiana* woodland.

Many species are likely to breed in the study area, constructing nests in trees or shrubs in densely vegetated areas. Few nest hollows were observed, though some were present in the Wandoo woodland on the minor creek, and small hollows were present in the scattered *Eucalyptus todtiana*. Feral Bees (*Apis mellifera*) were present, particularly along the minor creek, rendering some hollows unsuitable for nesting.

Waterbirds, such as ducks, herons, egrets and ibis occur in the region and may occur nearby on farm dams or the Arrowsmith River. However, no waterbirds have been listed in Appendix 3, as there is no significant waterbird habitat present in the study area.

5.3.1 Birds of Conservation Significance

There are five birds of conservation significance that may potentially occur in the study area. Each species is listed in the box below, and discussed. Several bird species are listed on databases for the region, but have been excluded due to lack of suitable wetland habitats.

<u>Conservation Significance 1</u>

Malleefowl *Leipoa ocellata*
This species is listed as Vulnerable under the EPBC Act and under Schedule 3 (Vulnerable) of the WC Act.

Fork-tailed Swift *Apus pacificus*
This species is listed as migratory under the EPBC Act and under Schedule 5 (migratory birds protected under international agreement) of the WC Act.

Rainbow Bee-eater *Merops ornatus*
This species is listed under Schedule 5 (migratory birds protected under international agreement) of the WC Act.

Peregrine Falcon *Falco peregrinus*
This falcon is listed under Schedule 7 (other specially protected fauna) of the WC Act.

Carnaby's Black-Cockatoo *Calyptorhynchus latirostris*
This species is listed as Endangered under the EPBC Act and under Schedule 2 (Endangered) of the WC Act.

The **Malleefowl** is a large ground-dwelling bird inhabits mallee woodlands and *Acacia* shrublands that have a dense layer of leaf litter (Johnstone and Storr 1998). The Malleefowl is thought never to have been common in the vicinity of the study area, with higher density populations occurring to the east of a line between Kalbarri and Wongan Hills (Abbott, 2008). Since European settlement, this range has contracted further (Abbott 2008, Benshemesh 2007). There are 15 records of this species within 55 km of the study area on the DBCA Threatened and Priority Fauna Database (Figure 4). Three of these records are undated historical records, the remainder ranging from 1964 to 2011. The most recent record in 2011 is of a bird on Beekeepers Rd at Arrowsmith, indicating that this species still maintains a presence in the region. Although some of the shrubland habitats in the study area may be suitable habitat for foraging Malleefowl, much of the vegetation present is too low and sparse to support breeding and no nesting mounds were recorded during the site visit, or by Mattiske Consulting Pty Ltd (2017). The Malleefowl potentially occurs at low density in the study area, most likely as occasional dispersing individuals.

The **Fork-tailed Swift** is a non-breeding visitor to Australia between September and April (Boehm 1962). While it can be common in the north, it is generally scarce in southwest Australia (Johnstone and Storr 1998). The bird is primarily observed foraging for insects in proximity to cyclonic weather (Boehm 1962). Although a migratory species, the Fork-tailed Swift has a large range and a large population that appears to be stable (BirdLife International 2017). The Fork-tailed Swift is largely aerial in Australia, so is unlikely to be affected by changes to the study area.

The **Rainbow Bee-eater** is a common species that migrates southwards in summer to breed. It is widespread in Western Australia and was recorded in the study area during the site visit (Appendix 3). The Rainbow Bee-eater may forage anywhere over the study area, and is likely to breed where there are sandy soils in which to burrow, including along the minor creek, on the edges of sandy tracks or firebreaks and in open patches of sand amongst shrubland vegetation. As the Rainbow Bee-eater has an extremely large range and an extremely large population size that does not appear to be declining (BirdLife International 2017), it is unlikely that the study area is of particular significance for this species, except on a local level.

The **Peregrine Falcon** is a widespread bird of prey that globally has a very large range and a very large population that appears to be secure (BirdLife International 2017). In Western Australia the population is secure, though this species may experience reductions at a local level due to human disturbance at nesting sites (Debus 1998). The Peregrine Falcon nests mainly on ledges on cliffs or rocky outcrops, and it may also use tall trees (Johnstone and Storr 1998). This species often takes advantage of man-made structures such as abandoned open pits or quarries. There are three records of this species within 55 km of the study area on the DBCA Threatened and Priority Fauna Database (Figure 4), including a record at Arrowsmith in 2002. The Peregrine Falcon may occur and forage in the study area, with potential breeding habitat present on breakaways on the low laterite hills.

Carnaby's Black-Cockatoo nests in large eucalypt hollows, usually in smooth-barked species such as Salmon Gum or Wandoo, though they may nest in any suitably sized hollow (DSEWPaC 2012, DPAW 2013). The breeding season is July to December, and for breeding to be successful, birds rely on the presence of foraging habitat within 12km of the breeding site (DPAW 2013). During the non-breeding season, birds generally move west or south towards the coast, foraging in proteaceous shrublands and woodlands. Key threats for this species include loss of breeding habitat, loss of feeding habitat in close proximity to breeding habitat, loss of non-breeding season foraging habitat and night-roost sites, clearing for mining and extraction activities and illegal shooting (DPAW 2013). Carnaby's Black-Cockatoo has been recorded within 55 km of the study area on DBCA's Threatened and Priority Fauna Database (Figure 5), including a large flock of 350 just to the north of the study area (Figure 5).

- **Roosting Habitat**. The study area is unlikely to provide roosting habitat for Carnaby's Black-Cockatoo, as this species roosts in tall trees, usually in riparian habitats (DSEWPaC 2012). Carnaby's Black-Cockatoos potentially roost elsewhere in the Project Area, such as along the Arrow smith River, or further afield on the Irwin River.

- **Foraging habitat**. The study area contains some foraging habitat for Carnaby's Black-Cockatoo, with patches of Banksia shrubland (particularly *Banksia attenuata* and *Banksia hookeriana*, but also *Banksia sphaerocarpa* and/or *Banksia scabrella*) on sands or gravelly sands (Plate 10), and small areas of *Hakea trifurcata* and *Banksia sessilis* on some of the laterite rises. However, no evidence of current or past foraging activity (e.g. chewed *Banksia* cones) was recorded, despite searching in several locations (Figure 3). Despite the lack of evidence, the stands of Banksia shrubland in the study area are highly likely to be used by foraging cockatoos, at least in the non-breeding season (January – June).

- **Breeding habitat.** No Carnaby's Black-Cockatoos were recorded during the site visit, or by Mattiske Consulting personnel during the 27 days of flora survey between August and October 2017. As these surveys were within the breeding season, it suggests that Carnaby's Black-Cockatoos are not using the study area as a foraging resource to support breeding, though the absence of records does not necessarily prove an absence. Carnaby's Black-Cockatoo is known to breed in the region, with the nearest breeding records to the east at Three Springs and south-east at Coomallo (Figure 5). However, the study area falls on the boundary of the known breeding range of this species, as mapped by DEE (2017), with no breeding known to occur further west. The Wandoo woodland on the minor creek contains trees with a diameter at breast height (DBH) of 30cm or more, and is therefore considered 'potential breeding habitat' (DSEWPaC 2012). Woodlands along the Arrowsmith River are also potential breeding habitat, and these areas have been excised from the seismic survey.

Plate 10. Banksia shrubland - foraging habitat for Carnaby's Black-Cockatoo.

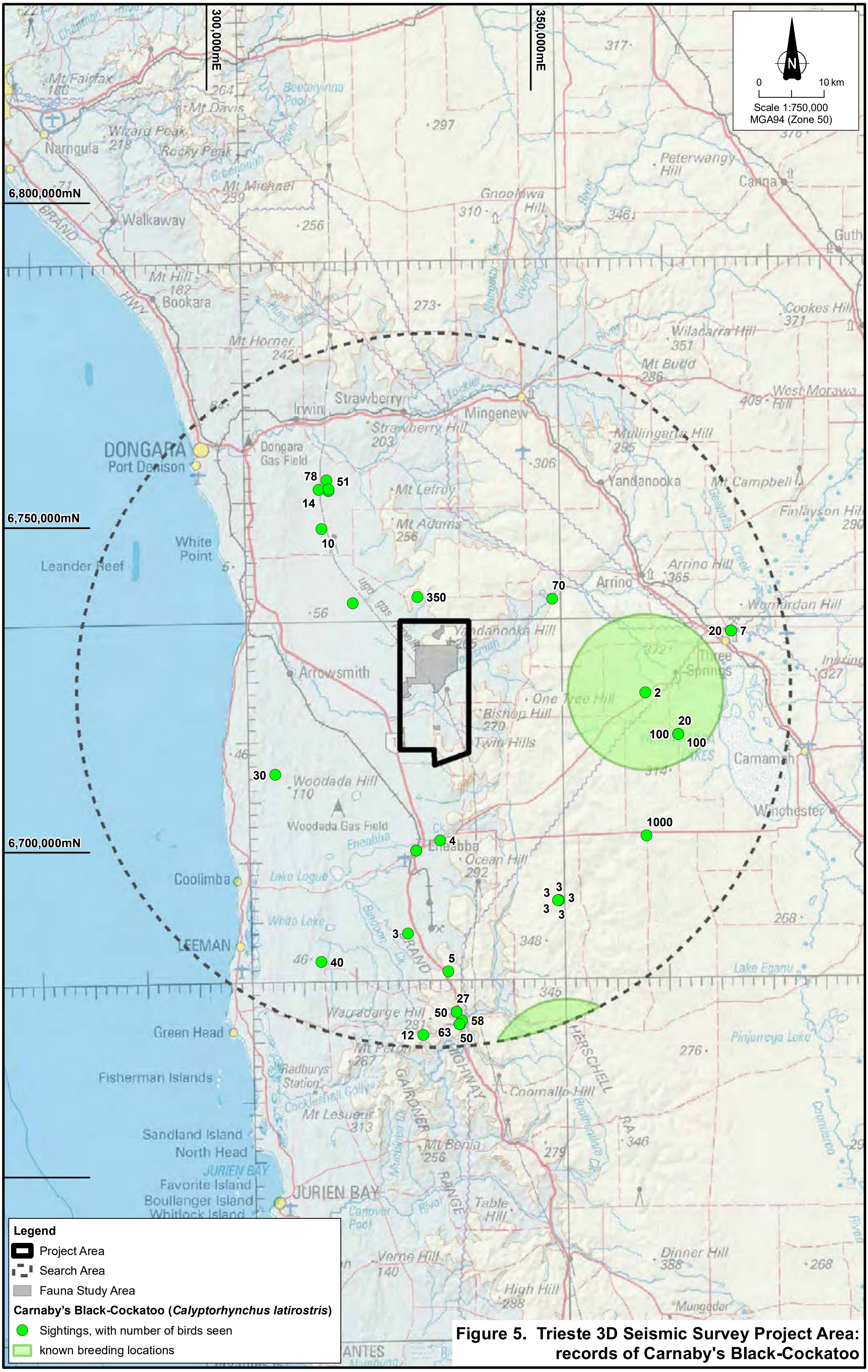


Figure 5. Trieste 3D Seismic Survey Project Area: records of Carnaby's Black-Cockatoo

Author: Western Wildlife ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ November 2017 ~ A4 ~ Rev: A ~ CAD Ref: a2505_Fa_F005

5.4 Mammals

There are 25 species of mammal that have the potential to occur in the study area, of which 18 are native and seven introduced (Appendix 4). Five species of mammal were recorded opportunistically during the site visit, one native species and four introduced (Appendix 4). The native species observed was the Western Grey Kangaroo (*Macropus fuliginosus*), which is likely to be common in the study area, sheltering under larger shrubs during the day. Evidence of feral mammals (Foxes, Rabbits and Goats) was common across the study area, and evidence of livestock (cattle) was present in the private property vegetation remnants.

Several of the mammals listed in Appendix 4 are insectivorous bats. These species are likely to forage over the study area at night. Most species roost in tree hollows or crevices, and may roost in the Wandoo woodland in the minor creek or in larger *Eucalyptus todtiana* in the open woodlands.

The Honey Possum is likely to be common across all the floristically diverse shrublands of the study area, and connectivity of habitat is important for this tiny marsupial. The shrublands on sandy soils are also likely to support small native mammals such as dunnarts (*Sminthopsis spp.*), the Ash-Grey Mouse (*Pseudomys albocinereus*) and Western Bush Rat (*Rattus fuscipes*).

5.4.1 Mammals of Conservation Significance

There are two mammals of conservation significance that may occur in the study area, as listed and discussed below. The Dibbler (*Parantechinus apicalis*), although recorded nearby on databases (Appendix 5), is not known from the mainland in this region, occurring only on islands off Jurien Bay.

Conservation Significance 1

Chuditch *Dasyurus geoffroii*
This species is listed as Vulnerable under the EPBC Act and under Schedule 3 (Vulnerable) of the WC Act.

The **Chuditch** used to occur across much of the continent, but is now restricted to the southwest of Western Australia. Although they used to occupy a range of habitats, the majority of Chuditch now occur in the Jarrah forest with some wheatbelt/goldfields populations in drier woodlands, heath and mallee shrublands (Van Dyck and Strahan 2008; Orrell and Morris 1994). As part of the recovery plan for this species, a population was translocated to Kalbarri National Park (DEC 2012), about 200 km north of the study area. The translocation was successful, and records of the Chuditch to the south are presumably individuals dispesing from this area. There is a single record of the Chuditch within 55 km of the study area on DBCA's Threatened and Priority Fauna Database, form Dongara in 2012 (Figure 4). The Chuditch is not currently known to occur in the vicinity of the study area, though this may be due to the lack of surveys to target this species. The taller shrublands and woodland in the minor creek potentially support Chuditch. However, if present, the Chuditch is likely to be at low densities or represented by a few dispersing individuals.

Conservation Significance 2

Western Brush Wallaby *Macropus irma*
This species is listed as Priority 4 by DBCA.

The **Western Brush Wallaby** is endemic to the southwest of Western Australia and occurs in open forests or woodlands (Van Dyck and Strahan 2008). There are three records of this species within 55 km of the study area on DBCA's Threatened and Priority Fauna Database (Figure 4), including one in 2002 on the Mount Adams. The Western Brush Wallaby potentially occurs in the more wooded parts of the study area, from where it may shelter under trees or large shrubs during the day, ranging out onto shorter vegetation to forage at night.

6. Invertebrate Fauna of the Study Area

This report is primarily concerned with vertebrate fauna. The invertebrate fauna of the study area are more species rich and abundant than the vertebrate fauna, but cataloguing their occurrence was outside the scope of this survey. However, a few invertebrates of conservation significance were recorded within 55 km of the study area on DBCA's Threatened and Priority Fauna Database (Figure 6).

6.1 Invertebrates of Conservation Significance

There are six invertebrates of conservation significance recorded within 55 km of the study area on DBCA's Threatened and Priority Fauna Database (Figure 6). Note that this may not represent all the conservation significant invertebrates in the region, as invertebrates are typically understudied and not often subject to opportunistic reporting by the general public.

Conservation Significance 1

Shield-backed Trapdoor Spider *Idiosoma nigrum*
This species is listed as Vulnerable under the EPBC Act and under Schedule 3 (Vulnerable) of the WC Act.

The **Shield-backed Trapdoor Spider** is endemic to Western Australia and known from only a few locations (TSSC 2013b). It typically inhabits eucalypt woodlands or *Acacia* shrublands on clay soils, where it builds a burrow using leaf litter and twigs (TSSC 2013b). There are five records of this species within 55 km of the study area on DBCA's Threatened and Priority Fauna Database. Two are from Woolaga Creek, Ikewa in 1954 and three are from the Eneabba region in 1987. As the study area appears to lack suitable habitat for this species, it appears unlikely that the Shield-backed Trapdoor Spider occurs.

Conservation Significance 2

a katydid *Hemisaga vepreculae*
This species is listed as Priority 3 by DBCA.

a katydid *Phasmodes jeeba*
This species is listed as Priority 2 by DBCA.

Graceful Sun-moth *Synemon gratiosa*
This species is listed as Priority 4 by DBCA.

Woolybush Bee *Hylaeus globulifera*
This species is listed as Priority 3 by DBCA.

An earwig fly *Austromerope poultoni*
This species is listed as Priority 2 by DBCA.

The **katydid** *Hemisaga vepreculae* is a green flightless predatory species endemic to Western Australia (Rentz 2010). There is a single record of this species within 55 km of the study area on DBCA's Threatened and Priority Fauna Database, northwest of Eneabba in 1980. The katydid *Hemisaga vepreculae* potentially occurs in the shrublands of the study area.

The **katydid** *Phasmodes jeeba* is a species of 'stick katydid' that occurs in coastal sandplain heaths and is endemic to Western Australia (Rentz 2010). Stick katydids feeds on flowers and pollen, with the adults present in flowering vegetation through spring, feeding during the night and sheltering in vegetation during the day (Rentz 2010). There is a single record of this species within 55 km of the study area on DBCA's Threatened and Priority Fauna Database, at Mt Adams in 1984. The katydid *Phasmodes jeeba* potentially occurs in the shrublands of the study area.

The **Graceful Sunmoth** occurs in coastal heaths and *Banksia* woodlands in a coastal strip from Kalbarri south to Binningup (TSSC 2013a). The larval stage of this species feeds on native sedges *Lomandra hermaphrodita* and *Lomandra maritima*, and populations of the sun-moth occur where these plants occur. The life-cycle is thought to take two years, with the adult sun-moths flying between mid February and late March (TSSC 2013a). There are 24 records of this species within 55 km of the study area on DBCA's Threatened and Priority Fauna Database, all at Coolimba Rd between 2010 and 2011. The Graceful Sun-moth potentially occurs in the study area, though little *Lomandra* spp. were noted to occur in the study area (Mattiske Pty Ltd, *pers. comm.* 2017).

The **Woolybush Bee** is known from records on the west coast (from about Bunbury north to Arrowsmith) and scattered records in the southeast wheatbelt (Padil, 2017). It is often recorded in association with Woolybush (*Adenanthos cygnorum*), with additional records on species of *Grevillea* and *Banksia* (Padil, 2017). There are two records of this species within 55 km of the study area on DBCA's Threatened and Priority Fauna Database (Figure 6). Both records are from 1996, one from Arrowsmith and one from Tathra National Park, Eneabba. The Woolybush Bee potentially occurs in the study area, particularly where woolybush is present on the southern private property, though Woolybush is sparse in most parts of the study area (Mattiske Pty Ltd, *pers. comm.* 2017).

The **earwig fly** *Austromerope poultoni* occurs mainly in the Jarrah forest south of Perth (Abbot *et al*. 2007). There is a single record of this species within 55 km of the study area on DBCA's Threatened and Priority Fauna Database, at Eneabba in 1998. The record at Eneabba represented a 240 km range extension when it was made (Abbott *et al*. 2007). This species of earwig fly may possibly occur in the study area.

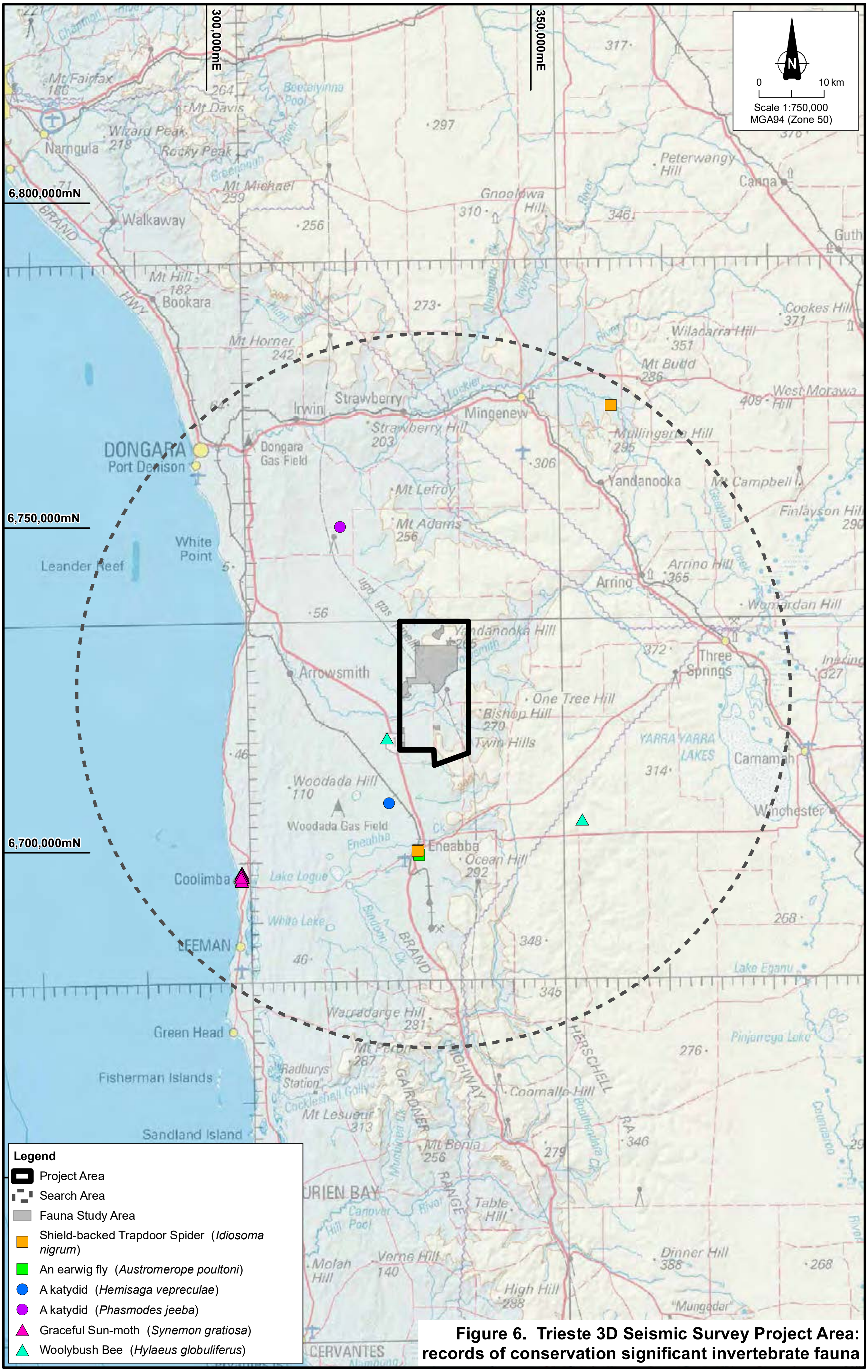


Figure 6. Trieste 3D Seismic Survey Project Area: records of conservation significant invertebrate fauna

Table 4. Summary of conservation significant (CS) fauna in the study area.

Group	Species	Conservation Status				Likelihood of occurrence in the study area	Explanation of likelihood of occurrence
		Level of Conservation Significance	EPBC Act	WC Act	DBCA Priority		
Reptile	*Aspidites ramsayi* **Woma** (southwest pop[n])	CS2			P1	Very low	Likely to be locally extinct.
Reptile	*Neelaps calonotos* **Black-striped Snake**	CS2			P3	High	Nearby records to north and south, suitable habitat present in study area.
Bird	*Leipoa ocellata* **Malleefowl**	CS1	Vu	S3		Low	Records within 55km, but shrubland habitat in study area generally too low.
Bird	*Apus pacificus* **Fork-tailed Swift**	CS1	Mig	S5		Low	May occur but only as an aerial species overflying the study area.
Bird	*Merops ornatus* **Rainbow Bee-eater**	CS1		S5		Present	Recorded in study area during this survey, many records within 55km. Common species.
Bird	*Falco peregrinus* **Peregrine Falcon**	CS1		S7		Moderate	Recorded within 55km, suitable habitat present in the study area.
Bird	*Calyptorhynchus latirostris* **Carnaby's Black-Cockatoo**	CS1	En	S2		High	Recorded within 55km, suitable foraging habitat present in the study area.
Mammal	*Dasyurus geoffroii* **Chuditch**	CS1	Vu	S3		Low	A single record within 55km, likely to be a dispersing individual rather than part of a local population.
Mammal	*Macropus irma* **Western Brush Wallaby**	CS2			P4	Moderate	Recorded within 55km, some suitable habitat present in the study area.
Invertebrate	*Idiosoma nigrum* **Shield-backed Trapdoor Spider**	CS1	Vu	S3		Very low	Although recorded within 55km, habitats in the study area appear unsuitable for this species.
Invertebrate	*Hemisaga vepreculae* **A katydid**	CS2			P3	Moderate	Recorded within 55km, suitable habitat probably present in the study area. Poorly known species.
Invertebrate	*Phasmodes jeeba* **A katydid**	CS2			P2	Moderate	Recorded within 55km, suitable habitat probably present in the study area. Poorly known species.
Invertebrate	*Synemon gratiosa* **Graceful Sun-moth**	CS2			P4	Low	Recorded within 55km, but little if any suitable habitat (*Lomandra* spp.) in study area.
Invertebrate	*Hylaeus globulifera* **Woolybush Bee**	CS2			P3	Moderate	Recorded within 55km, some suitable habitat (Woolybush) present in the study area.
Invertebrate	*Austromerope poultoni* **An earwig fly**	CS2			P2	Low	Most records from the Jarrah forest, only known from one nearby record. Poorly known.

7. Potential Impacts

The Trieste 3D Seismic Survey is proposed to be completed within a 5 – 7 week period between May and October 2018. When considering potential impacts on fauna, the Trieste 3D Seismic Survey is divided into two key activities:

- Mulching of tracks to access the source and receiver lines (together referred to as the 'seismic lines') for the seismic survey. Tracks are to be mulched to a width of 4m, with the mulch being left in situ. The locations of the seismic lines are shown in Figure 2. The total area of mulching within the study area is calculated to be up to 100.82 ha (about 10.77 ha on private property and 90.05 ha in the UCL), unless further areas are excluded on the basis of other environmental considerations (e.g. rare flora).
- During the data collection several personnel and vehicles will be operating in the study area. Operations will be during daytime hours only, thus reducing the chance of impacting nocturnal fauna. Vehicles on site will include four-wheel drive (4WD) vehicles, All-terrain vehicles (ATV), Vibroseis buggys, forestry mulchers and various support vehicles. The vibroseis buggies generate vibrations for a few seconds at each source point, located at 20m intervals along the source lines. The receiver equipment will be in the form of cable-free nodes placed at 20m intervals along the receiver lines.

Based on these activities, the most likely potential impacts on fauna and fauna habitats are:

- Direct impacts:
  - Direct mortality of fauna during mulching of tracks or through vehicle strike.
  - Loss of fauna habitat and increased habitat fragmentation in the medium-term through creation of tracks.
- Indirect impacts
  - Habitat degradation in the vicinity of access tracks through the introduction of dieback or weeds, by increased access by feral fauna or by trampling or crushing of adjacent vegetation.
  - Temporary disturbance to fauna in the vicinity of works, through noise, light or vibration.
  - Increased risk of fire.
  - Increased risk of third party access, exacerbating other impacts by preventing the rehabilitation of tracks.

These are potential impacts are discussed in the sections below, and summarised in Table 5.

7.1 Direct Impacts

7.1.1 Direct Mortality of Fauna

Some direct mortality of fauna is unavoidable when mulching tracks. Fauna that are most at risk are small species that are likely to hide rather than move away from disturbance. This includes a range of small reptiles (e.g. many geckos and legless lizards) and mammals (e.g. Honey Possum) that shelter in shrubs, many of which are nocturnal. In cool weather, reptiles are less active and therefore less able to move away. In addition, while adult birds are able to disperse away, eggs or unfledged birds in nests are also vulnerable to mortality.

Conservation significant species that are vulnerable to direct mortality during mulching include flightless or weakly flying invertebrates (e.g. the katydid *Hemisaga vulpeculae*) and the immobile immature stages of invertebrates (most invertebrate species in Table 4). Most other conservation significant species are relatively mobile and are likely to disperse away from mulching activities.

Direct mortality may also occur due to accidental vehicle strikes, both on current access tracks and on mulched tracks. Faunal groups at risk include reptiles that bask on tracks (e.g. snakes) and large mammals (e.g. kangaroos). Small reptiles may also be at risk where they shelter in dead mulched vegetation that remains on mulched tracks, when tracks are in use. However, road mortalities are unlikely to negatively impact the conservation status of a fauna species unless the fauna population was small or otherwise fragile. Conservation significant species that are vulnerable to road mortalities include the Woma (though this species is likely to be locally extinct), Malleefowl, Rainbow Bee-eater, Carnaby's Black-Cockatoo, Western Brush Wallaby and conservation significant invertebrates. The Black-striped Snake may be impacted, as though it is nocturnal, it can occur in loose surface soil so may be vulnerable to being crushed. The Chuditch is unlikely to be impacted as it is both nocturnal and likely to be very uncommon in the vicinity of the study area.

7.1.2 Habitat Loss and Fragmentation

The habitat loss in the study area is likely to be temporary, as the tracks are to be created by mulching, with the mulch left in situ. The plant material that remains should allow the tracks to regenerate from lignotubers and seed. The creation of the mulched tracks potentially fragments the relatively large tracts of native vegetation into many smaller areas, particularly in the UCL. However, the tracks are unlikely to consist of bare ground, and the mulched material should provide some cover for dispersal of fauna. It is unlikely that this degree of fragmentation will significantly inhibit fauna dispersal.

Long-term habitat loss and fragmentation may occur if the tracks do not regenerate, e.g. due to use by third parties or through issues such as soil compaction, and these issues will need to be addressed as part of the track rehabilitation plan. Mulching the tracks, rather than rolling vegetation, is thought to result in a better outcome for rehabilitation, as the soil disturbance is minimised, the rootstock and seed remains in situ for regeneration and the mulched material protects the topsoil (reducing the risk of weed invasion or erosion), while breaking down to release nutrients back into the soil (Terrex Group, 2017).

The habitat loss is likely to impact on almost all fauna species in the medium-term, until the vegetation regenerates. However, the impact is unlikely to be significant for most fauna. No species is likely to become locally extinct within the study area, and populations affected by the habitat loss are likely to recover as the vegetation recovers.

One conservation significant species that may be affected is Carnaby's Black-Cockatoo, as the study area contains some foraging habitat for this species. Although the habitat loss is temporary, for the period of time until the mulched tracks regenerate there is likely to be a loss of more than 1ha of foraging habitat. This is considered to be a high risk of a significant impact (DSEWPaC 2012), warranting referral of the project under the EPBC Act. There is a small amount of potential Carnaby's Black-Cockatoo breeding habitat in the minor creek in the northeast corner of the UCL (Figure 3), and it is recommended that this area is either avoided, or that all trees with a diameter at breast height (DBH) of 30cm or more are retained. The equipment used to mulch tracks does not process vegetation with a DBH above 15 to 20cm, so seismic lines will be deviated around larger trees. If the seismic survey proceeds during the breeding season (July to December), the Wandoo woodland should be avoided with a 100m buffer, or the trees inspected prior to the seismic survey, to ensure that breeding cockatoos are not disturbed.

7.2 Indirect Impacts

7.2.1 Habitat Degradation

There is a potential for habitats adjacent to the mulched tracks to be degraded through the introduction of weeds, pathogens (e.g. Dieback) and increased access by feral predators. There is also the risk of accidental trampling or crushing of vegetation adjacent to tracks, either by personnel or by vehicles.

Weeds and pathogens modify vegetation communities and therefore fauna habitats. If they are introduced to the study area, the impacts are potentially long-term.

Feral species, including foxes, are currently present in the study area (Appendix 4). Native species may be more vulnerable to predation by foxes and cats where vegetation is opened up by tracks, as tracks provide access to the feral species and open areas with less shelter to hide from predators. Access by feral predators should be a temporary impact, ameliorated over time as the vegetation regenerates.

Conservation significant fauna potentially impacted by feral predators include the Malleefowl (if present), Chuditch (if present) and Black-striped Snake. Other fauna that may be impacted include small native mammals, reptiles, frogs and small birds.

7.2.2 Disturbance to Adjacent Habitat

There is likely to be some temporary disturbance to fauna during the seismic survey, due to noise, movement (by vehicles and personnel) or vibration. These disturbances are likely to result in some species temporarily avoiding areas of habitat that are otherwise suitable. Fauna may also experience increased stress and/or expend extra energy in avoidance behaviours. Should disturbance occur near breeding sites, there is the potential for abandonment of nests or young, though this is unlikely as the disturbance is likely to be very brief at each of the source and receiver locations. These impacts are temporary (mostly within the 5 – 7 weeks of the seismic survey) and unlikely to cause a significant impact to fauna populations.

7.2.3 Increased Risk of Fire

The presence of vehicles and personnel in the project area increase the risk of an accidental fire. Sources of ignition include hot machinery in contact with vegetation and cigarettes that are not appropriately disposed of. Although bushfire is a natural part of the ecosystem, too-frequent, broad-scale or very hot fires can negatively impact fauna and fauna habitats. When large areas are impacted by fire there is a risk of local extinctions or rendering large tracts of habitat as temporarily unsuitable for a particular species or for breeding. For example, both Chuditch and Malleefowl populations are negatively impacted by broad-scale fire, with Malleefowl not breeding for many years after fire (DEC 2012, Benshemesh 2007). In a fragmented landscape, negative impacts may be exacerbated, as fauna are less able to move between vegetated patches to recolonize after fire.

7.2.4 Increased Risk of Third Party Access

One of the key disturbances to the study area is the creation of about 254 km of tracks. If the vegetation on the tracks regenerates over time, access to the study area will be similar to the current state. However, should third parties access the tracks, e.g. for recreational four-wheel driving, this will prevent the regeneration of vegetation and allow for some of the potentially temporary impacts to become long-term ones. This includes the potential for permanent habitat loss and fragmentation, the introduction and spread of weeds or pathogens, road mortalities and risk of fire.

7.3 Strategies to Reduce Potential Impacts

For each of the potential impacts described in the preceding section, management strategies to reduce the risk of a significant impact have been listed in Table 5. It is recognised that some of these strategies are in common use in the mining and resource industries, and that Lattice already implement these in their day to day operations.

7.4 Residual Risk

As ‘fauna’ are a diverse group, the potential impact of the seismic survey is likely to vary between species. However, the residual risk of a significant impact on fauna is likely to be low for almost all species. The majority of the impacts are temporary and are likely to be ameliorated over time if rehabilitation of tracks is successful. The key risks to manage are those associated with degradation of adjacent habitat, fire and rehabilitation of tracks.

The majority of conservation significant species are unlikely to be significantly impacted by the seismic survey. Of key concern is Carnaby’s Black-Cockatoo, as the study area contains foraging habitat and a small area of potential breeding habitat for this species. The referral guidelines for this species indicate a high risk of a significant impact when more than 1ha of foraging habitat or any potential breeding habitat is disturbed (DSEWPaC 2012). Although the impacts of the seismic survey are likely to be temporary, several hectares of potential foraging habitat will be removed by mulching and unavailable to foraging birds for the medium-term. It is therefore recommended that the seismic survey is referred under the EPBC Act.

Table 5. Potential impacts on fauna of the Trieste 3D Seismic Survey and recommended strategies to reduce impacts.

Potential impact	Fauna potentially impacted	Nature and scale of impact	Recommended strategies to reduce impact
Direct mortality of fauna while mulching tracks	*Faunal assemblage:* • Reptiles, small mammals and frogs that are likely to hide rather than move away from disturbance. • All reptiles in the cooler months. • Bird eggs and unfledged young in nests. *Conservation significant fauna:* • Immature stages of listed invertebrate species (Table 4) and flightless adults of the katydid *Hemisaga vepreculae.*	Immediate impact (loss of individual from the population). Short-term impact, with replacement of lost individuals likely within 1 year. Impact likely to be minor for all species.	• Avoid mulching tracks during late winter and spring when birds have eggs and unfledged young in the nest. • Avoid mulching tracks in very cool weather when practicable, as warmer weather allows for more reptiles to disperse from the area being mulched. • Develop and implement procedure to deal with injured wildlife.
Road mortalities	*Faunal assemblage:* • Diurnal (day-active) species only. Large mammals (e.g. kangaroos) and reptiles that bask on roads (e.g. snakes) are at increased risk, though any species that crosses tracks may be at risk. *Conservation significant fauna:* • Woma • Black-striped Snake • Malleefowl • Rainbow Bee-eater • Carnaby's Black-Cockatoo • Western Brush Wallaby • All invertebrate species listed in Table 4.	Immediate impact (loss of individual from the population). Short-term impact, with replacement of any lost individuals likely within 1 year. Impact likely to be minor for all species.	• Induction training to include awareness of fauna that may occur on roads and reporting requirements with regards to incidents. • Low speed limits for all vehicles in vegetated areas. • Develop and implement procedure to deal with injured wildlife.

Habitat loss / fragmentation	*Faunal assemblage:*
	• All species
	
	Conservation significant fauna:
	• More than 1 ha of Carnaby's Black-Cockatoo foraging habitat affected.
	• Temporary loss of up to 100.82 ha of habitat for ground-dwelling fauna
	   ○ Woma
	   ○ Black-striped Snake
	   ○ Malleefowl
	   ○ Chuditch
	   ○ Western Brush Wallaby
	   ○ All invertebrates listed in Table 4.
		Immediate impact (loss and fragmentation of habitat due to track mulching).
		
		Medium-term impact, with the risk of long-term impact if mulched access tracks are not regenerated.
		
		Impact likely to be minor for most species if tracks are successfully rehabilitated.
			• Minimise disturbance footprint during the planning phase and ensure that mulching only occurs in the approved areas.
			
			• Develop and implement a *track rehabilitation plan*, ensuring the rehabilitation of mulched tracks to an appropriate standard.
			
			• Avoid clearing any potential Carnaby's Black-Cockatoo breeding habitat (Wandoo woodland) and divert seismic lines around large stands of *Banksia* shrubland (foraging habitat) where practicable.

Table 4. (cont.)

Potential impact	Fauna potentially impacted	Nature and scale of impact	Recommended strategies to reduce impact
Habitat degradation in the vicinity of access tracks through the introduction of pathogens or weeds, by trampling/crushing of vegetation, or by increased access by feral fauna.	*Faunal assemblage:* • All species. *Conservation significant fauna:* • Carnaby's Black-Cockatoo (impacts to foraging habitat, loss of *Banksia* spp. to Dieback) • All species, though ground-dwelling species are more vulnerable to feral predators and more reliant on intact habitats including: ○ Woma ○ Black-striped Snake ○ Malleefowl ○ Chuditch ○ Western Brush Wallaby ○ All invertebrates listed in Table 4.	Delayed impact (degradation of adjacent habitats may occur and continue to occur months or years after track formation. Potentially a medium to long-term impact. Impact on fauna may be minor to moderate, depending on the scale of habitat degradation.	• Develop and implement a *weed management plan* and *Dieback management plan*. The plans should include strategies to: ○ Reduce the risk of weed or Dieback introductions to the study area. ○ Manage any existing weeds or areas of Dieback to avoid their spread. ○ Control any weed or Dieback outbreaks. ○ Monitor for weeds or Dieback after track closures. • Ensure that all food waste is appropriately disposed of to avoid attracting feral fauna. • No feeding of any fauna on site. • Ensure that all personnel restrict activities to tracks and do not walk or drive over adjacent native vegetation.
Temporary disturbance to fauna in the vicinity of works, through noise, light or vibration.	*Faunal assemblage:* • All species, but particularly nesting birds or mammals with young in a nest or den. *Conservation significant fauna:* • Malleefowl • Rainbow Bee-eater (particularly when chicks in nest) • Carnaby's Black-Cockatoo (disturbance from foraging areas or breeding areas)	Immediate impact (fauna move away from disturbance area). Short-term impact, 5 – 7 weeks of activity on site. Impact likely to be minor for all species.	• Minimise the number of personnel and vehicles required on site for operations. • Ensure equipment is maintained and operated within manufacturers specifications, to eliminate likelihood of excessive noise or vibration. • If operating in the breeding season for Carnaby's Black-Cockatoo (July – December), maintain a buffer from areas of Wandoo woodland that may support breeding or ascertain that no breeding cockatoos are present prior to the seismic survey.

Table 4. (cont.)

Potential impact	Fauna potentially impacted	Nature and scale of impact	Recommended strategies to reduce impact

Increased risk of bushfire	*Faunal assemblage:*
	• All species, but particularly small, poorly dispersing species that cannot escape bushfire and are poor re-colonisers (e.g. many small reptiles and mammals).
	
	Conservation significant fauna:
	• Temporary loss of habitat for all species in Table 4.
	• Potential loss of individuals of ground-dwelling species:
	  ○ Woma
	  ○ Black-striped Snake
	  ○ Malleefowl
	  ○ Chuditch
	  ○ Western Brush Wallaby
	  ○ All invertebrates listed in Table 4.
		Immediate impact (loss of individual fauna and fauna habitats to fire).
		
		Generally medium-term. Long-term in the case of a broad-scale fire over the entire vegetated area.
		
		Impact on fauna may be minor to moderate, depending on the scale of the fire.
			• Develop and implement a *fire management plan*. The plan should include strategies for:
			  ○ Fire prevention
			  ○ Fighting small spot-fires (e.g. raking or shoveling by hand, provision and use of appropriate fire extinguishers).
			  ○ Fire emergency response procedure.
			• Restrict smoking to designated areas, away from native vegetation.

Increased risk of third party access, leading to potential for introduction of weeds, Dieback and increased access by feral animals.	*Faunal assemblage:*
	• All species.
	
	Conservation significant fauna:
	• Carnaby's Black-Cockatoo (impacts to foraging habitat, loss of *Banksia* spp. to Dieback)
	• All species, though ground-dwelling species are more vulnerable to feral predators and more reliant on intact habitats including:
	  ○ Woma
	  ○ Black-striped Snake
	  ○ Malleefowl
	  ○ Chuditch
	  ○ Western Brush Wallaby
	• All invertebrates listed in Table 4.
		Delayed impact, occurring months or years after track formation.
		
		Potential for long-term impacts where tracks are prevented from rehabilitating and third parties introduce weeds or Dieback.
		
		Impact on fauna may be minor to moderate, depending on the scale of habitat degradation.
			• Develop and implement a *track rehabilitation plan*. The plan should include strategies for:
			  ○ Preventing third party access to the mulched tracks, e.g. through the use of 'dog-legs' at track entrances to reduce their visibility to passing traffic.
			  ○ Monitoring of closed tracks for third party access.
			  ○ Monitoring of closed tracks for introduction of weeds or dieback.
			  ○ Remedial actions to be taken in the event that rehabilitation targets are not met.

8. References

Abbot, I. (2008). Historical perspectives of the ecology of some conspicuous vertebrate species in south-west Western Australia. *Conservation Science Western Australia* 6(3): 1 – 214.

Abbot, I., Burbidge, T. and Wills, A. (2007). Austromerope poultoni (Insecta, Mecoptera) in south-west Western Australia: occurrence, modelled geographical distribution, and phenology. *Journal of the Royal Society of Western Australia* 90: 97-106.

Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). *The New Atlas of Australian Birds*. Royal Australasian Ornithologists Union, Victoria.

Benshemesh, J. (2007). *National Recovery Plan for Malleefowl*. Department for Environment and Heritage, South Australia.

BirdLife International (2017). IUCN Red List for birds. URL: http://www.birdlife.org

Boehm, E.F. (1962). Some habits of the Fork-tailed Swift. *Emu* 61(4) 281-282.

Bush, B., Maryan, B., Browne-Cooper, R. and Robinson, R. (2007). *Reptiles and Frogs in the Bush: Southwestern Australia*. University of Western Australia Press, Crawley, Western Australia.

Churchill, S. (1998). *Australian Bats*. Reed New Holland, Sydney.

Cogger, H.G., Cameron, E.E., Sadlier, R.A. and Eggler, P. (1993). *The Action Plan for Australian Reptiles*. Endangered Species Programme Project Number 124, Australian Nature Conservation Agency, Canberra.

Debus, S. (1998). *The Birds of Prey of Australia: A Field Guide*. Oxford University Press, Australia.

DEC (2012). *Chuditch (Dasyurus geoffroii) Recovery Plan*. Wildlife Management Program No. 54. Department of Environment and Conservation, Perth, Western Australia.

Desmond, A. and Chant, A.. Geraldton Sandplains 3 (GS3 – Lesueur Sandplains Subregion). In ‘A Biodiversity Audit of Western Australia’s 53 Biogeographical Subregions in 2002). Ed by J.E. May and N.L. McKenzie. Department of Conservation and land Management, Western Australia.

DBCA (2007-). *Naturemap: Mapping Western Australia’s Biodiversity*. Department of Environment and Conservation. URL: http://naturemap.dec.wa.gov.au/

DPAW (Department of Parks and Wildlife) (2013). *Carnaby’s cockatoo* (Calyptorhynchus latirostris) *Recovery Plan*. Department of Parks and Wildlife, Perth, Western Australia.

DEWHA (Department of the Environment, Water, Heritage and the Arts) (2004). Interim Biogeographic Regionalisation for Australia (IBRA), Version 6.1.

EPA (2016a). *Statement of Environmental Principles, Factors and Objectives.* EPA, Western Australia.

EPA (2016b). *Environmental Factor Guideline – Terrestrial Fauna*. EPA, Western Australia.

EPA (2016c). *Technical Guidance – Terrestrial Fauna Surveys*. EPA, Western Australia.

EPA and DEC (Department of Environment and Conservation) (2010). *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*. Eds B.M. Hyder, J. Dell and M.A. Cowan. Perth, Western Australia.

Garnett, S.T. Szabo, J.K. and Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. CSIRO Publishing, Collingwood, Victoria.

Government of Western Australia (2000). *Bush Forever Volume 2*. Department of Environmental Protection, Perth.

Johnstone, R.E. & Storr, G.M. (1998). *Handbook of Western Australian Birds. Volume 1: Nonpasserines (Emu to Dollarbird)*. Western Australian Museum, Perth.

Johnstone, R.E. & Storr, G.M. (2004). *Handbook of Western Australian Birds. Volume 2: Passerines (Blue-winged Pitta to Goldfinch)*. Western Australian Museum, Perth.

Mattiske Consulting Pty Ltd (2017). Personal communication, various personnel involved in 2017 flora survey of study area between August – October.

Menkhorst, P. and Knight, F. (2011). *A field guide to the mammals of Australia*. 3rd Edition. Oxford University Press, South Melbourne.

Padil (2017). Native globuliferus hylaeine. URL: http://www.padil.gov.au/pollinators/pest/specimens/139549#map. Accessed November 2017.

Rentz, D. (2010). *A Guide to the Katydids of Australia*. CSIRO Publishing, Collingwood, Victoria.

Storr, G.M., Smith, L.A. and Johnstone, R.E. (1983). *Lizards of Western Australia. II. Dragons and Monitors*. W.A. Museum, Perth.

Storr, G.M., Smith, L.A. and Johnstone, R.E. (2002). *Snakes of Western Australia*. W.A. Museum, Perth.

Storr, G.M., Smith, L.A. and Johnstone, R.E. (1990). *Lizards of Western Australia. III. Geckoes and Pygopods*. W.A. Museum, Perth.

Storr, G.M., Smith, L.A. and Johnstone, R.E. (1999). *Lizards of Western Australia. I. Skinks*. 2nd edition. W.A. Museum, Perth.

Terrex Group (2017). Information on rolling vs. mulching. Unpublished report provided to Lattice Energy.

TSSC (Threatened Species Scientific Committee) (2013a). *Advice to the Minister for Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee (the Committee) on amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* DSEWPaC, Canberra. URL: http://www.environment.gov.au/biodiversity/threatened/species/pubs/66757-listing-advice.pdf

TSSC (Threatened Species Scientific Committee) (2013b). Approved Conservation Advice for *Idiosoma nigrum* (shield-back spider). DSEWPaC, Canberra. URL: http://www.environment.gov.au/biodiversity/threatened/species/pubs/66798-conservation-advice.pdf.

Tyler, M.J. (1998). *The Action Plan for Australian Frogs.* Environment Australia, Canberra.

Tyler, M.J., Smith, L.A. and Johnstone, R.E. (2000). *Frogs of Western Australia*. W.A. Museum, Perth.

Van Dyck and Strahan, R. (Ed.) (2008). *The Mammals of Australia*. 3rd Edition. Australian Museum/Reed Books, Sydney.

Woinarski, J.C.Z., Burbidge, A.A. and Harrison, P.L. (2012). *The Action Plan for Australian Mammals 2012*. CSIRO Publishing.

Appendix 1. Amphibians potentially occurring in the study area.

Project area = species recorded in the study area during the 2017 level 1 fauna survey.
WAM = species recorded in the area on the Western Australian Museum Specimen Database (see Table 1).
FSDB = species recorded in the area on the Fauna Survey Returns Database (see Table 1).
TF = species recorded in the area on the DBCA Threatened and Priority Fauna Database (see Table 1).
EPBC = species or species habitat recorded in the area on the EPBC Protected Matters Search Tool (see Table 1).

Species		Conservation Status	Records				
			Project area	WAM	FSDB	TF	EPBC
Hylidae (tree frogs and water-holding frogs)							
Slender Tree Frog	*Litoria adelaidensis*						
Motorbike Frog	*Litoria moorei*			+			
Limnodynastidae (ground frogs)							
Western Spotted Frog	*Heleioporus albopunctatus*						
Moaning Frog	*Heleioporus eyrei*			+			
Sand Frog	*Heleioporus psammophilus*						
Banjo Frog / Pobblebonk	*Limnodynastes dorsalis*			+			
Humming Frog	*Neobatrachus pelabatoides*				+		
Myobatrachidae (ground frogs)							
Turtle Frog	*Myobatrachus gouldii*				+		
Bleating Froglet	*Crinia pseudinsignifera*			+			
Crawling Toadlet	*Pseudophryne guentheri*				+		
	Number of frog species:	**10**					

Appendix 2. Reptiles potentially occurring in the study area.

Project area = species recorded in the study area during the 2017 level 1 fauna survey.
WAM = species recorded in the area on the Western Australian Museum Specimen Database (see Table 1).
FSDB = species recorded in the area on the Fauna Survey Returns Database (see Table 1).
TF = species recorded in the area on the DBCA Threatened and Priority Fauna Database (see Table 1).
EPBC = species or species habitat recorded in the area on the EPBC Protected Matters Search Tool (see Table 1).

Species		Conservation Status	Records				
			Project area	WAM	FSDB	TF	EPBC
Carphodactylidae (knob-tailed geckoes)							
Barking Gecko	*Underwoodisaurus milii*						
Diplodactylidae (geckoes)							
Clawless Gecko	*Crenadactylus ocellatus*						
Wheatbelt Stone Gecko	*Diplodactylus granariensis*						
Ornate Gecko	*Diplodactylus ornatus*						
	Diplodactylus pulcher						
White-spotted Ground-gecko	*Lucasium alboguttatum*						
Soft Spiny-tailed Gecko	*Strophurus spinigerus*			+			
Gekkonidae (geckoes)							
Marbled Gecko	*Christinus marmoratus*						
	Gehyra variegata			+			
Bynoe's Gecko	*Heteronotia binoei*						
Pygopodidae (legless lizards)							
Sand-plain Worm-lizard	*Aprasia repens*						
	Delma australis						
Fraser's Legless Lizard	*Delma fraseri*						
Gray's Legless Lizard	*Delma grayii*						
Burton's Legless Lizard	*Lialis burtonis*			+			
Keeled Legless Lizard	*Pletholax gracilis*						
Common Scaley-foot	*Pygopus lepidopodus*			+			
Agamidae (dragon lizards)							
Southern Heath Dragon	*Ctenophorus adelaidensis*		+	+			
Spotted Military Dragon	*Ctenophorus maculatus*		+	+	+		
Central Netted Dragon	*Ctenophorus nuchalis*						
Thorny Devil	*Moloch horridus*						
Bearded Dragon	*Pogona minor*			+			
Scincidae (skink lizards)							
Fence Skink	*Cryptoblepharus buchananii*			+	+		
Limestone Ctenotus	*Ctenotus australis*						
West Coast Ctenotus	*Ctenotus fallens*			+			
South-western Odd-striped Ctenotus	*Ctenotus impar*						
	Ctenotus mimetes						
	Ctenotus pantherinus			+			
	Ctenotus schomburgkii		+				

Appendix 2. (cont.)

Species		Conservation Status	Records				
			Project area	WAM	FSDB	TF	EPBC
Scincidae (continued…)							
Western Slender Blue-tongue	*Cyclodomorphus celatus*						
Broad-banded Sand Swimmer	*Eremiascincus richardsonii*						
	Lerista distinguenda						
	Lerista elegans			+			
	Lerista gerrardii						
	Lerista lineopunctulata						
	Lerista planiventralis			+	+		
	Lerista praepedita				+		
Bull Skink	*Liopholis multiscutata*						
Dwarf Skink	*Menetia greyii*				+		
	Morethia lineoocellata						
	Morethia obscura						
Western Bluetongue	*Tiliqua occipitalis*			+			
Bobtail	*Tiliqua rugosa*		+	+			
Varanidae (monitors & goannas)							
Stripe-tailed Monitor	*Varanus caudolineatus*						
Gould's Goanna	*Varanus gouldii*						
Black-tailed Monitor	*Varanus tristis*						
Typhlopidae (blind snakes)							
Southern Blind Snake	*Anilios australis*						
Prong-snouted Blind Snake	*Anilios bituberculatus*						
	Anilios hamatus						
	Anilios waitii						
Boidae (pythons)							
Stimpson's Python	*Antaresia stimsoni*						
Woma (southwest population)	*Aspidites ramsayi*	CS2					
Carpet Python	*Morelia spilota*						
Elapidae (front-fanged snakes)							
Narrow-banded Shovel-nosed Snake	*Brachyurophis fasciolatus*						
Southern Shovel-nosed Snake	*Brachyurophis semifasciatus*						
Yellow-faced Whipsnake	*Demansia psammophis*						
Bardick	*Echiopsis curta*			+			
Black-naped Snake	*Neelaps bimaculatus*						
Black-striped Snake	*Neelaps calonotos*	CS2					
Tiger Snake	*Notechis scutatus*						
Gould's Hooded Snake	*Parasuta gouldii*						
Mulga Snake	*Pseudechis australis*						
Ringed Brown Snake	*Pseudonaja modesta*						
Western Brown Snake	*Pseudonaja mengdeni*						
Jan's Banded Snake	*Simoselaps bertholdi*						
	Number of reptile species:	**64 (3 recorded)**					

Appendix 3. Birds potentially occurring in the study areas.

Project area = (+) species recorded in the study area during the 2017 level 1 fauna survey by Western Wildlife and (M) species recorded by Mattiske Consulting Pty Ltd, August – October 2017.
BA = species recorded in the area on the Birds Australia Atlas Database (see Table 1).
WAM = species recorded in the area on the Western Australian Museum Specimen Database (see Table 1).
FSDB = species recorded in the area on the Fauna Survey Returns Database (see Table 1).
TF = species recorded in the area on the DBCA Threatened and Priority Fauna Database (see Table 1).
EPBC = species or species habitat recorded in the area on the EPBC Protected Matters Search Tool (see Table 1).

Species		Conservation Status	Records					
			Project area	BA	WAM	FSDB	TF	EPBC
Dromaiidae (emu)								
Emu	*Dromaius novaehollandiae*		+	+		+		
Megapodiidae (mound-builders)								
Malleefowl	*Leipoa ocellata*	CS1						+
Phasianidae (quails)								
Stubble Quail	*Coturnix pectoralis*							
Accipitridae (osprey, hawks, eagles and harriers)								
Black-shouldered Kite	*Elanus caeruleus*		+	+				
Square-tailed Kite	*Hamirostra isura*							
Whistling Kite	*Haliastur sphenurus*			+		+		
Brown Goshawk	*Accipiter fasciatus*			+				
Collared Sparrowhawk	*Accipiter cirrocephalus*			+				
Little Eagle	*Aquila morphnoides*			+				
Wedge-tailed Eagle	*Aquila audax*		+ M	+		+		
Spotted Harrier	*Circus assimilis*		M	+				
Otididae (bustard)								
Australian Bustard	*Ardeotis australis*			+				
Rallidae (crakes, rails, coots & allies)								
Black-tailed Native Hen	*Gallinula ventralis*			+				
Turnicidae (button-quails)								
Little Button-Quail	*Turnix velox*							
Charadriidae (plovers, dotterels and lapwings)								
Banded Lapwing	*Vanellus tricolor*			+				
Columbidae (pigeons and doves)								
Common Bronzewing	*Phaps chalcoptera*			+		+		
Brush Bronzewing	*Phaps elegans*			+				
Crested Pigeon	*Ocyphaps lophotes*		+ M	+		+		
Cuculidae (cuckoos)								
Fan-tailed Cuckoo	*Cacomantis flabelliformis*			+		+		
Pallid Cuckoo	*Cacomantis pallidus*			+		+		
Black-eared Cuckoo	*Chrysococcyx osculans*							
Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*		+			+		
Shining Bronze-Cuckoo	*Chrysococcyx lucidus*							
Strigidae (hawk owls)								
Boobook Owl	*Ninox boobook*							

Appendix 3. (cont.)

Species		Conservation Status	Records					
			Project area	BA	WAM	FSDB	TF	EPBC
Tytonidae (barn owls)								
Barn Owl	*Tyto alba*							
Podargidae (frogmouths)								
Tawny Frogmouth	*Podargus strigoides*			+		+		
Aegothelidae (owlet-nightjars)								
Australian Owlet-Nightjar	*Aegotheles cristatus*			+				
Apodidae (swifts)								
Fork-tailed Swift	*Apus pacificus*	CS1						
Alcedinidae (kingfishers)								
Laughing Kookaburra	*Dacelo novaeguinae*	Int.		+		+		
Red-backed Kingfisher	*Todiramphus pyrropygia*		**M**					
Sacred Kingfisher	*Todiramphus sanctus*			+				
Meropidae (bee-eaters)								
Rainbow Bee-eater	*Merops ornatus*	CS1	**+ M**	+				
Falconidae (falcons)								
Brown Falcon	*Falco berigora*		**+ M**	+		+		
Australian Kestrel	*Falco cenchroides*		**+ M**	+		+		
Australian Hobby	*Falco longipennis*			+				
Peregrine Falcon	*Falco peregrinus*	CS1		+				
Cacatuidae (cockatoos)								
Galah	*Cacatua roseicapilla*		**+ M**	+		+		
Major Mitchell's Cockatoo	*Cacatua leadbeateri*							
Western Long-billed Corella	*Cacatua pastinator*			+				
Little Corella	*Cacatua sanguinea*			+				
Red-tailed Black-Cockatoo	*Calyptorhynchus banksii*							
Carnaby's Black-Cockatoo	*Calyptorhynchus latirostris*	CS1		+	+	+	+	+
Cockatiel	*Nymphicus hollandicus*							
Psittacidae (parrots, lorikeets & rosellas)								
Budgerigar	*Melopsittacus undulatus*							
Elegant Parrot	*Neophema elegans*			+				
Mulga Parrot	*Platycercus varius*							
Australian Ringneck	*Platycercus zonarius*		**+ M**	+		+		
Regent Parrot	*Polytelis anthopeplus*							
Maluridae (fairy-wrens, grasswrens and emu-wrens)								
Variegated Fairy-wren	*Malurus lamberti*		**+ M**	+		+		
White-winged Fairy-wren	*Malurus leucopterus*		**+ M**	+	+			
Blue-breasted Fairy-wren	*Malurus pulcherrimus*							
Splendid Fairy-wren	*Malurus splendens*			+		+		
Southern Emu-wren	*Stipiturus malachurus*							

Appendix 3. (cont.)

Species		Conservation Status	Records					
			Project area	BA	WAM	FSDB	TF	EPBC
Meliphagidae (honeyeaters and chats)								
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*		+	+				
Western Spinebill	*Acanthorhynchus superciliosus*			+				
Red Wattlebird	*Anthochaera carunculata*			+		+		
Western Wattlebird	*Anthochaera lunulata*			+				
Pied Honeyeater	*Certhionyx vareigatus*							
Tawny-crowned Honeyeater	*Glyciphila melanops*		+ M	+				
Brown Honeyeater	*Lichmera indistincta*		+ M	+		+		
Singing Honeyeater	*Gavicalis virescens*		+					
Yellow-throated Miner	*Manorina flavigula*		+	+				
Brown-headed Honeyeater	*Melithreptus brevirostris*			+				
White-cheeked Honeyeater	*Phylidonyris niger*		+	+				
New Holland Honeyeater	*Phylidonyris novaehollandiae*		+	+				
White-fronted Honeyeater	*Purnella albifrons*			+				
White-plumed Honeyeater	*Ptilotula penicillata*							
White-fronted Chat	*Epthianura albifrons*		+	+				
Crimson Chat	*Epthianura tricolor*							
Pardalotidae (pardalotes)								
Spotted Pardalote	*Pardalotus punctatus*			+				
Striated Pardalote	*Pardalotus striatus*		+	+		+		
Acanthizidae (thornbills, gerygones & allies)								
Inland Thornbill	*Acanthiza apicalis*		+	+				
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*			+		+		
Western Thornbill	*Acanthiza inornata*							
Chestnut-rumped Thornbill	*Acanthiza uropygialis*			+				
Southern Whiteface	*Aphelocephala leucopsis*							
Rufous Fieldwren	*Calamanthus campestris*							
Western Gerygone	*Gerygone fusca*		+	+		+		
Shy Heathwren	*Hylacola cauta*							
Redthroat	*Pyrrholaemus brunneus*			+				
White-browed Scrubwren	*Sericornis frontatus*		+	+				
Weebill	*Smicrornis brevirostris*		+ M	+				
Pomatostomidae (babblers)								
White-browed Babbler	*Pomatostomus superciliosus*							
Artamidae (woodswallows)								
Masked Woodswallow	*Artamus personatus*							
Black-faced Woodswallow	*Artamus cinereus*		+	+				
Dusky Woodswallow	*Artamus cyanopterus*			+		+		

Appendix 3. (cont.)

Species		Conservation Status	Records					
			Project area	BA	WAM	FSDB	TF	EPBC
Cracticidae (magpies, butcherbirds & currawongs)								
Grey Butcherbird	*Cracticus torquatus*			+				
Pied Butcherbird	*Cracticus nigrogularis*			+				
Australian Magpie	*Cracticus tibicen*		+ M	+		+		
Grey Currawong	*Strepera versicolor*					+		
Campephagidae (cuckoo-shrikes and trillers)								
Black-faced Cuckoo-Shrike	*Coracina novaehollandiae*		+ M	+				
White-winged Triller	*Lalage tricolor*		+					
Neosittidae (sittellas)								
Varied Sittella	*Daphoenositta chrysoptera*							
Oreoicidae (crested bellbird)								
Crested Bellbird	*Oreoica gutteralis*			+		+		
Pachycephalidae (shrike-tits, whistlers and allies)								
Western Golden Whistler	*Pachycephala occidentalis*							
Rufous Whistler	*Pachycephala rufiventris*		+	+		+		
Grey Shrike-thrush	*Colluricincla harmonica*			+		+		
Rhipiduridae (fantails)								
Willie Wagtail	*Rhipidura leucophrys*		+ M	+				
Grey Fantail	*Rhipidura albiscapa*			+				
Monarchidae (flycatchers, monarchs & magpie-lark)								
Magpie-lark	*Grallina cyanoleuca*			+				
Corvidae (ravens and crows)								
Australian Raven	*Corvus coronoides*		+ M	+		+		
Little Crow	*Corvus bennetti*							
Petroicidae (robins)								
White-breasted Robin	*Eopsaltria georgiana*			+		+		
Western Yellow Robin	*Eopsaltria australis griseogularis*							
Southern Scrub-robin	*Drymodes brunneopygia*							
Jacky Winter	*Microeca fascinans*			+				
Hooded Robin	*Melanodryas cucullata*			+				
Red-capped Robin	*Petroica goodenovii*		+ M	+				
Hirundinidae (swallows and martins)								
White-backed Swallow	*Cheramoeca leucosterna*		+	+				
Welcome Swallow	*Hirundo neoxena*			+				
Tree Martin	*Petrochelidon nigricans*		+ M	+				
Fairy Martin	*Petrochelidon ariel*			+				
Acrocephalidae (reed-warblers)								
Australian Reed Warbler	*Acrocephalus australis*			+				
Locustellidae (grassbirds, songlarks & old world warblers)								
Rufous Songlark	*Megalurus mathewsi*							
Brown Songlark	*Megalurus cruralis*							

Appendix 3. (cont.)

Species		Conservation Status	Records					
			Project area	BA	WAM	FSDB	TF	EPBC
Zosteropidae (white-eyes)								
Silvereye	*Zosterops lateralis*		+	+		+		
Dicaeidae (flowerpeckers)								
Mistletoebird	*Dicaeum hirundinaceum*			+				
Estrildidae (grassfinches and allies)								
Zebra Finch	*Taeniopygia guttata*		+					
Motacillidae (pipits and wagtails)								
Australian Pipit	*Anthus australis*		+ M					
# bird species expected in the study area:		**119 (40 recorded)**						

Appendix 4. Mammals Potentially occurring in the study areas.

Project area = species recorded in the study area during the 2017 level 1 fauna survey.
WAM = species recorded in the area on the Western Australian Museum Specimen Database (see Table 1).
FSDB = species recorded in the area on the Fauna Survey Returns Database (see Table 1).
TF = species recorded in the area on the DBCA Threatened and Priority Fauna Database (see Table 1).
EPBC = species or species habitat recorded in the area on the EPBC Protected Matters Search Tool (see Table 1).

Species		Conservation Status	Records				
			Project area	WAM	FSDB	TF	EPBC
Tachyglossidae (echidnas)							
Echidna	*Tachyglossus aculeatus*						
Dasyuridae (dasyurid marsupials)							
Chuditch	*Dasyurus geoffroii*	CS1					+
Fat-tailed Dunnart	*Sminthopsis crassicaudata*						
Little Long-tailed Dunnart	*Sminthopsis dolichura*			+			
White-tailed Dunnart	*Sminthopsis granulipes*						
Tarsipedidae (honey possum)							
Honey Possum	*Tarsipes rostratus*						
Macropodidae (kangaroos and wallabies)							
Western Grey Kangaroo	*Macropus fuliginosus*		+		+		
Western Brush Wallaby	*Macropus irma*	CS2					
Euro	*Macropus robustus*						
Molossidae (freetail bats)							
White-striped Freetail Bat	*Tadarida australis*						
Vespertilionidae (ordinary bats)							
Gould's Wattled Bat	*Chalinolobus gouldii*						
Chocolate Wattled Bat	*Chalinolobus morio*						
Southern Forest Bat	*Vespadelus regulus*						
Inland Broad-nosed Bat	*Scotorepens balstoni*						
Lesser Long-eared Bat	*Nyctophilus geoffroyi*			+			
Muridae (rats and mice)							
House Mouse	*Mus musculus*	Int.					
Western Bush Rat	*Rattus fuscipes*			+			
Black Rat	*Rattus rattus*	Int.					
Ash-grey Mouse	*Pseudomys albocinereus*						
Canidae (dogs and foxes)							
Fox	*Vulpes vulpes*	Int.	+		+		
Dingo/Dog	*Canis lupus familiaris/dingo*			+	+		
Felidae (cats)							
Feral/House Cat	*Felis catus*	Int.			+		
Leporidae (rabbits & hares)							
Rabbit	*Oryctolagus cuniculus*	Int.	+		+		
Bovidae (horned ruminants)							
Cow	*Bos taurus*	Int.	+				
Goat	*Capra hircus*	Int.	+		+		
	Number of mammal species:		**25 (5 recorded)**				

Appendix 5. EPBC Protected Matters Search Tool results.

Species listed for the area 25 km in radius from 29º 35' 07"S, 115º 17' 54"E on the EPBC Protected Matters Search Tool.

Species	Status	Type of presence of species or species habitat	Author's Comment
Red Knot *Calidris canutus*	Endangered & Migratory	May occur	Not likely to occur. Shorebird with no suitable habitat in the study area.
Curlew Sandpiper *Calidris ferruginea*	Critically Endangered & Migratory	May occur	Not likely to occur. Shorebird with no suitable habitat in the study area.
Carnaby's Black-Cockatoo *Calyptorhynchus latirostris*	Endangered	Known to occur	Likely to be a seasonal foraging visitor.
Malleefowl *Leipoa ocellata*	Vulnerable	Likely to occur	May possibly occur.
Eastern Curlew *Numenius madagaascariensis*	Critically Endangered & Migratory	May occur	Not likely to occur. Shorebird with no suitable habitat in the study area.
Chuditch *Dasyurus geoffroii*	Vulnerable	Likely to occur	May possibly occur.
Dibbler *Parantechinus apicalis*	Endangered	May occur	Not likely to occur. Only known from offshore islands in this region.
Western Spiny-tailed Skink *Egernia stokesii badia*	Endangered	Likely to occur	Not likely to occur. No suitable habitat present for this species.
Shield-backed Trapdoor Spider *Idiosoma nigrum*	Vulnerable	Likely to occur	Low likelihood of occurence. Suitable habitat not present.
Grey Wagtail *Motacilla cinerea*	Migratory (terrestrial)	May occur	Not likely to occur. Vagrant to the area
Common Sandpiper *Actitis hypoleucos*	Migratory (wetland)	May occur	Not likely to occur. Shorebird with no suitable habitat in the study area.
Sharp-tailed Sandpiper *Calidris acuminata*	Migratory (wetland)	Likely to occur	Not likely to occur. Shorebird with no suitable habitat in the study area.
Pectoral Sandpiper *Calidris melanotos*	Migratory (wetland)	May occur	Not likely to occur. Shorebird with no suitable habitat in the study area.
Common Greenshank *Tringa nebularia*	Migratory (wetland)	Likely to occur	Not likely to occur. Shorebird with no suitable habitat in the study area.
Osprey *Pandion haliaetus*	Migratory (wetland)	Likely to occur	Not likely to occur. Coastal species with no suitable habitat in the study area.
Fork-tailed Swift *Apus pacificus*	Migratory (marine)	Likely to occur	May occur in the study area.

Appendix E

EP commitments register

TRIESTE 3D SEISMIC SURVEY (EP320)

Environment Plan – commitments register

Performance standard	Measurement criteria
PROJECT DESCRIPTION (any duplication with the impact & risk assessment is not included here)	
The survey will take place over 5-7 weeks (40 days).	
The survey will take place between November and May 2019.	
Vibroseis vehicles will be of Inova AHV-IV Commanders (2 fleets of 3 vehicles).	
Receivers will be SmartSolo cable-free nodes.	
The line preparation machinery will be fitted with a real-time sub-1 m accuracy positioning solution	
No fencing will be erected for the survey. Lattice will, however, ensure that a fully equipped fencer and crew is hired to repair any gates or fences inadvertently damaged during the survey.	
The maximum line clearing widths are 4 m. Lattice will endeavour to reduce the width of 20-50% of the receiver lines.	
Vegetation will be mulched rather than rolled.	
The locations of the seismic lines will be under the guidance of the Line Pointing Surveyor using GPS navigation and where possible, compass and back sighting methods.	
A global positioning system (GPS) base station will be established within the proposed survey area in an area that does not require any vegetation clearing.	
One or two laydown areas will be used – at the 'Riverbend' property and 'Westview' property. The laydown area/s will be equipped with a portable toilet and waste reception/collection facilities.	
Terrex will provide at least three crew members that are suitably trained in accordance with Clean and Inspect Vehicle and Machinery (AHCBIO201A) or equivalent.	
Lattice will provide six portable clean down mats (8x5 m bunded PVC) and two high-pressure gurneys for use at property entrance locations. All wash downs or blow downs undertaken on site will occur within these temporary clean down mats, and where water is used, this will be filtered through a weed seed mesh and be discharged to stable land. All organic matter collected in this process will be collected by ToxFree and disposed at a contaminated waste disposal facility.	

Performance standard	Measurement criteria
Lattice will establish a contract with ToxFree (Geraldton) to supply skip bins for general waste, recyclables and contaminated waste (such as oily rags and used oil filters, contaminated soil from washdowns), collect the waste and dispose of it appropriately.	
ENVIRONMENTAL IMPACT & RISK ASSESSMENT	
1. Native vegetation clearing *Objectives - Keep vegetation mulching to the minimum amount possible. Rehabilitation of disturbed areas is successful.*	
Avoidance	
Do not undertake any ‘conventional’ vegetation clearing (i.e., removal of vegetation using bulldozers).	Photos of mulchers in action are available.
Load the mulchers with pre-determined and validated GPS data to ensure that source and receiver lines are prepared in accordance with botanist advice.	Pre-mulching checklist completed, indicating that GIS data is correctly loaded.
Guide the locations for seismic line preparation using GPS navigation (under the guidance of the Line Pointing Surveyor) so as to avoid pre-determined sites of sensitivities (e.g., threatened flora species).	Daily operations reports and photos verify that the Line Pointing Surveyor guides the mulcher during line preparation.
Do not mulch the following areas of defined native vegetation: • The Nature Conservation Reserve. • Riparian vegetation along the Arrowsmith River (vegetation outside the cadastral boundary of adjoining private properties). • Roadside vegetation (the area between road verges and adjacent property boundaries). • Wandoo woodland in the northeast part of the UCL. • Mallee trees within the Mallee Land Co property.	Daily operations reports verify no clearing of remnant vegetation.
	As-completed GIS survey lines verify that no line clearing took place within the wandoo woodland.
	Statement from the landowner at the completion of the survey verifies that no trees were cleared.
Do not mulch or remove trees with a DBH >20 cm in order to preserve potential breeding habitat for Carnaby’s black cockatoo.	Daily operations reports and photos verify trees with DBH >20 cm is retained.
Mitigation	
Leave mulched/slashed material at the point of mulching/slashing to provide a seed source, minimise soil erosion and compaction, and provide nutrients to the remaining rootstock as it decomposes.	Daily operations reports and photos verify vegetation is left on site.

Performance standard	Measurement criteria
Keep a fire tender available with the mulcher to enable any spot fires to be immediately extinguished.	Daily operations reports and photos verify that a fire tender is provided during mulching.
Do not permit any off line driving (e.g., for short-cuts).	No incident reports regarding off line driving.
Induct all project personnel into the vegetation management requirements prior to the commencement of line clearing.	The project induction includes information regarding the prevention of vegetation clearing.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Damage to any flora species listed under the *EPBC Act 1999* or *Wildlife Conservation Act 1950* will be reported to the DoEE and DEC (as per reporting requirements listed in Table 7.5).	Reportable incident report is available.
Rehabilitation	
A Rehabilitation Monitoring Plan will be developed prior to the survey, which will include a description of (but not be limited to): • Monitoring methodology (frequency, timing, locations, number of botanists, logistics); • Completion criteria (see Section 3.6.12); • Active revegetation works (if required); and • Reporting requirements.	A Rehabilitation Monitoring Plan is available prior to the survey commencing.
The Rehabilitation Monitoring Plan will be implemented upon completion of the survey, with timing dependent on temporal issues (e.g., spring is ideal for surveying to make identification of flowering plants easier).	Reports from the botanical consultant are available to verify that the Rehabilitation Plan has been implemented.
The results of rehabilitation monitoring and revegetation activities (if required) will be reported to DMIRS (as outlined in Section 8.6.2).	Reports to DMIRS, and evidence of transmittal, are available.
2. Noise and vibration *Objective – minimise noise and vibration disruption to landholders.*	
Do not operate vibroseis buggies within 30 m of homesteads.	Survey mapping verifies that source lines are >30 m from homesteads.

Performance standard	Measurement criteria
Do not operate vibroseis buggies within the cadastral boundaries of the Arrowsmith River in order to minimise vibration impacts to riparian habitats and associated fauna.	There are no incident reports regarding breach of no-entry zone.
Maintain vibroseis buggies, mulchers and trucks in accordance with a Planned Maintenance System (PMS) to ensure noise abatement devices (e.g., engines, mufflers) are operating efficiently.	PMS records indicate regular servicing.
Undertake survey activities ONLY during daylight hours in order to minimise the impacts of noise and vibration on native nocturnal fauna.	Daily operations reports list the survey acquisition times, confirming no work outside of daylight hours.
Fit a silencer pack to the generators.	Photos verify that a silencer pack is fitted to the generators.
Consult with local landholders during the planning and operation phases of the project and notify them of the exact timing of the survey once confirmed.	Consultation register confirms the consultation material, meetings and phone calls have taken place with local residents, business and community organisations in a timely fashion.
Induct all project personnel into the noise and vibration management requirements prior to the commencement of line clearing.	The project induction includes information regarding noise and vibration management.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Log complaints regarding noise or vibration in the enterprise incident management system. Undertake follow up investigations (e.g., sound and/or vibration monitoring) as required.	Investigation records are available.
	Monitoring records are available (if required).
3. Disturbance to wildlife *Objective – avoid injury or death of native wildlife.*	
Undertake survey activities ONLY during daylight hours in order to minimise the impacts of noise and vibration on native nocturnal fauna.	Daily operations reports list the survey acquisition times, confirming no work outside of daylight hours.
Do not operate vibroseis buggies within the cadastral boundaries of the Arrowsmith River in order to minimise vibration impacts to riparian habitats and associated fauna.	There are no incident reports regarding breach of no-entry zone.
Limit the speed of survey vehicles (other than vibroseis buggies, which travel at ~15 km/hr) to a speed limit of 40 km/hr when undertaking survey activities (excluding travel on formed roads, when the public speed limit will be observed), in order to minimise the risk of fauna strike.	There are no incident reports via the In-Vehicle Monitoring System (IVMS) of speed limit breaches.

Performance standard	Measurement criteria
Retain mulched vegetation at the site at which it was mulched so as to provide groundcover for fauna (especially reptiles and small mammals).	Daily operations reports list the survey acquisition times, confirming no work outside of daylight hours.
Do not allow hunting activities (e.g., shotting, trapping).	There are no incident reports regarding hunting.
Do not bring pets to site.	There are no incident reports regarding pets.
Dispose of food waste appropriately (see Section 7.2.7) in order to avoid attracting pest species.	See Section 7.2.7.
Only personnel trained in fauna handling are permitted to handle fauna, with permits obtained under the Biodiversity Conservation Act 2016 to handle and relocate injured fauna.	Fauna handling training records verify that experienced people handle injured fauna.
	Biodiversity Conservation Act permit to handle and relocate injured fauna is available.
	Incident reports.
Telephone (24/7) Greenough Wildlife & Bird Park on 08-9926 1171 for assistance with injured wildlife. Alternatively, telephone the Wildcare Helpline (08-9474 9055) for assistance with injured wildlife (they will provide details of the nearest wildlife rehabilitator). See also https://www.dpaw.wa.gov.au/about-us/contact-us/wildcare-helpline.	Incident report records time, location and nature of fauna impact and measures taken to assist.
Induct all project personnel into the wildlife management requirements prior to the commencement of line clearing.	The project induction includes information regarding noise and vibration management.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Threatened fauna	
Carnaby's black-cockatoo Avoid any mulching within the wandoo woodland (along the creek line in the northeast corner of the UCL) in order to preserve potential breeding habitat.	As-completed GIS survey lines verify that no line clearing took place within the wandoo woodland.
Do not mulch trees (particularly wandoo) and shrubs (particularly banksias) >20 cm DBH so as to preserve potential breeding habitat for the Carnaby's black-cockatoo.	Daily operations reports verify no trees and shrubs >20 cm DBH are mulched.

Performance standard	Measurement criteria
Malleefowl Create a buffer of 20 m for access around malleefowl nest mounds if found (this is unlikely, as none have been sighted during the botanical and fauna field surveys).	Photos verify that a minimum 20 m buffer is created around malleefowl nest mounds.
4. Soil disturbance *Objective – avoid soil erosion off the survey lines.*	
Create source and receiver lines only by mulching (native vegetation) or slashing (crops/pasture), and do not create permanent tracks. The retained plant roots will minimise the potential for mass soil erosion.	Daily operations reports and photos verify only vegetation mulching/slashing takes place (not wholesale clearing).
Retain mulched/slashed vegetation in situ to minimise wind or water erosion of the soil.	Daily operations reports and photos verify that mulched/slashed vegetation is retained in situ.
Use existing roads and tracks (including farm tracks) wherever possible to provide access to new survey lines.	Survey GIS records/mapping verifies use of existing roads/tracks.
Fit balloon tyres to vibroseis buggies for use on farmland to minimise soil compaction.	Photos verify the use of balloon tyres.
Do not travel along survey lines during or immediately after heavy rain. The Field Survey Manager will track weather forecasts to minimise the risk of vehicles being on site during heavy rains.	Daily operations reports and photos verify no vehicle activity during or immediately after heavy rains.
	Weather forecast logs are available.
Do not create survey lines within the Arrowsmith River riparian corridor (cadastral boundaries) in order to minimise the risk of erosion and sedimentation into the river.	Survey GIS records verify that survey lines avoided the riparian vegetation of the Arrowsmith River.
Use ATVs in private properties (rather than passenger vehicles) in order to minimise soil compaction.	Photos verify the use of ATVs on private properties.
Backfill soil divots created during nodes recovery so as to avoid soil pock-marking.	Daily operations reports note that soil divots are backfilled.
Undertake a post-survey inspection along the survey lines to ascertain if soil damage has occurred. Remeliorate any soil damage in accordance with landholder requirements.	Post-survey inspection report and photos. Photos of rehabilitation efforts.
5. Atmospheric and dust emissions *Objective - No complaints from local residents regarding air and dust emissions creating a nuisance.*	
Dust generation	

Performance standard	Measurement criteria
Create source and receiver lines only by mulching (native vegetation) or slashing (crops/pasture), and do not create permanent tracks. The retained plant mass will minimise soil exposure and thus the potential for dust generation.	Daily operations reports and photos verify only vegetation mulching/slashing takes place (not wholesale clearing).
Retain mulched/slashed vegetation in situ to minimise dust generation.	Photos verify that mulched/slashed vegetation is left in situ.
Use existing roads and tracks (including farm tracks) wherever possible to provide access to new survey lines.	Photos verify the use of existing roads and tracks as access points.
Abide by local speed limits on all roads, particularly unsealed roads or farmer access roads. Where speed limits are not clearly signposted, a 40 km/hr limit on unsealed roads, and 10 km/hr in the vicinity of homesteads, will be enforced by Lattice to minimise dust generation.	No complaints from local landholders about dust from excessive vehicle speed.
Do not create temporary or permanent unsealed tracks.	Photos verify no unsealed tracks created.
Air emissions	
Undertake maintenance on the vibroseis buggies in accordance with the PMS to ensure optimum combustion efficiency.	PMS records of the vibroseis trucks indicate servicing is up to date.
Record fuel use for all trucks and vehicles to enable quantification of GHG emissions.	Daily operations reports note refuelling volumes.
6. Unplanned disruption to farming activities Objective – avoid unplanned disruption to farming activities.	
Consult with all landholders within the proposed survey area to determine an optimal time for surveying to take account for key farm activities (e.g., lambing, sowing and harvesting). • Acquisition is planned to occur immediately after the sowing of wheat crops. • Mallee farm source lines have been re-designed to avoid any loss of trees.	Consultation records verify that Lattice has made all attempts to balance landholder considerations with environmental considerations in terms of survey timing.
Provide landholders with the contact details for the Seismic Field Manager to enable direct communications and the prompt issue resolution.	Consultation records verify that the contact details for the Siesmic Field Manager were supplied to all landholders.
Do not undertake survey work along public road reserves, restricting impacts to local landholders to mobilisation and demobilisation only.	GIS survey records verify that no road reserves have been included in the survey.

Performance standard	Measurement criteria
Guide the locations for survey acquisition using GPS navigation (under the guidance of the Line Pointing Surveyor) so as to avoid moving beyond agreed areas of disturbance.	As-completed GIS data verifies no variation from planned survey lines.
Manage vehicle movements to and from the survey area and the camp through contractor journey management to minimise the number of vehicles on site.	Daily operations reports verify that journey management is implemented.
Handle landowner complaints in accordance with the project-specific SEP (see Chapter 4).	Enterprise incident management system records verify that landowner complaints are handled in accordance with the SEP.
Induct all project personnel into the requirement to avoid undertaking activities off agreed survey lines.	The project induction includes information regarding the prevention of preventing movements off seismic lines.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Conduct a thorough inspection of each property immediately following completion of all seismic lines on a landowner's property, noting and photographing all impact and ensuring that no survey pegs, flagging, gate signs, equipment or general rubbish has been left behind.	A line clearance report signed by the Terrex representative verifies that inspection was undertaken prior to demobilising from site.
7. Introduction of weeds and pathogens Objective - Prevent the introduction or spread of weeds or pathogens into or throughout the survey area from survey equipment or vehicles.	
Ensure that all Lattice, Terrex and sub-contractor equipment and vehicles arrive on site ready to commence operations with a valid Vehicle and Mobile Plant Hygiene Inspection Report.	Completed Vehicle and Mobile Plant Hygiene Inspection Reports are available for all equipment and vehicles.
Clean down facilities (for vehicles and footwear) will be available at the laydown sites and Iluka Resources sites (see Section 3.6.4) and available for the duration of the project.	Date-stamped photos verify the establishment and operation of clean down facilities.
All Lattice, contractor and sub-contractor equipment and vehicles will be subject to clean down procedures upon entry to a new property in accordance with landholder requests. • Blow down will occur in preference to wash down where practicable, so as to avoid creating conditions suitable for Phytopthora cinnamomi (warm, moist soil conditions).	Completed clean down records for all equipment and vehicles are available.
	Date-stamped photos verify the establishment and operation of mobile clean down facilities.

Performance standard	Measurement criteria
• Mobile clean down stations (for vehicles and footwear) will be provided to facilitate this. • An accredited certifier (trained with Clean and Inspect Vehicle and Machinery certification, AHCBIO201A, or equivalent) will be present to inspect equipment and vehicles and certify them clean prior to proceeding to the next property.	Weed inspection accreditation certification is available for inspectors.
Do not drive over areas other than designated access roads and tracks and survey lines (i.e., not over roadside vegetation or through the riparian vegetation of the Arrowsmith River). • Access across the Arrowsmith River is via existing causeways only.	Daily operations reports verify no vehicle access beyond formed roads, access tracks and survey lines.
Inspect and clean each node prior to deployment.	Daily operations reports verify that nodes are inspected and cleaned prior to each deployment.
Retain mulched/slashed vegetation in situ so as to prevent the potential spread of weeds and pathogens.	Daily operations reports verify mulched/slashed vegetation remains on site.
Avoid preparing survey lines and undertaking survey acquisition avoided during periods of heavy rain (and immediately afterwards, while pooled water is present and ground conditions are too soft) to prevent soil rutting/churning (which in turn promote conditions favouring weed and pathogen invasion).	Daily operations reports verify that line preparation or survey work is avoided during and immediately after heavy rain.
Induct all project personnel into weed and pathogen management requirements prior to the commencement of line clearing.	The project induction includes information regarding weed and pathogen management procedures.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
In the event that plant seedlings are used for active survey line rehabilitation, they will be certified as *Phytophthora*-free.	Certification is provided with seedlings verifying that the growing medium is *Phytophthora*-free.
8. Disturbance to cultural heritage *Objective - Avoid damage to recorded indigenous and non-indigenous cultural heritage sites occurs.*	

Performance standard	Measurement criteria
Invite traditional owner representatives to undertake a field inspection prior to or during the survey in order to ascertain and record locations of unlisted cultural heritage significance. • Where sites of significance are identified, determine measures to protect such sites from the survey.	Stakeholder consultation records verify that traditional owner representatives have inspected the survey area.
Avoiding undertaking line clearing and survey activities along the Arrowsmith River corridor so as to avoid the potential for encountering unrecorded indigenous cultural heritage sites.	Daily reports and as-completed GIS data verify no activity within the Arrowsmith River corridor takes place.
Guide the locations for seismic line preparation using GPS navigation (under the guidance of the Line Pointing Surveyor) so as to avoid pre-determined sites of sensitivities (e.g., cadastral boundaries of the Arrowsmith River).	
Where unrecorded surface indigenous sites are suspected/noted by survey personnel, the following protocol will be followed: • Stop work in that location (and 20 m either side of the suspect/known site). • Erect bunting (or similar) around site to prevent entry. • Contact Lattice's Senior Access Advisor (0423 092 774) for advice. • Report the potential find to the Registrar at the WA Department of Aboriginal Affairs (DAA) (https://www.daa.wa.gov.au/heritage/site-preservation/report-a-site/). • Prepare observation report and log in the enterprise incident management system.	Content of project induction verifies that the cultural heritage protocol is addressed. Incident report is prepared and available in the enterprise incident management system.
Induct all project personnel into the cultural heritage management requirements prior to the commencement of line clearing.	The project induction includes information regarding the prevention of vegetation clearing. Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
9. Reduction of visual amenity *Objective - No complaints from landowners within the survey area or local residents regarding visual amenity.*	
Do not undertake vegetation clearing in areas of visibility to the public (e.g., road reserves, conservation reserves).	As-completed GIS data (and photos) confirms survey lines were not created in areas of public visibility.

Performance standard	Measurement criteria
Mulch vegetation rather than clearing it (i.e., using traditional methods, such as bulldozing) or rolling it to enable rapid regeneration and restoration to its former visual condition.	Date-stamped photos verify that vegetation was mulched (rather than rolled or bulldozed).
Do not create permanent access tracks.	Date-stamped photos verify that permanent access tracks were not created.
Do not install traffic management signage.	Date-stamped photos verify that traffic management signage was not erected.
Recover nodes as soon as practicable upon completion of the source line.	Daily operations reports verify the rapid recovery of nodes.
Create 'doglegs' when mulching native vegetation at public road verges (e.g., Lovegrove Road) so as to minimise the line-of-sight distance.	As-completed GIS data (and photos) confirm the creation of dog legs at public road verges.
Record complaints regarding visual intrusion into the enterprise incident management system, and investigate (and where possible, resolve) these in accordance with the Lattice Incident Management Directive (LAT-RMS-DVE-006).	Complaint is recorded and available in the enterprise incident management system.
Induct all project personnel into the visual amenity management requirements prior to the commencement of line clearing.	The project induction includes information regarding managing visual amenity.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
10. Ignition of wildfire *Objective – avoid wildfire resulting from the survey*	
Preparedness	
Do not undertake any survey activities during days of declared Total Fire Ban (TFB).	Daily operations report verifies that work was not undertaken during days of TBF.
Monitor local/regional weather conditions on a daily basis through the BoM (e.g., http://www.bom.gov.au/wa/forecasts/central-west.shtml) and WeatherZone (e.g., http://www.weatherzone.com.au/wa/central-west/eneabba) websites.	Daily weather forecasts are available.
Conduct daily toolbox meetings to alert the workforce to the fire risk level for the day and reinforce fire management controls.	Daily operations report verifies that toolbox meeting was conducted.

Performance standard	**Measurement criteria**
Keep a fire cart (carrying 500 litres of water and associated pumps and hoses) on site with line clearing equipment at all times. Train personnel in the use of this equipment.	Contract/invoice and photos verify the use of a fire cart during the survey.
Undertake an emergency response drill prior to and/or during the line clearing activities commencing to test personnel knowledge of procedures.	Emergency response report verifies that a drill was undertaken.
Equip vibroseis buggies and all other vehicles with portable fire extinguishers (9 kg water and a 1-2.5 kg dry powder) and shovel/pick.	Photos verify that deployment vehicles are fitted with portable fire extinguishers.
Equip the mulcher operator and fire cart operator with fully operational VHF and/or UHF radio transceivers, with the water cart operator maintaining fire watch on the appropriate channel.	Operational reports note testing of radios to ensure they are operational.
Inspect the underside of viboseis buggies and vehicles when moving between properties and remove any accumulated vegetation.	Completed weed hygiene inspection reports verify inspections (and cleaning) were undertaken.
Consult with the DFES Geraldton office immediately prior to the commencement of the survey, and regularly during the survey, to ensure that they are aware of survey timing and have personnel available to assist with fire fighting at the time of the survey.	Consultation records verify consultation with local fire authorities has taken place.
Establish a call-off contract, agreement (or similar) with an aerial fire-fighting contractor so that access to aerial fire fighting capabilities are readily available to fight a wildfire.	Call-off contract or similar is available.
Do not establish campfires or barbeques within the survey area.	No incident reports of campfires or barbeques started by survey crew in the survey area.
Restrict cigarette smoking to formed roads and tracks, unless landowners request more stringent measures. Provide cigarette butt receptacles to smokers, which are to be stored within vehicles, with the contents then disposed of appropriately at the accommodation or laydown yard.	Photos verify that cigarette butt bins are provided to smokers.
Induct all project personnel into the visual amenity management requirements prior to the commencement of line clearing.	The project induction includes information regarding managing visual amenity.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Response	

<table>
<tr><th>Performance standard</th><th>Measurement criteria</th></tr>
<tr><td>Apply water from the water cart or use fire extinguishers to extinguish any spot fires.</td><td>Incident report verifies that water cart and/or fire extinguishers were used to extinguish fire.</td></tr>
<tr><td>Where a spot fire escapes and has the potential to become a wildfire, undertake the following:
• Implement the ERP:
  o Call the DFES Geraldton office (08-9956 6000) and police (131 444).
  o Notify Lattice.
  o Evacuate all personnel from the area, including landholders.
• Place the aerial fire fighting contractor on notice to attend the scene.</td><td>Incident report verifies that procedures from the ERP were implemented.</td></tr>
<tr><td>Record incidents into the enterprise incident management system, and investigate (and where possible, resolve) these in accordance with the Lattice Incident Management Directive (LAT-RMS-DVE-006).</td><td>Incident is recorded and available in the enterprise incident management system.</td></tr>
<tr><td colspan="2">11. Damage to third-party infrastructure
Objective - Minimise unplanned damage to third-party infrastructure.</td></tr>
<tr><td rowspan="2">Mark all above-ground and buried infrastructure on project mapping. Achieve this by:
• Checking aerial photography (e.g., Google Earth).
• Checking topographic maps.
• Consulting with landholders and conducting property scouting.
• Consulting with the DBNGP Operator/s.
Consulting with the Dial Before You Dig service.</td><td>Consultation records verify that discussions have taken place with relevant asset owners.</td></tr>
<tr><td>Project mapping includes above-ground and buried infrastructure.</td></tr>
<tr><td>Take date-stamped photos of all infrastructure that may be affected by the survey as a record of pre- and post-survey condition.</td><td>Date-stamped photos of infrastructure are available.</td></tr>
<tr><td>Load all above-ground and buried infrastructure GIS coordinates into the mulcher GPS navigation system.</td><td>Download of GPS inputs verifies that infrastructure is marked.</td></tr>
<tr><td>Avoiding activating the seismic source in the DBNGP easement.</td><td>As-completed GIS survey data verifies that no seismic was acquired in the pipeline easement.</td></tr>
</table>

Performance standard	Measurement criteria
Guide the locations for seismic line preparation using GPS navigation (under the guidance of the Line Pointing Surveyor) so as to avoid pre-determined sites of sensitivities (e.g., fences).	Daily operations reports verify that the Line Pointing Surveyor
Induct all project personnel into the requirements for preventing unplanned damage to third-party infrastructure prior to the commencement of line clearing.	The project induction includes information regarding preventing damage to third-party infrastructure.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Provide all landholders with the contact details for the Lattice Field Survey Manager so that issues regarding potential or actual infrastructure damage can be quickly reported to enable rapid rectification.	Consultation records verify that the Lattice Field Survey Manager contact details have been provided to all landholders.
Record incidents of infrastructure damage into the enterprise incident management system, and investigate (and where possible, resolve) these in accordance with the Lattice Incident Management Directive (LAT-RMS-DVE-006).	Incident is recorded and available in the enterprise incident management system.
12. Inappropriate waste disposal *Objective - Avoid unplanned release of waste within the survey area.*	
Manage waste in accordance with Terrex's Procedure for Housekeeping and Waste Disposal (TS-PRO-40, Rev 3, Jan 2017). This includes measures such as: • Establishing and using covered rubbish bins. • Cleaning up spills immediately. • Maintaining spill kits on site. • Washing and maintaining vehicles in contained areas. • Using recycling facilities where available.	The Procedure for Housekeeping and Waste Disposal is readily available to project crew.
	Interviews with crew indicate they are familiar with waste management procedures.
Secure waste and recycling bins with lids will be provided at the project laydown area for the disposal of any waste accumulated.	Photos and waste contract verifies that bins are provided at the laydown yard.
Provide personal cigarette butt receptacles to smokers, to be stored within vehicles, with the contents then disposed of appropriately at accommodation or landholder facilities.	Photos verify the provision of personal cigarette butt receptacles.
Remove clean down waste from site by an appropriately licensed waste contractor and disposed at an appropriate facility.	Waste transport certificates verify the removal of waste by a licensed contractor.

Performance standard	Measurement criteria
Undertake daily inspections of vehicles and use cargo netting as required to secure contents (e.g., back of utes).	Daily operations report verify that daily checks are undertaken.
Restrict cigarette smoking to formed roads and tracks, unless landowners request more stringent measures. Provide cigarette butt receptacles to smokers, which are to be stored within vehicles, with the contents then disposed of appropriately at the accommodation or laydown yard.	Photos verify that cigarette butt bins are provided to smokers.
Visual inspection is undertaken along survey lines to check for (and retrieve) any wastes at completion of each day's work and at completion of the survey.	Daily operations report and end-of-survey inspection report verifies whether waste was retrieved.
Induct all project personnel into the waste management requirements prior to the commencement of line clearing.	The project induction includes information regarding waste management.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Record incidents into the enterprise incident management system, and investigate (and where possible, resolve) these in accordance with the Lattice Incident Management Directive (LAT-RMS-DVE-006).	Incident is recorded and available in the enterprise incident management system.
13. Hydrocarbon and chemical spills *Objective - Avoid release of hydrocarbons or chemicals to grade*	
Prevention	
Induct all project personnel into hydrocarbon and chemical spill prevention and response requirements prior to the commencement of line clearing.	The project induction includes information regarding hydrocarbon and chemical spill prevention and response.
	Induction attendance records cross-referenced with the personnel records verify all personnel are inducted.
Store bulk quantities of hydrocarbons or chemicals on level terrain within bunding at the laydown yard.	Photos and operations report note equipment stored at the laydown yard.

Performance standard	Measurement criteria
Store hydrocarbons and chemicals in accordance with AS1940 (*The storage and handling of flammable and combustible liquids*), that is: • Within appropriate containers (i.e., not damaged or otherwise compromised) that are appropriately labelled. • Within a bunded area (sized to accommodate at least 110% of the volume of the largest container). • There is a 3 m radius of combustible-free material around the storage location.	Inspection notes and/or photos verify that fuels and chemicals are appropriate stored.
Make available a fully-equipped spill kit at the laydown yard (containing absorbent pads, absorbent ‘sausages’, kitty litter, shovels, gloves and so forth).	Photos verify the presence of a spill kit at the laydown yard.
Equip each vibroseis buggy and vehicle (excluding ATVs) with a fully-equipped spill kit on board (containing absorbent pads, absorbent ‘sausages’, kitty litter, shovels, gloves and so forth).	Photos verify the presence of spill kits on board each vehicle.
Avoid working in the Arrowsmith River corridor.	As-completed GIS records verify that no survey work was conducted in the Arrowsmith River corridor.
Refuel vibroseis buggies, vehicles and equipment in accordance with Terrex’s *SOP Refuelling (TS-SOP-GEN019, Rev 4, Jan 2017*). This includes: • Undertaking refuelling on flat, level ground away from sensitive sites. • Placing a portable bund under the refuelling area. • Immediately cleaning up any spill. • Not refuelling within 1km of any designated watercourse. • Reporting any spill to grade to the Crew Manager and digging up and/or treating the contaminated soil with biodegradable bio-active hydrocarbon absorbent. • Not smoking near the fuel tanker while refuelling. • Ensuring that the tanker compartment safety shut off valve is closed whenever a compartment is not being drawn from and whenever the tanker is to be moved for any reason. • The refuelling operator remaining at the vehicle and holding the fuel nozzle at all times.	Photos verify that spill kits are readily available. For refuelling activities undertaken on site, the following is available. • Completed refuelling checklists. • Completed Job Hazard Analysis (JHA). • Completed Permit to Work (PTW).
Response	

Performance standard	Measurement criteria
Train all on-ground project personnel in hydrocarbon and chemical spill prevention and response management measures.	Training records verify all on-ground project personnel are trained.
Undertake spill response in accordance with Section 3 of the project-specific OSCP (WAA-4000-ENV-PLN) and the Terrex *SOP Hydrocarbon Spillage and Clean Up (TS-SOP-GEN016, Rev 5, Jan 2016).* The OSCP takes precedence in the event of a spill.	Incident report is available in the enterprise incident management system, verifying that response, reporting and investigation was undertaken in accordance with the OSCP.
Record incidents into the enterprise incident management system, and investigate (and where possible, resolve) these in accordance with the Lattice Incident Management Directive (LAT-RMS-DVE-006).	
IMPLEMENTATION STRATEGY	
Terrex will review all personnel training matrices for completion of the minimum Terrex and Lattice training requirements prior to mobilising to the project site.	Terrex training matrices and personnel certificates verify that all training requirements are up-to-date prior to the survey commencing.
All project personnel will receive the required information, instruction, training and supervision necessary to ensure a proactive effort is maintained and any constraints imposed on the project are adhered to	Induction attendance records verify that all personnel are inducted into project requirements.
The Bridging ERP will be tested: • Prior to the commencement of the survey; • When there is a significant modification to the Bridging ERP; and • In accordance with Lattice's Emergency Response Exercise Planning and Reporting Procedure.	Exercise report verifies that the ERP was tested prior to the survey commencing.
A survey-specific HSE induction for all project personnel will be undertaken prior to the survey commencing.	Induction attendance records verify that all personnel are inducted into project HSE requirements.
All project personnel are kept aware of HSE matters via: • Daily toolbox meetings; • Weekly safety meetings; • Weekly crew department head meetings; and • Pre-job safety meetings.	Meeting notes verify that all project personnel are briefed on HSE matters.

Performance standard	Measurement criteria
Regular training of the survey crew in oil and chemical spill procedures will take place.	Dated training matrix/matrices are available to verify that survey personnel have up to date training.
All reportable and recordable incidents are recorded and reported as per Section 8.6 of the EP.	All incident reports are logged in the enterprise incident management system.
The end-of-survey EP performance report is prepared and submitted to DMIRS within 3 months of survey completion.	Dated correspondence from Lattice to DMIRS accompanying the end-of-survey EP performance reports verifies the report was issued within 3 months of survey completion.
Monitoring is undertaken as outlined in Section 8.7 of the EP.	Environmental monitoring data is available.
Due diligence inspection of the vibroseis buggies and mulchers is undertaken prior to the survey commencing.	Inspection report is available.
Continuous inspection of the survey activities is undertaken against the EPS.	Completed environmental checklists are available.
Non-compliances with the EPS are investigated, closed-out and reported internally and externally.	The enterprise incident management system records are available.
A project-specific ERP will be prepared and tested prior to the survey commencing.	The ERP is available.
	An ERP exercise report verifies that the exercise was undertaken prior to the survey commencing.
The ERP is implemented in the event of an emergency.	The enterprise incident management system records verify that the ERP was implemented.
The OSCP is tested prior to the survey commencing.	Exercise report verifies that the OSCP was tested prior to the survey commencing.
All records pertaining to the survey are stored on Lattice's computer server.	Survey records are logically stored and easily retrieved on the computer server.