Appendix A

Environmental Management Plans

A1 Flora and Fauna Management

A2 Weed and *Phytophthora cinnamomi* Management

A3 Wetland Management

A4 Pollution Prevention Management

A5 Social and Cultural Management

A6 Rehabilitation Management

A7 Summary of Environmental Objectives, Standards and Performance Criteria.

Contents

Figures

Tables

Boxes

A1 Flora and Fauna Management

A1.1 Environmental Objectives & Standards

A1.1.1 Environmental Objectives

The objectives for flora and fauna management of the Mullering 3D Onshore Seismic Survey are:

- Protect flora and fauna species of conservation significance.
- Minimize disturbance to all native flora across the proposed seismic survey area.
- Minimize disturbance to all native fauna across the proposed seismic survey area.

A1.2 Existing Environment

The vegetation communities within the Mullering 3D Onshore Seismic Survey can be broadly described as woodlands, heaths, forests, scrub, thickets, sedgelands, disturbed areas and mosaics. Woodland communities are the most common and widespread communities in the Mullering 3D Onshore Seismic Survey project area. In particular the W3 community is very widespread. These communities occur throughout most of the project area and are generally in excellent condition with little disturbance and few weeds. Heath communities are the second most common vegetation community in the Mullering 3D Onshore Seismic Survey project area. The H1 heath community is the most widespread and is associated with the drainage lines occurring across the project area. Scrub communities occur along the western edge of the project area with the S1 community in the southwest section on Guilderton soils and the S2 community on private property in the northwest of the project area. Both communities are in excellent condition with few weeds. There are three thicket communities in the project area associated with wet areas, such as drainage lines and swamps, or limestone outcropping. The T1 community often forms narrow belts in wet depressions and along the edge of wetlands and often has features of the surrounding communities present within it. A single sedge community, dominated by *Gahnia trifida*, is confined to swampy areas in the northwestern section of the project area. Despite its proximity to cleared areas, this vegetation community was in excellent condition with few weeds.

The faunal assemblage in the vicinity of the proposed Mullering 3D Onshore Seismic Survey is likely to be typical of the northern Swan Coastal Plain but with the distinct influence of wetlands and the close proximity of the project's western boundary to the coast (Bancroft and Bamford 2006). Literature review has identified 242 species of vertebrates that could potentially occur in the project area including four species of fish, 11 species of frogs, 54 reptile species, 147 bird species and 26 mammal species.

More detailed description of the current environment for flora and fauna of the project area are available in the Assessment on Referral Information document (Section 5.3).

A1.3 Key Risks and Potential Impacts

While it is acknowledged that some flora will be disturbed as a result of the Mullering 3D Onshore Seismic Survey, Empire Oil is committed to minimising this disturbance as much as possible and preventing any unplanned and unnecessary disturbance. The key risks for unplanned disturbance of native vegetation are a lack of planning to ensure that daily operations minimise vegetation disturbance and a lack of communication to indicate which areas should and should not be disturbed. The key risks for unnecessary disturbance to native fauna are the passage of personnel or vehicles outside of designated areas and excessive vehicle speeds.

In the short-term, unnecessary disturbance to flora increases the risk of soil erosion and temporary loss of habitat for native fauna. Short-term disturbance to fauna may restrict fauna movement and result in a temporary loss of habitat. If not properly managed, increased human activity may provide an alternative food source, often favouring feral animals, and encourage scavenging behaviour.

All short term impacts will cease with the completion of the seismic survey and rehabilitation of seismic lines. The long-term potential impact of unplanned and unnecessary disturbance to native flora is the increased time required for rehabilitation of the project area. Seismic lines may also provide preferred pathways for all fauna, including introduced and feral species.

A1.4 Management Actions

A1.4.1 Inductions and Training

All personnel working on the Mullering 3D Onshore Seismic Survey will be inducted on the significance of the flora and fauna of the project area and the management measures put in place to ensure their protection. Seismic line route plans will be discussed before work commences each morning to ensure that all personnel are aware of the planned clearing required each day. Ongoing training will be provided as required through daily tool-box meetings.

A1.4.2 Camp Site

The campsite will located on clear land at the Cataby No. 1 well site. No native vegetation will be cleared for the construction of the campsite and as such the campsite will not have any impact on native vegetation. Vermin-proof bins will be installed at the camp to discourage scavenging behaviour by native and introduced fauna. The camp site will be maintained in a neat and tidy manner with no food scraps accessible to fauna. Personnel will be strongly discouraged from feeding any animals on site.

A1.4.3 Seismic Line Planning

Seismic line planning has been based on the recommendations of Woodman Environmental Consulting (see Table 5, Appendix C). The location of seismic lines and the camp site have been planned to avoid all environmentally sensitive vegetation communities and significant fauna habitats. All known populations of the DRF species *A.*

gracilis and *A. viridis* subsp*. terraspectans* will be avoided with a 'no-clearing' buffer of at least 50 m maintained around these locations, unless a *Permit to Take DRF* has been granted, to ensure that the survey does not inadvertently clear vegetation with the environmentally sensitive area (ESA) associated with these locations (Figure A1.1). Existing roads or tracks that pass within 50 m of a known DRF location will be used by the seismic survey but no vehicles will leave the track.

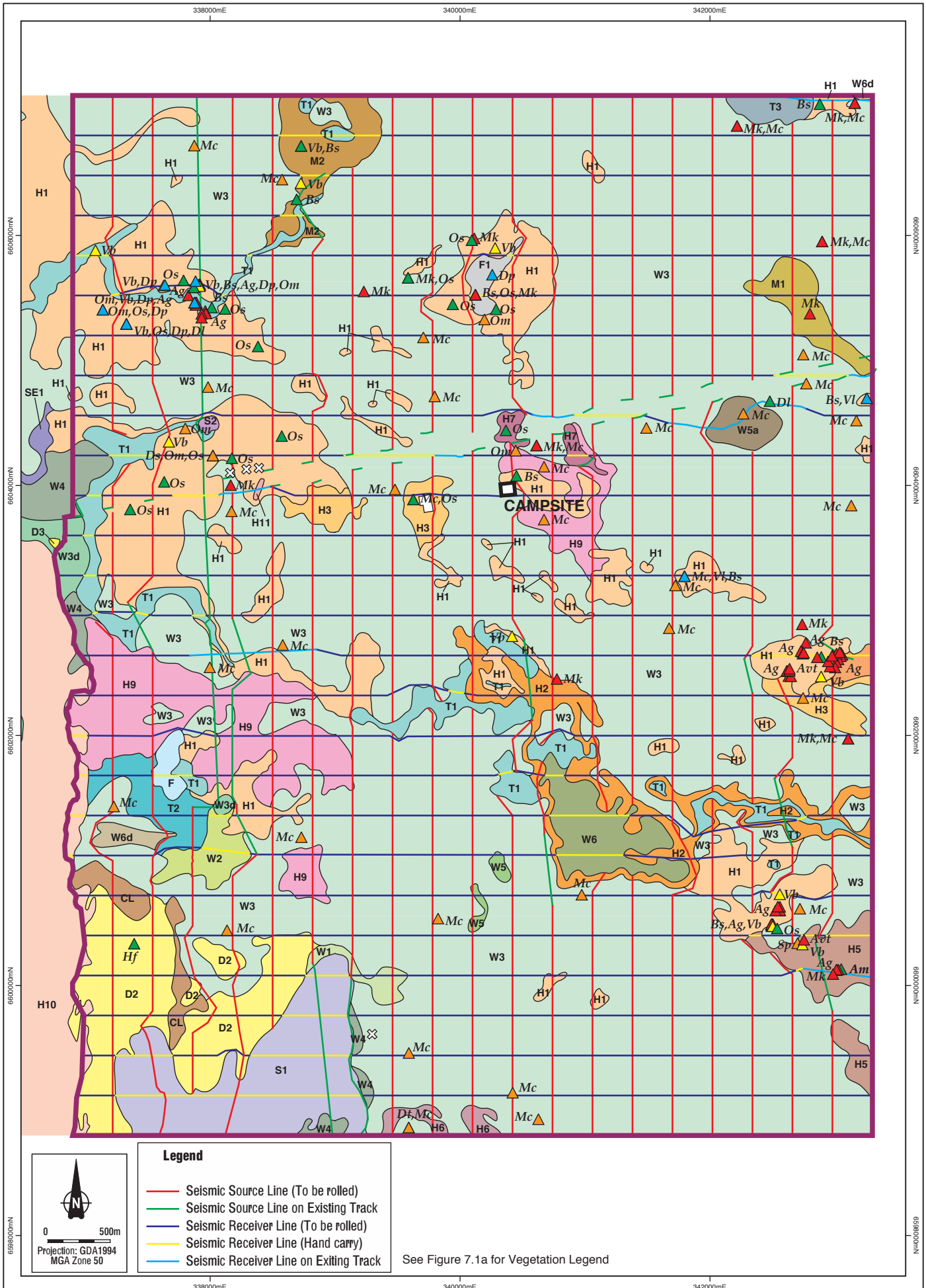
M. keigheryi is locally common and unable to be completely avoided by the survey. Seismic lines have been planned to avoid major populations however it is estimated that approximately 1.8% of the total potential habitat for *M. keigheryi* will be affected by the project. *M. keigheryi* is a small plant, growing to 15 cm tall. Line rolling with a raised blade is not expected to kill this plant and the number of individuals affected by the project is expected to be less than the estimated 1.8% of the population potentially affected. A 'permit to take' for *M. keigheryi* has been granted by the DEC approving this disturbance.

Many priority species are also locally common and although seismic line planning has aimed to avoid these species as much as possible, some will be disturbed by this seismic survey. No more than 3% of the habitat available for any individual Priority flora species within the project survey area will be disturbed by the Mullering 3D Onshore Seismic Survey. Impacts on these species are expected to be short-lived with a low to negligible long term impact on the populations. Populations of Priority flora within 30 m of seismic activity will be flagged to ensure that accidental disturbance is avoided.

In addition, DEC has a number of long term monitoring plots in the area (see Figure A1.1). These will be avoided by the seismic survey by a buffer of at least 10 m.

The Empire Oil Project Director will provide detailed swath maps to the Empire Oil Project Supervisor and Seismic Crew Manager prior to mobilisation and commencement of the Mullering 3D Onshore Seismic Survey. These maps will be made available to all survey, line preparation, seismic acquisition and up-hole drilling crews prior to the commencement of their activities. The swath maps will include:

- Clearly designated areas of high environmentally sensitivity to be avoided.
- The location of planned seismic line alignments.
- Line preparation methods for each section of seismic line (e.g., areas to be rolled, hand prepared or avoided altogether).
- The location of designated weed and hygiene control points.



See Figure 7.1a for Vegetation Legend

enesar people and place	Job No: we0816	Empire Oil Company (WA) Ltd	Figure No: A1.1
	File No: g1186_ef06.dgn	Mullering 3D Onshore Seismic Project	Seismic Line Route Plan

Vegetation Map Legend

Forests

F1 Low Forest dominated by *Banksia attenuata* over mixed herbaceous species dominated by *Anarthia laevis* on brown sand

Woodlands

W1 Woodland dominated by *Eucalyptus decipiens* subsp. *decipiens* over mixed shrubs and herbs dominated by *Austrostipa compressa* on grey sand

W2 Open Woodland of *Eucalyptus rudis* over mixed shrubs on grey sand

W3 Low Woodland of *Eucalyptus todtiana, Banksia attenuata* and *Banksia menziesii* over mixed shrubs on grey sand

W3d Degraded areas of Type W3

W4 Low Woodland dominated by *Banksia prionotes* over mixed shrubs on brown sand

W5 Open Low Woodland of *Melaleuca preissiana* and *Banksia attenuata* over mixed shrubs on brown sand

W5a Open Woodland of *Melaleuca preissiana* , *Banksia attenuata* and *Melaleuca rhaphiophylla* over mixed shrubs on brown loamy sand on the crest of a low rise

W6 Low Woodland to Low Forest dominated by *Melaleuca rhaphiophylla* on grey sand in a swamp

W6d Degraded areas of Type W6

Scrub

S1 Dwarf Scrub dominated by *Melaleuca systena* and mixed shrubs and herbs on grey sand

S2 Dwarf Scrub dominated by *Halosarcia indica* subsp. *bidens* over mixed herbs and sedges on grey sand in a swamp

Thickets

T1 Thicket of *Melaleuca viminea* subsp. *viminea* over herbs and sedges on grey sand in swamps and creeks

T2 Thicket dominated by *Acacia rostellifera* on grey sand with occasional limestone outcropping

T3 Thicket of *Melaleuca lateritia* and *Melaleuca teretifolia* over herbs and sedges on grey clay in a swamp

Heaths

H1 Dense Heath dominated by *Banksia telmatiaea* with mixed shrubs on grey sand

H2 Dense Heath dominated by *Beaufortia squarrosa* over mixed shrubs and herbs on grey sand

H3 Dense Heath dominated by *Melaleuca seriata* over mixed shrubs on grey sand

H4 Heath dominated by *Dryandra armata* var. *armata* and *Gastrolobium plicatum* and mixed shrubs on brown sand

H5 Heath dominated by *Calothamnus quadrifidus* and *Hakea obliqua* subsp. *parviflora* and mixed shrubs on white sand

H6 Heath of mixed shrubs on yellow sand with limestone outcropping

H7 Heath dominated by *Banksia telmatiaea* and *Beaufortia squarrosa* and mixed shrubs and sedges on brown sand in a swamp

H8 Heath dominated by *Alocasuarina lehmanniana* subsp. *lehmannian* a and mixed shrubs and sedges on grey sandy clay in a swamp.

H9 Dense Low Heath dominated by *Calothamnus quadrifidus* over mixed shrubs and sedges on grey sand

H10 Low Heath dominated by *Melaleuca systena* and on yellow sand and dunes

H11 Low Heath dominated by *Melaleuca brevifolia, Melaleuca seriata* and *Grevillea preissii* subsp. *preissii* over mixed shrubs on grey sand in a drainage basin

Sedges

SE1 Very Open Tall Sedgeland dominated by *Gahnia trifida* on grey sandy clay in swamps.

Disturbed

D1 Disturbed Forest of *Casuarina obsesa* over mixed weeds on brown clay

D2 Disturbed Thicket dominated by *Allocasuarina ?lehmanniana* over mixed shrubs and herbs

D3 Disturbed Woodland of *Eucalyptus ?decipiens* over pasture

Mosaics

Areas mapped as a mosaic contained two different vegetation types that were distinguishable in the field but could not be separated on the aerial photography.

M1 Mosaic of Low Woodland of *Banksia ilicifolia, Banksia menziesii, Banksia attenuata* and *Eucalyptus todtiana* over mixed shrubs on brown sand; and Low Heath dominated by *Acacia pulchella* var. *glaberrima* and *Calothamnus quadrifidus* and mixed shrubs on grey clayey sand

M2 Mosaic of Heath dominated by *Banksia telmatiaea* and mixed shrubs on brown sand; and Low Sedgeland dominated by *Chorizandra enodis* with *Melaleuca lateriflora* subsp. *acutifoli* a on brown clayey sand

Other

CL Cleared land

F Seasonally inundated wetland floor associated with plant community T1

Dist Disturbed Land

Campsite

DEC Monitoring Plot

Rare and Priority Flora

Ab *Acacia benthamii* (P2)

Ag *Andersonia gracilis* (DRF)

Avt *Anigozanthos viridis* ?subsp. *terraspectans* (DRF)

Bs *Baeckea* sp. Perth Region (R.J. Cranfield 444) (P3)

Dl *Dryandra lindleyana* subsp. *pollosta* (P3)

Dp *Dryandra platycarpa* (P4)

Ds *Dryandra stricta* (P3)

Dt *Dryandra tortifolia* (P3)

Hf *Haloragis foliosa* (P3)

Mk *Macarthuria keigheryi* (DRF)

Mc *Melaleuca clavifolia* (P1)

Os *Olax scalariformis* (P3)

Om *Onychosepalum microcarpum* (P1)

Sp *Schoenus pennisetis* (P1)

Vb *Verticordia blepharophylla* (P2)

Vl *Verticordia lindleyi* subsp. *lindleyi* (P4)

enesar people and place	Job No: **we0816** File No: **g1186_ef06a.dgn**	**Empire Oil Company (WA) Ltd** **Mullering 3D Onshore Seismic Project**	**Vegetation, DRF and Priority Species Legend**	Figure No: **A1.1a**

A1.4.4 Seismic Line Preparation

Rolling will be carried out using the methods established during ARC Energy's Denison Seismic survey by ARC Energy and DEC (then CALM). That is, rolling will be done by a bulldozer equipped with a scrub rake or blade attached to the front and set above ground level, to push over larger vegetation. A heavy roller attached to the back of the bulldozer will be used to flatten down the vegetation. All rolled vegetation will be retained on the lines and any vegetation that is pushed to the side due to the passage of seismic vehicles will be returned to the lines on line decommissioning.

All source and receiver lines will be prepared in accordance with recommendations in Woodman 2006 (Table 5, Appendix C). These recommendations have been included in swath maps. In particular, hand carrying of receiver lines will be undertaken in sensitive vegetation types, as per swath maps and Table 5 of Appendix C (Flora, Vegetation and *Phytophthora cinnamomi* Assessment).

Where required, overhanging branches will be trimmed to allow the safe passage of seismic survey vehicles, rather than removing whole trees or shrubs. Trimming will be undertaken using chainsaws or handsaws, not excavators. Large trees (nominally greater than 3 m in height) will not be removed during seismic line preparation and low growing species, including *Macrozamia fraseri* and *Xanthorrhoea* species, will be avoided wherever practicable.

Where a seismic line is close to an existing DEC long-term monitoring location, the location will be flagged in the field and will be avoided by at least 10 m.

Prior to commencing work each day, the Seismic Crew Manager will conduct a toolbox meeting to communicate the work area for the day and the access to the work area to which will maximise the use of existing tracks. The Empire Oil Project Supervisor will highlight key environmental sensitivities within the work area to each work party during this meeting.

The seismic survey will be conducted during daylight hours only to avoid impacts to nocturnal species. Lighting requirements at the campsite will be kept as low as reasonably practicable.

Line Preparation crews will be inducted on the nesting habitat of rainbow bee-eaters and provided with information to help them identify potential nests. Any nest identified will be avoided by the seismic survey.

Fauna injuries or fatalities will be reported through the internal incident reporting system and will be reported to the DEC regional office. Rebecca Carter (Programme Leader Nature Conservation) will be a first point of contact (phone number 9652 1911). All practicable measures to rehabilitate any injured animal found within the operations boundaries will be implemented.

On completion of each line, brush or other suitable material will be placed across the entrance to each line to discourage movement of native or feral animals along the

seismic line. If there is no brush available from seismic line clearing, brush may be obtained from areas off the seismic lines provided flora species from which brush is harvested are abundant in the area. Appendix A6 (Rehabilitation EMP) has further details on line closure requirements.

A1.4.5 Up hole Survey

Drilling for uphole surveys will take place on cleared land or on a previously cleared seismic line. Waste drill cuttings will be replaced in the drill hole. Excess cuttings will be spread over the surrounding topsoil in a thin layer and raked into the soil.

A1.4.6 General

Speed restrictions will be put in place within the project area. Vehicles will not exceed 60 km/h along Woolka Road and will not exceed 40 km/h on seismic lines. Management of noise and dust is discussed in Appendix A4 but noise and dust emissions will be kept as low as reasonably possible.

No pets will be permitted on site and the feed of animals, hunting and firearms will be prohibited.

The seismic survey site will be maintained in a neat and tidy manner and obstructions to the passage of terrestrial fauna (e.g., equipment on the ground) will be minimised.

A1.5 Roles and Responsibilities

A1.5.1 Empire Oil Project Director

The Empire Oil Director in charge of the project will ensure that appropriate resources are provided to implement the actions outlined in this EMP. The Empire Oil Director has overall responsibility to ensure that all land clearing within the Mullering 3D Seismic Survey project area is conducted in accordance with the Assessment on Referral Information document, this EMP and other regulatory requirements.

A1.5.2 Empire Oil Project Supervisor

The Empire Oil Project Supervisor is responsible for ensuring that the management actions contained in this EMP are implemented. The Project Supervisor is also responsible for ensuring that all personnel are provided with the training and awareness required to fulfil their obligations under this management plan, principally via inductions and daily toolbox meetings. The Project Supervisor will also be available to provide advice and assistance to all personnel on matters related to this EMP. The Project Supervisor will also be available to provide advice and assistance to all personnel on matters related to this EMP.

A1.5.3 Environmental Manager

The Environmental Manager is responsible for daily feedback to the Empire Oil Project Supervisor regarding on-ground environmental management and compliance. The

Environmental Manager will work with the Seismic Crew Manager on, and advise the Project Supervisor of, the implementation of the management actions contained in this EMP by the Seismic Crew. The Environmental Manager will conduct audits and monitor progress as outlined in Section A1.6 below.

A1.5.4 Seismic Crew Manager

The Seismic Crew Manager will work with the Environmental Manager to ensure that the management actions contained in this EMP are implemented. The Seismic Crew Manager will provide supervision of all personnel undertaking clearing on behalf of Empire Oil.

The Seismic Crew Manager will provide clear direction regarding the clearing and rehabilitation works required each day, including preferred access routes and turn around points. In addition the Seismic Crew Manager will record all clearing and rehabilitation carried out on a daily basis and report this information to the Environmental Manager.

A1.5.5 All Personnel

All personnel are responsible for following seismic line preparation procedures outlined in this EMP. All personnel will keep to existing tracks or designated seismic lines unless following advice from the Empire Oil Project Supervisor or the Seismic Crew Manager. All personnel will stay off closed seismic lines.

All personnel will provide assistance in implementing this EMP and will report any non-compliance to the Environmental Manager.

A1.6 Monitoring and Auditing

The Environmental Manager will conduct occasional audits of the seismic operations to ensure compliance with this EMP (no less than two audits throughout the duration of the survey).

The Environmental Manager will conduct an audit and inspection at the end of the seismic survey to ensure compliance with this EMP, record the total area cleared, ensure that all lines have been closed appropriately and to determine if any additional rehabilitation work is required.

Annual vegetation monitoring will be conducted for at least three years post survey, or until completion criteria are met, to ensure successful rehabilitation of vegetation. Details of this monitoring program are provided in the Rehabilitation Management Plan (Section A6).

A1.7 Records and Reporting

This EMP forms the primary report for flora and fauna management of the Mullering 3D Onshore Seismic Survey prior to commencement of the survey. Approval of this EMP will

represent compliance with the planning aspects of flora and fauna management, including seismic line route mapping.

During the survey, compliance with the flora and fauna management procedures will be documented via induction records and will include sign-off by inductees to confirm that flora and fauna management has been discussed.

Unauthorised clearing of vegetation and any serious injury or mortality of vertebrate fauna will be reported to the Environmental Manager using the Environmental Incident Report Form. The Environmental Manager will record the area of damage as appropriate and will forward the incident report form to the Empire Oil Project Director, via the Project Supervisor, for submission to the DEC.

The Empire Oil Project Supervisor, with advice from the Environmental Manager, will provide daily reports to Empire Oil to report on the work completed and to verify that seismic lines are prepared and data is acquired according to swath maps.

A short report will be produced annually post-survey, after rehabilitation monitoring, indicating the results of rehabilitation monitoring and the performance against rehabilitation completion criteria (these criteria are provided in the Rehabilitation Management Plan). This report will be produced until rehabilitation criteria have been met. These reports will be made available to DEC and DoIR.

A1.8 Performance Criteria

Performance criteria and targets for flora and fauna management of the Mullering 3D Onshore Seismic Survey are outlined in Table A1.1.

Table A1.1 Performance criteria for flora and fauna management

Performance Criteria	Target
Protect flora and fauna species of conservation significance	
Avoid selected areas of high environmental sensitivity as identified on swath maps (e.g., wetlands).	Swath maps made available.
	No vehicles have entered areas of high environmental sensitivity.
	All personnel remain within marked out seismic lines.
	Populations of Priority flora within 30 m of seismic activity will be flagged to ensure that accidental disturbance is avoided.
Maintain a buffer of at least 50 m around all known sites where DRF occur, except for locations of *Macarthuria keigheryi* for which Empire Oil have been granted a Permit to Take.	No vehicles or personnel have entered areas of high environmental sensitivity, except by foot on designated receiver lines.
No impact to fauna of conservation significance.	Personnel trained to recognise potential Rainbow bee-eater nests. Zero incidences of Rainbow Bee-eater nest destruction.

Table A1.1 Performance criteria for flora and fauna management (cont'd)

Performance Criteria	Target
Minimise the disturbance to all native flora	
Avoid removal of large trees and slow growing plants and restrict branch trimming to the minimum necessary to allow the passage of seismic survey vehicles.	No clearing of large trees (nominally those over 3 m in height). Avoid slow growing species (*Macrozamia fraseri* and Xanthorrhoea species) as much as practicable.
Clearing of wetland areas will be avoided	No clearing of wetland areas
Flora and fauna management communicated to all personnel.	All personnel inducted on flora and fauna management for the project.
	Key environmental sensitivities within each days working area highlighted during toolbox meetings.
Maximise the use of existing tracks.	Access planned daily to maximise vehicle passage along existing tracks.
Ensure that clearing undertaken is the minimum required for safe passage of seismic vehicles.	All seismic lines prepared in accordance with swath maps.
	Source line width is less than 4 m except for turning areas.
Minimise the disturbance to all native fauna	
Report any injury or mortality of vertebrate fauna.	Any injury or mortality to vertebrate fauna reported to the Environmental Manager and to the DEC regional office.
Vehicle speeds within the project area restricted to a maximum of 60 km/h on Woolka Road and 40 km/h on all seismic lines.	Speed restrictions adhered to.
Avoid undertaking seismic activities at night and during dusk and dawn periods.	All seismic activities conducted during daylight hours.

A2 Weed and *Phytophthora cinnamomi* Hygiene Management

A2.1 Environmental Objectives

The objective of weed and *Phytophthora cinnamomi* Management of the Mullering 3D Onshore Seismic Survey is to:

- Prevent the human-vectored introduction or spread of dieback (*P. cinnamomi)*.
- Prevent the human-vectored introduction of weeds not previously recorded in the project area and to prevent the human-vectored spread of weeds within the project area.

A2.2 Existing Environment

There are currently no areas in the project area identified as displaying symptoms of *P. cinnamomi* infestation and none of the soil samples collected recorded the presence of *P. cinnamomi*. The project area was interpreted for dieback by Mr Evan Brown of Glevan Consulting in October and November 2005. Mr Brown is experience in the detection and mapping of *P. cinnamomi* and is accredited by DEC (Parks and Conservation) to conduct dieback interpretation.

Generally the project area is relatively weed free. Thirty-two introduced (weed) flora species were recorded in the project area during flora surveys with weed densities representing less than 1% of the total foliage cover in most instances. The W6, W6d, T1, and W3d vegetation communities had the highest weed densities while the D2 community had a very high diversity of introduced flora. Only the D2 vegetation community has been identified as requiring specific management to avoid spreading weeds from this vegetation community into the rest of the project area. The W6, W6d, T1, and W3d vegetation communities are much smaller and are avoided by the survey.

Only one weed species, *Moraea flaccida* or Cape Tulip, is listed as a Declared Plant (P1) by the Department of Agriculture and Food. The movement of this plant, or its seeds, within the state is prohibited, including the movement of contaminated vehicles or machinery. Information on the identification and management of *Moraea flaccida* is provided in Box A2.1. Any sightings of this weed will be reported to the Empire Oil Environmental Manager who will notify the Department of Agriculture and Food and the owner of the land on which it is found.

More detailed description of the current environment for dieback and weeds within the project area is available in the Assessment on Referral Information document (Section 5.3).

Box A2.1 Identification and Reporting of *Moraea flaccida* (Cape Tulip)

One-Leaf Cape Tulip is a serious pasture weed in WA, SA and Vic. It has been listed as a declared plant (P1) by the Department of Agriculture and Food. Under the *Agriculture and Related Resources Act 1976* the introduction of the Cape Tulip into, or its movement within, the state of WA is prohibited.

Moraea flaccida (Cape Tulip) in flower

The one leaf Cape Tulip (*Moraea flaccida*, syn. *Homeria flaccida*) is a native of South Africa and was originally introduced to Australia as a garden plant in the 19th century. It is a perennial herb, growing to 70 cm high. Cape Tulip flowers in spring when 2 or 3 years old. The one leaf Cape Tulip is distinguished by:

- Fibrous-sheathed corm[1] at the base of the plant.
- Orange to salmon pink flowers that are yellow in the centre on branched stems.
- Single folded, ribbed leaves to 1 m long, extended and drooping above the flowers.
- The presence angular red brown seeds, about 2 mm long, in narrow-cylindrical capsules 2.5 cm to 5 cm long.
- Corms 1 cm to 4 cm wide, developing new corms each year.

Cape Tulip is spread by the movement of seeds and corms. Seeds germinate in autumn and plants regrow from corms at the same time. Cape Tulips are poisonous to stock but generally avoided by them. Young stock may be affected if there is no alternative grazing available.

Cape Tulip has been recorded within the project area in T1, W4 and D1 vegetation communities in the western portion of the project area on private property. Any sighting of Cape Tulip must be reported to the Environmental Manager. The Environmental Manager will confirm and record the location of this weed on swath maps. Any significant infestations of Cape Tulip will be reported to the Department of Agriculture and Food. If the Department of Agriculture and Food require Empire Oil to eradicate or otherwise manage any infestations of Cape Tulip, management measures will be developed in consultation with DEC and the Department of Agriculture and Food.

[1]A corm is an underground swollen stem base on some plants, sometimes bearing papery scale leaves.

Source: Department of Agriculture and Food, 2007 (www.agric.wa.gov.au).

A2.3 Key Risks and Potential Impacts

The key risk factors for the introduction and spread of both *P. cinnamomi* and weeds is the transport of soil and plant material, either knowingly or unknowingly, from infected to uninfected areas. The key risk for *P. cinnamomi* and weed introduction to the Mullering 3D Onshore Seismic Survey project area is the incidental transport of soil and vegetation into the project area on vehicles and other equipment. The key risk for spreading weeds within the project area is the incidental movement of soil and vegetation from weed infested to weed free areas. There is little to no risk of spreading *P. cinnamomi* within the project area as the whole project area has been interpreted as dieback free.

The potential impact of introducing *P. cinnamomi* into the project area is the onset of dieback in many highly vulnerable flora species that are present in a number of vegetation communities. In the worst cases, dieback can cause the death of many flora species which are either rare and protected in their own right or play a key habitat role in the ecology of that vegetation community.

The potential impacts of spreading or introducing weeds into the project area include the displacement of many native species which can lead to a reduction of biodiversity, lowered erosion resistance and reduced habitat and food resources for fauna. Weeds can also reduce the amenity and aesthetic value of the area.

A2.4 Management Actions

A2.4.1 Awareness and Training

Weed and *P. cinnamomi* hygiene management will be detailed to all employees prior to commencing work on the seismic survey, as part of the environmental induction program, and training will be provided in the correct use of hygiene stations. These processes will be reiterated during daily toolbox meetings and a copy of the weed and *P. cinnamomi* hygiene station procedures will be provided to each field vehicle.

A2.4.2 Hygiene Boundary Confirmation

As the Weed and *P. cinnamomi* hygiene plan for the project is over one year old, weed and *P. cinnamomi* infestation boundaries will be confirmed prior to the start of the seismic survey and hygiene stations revised if necessary.

A2.4.3 Access and Mobilising Vehicles and Equipment

The Mullering 3D Seismic Survey will be carried out in dry conditions to minimise the risk of weed and *P. cinnamomi* movement via wet soil carried on vehicles.

All vehicles and equipment must be clean, prior to entering the project area, on commencement of works. The Empire Oil Environmental Manager, or their delegate, will inspect all vehicles and equipment prior to the commencement of the project.

Access to the project area will be restricted to Woolka Road. All vehicles must pass through a Clean on Entry hygiene station (marked as CoE A on Figure A2.1) prior to leaving Woolka Road, including all vehicles headed for the campsite.

The seismic survey will be conducted from east to west, minimising the movement required from weed infested areas into non weed infested areas. Daily movements of vehicles and line rolling equipment will be planned to minimise transit between weed prone and weed free areas.

All equipment and vehicles used for the uphole survey must be 'clean on departure' when each uphole is completed to avoid spreading soil and vegetative material from one uphole to the next.

A2.4.4 Hygiene Stations

Movement of vegetative material and soil be will prevented by the use of hygiene stations at strategic locations on Woolka Road, before vehicles can enter the firebreak, seismic lines or campsite, and on the boundary of areas of weed infestation as per Figure A2.1. Weed and *P. cinnamomi* hygiene stations along Woolka Road (COE A, Figure A2.1) are designed to prevent the introduction of both weeds and *P. cinnamomi* to the project area while weed hygiene stations on the boundary of the D2 community and other weed infested areas (COE Vehicle and COE Hand carry, Figure A2.1) are designed to prevent the spread of weeds within the project area by vehicle movement and personnel movement respectively. At all hygiene stations, all personnel must inspect and clean their own shoes and clothing, in addition to vehicle and equipment inspection and cleaning.

Weed and P. cinnamomi Hygiene Station (COE A)

Each vehicle will be required to follow weed and *P. cinnamomi* hygiene procedures (Box A2.2) at hygiene stations including brushing down vehicles, machinery, hand tools, personnel's boots, clothing and any item that is used in contact with soils or organic matter. Inspections will include tyres/wheels, undercarriage, belly plates, buckets and tracks of all vehicles and equipment.

Inspection and clean down activities will be recorded at each hygiene station in a hygiene logbook that is kept with each vehicle. All personnel are responsible for correct use of the hygiene stations and maintenance of hygiene logbooks. The Seismic Contractor will ensure that all hygiene stations are supplied with the appropriate equipment at all times. Should an environmental inspection or audit during operations identify that a logbook has not been maintained correctly or that the correct equipment is not available, a non-compliance will be issued against the seismic contractor and an environmental incident and investigation process initialised.

338000mE 340000mE 342000mE

6606000mN 6604000mN 6602000mN 6600000mN 6598000mN

0 500m

Projection: GDA 1994
(MGA Zone 50)

COE A

COE A

COE A

COE A

COE A

COE A

Legend

- Seismic Source Line
- Seismic Source Line on Existing Track
- Seismic Receiver Line (To be rolled)
- Seismic Receiver Line (Hand carry)
- Seismic Receiver Line on Exiting Track
- Clean on Entry Point (Weed only) - Vehicle
- Clean on Entry Point (Weed only) - Hand Carry
- COE A — Clean on Entry Point Indicates to Access Project Area
- Weed Infestation Requiring Hygiene
- Roads/Tracks
- Project Area
- Direction of Hygiene
- DEC Monitoring Plot

Uninfested (Protectable)
Determined by a qualified Interpreter to be free of plant disease symptoms which indicates the presence of *P. cinnamomi*

Uninfested (Unprotectable)
Determined by a qualified Interpreter to be free of plant disease symptoms which indicates the presence of *P. cinnamomi*

BOUNDARIES CAPTURED USING GPS.
BOUNDARIES POSITIONED RELATIVE TO MAP FEATURES

AGE LIMITS FOR THIS MAP

Map Boundaries should be checked before operations proceed if this map is older than 1 year (Nov 2006).
This map should not be used if it is older than 3 years (Nov 2008).
Areas that have had operation in them become unreliable and should be checked prior to Further/New activities

INTERPRETATION

Field Interpretation of *P. Cinnamomi* conducted by Glevan Consulting
Field Interpretation of Weed conducted by WEC
Interpretation conducted during Nov 2005

HYGIENE PLANNING

Phytophthora cinnamomi Hygiene Management Map and Management Plan prepared by Greg Woodman
(Woodman Environmental Consulting Pty Ltd)

338000mE 340000mE 342000mE

Drawn: CAD Resources

enesar people and place

Job No: we0816
File No: g1186_ef08

Empire Oil Company (WA) Ltd

Mullering 3D Onshore Seismic Project

Weed & *Phytophthora cinnamomi* Hygiene Plan

Figure No: **A2.1**

Box A2.2 Weed and *P. cinnamomi* hygiene station (COE A) procedures

1. All vehicles and equipment will stop on the inspection pad at each Clean on Entry point prior to travelling from Woolka Road into the project area. This includes any vehicles or equipment travelling directly to the campsite and any vehicles or equipment crossing Woolka Road from the north section of the project area to the south or vice versa.

2. Inspect vehicles and equipment for soil, mud or plant material. Inspections include the following as a minimum:
   – Tyres/wheels.
   – Undercarriage.
   – Belly plates.
   – Tracks.
   – Buckets.

3. Should any soil, mud or plant material be present, the vehicle or equipment must be cleaned and the material removed. Dry conditions require a brushdown to remove dirt clods or vegetation. Dust does not have to be cleaned from the vehicle. Wet conditions, with mud present, require a wash down with high pressure water.

4. Prior to exiting the Clean on Entry point, the inspection pad must be cleaned of soil, mud or vegetation. This material should be deposited in the sump adjacent to the inspection pad.

Each weed and *P. cinnamomi* hygiene station (COE A) will consist of:

- A pad to allow inspection and cleaning of vehicles and equipment without contamination of the surrounding soil.
- A bin for the disposal of contaminated soil and vegetation material.
- High pressure water pump and hose with a water supply that contains at least 7 ppm sodium hypochlorite.
- Tools such as brushes and pliers to aid in clean down.
- A copy of the hygiene station procedures.

Pads will be lined with either limestone (to a minimum depth of 20 cm) or heavy-duty rubber matting (e.g., conveyor material) so that vehicles and equipment to be cleaned are not resting in potentially contaminated soil. The pad will be sloped towards the existing road drain and any potential run off will be directed into a shallow, lined earthen sump. Sumps will be monitored regularly and if there is any potential that the sump will overflow (including due to forecast heavy rain) then they will be dosed with sodium hypochlorite to a concentration in excess of 7 ppm and pumped into the road drain. Contaminated soil and vegetation will be removed from site with general project waste and disposed of in landfill.

Weed Hygiene Stations (COE Vehicle)

Each weed hygiene station on the boundary of the D2 vegetation community will be clearly marked with a designated pull over area for vehicles. These will be ‘one-way’

hygiene stations with personnel required to inspect and clean vehicles, equipment, shoes and clothing when going from the D2 vegetation community back into the rest of the project area. Brushing down will occur within the D2 community and will be recorded on the hygiene record located within each vehicle. Tools required for inspecting and cleaning vehicles, equipment and boots will be supplied at each weed hygiene station or will be carried in each vehicle.

Weed and P. cinnamomi Hygiene Station (COE Hand carry)

Where receiver lines are hand carried (as designated on swath maps), personnel will inspect and clean boots and clothing to ensure that they are free of soil, seeds and vegetation prior to leaving designated hand carry areas. Modified hygiene stations will be established at the exit point of weed-infested areas where hand carrying of equipment is stipulated. This will consist of a brush and tray as a minimum. Soil, mud or plant material will be removed from the soles of shoes and clothing and contained within the tray for appropriate disposal.

A2.4.5 Decommissioning

During post-survey decommissioning, all hygiene stations will be removed and the land rehabilitated as required.

A2.4.6 Weed Eradication Contingency Measures

If post-survey rehabilitation monitoring indicates that weeds have been introduced or spread as a result of the Mullering 3D Onshore Seismic Survey Empire Oil will undertake an active weed eradication program, in consultation with DEC and the Department of Agriculture and Food, including spraying with herbicide where appropriate. This program will be continued until completion criteria for weeds can be met and sustained.

A2.5 Roles and Responsibilities

A2.5.1 Empire Oil Project Director

The Empire Oil Project Director will ensure that appropriate resources are provided to implement the actions outlined in this EMP. The Empire Oil Director has overall responsibility to ensure that all activities associated with the Mullering 3D Seismic Survey project area are conducted in a way that reduces the risk of introducing or spreading weeds or *P. cinnamomi* in the project area in accordance with the Assessment on Referral Information document, this EMP and other regulatory requirements.

A2.5.2 Empire Oil Project Supervisor

The Empire Oil Project Supervisor is responsible for ensuring that the management actions contained in this EMP are implemented. The Project Supervisor is also responsible for ensuring that all personnel are provided with the training and awareness required to fulfil their obligations under this management plan, principally via inductions and daily toolbox meetings.

The Project Supervisor will also be available to provide advice and assistance to all personnel on matters related to this EMP.

A2.5.3 Environmental Manager

The Environmental Manager is responsible for daily feedback to the Empire Oil Project Supervisor regarding on-ground environmental management and compliance. The Environmental Manager will work with the Seismic Crew Manager on, and advise the Project Supervisor of, the implementation of the management actions contained in this EMP by the Seismic Crew. The Environmental Manager will conduct audits and monitor progress as outlined in Section A2.6 below.

The Environmental Manager will inspect all vehicles and equipment arriving on site for cleanliness at the commencement of the Mullering 3D Onshore Seismic Survey. The Environmental Manager will also maintain weed and *P. cinnamomi* hygiene stations, including appropriate disposal of potentially contaminated soil.

A2.5.4 Seismic Crew Manager

The Seismic Crew Manager will work with the Empire Oil Environmental Manager to ensure that the management actions contained in this EMP are implemented. The Seismic Crew Manager will ensure that all equipment and consumables required for the proper operation of hygiene stations are available at all times.

A2.5.5 All Personnel

All personnel are responsible for following weed and *P. cinnamomi* hygiene procedures outlined in this EMP. All personnel will keep to existing tracks or designated seismic lines unless following advice from the Environmental Manager or the Seismic Crew Manager. All personnel will cause the vehicle they are driving and any equipment carried to be inspected and cleaned down at each hygiene station when travelling in the direction indicated in Figure A2.1.

All personnel will provide assistance in implementing this EMP and will report any non-compliance to the Empire Oil Project Supervisor.

A2.6 Monitoring and Auditing

The Environmental Manager will conduct occasional audits of the seismic operations to ensure compliance with this EMP (no less than two audits throughout the duration of the survey).

The Environmental Manager will conduct an audit and inspection at the end of the seismic survey to ensure compliance with this EMP. Annual vegetation monitoring will be conducted for at least three years post survey, or until completion criteria are met, to ensure successful rehabilitation of vegetation and to identify any potential spread or introduction of weeds or *P. cinnamomi*. Details of this monitoring program are provided in the Rehabilitation Management Plan (Section A6).

A2.7 Records and Reporting

The environmental component of the pre-survey induction will educate the workforce on weed and *P. cinnamomi* hygiene issues. Induction records will include sign-off by inductees to indicate that weed and *P. cinnamomi* hygiene management has been discussed.

Hygiene station registers will be filled in and completed by all personnel. Any breach to these procedures reported to the Environment Manager and an incident report completed.

Post survey rehabilitation monitoring reports will record any instance of weed or pathogen spread or invasion.

A2.8 Performance Criteria

The weed and *P. cinnamomi* performance criteria for the Mullering 3D Onshore Seismic Survey are outlined in Table A2.1.

Table A2.1 Performance criteria for weed and *P. cinnamomi* management

Performance Criteria	Target
P. cinnamomi has not been introduced to the project area by the Mullering 3D Onshore Seismic Survey.	Rehabilitation monitoring does not record any instance of *P. cinnamomi* infestation or dieback.
No weeds have been introduced to the project area attributable to the seismic survey.	Rehabilitation monitoring does not record any weed species not previously identified during flora surveys.
No weeds have been spread within the project area due to the Mullering 3D Onshore Seismic Survey.	Percentage cover and distribution of weeds on rehabilitated seismic lines are similar to that of surrounding undisturbed areas.
Personnel have correctly used hygiene stations and points, including inspection of equipment and vehicles, cleaning if required, adhering to authorised access routes and filling out of register.	All hygiene registers correctly filled out. Zero incidents relating to incorrect use of hygiene stations.

A3 Wetland Management

A3.1 Environmental Objectives

The objective of wetland management for the Mullering 3D Onshore Seismic Survey is to prevent any impact of survey activities on sensitive wetlands and riparian zones in the survey area.

A3.2 Existing Environment

The wetlands in the project area are largely ephemeral and form part of the Mullering Wetlands chain, which collects water from the Minyulo and Mullering brooks. Mullering Brook enters the project area from the northeast while a series of small swamps associated with Minyulo Brook entering the project area from the southeast. Both of these water courses culminate in Cooljarloo and Coomado Swamps in the northwest corner of the proposed project area. The area of land inundated is seasonally dependant and can range from dry to saturated to inundated depending on the recent rainfall and runoff. Water in the Minyulo Suite can range from fresh to hypersaline with permanent pools maintained through ponding and groundwater rise.

The wetlands are an area of diverse habitat providing critical habitat functions for many flora and fauna species. The wetland chains also provide a pathway for sediment transport and for the movement of flora and fauna.

Wetlands in the project area can generally be defined as coinciding with the T1 and W6 vegetation communities described in Section 5.3.1 of the Assessment on Referral Information document.

A3.3 Key Risks and Potential Impacts

The key risks to wetlands in the project area due to the Mullering 3D Onshore Seismic Survey are associated with unplanned and unauthorised disturbance of wetlands and riparian zones by vehicles or personnel. Risks associated with potential hydrocarbon or other pollutant contamination are described below in Section A4.3.

Potential impacts to wetlands and creeks include damage to sensitive riparian zones leading to possible sediment loading of water bodies and disruption of a key habitat for many fauna species.

A3.4 Management Actions

Impacts on wetlands will be minimised by ensuring that all source lines avoid wetlands and riparian zones. Source lines have been deviated to avoid all wetlands in the proposed seismic survey area or stopped outside riparian zones, recommencing on the other side of the riparian zones, so that the wetland can be ‘undershot’.

Wetlands that experience significant periods of inundation will not be traversed by vehicles, in order to protect the surface from compaction and to ensure that surface drainage patterns are not compromised.

Receiver lines have been deviated to avoid the wetlands if practicable, or will be prepared and laid by hand where deviation is not possible.

Access across creeks and wetlands will be via existing tracks only and the Mullering 3D Onshore Seismic Survey requires no new river or wetland crossings.

No re-fuelling will take place within 50 m of a wetland or water course. Non return valves will be used for refuelling and no chemical additives will be used in drilling fluid to ensure that there is minimal risk of spillage of these materials.

During the uphole survey, if any drill hole intersects an aquifer, the uphole will be backfilled and cement sealed to ensure that potential impacts to groundwater are avoided.

All personnel working on the Mullering 3D Onshore Seismic Survey will be inducted on the significance of wetlands in the project area and the management measures put in place to ensure their protection. Ongoing training will be provided as required through daily tool-box meetings.

A3.5 Roles and Responsibilities

A3.5.1 Empire Oil Project Director

The Empire Oil Director in charge of the project will ensure that appropriate resources are provided to implement the actions outlined in this EMP. The Empire Oil Director has overall responsibility to ensure that all seismic line preparation is carried out in accordance with the Assessment on Referral Information document, this EMP and other regulatory requirements.

A3.5.2 Empire Oil Project Supervisor

The Empire Oil Project Supervisor is responsible for ensuring that the management actions contained in this EMP are implemented. The Project Supervisor is also responsible for ensuring that all personnel are provided with the training and awareness required to fulfil their obligations under this management plan, principally via inductions and daily toolbox meetings. The Project Supervisor will also be available to provide advice and assistance to all personnel on matters related to this EMP.

A3.5.3 Environmental Manager

The Environmental Manager is responsible for daily feedback to the Empire Oil Project Supervisor regarding on-ground environmental management and compliance. The Environmental Manager will work with the Seismic Crew Manager on, and advise the Project Supervisor of, the implementation of the management actions contained in this

EMP by the Seismic Crew. The Environmental Manager will conduct audits and monitor progress as outlined in Section A3.6 below.

A3.5.4 Seismic Crew Manager

The Seismic Crew Manager will work with the Environmental Manager to ensure that the management actions contained in this EMP are implemented and will provide supervision of all personnel working in (e.g., hand carrying receiver lines) or near wetlands on behalf of Empire Oil.

A3.5.5 All Personnel

All personnel are responsible for following seismic line preparation procedures outlined in this EMP. All personnel will keep to existing tracks or designated seismic lines unless following advice from the Environmental Manager or the Seismic Crew Manager. All personnel will provide assistance in implementing this EMP and will report any non-compliance to the Environmental Manager.

A3.6 Monitoring and Auditing

The Environmental Manager will conduct occasional audits of the seismic operations to ensure compliance with this EMP (no less than two audits throughout the duration of the survey).

The Environmental Manager will conduct an audit and inspection at the end of the seismic survey to ensure that there has been no significant impacts on the wetlands and water courses in the project area. Any impacts identified will be rectified in consultation with DEC and included in the annual rehabilitation monitoring program to ensure that rehabilitation has been successful.

A3.7 Records and Reporting

Approval of this EMP will represent compliance with the planning aspects of wetland management, including seismic line route mapping.

The environmental component of the pre-survey induction will educate the workforce on wetland management issues. Induction records will include sign-off by inductees confirm that wetland management has been discussed.

Post-survey inspection and rehabilitation monitoring will identify if any impacts to wetlands within the project area have occurred as a result of the seismic survey.

A3.8 Performance Criteria

Performance criteria for wetland management for the Mullering 3D Onshore Seismic Survey are outlined in Table A3.1

Table A3.1 Performance criteria for wetland management

Performance Criteria	Target
Seismic survey planned to avoid impacts to wetlands.	All source lines planned to avoid wetlands, unless utilising an existing track.
	Receiver lines planned to avoid wetlands wherever possible.
Seismic survey carried out to avoid impacts to wetlands and rivers.	All receiver line preparation and closure in wetlands is carried out by hand.
	No vehicles enter wetlands unless on existing tracks.
No on-going impacts to wetlands and rivers due to the seismic survey.	Post-survey inspection finds no impacts to wetlands attributable to the survey.

A4 Pollution Prevention Management

A4.1 Environmental Objectives and Standards

The objectives of pollution prevention for the Mullering 3D Onshore Seismic Survey are to maintain the integrity, ecological functions and environmental values of the survey area by ensuring that hazardous material storage, waste handling and disposal practices meet statutory requirements and acceptable standards and do not adversely affect the environmental values or health, welfare and amenity of people and land uses.

A4.2 Existing Environment

The Mullering Onshore 3D Seismic Survey project area is located in a relatively pristine environment with very low levels of pollutants including hydrocarbons and dust. The air quality of the local area is excellent given the remote location, sparse population and subsequent low level of air pollutant emissions. Regional sources of air emissions are primarily from near by mineral sand mining operations and vehicle use. Existing sources of noise in the local region are dominated by natural noise such as wind and fauna (i.e., birds, insects and livestock). Vehicle noise from local roads is also a primary source of noise.

A4.3 Key Risks and Potential Impacts

The key risks from the project are the incorrect handling, storage and disposal of general waste, hydrocarbons and other potential pollutants and failure to remove all project waste and equipment from site on closure.

The potential impacts include reduction in the visual amenity of the site due to litter and abandoned equipment and materials. Another potential impact is the degradation of soil, surface and groundwater quality due to contamination by hydrocarbons or other pollutants. This may affect aquatic and terrestrial flora and fauna and may have an impact outside of the project area if pollutants are carried downstream.

A4.4 Management Actions

A4.4.1 General Waste

All general and domestic wastes produced by the survey activities will be disposed of in accordance with relevant regulations as outlined below.

- Domestic wastes (food scraps, light paper, cardboard, putrescible and plastic waste), including rubbish produced by the workforce operating in the field, will be collected according to contractor management procedures and treatment systems and disposed in line with local Shire requirements.

- Domestic sewage (black and grey water), will be temporary stored in a buried septic tank system installed at the camp and operated as per the Contractor management procedures and treatment systems. The tank will be pumped out as required and the waste transported to an appropriate waste management facility for disposal.

A4.4.2 Industrial and Hazardous Wastes

All industrial and hazardous wastes produced by the survey activities will be disposed of in accordance with relevant regulations as outlined below.

- Drill wastes, consisting of broken rock and soil matter, will be temporarily stored on the drilling rigs in transportable containers and returned to the up-hole once drilling and testing is complete. Excess cuttings will be spread over topsoil in a thin layer and raked in.

- Industrial wastes (i.e., wood, scrap steel and other metals, scrap tyres, rubber and synthetic materials and other inert, mixed industrial wastes) will be collected according to Contractor management procedures and treatment systems and disposed in line with local Shire requirements.

- Non return valves will be used for refuelling and no re-fuelling will take place within 50 m of a wetland or water course.

- No chemical additives will be used in drilling fluid.

- Equipment will be maintained in good working order to ensure that the risk of hydrocarbon spills or leaks is minimised.

- Spill clean up equipment will be available where refuelling takes place and where significant amounts of hydrocarbons (e.g., oils, lubricant etc) are stored.

- Hazardous materials will be clearly labelled (including an MSDS that conforms with the WorkSafe Australia Code of Practice), stored and bunded as per the requirements of Australian Standard AS 1940 – 1993 and disposed of in line with local Shire requirements. Handling of hazardous material will be done in accordance with Contractor dangerous goods procedures which address the requirements of the Explosives & Dangerous Goods Legislation, OH&S Legislation, Codes of Practice and Australian Standards as referred to under the Legislation. Spill kits, bio-remedial products, drip trays and shovels will be provided in the case of a spill of hazardous materials or wastes and workers required to access dangerous goods will be trained in the use of this equipment. Hazardous materials will include:

  – Hydraulic Fluids, oils, greases, batteries and acids for equipment servicing.
  – Diesel for vehicle refuelling.
  – Drilling mud for up-hole drilling.
  – Gas for domestic use.

A4.4.3 Noise and Dust

The noise generated during the seismic survey will be primarily associated with vehicle movement and running diesel engines, and will be similar to that from running

agricultural machinery. Vehicle speeds will be restricted to 60 km/h along Woolka Road and 40 km/h on seismic lines to minimise noise disturbance to fauna. Speed restrictions will also minimise potential dust generation and associated impacts on flora and fauna.

To ensure minimal disturbance to lease holders in the area, operations will be carried out during daylight hours and local lease holders will be kept informed of progress and areas of operations throughout the survey.

A4.5 Roles and Responsibilities

A4.5.1 Empire Oil Project Director

The Empire Oil Director in charge of the project will ensure that appropriate resources are provided to implement the actions outlined in this EMP. The Empire Oil Director has overall responsibility to ensure that all seismic line preparation is carried out in accordance with the Assessment on Referral Information document, this EMP and other regulatory requirements.

A4.5.2 Empire Oil Project Supervisor

The Empire Oil Project Supervisor is responsible for ensuring that the management actions contained in this EMP are implemented. The Project Supervisor is also responsible for ensuring that all personnel are provided with the training and awareness required to fulfil their obligations under this management plan, principally via inductions and daily toolbox meetings. The Project Supervisor will also be available to provide advice and assistance to all personnel on matters related to this EMP.

A4.5.3 Environmental Manager

The Environmental Manager is responsible for daily feedback to the Empire Oil Project Supervisor regarding on-ground environmental management and compliance. The Environmental Manager will work with the Seismic Crew Manager on, and advise the Project Supervisor of, the implementation of the management actions contained in this EMP by the Seismic Crew. The Environmental Manager will conduct audits and monitor progress as outlined in Section A4.6 below.

A4.5.4 Seismic Crew Manager

The Seismic Crew Manager will work with the Environmental Manager to ensure that the management actions contained in this EMP are implemented. The Seismic Crew Manager is responsible for ensuring that the facilities and equipment required for safe storage, handling and disposal of all waste and hazardous materials is made available to all personnel.

A4.5.5 All Personnel

All personnel are responsible for following the waste storage, handling and disposal procedures outlined in this EMP. All personnel will provide assistance in implementing this EMP and will report any non-compliance to the Environmental Manager.

A4.6 Monitoring and Auditing

The Environmental Manager will conduct occasional audits of the seismic operations to ensure compliance with this EMP (no less than two audits throughout the duration of the survey).

The Environmental Manager will conduct an audit and inspection at the end of the seismic survey to ensure that there has been no impact to the project area due to any pollutants being released into the environment. Any impacts identified will be rectified in consultation with DEC and included in the annual rehabilitation monitoring program to ensure that remediation and rehabilitation has been successful.

A4.7 Records and Reporting

The environmental component of the pre-survey induction will educate the workforce on pollution prevention issues. Induction records will include sign-off by inductees confirm that pollution prevention management has been discussed.

A Hazardous Materials Registry will be maintained which will detail all hazardous goods brought on to site, usage and remaining inventories. The relevant Material Safety Data Sheet (MSDS) will be available for all hazardous goods.

A waste log will be kept detailing waste types, volumes and disposal methods.

A4.8 Performance Criteria

The environmental standards for pollution prevention for the Mullering 3D Onshore Seismic Survey are:

Table A4.1 Performance criteria for pollution prevention management

Performance Criteria	Target
All hazardous materials (e.g., fuel, lubricants and chemicals) are stored appropriately in bunded areas and used in accordance with relevant Material Safety Data Sheet.	Zero incidents regarding mishandling of hazardous materials.
All wastes are disposed of in accordance regulatory and statutory requirements.	Zero complaints regarding waste management and disposal.
There is no impact on environmental values, soil or water quality through the improper disposal of general and hazardous wastes.	No litter is left on site. There are no spills of any hazardous goods outside of bunded areas.
All noise and dust emissions are minimal and restricted to the project area.	Zero complaints regarding noise and/or dust emissions.

A5 Social and Cultural Management

A5.1 Environmental Objectives

The Social and Cultural Management objectives of the Mullering 3D Onshore Seismic Survey are to:

- Ensure that proposed activities do not adversely affect cultural associations present in the survey area, including registered heritage sites and any sites discovered during the survey.
- Ensure that the proposed activities comply with the requirements of the Aboriginal Heritage Act 1972.
- Ensure that proposed activities do not unnecessarily impact on other uses of the survey area including farming and recreational activities.

A5.2 Existing Environment

A5.2.1 Natural and European Heritage

There are two places of natural or European heritage significance recorded on the Australian Heritage Database or the Register of the National Estate within the proposed survey area however neither is wholly within the project area. The Lancelin Defence Training Area is situated at the northern end of the Swan Coastal Plain and to the north of the proposed survey site is the Northern Bassendean Dunes Area. This area covers about 60,000 ha and comprises the Wongonderra, Mullering, Eneminga, South Mimegarra and Namming Nature Reserves.

A5.2.2 Aboriginal Heritage

The land around the Mullering 3D Onshore Seismic Survey project area was traditionally occupied/owned by the Yued Aboriginal People. The Yued are currently registered as Native Title Claimants on the National Native Title Tribunal register (registry number WC97/71).

There are three registered Aboriginal sites within the project area:

- Cooljarloo Swamp was a camp site, hunting place and water source for the Aboriginal people of the area.
- Coomado Swamp was a birthplace, camp site and hunting place for the local Aboriginal people.
- Mullering Brook is a site of mythological significance to the Aboriginal people of the area. There are currently no restrictions on the access to this site.

A5.2.3 Socio-economic Environment

The current land tenure of the majority of the survey area is Unclaimed Crown Land (UCL), with a section of Vacant Crown Land (VCL) stretching diagonally through the area, for the purpose of a Stock Route. One 'water and stopping place' reserve ('C' Class 729) is located within the survey area, around Wooka Wooka Well, on an old stock route. This reserve is vested within the Shire of Dandaragan.

The Tiwest Cooljarloo Mineral Sands Mine, located to the east and north of the project area, generates the principle economic activity in the area. Farming is the second largest economic driver with cattle grazing on the pastoral lease located adjacent to the western boundary of the project area.

A number of Apiary Site Permits located in the project area and a small number of seed collectors and wildflower pickers may utilise the project area. Tourist traffic is very low with the majority of tourists utilising the nearby nature reserves and national parks at Nambung, Mt Lesuer and Wanagarren.

A5.3 Key Risks and Potential Impacts

The key risks to the social and cultural environment from the Mullering 3D Onshore Seismic Survey are through disruption to usual economic activities and inadvertent damage to previously undiscovered artefacts of aboriginal heritage significance.

Potential impacts include temporary interruption to access for land users, such as beekeepers, and possible disturbance to previously unknown artefacts of significance to the local Aboriginal community.

A5.4 Management Actions

A5.4.1 Ethnographic and Archaeological

A suitably qualified person, in consultation with the Yued people, will conduct a heritage survey of the project area prior to commencement of the project. Swath Maps will include information on registered heritage sites, including limited or no access areas around sites. The environmental induction will include information on the *Aboriginal Heritage Act 1972* highlighting Section 17 i.e., that it is an offence to knowingly interfere with Aboriginal sites.

All personnel involved in the project will be inducted in Aboriginal heritage management procedures and provided with information to allow them to identify potential heritage artefacts.

In the event that any archaeological material, including human skeletal material, is uncovered as a result of line preparation, all work in the area will stop immediately and the discovery will be immediately reported to the relevant authorities.

In the event that potential Aboriginal heritage material is uncovered, work will be halted at the location and an appropriate buffer established around the site (work may continue outside the buffer area, notionally 20 m). Empire Oil will arrange for an archaeologist to attend the site and assess the material. The DIA will be notified if the material is deemed to be of significance. If required by the seismic survey, seek a 'Consent to Disturb' permit from the DIA.

A5.4.2 Agricultural Management

Empire Oil will continue to conduct extensive consultation with the Mimigarra Pastoral Company to manage any potential impacts associated with the proposed seismic survey. An access agreement will be made with the Mimigarra Pastoral Company once the timing of the survey is known. Every effort will be made to ensure that disturbance to normal farming practices is minimised. If it is necessary to remove fences or gates, temporary fencing will be installed. This will be removed and permanent fencing or gates reinstated on completion of the survey. All fences and farm infrastructure will be returned to pre-survey conditions, as agreed with the lease holder, and appropriate compensation agreements negotiated.

Relevant utility authorities will be consulted, and a site inspection will be undertaken if required, to identify existing buried cables, pipes, water mains and other infrastructure. Any damaged infrastructure will be reinstated to its prior condition, as a minimum, in consultation with the asset owner.

The environmental component of the induction will discuss the importance of farm access protocols, including farm gate management, to ensure farmers are consulted over the survey farm access requirements and that stock are not accidentally released because of poor gate management.

There are a number of apiary permits operating in the proposed survey area. Empire Oil will contact all apiary permit holders within the Mullering 3D Onshore Seismic Survey project area prior to conducting the survey to inform them of the project and consult on ways to minimise interruption to their operations.

If required, temporary barriers or warning signs will be erected to ensure public safety.

A5.5 Roles and Responsibilities

A5.5.1 Empire Oil Project Director

The Empire Oil Project Director will ensure that appropriate resources are provided to implement the actions outlined in this EMP. The Empire Oil Project director will ensure that a heritage survey of the project area is undertaken prior to the commencement of the Mullering 3D Onshore Seismic Survey in accordance with this EMP. The Empire Oil Project Director will also ensure that consultation with current land users is undertaken in a timely manner.

The Empire Oil Project Director has overall responsibility to ensure that all seismic line preparation is carried out in accordance with the Assessment on Referral Information document, this EMP and other regulatory requirements.

A5.5.2 Empire Oil Project Supervisor

The Empire Oil Project Supervisor is responsible for ensuring that the management actions contained in this EMP are implemented. The Project Supervisor is also responsible for ensuring that all personnel are provided with the training and awareness required to fulfil their obligations under this management plan, principally via inductions and daily toolbox meetings. The Project Supervisor will also be available to provide advice and assistance to all personnel on matters related to this EMP.

A5.5.3 Environmental Manager

The Environmental Manager is responsible for daily feedback to the Empire Oil Project Supervisor regarding on-ground environmental management and compliance. The Environmental Manager will work with the Seismic Crew Manager on, and advise the Project Supervisor of, the implementation of the management actions contained in this EMP by the Seismic Crew. The Environmental Manager will conduct audits and monitor progress as outlined in Section A5.6 below.

A5.5.4 Seismic Crew Manager

The Seismic Crew Manager will work with the Environmental Manager to ensure that the management actions contained in this EMP are implemented.

A5.5.5 All Personnel

All personnel are responsible for following the procedures outlined in this EMP for ensuring the preservation of European and Aboriginal heritage and ensuring that disruptions to other land users are minimised. All personnel will provide assistance in implementing this EMP and will report any non-compliance to the Environmental Manager.

A5.6 Monitoring and Auditing

The Environmental Manager will conduct occasional audits of the seismic operations to ensure compliance with this EMP (no less than two audits throughout the duration of the survey).

The Environmental Manager will conduct an audit and inspection at the end of the seismic survey to ensure that there has been no impact to any sites of Aboriginal heritage significance. Any impacts identified will be rectified in consultation with DEC and DIA and will be included in the annual rehabilitation monitoring program to ensure that remediation and rehabilitation has been successful.

A5.7 Records and Reporting

The environmental component of the pre-survey induction will educate the workforce on social and cultural management issues. Induction records will include sign-off by inductees confirm that social and cultural management has been discussed.

Records of lease holder and land user consultation will be maintained.

Complaints will be recorded as an environmental incident and handled according to the incident management procedures.

Damage to cultural heritage sites will be recorded as an environmental incident and managed according to the incident management procedures.

A5.8 Performance Criteria

The performance criteria for social and cultural management of the Mullering 3D Onshore Seismic Survey are:

Table A5.1 Performance criteria for social and cultural management

Performance Criteria	Target
There is no impact to any cultural associations present in the survey area, including registered heritage sites and any sites discovered during the survey.	There is no damage to Aboriginal heritage sites during the survey.
There are no unnecessary impacts on other uses of the project area including farming and recreational activities.	There is no damage to infrastructure and services attributable to the seismic survey.
	Gate management protocols are adhered to.
	There is no unauthorised entry to private property.
	There are no complaints received from land users or the pastoral lease holder.

A6 Rehabilitation Management

A6.1 Environmental Objectives

The rehabilitation objectives of the Mullering 3D Onshore Seismic Survey are to prevent on-going impacts attributable to the Mullering 3D Seismic Survey. More specifically, rehabilitation of the Mullering 3D Onshore Seismic Survey aims to ensure that seismic lines do not become permanent vehicle access routes, are not subject to significant soil erosion and that vegetation (foliage) cover on the seismic lines is returned to a condition similar to adjacent undisturbed areas. Proper rehabilitation of seismic lines will ensure that the Mullering 3D Onshore Seismic Survey will avoid land degradation on both Crown Land and pastoral lease within the seismic survey area.

A6.2 Key Risks and Potential Impacts

The key risks leading to failed or improper rehabilitation include a number of factors that may prevent proper vegetation growth and soil stability. These include continued third party access to the lines, continued soil erosion, loss of seed stock, degraded soil condition and other more natural factors such as a poor growing season due to lack of rain. Potential impacts include the long-term loss of vegetation, habitat and biodiversity in the areas cleared by the seismic survey.

A6.3 Management Actions

A6.3.1 Survey Planning

One of the keys to rehabilitation success of the Mullering 3D Onshore Seismic Survey is the prior planning of the survey with the end point of a fully rehabilitated project area.

Areas that are environmentally sensitive, and therefore likely to be more sensitive to disturbance, have been avoided as much as possible (e.g. wetlands). In order to prevent possible ongoing third party access, the entrance to lines have been planned such that the entrance will be disguised by the use of the fire breaks (no seismic lines will enter directly onto Woolka Rd, access will be via the fire break) and bends in the lines.

Seismic line preparation and data acquisition methods also help to ensure that rehabilitation of the lines is optimised. As the survey lines are rolled, not cleared completely, there is sufficient seed stock naturally occurring to expect full, natural regeneration of the survey area. Avoiding the introduction of seeds into the area, ensures local provenance and the risk of weed introduction is lessened.

The campsite for the survey will be located in a previously cleared area that is not visible from Woolka Road and is located at a sufficient distance from residences to minimise noise nuisance from traffic, generators or general noise.

A6.3.2 Line Closure

All seismic lines and the campsite will be closed within two weeks of their last required use to discourage third party access. To promote successful rehabilitation of the seismic lines the following will be carried out immediately on completion of the survey:

- All drill collars, steel pegs and other drilling and seismic materials will be removed from the seismic lines, drill sites and camp site.
- No drill spoil stock-piles, open holes nor sumps will be left on the seismic lines, drill sites or camp site. Upholes will be plugged and backfilled to an appropriate depth to prevent collapse, avoid hazard and dispose of drill cuttings.
- All intersections of seismic lines with public roads will be disguised to discourage third party access.
- Any vegetation pushed to one side of the seismic lines during operations will be pulled back over the lines.
- All campsite equipment and infrastructure will be removed from site.

A6.3.3 Post Survey Inspection

A post-survey inspection will be carried out confirm that all line closure activities have been successfully carried out and to determine if there is any need for additional closure activities or active rehabilitation.

The methods used for additional line closure will be determined on a case-by-case basis. The following is a list of active measures to improve rehabilitation performance that may be carried out, if required, immediately following completion of the seismic survey:

- Compacted or rutted soils may be lightly scarified to improve aeration and prevent channelling of surface water flows.
- At the boundary between degraded vegetation and native vegetation movement of native and introduced fauna along the seismic lines may discouraged by placing brush across the seismic line. Brush would be harvested from nearby native vegetation as appropriate, if there is no stockpiled vegetation available from the seismic survey.

A6.4 Rehabilitation Monitoring and Completion Criteria

A6.4.1 Rehabilitation Monitoring

Permanent monitoring quadrats will be established in key locations to allow for assessment of rehabilitation success against the completion criteria outlined in this EMP (Table A6.2). Quadrats will be surveyed within six months, after the winter rain, following completion of the Seismic Survey and then annually for at least three years or until completion criteria are achieved, whichever is longer. The results of monitoring will be reported annually. Completion criteria will be deemed achieved once DEC is satisfied, and has signed off, that the completion criteria listed in Table A6.2 have been met.

Monitoring will be conducted by a qualified botanist using a quadrat based assessment and will consider:

- The percentage cover and distribution of declared and environmental weeds.
- Total vegetation percentage cover.
- The presence of keystone flora species.
- Any evidence of erosion, soil compaction and disruptions to surface water drainage.
- Any evidence of *P. cinnamomi* introduction to the seismic lines.
- Any evidence of third party access to the seismic lines that were not already on established tracks.

Each monitoring location will include photographic records of line regeneration. If *P. cinnamomi* invasion is suspected, soil samples will be tested for the presence of *P. cinnamomi* and dieback mapping of the project area will be undertaken by a qualified dieback interpreter. In addition to quadrat based assessment, the presence or absence of *Macarthuria keigheryi* at previously recorded locations on seismic lines will be noted.

All monitoring will ensure that there are no additional environmental impacts to the site as a result of the monitoring program. All personnel will comply with standard weed and disease hygiene protocols including ensuring that vehicles are clean on entry and that the spread of soil and vegetation material through the project area is minimised.

A6.4.2 Completion Criteria

An assessment of historical seismic lines within the Mullering 3D Seismic project area (Appendix E) has shown that the lines recover well from the clearing and data acquisition process when fire occurs following the disturbance. Soil compaction was not observed on any of the lines inspected and is considered unlikely be a significant issue for the Mullering 3D Onshore Seismic Survey.

Rehabilitation success will be primarily measured using the degree of keystone species recovery on seismic lines. Table A6.1 identifies the communities that will receive some level of disturbance from rolling of the lines and the keystone species recorded in each community. Keystone species were identified following interrogation of site records from the botanical studies conducted during 2005. Those species that contributed the greatest cover for each community to be impacted were chosen as keystone species for the purposes of this project because line closure through development of foliage cover on the lines is the main objective of the rehabilitation program.

Table A6.1 Keystone species for each plant community

Plant Community	Keystone Species
T2	*Acacia rostellifera* *Acacia spathulifolia* *Allocasuarina lehmanniana* *Dryandra sessilis var. cygnorum* *Lomandra suaveolens* *Melaleuca rhaphiophylla* *Melaleuca systena*
W3	*Acacia pulchella var. glaberrima* *Austrostipa compressa* *Banksia attenuata* *Banksia menziesii* *Dasypogon obliquifolius* *Eremaea pauciflora* *Eucalyptus todtiana* *Hibbertia hypericoides* *Melaleuca seriata* *Mesomelaena pseudostygia*
H1	*Acacia lasiocarpa var. lasiocarpa* *Banksia telmatiaea* *Beaufortia squarrosa* *Calothamnus quadrifidus* *Conospermum stoechadis subsp. stoechadis* *Hakea obliqua subsp. parviflora* *Jacksonia nutans* *Melaleuca rhaphiophylla* *Melaleuca seriata*
H2	*Banksia telmatiaea* *Beaufortia squarrosa* *Hakea varia* *Melaleuca seriata* *Melaleuca viminea subsp. viminea* *Xanthorrhoea preissii*
H6	*Austrostipa macalpinei* *Banksia leptophylla* *Conospermum stoechadis subsp. stoechadis* *Dryandra sessilis var. cygnorum* *Hibbertia hypericoides* *Jacksonia hakeoides* *Melaleuca systena* *Xanthorrhoea preissii*

Table A6.1 Keystone species for each plant community (cont'd)

Plant Community	Keystone Species
H9	*Allocasuarina microstachya* *Calothamnus quadrifidus* *Caustis dioica* *Dasypogon obliquifolius* *Daviesia decurrens* *Hibbertia hypericoides* *Melaleuca clavifolia* *Melaleuca seriata* *Mesomelaena pseudostygia*
M1	*Acacia pulchella var. glaberrima* *Banksia ilicifolia* *Banksia menziesii* *Calothamnus quadrifidus* *Dasypogon obliquifolius* *Hibbertia crassifolia* *Xanthorrhoea preissii*

Completion criteria for the Mullering 3D Onshore Seismic Survey are provided in Table A6.2. These criteria have been developed by Woodman Environmental Consulting and are based on information gathered from flora surveys conducted for the project and Woodman Environmental's experience with other rehabilitation projects in the area including the Denison 3D Seismic Survey and Tiwest's Cooljarloo Mineral Sands Mine.

Table A6.2 Completion criteria

Completion Criterion	Method of Assessment
Native Vegetation	
Total vegetation percentage cover should be at least 10% after 3 years, with foliage cover recorded as increasing each year.	Quadrat assessment of a representative number of seismic lines within each vegetation type.
No bare patches longer than 10 m in any 100 m of rolled lines after 12 months.	Visual assessment of seismic lines.
70% of quadrats within a particular vegetation type should record at least one keystone species for that vegetation type.	Quadrat assessment of a representative number of seismic lines within each vegetation type.
Line Closure	
There will be no evidence of third party access to the seismic lines after 12 months.	Visual assessment of seismic lines for evidence of third party access.
Hygiene Management	
Quadrat assessment of weed species percentage cover at representative sites with the potential to have weeds spread by the operation (hygiene boundaries).	Visual assessment of weed species presence and percentage cover.
There will be no introduction or spread of *Phytophthora cinnamomi* attributable to the seismic survey after three years.	Dieback interpretation of the project site will be carried out in conjunction with annual monitoring three years post completion of the survey.

Table A6.2 Completion criteria (cont'd)

Completion Criterion	Method of Assessment
Soil Conservation	
Natural contours reinstated to pre-disturbance conditions.	Visual assessment of seismic lines.
No active erosion rills greater than 10 m by 0.1 m.	Visual assessment of seismic lines.
There is no evidence of severe compaction after 12 months.	Visual assessment of seismic lines.

A6.5 Rehabilitation Contingencies

After two years the progress of rehabilitation will be assessed and, if monitoring identifies poorly rehabilitating seismic lines, the root cause of the poor performance will be investigated and appropriate contingency actions will be implemented. Contingency actions will consider the following as appropriate:

- Alternative means of line closure will be assessed and implemented (e.g., burning of lines, mulching) if unauthorised third party access to lines is observed.
- Weed eradication measures (e.g., spraying) will be assessed and implemented, in consultation with DEC, if the spread of weeds is observed.
- Erosion control measures will be implemented as required based on monitoring, e.g., scrub-packing, mulching or the use of brush.
- Compaction reduction measures will be implemented as required e.g., deep tilling, if soil compaction linked to seismic line is observed.
- Other rehabilitation techniques will be assessed and implemented if poor germination of native vegetation is observed.

A6.6 Roles and Responsibilities

A6.6.1 Empire Oil Project Director

The Empire Oil Project Director will ensure that appropriate resources are provided to implement the actions outlined in this EMP. The Empire Oil Project director will ensure that annual rehabilitation monitoring is carried out in accordance with this EMP. and will make the results of this monitoring available to the DEC and DoIR.

Once Empire Oil is satisfied that completion criteria have been met the Empire Oil Project Director will consult with DEC and provide evidence to show that completion criteria have been met and allow sign off on the project by DEC.

Empire Oil will remain responsible for the closure and rehabilitation of seismic lines created by this project until such time as completion criteria have been met, to the satisfaction of DEC.

A6.6.2 Empire Oil Project Supervisor

The Empire Oil Project Supervisor is responsible for ensuring that the management actions contained in this EMP are implemented. The Project Supervisor is also responsible for ensuring that all personnel are provided with the training and awareness required to fulfil their obligations under this management plan, principally via inductions and daily toolbox meetings. The Project Supervisor will also be available to provide advice and assistance to all personnel on matters related to this EMP.

A6.6.3 Environmental Manager

The Environmental Manager is responsible for daily feedback to the Empire Oil Project Supervisor regarding on-ground environmental management and compliance. The Environmental Manager will work with the Seismic Crew Manager on, and advise the Project Supervisor of, the implementation of the management actions contained in this EMP by the Seismic Crew. The Environmental Manager will conduct an audit of the project area immediately post completion of the survey to determine if any active rehabilitation is required.

A6.6.4 Seismic Crew Manager

The Seismic Crew Manager will work with the Environmental Manager to ensure that the management actions contained in this EMP are implemented. The Seismic Crew Manager is responsible for facilitating the ongoing, progressive closure of seismic lines as they become available. The Seismic Crew Manager will provide supervision of line closure crews on behalf of Empire Oil.

A6.6.5 All Personnel

All personnel are responsible for following the procedures outlined in this EMP for ensuring the preservation of European and Aboriginal heritage and ensuring that disruptions to other land users are minimised. All personnel will provide assistance in implementing this EMP and will report any non-compliance to the Environmental Manager.

A6.7 Records and Reporting

The environmental component of the pre-survey induction will educate the workforce on line closure and rehabilitation requirements. Induction records will include sign-off by inductees confirm that social and cultural management has been discussed.

Records of progressive line closure and rehabilitation progress will be maintained and reported to the Empire Oil Project Director on a regular basis.

An annual rehabilitation monitoring report will be prepared to record the results of annual rehabilitation monitoring, progress against completion criteria and any additional items identified during the post-survey inspection and audit as requiring ongoing monitoring. This report will be made available to both DoIR and DEC.

A7 Summary of Environmental Objectives, Performance Criteria and Targets

Table A7.1 Summary of environmental objectives, performance criteria and targets

Topic	Objectives	Performance Criteria	Target
Flora & Fauna Management	Protect flora and fauna species of conservation significance as far as practicable. Minimize disturbance to all native flora across the proposed seismic survey area. Minimize disturbance to all native fauna across the proposed seismic survey area.	Avoid selected areas of high environmental sensitivity as identified on swath maps (e.g., wetlands). Maintain a buffer of at least 50 m around all known sites where DRF occur, except for locations of Macarthuria keigheryi for which Empire Oil have been granted a Permit to Take. No impact to fauna of conservation significance. Avoid removal of large trees and restrict branch trimming to the minimum necessary to allow the passage of seismic survey vehicles. Clearing of wetlands will be avoided. Flora and fauna management communicated to all personnel. Maximise the use of existing tracks. Ensure that clearing undertaken is the minimum required for safe passage of seismic vehicles. Report any injury or mortality of vertebrate fauna. Vehicle speeds within the project area restricted to a maximum of 60 km/h on Woolka Road and 40 km/h on all seismic lines. Avoid undertaking seismic activities at night and during dusk and dawn periods.	Swath maps available to all personnel. No vehicles have entered areas of high environmental sensitivity. All personnel remain within marked out seismic lines. Populations of Priority flora within 30 m of seismic activity will be flagged to ensure that accidental disturbance is avoided. No vehicles or personnel have entered areas of high environmental sensitivity, except by foot on designated receiver lines. Personnel trained to recognise potential Rainbow bee-eater nests. Zero incidences of Rainbow Bee-eater nest destruction. No clearing of large trees (nominally those over 3 m in height). Avoid slow growing species (*Macrozamia fraseri* and Xanthorrhoea species) as much as practicable. No clearing of wetland areas. All personnel inducted on flora and fauna management for the project. Key environmental sensitivities within each days working area highlighted during toolbox meetings. Access planned daily to maximise vehicle passage along existing tracks. All seismic lines prepared in accordance with swath maps. Source line width is less than 4 m except for turning areas. Any injury or mortality to vertebrate fauna reported to the Environmental Manager and to DEC regional office. Speed restrictions adhered to. All seismic activities conducted during daylight hours.

Table A7.1 Summary of environmental objectives, performance criteria and targets (cont'd)

Topic	Objectives	Performance Criteria	Target
Weed and *P. cinnamomi* Hygiene Management	Prevent the human-vectored introduction or spread of dieback (P. cinnamomi). Prevent the human-vectored introduction of weeds not previously recorded in the project area and to prevent the spread of weeds within the project area.	P. cinnamomi has not been introduced to the project area by the Mullering 3D Onshore Seismic Survey. No weeds have been introduced to the project area attributable to the seismic survey. No weeds have been spread within the project area due to the Mullering 3D Onshore Seismic Survey. Personnel have correctly used hygiene stations and points, including inspection of equipment and vehicles, cleaning if required, adhering to authorised access routes and filling out of register.	Rehabilitation monitoring does not record any instance of P. cinnamomi infestation or dieback. Rehabilitation monitoring does not record any weed species not identified during flora surveys. Percentage cover and distribution of weeds on rehabilitated seismic lines are be similar to that of surrounding undisturbed areas. All hygiene registers correctly filled out. Zero incidents relating to incorrect use of hygiene stations.
Wetland Management	Prevent any impact of survey activities on sensitive wetlands and riparian zones in the survey area.	Seismic survey planned to avoid impacts to wetlands. Seismic survey carried out to avoid impacts to wetlands and rivers. No on-going impacts to wetlands and rivers due to the seismic survey.	All source lines planned to avoid wetlands, unless utilising an existing track. Receiver lines planned to avoid wetlands wherever possible. All receiver line preparation and closure in wetlands is carried out by hand. No vehicles enter wetlands unless on existing tracks. Post-survey inspection finds no impacts to wetlands attributable to the survey.

Table A7.1 Summary of environmental objectives, performance criteria and targets (cont'd)

Topic	Objectives	Performance Criteria	Target
Pollution Prevention & Management	Maintaining the integrity, ecological functions and environmental values of the survey area. Ensure that hazardous material storage and waste handling and disposal practices meet statutory requirements and acceptable standards and do not adversely affect the environmental values or health, welfare and amenity of people and land uses.	All hazardous materials (e.g., fuel, lubricants and chemicals) are stored appropriately in bunded areas and used in accordance with relevant Material Safety Data Sheet. All wastes are disposed of in accordance regulatory and statutory requirements. There is no impact on environmental values, soil or water quality through the improper disposal of general and hazardous wastes. All noise and dust emissions are minimal and restricted to the project area.	Zero incidents regarding mishandling of hazardous materials. Zero complaints regarding waste management and disposal. No litter is left on site. There are no spills of any hazardous goods outside of bunded areas. Zero complaints regarding noise and/or dust emissions.
Social & Cultural Management	Ensure that proposed activities do not adversely affect cultural associations present in the survey area, including registered heritage sites and any sites discovered during the survey. Ensure that the proposed activities comply with the requirements of the Aboriginal Heritage Act 1972. Ensure that proposed activities do not unnecessarily impact on other uses of the survey area including farming and recreational activities.	There is no impact to any cultural associations present in the survey area, including registered heritage sites and any sites discovered during the survey. There are no unnecessary impacts on other uses of the project area including farming and recreational activities.	There is no damage to Aboriginal heritage sites during the survey. There is no damage to infrastructure and services attributable to the seismic survey. Gate management protocols are adhered to. There is no unauthorised entry to private property. There are no complaints received from land users or the pastoral lease holder.

Table A7.1 Summary of environmental objectives, performance criteria and targets (cont'd)

Topic	Objectives	Performance Criteria	Target
Rehabilitation Management	• Prevent on-going impacts of the Mullering 3D Seismic Survey. • To prevent seismic lines becoming permanent vehicle access routes. • Vegetation (foliage) cover is returned to a condition similar to adjacent undisturbed areas. • There is no significant soil erosion attributable to the Mullering 3D Onshore Seismic Survey.	See Table A6.2.	• All completion criteria met within three years of completion of the Mullering 3D Onshore Seismic Survey.