



Macallum Group Ltd

ENVIRONMENTAL PLAN

PUBLIC SUMMARY

MOGUMBER 2D SEISMIC SURVEY, ONSHORE, PERTH BASIN, WA

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1. INTRODUCTION

Macallum Group Ltd is an Australian based exploration company. Macallum Group Ltd is the operator of exploration permit EP 494 in Joint Venture partnership with Southern Sky Energy Pty Ltd. As part of the farm-in agreement, Macallum is required to undertake a two-dimensional (2D) onshore seismic survey in the Perth Basin, Western Australia (WA).

This document summarises the environmental management of the proposed 2D seismic acquisition in the Perth Basin. This document has been prepared in accordance with Regulation 11(7) of the Petroleum and Geothermal Energy Resource Act 1967 (PGER Act). The DMP Guideline for the Development of the Environmental Plans, November 2016 was used as guidance for the preparation and submission of the Environmental Plan (EP).

Providing key stakeholder approvals are granted, Macallum is planning to commence activities in Q4 2018 (November-December).

Once approved by DMIRS, this EP will be used by Macallum personnel and Macallum's Contractors as a practical implementation and management tool when conducting the project activities.

MACALLUM ENVIRONMENTAL POLICY MANAGEMENT

Macallum's overarching environmental objective for the project is to avoid or minimise environmental risks to as low as reasonably practicable (ALARP) - refer to Attachment 1: Macallum Environment Policy. Macallum makes this commitment to all our workers, contractors, shareholders, stakeholders and the community.

CONTRACTOR

Macallum has commissioned Terrex Seismic (Terrex) to provide a plan for the acquisition of the 2D seismic survey. Terrex is an Australian owned and operated company who has been operating seismic surveys in Australia for over 30 years. Terrex will be managing the completion of all acquisition activities on behalf of Macallum. The procedures and other details described below are those utilised by Terrex under their Integrated Management System.

2. DESCRIPTION OF THE ACTIVITY

2.1 LOCATION

The seismic survey area is located approximately 100km by line of sight north of Perth and 10km by line of sight west of Mogumber, within Petroleum Exploration Permit EP 494 held by Macallum Group Ltd and Southern Sky Energy Pty Ltd. Two lines are planned to be surveyed along public roads to minimise impact. The nearest towns are Mogumber and Muchea, located within or adjacent to the Project area. Macallum have designed the seismic survey to specifically image an interesting sub-surface structure identified by remote sensing and geophysical data and provide verification of its validity.

2.2 GENERAL DETAILS

The Project is two seismic lines, one 20km roughly east-west and the other 14km north-south. The Project is designed to acquire approximately 34km of two dimensional seismic data. Figure 2: Layout of the 2D seismic survey provided in Attachment 2 illustrates conceptual layout of 2D seismic survey.

A summary of the key characteristics of the seismic survey is provided in Table 1 below.

Element	Description
Type of Survey	2D Seismic Survey
Nominated Contractor	Terrex Seismic
Timing	The preferred time is Q4 2018, subject to relevant environmental approvals
Duration of survey	~6 days
Total Length of Seismic lines (Km)	34km
Total extent of Vegetation Disturbance	0Ha
Plant and Equipment details for the survey	Source vehicles – 4WD Utilities
Approximate number of persons involved	34
Operation hours	Daylight only
Mogumber Road West Coordinates	(GDA94 Zone 50):
Eastern end of line	408,536mE and 6,565,523mS
Western end of line	388,859mE and 6,570,936mS
Wandena Road/GNH Coordinates	(GDA94 Zone 50):
Southern end of line	407,386mE and 6,505,876mS
Northern end of line	410,205mE and 6,518,912mS

Table 1 – Seismic survey details

2.3 OPERATIONAL DETAILS

The Project includes the following (routine and non-routine) components:

- on-ground ecological assessment;
- negotiation of land access with affected parties;
- preparation of seismic lines;
- seismic data acquisition;
- mobilisation and demobilisation of seismic crew;
- rehabilitation and monitoring;
- emergency management and response.

On-ground ecological survey

Since June 2017 Macallum has undertaken a detailed desktop study of the existing environment within the Project area and carried out one reconnaissance surveys in November 2017.

Macallum also engaged 360 Environmental to undertake an Environmental Opportunities and Constraints (Ops and Cons) Assessment to ensure that current environmental desktop baseline data is available for environmental impact assessment and approval applications. The program also includes a single-season on-ground flora/vegetation survey. The on-ground ecological survey was carried out in December 2017. The ecological survey was carried over the areas proposed seismic acquisition.

Land access

Figure 3: Tenure and Land Use provided in Attachment 2 illustrates the tenure of the Project and surrounds.

A large portion of the land within the proposed 2D seismic survey layout is currently used for agricultural purposes. The Project is proposing to use the road verge on Mogumber Road West and the road verge on Wandena Rd/Great Northern Highway to acquire the seismic data.

Seismic survey lines access

Seismic survey lines are linear corridors along which all-terrain vehicles and trucks drive, and crew walk, during the conduct of a seismic survey.

The proposed positioning of seismic survey lines is determined by Macallum’s geophysicist and exploration advisors, taking into account available geographic/topographic, geological and geophysical information, and the results of desktop and on-ground scouting, heritage surveys and ecological survey. Any environmentally or culturally sensitive areas identified in these surveys are either excluded from the seismic survey or alternative seismic survey methods (incorporating protective elements) are implemented (e.g. vehicle exclusion and hand carrying of geophones).

The images below illustrate the line surveying and acquisition processes.



P.1 Line surveying and pegging



P.2 Installing the nodal geophones



P.3 Preparing for seismic acquisition



P.4 Seismic acquisition – ‘vibe trucks’

2D Seismic Data Acquisition

Macallum will be utilising the HEMI 60 buggy vibrator. The system is designed for high quality geophysical prospecting with a 60,000 pound output vibrator that has broad band output and a high signal to noise ratio for the deepest penetrating surveys.

Seismic data acquisition involves applying a vibrating seismic energy source, such as a vibroseis truck at discrete surface locations. The resulting energy is reflected back from interfaces where rock

properties change. By recording this reflected energy at an array of geophones placed in the ground surface, the results can be processed to produce an image of underground geological structures and a range of attributes that can be used to infer the physical rock properties.

The equipment used during the conduct of a seismic survey is typically as follows:

- a series of microphones (called geophones), which are placed in a line on the ground (~20m apart);
- low impact trucks ('vibe-trucks'), equipped with vibrating pads which travel along the seismic lines and introduce vibrations (which are picked up by the microphones) into the ground (~20m apart);
- a central control unit (located in a truck/ute), which sends the control signal to the 'vibe-trucks';
- a fleet of vehicles (including 4wds, trucks, low loaders and earthmoving equipment) for creating seismic lines, and transporting crew, supplies and equipment.

These processes are illustrated above on Photo P1 - Photo P4.

Workforce accommodation

Different personnel, equipment and supplies will be required over the life of the Project. As such there will be two separate mobilisation phases for the Project. The first phase being surveying and line preparation and the second, acquisition.

Phase one will require up to 4 personnel on site, while phase two will require up to 20-25 suitably qualified and experienced personnel. Personnel will be accommodated locally at existing nearby accommodation, potentially in Cataby or Dandaragan. There will be no onsite camp established as part of the Project.

Water Use

As personnel will be housed off site, water use for the Project will not be required.

Demobilisation and Rehabilitation

The majority of disturbed areas will be rehabilitated immediately following completion of the survey. Any disturbed areas will require only minor civil works to return them to a condition similar to that of surrounding undisturbed areas. Rehabilitation works will be undertaken to establish a safe stable non-polluting landform similar to that of surrounding undisturbed areas.

The road verges along Mogumber Road West and Wandena Rd/Great Northern Highway are considered to be disturbed and are subject to several different methods of weed control through slashing and chemical herbicides.

2.4 DETAILS OF CHEMICALS AND OTHER SUBSTANCES

Regulation 15(9) of the PGER(E) requires an Environment Plan to disclose the details of all chemicals to be used in the course of the petroleum activity. Chemical disclosure is required for all 'down-hole' petroleum or geothermal related activities, including seismic activity.

Macallum does not plan to undertake any seismic upholes during the course of this project.

3.1 PHYSICAL ENVIRONMENT

The Project is located in the Shire of Victoria Plains, Gingin and Chittering within the Wheatbelt Region of Western Australia. The area has a Mediterranean climate with cool, wet winters and warm, dry summers. The long term (1956-1992) average annual rainfall is about 570 millimetres (WRC, 1999). Most of the rain falls during the winter months between April and September. The average annual evaporation is about 200mm and rainfall exceeds evaporation only during the winter months.

During summer from October to April, the advent of hot, dry northerly winds frequently results in severe fire weather conditions. Wind speed and direction is the major factor influencing the spread of wildfires in this area. A typical daily weather pattern during the fire season starts with light to moderate offshore winds in early morning. Moderate to strong south to south-westerly sea breezes take over in the late morning or early afternoon. The sea breeze is commonly over 30kph. These usually decrease in the evening returning to the east or south-east. The elevation ranges from 120 m Australian Height Datum (AHD) in the south-western corner to 200 m on the Mogumber Road West line and 120m to 240m on the Wandena Rd/GNH line (Geoscience Australia 2008).

The Project area is located in the Perth subregion (SWA02) of the Swan Coastal Plain bioregion and the Lesueur Sandplain subregion (GES02) of the Geraldton Sandplains bioregion.

The Project area is located within a number of separate catchment areas. Each catchment area is associated with the significant stream in the landscape. Moore River flows through the very north-western portion of the Project area (DoW 2015). Another watercourse called Minyulo Brook flows through the Project area from the north-eastern portion to the western portion of the Project area. The Douaraba Swamp exists along the Minyulo Brook within the Project area. A minor tributary flows from the swamp to the south-western portion of the Project area (DoW 2015). Enemunga Brook a major drain flows through the southern portion of the Project area.

The Project area is located in the Perth subregion (SWA02) of the Swan Coastal Plain bioregion and the Lesueur Sandplain subregion (GES02) of the Geraldton Sandplains bioregion.

No extraction of surface or groundwater is proposed for the seismic survey. No activities are proposed that will interact with surface or ground waters. The Project area does not fall within any Priority Drinking Water Source Areas (PDWSAs).

3.2 BIOLOGICAL ENVIRONMENT

Based on Macallum's desktop study, reconnaissance surveys and the on-ground ecological survey undertaken by 360 Environmental Pty Ltd (360 Environmental) on 1 & 5 December 2017, no Threatened species pursuant to the *Environment Protection and Biodiversity Act 1999* (EPBC Act) and/or gazetted as Declared Rare Flora (DRF) pursuant to the *Wildlife Conservation Act 1950* (WC Act) were recorded during the survey.

A Department of Parks and Wildlife (DPaW) NatureMap Flora Search and a Department of the Environment (DotE) Protected Matters Search was undertaken with a 20km buffer from the centre of each of the Project areas (DPaW 2016; DotE 2016). The NatureMap Report for the Mogumber Road West identified 26 Threatened flora species, 3 Priority 1 flora species, 12 Priority 2 flora species, 32 Priority 3 flora species and 25 Priority 4 flora species as occurring within 20 km of the centre of the study area. The DoE *Protected Matters Search Tool* identified 26 Threatened flora species as occurring within 10 km of the centre of the Project.

The NatureMap Report for the Wandena Road-GNH identified 17 Threatened flora species, 1 Priority 1 flora species, 8 Priority 2 flora species, 14 Priority 3 flora species and 10 Priority 4 flora species as occurring within 10 km of the centre of the study area. The DoE *Protected Matters Search Tool* identified 17 Threatened flora species as occurring within 10 km of the centre of the Project.

There were no Conservation Category Wetlands (CCW), as defined by The Department of Parks and Wildlife (DPaW) Geomorphic Wetlands Dataset, identified in the Project area. Nor were any Bush Forever sites or Regional Ecological Linkages identified. There are several small pockets of ESA's located within the Survey Area. These pockets represent the historical locations of T/ DRF and their buffer zones.

The Project area is not part of any Regional Ecological Linkage as defined by the Perth Biodiversity Project's Draft Regional Ecological linkage network.

A DPaW NatureMap Fauna Search and a DoE Protected Matters Search was undertaken with a 10km buffer from the centre of the Project (DPaW 2016; DoE 2016). The DoE *Protected Matters Search Tool* identified four Threatened fauna species and four Migratory species as occurring within 10 km of the centre of the Project area (Desktop report, 360 Environment 2017).

Majority of the conservation significant fauna species identified in the State and Federal database searches are bird species and therefore are unlikely to be impacted by the movement of trucks within the Project area, particularly as the seismic lines are already contained within gazetted road reserves.

3.3 HERITAGE AND SOCIAL

A search of the Department of Aboriginal Affairs (DAA) Aboriginal Heritage Inquiry System identified a number of ‘Registered Sites’ close to the Project area, DAA 2015. Figure 5, Attachment 2 provides locations of registered cultural heritage sites.

The Mogumber Road West site has 5 registered sites close to the road. These are:

Place ID 20008 – Gingin Brook – Waggyl site – Mythological Site

Place ID 20749 – River Site

Place ID 21620 – River Site

Place ID 3472 – Mogumber Burial Site

Place ID 4407 – Mogumber Cementary

These sites are registered due to mythological significance of the brook to the aboriginal people, however the seismic survey line will not impact on any of these sites as it will not leave the gazetted road.

The Wandena Road-GNH site has 1 registered sites close to the road. These are:

Place ID 3525 – Ellenbrook Upper Swan – Mythological Site

Macallum/Southern Sky Energy has Heritage Protection Agreements in place with the Yued and Whadjuk Peoples. Management of cultural heritage will be undertaken in accordance with the provisions of these Agreements. Macallum Management recognises the need, and is committed to the preservation of Indigenous and European cultural heritage and artefacts. Macallum will conduct operations with regard to areas of cultural significance.

Pastoral and cropping activities, tourism, retail trade, mineral and petroleum development, fishing and horticulture are economically important in the region. The Project area consists of Freehold land, Crown land and Reserve land. The main farming activity is wheat, sheep and cattle on introduced pasture species with some grazing of livestock on native species (Wheatbelt Development Commission, 2012). The project will not operate outside of the gazetted road reserve boundary.

4 ENVIRONMENTAL RISK ASSESSMENT

An evaluation of environmental risks and impacts in relation to the Project was carried out in accordance with the methodology and principles outlines in the Australian and New Zealand Standard *AS/NZS ISO 31000:2009 Risk management* and HB 203:2006 *Environmental Risk Management – Principles and Process*.

The main operational aspects or elements of the seismic survey in the risk identification process are:

- Seismic lines preparation;
- Driving seismic vehicles to acquire data;
- General activities;
- Unplanned and non-routine events;
- Interaction with services and stakeholders;

- Restoration of any ruts or pad marks.

Table 2: Summary of Environmental Risk Assessment, Objectives, Performance Indicators and Measurement Criteria provides a summary of the risk assessment including impact descriptions, mitigation and management measures proposed for individual impacts. The proposed mitigation and management measures will be implemented throughout the survey to reduce environmental risks to ALARP.

Should any risks or impacts change prior to the commencement of the project, Macallum will notify DMIRS. This EP will be revised and changes will be resubmitted to DMIRS for approval as required by Regulation 11(7) (8) of the PGER (Environment) Regulations 2012.

5 MANAGEMENT APPROACH

Macallum's overarching environmental objective for the project is to avoid or minimise environmental risks to as low as reasonably practicable (ALARP).

Macallum has developed specific performance objectives for the Project to meet Macallum's Environment Policy commitments, protect identified environmental values and reduce impacts on the environment to ALARP.

To ensure Macallum's environmental commitments are met, environmental performance indicators have been established for each objective. Environmental performance will be measured and reported against these indicators as part of the Macallum's commitment to continuously improve environmental, health and safety performance. The specific objectives and performance indicators for each environmental aspect of the project are summarised in Table 2 below.

Macallum developed specific management plans that details proposed management initiatives and practices that will be implemented to avoid and mitigate impacts to identified environmental values. With the application of these management commitments, the risk assessment identified that the overall residual impact to identified environmental aspects is considered to be medium to low.

Activity/ Aspect	Hazard	Potential Impact	Pre-treatment			Mitigation measures/ management control	Post-treatment		
			likelihood	Consequence	Inherent risk		likelihood	Consequence	Residual risk
1. Line preparation and seismic data acquisition									
Disturbance of native vegetation	Temporary alteration to native vegetation	Disturbance or loss native vegetation, flora species and its habitat.	B	2	Low	The seismic survey layout was designed to avoid clearing within sensitive areas such as wetland areas, creek tributaries and pastoral landholdings. The total footprint of temporary disturbance will be approximately (34km of source lines) within the Project area. There is no disturbance to native vegetation as the design of the line utilises an existing road corridor. Some vegetation may have grown over the verge during the winter rainy season, and some vehicle tyre marks may temporarily cause some grasses/ground covers to be flattened. This would be intermittent, very temporary and the plants on the verge would be sprayed/slashed by local shire maintenance teams. Accidental disturbance to native vegetation through a motor vehicle accident or accidental fire, however risks are reduced to ALARP. No Threatened flora species or Declared rare flora (or suspected DRF) have been identified during the ecological survey. GPS instruments were used to achieve high accuracy of demarcating final seismic alignments.	B	2	Low
		Disturbance or loss conservation significant flora species and TEC/PEC	B	2	Low	Very short duration survey within the disturbed environment of the road verge	B	2	Low
		Disturbance to native and conservation significant fauna and its habitat	B	2	Low	No conservation significant fauna were recorded during the on-ground ecological survey.	A	1	Low
	Disturbance to topsoil and Dust generation.	Soil degradation and reduction in soil quality, instability and erosion. Wind, water erosion and alteration to drainage and associated sediment runoff.	A	1	Low	No topsoil disturbance including removal of topsoil is proposed. No clearing will be involved as the road verge is clear to allow seismic geophones to be installed. Most vehicle and machinery movements will be at very slow speed to prevent dust generation. There will be no off-road driving and traffic will be restricted to designated road corridors only.	A	1	Low
All activities	Disturbance to cultural and historical heritage sites of significance.	Loss of artefacts. Disruption of Indigenous activities.	B	3	Low	Locations of cultural heritage sites (registered and lodged) are known. Cultural heritage management will be undertaken under the Heritage Protection Agreement executed between The Yued and Whadjuk Peoples and the permit holders. It is reasonable to assume, therefore that no potential artefacts will be affected by the Project activities.. Management of cultural heritage will be undertaken in accordance with the provisions of the Cultural Heritage Agreement.	A	1	Low
2D seismic data acquisition	Alteration to drainage.	Decrease in bank stability, increase in erosion, sedimentation and turbidity. Changes in flow rate. Disturbance to geomorphic wetland ecology	B	1	Low	The Project will be conducted during dry weather conditions. No watercourse crossing is proposed where permanent water flow is encountered. No clearing of vegetation is proposed for the project. No alteration to the drainage lines and watercourses is proposed. Nodes will be placed manually on the edge of the road verge. No water will be used during the Project activities to prevent run off to existing drainage channels, watercourses and wetland areas.	A	1	Low
	Generation of acoustic signals (vibration) and noise	Nuisance or disturbance to sensitive receptors.	B	1	Low	The Project area is sparsely populated. Seismic acquisition is planned during daylight time only (7am to 6pm) and is unlikely to exceed the noise criteria for 4WD vehicles set out in WA Environmental Protection (Noise) Regulations 1997. Appropriate speed limits for vibroseis vehicles and for supporting vehicles will be applied in the field. Field personnel are to ensure all engines, machinery equipment are operated and maintained with manufacturers' specifications. Vehicles and equipment will be operated in a manner that does not cause unnecessary noise (e.g. excessive revving or dropping materials)	A	1	Low
		Degradation of sensitive areas (water bores or public utilities). Structural damage to belowground infrastructure.	A	1	Low	The Project area is sparsely populated with limited infrastructure in place. A minimum 20m buffer zone will be established of a well, production facility, pipeline, building or public utility (s.714(1 (b) of the Schedule of Requirements 1991, revoked in 2016). Affected parties will be notified. Consultations on locations of below ground infrastructure will be undertaken with relevant parties, approvals/ permits will be obtained via Dial Before Dig services prior to clearing activities. Training and induction will be provided to the seismic crew and field personnel on strategic locations.	A	1	Low
Vehicle, machinery and equipment operations	GHG emissions and dust generation	Air pollution and contribution to climate change	C	1	Low	GHG emissions will result from the vehicle movements and machinery operations. Approx. 14 vehicles will be required for operations during the Project life. Total fuel consumption will be ~ 5-7kL. All engines and generators will be serviced to manufacturer's specifications and maintained as required. Routes to be optimised to avoid unnecessary driving. Vehicle movements will be kept to a minimum. Efficient use of machinery will be in place. All Contractors will maintain records of fuel consumption. All emissions will be reported quarterly to DMIRS in accordance with Regulation 33 and 34 of the PGER Act Regulations 2012.	B	1	Low
	Collisions with fauna	Fauna injury or mortality	C	1	Low	Project activities will be undertaken only during daylight hours. Driving outside of daylight hours will be limited to emergency only. Speed limits in place. Most operations at very slow speed. Reducing vehicle speed provides both the driver and fauna time to take evasive action. Field personnel will be inducted on speed limits, vehicle inspection requirements. Field personnel will be inducted on the potential to encounter fauna in the area and of the associated reporting requirements. Injured animal will be reported to DMIRS and the DPAW.	B	1	Low

Activity/ Aspect	Hazard	Potential Impact	Pre-treatment			Mitigation measures/ management control	Post-treatment		
			likelihood	Consequence	Inherent risk		likelihood	Consequence	Residual risk
	Introduction of Weeds	Spread of noxious weeds	C	1	Low	There is the potential that weeds maybe introduced to the road verge by survey vehicles. This will be managed by washdowns prior to mobilisation to site. Any noxious weeds noticed by the crew will be reported to Macallum, who will then pass the locations onto local shire maintenance teams. It is highly likely that weeds are already present in the disturbed area given its proximity to through traffic, wind and from agricultural zones. These areas are actively managed by the local shire maintenance teams.	B	1	Low
	Emergency	Accident (Traffic)	B	1	Low	There is the potential that a motor accident could cause a small environmental spill (fuel,oil), if a fuel tank was ruptured in the unlikely event of a motor vehicle accident. A traffic management plan will be put in place to reduce the risk of a traffic accident through the use of licenced traffic management controllers and reduced speed around the survey vehicles. Signs will be placed before the area being surveyed to warn motorists of the survey team working on the verge.	B	1	Low
General Activities									
Water consumption	Depletion of local water resources	Impact on local water supply.	A	1	Low	No water is required for seismic activities. Water will be consumed only for domestic purposes and sourced from accommodation facilities. Water for fire response will be supplied locally from licenced operators.	A	1	Low
Consumption of goods and materials	Generation of general waste	Visual pollution generated by litter, contamination of soil, modification of native and feral fauna habitat. Attraction of feral fauna.	B	1	Low	Given the relatively short-term life of the project, the generation of general waste will be limited to kitchen scraps, green waste, grey water, treated effluent, paper and packaging material. These wastes will generally be generated at accommodation facilities and will be managed in accordance with the accommodation facility waste management. Accommodation facility management will be responsible for further disposal of domestic waste and sewage. Domestic waste generated in the field (lunch boxes, food scraps, paper) will be brought back to the accommodation area each day for correct disposal. Personnel will be trained and competent to undertake waste identification, segregation, storage and disposal activities. All vehicles will contain plastic bags to collect rubbish. Sewage from portable toilets (if used) will be taken by a licenced contractor and disposed of at a designated waste facility according to the Shire of Dandaragan requirements. All emissions and discharges including waste will be reported quarterly to DMIRS in accordance with Regulation 33 and 34 of the PGER Act Regulations 2012.	A	1	Low
Refuelling and maintenance of equipment	Escape of controlled and hazardous waste <70L	Soil contamination, Land degradation	B	1	Low	Generation of controlled and hazardous waste will be limited to sewage, fuels and used oils/lubricants. Fuels, lubricants, and chemicals will be stored in appropriately bunded areas, (sufficient to retain the volume of the largest tank +10%) or self-bunded containers and used in accordance with manufacturer’s instructions and MSDS. A 1sq. metre bunded container will be placed under the refuelling nozzle. Refuelling will be conducted in accordance with Terrex TS-SOPMECH008 Fuel loading and unloading from delivery and TS-SOP-GEN019 Refuelling. All other vehicles will be refuelled at service stations offsite (Cataby Road House). All vehicles transporting fuel will have spill kits. Prestart inspections and load checks will be performed before travelling to / from site. All emissions and discharges will be reported quarterly to DMIRS in accordance with Regulation 33 and 34 of the PGER Act Regulations 2012. An approved <i>Oil Spill Contingency Plan</i> (OSCP) will be in place, with all field personnel trained in the implementation of the plan.	A	1	Low
2. Un-planned and non-routine activities									
Mobile fuel service tank operations	>500L spill of hydrocarbons from rupture of the mobile service tank used to refuel the vehicles.	Soil, water contamination and land degradation contained to the refuelling site area. Increase risk of fire.	B	3	Medium	The project will involve a refuelling in the field using a mobile service tank. It is expected that the mobile fuel service tank will have capacity of approximately 2,000L of fuel. The tank will be self-bunded and manufactured in accordance with <i>Australian Standards 1940:2004 and 3780:2008</i> . This risk assessment is based on a spill greater than 500L (reportable amount) but limited to the maximum amount of 2,000L spill (the worst case scenario). Chemicals and substances other than diesel fuel Terrex transports in vehicles and containers that meet road safety standards for transportation of all such chemical. Amount of chemicals and substances other than diesel fuel will not exceed 10L container each. In the event of an accident on the road which resulted in a spill, Terrex will respond in accordance with Terrex TS-PRO-32 – Emergency Preparedness and Response and notify the road safety authorities as it is obligated to do as a fuel transporter. Refuelling will be undertaken in accordance with Macallum’s minimum requirements for refuelling and Terrex TS-SOPMECH008 and TS-SOP-GEN019. All materials will be stored and handled in accordance with <i>Australian Standards 1940:2004 and 3780:2008</i> , manufacturer’s instructions and as described in MSDS for each identified material. A <i>Hazardous Materials Register</i> will be maintained by Terrex and MSDS for each registered material will be available on-site. All vehicles including a mobile fuel service tank will be equipped with suitable clean up equipment (spill kit). The DMIRS approved <i>OSCP</i> will be in place during the project, with site personnel trained in the implementation of the plan. In case of spill, the spill will be managed in accordance with the OSCP. Field personnel will be trained to implement the ERP and the OSCP. Emergency spill drill will be performed prior to the Project commencement date. In case of an environmental damage caused by a spill resulting from the Project activities, Macallum is responsible to complete necessary restoration activities. A spill incident will be reported to the DMIRS in accordance with Reg.28 of the PGER (E) Regulations 2012.	A	2	Low
Working equipment, electrical systems, cigarettes butts, 3rd party activities, natural	Fire	Smoke hazard, injury or death of native fauna, GHG emissions, changes to ecological values.	B	4	Medium	Consultation with the DFES will take place prior to the project activities. An approved <i>Emergency Response Plan</i> will be implemented. Fire drill and use of fire-fighting equipment training will be conducted prior to the commencement. Activities during high fire risk seasons and total fire ban days will be avoided. Consultation with the Local Fire Authority will take place prior to seismic activities. An approved Emergency Response Plan (ERP) will be implemented. Fire drill will be conducted on-site prior to commencement of the Project activities. A water truck with a 2,000L water tank and firefighting equipment will be with the crew at all times. Each 4WD vehicle will be equipped with correct fire extinguishers (9L water or foam), shovel or rake (Schedule of Requirements 1999 as amended 2010). Field personnel will be trained on firefighting techniques and inducted including smoking and driving behaviour. Smoking will be prohibited within high risk fire areas and during total fire ban period unless designated smoking areas established. Lighting of fires will be prohibited. All vehicles will use diesel fuel. Emergency services will be contacted on 000 in case of uncontrolled fire.	A	3	Medium

Activity/ Aspect	Hazard	Potential Impact	Pre-treatment			Mitigation measures/ management control	Post-treatment		
			likelihood	Consequence	Inherent risk		likelihood	Consequence	Residual risk
event and vandalism.									
Interaction with services and relevant stakeholders									
All activities	Increases in traffic across public and local road network.	Damage to the road surface, impact the efficiency, safety and amenity of roads.	A	1	Medium	Traffic management control in place. All of the survey will be conducted alongside the road in the disturbed verge zone. Most traffic on local roads will be commuted to/from seismic acquisition sites. Increase in traffic will be insignificant and limited to approx. 10-14 vehicles which will be dispersed within the project area. Survey will be conducted only during daylight hours. Driving outside of daylight hours will be minimised. Unnecessary trips will be avoided. Speed limits in place.	A	1	Low
All activities	Interaction with agricultural activities	Impact on crop or stock. Nuisance to landholder. Restriction of landholder activities.	A	1	Low	Not applicable as the survey will not be conducted on agricultural land.	A	1	Low

6 IMPLEMENTATION STRATEGY

The implementation strategies were developed to ensure environmental objectives are met and performance indicators are achieved over the course of the Project. The strategy describes specific mitigation measures and management practices that will be applied to the operations to reduce environmental impacts to land, water, air and cultural heritage.

Once this Environmental Plan is approved, these practices and procedures will be used by Macallum personnel and Macallum's contractors and sub-contractors as a practical implementation and management tool when conducting the Project activities. In order to ensure that the environmental objectives are achieved all field personnel including Macallum, contractors and sub-contractors must comply with this EP. In addition, the approved Safety Management Plan (SMP) and contractor's Site Specific Management Plan (SSMP) will be implemented to assist with management of safety and emergency responses.

The Macallum Site Representative will be present in the field at all times during the survey and will ensure that Macallum's environmental requirements are met in all aspects of the survey's operations. This will be verified via audits, inspections, monitoring and review.

Macallum will ensure that all contractors and sub-contractors have the following documents and procedures in place prior to commencement of the survey:

- Copy of this approved EP and associated reporting and compliance documents
- Site Specific Management Plan
- Oil Spill Contingency Plan
- Emergency Response Plan (ERP)
- Re-fuelling procedure
- Records of field personnel trainings and inductions.

6.1 ROLES AND RESPONSIBILITIES

The survey specific roles and responsibilities are detailed in implementation strategies. Macallum will appoint Terrex Seismic as the Principal Contractor to deliver the project. The Contractor's responsibilities will be incorporated into a bridging document prior to the commencement of the seismic survey.

Generally, the seismic contractor is responsible for surveying the seismic lines and acquiring the seismic data. The contractor will be responsible for exhibiting an environmental "duty of care" and meeting Macallum's environmental objectives described in this Plan. Macallum is responsible for clearly defining and communicating the project management and responsibilities for the seismic survey, monitoring the seismic line preparation and data acquisition and ensuring that disturbed areas are rehabilitated as soon as practical and that rehabilitation performance indicator are met.

Macallum Site Representative will be present in the field during activities. The Terrex Crew Manager is responsible for reporting daily on operations activities to the Macallum Site Representative. Macallum Land Access Officer will organise land access on private properties and ensure compliance with land access protocols. Macallum Project Manager will be responsible for compliance with approved EP including inspections, monitoring, data collection and reporting as prescribed under relevant regulations.

All Macallum personnel, contractors and sub-contractors must comply with this Environmental Plan.

6.2 TRAINING, INDUCTION AND COMPETENCIES

All personnel will be suitably trained and experienced in the works that they are to perform. Contractors shall maintain and provide to Macallum a Competency Training and Induction Matrix including details of qualifications and competencies for their team members. Personnel are obliged to have valid certifications and medicals prior to the project activities and provide copies when requested.

All workers (including contractors and subcontractors) are required to complete field induction. Training, induction and awareness content and how this relates to the responsibility of personnel are addressed in the implementation strategy framework for each objective or group of objectives. All field

personnel including Macallum employees, contractors, visitors, auditors etc. will be required to attend field induction prior to activities. All workers will be made aware during induction of relevant environmental obligations to perform their jobs in an environmentally responsible manner.

6.3 ENVIRONMENTAL REPORTING

Incident reporting will be undertaken in accordance with Regulation 16, 28, 29 and 30 of the PGER(E) Regulations 2012 and as prescribed in s.3.8 of the Guideline for the Development of the Environmental Plans in WA, DMP 2016.

Regulation 28 of the PGER (E) Regulations requires Macallum to report to DMIRS any reportable incident that classified as a reportable incident in the Environment Plan for the project; or an incident has caused, or has the potential to cause, an adverse environmental impact; and an environmental impact that has been categorised as moderate or more serious than moderate under the environmental risk assessment process described in the EP.

DMIRS will be notified via email petroleum.environment@dmirs.wa.gov.au or via DMIRS Submissions Portal within two hours of Macallum Site Representative becoming aware of a reportable incident occurring. In addition to the notification provided to the DMIRS, Macallum will submit a written report to the DMIRS within three (3) days of the initial notification. The DMIRS Environmental Incident Report Form template ENV-PEB-189, Rev3.0, 2012 will be used.

Recordable incidents will be reported to DMIRS in accordance with Regulation 30 (4d) of the PGER (E) Regulations. Any incident that occurs during the project and which breaches an environmental performance objective or standard in this EP, but is not reportable, is a recordable incident.

Macallum will maintain a record of all recordable incidents that occur during the Project activities and report to DMIRS no later than 15 days following the end of each calendar month.

In accordance with Regulation 34 of the PGER (E) Regulations, Macallum will report to DMIRS on a three monthly basis the estimated emissions and discharges to the environment as a result of the project. This reporting will commence immediately upon beginning the project and will continue until completion of the project.

Macallum will provide an environmental close-out report within three (3) months of completion of the seismic activities. The close-out environmental report will summarise environmental performance of the project activities to enable DMIRS to determine whether the EP objectives have been achieved, performance indicators are met and the implementation strategy complied with.

In addition to the close-out report, an annual rehabilitation report covering the ongoing rehabilitation and monitoring activities will be submitted to DMIRS within 12 months following the completion of the seismic activities. Annual rehabilitation report will be submitted annually for a period until the rehabilitation is considered successful.

8 STAKEHOLDERS CONSULTATION

Consultations have be undertaken and will continue to be taken with relevant stakeholders:

- DMIRS
- South West Aboriginal Land & Sea Council
- The Yued People
- Department of Lands
- Shire of Victoria Plains, Gingin and Chittering
- Landholders
- Terrex Seismic

Macallum will continually consult with relevant government authorities, community, interested third parties and organisations on all operations, as required until the project is completed.

9 CONTACTS

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10 REFERENCES

- 360 Environment, *Environmental Opportunities and Constraints Assessment – North Perth Basin*) Desktop assessment report, November 2017
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Abbreviations

ALARP	As low as reasonably practical
ATR	Action Tracking Register
Macallum	Macallum Group Limited
2D	Two Dimensional
DAA	Department of Aboriginal Affairs
DRF	Declared Rare Flora
EP	Environmental Plan
EP	Exploration Permit
EP494	Petroleum Exploration Permit EP494
EP Act	Environmental Protection Act 1986
OEPA	Office of the Environmental Protection Authority
EPBC	Environmental Protection and Biodiversity Conservation Act 1999
ESA	Environmentally Sensitive Area
ERP	Emergency Response Plan
IMS	Integrated Management System
DFES	Department of Fire and Emergency Services
GHG	Greenhouse Gas
GIS	Geographical Information System
GPS	Global Positioning System
HSE	Health, Safety and Environment
MSDS	Material Safety Data Sheets
NR	Nature Reserve
NP	National Park
PGER Act	Petroleum and Geothermal Energy Resources Act 1967
PPE	Personal Protective Equipment
SSMP	Site Specific Management Plan
SMP	Safety Management Plan
OH&S	Occupational Health & Safety
OSCP	Oil Spill Contingency Plan
UCL	Unallocated Crown Land
UHF	Ultra High Frequency
WA	Western Australia



Macallum Group Limited – ENVIRONMENTAL POLICY

Scope:

This policy covers all Macallum Group Limited (Macallum) activities and its subsidiary companies who commit to diligently conducting operations, so as to responsibly protect the natural environment, taking into consideration safety, social and economic factors.

This policy applies to all aspects of exploration and production.

Macallum’s directors, employees and contractors shall undertake their duties in accordance with this Policy.

In order to fulfil this commitment, Macallum will:

- Provide management leadership to the company supporting this Policy.
- Act diligently and responsibly to protect the environment in which it operates – by meeting or exceeding the legal requirements.
- Establish, act to achieve and periodically review environmental performance objectives, targets and outcomes, seeking opportunities for further improvement.
- Develop a culture of sustainable environmental management by:
 - Developing awareness and involvement of our Board and employees
 - Implementing systems for environmental management
 - Setting objectives and associated monitoring systems to enable continuous improvement.
- Identify, evaluate and control environmental risks to activities, to as low as reasonably practicable.
- Promote the efficient use, reuse and recycling of resources, and the minimisation of waste and emissions.
- Rehabilitate disturbed areas in accordance with regulations and site specific plans
- Ensure that contractors, joint venture partners and stakeholders share the responsibility of achieving sustainable environmental practices.
- Review this policy and our performance every two years against our environmental targets.

A handwritten signature in black ink, appearing to read "Peter McIntyre", is written over a horizontal dotted line.

Peter McIntyre
Director, Macallum Group Ltd.
9th February 2018

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ATTACHMENT 2: FIGURES

Figure 1 – Regional location of the project area

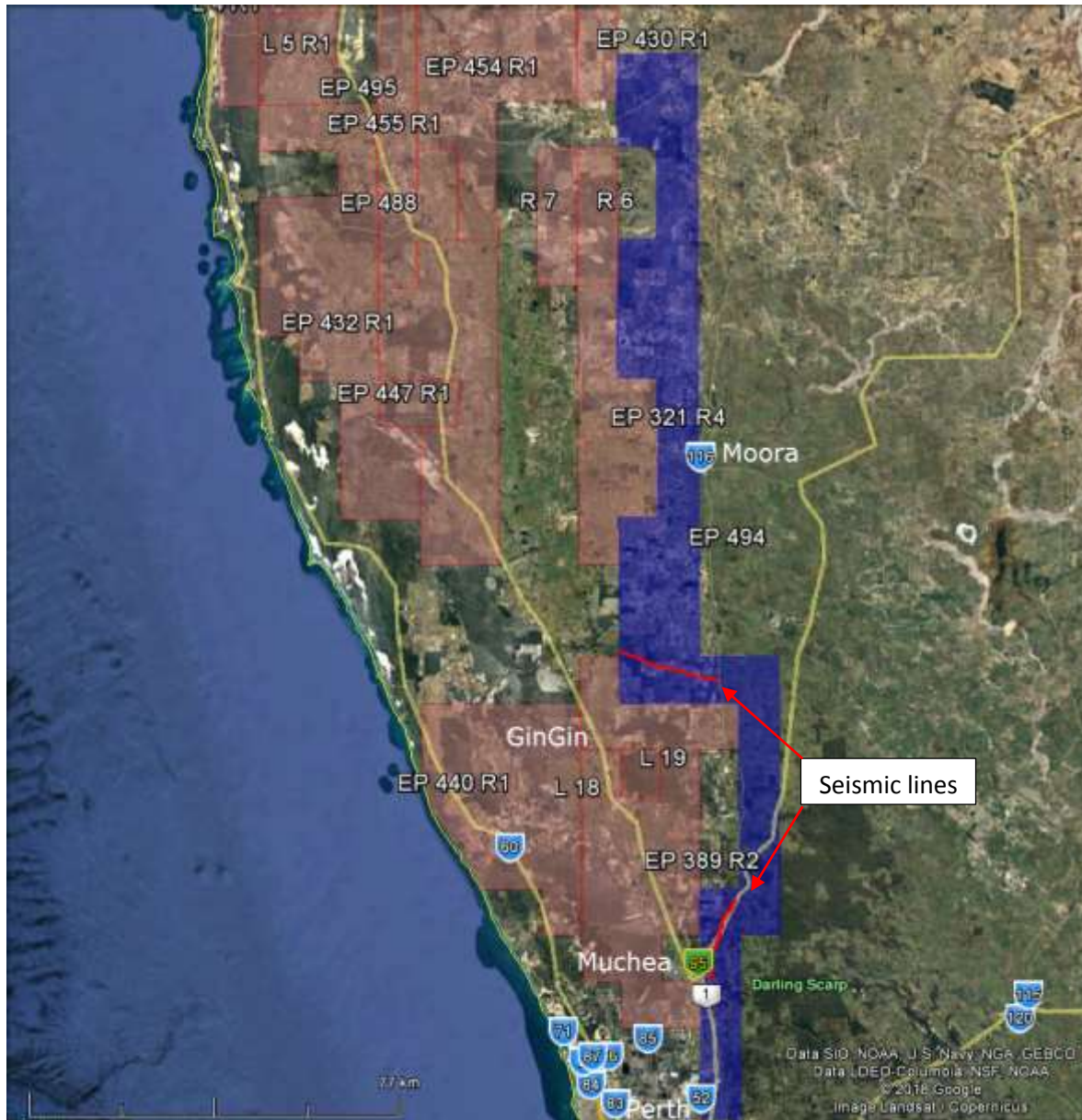


Figure 2: Layout of 2D seismic survey overlaid on Google Earth map

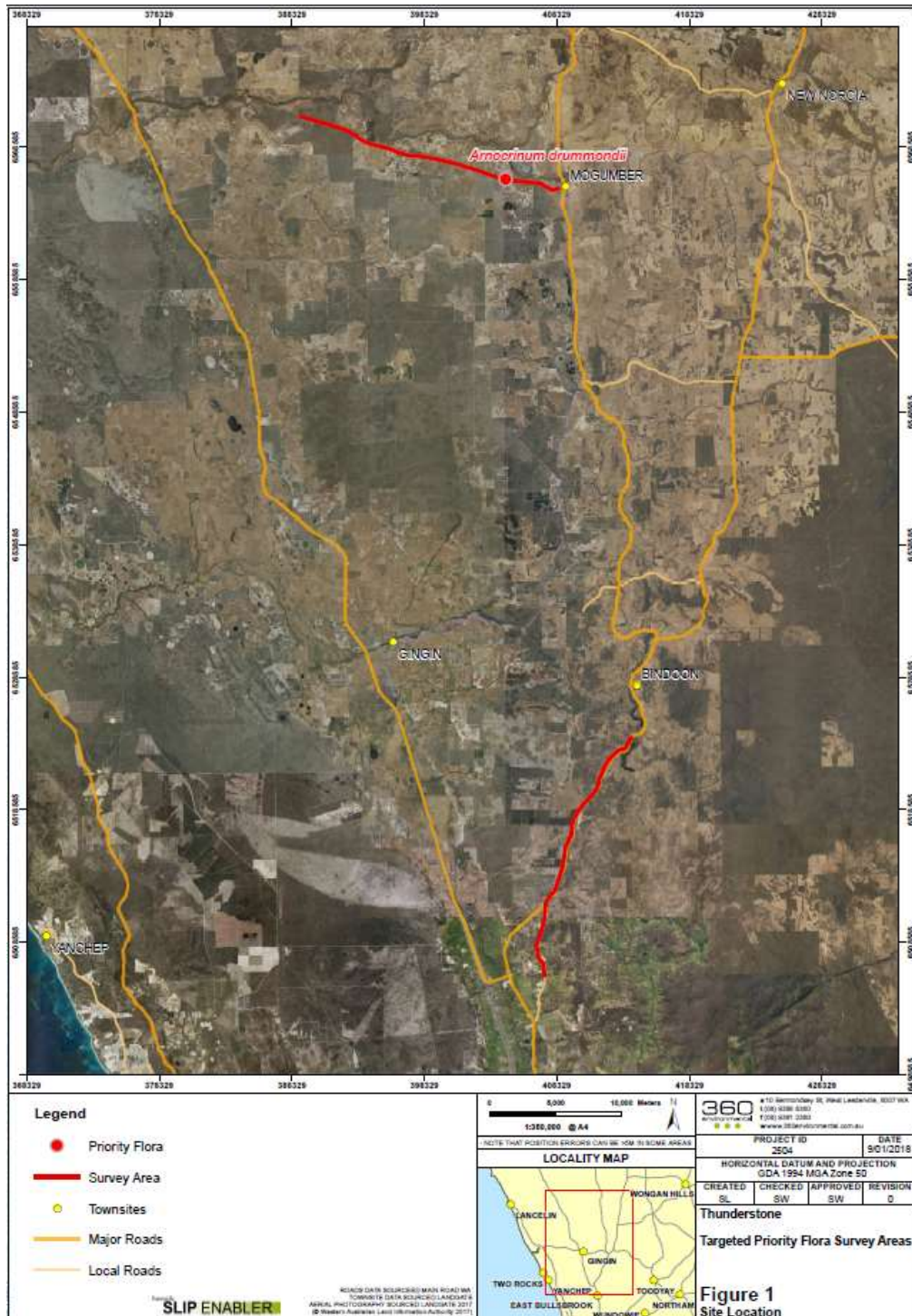


Figure 3: Tenure and Land use – Mogumber Rd West

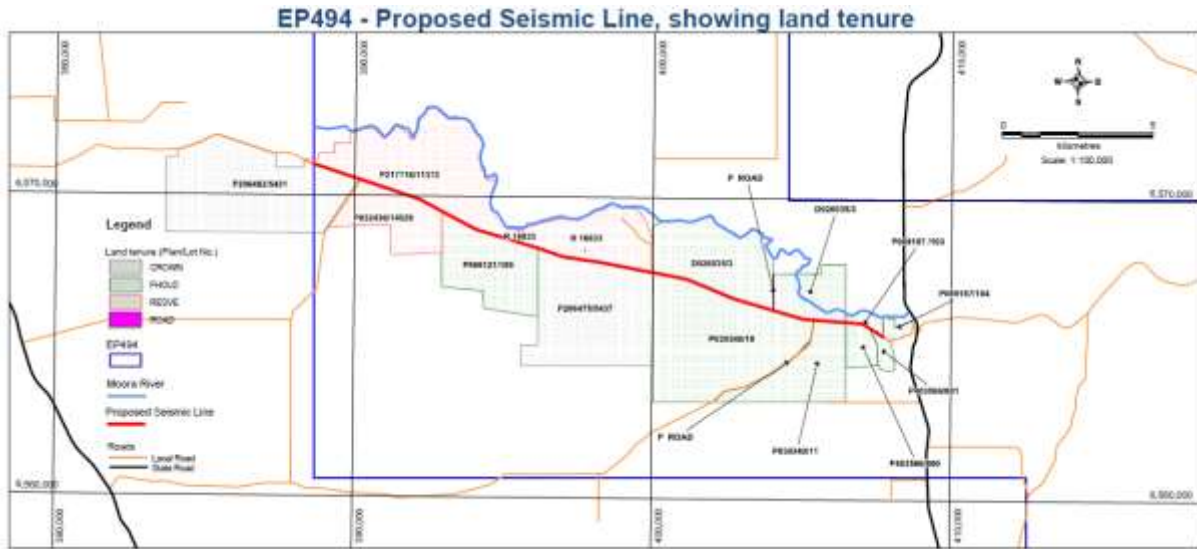


Figure 4: Tenure and Land use – Wandena Rd – Great Northern Highway

