Wodgina Lithium Project

M45/281, M45/50-I, L45/108

W2 PIPELINE REHABILITATION PLAN – PUBLIC DISCLOSURE DOCUMENT

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30 January 2019

Report Reference: ENV-TS-RP-0119

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Revision History

Revision Number	Issue Date	Prepared By	Approved By	Purpose
0	30/01/2019	David Swain	Tim Berryman	Initial revision of W2P rehab plan for public disclosure
1				
2				

CONTENTS

TABLES

FIGURES

1. INTRODUCTION

1.1. Scope

This Rehabilitation Plan (the Plan) has been developed to addresses Condition 1 of the Wodgina Lithium Project Construction Environment Plan for Pipeline Licence (PL) 116. The Plan addresses progressive rehabilitation during the construction phase of the W2P project. Preliminary information associated with provision of a Detailed Rehabilitation Environmental Plan (REP) for the W2P has also been provided.

The Scope of the Plan is consistent with Section 3.1.2.3 of the DMIRS 2016 Guideline titled: Guideline for the Development of Petroleum and Geothermal Environment Plans in Western Australia, November 2016, which states:

(1) If rehabilitation activities are not adequately described in the activity EP, then a summary of planned rehabilitation activities and commitments is provided in the rehabilitation EP.

(2) Prior to operational activities ceasing and decommissioning activities commencing, a detailed rehabilitation EP must be submitted to DMIRS for review.

The Wodgina mining centre sits about 95 km south of Port Hedland, in the Pilbara region of Western Australia (WA). The site has a long history of mining for a variety of minerals, including iron ore and tantalum. Wodgina Lithium Pty Ltd (WLPL), a subsidiary of Mineral Resources Limited (MRL), presently holds minerals rights to mine spodumene ore (a lithium-bearing mineral).

The WLPL operations incorporate an 11 MW gas reciprocating power station, to support production of up to 0.4 million tonnes per annum (Mtpa) of ore for direct shipment. The power station is fed by an existing approved 80 km DN100 buried gas lateral (here referred to as W1P), connected to the Pilbara Energy Pipeline (PEPL), which runs between Karratha and Port Hedland.

WLPL intends to expand operations to 0.6 Mtpa, with potential to eventually expand to 12 Mtpa. To support such production rates WLPL received approval under the *Mining Act 1978* on 16 March 2018 (REGID 71172) to upgrade the power station to 64 MW. This power station upgrade will be fed by an additional DN250 buried gas lateral with new inlet and delivery (outlet) stations (here referred to as W2P), running from the PEPL in parallel with the W1P. Approval of the W2P was granted under the *Pipeline Petroleum Act 1969* (PL 116) on 21 August 2018 and *Mining Act 1978* on 23 October 2018 (REGID 74363). WLPL will be the operator of the W2P.

The W2P pipeline will extend primarily along tenement L45/108 which ends at the boundary with M45/381. A small section of the pipeline will be constructed on M45/381 and M45/50-I.

The W2P rehabilitation plan commits to reinstating disturbed areas during the construction phase including:

- backfilling and compacting the trench and reinstate adjacent areas, to ensure that water does not pool and encourage feral species.
- respreading stockpiled topsoil evenly, to return growth medium and seed bank.
- scarifying across contours, to trap seed.
- respreading stockpiled vegetation, to return vegetative material, and provide resistance to erosion.

Further details on the W2P, its route, tenure, surrounding environment, construction and reinstatement methods, and environmental management measures for construction works are provided in the Construction Environment Plan (CEP) (EARS-EP-76664) approved by Department of Mines, Industry Regulation and Safety (DMIRS) on 07 November 2018.

2. APPLICABLE LEGISLATION

2.1. Commonwealth and State Legislation and Regulations

Key Commonwealth legislation applicable to rehabilitation and considered in the preparation of this Rehabilitation Plan includes:

- *Environment Protection and Biodiversity Conservation Act 1999.*
- *Native Title Act 1993.*
- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984.*

Key State legislation applicable to rehabilitation and considered in the preparation of this Rehabilitation Plan includes:

- *Petroleum Pipelines Act 1969*
  - *Petroleum Pipelines Regulations 2012*
- *Environmental Protection Act 1986*
  - *Environmental Protection Regulations 1987*
- *Mining Act 1978*
  - *Mining Regulations 1981*
  - *Mines Safety and Protection Regulations 1995*
- *Contaminated Sites Act 2003*
  - *Contaminated Sites Regulations 2006*
- *Aboriginal Heritage Act 1972*
- *Wildlife Conservation Act 1950*
- *Land Administration Act 1997*
- *Soil and Land Conservation Act 1945*
- *Dangerous Goods Safety Act 2004*

2.2. Tenement Conditions

Conditions for the W2P mining tenements have been reviewed for relevance to rehabilitation and closure planning. The following commitments displayed in **Table 1** have been identified.

TABLE 1: TENEMENT CONDITIONS

Condition	Commitment
Tenement L45/108	
11	On completion of the life of mining operations in connection with the licence, the holder shall rehabilitate the land used for road purposes, to the satisfaction of the State Mining Engineer.
19	Consent to mine on the Yule River Water Reserve and Water Reserve 33015 granted subject to: On completion of operations the area being restored to a condition as close as possible to that existing prior to the commencement of operations.
Tenement L45/381	
6	Unless the written approval of the Environmental Officer, DoIR is first obtained, the use of scrapers, graders, bulldozers, backhoes or other mechanised equipment for surface disturbance or the excavation of costeans is prohibited. Following approval, all topsoil being removed ahead of mining operations and separately stockpiled for replacement after backfilling and/or completion of operations.
16	The development and operation of the project being carried out in such a manner so as to create the minimum practicable to the existing vegetation and natural landform.
17	All topsoil being removed ahead of all mining operations from sites such as excavation areas, waste disposal areas, ore stockpile areas, pipeline, haul roads and new access roads and being stockpiled for later respreading or immediately respread as rehabilitation progresses.
18	At the completion of operations, all buildings and structures being removed from site or demolished and buried to the satisfaction of the State Mining Engineer
20	At the completion of operations, or progressively where possible, all access roads and other disturbed areas being covered with topsoil, deep ripped and revegetated with local native grasses, shrubs and trees to the satisfaction of the State Mining Engineer.
Tenement M45/50-I	
2	All topsoil being removed ahead of mining operations and stockpiled for replacement in accordance with the directions of the Mining Engineer-District Inspector of mines.
9	All topsoil being removed ahead of all mining operations from sites such as pit areas, waste disposal areas, ore stockpile areas, pipeline, haul roads and new access roads and being stockpiled for later respreading or immediately respread as rehabilitation progresses.
10	At the completion of operations, all buildings and structures being removed from site or demolished and buried to the satisfaction of the State Mining Engineer.
12	At the completion of operations, or progressively where possible, all access roads and other disturbed areas being covered with topsoil, deep ripped and revegetated with local native grasses, shrubs and trees to the satisfaction of the State Mining Engineer.
34	The lessee submitting to the State Mining Engineer in October of each year, a brief annual report outlining the project operations, minesite environmental management and rehabilitation work undertaken in the previous 12 months and the proposed operations, environmental management plans and rehabilitation programmes for the next 12 months

2.3. Petroleum Pipelines Act 1969

A CEP (EARS-EP-76664) was approved by Department of Mines, Industry Regulation and Safety (DMIRS) on 07 November 2018 to address requirements of the *Petroleum Pipelines Act 1969*. Commitments approved in the CEP relating to rehabilitation and decommissioning are summarised in **Table 2**.

2.4. Mining Act 1978

2.4.1. Mining Proposals

Rehabilitation and decommissioning related commitments made in MPs granted under the *Mining Act 1987* are presented in **Table 2** and are addressed by this Rehabilitation Plan.

2.5. Environmental Protection Act 1986

Vegetation clearing for the W2P was assessed under Part IV of the *Environmental Protection Act 1986* (EP Act) related to "Environmental Impact Assessment". Conditions associated with approved clearing permit CPS 8068/1 relating to rehabilitation and decommissioning are summarised in **Table 2**.

2.6. Environmental Protection Biodiversity Conservation Act 1999

No approvals associated with W2P have been referred for consideration of Matters of National Environmental Significance.

2.7. Cultural Heritage

The W2P is wholly situated in the Kariyarra native title claim area. Currently the WLPL mine operates under a land use agreement with the Kariyarra Native Title Claimant Group (WA6169/1998).

A search of the Department of Aboriginal Affairs' Aboriginal Heritage Inquiry System (AHIS) indicates there are two Registered Aboriginal heritage sites and one Other Heritage Place that falls within Pipeline Licence 116 (otherwise referred to as STP-PLA-0033):

- Site ID 16034 Karratha-South Hedland 17 (Registered).
- Site ID 9009 Gulindjina Yambara (Registered).
- Site ID 37223 Women's Hill (Coodigulla).

A description of these sites and their relationship to the proposed gas pipeline is provided in **Section 2.7.1 – Section 2.7.3**.

During 2018 MRL consulted with representatives from the Kariyarra People's native title determination application to undertake further heritage surveys over PL116. Additional heritage sites that were identified during these surveys have been mapped and the pipeline has been re-designed to avoid the disturbance of these heritage sites.

2.7.1. Site ID 16034

Utilising the services of the Yamatji Marlpa Aboriginal Corporation (YMAC) and in consultation with representatives from the Kariyarra People's native title determination application, a site identification heritage survey was undertaken at Side ID 16034 in August 2018 in order to provide an accurate boundary of the site's extent. The results from this survey concluded that Karratha-South Hedland 17 does not extend into the boundary of PL116 therefore MRL's activities will not disturb this site.

2.7.2. Site ID 9009

A heritage survey was undertaken in July 2018 with the Wamarranya representatives from the Kariyarra People's native title determination application for MRL's activities within M45/38. The results from this survey conclude that Site ID 9009 does not fall within the area of PL116.

2.7.3. Site ID 37223

MRL continues to liaise with the Wamarranya representatives to ensure that this site is not disturbed during construction of the pipeline.

2.8. Industry Guidelines

Industry guidelines considered in the preparation of this Rehabilitation Plan, include:

- Guideline for the Development of Petroleum and Geothermal Environment Plans in Western Australia, November 2016. Department of Mines and Petroleum, Western Australia.

TABLE 2: MINING PROPOSAL COMMITMENTS

Proponent (date)	Details	Approved / Submitted	Construction / Decommissioning Commitment	Commitments
Mining Act 1978 **(REGID 74363)**				
Wodgina Lithium (12 October 2018)	Mining Proposal for clearing of 262 ha of native vegetation for duplication of the W1P (DN100) pipeline with a DN250 gas pipeline.	Approved	Construction	Rehabilitation will include: - Removal of temporary infrastructure required for construction - Rehabilitation of the construction right of way with the exception of the access road. - Turkey nest dam will be backfilled. Rehabilitation of the construction right of way will involve: - Restoration of the land surface through backfilling of the pipeline trench. - Respreading of separately stockpiled subsoil, topsoil and vegetation, and scarification of the final land surface.
			Decommissioning	Rehabilitation will include: - Removal of any surface infrastructure used for operations and rehabilitation of the affected surfaces. - Rehabilitation of the access track where transfer to a third party is not agreed.
Petroleum Pipelines Act 1969 (EARS-EP-76664)				
Wodgina Lithium (19 October 2018)	Construction Environment Plan covering environmental risks and controls for construction of the W2P DN250 gas pipeline.	Approved	Construction	In order to manage 'erosion of soils, weed proliferation, and impacts to land uses due to inadequate reinstatement', at completion of works, and except where otherwise agreed with landholders, disturbed areas will be reinstated by: - Respreading stockpiled topsoil evenly, to return growth medium and seed bank. - Scarifying across contours, to trap seed and water. - Respreading stockpiled vegetation, to return vegetative material, and provide resistance to erosion. In order to manage 'attraction of feral animals to ponded water', at completion of works disturbed area will be reinstated by: - Backfill and compact trench and reinstate adjacent areas, to ensure that water does not pool and encourage feral species.
			Decommissioning	WLPL expects the pipeline to remain insitu at the end of the asset life, with only final decommissioning and rehabilitation works for surface facilities (the inlet and delivery stations) and remaining disturbances to be completed. Works are expected to include: - Disconnecting and depressurising the below-ground pipeline, and purging it of all residual gas and hydrocarbons. - Removing short sections of the pipeline or filling them with grout at third-party crossings, depending on stakeholder requirements. - Removing above-ground pipework and installations, including the offtake and delivery stations, and associated control equipment, for salvage, scrap, or disposal. - Breaking up above-ground concrete slabs or footings for burial in-situ or other appropriate disposal. - Removing marker posts, other signs, and fences. - Reinstating any remaining disturbed areas such as inspection tracks and access roads, except where agreements and approvals are established to fully transfer liability to a third party such as a pastoral station.
Environmental Protection Act 1986 **(CPS 8068/1)**				
Wodgina Lithium (11 October 2018)	Vegetation Clearing Permit	Approved	Construction	Condition 7(b): Where a watercourse or wetland is to be impacted by clearing, the Permit Holder shall maintain the existing surface flow.
Environmental Protection Act 1986 **(CPS 8068/1 Native Vegetation Clearing Permit - Supporting Document)**				
Wodgina Lithium (7 September 2018)	Wodgina Lithium assessment against 10 clearing principles for Gas Pipeline, Cassiterite Pit Expansion, Expansion of Eastern Waste Landform and Construction of Dry Tailings Storage Facility north of TSF4 (Report Ref. ENV-TS-0097-Rev1).	Approved	Construction/Decommissioning	Nil

3. STAKEHOLDER ENGAGEMENT

WLPL recognises the importance of stakeholder consultation in the development of the objectives and criteria for this Rehabilitation Plan.

The objective of stakeholder consultation is to ensure that groups and individuals who may be affected by the Rehabilitation Plan have been consulted and their input considered with respect to final land use and closure.

WLPL's approach to stakeholder consultation involves:

- Identifying key internal and external stakeholders.
- Identifying stakeholder issues regarding social and environmental values and grouping these issues into manageable categories.
- Commencing a thorough consultation process to ensure that stakeholders concerns are appropriately considered.
- Assessing all stakeholder issues and concerns and providing feedback to stakeholders on how issues will be addressed.
- Understanding future stakeholder consultation requirements throughout operation and closure phases.

3.1. External Stakeholders

The current focus of consultation for the W2P is with key stakeholders: Department of Mines, Industry Regulation and Safety, Traditional Owners (Kariyarra People) and Pastoralists (Mundabullangana, Indee and Kangan Pastoral Stations). As the W2P approaches cessation of operations, closure specific consultation will increase with broader stakeholder groups such as those listed below.

State Government agencies:

- Department of Mines, Industry Regulation and Safety (DMIRS) - Approvals.
- Department of Water and Environment Regulation (Department of Water) – Activities on Water Reserve 33105.
- Water Corporation – Activities within Water Reserve 33105.
- Department of Planning, Lands and Heritage – Heritage issues.
- Main Roads Western Australia (MRWA) – Activities near North West Coastal Highway.

Shires, Local Governments and politicians:

- Town of Port Hedland.
- Local Member for the Pilbara.
- Minister for the Environment and Water Resources.
- Minister for Mines and Petroleum.
- Minister for Heritage.

Traditional owners and community

- Traditional Landowners: Kariyarra People.
- Atlas Mining – Mount Dove road crossing.
- Horizon Power – Power transmission line.
- Pastoral Station Manager (Kangan Pastoral Station, Indee Pastoral Station and Mundabullangana Pastoral Station).
- Other affected tenement holders.

4. REHABILITATION PLAN OBJECTIVES

4.1. Background

Rehabilitation objectives for the W2P project are detailed in **Table 3,** with WLPL's overarching philosophy for rehabilitation and mine closure is to leave the site in a *safe, stable and non- polluting state, with self-sustaining ecosystems present, where possible*.

The W2P is located on several different land tenure types described below:

- The majority of the project lies on pastoral station supporting low intensity grazing. These include the Kangan, Indee and Mundabullangana Pastoral Leases.
- The far northern extent of the gas pipeline is designated Water Reserve managed by Department of Water and Environment Regulation (DWER).

As indicated in **Section 2.8,** in determining appropriate rehabilitation objectives for the construction phase, reference has been made to the DMIRS Guideline titled: Guideline for the Development of Petroleum and Geothermal Environment Plans in Western Australia November 2016 (DMIRS, 2016).

4.2. W2P Rehabilitation Objectives

The overall rehabilitation objective of the W2P is to reduce the operational footprint of the active pipeline CROW. In an endeavour to achieve this primary objective, a number of underlying objectives have been developed, which will assist in ensuring that commitments made in and conditions of approvals are appropriately addressed.

A summary of rehabilitation objectives relevant to the W2P project is provided in **Table 3**.

Rehabilitation objectives that address the closure and decommissioning of linear infrastructure, including the W2P will be addressed in the W2P Detailed REP.

TABLE 3: CONSTRUCTION REHABILITATION OBJECTIVES

Aspect	Rehabilitation Objective
Flora	• Disturbed areas have vegetation communities that are representative of the region, are where practicable, self-sustaining and provide habitat for local fauna. • No new weed species have become established as a result of the Project.
Fauna	• Construction does not encourage proliferation of feral species.
Surface Water	• Hydrological patterns are not adversely affected long-term.
Waste	• Waste is disposed of appropriately and in accordance with the relevant legislation and regulatory approvals.
Linear Infrastructure	• Turkey nest dams are designed to reduce the risk of falls to people and wildlife and backfilled to ensure no ponding of water. • Liner to be removed where infrastructure located either within a PDWSA and/or identified conservations significant habitat area Note: the W2P turkey nest dam liner will be removed as it is located within identified conservation significant habitat area

5. COMPLETION CRITERIA

5.1. W2P Completion Criteria

Completion criteria for rehabilitation following construction of the W2P is addressed in **Table 4**

Completion criteria applicable to closure and decommissioning of the W2P at the end of its effective operating life will be addressed in the W2P Detailed REP.

TABLE 4: CONSTRUCTION REHABILITATION COMPLETION CRITERIA

Aspect	Closure Objective	Completion Criteria	Performance Indicator	Measurement Tool
Flora	• Disturbed areas have vegetation communities that are representative of the region, are where practicable, self-sustaining and provide habitat for local fauna.	• Vegetation is locally endemic. • Vegetation is suited to the agreed final land use.	• Stockpiled topsoil has been used to provide a suitable medium for plant establishment and a source of propagules. • Stockpiled vegetation utilised in rehabilitation activities.	• Project inspection and audits records. • Bi-annual review of the W2P corridor for years 1 & 2 post completion of rehabilitation activities to include: – Photographic monitoring
	• No new weed species have become established as a result of the Project.	• Weed density comparable to surrounding vegetation. • No new weed species identified which are new to the area.	• Vehicles, mobile and fixed plant, equipment, and materials certified as clean, and free of clumps of soil or vegetation, before entry to the project. • Control weeds as necessary.	• Project inspection and audits records. • Bi-annual review of the W2P corridor for years 1 & 2 post completion of rehabilitation activities to include: – Presence/ absence of weed species •
Fauna	• Construction does not encourage proliferation of feral species.	• Pipeline trench does not pond water, which could support feral species.	• Backfill and compact trench and reinstate adjacent areas, to ensure that water does not pool and encourage feral species.	• Project inspection and audits records. • Bi-annual review of the W2P corridor for years 1 & 2 post completion of rehabilitation activities to include: – Presence/ absence of feral animals
Surface Water	• Hydrological patterns are not adversely affected long-term.	• Where a watercourse is impacted by clearing, the existing surface flow is maintained.	• No ponding or impoundment of surface water in watercourses as a result of construction.	• Project inspection and audits records. • Bi-annual review of the W2P corridor for years 1 & 2 post completion of rehabilitation activities to include: – Presence/ absence of significant erosion and/or pooling of surface water
Waste	• Waste is disposed of appropriately and in accordance with the relevant legislation and regulatory approvals.	• All waste is removed from the CROW and disposed of to an appropriately licenced facility.	• All waste removed from CROW.	• Project inspection and audits records.
Linear Infrastructure	• Turkey nest dams are designed to reduce the risk of falls to people and wildlife and backfilled to ensure no ponding of water.	• All turkey nest dams are backfilled. • Where a turkey nest dam[1] is located within either a PDWSA and/or identified conservations significant habitat area, the dam liner will be removed and disposed of to a licensed landfill. • Where a turkey nest dam is not located within a PDWSA and/or identified conservation significant habitat area, the liner will be either be buried at least 1m below surface or alternatively, removed to a licensed landfill.	• Landform consistent with surroundings • Liners removed or buried at least 1m below surface – subject to location within either a PDWSA and/or identified conservations significant habitat area.	• Project inspection and audits records. • Bi-annual review of the W2P corridor for years 1 & 2 post completion of rehabilitation activities to include: – Presence/ absence of significant erosion and/or pooling of surface water – Presence/ absence of weed species

[1] The W2P turkey nest dam liner will be removed as the dam is located within an identified conservation significant habitat area.

6. EXISTING ENVIRONMENT

6.1. Background

Information presented in this section of the Rehabilitation Plan has been prepared based on existing information available from applicable site studies and investigations, legislative and policy requirements and discussions with WLPL representatives.

6.2. Climate

The Pilbara region has a "arid and tropical' climate, with high temperatures and low, irregular rainfall. The average annual rainfall for the region is between 200 mm and 350 mm, and almost all falls between December and May, usually in heavy downpours from thunderstorms or tropical cyclones from January to March. The period from June to November is often completely rainless, with warm to very hot and sunny conditions.

Construction of the W2P commenced in November 2018, with commissioning scheduled to commence in March 2019. The long-term average rainfall and mean maximum temperatures, as recorded at the Bureau of Meteorology (BoM) weather station (no. 4032) at Port Hedland airport about 40 km from the northern end of the W2P area over the construction and commissioning period (i.e. October 2018 – March 2019) are 227 mm and 36.2 ^{0}C respectively.

A summary of the monthly long-term average rainfall and mean maximum/ minimum temperatures over the duration of the W2P construction and commission period is provided in **Table 5** and **Figure 1**.

TABLE 5: W2P CLIMATE DATA

Month	Construction Period					Commissioning Period	
	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019
Long term Ave Rainfall (mm)	0.9	1.6	19.1	63.9	89.9	51.3	21.8
2017 Rainfall (mm)	0.0	3.4	33.6	90.0	70.2	355.4	37.8
Ave mean Max temp (0C)	35.0	36.3	36.6	36.3	36.2	36.7	35.2
Ave mean Min temp (0C)	18.5	21.4	24.1	25.6	25.4	24.5	21.4

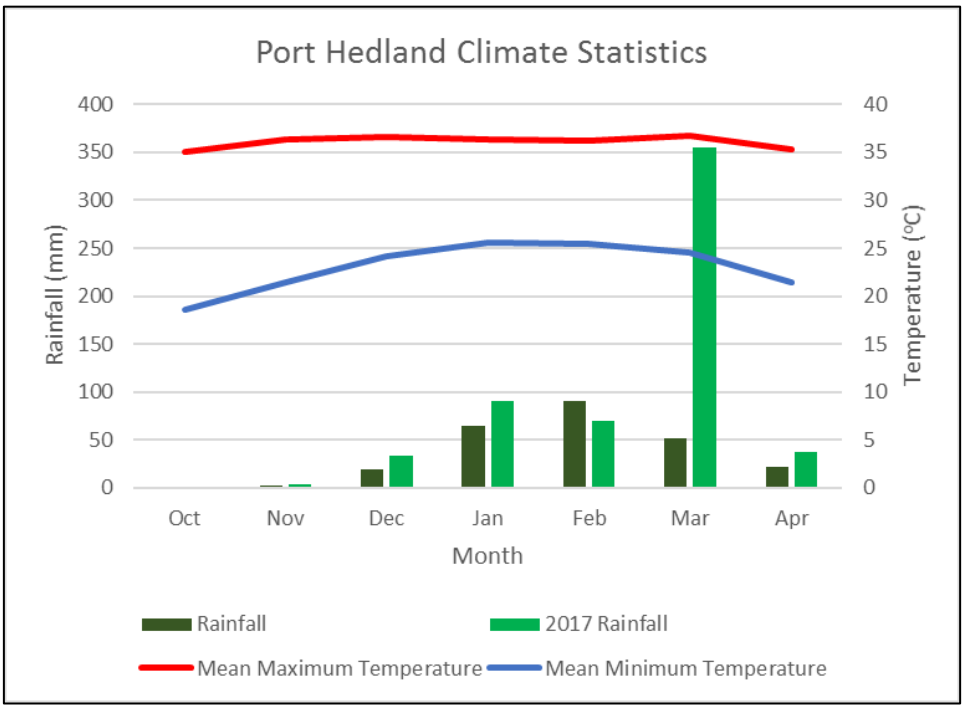

FIGURE 1: CLIMATE STATISTICS FOR PORT HEDLAND AIRPORT

6.3. Biogeographic Region

The W2P falls within the "Pilbara" bioregion, as identified by the Interim Biogeographic Regionalisation of Australia (IBRA; DEE 2016, cited by 360 Environmental (360 Environmental, 2018a)) within the "Roebourne" (PIL04) and Chichester" (PIL01) subregions. The Pilbara bioregion is characterised by vast coastal plains and inland mountain ranges, with cliffs and deep gorges. Vegetation is predominately mulga low woodlands or snappy gum over bunch and hummock grasses (Bastin and ACRIS 2008, cited by 360 Environmental (360 Environmental, 2018a)).

The Roebourne subregion is comprised of quaternary alluvial and older colluvial plains with savannah of bunch and hummock grasses, and dwarf shrubs such as *Acacia stellaticeps*, *A. pyrifolia* and *A. inaequilatera*. *Triodia* hummock grasslands dominate the uplands. *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands are supported by drainage lines. River deltas and marine alluvial flats support samphire, mangal and *Sporobolus*. Resistant ranges of basalt occur along coastal plains with minor outcrops of granite (Kendrick and Stanley 2001, cited by 360 Environmental (360 Environmental, 2018a)).

The Chichester subregion comprises the northern section of the Pilbara Craton. Undulating Archaean granite and basalt plains include significant areas of basaltic ranges. Plains support a shrub steppe characterised by *Acacia inaquilatera* over *Triodia wiseana* (formerly *Triodia pungens*) hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges (Kendrick and McKenzie 2001, cited by 360 Environmental (360 Environmental, 2018a)).

6.4. Land Systems and Soils

360 Environmental identified four land systems traversed by the W2P area, as summarised in **Table 6** (360 Environmental, 2018a). These land systems are generally not susceptible to erosion, with the exception of the Mallina system from about KP0 to KP20 of the W2P, which may be moderately to highly susceptible to erosion if vegetation cover is seriously depleted. Given the narrow width and temporary nature of clearing for the CROW, however, the risk of soil erosion from construction works is low.

TABLE 6: LAND SYSTEMS WITHIN THE W2P AREA

System	Description
Uaroo	Broad sandy plains, pebbly plains and drainage tracts supporting hard and soft spinifex hummock grasslands with scattered acacia shrubs.
Boolgeeda	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.
Ruth	Hills and ridges of volcanic and other rocks supporting shrubby hard spinifex and occasionally soft spinifex grasslands.
Mallina	Sandy surfaced alluvial plains supporting soft spinifex grasslands and minor hard spinifex and tussock grasslands.

None of the above land systems are typically associated with acid-sulphate soils (ASS), and there is little to no risk of ASS exposure by mainline trenching or other excavation. The *Australian Soil Resource Information System* (ASRIS) maps the probability of ASS as "very low" to "low" for the entire pipeline route (Australian Collaborative Land Evaluation Program, 2014).

Soil salinity in the Pilbara region is variable and dependent on land unit location, however many deep clays tend to have weakly saline subsoil. If exposed through erosion, these subsoils may become scalded and sealed, with greatly reduced water infiltration rates and increased surface salinity. None of the land systems within the W2P area are known to demonstrate these properties (360 Environmental, 2018a).

6.5. Surface Water

No major surface water features intersect the W2P area (360 Environmental, 2018a). The Yule River runs to the west of the W2P, approaching within about 3 km at the northern end of the W2P. The Turner River runs to the east of the corridor, with a tributary approaching within 1 km near the Wodgina mine site (360 Environmental, 2018a). Surface water flows in the region are typically ephemeral, and generally flow only following heavy rainfall events.

The W2P crosses a number of ephemeral, weakly defined drainage lines. Construction methodology through these drainage lines is defined in the CEP.

6.6. Groundwater

Groundwater in the northern 50 km of the proposed pipeline corridor is characterised as fresh to brackish, with 1,000 to 3,000 mg/L total dissolved solids (TDS); groundwater in the southern 30 km is more fresh, with 500 - 1,000 mg/L TDS (DoW 2010, cited by 360 Environmental, 2018a).

Depths to groundwater in the Yule River well field near the northern end of the W2P are about 4 to 10 metres below ground level (mBGL) (360 Environmental, 2018); around the Wodgina mine site at the southern end of the corridor, levels range from 10 to 15 mBGL. The W2P trench or other excavations will not require dewatering for pipeline installation given the shallow depth of excavation proposed

6.7. Vegetation and Flora

The W2P envelope lies within the Eremaean Province, as defined and mapped by Beard (1975; 1990), which occupies over 70% of Western Australia (Beard, 1990). The W2P is located within the Fortescue Botanical District (Pilbara Region) of the Eremaean Province. The Fortescue Botanical District extends northwards from the Acacia-dominated scrub in the south, and is bounded to the west and east by the Carnarvon and Canning Basins. The vegetation of this District was described by Beard (1975) as 'tree and shrub-steppe communities, with *Eucalyptus* trees, *Acacia* shrubs, *Triodia pungens* and *Triodia wiseana*, with *Triodia* hummock grasslands, the characteristic vegetation type of the region'.

The W2P lies on the northern section of the Pilbara Craton within the Fortescue Botanical District, on the Abydos Plain. Of the four main associations described on the Abydos Plain, Shrub Steppe is predominant in the study area (Beard 1975). This is the main community of the granite plain and is dominated by *Acacia pyrifolia-Triodia pungens* associations, with hummock grasses and widely-spaced shrubs.

The W2P occurs within the Pilbara IBRA biogeographic region (Interim Biogeographic Regionalisation for Australia) (Environment Australia, 2000), which is equivalent to the Fortescue Botanical District as defined by Beard (1975). More specifically the study area is located within the Pilbara 1 (PIL1) Chichester Subregion of the Pilbara IBRA region (Kendrick & McKenzie 2001).

The PIL1 Chichester Subregion is comprised of undulating Archaean granite and basalt plains, with significant areas of basaltic ranges. Plains support a shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges. Grazing of native pastures by stock and impacts from mining are the main impacts on biodiversity within the region (Kendrick & McKenzie, 2001).

Mapping of the pre-European vegetation extents within the Pilbara region of WA was completed on a broad scale (1:1,000,000) by Beard (1975). These vegetation types were later re-assessed by Shepherd et al. (2002) to account for clearing in intensive land use zones, dividing some larger vegetation units into smaller units. Four broad vegetation types have been identified for the W2P:

- Abydos Plain - Chichester 626: Hummock grasslands, shrub-steppe, kanji over soft spinifex and *Triodia brizioides*.
- Abydos Plain 93: Hummock grasslands, shrub steppe; kanji over soft spinifex.
- Abydos Plain 647: Hummock grasslands, dwarf-shrub steppe; *Acacia translucens* over soft spinifex.
- Abydos Plain 589: Mosaic. Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe, soft spinifex (Shepherd, Beeston, & Hopkins, 2002).

6.7.1. W2P Northern Envelope

Two flora and vegetation surveys for the northern envelope were completed by 360 Environmental in 2018. These surveys comprised a Level 1 reconnaissance flora and vegetation survey in January 2018 (360 Environmental, 2018b) and a detailed flora and vegetation survey in June 2018 (360 Environmental, 2018c).

The following vegetation associations were identified within the northern envelope by 360 Environmental – note that the boundaries of these associations were mapped during the January 2018 survey and confirmed during the detailed survey in June 2018:

- AaAbTe: A. *ancistrocarpa*, A. *bivenosa* mid sparse shrubland over T. *epactia* tussock grassland.
- AiGwTe: Acacia *inaequilatera*, Grevillea *wickhamii* tall sparse shrubland over A. *ancistrocarpa*, A. *bivenosa* mid isolated clumps of shrubs over *Triodia epactia* tussock grassland.
- AmTe: A. *maitlandii* mid isolated clumps of shrubs over T. *epactia* tussock grassland.
- AiTe: A. *orthocarpa*, A. *inaequilatera* tall isolated clumps of trees over T. *epactia*, T. *brizoides* mid tussock grassland.

- AhAiTe: *Atalaya hemiglauca* low Isolated clumps of trees over A. *inaequilatera* tall isolated clumps of shrubs over Carissa *lanceolata* mid isolated shrubs over *Corchorus laniflorus* low isolated shrubs over T. *epactia*, *Eragrostis desertorum*, **Cenchrus ciliaris*.
- AiGwTe: *Acacia inaequilatera*, *Grevillea wickhamii* tall sparse shrubland over A. *ancistrocarpa*, A. *bivenosa* mid isolated clumps of shrubs over Triodia *epactia* tussock grassland.
- CcAiMlTe: *Corymbia candida* ?subsp. *lautifolia* low isolated clumps of trees over A. *inaequilatera*, *Melaleuca lasiandra* mid isolated clumps of shrubs over A. *stellaticeps* low open shrubland over T. *epactia* mid tussock grassland.
- CcAiTe: *Corymbia candida* ?subsp. *lautifolia* low woodland over *Carissa lanceolata*, A. *inaequilatera* mid isolated shrubs overmixed low isolated shrubs over T. *epactia*, **Cenchrus ciliaris*, *Eragrostis desertorum* mid closed grassland.
- ChAiTe: *Corymbia hamersleyana* low isolated trees over A. *inaequilatera*, A. *sericophylla*, tall isolated clumps of shrubs over *Grevillea wickhamii*, *Sida arenicola* mid isolated shrubs over A. *acradenia*, A. *stellaticeps* low isolated shrubs over T. *epactia* tussock grassland.
- ChAtTe: *Corymbia hamersleyana* low isolated trees over A. *tumida* var. *pilbariensis*, A. *ancistrocarpa*, *Grevillea wickhamii* tall sparse *shrubland* over A. *maitlandii* mid isolated shrubs over T. *epactia* tussock grassland.
- CzAspp.Te: *Corymbia zygophylla* low isolated clumps of trees over A. *tumida* var. *pilbariensis*, A. *acradenia* mid sparse shrubland over A. *ancistrocarpa*, A. *stellaticeps* low sparse shrubland over T. *epactia* mid tussock grassland.
- CzAtTe: *Corymbia zygophylla* low isolated clumps of trees over A. *trachycarpa*, Hakea *lorea* mid sparse shrubland over A. *inaequilatera* low isolated clumps of shrubs over T. *epactia* tussock grassland.
- EvChCc: *Eucalyptus victrix* mid woodland over *Corymbia hamersleyana* low isolated trees over A. *tumida* var. *pilbariensis* mid isolated shrubs over T. *epactia* mid tussock grassland.
- MlAiTe: *Melaleuca lasiandra* low isolated clumps of trees over *Acacia inaequilatera* tall isolated shrubs over A. *stellaticeps*, *Corchorus parviflorus* low sparse shrubland over *Triodia epactia* tussock grassland.
- TsCP: *Neptunia dimorphantha*, *Rhynchosia minima* low isolated shrubs over *Triodia secunda*, *Dactyloctenium radulans*, *Eriachne glauca* var. *glauca* low open grassland.

None of the vegetation associations identified in the northern envelope is likely to represent a Threatened Ecological Community (TEC) or a Priority Ecological Community (PEC).

No threatened species listed under the EPBC Act or *Wildlife Conservation Act 1950* (WA) (Declared Rare Flora) were recorded (360 Environmental, 2018b and c).

A single DBCA Priority-listed species, *Euphorbia clementii* (P3), was recorded at two locations, one of which is outside the northern envelope (360 Environmental, 2018c).

6.7.2. W2P Southern Envelope

There have been numerous flora and vegetation surveys completed over the Wodgina area, including the W2P southern envelope and immediate surrounds. Most recently, a detailed flora and vegetation survey was completed by Woodman Environmental Consulting (WEC) in June 2018 (Woodman Environmental, 2018).

The detailed flora and vegetation assessment comprised a field survey to fill gaps in previous survey coverage and the consolidation of previous studies to produce a single flora and vegetation assessment for the Wodgina mine site and surrounds (including the southern envelope).

A single DBCA Priority-listed species, *Euphorbia clementii* (P3), was recorded at three locations, one of which is outside the southern envelope (Mineral Resources Limited, 2018).

The following vegetation units were identified and mapped within the W2P southern envelope (Woodman Environmental, 2018):

2: Low woodland of *Corymbia hamersleyana* over open shrubland of *Acacia ancistrocarpa* and A. *tumida* var. *pilbarensis*, over hummock grassland of *Triodia epactia* and T. *lanigera* with sparse herbs including *Bonamia erecta* and *Ptilotus astrolasius* and sparse tussock grasses including *Chrysopogon fallax* on drainage lines and surrounding flats and plains, occasionally stony, with red to orange sandy to clay loams.

5: Low open woodland to woodland of *Corymbia hamersleyana* and/or *Eucalyptus victrix* over tall sparse shrubland to open shrubland dominated by *Acacia pyrifolia* var. *pyrifolia*, *Acacia tumida* var. *pilbarensis* and/or *Melaleuca linophylla* over mid sparse tussock grassland to tussock grassland dominated by **Cenchrus ciliaris* and/or *Cymbopogon ambiguus* with mid sparse to open hummock grassland of *Triodia epactia* and/or *Triodia wiseana* on stony drainage lines on red or brown clay loam or sandy loam.

6: Tall sparse shrubland of *Acacia inaequilatera* and *Grevillea wickhamii* subsp. *hispidula* over mid sparse to open shrubland dominated by *Acacia* acradenia or *Acacia ancistrocarpa* over mid hummock grassland often dominated by *Triodia epactia* and/or *Triodia wiseana* and occasionally by *Triodia brizoides* or *Triodia lanigera* on rocky lower to midslopes and occasional crests, and outwash plains on red or brown clay loam or sandy loam sometimes with granite outcropping.

7: Tall sparse shrubland *Grevillea wickhamii* subsp. *hispidula* over mid sparse shrubland of *Acacia acradenia* over low to mid hummock grassland dominated by *Triodia chichesterensis* and *Triodia wiseana* on stony outwash plains on red or brown clay loam often with calcrete outcropping.

10: Mid sparse shrubland of *Acacia acradenia* and/or A. *inaequilatera* over low hummock grassland dominated by *Triodia wiseana* with *Triodia epactia* and/or *Triodia brizoides* occasionally co-dominating and low sparse shrubland of mixed species including *Corchorus parviflorus*, *Gomphrena cunninghamii* and *Indigofera monophylla* on steep midslopes, upperslopes, crests and ridges on brown or red clay loam or sandy loam with dolerite, granite or ironstone outcropping.

11: Tall sparse shrubland of *Acacia inaequilatera* and/or *Acacia orthocarpa* over low to mid hummock grassland to closed hummock grassland often dominated by *Triodia scintillans*, and occasionally also by *Triodia epactia* or *Triodia wiseana* on stony low hills and undulating plains on brown or red-brown clay loam or sandy loam often with granite or dolerite outcropping.

None of the vegetation units mapped within the study area (including the southern envelope) represent any listed Threatened or Priority Ecological Communities defined under State or Commonwealth legislation. Further, none of these vegetation units are regionally significant (Woodman Environmental, 2018).

Management of construction works to minimise impacts on vegetation and flora in the W2P area is addressed in the CEP.

6.7.3. Introduced Flora

Two weeds species were recorded within the pipeline and Wodgina mine Survey Area these species being, *Aerva javanica* (Kapok) and *Cenchrus ciliaris* (Buffel). *Cenchrus ciliaris* was recorded in multiple locations within the Survey Area, particularly within drainage lines. *Aerva javanica* was not considered common within the Survey Area (360 Environmental, 2018b).

A total of three introduced flora species were recorded in the northern envelope these being, Aerva javanica (Kapok), Cenchrus ciliaris (Buffel) and Malvastrum americanum (Spiked Malvastrum). None of these species are listed as a Declared Pest under the *Biosecurity and Agriculture Management Act 2007* (WA) or is a Weed of National Significance (360 Environmental, 2018c).

6.8. Fauna and Habitat

Reconnaissance and targeted fauna surveys of the W2P were completed by 360 Environmental in 2018, comprising a Level 1 fauna and targeted Northern Quoll survey (January 2018) and a targeted fauna survey for conservation significant species (June 2018) (360 Environmental, 2018b and d).

More recently, Stantec undertook a Level 1 fauna survey, targeted conservation fauna survey and desktop assessment for Wodgina in July 2018 (Stantec, 2018):

- The Level 1 and targeted conservation significant fauna surveys focused on the eastern range, proposed lithium hydroxide plant, and other areas to the south of Wodgina – these areas are not of relevance to the W2P.
- The desktop assessment collated and consolidated all previous fauna survey work that has been completed at Wodgina (inclusive of the above surveys, include the 360 Environmental January and June reports).
- Habitat mapping for the Wodgina Lithium Project, including the W2P, was consolidated and a reassessment of the likelihood of occurrence of conservation significant fauna was completed.

A total of seven fauna habitats were identified within the W2P by Stantec (Stantec 2018).

6.8.1. Fauna Species of Conservation Significance

Stantec completed a likelihood assessment for conservation significant species, which is summarised in **Table 7** below, with respect to species that are likely to occur or have been confirmed as occurring within the W2P area (Stantec, 2018).

TABLE 7: CONSERVATION SIGNIFICANT FAUNA – LIKELIHOOD OF OCCURANCE

Common Name	Scientific Name	Recording	Conservation Status
W2P northern envelope			
Fork-tailed Swift	*Apus pacificus*	Recorded	Migratory and Marine – EPBC Act
Bilby	*Macrotis lagotis*	Recorded	Vulnerable – EPBC and WC Acts
Brush-tailed Mulgara	*Dasycercus blythi*	Recorded	Priority 4 – DBCA
W2P southern envelope			
Pilbara Leaf-nosed Bat	*Rhinonicteris aurantia*	Two recordings – foraging only	Vulnerable – EPBC and WC Acts
Likely to occur			
Ghost Bat	*Macroderma gigas*	Possible likelihood of occurrence	Vulnerable – EPBC and WC Acts
Western Pebble-mound Mouse	*Pseudomys chapmani*	High likelihood of occurrence	Priority 4 – DBCA
Northern Quoll	*Dasyurus hallucatus*	Possible likelihood of occurrence	Endangered – EPBC and WC Acts
Long-tailed Dunnart	*Sminthopsis longicaudata)*	High likelihood of occurrence	Priority 4 – DBCA
Grey falcon	*Falco hypoleucos*	High likelihood of occurrence	Vulnerable – EPBC and WC Acts
Peregrine falcon	*Falco peregrinus*	High likelihood of occurrence	Special protection – WC Act

In respect of the likelihood assessment provided in **Table 7**, the targeted fauna survey undertaken in June 2018 identified (Stantec, 2018):

- 30 instances of Bilby evidence on the W2P comprised of ten scats, 16 diggings and four track findings. This evidence was primarily recorded at the northern end of the pipeline corridor near the Northwest Coastal Highway.
- 30 instances of Brush-tailed Mulgara on the W2P comprised of four scats, 21 burrows and five tracks. Of the 21 burrow findings, one burrow was high certainty (aged), 11 burrows were medium certainty (two fresh, two recent, seven aged and one old), and nine burrows were low certainty (three aged and six old).
- No evidence of the Western Pebble-mound Mouse, Ghost Bat or any other fauna species of conservation significance were recorded during the survey.
- Two records of the Pilbara leaf-nosed Bat were identified in proximity to the rocky ranges near the southern portion of the gas pipeline.

Management of construction works to minimise impacts to habit and fauna in the W2P area is addressed in the CEP.

6.9. Social Environment

6.9.1. Aboriginal Heritage

The W2P pipeline corridor crosses the boundary of three Aboriginal heritage sites listed on the Aboriginal Heritage Inquiry System maintained by the Department of Planning, Lands, and Heritage (DPLH):

- Site ID 16034 (Karratha-South Hedland 17): The boundaries of this site were re-mapped with representatives of the Kariyarra People and archaeologists from the Yamatji Marlpa Aboriginal Corporation (YMAC). The results of the re-mapping are that the boundaries of Site 16034 do not overlap with WLPL's pipeline licence. YMAC will provide DPLH with the updated site recording forms.
- Site ID 37223 Women's Hill (Coodigulla): The DPLH has undertaken a search of the pipeline in relation to this particular site and advised that the proposed pipeline will not impact this site. YMAC confirmed that no further heritage surveys were required in this area.
- Site ID 9009 Gulindjina Yambara: WLPL has previously undertaken heritage surveys in this area with the Wamarranya representatives from within the Kariyarra People's native title determination application. The results of these surveys determined that site 9009 does not fall within the pipeline licence area.

WLPL has also undertaken additional Aboriginal ethnographic and archaeological surveys from May 2018 to June 2018. All newly identified Aboriginal heritage sites will not be impacted by this alignment of the proposed pipeline.

The W2P and Wodgina mining operations fall within the Kariyarra People's native title determination application, (WAD6169/1998), represented by the Yamatji Marlpa Aboriginal Corporation. WLPL is currently negotiating an agreement with the Kariyarra People for the existing Wodgina operations and associated infrastructure, and continues to engage with Traditional Owners on the proposed expansions, including the W2P. WLPL continues to engage with the Kariyarra People to ensure that no Aboriginal heritage sites are disturbed by WLPL's activities.

The Mugarinya (Yandeyarra) Aboriginal community is located 30 km east-south-east of the Wodgina operations and the southern end of the W2P, within the Yandeyarra Aboriginal reserve (reserve nos. 31427 and 31428). The W2P does not pass through Yandeyarra Aboriginal Reserve or any other Aboriginal reserve.

6.9.2. Community

The W2P is located within the Town of Port Hedland local government area (LGA), but some distance (40 km at closest point) from any built-up or residential areas. The main land uses of the W2P area and wider region are pastoral grazing, minerals exploration, mining, and regional infrastructure, including roads, railways, power lines, and gas pipelines.

The Town of Port Hedland covers 10,587 km^2 and supports a population of approximately 14,469 people as at 2016 census (ABS, 2018).

6.10. Local Land Use

The W2P intersects three pastoral leases. The Kangan pastoral station, which is leased to the Yamatji Marlpa Aboriginal Corporation, the Mundabullangana pastoral station and the Indee pastoral station.

The first 13 km of the W2P from the northern end intersects a public drinking water supply area (PDWSA) WRC 3208-01 (Yule River). This PDWSA is gazetted under the Country Areas Water Supply Act 1947 to protect the quality of groundwater resources supplying Port and South Hedland, and incorporates Water Reserve 33015.

Development of the W2P is a compatible land use within the PDWSA as per relevant Department of Water and Environment Regulation (DWER) notices (DWER, 2016).

The W2P crosses a number of third-party minerals titles (granted or pending); most of these are exploration licences, with the exception of the miscellaneous licence granted to Atlas Iron Limited for the Mt Dove mine access road.

The W2P crosses two substantial roads (Northwest Coastal Highway, Mt Dove mine access road) as well as third party pipeline infrastructure in the vicinity of Yule River borefield. The W2P also passes under power lines forming part of the regional power network. The W2P crosses a number of other minor pastoral roads, but no railways or other substantial foreign services or infrastructure.

No conservation estate is present within or near the W2P area, with the nearest (Mungaroona Range Wildlife Sanctuary) about 50 km to the southwest.

7. IDENTIFICATION AND MANAGEMENT OF REHABILITATION ISSUES

Risks associated with rehabilitation of construction areas were addressed as part of the Environmental Risk Assessment (ERA) for the W2P construction works in the CEP. Appropriate management measures were developed, and incorporated into the CEP.

Risks associated with decommissioning and closure post operations will be addressed in the W2P Detailed REP.

The main risks assessed and measures developed for construction rehabilitation are addressed in **Table 8**.

TABLE 8: RISKS AND ASSOCIATED MANAGEMENT MEASURES

Risk	Management Measure
Damage to and/ or erosion of topsoil resources.	• Clearly mark out boundaries of construction area to prevent unnecessary disturbance. • Strip topsoils from construction areas and stockpile adjacent, for use in rehabilitation. • Stockpile topsoils away from vehicle access points to prevent damage/ loss by vehicle movements; place signs or markings to prevent driving or parking over stockpiles. • Stockpile topsoils away watercourses, and areas prone to flooding; leave breaks in stockpiles to allow natural surface water flows, and prevent flooding or water erosion of stockpiles. • Keep topsoil stockpiles < 2m high to minimise wind erosion. • Progressively respread topsoil over disturbed areas as soon as practicable at completion of works; respread cleared vegetation over topsoil to promote revegetation and prevent erosion. • Address topsoil management and preservation in inductions, toolbox talks, and procedures. • Report substantial loss of topsoil or damage to stockpiles for investigation and corrective action. • Install appropriate measures (berms, sediment fences, etc.) along CROW and other construction areas, to control surface water flows to prevent erosion of disturbed surfaces. • Remediate any surface erosion on construction areas as part of reinstatement, if necessary. • Dispose of hydrotest water to Wodgina pit, which is located at the Wodgina mine site in proximity to the southern end of the pipeline.
Ponding of water encouraging feral species.	• Backfill and compact trench and reinstate adjacent areas, to ensure that water does not pool and encourage feral species. • Develop and implement measures to control feral animals, in conjunction with relevant regulators and landholders, if the need is indicated by monitoring under OEP and risk assessment.
Release of sediment impacting on surface water quality, vegetation, or habitats.	• Align watercourse crossings with access tracks or other existing infrastructure where practical. • Clearly delineate boundaries of disturbance through drainage lines. • Stockpile vegetation, topsoil, and trench spoil outside of drainage lines, to reduce interruption of natural surface water flows and reduce potential for erosion and transport of sediments. • Install erosion and sediment controls (berms, sediment fences, etc.) as directed by approved surface water management procedure.

Risk	Management Measure
	• Schedule construction works to avoid high rainfall season. • Reinstate CROW and other construction areas as soon as practicable, to stabilise disturbed surfaces and restore resistance to erosion. • Reinstate disturbed areas to restore patterns of drainage, infiltration, and evaporation, and resistance to erosion; leave long-term erosion and sediment controls where required. • Report poorly controlled drainage, erosion or sediment transport on or from construction areas, for investigation and corrective action.
Introduction, spread, or encouragement of weed species, with impacts on land uses, vegetation, and habitats.	• Keep construction footprint as small as practicable, to minimise disturbed area susceptible to colonisation by weeds. • Certify vehicles, mobile and fixed plant, equipment, and materials as clean, and free of clumps of soil or vegetation, before entry to the project. • Mark known weed locations on alignment lists; mark in field as part of survey and set out. • Arrange clear and grade to work into, rather than out of, known weed areas where practicable; clean down clear and grade plant and vehicles often, and particularly after working through known weed locations. • Keep construction works and movements to CROW, approved access tracks, and other approved construction areas; minimise construction movements as far as practicable (e.g., use of shared crew bus for transport to work sites). • Keep vehicles and mobile plant generally clean and free of clumps of soil or vegetation for duration of the project (include in pre-start checks). • Consult landholders and other relevant stakeholders on weed management requirements / expectations; incorporate into contractor specifications. • Address management of weeds in inductions, toolbox talks, and procedures. • Report breaches of hygiene, or new or spreading weed populations, for investigation
Disturbance, erosion, and/or spread of weeds from unauthorised 4WD access.	• Install gates, bunds, and signs at pipeline corridor entry to prevent / deter unauthorised access. • Develop and implement measures to control feral animals, in conjunction with relevant landholders, if the need is indicated by monitoring under OEP and risk assessment.
Disposal of inert wastes	• Use bins, skips, and other appropriate containment with lids for holding wastes till collection; provide adequate capacity to prevent containers over-filling between collections. • Provide appropriate lids / covers for waste containers to prevent wind-blown wastes; return wind-blown wastes to containment. • Remove wastes from CROW daily to collection points at Wodgina minesite. • Segregate wastes as required by for landfill disposal or collection by waste contractor; stockpile scrap and other inert industrial wastes in designated areas. • Arrange frequent progressive disposal of wastes to landfill or collection as appropriate; prevent large quantities of wastes from accumulating on site. • Forbid disposal of wastes in pipe trench or other excavations. • Segregate recyclable materials and arrange collection for recycling where practicable. • Remove all residual wastes from construction areas at completion of works; confirm as part of practical completion inspections. • Report improperly contained or segregated waste for investigation and corrective action. • Address waste management in inductions, toolbox talks, and procedures, including collection points, and proper waste segregation.

8. REHABILITATION PLAN IMPLEMENTATION

Implementation of the Plan is for the specific purpose of supporting the construction phase of the W2P project. . Mine closure related aspects associated with the W2P project will be addressed in a future submission of the W2P Detailed REP.

All data associated with the W2P will be stored on MRL's internal database and Environmental Management System (EMS).

8.1. Construction Rehabilitation – Management Tasks

The following tasks, as detailed in **Table 9** apply to all rehabilitation activities associated with the construction phase of the Project.

It should be noted that construction rehabilitation tasks, involving primarily the re-spreading of stockpiled topsoil and vegetation is scheduled to commence on 15 January 2019, and will be progressively undertaken for the remainder of the construction phase of the Project.

TABLE 9: TASK REGISTER CONSTRUCTION REHABILITATION

Tasks	Schedule	Measurement Tool	Responsibility
• Keep construction works and movements to CROW, approved access tracks, and other approved construction areas. • Minimise construction movements as far as practicable (e.g., use of shared crew bus for transport to work sites).	Commence 11 November 2018 – 15 March 2019	Project inspections and audit records.	W2P Project Manager
• Address management of weeds and waste in inductions, toolbox talks, and procedures.	Commence 11 November 2018 – 15 March 2019	Induction records.	W2P Project Manager
• Mark known weed locations on alignment lists; mark in field as part of survey and set out.	Commence 11 November 2018 – 15 March 2019	Project inspections and audit records.	W2P Project Manager
• Clearly mark out boundaries of construction area to prevent unnecessary disturbance.	18 November 2018 – 4 April 2018	Project inspections and audit records.	W2P Project Manager
• Install gates, bunds, and signs at pipeline corridor entry to prevent / deter unauthorised access.	18 November 2018 – 12 December 2018	Project inspections and audit records.	W2P Project Manager
• Arrange clear and grade to work into, rather than out of, known weed areas where practicable. • Clean down mobile equipment, in particular after working through known weed locations.	18 November 2018 – 20 February 2019	Project inspections and audit records.	W2P Project Manager
• Strip topsoils from construction areas and stockpile adjacent, for use in rehabilitation.	18 November 2018 – 12 December 2018	Project inspections and audit records.	W2P Project Manager
• Stockpile topsoils away from vehicle access points to prevent damage/ loss by vehicle movements; place	18 November 2018 – 9 March 2019	Project inspections and audit records.	W2P Project Manager

Tasks	Schedule	Measurement Tool	Responsibility
signs or markings to prevent driving or parking over stockpiles.			
• Stockpile topsoils away watercourses, and areas prone to flooding; leave breaks in stockpiles to allow natural surface water flows, and prevent flooding or water erosion of stockpiles.	18 November 2018 – 9 March 2019	Project inspections and audit records.	W2P Project Manager
• Progressively backfill and compact trench and reinstate adjacent areas, to ensure that water does not pool and encourage feral species.	3 January 2019 – 30 January 2019	Project inspections and audit records.	W2P Project Manager
• Respreading stockpiled topsoil evenly, to return growth medium and seed bank.	Commence 15 January 2019 – 8 March 2019	Project inspections and audit records.	W2P Project Manager
• Scarifying across contours, to trap seed.	Commence 15 January 2019 – 8 March 2019	Project inspections and audit records.	W2P Project Manager
• Respreading stockpiled vegetation, to return vegetative material, and provide resistance to erosion.	Commence 15 January 2019 – 8 March 2019	Project inspections and audit records.	W2P Project Manager
• Rehabilitation of the construction right of way with the exception of the access road.	Commence 15 January 2019 – 8 March 2019	Project inspections and audit records.	W2P Project Manager
• Removal of temporary infrastructure required for construction	Commence 15 February 2019 – 8 March 2019	Project inspections and audit records.	W2P Project Manager
• Backfilling turkey nest dams. • Remove liner to a licensed landfill.	Commence 15 February 2019 – 29 March 2019	Project inspections and audit records.	W2P Project Manager
• Remove wastes from CROW daily to collection points at Wodgina minesite.	Commence 15 November 2018 – 2 April 2019	Project inspections and audit records.	W2P Project Manager
• Weed control undertaken in rehabilitation where weed cover is greater than surrounding native vegetation or where new weed species are recorded post construction.	Commence 30 March 2019	Annual Environmental Report.	Wodgina Project Manager

8.2. Decommissioning / Closure – Management Tasks

Activities associated with the closure and decommissioning of the W2P, including the removal of all above-ground infrastructure and subject to DMIRS approval, abandonment of the buried pipeline insitu to support surrender of the Pipeline Licence (PL116) will be addressed in the future submission of the W2P Detailed REP.

9. MONITORING AND MAINTENANCE

The aim of W2P construction rehabilitation monitoring is to demonstrate that agreed rehabilitation works have been completed as described in Table 11.

Rehabilitation activities associated with the construction of the W2P, s outlined in **Section 8.1** will be undertaken progressively over the pipeline construction and commissioning period. Audits and inspections following completion of construction rehabilitation works will be the primary tool utilised to demonstrate compliance.

Where bi-annual inspections, as described in Table 5 determine rehabilitation works have not been undertaken to agreed requirements, remedial works will be undertaken to address the identified issues.

Mine closure/ decommissioning monitoring associated with the W2P will be utilised to demonstrate success against agreed rehabilitation outcomes/ completion criteria, to be described in the W2P Detailed REP, with the ultimate goal being achievement of agreed post mining land use objectives and final tenure relinquishment.

9.1. Reporting Requirements

9.1.1. Annual Environmental Report

The results of rehabilitation monitoring are reported in WLPL's Wodgina AER and used to show progress against the agreed completion criteria. Remedial actions, where identified are also reported in the AER.

9.1.2. Tenement Conditions

As outlined in the tenement conditions, the lessee will submit a brief annual report outlining the Project operations, mine site environmental management and rehabilitation work undertaken in the previous 12 months and the proposed operations, environmental management plans and rehabilitation programmes for the next 12 months. This will be addressed in the AER.

10. MANAGEMENT OF INFORMATION AND DATA

10.1. Information Management

A copy of the W2P Rehabilitation Plan will be stored and made available to all WLPL personnel should they require.

Rehabilitation data and information requirements will be integrated into the existing environmental databases, to ensure simple and efficient capture and retrieval of information. All data associated with the W2P will be stored on WLPL internal database, for use during all phases of closure of the Project. Any environmental data, including incidents, collected during site activities/mining will be collected in the internal database.

10.2. Additional Management Systems

MRL is in the process of developing an EMS, which aligns itself with ISO14001. This management system will assist in the strategic management of key environmental risks, a subsection of which is document control and data management.

10.3. Future Data Gathering

Future data gathering will be influenced by the closure objectives and site specific criteria. The process will be continually reviewed and developed depending on the level of data that is required.

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