West Erregulla Rehabilitation Management Plan

AGI Operations Pty Ltd

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DOCUMENT TRACKING

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Template 2.8.1

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Abbreviations

Abbreviation	Description
AGIO	AGI Operations Pty Ltd
BC Act	*Biodiversity Conservation Act 2016*
CEMP	Construction Environmental Management Plan
CHMP	Cultural Heritage Management Plan
CSSHZ	Conservation Significant Species Habitat Zone
DAWE	Department of Agriculture, Water and Environment
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DMIRS	Department of Mines, Industry Regulation and Safety
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ELA	Eco Logical Australia
GS6	*Guidance Statement 6*
MNES	Matters of National Environmental Significance
NVZ	Native Vegetation Zone
RMP	Rehabilitation Management Plan
WA	Western Australia

Executive Summary

AGI Operations Pty Limited (the Proponent) propose to construct and operate of a gas processing plant and pipeline near Dongara, Western Australia collectively referred to as the West Erregulla Gas Project. The Proposal includes the processing of gas from upstream wells (third party) and transport of the gas via a new interconnecting pipeline to tie into the Dampier to Bunbury Natural Gas Pipeline (DBNGP).

This Rehabilitation Management Plan (RMP) has been prepared to support the submission of the Proponent's Environmental Review Document (ERD) to the Environmental Protection Authority (EPA) under Part IV Section 38 of the *Environmental Protection Act 1984* (EP Act).

A summary of the RMP is provided in Table ES1.

Table ES1 Rehabilitation Management Plan Summary

Description	Summary
Title of Proposal	West Erregulla Pipeline
Proponent name	AGI Operations Pty Ltd
Ministerial Statement number	To be confirmed on approval
Purpose of the RMP	Provide management and monitoring actions for rehabilitation of the Proposal for EPA environmental factors Flora and Vegetation and Terrestrial Fauna.
Local Government Area	Shire of Irwin and Shire of Three Springs
Key environmental factor and objective	The environmental objectives for Flora and Vegetation and Terrestrial Fauna are respectively: • *To protect flora and vegetation so that biological diversity and ecological integrity are maintained,* • *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained* (EPA 2020). For these factors, key objectives outlined in this Rehabilitation Management Plan are summarised below. Flora and Vegetation • To re-establish vegetation in line with management targets • To ensure the soil profile is able to support pre-disturbance conditions • No increase of invasive weeds within the Development Envelope Terrestrial Fauna • To re-establish conservation significant species habitat in line with management targets
Condition clauses (if applicable)	To be determined
Key components in the RMP	Refer to Section 3
Proposed construction date	January 2022
EMP required pre-construction	No

1. Introduction

1.1 Proposal

Australian Gas Infrastructure (AGI) Operations Pty Ltd (the Proponent) propose to construct and operate of a gas processing plant and pipeline near Dongara, Western Australia collectively referred to as the West Erregulla Gas Project. The Proposal includes the processing of gas from upstream wells (third party) and transport of the gas to the Dampier to Bunbury Natural Gas Pipeline (DBNGP). The Proposal includes:

- A gas processing facility (referred to by the Proponent as the WEG), with a nominal design flow capacity of 87 terajoules per day (TJ/d).
- A 16.5 km interconnecting buried gas pipeline between the gas processing facility and the DBNGP tie-in point. The pipeline will be installed at a shallow depth and above the water table.
- Supporting infrastructure including but not limited to a custody transfer metering facility located at the DBNGP tie-in point, a pig launcher station, power generation, flare system, incinerator, fire water system, water treatment package, back-up diesel system, communications and access tracks.

A Development Envelope of 213 ha was surveyed to ensure siting to minimise environmental impacts. Total proposed disturbance is 90 hectares (ha). A breakdown of the Disturbance Footprint is outlined in Table 1-1. It is noted that a minimum of 45.2 ha (50%) of the Disturbance Footprint is intended to be rehabilitated upon completion of construction.

Construction of the Proposal is expected to commence in January 2022 and be completed by mid-2023.

1.2 Disturbance and rehabilitation

The Proposal includes the gas plant and pipeline Disturbance Footprint of 90 ha with just under half of the area to be rehabilitated (Table 1-1).

Table 1-1 Disturbance Footprint and Rehabilitation

Item	Disturbance Footprint	Proposed Rehabilitation
Gas processing plant: Gas plant Evaporation pond Evaporation pond piping Potential construction camp Connecting track to wellheads	42 ha	5 ha
Gas pipeline: 30 m wide construction right of way: • 6 m restricted rehabilitation over pipeline (no trees) • 3 m permanent access track • 21 m temporary disturbance for construction only	43 ha*	~38.7 ha including restricted area ~30.1 ha full rehabilitation
Support infrastructure: DBNGP tie in facility Access tracks (construction only) Ancillary works (bore access, permanent access tracks)	 1ha 1ha 3 ha	 0.5 ha 1 ha 0 ha
TOTAL	**90 ha**	45.2 ha (including restricted area) 36.6 ha full rehabilitation

* Note: Some of the clearing width for the 16.5 km pipeline is within the processing plant and DBNGP tie in facility footprint. Therefore, the clearing for the gas pipeline only refers to clearing outside of these infrastructure areas.

1.3 Key environmental factors

1.3.1 EPA guidance RMP prepared in accordance with

This Rehabilitation Management Plan (RMP) outlines the reinstatement and rehabilitation work that will be undertaken for the Proposal, in relation to the Environmental Protection Authority (EPA) key environmental factors Flora and Vegetation and Terrestrial Fauna (EPA 2020).

The EPA's objectives for these factors are outlined in Table 1-2.

Table 1-2 Key environmental factors and objectives applicable to the RMP

Theme	Factor	Objective
Land	Flora and Vegetation	*To protect flora and vegetation so that biological diversity and ecological integrity are maintained.*
	Terrestrial Fauna	*To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.*

In considering these factors, this RMP has been prepared to ensure the restoration of Terrestrial Ecosystems in accordance with EPA *Guidance Statement 6 (GS6) for the Rehabilitation of Terrestrial Ecosystems* (EPA 2006).

Table 1-3 identifies where key requirements for GS6 have been addressed in the RMP.

Table 1-3 RMP sections to address EPA guidance requirements (GS6)

RMP Guidance Requirements	RMP Section
Assess environmental significance of land	Section 1.3
Identify major limitation to rehabilitation	Section 2.3
Set rehabilitation objectives and definition	Section 3.1

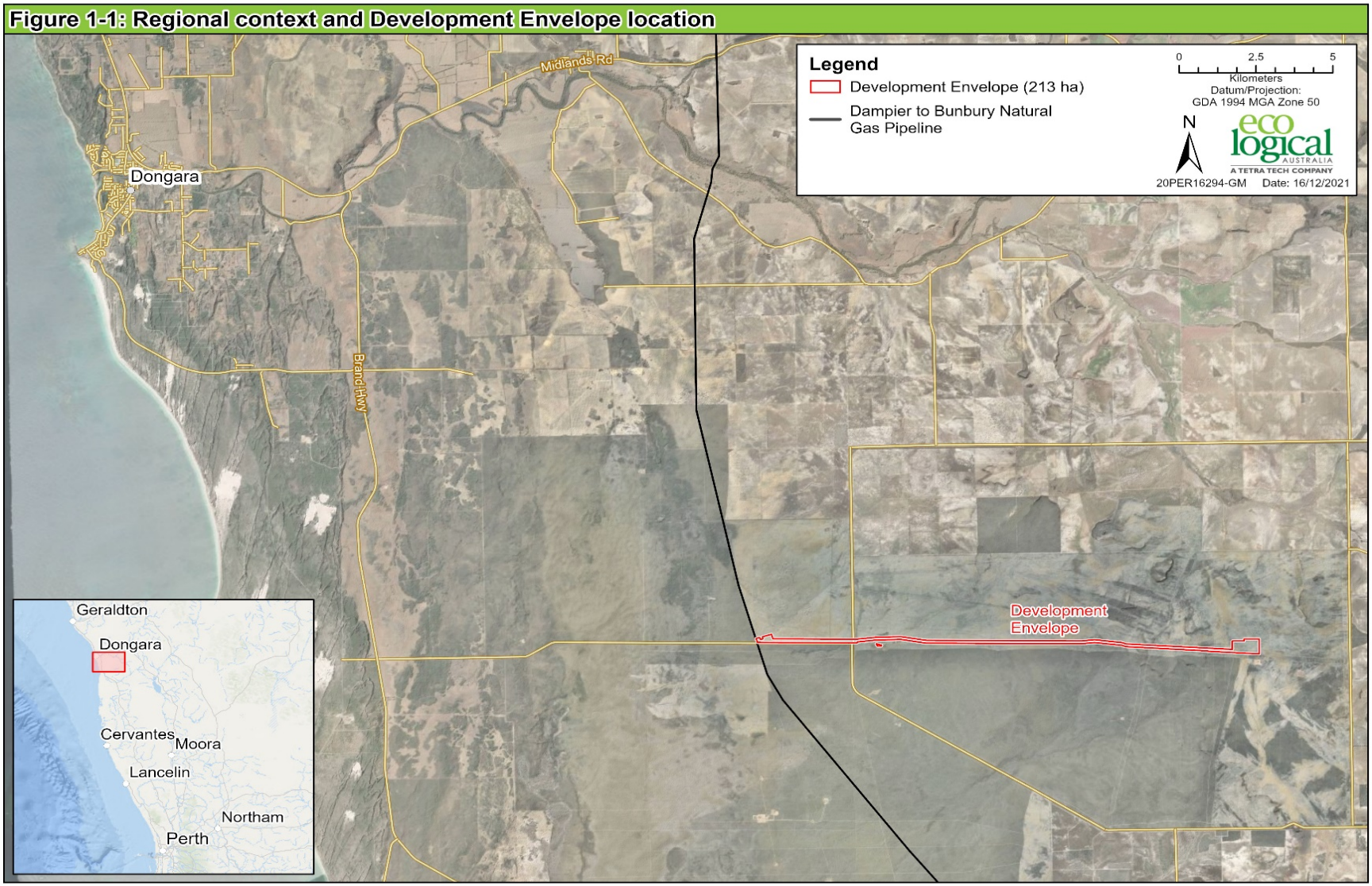

Figure 1-1 Regional context and Proposal location

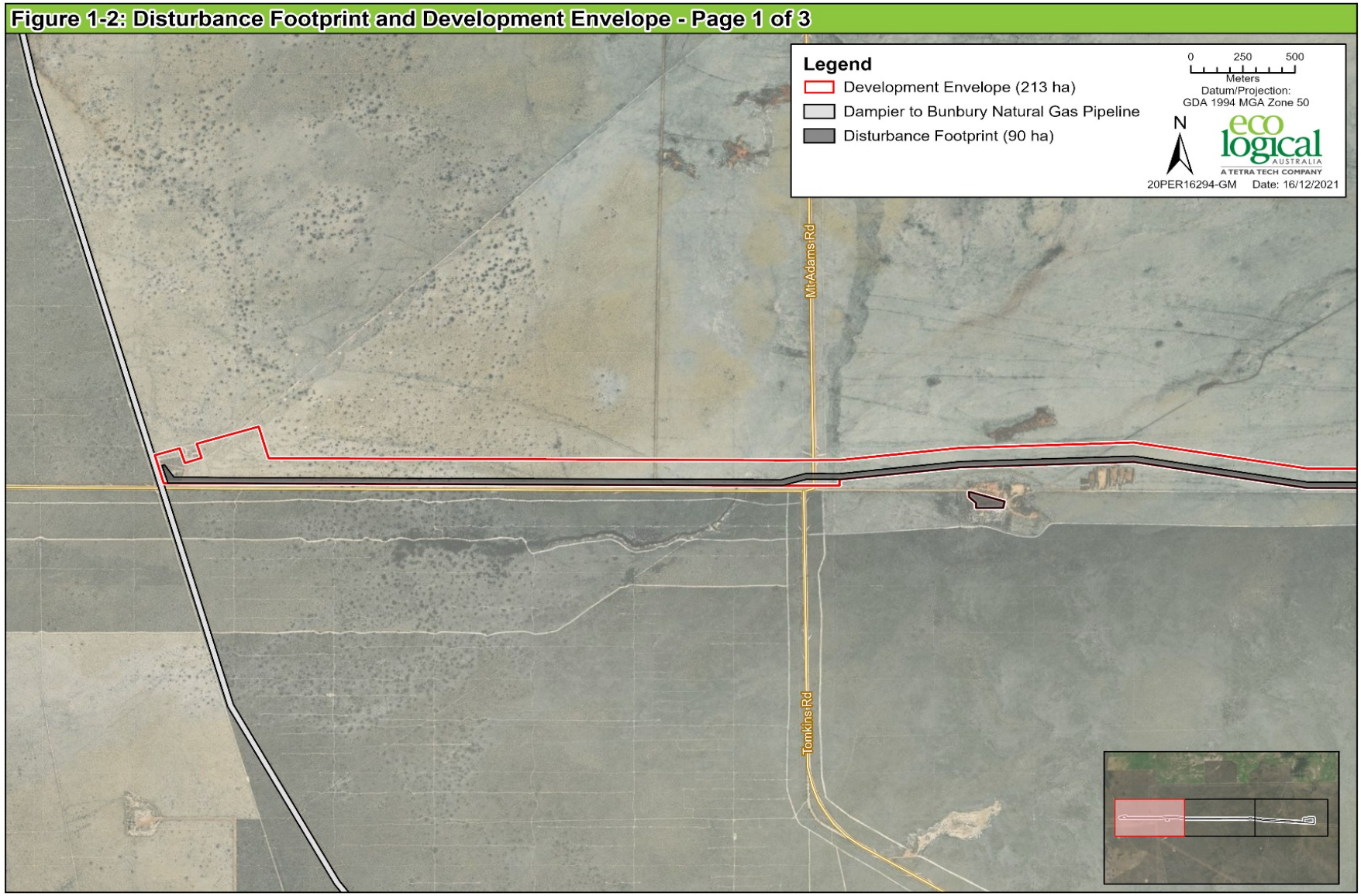

Figure 1-2 Disturbance Footprint and Development Envelope

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Figure 1-2: Disturbance Footprint and Development Envelope - Page 3 of 3

1.3.2 Conservation significance environmental values to be impacted by the Proposal

The majority of the pipeline corridor (excluding permanent facilities and access tracks) will be rehabilitated as outlined in Table 1-1. This area will be allowed to return to native vegetation and terrestrial fauna habitat, with the overarching aim of restoring terrestrial ecosystems across the Development Envelope.

This RMP focuses on habitat values for conservation significance listed species under the *Biodiversity Conservation Act 2016* (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as Matters of National Environmental Significance (MNES).

Desktop and field assessments determined that there is the potential for one threatened flora species and one fauna species to occur within the Development Envelope, based on presence of previous records or suitable habitat. These are:

- Sandplain Duck Orchid *(Paracaleana dixonii)* - Endangered (EPBC Act), Vulnerable (BC Act)
- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) – Endangered (EPBC Act and BC Act).

One *Paracaleana dixonii* was recorded in the recent targeted survey, and approximately 95.2 ha of low quality Carnaby's Cockatoo foraging habitat was mapped (ELA 2020a) within the Development Envelope including approximately 37.7 ha within the proposed Disturbance Footprint.

A further three fauna species were identified in the Flora and Fauna report (ELA 2021) as potentially occurring within the Development Envelope. These species have a diverse and wide range of habitats, including those which occur within the Development Envelope. However, these species are not considered likely to be present in the Development Envelope due to a lack of appropriate nesting habitat and preferred prey species (ELA 2020a). As such these three species, listed below, and their respective habitats are not discussed any further in this document:

- Fork-tailed Swift (*Apus pacificus*) - Migratory (EPBC Act and BC Act)
- Grey Falcon (*Falco hypoleucos*) - Vulnerable (EPBC Act and BC Act)
- Peregrine Falcon (*Falco peregrinus*) - Other Specially Protected Fauna (BC Act).

Eight flora species listed as Priority by the DBCA were recorded within the Development Envelope from the field survey undertaken in 2020, including:

- DBCA Priority 1 (P1)
  - *Micromyrtus rogeri*
  - *Lasiopetalum ogilvieanum*
- DBCA Priority 3 (P3)
  - *Guichenotia alba*
  - *Mesomelaena stygia* subsp. *deflexa*
  - *Stylidium drummondianum*
- DBCA Priority 4 (P4)
  - *Banksia scabrella*
  - *Eucalyptus macrocarpa* subsp. *elachantha*
  - *Stawellia dimorphantha*.

The Proposal will result in reduction of individuals of less than 15% for seven out of eight of the Priority flora species. The Priority 1 species *Lasiopetalum ogilvieanum* will experience a reduction of approximately 51% of individuals within the Development Envelope. Given the loss of greater than 50%, specific rehabilitation criteria have been set for this species (Table 3-1) to ensure it continues to persist in the local area.

A summary of the habitat requirements and expected residual impacts to potential habitat for *Paracaleana dixonii* and Carnaby's Cockatoo is presented in Table 1-4.

Table 1-4 Habitat requirements within the Development Envelope and expected residual impacts

Species	Habitat Description	Expected Residual Impacts
Paracaleana dixonii (Sandplain Duck Orchid)	Tuberous perennial herb that measures between 0.09-0.2 m high. Flowers yellow to brown from October through to December or January. Occurs commonly on grey sand over granite (ELA 2020a). Approximately 191.2 ha of potential habitat for the species has been mapped within the Development Envelope.	One individual was recorded in the most recent survey, and the species is cryptic and has previously been recorded within the Development Envelope in 2013. As such, the potential presence of additional individuals within the Development Envelope cannot be discounted. Up to 79.7 ha of habitat for this species will be impacted by the Proposal. Offsets (including rehabilitation and land acquisition) have been proposed to account for this habitat loss.
Calyptorhynchus latirostris (Carnaby's Cockatoo)	*Banksia* spp. and occasional *Eucalyptus todtiana* mid open woodland over shrubs and sedgeland on sandy plains Approximately 95.2 ha of low-quality foraging habitat has been mapped within the Development Envelope.	Up to 37.7 ha of low-quality foraging habitat will be impacted by the Proposal. Post construction, the majority of the pipeline disturbance area will be rehabilitated.

1.4 Condition requirements

The Proposal has not yet been assessed under Part IV of the *Environmental Protection (EP) Act 1986* or the EPBC Act. Considering the information that is provided in the Environmental Review Document, this RMP outlines the management approach to the rehabilitation of the Proposal to ensure environmental outcomes and objectives are achieved.

1.5 Regulation and policy

1.5.1 Commonwealth regulation and policy

The Proposal was referred to the Department of Agriculture, Water and Environment (DAWE), under the EPBC Act in March 2021 (ref. EPBC 2021/8907). The Proposal has been deemed a Controlled Action and will be assessed on Preliminary Documentation.

1.5.2 State regulation and policy

The Proponent referred the Proposal to the Environmental Protection Authority (EPA) on the 8th of April 2021. In August 2021, the EPA determined the Proposal required assessment at the level of "Referral Information with additional information required" with a two-day public review period.

1.6 Proponent experience with previous rehabilitation

The Proponent has a proven track record of rehabilitation success in arid environments, including for the original DBNGP constructed in 1981in WA. Rehabilitation for the DBNGP commenced in 2007. In 2012, a performance review was undertaken in accordance with Condition 5-1 of Ministerial Statement 735, which requires the Proponent to submit a Performance Review every five years after the start of construction to the WA EPA (Strategen 2012). Soil and vegetation cover were the key focus for rehabilitation completion criteria for the DBNGP project. Results of compliance audits over the five-year period found no potential non-compliances with conditions relating to management of soil cover and vegetation rehabilitation (Strategen 2012). Regarding soil cover, no evidence of soil erosion or sedimentation was observed or reported by any landholders (Strategen 2012). Three of the four completion criteria were met overall for vegetation rehabilitation in the Pilbara and Gascoyne regions of the project area and all survey sites had an average native species density equal to or greater than that of their respective control plots (Strategen 2012). The performance review found that 'construction impacts on watercourses were temporary and fully rehabilitated, utilising proven techniques to minimise future erosion potential' (Strategen 2012). Watercourse flows were managed to ensure no interruption to downstream ecological or anthropogenic uses (Strategen 2012).

These incorporated methods that enhanced rehabilitation were fauna management, acid sulphate soil treatment techniques, and the utilisation of Gluon with helicopter applications to cover sand dunes rehabilitation works where truck use was limited. The DBNGP expansion project received an Earth award from the Civil Construction Federation of Australia for the successful use of the technique.

The Proponent also completed successful rehabilitation of the Fortescue River Gas Pipeline. The project included a 270 km pipeline from the DBNGP to Fortescue Metal Group's Solomon Hub operations in the Pilbara region of Western Australia. Construction commenced in 2014 and was completed in March 2015. Successful close out of completion criteria was achieved within three years. Rehabilitation programs have also been successful on the Wheatstone – Ashburton West Pipeline (87 km), the Onslow Lateral Pipeline (24 km) and is underway on the Tanami Natural Gas Pipeline (NT).

2. Rationale and approach to rehabilitation

2.1 Environmental management objectives

Rehabilitation will be required for all areas cleared for construction purposes that are not required for operational use. The Proposal will involve initial temporary impact to 90 ha of native vegetation. Post-construction, a minimum of 45.2 ha of the Disturbance Footprint will be rehabilitated. This includes an 8.6 ha area of pipeline disturbance that will be reinstated and rehabilitated but is maintained as required under AS2885 (to Section 1.3.2), leaving a residual impact of ~44.8 ha of permanent clearing. Effective rehabilitation will manage potential impacts from:

- Direct loss through clearing of native vegetation
- Direct loss of fauna habitat from clearing
- Injury or mortality of individuals from vehicle or machinery interaction
- Introduction and/or spread of weed species as a result of disturbance and vehicle/ machinery movements
- Fire event.

Implementation of the Construction Environmental Management Plan (CEMP) will address specific management requirements relevant to construction and operation in terms of flora and vegetation, weeds, fauna, waste, hazardous material management and fire. There are some factors beyond the control of the Proponent that could affect the achievement of rehabilitation outcomes, such as climate change, occurrence of rainfall (drought or flooding) and fire. The factors that represent a risk to rehabilitation success are further addressed below.

Monitoring at both rehabilitation and control sites will be undertaken to determine progress towards achievement of objectives and management targets, and to identify where contingency actions need to be implemented to manage any risks to the rehabilitation outcomes (see Sections 3.1 and 4.2).

2.2 Surveys and study findings

A number of studies have been undertaken of the Development Envelope to assess the vegetation and fauna baseline conditions. These studies and results are discussed in Table 2-1.

Table 2-1 Overview of studies undertaken in proximity to the Development Envelope

Reference	Survey type and location	Conservation significant species of communities
West Erregulla Pipeline Targeted Flora Survey (Mattiske, 2021)	Targeted flora survey – conservation species focused on *Paracaleana dixonii*	*Paracaleana dixonii* – one individual found in survey.
West Erregulla Pipeline Flora and Fauna survey (Eco Logical Australia 2020a).	Detailed and Targeted flora survey and vegetation condition assessment, Basic fauna survey, Targeted Black Cockatoo habitat assessment and Targeted Malleefowl survey (of the Development Envelope).	No individuals of the targeted threatened taxa *Paracaleana dixonii* No individuals of the targeted threatened species Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and Malleefowl (*Leipoa ocellata).* **Priority flora:** 8 confirmed taxa No Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) were recorded.

Reference	Survey type and location	Conservation significant species of communities
Review of key potential flora, vegetation and fauna values on the proposed pipeline for Strike Energy near Dongara (Mattiske 2020)	Desktop assessment of the potential flora, vegetation and fauna values present (within the ELA 2020a survey area).	12 threatened and 18 priority flora species have the potential to occur. 4 TECs and 6 PECs have the potential to occur. 10 threatened fauna species have the potential to occur.
West Erregulla targeted threatened flora survey (ecologia 2018)	Targeted threatened flora survey (within the current survey area)	No individuals of the targeted threatened taxa *Thelymitra stellata, Paracaleana dixonii* and *Eucalyptus crispata*. No TECs and PECs were recorded.
West Erregulla Project Flora and Vegetation Assessment (Woodman 2013)	Detailed flora and vegetation survey (within the current survey area)	Threatened (Declared Rare Flora) flora: *Thelymitra stellata, Paracaleana dixonii, Eucalyptus crispata* Priority flora: 23 confirmed taxa No TECs and PECs were recorded.

2.3 Key assumptions and uncertainties

A number of factors that represent risk to the success of this RMP are described below. The rehabilitation objectives, management targets and actions (Table 3-1**;** Table 3-2), and corrective actions (Table 4-1) have been designed to try to minimise these risks wherever possible. In addition, a range of sub-plans will be implemented to ensure risks to rehabilitation are minimised; refer to the EMP for more information.

- **Increase in weed cover and diversity:** weeds can be introduced and/or spread to the Development Envelope via vehicles and equipment. New species can be introduced, or existing infestations can be spread into new areas. Weeds could prevent or delay the re-establishment of native species in rehabilitation areas.
- **Extreme weather**: extreme or unexpected weather events, such as flooding or drought, could wash away topsoil, modify landforms through erosion, or prevent seedling germination due to lack of rainfall. These negative impacts could prevent successful rehabilitation from occurring.
- **Fire:** wildfires, particularly unusually hot or out of control fires, have the potential to burn new growth, thereby preventing successful rehabilitation.
- **Introduced fauna:** introduced herbivores, such as cattle, rabbits and camels, could graze on new growth, thereby limiting the potential for regeneration of native vegetation. Introduced predators, such as cats and foxes, show preference for open areas for hunting, which could negatively impact on native fauna attempting to recolonise rehabilitated areas.

The Proponent is ultimately responsible for successful rehabilitation of the Proposal to meet the specific completion criteria outlined in this RMP; however, there are actions that will be implemented by third parties where relevant (e.g. the Construction Contractor will implement the majority of actions based on a standard pipeline reinstatement and rehabilitation approach).

2.4 Rehabilitative processes and planning

The crucial first step in ensuring successful rehabilitation of the Proposal is in the design phase. This Proposal has been designed to enable micro-siting before construction to avoid and minimise impacts to sensitive environmental values including low quality Carnaby's Cockatoo foraging habitat. The alignment does not intersect any sensitive values, including established trees, sensitive watercourses or heritage locations; however, if during pre-clearance surveys or through cultural monitoring during construction these sites are encountered, the Proponent will implement requirements under the CEMP to minimise and avoid impact.

This design phase has been informed by ecological surveys to determine the vegetation and fauna habitats that occur and any specific features that are relevant (e.g. watercourses, rocks or logs for habitat complexity). A range of construction and operational methods and management measures have been identified in the CEMP and these will contribute to the successful rehabilitation of the pipeline corridor.

2.4.1 Reinstatement and rehabilitation

Reinstatement is the process which occurs post-construction and involves removing temporary infrastructure and re-installing the pre-existing landforms and soil profiles, with rehabilitation taking this process further and replacing disturbed vegetation over the rehabilitation area.

While reinstatement and rehabilitation are staged as part of the construction process, the method of reinstatement and rehabilitation is structured from the early design and planning phases.

Once construction activities are predominantly complete in a section of the pipeline alignment, reinstatement and rehabilitation can commence. These activities will occur progressively to limit the time between removal of vegetation and re-establishment. The Development Envelope will be re-contoured to match the surrounding landforms and erosion controls constructed where necessary. Separately stockpiled topsoil will then be respread evenly across the Development Envelope and any stockpiled vegetation placed across the Development Envelope to assist in soil retention, provision of seed stock and fauna shelter.

Further rehabilitation works, such as reseeding or revegetation (using appropriate species) may be undertaken to restore vegetation cover in areas that do not meet the rehabilitation criteria. Rehabilitation objectives and targets and corrective actions are set out in Sections 3.1 and 4.2 respectively.

The Proponent has conducted and successfully completed reinstatement and rehabilitation works on over 3,000 km of gas transmission pipelines (this is outlined further in Section 1.6). Rehabilitation will be consistent with this standard process, with potential for targeted management actions to be implemented, in particular, rehabilitation zones as relevant (see Section 2.4.2).

The 6 m restricted rehabilitation as described in Table 1-1 includes the area directly above the pipeline which requires clearing for line of sight of pipeline markers under Australian Standard 2885 (AS2885) and the DMIRS approved safety case. In this area, rehabilitation is encouraged and full reinstatement will occur, however every 3 to 5 years vegetation maintenance occurs to ensure that the requirements of AS2885 are met which means ensuring the height of vegetation is managed and large trees that could impact the pipeline integrity are pruned or removed depending on distance from the pipeline.

2.4.2 Rehabilitation zones

For the purposes of this RMP, three distinct rehabilitation zones have been defined based on ecological survey work undertaken to date and the presence of MNES habitat. They include the following:

- *Paracaleana dixonii* potential habitat
- Carnaby's cockatoo potential foraging habitat
- Native vegetation (native vegetation without additional values required to support MNES)

These zones are shown on Figure 2-1 and fully described in Table 2-2.

Table 2-2 Primary rehabilitation zones

MNES rehabilitation categories	Descriptions	Extent within the Disturbance Footprint (ha)*	Approximate extent to be rehabilitated within the Disturbance Footprint (ha)*
***Calyptorhynchus latirostris* (Carnaby's Cockatoo) potential foraging habitat**	Preliminary mapping includes *Banksia* spp. and occasional *Eucalyptus todtiana* mid open woodland over shrubs and sedgeland on sandy plains. This includes the vegetation communities EtAhHh and EtBaHh.	37.7	12
***Paracaleana dixonii* (Sandplain Duck Orchid) potential habitat**	Sandplain Duck Orchid potential habitat includes vegetation communities EtAhHh, AcEbHh, EtBaHh and AcDdMI (of which EtAhHh and EtBaHh are habitat for Carnaby's Cockatoo).	79.7	30
Native Vegetation (without additional values required to support MNES)	There is 90 ha of native vegetation within the Disturbance Footprint. Native vegetation that does not include the additional values required to support the MNES species will be rehabilitated where rehabilitation of MNES habitat is not suitable.	90	15.2

***Note: These values are not additive**

Native vegetation will be rehabilitated in areas that are not suitable for MNES habitat rehabilitation. This includes the 8.6 ha area of pipeline disturbance that will be reinstated and rehabilitated but is maintained as required under AS2885 (Section 1.3.2) described as restricted rehabilitation in Table 1-1.

The RMP is intended to be adaptive such that new information about conservation significant species habitats can be taken into account in refining rehabilitation zone mapping. If a species is considered unlikely to occur in a particular area based on further information, that area will no longer be mapped

as habitat for that conservation significant species. If no conservation significant species are considered to have potential habitat in an area, then the area would revert to native vegetation only. Conversely, if further information suggests that an area is potential or actual conservation significant species habitat, then mapping will be updated accordingly.

Initial habitat mapping has been completed based on reconnaissance field surveys conducted in late 2020. Rehabilitation zones may also be updated during trenching, for example if direct evidence of conservation significant species presence is detected in an area previously not considered potential conservation significant species habitat.

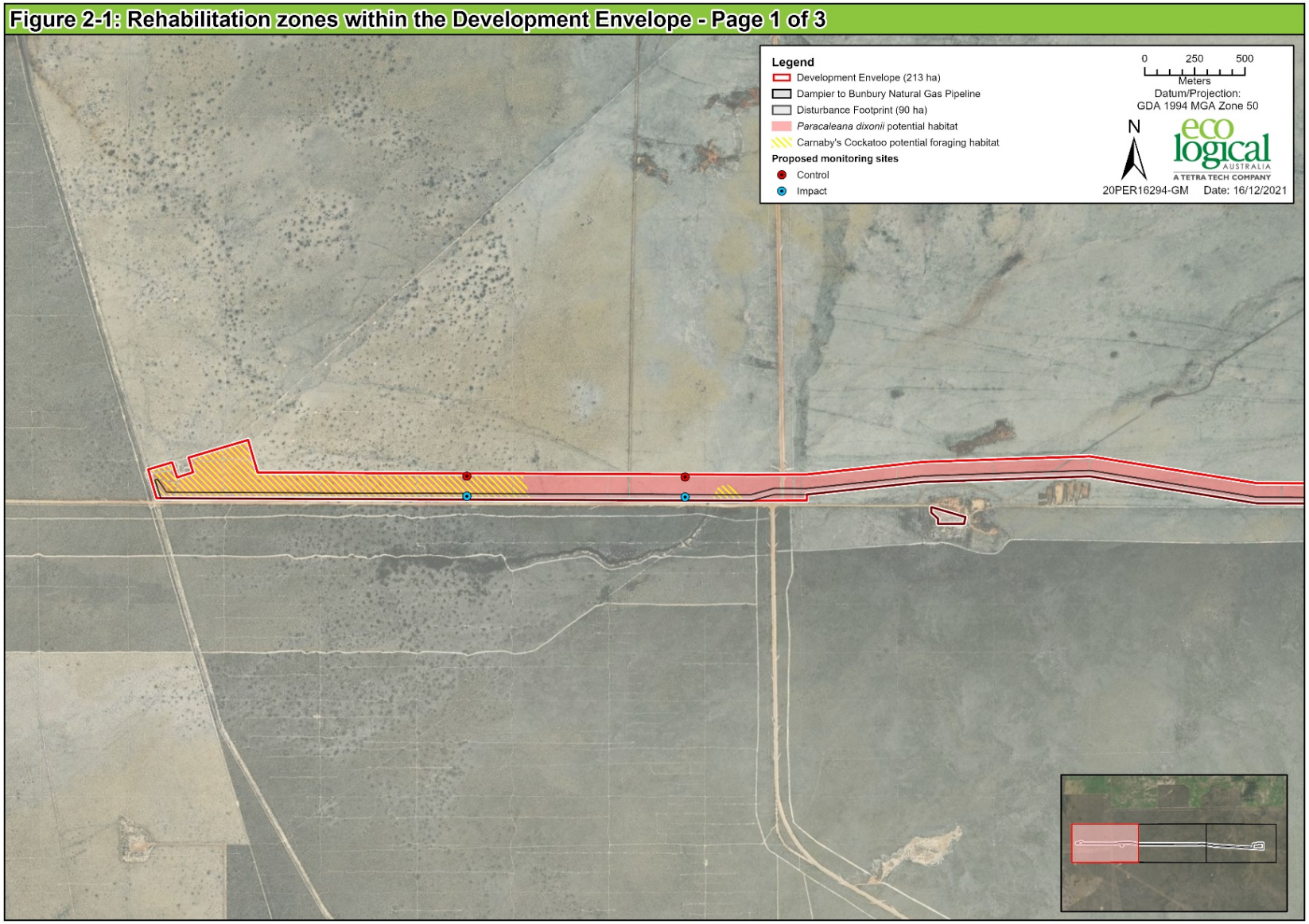

Figure 2-1 Rehabilitation zones within the Development Envelope

Figure 2-1: Rehabilitation zones within the Development Envelope - Page 2 of 3

Figure 2-1: Rehabilitation zones within the Development Envelope - Page 3 of 3

2.4.3 Monitoring sites

Based on the existing information available for vegetation and fauna habitats, preliminary monitoring sites for each rehabilitation zone will be selected from which an assessment against the management targets can occur. Each monitoring site will comprise one rehabilitation site and one corresponding control site. Six monitoring sites will be selected, including three for each rehabilitation zone to ensure appropriate replication of monitoring across the length of the Disturbance Footprint (Figure 2-1).

Monitoring sites will be located within the 'core' of rehabilitation zones to minimise the impacts of edge effects and to avoid transitional vegetation/habitats. Paired control sites will be located on undisturbed land within 300 m of the pipeline corridor but outside of the disturbance area. They will be established in the same native vegetation communities as the rehabilitation sites, to assist comparisons between rehabilitation and control area sites.

If required, alternative monitoring sites will be established to ensure optimal siting within habitats and along the pipeline corridor and adjacent to the plant.

2.4.4 Offsets

The Proposal will result in the loss of up to 90 ha of native vegetation within the Disturbance Footprint. This includes the loss of up to 79.7 ha of potential habitat for *Paracaleana dixonii* and 37.7 ha of low-quality foraging habitat for Carnaby's Cockatoo (*Calyptorhynchus latirostris*). Rehabilitation offsets for each species are as follows:

- Rehabilitation of 30 ha within the Disturbance Footprint using cleared native vegetation species suitable for providing *Paracaleana dixonii* habitat.
- Rehabilitation of 12 ha within the Disturbance Footprint using cleared native vegetation species suitable for Carnaby's Cockatoo foraging.

Based on a combination of rehabilitation within the Disturbance Footprint and the acquisition and protection in perpetuity of suitable habitat for each of these species, the proposed offsets will directly offset the residual impact of the Proposal on *Paracaleana dixonii* and Carnaby's Cockatoo.

3. Rehabilitation management plan provisions

3.1 Management actions under the RMP

Rehabilitation completion objectives have been designed for each EPA Factor (see Table 1-2), and for some factors are the objectives are only applicable to certain rehabilitation zones. The appropriateness of these objectives will be continually reviewed throughout rehabilitation based on the outcomes of adaptive management measures outlined in Section 4.

Monitoring and recording commitments are outlined in Table 3-1 and Table 3-2.

Table 3-1 RMP objective, management target and actions for EPA Factor Flora and Vegetation

Objective	Management target	Management actions	Monitoring	Timing/ frequency of actions	Responsibility and Reporting
To re-establish vegetation in line with management targets.	Perennial native flora species diversity is equal to or greater than 40% of that of the adjacent control area at 36 months. Perennial native flora species richness is equal to or greater than 40% of that of the adjacent control area and reflects the species composition present in the pre-disturbed vegetation type at 36 months. Within 3 m either side of the pipeline only ground cover species will be measured under this target and not tree species, which are not suitable to grow in close proximity to the pipeline. Tree species will be allowed to recover outside of this restricted corridor. A 3 m wide access track will also be left to enable access to the pipeline.	• Progressive rehabilitation undertaken to minimise the amount of disturbance time • Procedures for dust suppression • Topsoil and then cleared native vegetation will be re-spread over graded surfaces in an even layer to match the natural soil horizons • Limited access to areas beyond that disturbed by the Proposal • Fire management and response systems to be implemented • Reinstatement to include stripped vegetation and topsoil to provide a seedbank of existing species. These are specific to each location and vegetation habitat type and will be used directly back to where they were cleared.	• Monitor native vegetation rehabilitation sites and adjacent control sites to monitor aspects against management targets. • Control site/rehabilitation site transects. • Photo point monitoring • Monitoring of vegetation health within Disturbance Footprint.	Monitor at years 1, 4, 7 and 10 post-construction. Monitoring intervals will be reduced if required to meet the management target or on advice of an environmental specialist.	AGI Operations HSE Manager Rehabilitation Monitoring Report.
	Evidence of *Lasiopetalum ogilvieanum* (P1) re-establishment at a minimum of five locations within the Disturbance Footprint within 36 months of rehabilitation commencing.	• As above • Where *Lasiopetalum ogilvieanum* (P1) has not re-established within the Disturbance Footprint within 36 months, seed will be collected from retained locations of the species within the Development Envelope. The seed will be treated and planted within the Disturbance Footprint within the relevant vegetation communities.		Monitoring will continue until such a time that the species is re-established at a minimum of five locations within the Disturbance Footprint.	
No increase of invasive weeds within the Development Envelope	Percentage of foliage cover of Declared species under the *Weeds Management Act*, Weeds of National Significance (WONS) and Buffel grass (*Cenchrus ciliaris*) is not greater than that of the adjacent control area at 36 months.	• Clean down procedure of vehicles prior to entering the Development Envelope to reduce cross contamination of weeds • Topsoil will be stockpiled for as little time as possible to minimise the amount of disturbance and potential for cross contamination by weeds • Targeted weed control in response to observations of new weed infestations or introduction of new weed species.	Monitor native vegetation rehabilitation sites and adjacent control sites to monitor aspects against management targets.	Monitor at years 1, 4, 7 and 10 post-construction. Monitoring intervals will be reduced if required to meet the management target or on advice of an environmental specialist.	

Table 3-2 RMP objectives and management actions for EPA Factor Terrestrial Fauna

Objective	Management target	Management actions	Measurement and monitoring	Timing/ frequency of actions	Reporting
To re-establish conservation significant species habitat in line with management targets (Carnaby's Cockatoo) Applicable to Carnaby's Cockatoo potential foraging habitat only	• Perennial native flora species density and richness is equal to or greater than 50% of that of the adjacent control area and reflects the species composition present in the pre-disturbed habitat type at 36 months after completion of the Proposal. • Perennial native flora species ~~coverages~~ meets criteria described in West Erregulla Pipeline Flora and Fauna survey (ELA, 2021) for low quality foraging habitat for Carnaby's Cockatoo, that is projected foliage cover of preferred foraging species is greater than 2% • Note that within 3 m either side of the pipeline, the management target will only apply to ground cover species and not to tree species (restricted rehabilitation zone), which are not suitable to grow in close proximity to the pipeline. Tree species will be allowed to recover outside of the 6 m corridor.	• Progressive rehabilitation undertaken to minimise the amount of disturbance time • Procedures for dust suppression • Topsoil and then cleared native vegetation will be re-spread over graded surfaces in an even layer to match the natural soil horizons. • Implement traffic conditions including speed limits, signage, and limited access to areas beyond that disturbed by the Proposal • Maintain fauna sightings and incident register for injured or deceased fauna during construction • Structural habitat elements such as timber and rocks shall be reinstated over the rehabilitation area, such as small amounts of rocks and stones generated by the construction process • Fire management and response systems to be implemented • Reinstatement to include stripped vegetation and topsoil to provide a seedbank of existing species.	Monitoring of rehabilitation and control sites. Monitoring will include indications of: • Re-establishment of *Banksia* spp. and occasional *Eucalyptus todtiana* mid open woodland over shrubs and sedgeland on sandy plains habitat, except within 3m of pipeline. • Re-establishment of suitable foraging species for Carnaby's Cockatoo. • Observation surveys, including timed bird surveys and active searching, would be completed in line with *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020).	Monitor at years 1, 4, 7 and 10 post-construction. Monitoring intervals will be reduced if required to meet the management target or on advice of an environmental specialist.	AGI Operations HSE Manager Rehabilitation Monitoring Report.

3.2 Monitoring aspects

The monitoring program has been designed to ensure that rehabilitation objectives and management targets are achieved, indicating reinstatement has been undertaken to the appropriate standard and rehabilitation is successful. Monitoring focuses on the success of revegetation of cleared areas to ensure that habitats capable of supporting known conservation significant species or with potential to occur in the Development Envelope, are re-established.

Following the completion of construction, appropriately sized quadrats will be established at each of the pre-determined monitoring (rehabilitation and control) sites (Figure 2-1). Each quadrat will be permanently demarcated with fixed markers (e.g. fence dropper) and GPS coordinate locations of each quadrat corner will be recorded.

Within each quadrat, the following data will be recorded (as relevant to the management target):

- Site number
- Native flora species density (plants per m^2)
- Native flora species richness (per quadrat)
- Weed foliage cover (%)
- Indicators of the presence of fauna (e.g. scats, burrows, tracks)
- General observations (i.e. feral animal disturbance, fire occurrence).

Rehabilitation monitoring will occur at rehabilitation and control sites at a time of year when floristic material allowing plant identification is most likely to be available for most species to minimise the effects of seasonality. Monitoring will occur at years 1, 4, 7 and 10 post-construction. Monitoring intervals will be reduced if required to meet the management target or on advice of an environmental specialist. This timeframe is based on DAWE feedback to allow for a longer term review of rehabilitation success for Carnaby's Cockatoo low foraging habitat.

Photo monitoring points will be established at representative locations within each monitoring site and recorded with a GPS. At each point, two photographs will be taken along each direction of the pipeline corridor. All photos will be date stamped and photo number recorded with appropriate details (monitoring site number and direction of photo).

Fauna usage of the rehabilitated area will be monitored in tandem with vegetation monitoring. Observation surveys, including timed bird surveys and active searching, would be completed in line with *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020).

Data collection will be comparable and repeatable between monitoring sites and across monitoring years. After each monitoring event, data collected from each rehabilitation site will be compared with its corresponding control site, and results will be compared across the entire Development Envelope. Each year of monitoring will compare results to the previous monitoring results, including an assessment of each rehabilitation zone against the management targets (see Table 3-1**;** Table 3-2). Where deficiencies are encountered such as the presence of weeds or a low diversity or coverage of native vegetation, corrective actions (Table 4-1) may be required to ensure completion criteria are met by the end of the ten year monitoring period. In this circumstance the time to subsequent monitoring may be reduced as directed by the environment specialist to ensure any corrective actions are successful.

4. Adaptive management and review

4.1 Management plan review

The environmental management system outlined in the CEMP provides for ongoing review and improvement of existing systems and controls. The RMP would form part of this process and as a result objective management may be adapted in response to the outcomes of:

- Any changes (inclusion or removal) to regulatory listing of conservation significant species
- Any changes to conservation significant species habitat guidance (that may alter rehabilitation zones)
- Rehabilitation monitoring or contingency actions (see Section 4.2)
- Improved methods
- Increased knowledge (e.g. obtained through surveys or government advice).

The appropriateness of objectives and management targets will be continually reviewed throughout their application using monitoring results. Any changes would be made in agreement with relevant government agencies.

4.2 Contingencies and corrective actions

If monitoring indicates that objectives and management targets for rehabilitation are not being achieved, or are unlikely to be achieved within five years, contingencies and corrective actions will be enacted (Table 4-1).

Table 4-1 Rehabilitation contingencies and corrective actions

Trigger	Action
Native flora density, richness has not achieved at least 40% of adjacent control areas at any time from year 3 onwards.	1. Investigate cause of reduced recruitment (this could include review of weather conditions, review of threatening processes such as erosion or fire). 2. Remediate cause if possible, which could include implementing additional revegetation techniques (direct seeding or planting seedlings) in particular those focused on restoring key conservation significant species habitat values or addressing any threatening processes that may be influencing results. The species selected will be based on those identified in the Development Envelope (ELA 2020a) and seed collection will occur in the direct local area (adjacent to site) to ensure local endemic species are utilised. Rates of application of seed (density) will be advised by an environmental specialist at the time of seeding and based on existing density. 3. Monitor the effectiveness of any measures implemented during future monitoring events, until management target is achieved.
Weed foliage cover (%) for Declared, WONS, Buffel grass is greater than that in adjacent control areas.	1. Investigate cause for higher weed cover (this could include reviewing access to area or, weed control approaches). 2. Implement weed control to reduce weed cover where this is required and address any threatening processes that may be influencing results. 3. Monitor the effectiveness of any measures implemented during future monitoring events, until management target is achieved.
Evidence of *Lasiopetalum ogilvieanum* (P1) re-establishment at a minimum of five	1. Direct seed collection within undisturbed area of Development Envelope of *Lasiopetalum ogilvieanum.* 2. Treatment and application of seed to suitable vegetation habitat areas to promote reestablishment.

Trigger	Action
locations within the Disturbance Footprint within 36 months of rehabilitation commencing.	3. Monitor the effectiveness of any measures implemented during future monitoring events, until management target is achieved.

Contingency and corrective actions would be implemented, as required, until management targets are achieved. This is expected to occur within three to five years of initial works being completed by the Construction Contractor. If, in the unlikely event that contingency and corrective actions still fail to meet the requirements of the management targets, an alternative course of action will be devised that is jointly agreed upon by all relevant stakeholders (i.e. AGI Operations, DAWE, DMIRS, DWER and EPA).

4.3 Reporting

A Rehabilitation Monitoring Report will be prepared post each monitoring event that will identify the following:

- Any changes to rehabilitation approach, actions and monitoring due to new knowledge regarding the presence/absence of conservation significant species
- A summary of monitoring results in comparison to objectives and management targets
- Any contingency actions implemented
- Any other issues encountered (e.g. fire occurrence).

The status of rehabilitation progress against the management targets (whether they have been met or the level of achievement), will be reported to the aforementioned government agencies.

5. References

Eco Logical Australia 2020a. *West Erregulla Pipeline Flora and Fauna survey*. Prepared for Australian Gas Infrastructure Group.

Eco Logical Australia 2020b. *West Erregulla Environmental Survey and Approvals Hydrology and Hydrogeology Baseline and Preliminary Impact Assessment Report*. Prepared for AGIO.

Environmental Protection Authority 2020. *Statement of Environmental Principles, Factors and Objectives*, EPA, Western Australia.

Strategen Environmental Consultants Pty Ltd (Strategen) 2012. *Dampier to Bunbury Natural Gas Pipeline Stage 5 Looping Expansion Project Five-year Performance Review (2007-2012).* Prepared for DBNGP (WA) Nominees Pty Ltd.