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MITSUI E&P Australia

Waitsia Gas Project Stage 2: Flora and Vegetation Management Plan

Disclaimer

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RELATED DOCUMENTS

This document should be read in conjunction with following documents:

Document Number	Document Title
MS 1164	Ministerial Statement 1164: Waitsia Gas Project Stage 2

TERMS, ABBREVIATIONS AND DEFINITIONS

Term or Abbreviation	Definition
AHD	Australian Height Datum
ALARP	As Low As Reasonably Practicable.
ARI	Assessment on Referral Information
BC Act	*Biodiversity Conservation* Act 2016
CAR	Compliance Assessment Report
Clearing envelope	The authorised extent of native vegetation within the approved development envelope that may be cleared
DBCA	Department of Biodiversity, Conservation and Attractions
DBNGP	Dampier Bunbury Natural Gas Pipeline
DCCEEW	Department of Climate Change, Energy, the Environment and Water
Development Envelope	The authorised extent within which the Proposal comprises
DPLH	Department of Planning Lands and Heritage
DWER	Department of Water and Environmental Regulation
DPIRD	Department of Primary Industries and Regional Development
Environmental Referral Supporting Report	Detailed information supporting the Waitsia Gas Project Stage 2 referral http://www.epa.wa.gov.au/proposals/waitsia-gas-project-stage-2
EP Act	*Environmental Protection Act* 1986
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act* 1999
EP	Environment Plan
Final Flowline Easement	Final flowline easement selected once absence or presence of sub-surface obstructions has been determined.
Flowline	Pipes that carry raw oil or gas products from the wells to a processing facility.
FVMP	Flora and Vegetation Management Plan
General Vegetation Area	A subset of the clearing envelope that comprises vegetation in poor condition.
ha	Hectares
IBSA	Index of Biodiversity Surveys for Assessments

Term or Abbreviation	Definition
Indicative Flowline Easement	Construction widths for individual flowline or pipeline installation will be approximately 30 m for the route. Sub-surface obstructions (e.g. rocks) may require flowline deviations – hence the use of the term indicative.
km	Kilometres
m	Metres
MEPAU	Mitsui E&P Australia
mm	Millimetres
MS	Ministerial Statement
NVCP	Native Vegetation Clearing Permit
PJ	Petajoule
PGER(E)R	Petroleum and Geothermal Energy (Environment) Regulations 2012
Pipeline	Pipes that carry processed oil or gas products from a processing facility to market.
Serious Weed	For the purposes of this FVMP a 'serious' environmental weed is a weed that has been determined by a weed specialist to have potential to pose a serious environmental risk to the Waitsia-03 Vegetation Area.
Significant Weed	A suite of weed species to be particularly addressed for monitoring / management under this FVMP, comprising any Weeds of National Significance (WoNS), Declared pest plants under the WA Biosecurity and Agriculture Management Act 2007, and serious environmental weeds. The list of significant weeds is included in 3.2.1 of this FVMP and will be reviewed and amended as necessary.
The Proposal	The Waitsia Gas Project Stage 2
Vegetation	"Defined as groupings of different flora patterned across the landscape that occur in response to environmental conditions". (EPA, 2016a)
VSAs	Vegetation and Substrate Associations
WA	Western Australia
Waitsia-03 Area Vegetation	A subset of the clearing envelope that comprises vegetation in good condition.
WC Act	*Wildlife Conservation Act* 1950
WGP	Waitsia Gas Plant
WGP2	Waitsia Gas Project Stage 2
WoNS	Weeds of National Significance

1.0 SUMMARY

A summary of this Flora and Vegetation Management Plan (FVMP) is provided in Table 1-1.

Table 1-1 Summary of the Proposal

Proposal Title	Waitsia Gas Project Stage 2 (WGP2)
Proponent Name:	MEPAU Perth Basin Pty Ltd
Purpose of this Flora and Vegetation Management Plan:	The purpose of this FVMP is to identify the direct and adverse indirect impacts on flora and vegetation within the Yardanogo Nature Reserve and develop management measures that minimises impacts associated with the implementation of the Proposal. This FVMP has been written in accordance with the "Instructions on how to prepare *Environmental Protection Act* (EP Act) 1986 Part IV Environmental Management Plans" (EPA, 2024).
Ministerial Statement:	The Proposal has been assessed by the EPA (Assessment 2226) and on 1 February 2021, a Ministerial Approval was received via Ministerial Statement (MS) 1164, with associated Proposal implementation conditions.
Condition Clauses:	Condition 6
Proposed Construction and Operation Dates:	Construction of the Proposal commenced in July 2021 and is anticipated to be finalised by mid-2026. The Waitsia Gas Plant (WGP) is expected to be operational for at least 20 years.
Plan Required Pre-Construction:	Yes.
Key Environmental Factor/s and Objective/s:	Key environmental factor: Land – Flora and Vegetation **EPA Objective**: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained.* (EPA, 2016)
Key Provisions:	• Baseline flora and vegetation assessments and studies; • Analysis of direct and indirect impacts associated with implementing the Proposal; • Ongoing monitoring for weeds and dieback; • Implementation of management actions; and • Annual reporting (including results of monitoring).

1.1 Ministerial Statement 1164 Conditions

Table 1-2 provides a summary of the conditions outlined in MS 1164 in relation to the FVMP and the relevant sections of the FVMP where these conditions have been addressed[1].

Table 1-2 Summary of MS 1164 Conditions Relating to the FVMP

MS 1164 Condition No.	Description	Location in Document
6	**Flora and Vegetation Management Plan**	-
6-1	The proponent shall implement the proposal to meet the following environmental objective: (1) no direct or adverse indirect impacts to flora and vegetation within the Yardanogo Nature Reserve as a result of the implementation of the proposal.	-
6-2	In order to meet the objective of condition 6-1, prior to clearing activities within the development envelope delineated in Figure 2 of Schedule 1, unless otherwise agreed in writing by the CEO, the proponent shall implement the *Waitsia Gas Project Stage 2: Flora and Vegetation Management Plan* [P-WGP2-054 Rev 2, May 2020]. This Plan shall:	-
6-2 (1)	When implemented, substantiate and ensure that condition 6-1 is being met;	-
6-2 (2)	Specify trigger criteria that will trigger the implementation of management and/or contingency actions to prevent direct or indirect impacts to Flora and Vegetation in the Yardanogo Nature Reserve;	Table 4-2
6-2 (3)	Specify threshold criteria to demonstrate compliance with condition 6-1;	Table 4-2
6-2 (4)	Specify monitoring methodology to determine if trigger criteria and threshold criteria have been met;	Table 4-3
6-2 (5)	Specify management and/or contingency actions to be implemented if the trigger criteria required by condition 6-2(2) and/or the threshold criteria required by condition 6-2(3) have not been me;	Table 4-3
6-2 (6)	Provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that condition 6-1 has been met over the reporting period in the Compliance Assessment Report required by condition 4-6.	Section 4.3 Table 4-2 Table 4-3

[1] MEPAU's Compliance Assessment Plan [WAT-HSE-PLN-00004] outlines MEPAU's approach to compliance with all conditions of MS 1164.

2.0 INTRODUCTION

MEPAU Perth Basin Pty Ltd is a wholly-owned subsidiary of Mitsui E&P Australia Holdings Pty Ltd, which in turn is a wholly-owned subsidiary of Mitsui & Co., Ltd. The Mitsui E&P Australia Holdings Pty Ltd group of companies operates under the brand Mitsui E&P Australia (MEPAU).

3.0 CONTEXT, SCOPE AND RATIONALE

This FVMP has been prepared to support the assessment, approval and implementation of the Proposal under Part IV of the *Environmental Protection Act* 1986 (EP Act).

The WGP2 was referred under the EP Act to the Environmental Protection Authority (EPA) on 23 August 2019 (EPA Assessment 2226). The EPA assessed the Proposal as a significant proposal, through Assessment of Referral Information (ARI). The ARI included additional information requested under Section 40(2)(a) of the EP Act, including this FVMP, which was be subject to a two-week public review period.

On 1 February 2021, Ministerial Approval was received for the project via Ministerial Statement (MS) 1164.

Under s. 45C application of the EP Act, an application to amend the Development Envelope was submitted to the EPA due to further refine the well locations/reservoir targets and make associated minor changes to the flowline routes. MS 1164 was amended on 4 October 2021.

A s.45C application of the EP Act was submitted to the EPA on 12 June 2023 and amended on 27 November 2023 to amend the development envelope and footprint and increase the number of gas production wells to a maximum of nineteen (19) to allow further development of the Waitsia Gas Field and to enable the approved production rate to be achieved over the life of the project. MS 1164 was amended on 17 April 2024.

This FVMP has been written in accordance with the "Instructions on how to prepare EP Act Part IV Environmental Management Plans" (EPA, 2024).

3.1 Proposal

The Proposal (known as WGP2) is a conventional gas proposal located approximately 16km East-South-East of the Dongara-Port Denison town sites (Figure 3-1). It includes the construction and operation of the 91.25 Petajoule per annum WGP, related wells and gas gathering infrastructure. Table 3-1provides a summary of the WGP2.

Table 3-1 Proposal Overview

Proposal Title	Waitsia Gas Project Stage 2
Proponent Activities	Development of a conventional gas reservoir by designing and constructing wells, a gathering system, gas processing plant and export pipeline to the Dampier to Bunbury Natural Gas Pipeline (DBNGP).
Short Description	Waitsia Stage 2 includes the following components: • Construction and operation of the WGP with a maximum export capacity of 91.25 Petajoule (PJ) per annum; • Up to nineteen (19) gas production wells; • Constructing of a (~1km) pipeline (PL 128) to connect the WGP to the existing Waitsia Export Pipeline (PL 124);

Proposal Title	Waitsia Gas Project Stage 2
	• Installation of a gas gathering system comprising flowlines and hubs to convey the extracted gas to the WGP and the gas distribution network; • Installation of a flowline from the WGP to up to three (3) water injection wells to inject produced water into a disused petroleum formation; • Clearing of no more than 16.5 ha of native vegetation within a 580.9 ha development envelope; • Disturbance footprint of up to 479.2 ha within the 580.9 ha development envelope; and • Scope 1 Emissions up to ~300,000 tCO_2-e per annum.

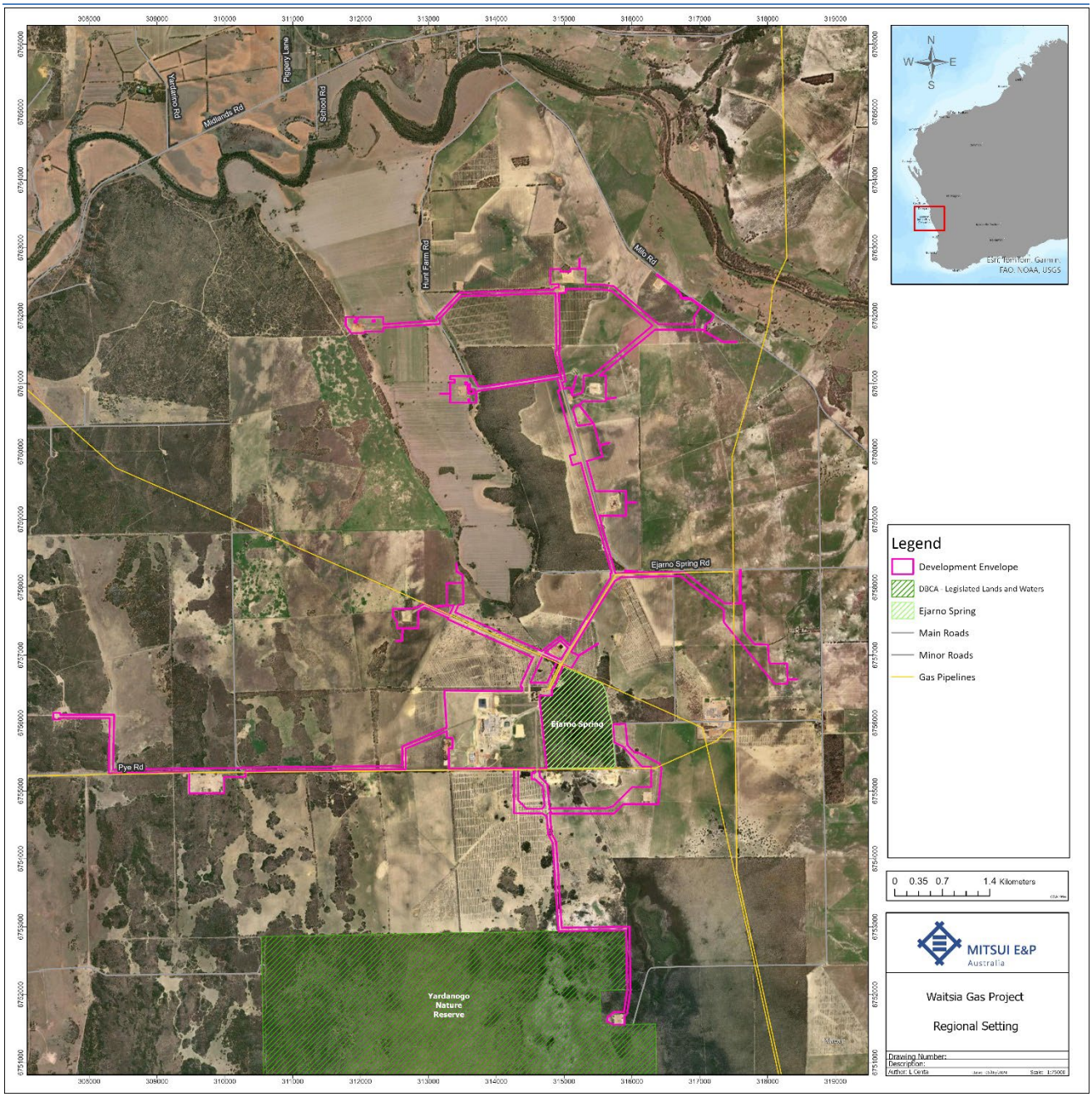

Figure 3-1 Regional Setting

3.1.1 Development Envelope

3.1.1.1 Avoidance and Mitigation

Throughout the scoping and development phase of the WGP2, MEPAU conducted site selection analysis to, where possible, reduce the environmental footprint of the WGP2. Specifically, the location of the WGP, well sites and flowline alignments were selected to avoid vegetated areas and minimise the amount of vegetation and flora that was directly impacted by the WGP2. As detailed in Table 3-2, ~97.2 % of the development envelope is located within existing agricultural or other cleared land and only ~0.5 % of the development envelope is situated in good quality native vegetation.

The Proposal was designed to exclude areas with significant environmental values, namely:

- Ejarno Spring;

- Yardanogo Nature Reserve;
- Waterways;
- Black Cockatoo potential nesting, roosting and foraging habitat;
- Priority flora;
- Native vegetation extents as mapped by DPIRD (2020); and
- Registered and other heritage sites, noting that Heritage Place Irwin River (SC04), is partially within the approved development envelope as wells already exist in this area.

MEPAU has managed to balance the project needs, whilst locating the approved development envelope in a location that has reduced the direct vegetation and flora impacts to a level that is as low as reasonably practicable (ALARP).

3.1.1.2 Development Envelope

The total area of the approved development envelope for the WGP2 area is 580.9 ha(Figure 2-2).

The EPA (2020) identified the following potential impacts to Flora and Vegetation for implementation of the WGP2:

- Clearing of 17 ha of native vegetation (reduced to clearing of 16.5 ha of native vegetation via the 2021 s.45C);
- Introduction or propagation of weeds and/or dieback; and
- Changes to fire regimes.

Although the area of impact has been minimised to the lowest practicable extent by utilising existing cleared areas to locate infrastructure, the WGP2 will result in a direct loss of vegetation and flora through clearing to construct some well sites, access roads and flowlines.

Five Priority flora species have been recorded (JBS&G 2023, Biota 2022, Woodman 2020) in the current approved development envelope:

- *Comesperma griffinii* (Priority 2);
- *Acacia telmica* (Priority 3);
- *Baeckea* sp. Walkaway (A.S. George 11249) (Priority 3);
- *Banksia elegans* (Priority 4); and
- *Stawellia dimorphantha* (Priority 4).

Proposed disturbance to these species for the WGP2 comprised:

- Clearing of one *Comesperma griffinii* individual as part of the Waitsia-03/Waitsia-12 Area construction;
- Clearing of two *Baeckea* sp. Walkaway (A.S. George 11249) (P3) individuals; and
- Clearing of no more than 17% of Priority 4 individuals identified in the survey area, predominately in the Waitsia-03/Waitsia-12 well area.

The EPA (2020) considered that the conservation status of these Priority flora species was unlikely to change as a result of the clearing activities.

A reconnaissance flora and vegetation survey was conducted by JBS&G in April 2023 (JBS&G 2023). No Priority Ecological Communities or Threatened Ecological Communities were

recorded in the approved development envelope, nor are any likely to occur (JBS&G 2023). The proposed additional area has been designed to avoid all Priority flora records.

The direct impacts of the WGP2 are the construction of well sites, access tracks and flowlines will result in clearing of approximately:

- ~3 ha (or 0.5 % of the approved development envelope) of native vegetation in good condition (known as Waitsia-03 Area Vegetation);
- ~13.5 ha (or 2.3 % of the approved development envelope) of native vegetation in poor condition that has been largely degraded over many decades by a mixture of partial clearing, burning and grazing (known as General Vegetation Area).

Table 3-2 Clearing of Vegetation as a Percentage of Overall Development Envelope

Area of Impact	Hectares	% of Development Envelope
Development Envelope	580.9	100%
Waitsia-03 Area Vegetation		
Indicative Flowline Easement	~3	0.5
Clearing Envelope	~5	0.9
General Vegetation Area		
Indicative Flowline Easement	~13.5	2.3
Clearing Envelope	~24	4.0
Existing Agricultural or Cleared Land		
	~564.4	97.2

The EPA has considered the cumulative impacts on flora and vegetation from the Proposal are not significant in a regional context.

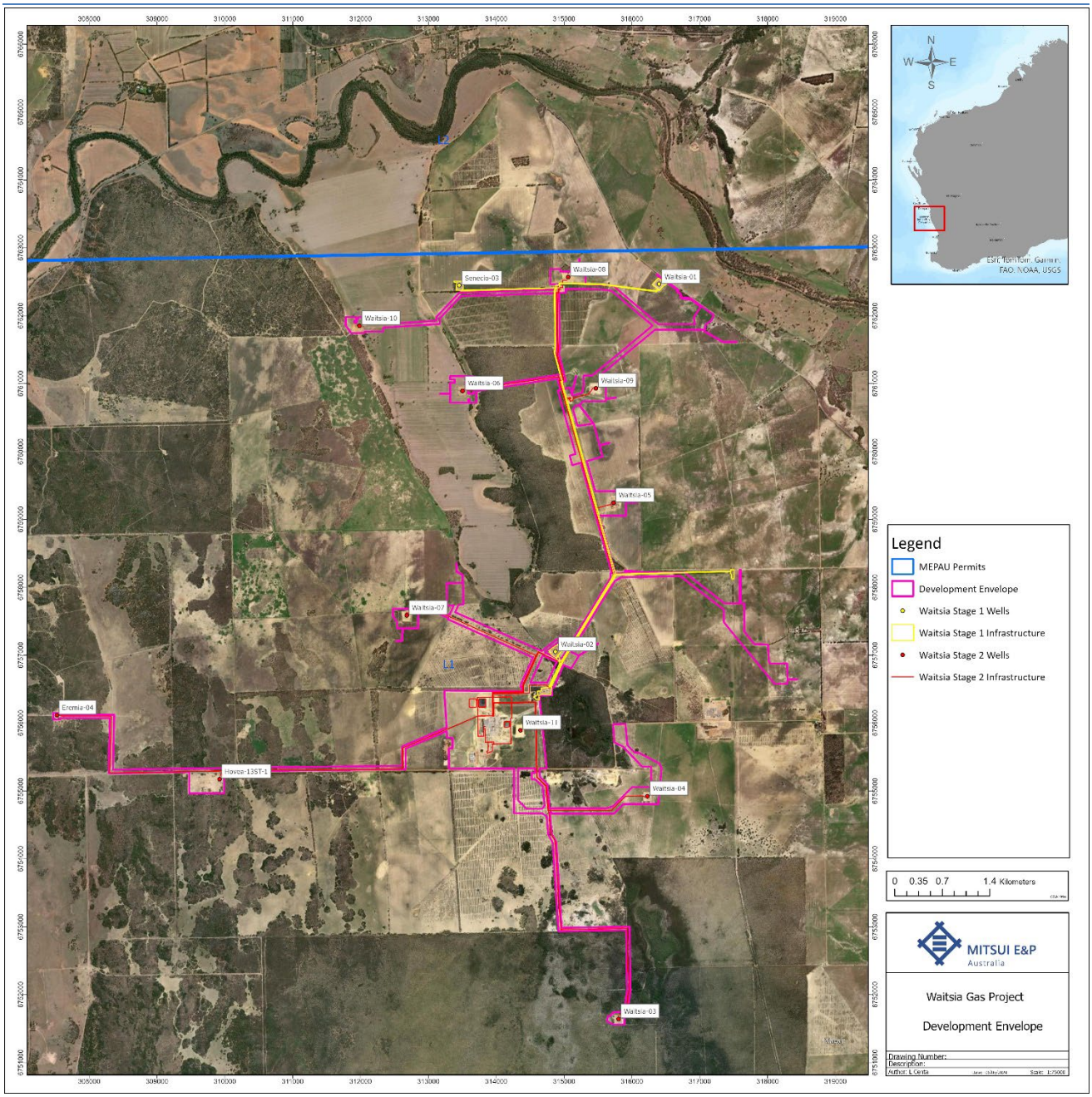

Figure 3-2 Waitsia Gas Project Stage 2 - Development Envelope

3.2 Key Environmental Factors

The preliminary key environmental factors that have been identified by the EPA includes: Air Quality, Flora and Vegetation, Inland Waters, and Social Surroundings. A summary of the Flora and Vegetation factor with a specific focus on the impacts on flora and vegetation by the WGP2 are detailed in Table 3-4. The other preliminary key environmental factors and their management provisions are outlined in separate environmental management plans.

Impacts will be managed via the management measures detailed in Section 4.0.

Table 3-3 Summary of Key Environmental Factors – Flora and Vegetation

Flora and Vegetation	
EPA Objective	*To protect flora and vegetation so that biological diversity and ecological integrity are maintained.*
Policy and Guidance	• Environmental Factor Guideline – Flora and Vegetation 2016; • Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment 2016; • Part V of the *Environmental Protection Act* 1986; • *Petroleum and Geothermal Energy Resources Act* 1967; • Petroleum Pipelines (Environment) Regulations 2012
WGP2 activities	• Clearing of native vegetation for the purposes of flowline and pipeline construction.
Potential impacts – Direct impacts	• Direct loss of vegetation and flora; and • Accidental disturbance of areas outside of the final flowline envelope.
Potential impacts – indirect impacts	• Introduction of new weeds and/or spread of existing weeds; and • Potential introduction of dieback.

3.3 Condition Requirements

The WGP2 has been assessed by the EPA (Assessment 2226) and on 1 February 2021, Ministerial Approval was received via MS 1164. Condition 6 outlines the objectives, requirements for implementation and reporting associated with this FVMP.

3.4 Rationale and Approach

A number of key information sources and aspects inform the rationale and approach of the management provisions outlined in Section 4.0. The following sub-sections summarise:

- Vegetation and Flora assessments and desktop studies completed and findings (Section 3.4.1);
- Key assumptions and uncertainties (Section 3.4.2);
- Management approach (Section 3.4.3); and
- Rationale for choice of provisions (Section 3.4.4).

3.4.1 Vegetation and Flora Assessments and Desktop Studies Completed and Findings

Several vegetation and flora assessments and desktop studies have been undertaken within the approved Development Envelope and wider WGP2 Area. Assessments that are relevant to the Project were identified and discussed in the *Waitsia Gas Project Stage 2 – Environmental Referral Supporting Report* (MEPAU 2019) are detailed in Attachment 1.

The key findings of these assessments are:

- There are six Vegetation System Associations (VSAs) across the Waitsia area: Agricultural land, Kwongan to open banksia woodland on sand, Riparian shrub-thicket and woodland on dark peaty-sand (including wetlands such as Ejarno Spring), Eucalypt/banksia/acacia low forest on sand, York Gum Woodland on red sandy loam and Irwin River Red Gum Woodland. The six VSAs are relatively well represented with more than 45% of pre-European extent remaining (Attachment 3 Table 3-1).

- No riparian vegetation, declared rare flora (Threatened), or threatened ecological communities, as listed under the *Biodiversity Conservation Act* 2016 (BC Act) or threatened species or priority ecological communities as listed under the EPBC Act, have been recorded within the approved development envelope or the abutting area.
- Five flora taxa listed as priority flora by the Department of Biodiversity, Conservation and Attractions (DBCA) are known to occur within the proposed clearing area. All five taxa are known to occur outside the clearing area across relatively large ranges.
- Key threatening processes to flora and vegetation include the direct impact of clearing, potential indirect impacts caused by weeds and potential spread of *Phytophthora* dieback.

3.4.2 Key Assumptions and Uncertainties

The key assumptions and uncertainties relating to the Flora and Vegetation assessments detailed in Attachment 1 are summarised in Table 3-4.

Table 3-4 Assumptions and Uncertainties

#	Assumptions and Uncertainties	Comment
1	Level of surveys completed were adequate to assess flora and vegetation	Where targeted and/or detailed surveys were completed they were conducted over one field trip at varying times within the peak flowering season in the Geraldton Sandplains Bioregion. Replicated quadrats were established in each vegetation pattern identified in the Study Area. EPA (2016a) indicates that survey may be required to be undertaken in other seasons. It is considered that surveys in the peak flowering season only are adequate, as it considered likely that most taxa that flower outside the peak flowering season could be identified during the survey period (Woodman, 2018a)
2	Competency and experience of consultant/s carrying out the survey was sufficient to ensure qualified results	Senior experienced and qualified personnel were involved with all desktop assessments and/or targeted and/or detailed flora surveys undertaken. They also had experience in conducting similar assessments in the bioregion.
3	Scope (Were the sampling of flora groups limited because of any constraints?)	All vascular groups that were present during the targeted and/ or detailed assessments were sampled. No constraints prevented appropriate sampling techniques (quadrat establishment, relevés, targeted searching and opportunistic recording) being undertaken.
4	A sufficient proportion of flora identified, recorded and /or collected	In most instances a high proportion of perennial vascular taxa were recorded based on the intensity and method of survey. A lower proportion of ephemeral and annual vascular taxa were recorded based on the below-average rainfall prior to and the later timing of the survey (Woodman, 2018a). Unknown vascular taxa were collected within quadrats, relevés and opportunistically, with specimens identified at the WA Herbarium
5	Sources of information on previous surveys was used.	Sources of information used during desktop assessments and/or targeted and/or detailed surveys included

#	Assumptions and Uncertainties	Comment
		government databases (e.g. DBCA and Department of Climate Change, Energy, the Environment and Water (DCCEEW)) and previous reports and unpublished data from the vicinity of the broader WGP2 area.
6	The proportion of the task achieved and further work which might be needed	Where Targeted and/or Detailed Surveys were completed, the targeted survey included grid searching for significant flora taxa throughout the entire Development Envelope. No further surveys within the Study Area were considered necessary.
7	Timing/weather/season/cycle were factored into the surveys	Where Targeted and/or Detailed Surveys were completed the field survey was conducted in Spring, corresponding with the optimum flowering period for the Geraldton Sandplains Bioregion. Where below-average rainfall in the months prior to the survey and/or later timing of the survey limited the number of ephemeral and annual taxa recorded/identified this did not impact the outcomes of the survey or prevent identification of any potential significant taxa that may potentially occur in the Study Area.
8	Disturbances (e.g. fire, flood, accidental human intervention etc.), which affected results of survey	Where Targeted and/or Detailed Surveys were completed some disturbances such as historical clearing and weeds were apparent. These did not significantly impact the flora taxa present and are therefore not considered to have affected the results of the survey.
9	Intensity of survey	Where Targeted and/or Detailed Surveys were completed the survey intensity was considered adequate, with replication of quadrats in vegetation types and detailed foot searching (particularly for significant flora) undertaken throughout the Study Area.
10	Completeness and mapping reliability	Where Targeted and/or Detailed Surveys were completed the survey of the Study Area is considered complete in terms of mapping of vegetation types. Specific grid searching for significant flora taxa was undertaken throughout the entire Study Area. Where appropriate foot and/or vehicle transects were employed to aid in mapping which increased the reliability.
11	Remoteness and/or access problems	Where Targeted and/or Detailed Surveys were completed access to the Study Area was considered good, given the entire Study Area was accessible via tracks and firebreaks.
12	Survey planning and implementation	All surveys have been planned and implemented in accordance with relevant in-force industry guidance (including the EPA's Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment guidance).

3.4.3 Management Approach

MEPAU plan to implement both outcome and management-based provisions under this FVMP.

The reason for this approach is the nature of the risks associated with the implementation of the WGP2 where some vegetation will be directly impacted (i.e. cleared under a Part V of the EP Act clearing permit) and where other potential indirect impacts are considered low risk.

Attachment 3 provides an assessment of:

- The direct impacts on vegetation and priority flora associated with the implementation of the WGP2; and
- The potential indirect impacts on vegetation and priority flora associated with the implementation of the WGP2.

The assessment identifies that limited vegetation to be cleared has conservation significance and no VSA will be cleared by more than 0.01%.

Although four priority listed taxa were identified, the potential impact to each of these species is considered small as:

- The number of plants impacted for each of these species comprise only a small proportion of the recorded population; and
- Each of these species has a wide distribution outside the approved development envelope, including within formal reserves or beyond the Geraldton Sandplains IBRA.

Further details on the assessment of potential impacts associated with the implementation of the WGP2can be found in MEPAU, 2019.

3.4.4 Rationale for Choice of Provisions

The management provisions proposed are based on the following rationale:

- Nature of the impact - Throughout the scoping and development phase of the WGP2, MEPAU conducted site selection analysis to, where possible, reduce the direct impacts from environmental footprint of the WGP2. Specifically, the location of the WGP, well sites and flowline alignments were selected to avoid vegetated areas and minimise the amount of vegetation and flora that was directly impacted by the WGP2. The area directly impacted from these activities will be minimised following construction to the smallest practicable extent through selective reinstatement / rehabilitation whilst still ensuring that infrastructure can be safely maintained. Table 2 2 details the percentage clearing vegetated areas compared to non-vegetated areas. Specifically, ~97.2 % of the approved development envelope is located within existing agricultural or other cleared land and only ~0.5 % of the approved development envelope is situated in good quality native vegetation;
- Duration of impact – Given that the clearing of native vegetation and construction of flowlines are short in duration, indirect impacts will be minimised. Operational activities pose minimal indirect impacts that can be managed through adaptive management actions detailed in this FVMP; and
- Expected changes in flora and vegetation – as detailed in Attachment 3 the flora and vegetation to be cleared are well represented outside of the WGP2 the approved development envelope.

4.0 FLORA AND VEGETATION MANAGEMENT

A series of environmental objectives have been developed to mitigate environmental impacts on flora and vegetation associated with the implementation of the WGP2. Table 4-1 details the environmental objectives for this FVMP.

For each objective, outcome and / or management-based provisions have been developed to ensure the impacts from the implementation of the WGP2 are appropriately managed, targets achieved, and the appropriate monitoring and reporting are completed to support the implementation of the management actions.

Table 4-1 Environmental Objectives

Potential Impact	Environmental Objective
Direct loss of native vegetation and flora.	Minimise impacts to conservation significant flora.
Accidental disturbance of areas outside of the approved development envelope.	Prevent clearing of native vegetation and flora outside of the approved development envelope.
	Minimise disturbance of native vegetation and flora outside of the approved development envelope.
Introduction of new significant weeds and/or spread of existing significant weeds to the Waitsia-03 Vegetation Area, as outlined in Section 4.2.1.	Prevent introduction and spread of significant weed species into the Waitsia-03 Vegetation Area, during construction and operations.
Introduction of *Phytophthora* dieback to the Waitsia-03 Vegetation Area.	Prevent introduction and spread of *Phytophthora* dieback into the Waitsia-03 Vegetation Area.

4.1 Flora and Vegetation Management Plan Provisions

Table 4-2 and Table 4-3 identify the legal outcome and management-based provisions (respectively) that MEPAU will implement to ensure that the environment outcomes are met during the implementation of the WGP2.

Table 4-2 Outcome Based Provisions for Flora and Vegetation

EPA Objective		To protect flora and vegetation so that biological diversity and ecological integrity are maintained			
Impact	**Management Objective**	**Environmental Criteria**	**Response Actions**	**Monitoring**	**Reporting**
Introduction of significant weeds to the Waitsia-03 Vegetation Area.	Prevent introduction and spread of significant weed species into the Waitsia-03 Vegetation Area, during construction and operations.	**Trigger Criteria** Suspected introduction of a significant weed species within the Waitsia-03 Vegetation Area. **Threshold Criteria** Spread of a significant weed species that is potentially project attributable beyond the area delineated per initial trigger criteria investigations.	**Trigger Criteria** • Engage with an independent weed specialist to determine whether the new weed species identified is significant; • If determined to be significant delineate and record the physical extent of the weed species incursion in consultation with a weed specialist; • Undertake assessment to determine key cause(s) and environmental risks of new significant weed species observation, in consultation with a weed specialist. Assessment of key causes shall consider surrounding land uses, past construction and third-party activities in the immediate vicinity of the observation and the effectiveness of hygiene management controls implemented to date. Subsequently, a determination of whether the observation of the new significant weed species is potentially attributable to the WGP2 shall be made; • If the significant weed species is potentially project attributable implement specific control measures to prevent the spread of the significant weed, in consultation with a weed specialist. When planning weed control measures consideration shall be given to the environmental risks and key causes outlined above. Weed control measures may include targeted spraying, direct removal of specimens and the creation of physical exclusion zones to limit access, where operationally feasible. Note: if a Declared Pest is verified to be present, implement weed eradication measures immediately, in accordance with the Department of Primary Industries and Regional Development's (DPIRD) Declared Weed Control Advice; • Following the commencement of weed control measures, monitor the extent of the weed's distribution by undertaking targeted quarterly weed monitoring and annual third-party detailed flora and vegetation surveys of the target area. Implement more regular weed monitoring of the target area, if recommended by a weed specialist; • Review effectiveness of weed control measures in consultation with a weed specialist based on the results of weed monitoring. If the weed species has not been eradicated implement additional control measures, such as follow-up targeted weed spraying, as recommended by weed specialist; and • If the new significant weed species is determined to be potentially project attributable, undertake a comprehensive review of the effectiveness of project weed control measures, in consultation with a weed specialist. Update project weed control measures, as required. **Threshold Criteria** • If threshold criteria are reached or exceeded, implement immediate weed control in accordance with specialist advice to reduce the spread and impact. If a Declared Pest engage with DPIRD to receive advice on eradication measures; • Engage with key stakeholders including DBCA, and relevant weed specialists, where required, to determine key corrective actions; and • Review management strategies to determine key cause for threshold criteria exceedance and review future monitoring frequency requirements, in consultation with weed specialist.	Table 4-5	• Petroleum and Geothermal Energy (Environment) Regulations 2012 (PGER(E)R) Annual Environmental Report • Ministerial Conditions Annual Compliance Assessment Report (CAR)
Potential introduction of *Phytophthora* dieback to the Waitsia-03 Vegetation Area.	Prevent introduction of *Phytophthora* dieback into the Waitsia-03 Vegetation Area.	**Trigger Criteria** Suspected introduction of dieback into the *Phytophthora* dieback free Waitsia-03 Vegetation Area based on visual evidence of declining health/death of dieback	**Trigger Criteria** • Collect photographic evidence of potential *Phytophthora* dieback introduction in accordance with the Project Weed and Hygiene Protocol; • Immediately engage with a DBCA accredited Dieback specialist to review visual evidence of potential dieback introduction;	Table 4-5	• PGER(E)R Annual Environmental Report • Ministerial Conditions Annual CAR

EPA Objective		To protect flora and vegetation so that biological diversity and ecological integrity are maintained			
Impact	**Management Objective**	**Environmental Criteria**	**Response Actions**	**Monitoring**	**Reporting**
		susceptible species such as Banksia, Hakea, Zamia Palms and *Xanthorrhoea* species, as well as other key *Phytophthora* dieback indicators. **Threshold Criteria** Introduction of dieback into the Waitsia-03 Vegetation Area, as confirmed by a DBCA accredited dieback specialist.	• Implement any recommendations for additional assessment and information gathering required by the Dieback specialist to confirm dieback presence or otherwise, including potential soil and vegetation sampling and analysis. Dieback specialist to make conclusions of whether dieback is present or otherwise; • Engage DBCA accredited Dieback specialist to undertake targeted survey of the potentially impacted area if the specialist is unable to make conclusions based on the initial information gathered. Survey shall confirm the presence of *Phytophthora* dieback presence, or otherwise; and • If *Phytophthora* dieback presence is not observed, continue to implement hygiene controls and *Phytophthora* dieback monitoring, in accordance with this FVMP and the Weed and Hygiene Protocol. **Threshold Criteria** • If dieback presence is confirmed by a DBCA *Phytophthora* Dieback specialist, the physical extent of the *Phytophthora* dieback affected area shall be mapped and delineated by the specialist. The survey shall also include an assessment of the environmental risks and potential future impact pathways of the confirmed *Phytophthora* dieback presence; • Undertake assessment to determine key cause(s) of *Phytophthora* dieback incursion, in consultation with a *D*ieback specialist. The assessment shall consider surrounding land uses, past construction and third-party activities in the immediate vicinity of the observation and the effectiveness of hygiene management controls implemented to date. Subsequently, a determination of whether the dieback observation is potentially attributable to the WGP2 shall be made; • If the presence of *Phytophthora* dieback is assessed as being potentially attributable to project activities, undertake a comprehensive review of project *Phytophthora* dieback control measures, in consultation with a DBCA accredited Dieback specialist and amend, where necessary; • In consideration of the above assessment of key causes implement specific control measures to prevent the spread of the dieback incursion, in consultation with a Dieback specialist and other key stakeholders, including DBCA; • Following the implementation of *Phytophthora* dieback control measures, monitor the extent of the *Phytophthora* dieback's distribution by undertaking targeted quarterly *Phytophthora* dieback monitoring that focuses on the area of observed impact, until otherwise recommended by a Dieback specialist; • Review effectiveness of *Phytophthora* dieback control measures, in consultation with a Dieback specialist, based on the results of *Phytophthora* dieback monitoring. Update project *Phytophthora* dieback control measures if recommended by dieback specialist; and • Implement increased frequency (e.g. annual) *Phytophthora* dieback presence surveys, if recommended by Dieback specialist.		

Table 4-3 Environmental Management Approach for Flora and Vegetation

EPA Objective		To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
Impact	**Management Objective**	**Management Action**	**Project Stage**	**Management Targets**	**Monitoring**	**Reporting**
Habitat loss, degradation and fragmentation						
Direct loss of vegetation and flora.	Minimise impacts to conservation significant flora.	• MEPAU will finalise additional targeted flora surveys in General Vegetation Area and Waitsia-03 Vegetation Area to ensure no significant flora species will be significantly impacted by construction. • Clearing of vegetation will be undertaken under MS 1164 and under the approved Native Vegetation Clearing Permits (NVCP).	Construction	Compliance with commitment in the EPA referral which states no significant impacts to flora and vegetation.	None identified	• NVCP annual compliance report; • Ministerial Conditions Annual CAR.

Accidental disturbance of areas outside of the approved development envelope.	Prevent clearing of vegetation and flora outside of the approved development envelope.	• Ensure final flowline easement is ≤ 30m width within the approved development envelope;
		• Vegetation clearing will be undertaken in accordance with a the Clearing Vegetation Procedure. The procedure will include the following requirements:
		  • An authorised internal clearing request must be issued prior to undertaking any vegetation clearing;
		  • Clearing boundaries must be clearly marked and checked to confirm they are accurate prior to undertaking clearing;
		  • A post clearing survey of cleared areas will be undertaken to confirm boundaries have been adhered to; and
		  • All construction personnel will be aware of the clearing area process through inductions and training.
			Construction	Compliance with pre-defined clearing limits and boundaries described under MS 116 and the approved NVCP.	• Verification prior to clearing activities that clearing limits are clearly defined;
					• Verification post clearing activities that no clearing outside of this area has occurred;
					• Post clearing inspection to visually check/review clearing boundaries and compliance; and
					• Photographic reference points of clearing to enable comparison between pre and post clearing environments.
						• NVCP annual compliance report;
						• Ministerial Conditions Annual CAR; and
						• Any clearing undertaken outside of the clearing area will be reported as required by the EP Act Part V and PGER(E)R requirements in accordance with MEPAU's incident management procedure.

	Minimise disturbance of vegetation and flora outside of the approved development envelope.	• Stockpiling of all soil and vegetative materials from clearing will be within the approved development envelope; • Final flowline envelope boundaries in the vicinity of proposed stockpiling areas must be clearly marked and checked to confirm they are accurate prior to undertaking clearing; • A survey of stockpiled areas will be undertaken post stockpiling to confirm boundaries have been adhered to; • Make all construction personnel aware of the final flowline envelope area boundaries through the induction/ training process; • Vehicles shall be restricted to movement along designated tracks and cleared areas, unless undertaking clearing;	Construction	Minimal disturbance to vegetation and flora outside of final flowline envelope.	• Post clearing inspection to visually check/review: • Stockpiling of all soil and vegetation materials are within final flowline envelope. • Compliance with final flowline envelope and stockpiling area boundaries. • Vegetation and flora outside of final flowline envelope has not been disturbed.	• PGER(E)R Annual Environmental Report; • Ministerial Conditions Annual CAR.

EPA Objective		To protect flora and vegetation so that biological diversity and ecological integrity are maintained				
Impact	**Management Objective**	**Management Action**	**Project Stage**	**Management Targets**	**Monitoring**	**Reporting**
		• Vehicle speeds will be restricted (~ 25 km/h) on unconsolidated construction tracks in dry conditions.				
Invasive Species						
Introduction of new significant weeds to the Waitsia-03 Vegetation Area.	Prevent introduction of new significant weed species into the Waitsia-03 Vegetation Area during construction and operations.	MEPAU will: • Develop a weed and dieback hygiene protocol prior to commencement of construction. This protocol will: ○ Describe the requirements and triggers for conducting a hygiene inspection and vehicle clean-down. Specifically: ▪ all vehicles/plant/ equipment prior to mobilising to site will be inspected and washed down; and ▪ all vehicles/plant/equipment is required to be inspected prior to accessing the Waitsia-03 Vegetation Area; ○ Describe the process by which construction fill is evaluated to verify it comprises a low risk of containing weeds or pathogens; ○ Describe the requirement for monitoring: ▪ weed presence quarterly, including review of the list of significant weeds; ▪ dieback presence annually; ▪ dieback biennually with a specialist survey (specific to the Waitsia-03 well site access track); ○ Describe weed management methods (such as spot spraying, boom spraying and vegetation slashing) relevant to the activity. • Make all personnel aware of weed and dieback hygiene protocol and practices through the induction/ training processes; • Prohibit the importation of soil and vegetation materials to site unless approved for a specific purpose and is assessed to comprise a low risk of containing weeds or pathogens; • Implement the weed and dieback hygiene protocol.	Construction	No new significant weeds or *Phytophthora* dieback infestations introduced into the Waitsia-03 Vegetation Area attributable to the WGP2.	• Pre-clearing baseline flora and vegetation survey that identifies the extent of significant weeds and dieback presence; • Quarterly observations for the presence of significant weeds; • Verification that construction fill brought to site has low risk of containing weeds or pathogens; • Verification that vehicles/plant/equipment comply with weed and dieback hygiene protocol inspection and clean-down requirements.	• PGER(E)R Annual Environmental Report; • Ministerial Conditions Annual CAR.
			Operations		• Annual assessment for presence of weeds, including review of the list of significant weeds.	
Introduction of *Phytophthora* dieback.	Prevent introduction of *Phytophthora* dieback into the Waitsia-03 Vegetation Area.		Construction and Operations		• Biennial dieback assessment of access route to Waitsia-03 well site (flowline route adjoining Yardanogo Nature Reserve).	

4.2 Monitoring

To clearly understand if the environmental criteria have been met or exceeded, MEPAU has (and will continue) to monitor flora and vegetation adjacent to the approved development envelope within the Yardanogo Nature Reserve. Specifically, the monitoring program is used to:

- Establish presence of existing significant weed species and *Phytophthora* dieback infestations; and
- Identify if the presence of significant weeds and dieback has been impacted by the WGP2.

4.2.1 Establish Presence of Existing Significant Weed Species and Dieback Infestations

In addition to the surveys completed specifically to support this WGP2, flora and vegetation composition for the WGP2 area and surrounds, are well understood given the numerous surveys that have been conducted for previous oil and gas activities in the area.

Based upon these surveys MEPAU has a clear understanding regarding weed and *Phytophthora* dieback presence within the development envelope. Specifically, two weed species known to be declared pests under the *Biosecurity and Agriculture Management Act 2007* are known to be present within the approved development envelope. These are:

- *Echium plantagineum (Patersons Curse)*; and
- *Rumex hypogaeus (Doublegee)*.

One weed species of national significance is known to occur within the approved development envelope:

- *Lycium* ferocissimum (African Boxthorn).

In addition, five serious environmental weeds are known to occur within the approved development envelope. For the purposes of this FVMP a 'serious' environmental weed is one that has been determined by a weed specialist to have potential to pose a serious environmental risk to the Waitsia-03 Vegetation Area. Five such weeds have been nominated as being of particular concern to stakeholders. These are:

- *Verbesina encelioides* (Dongara Daisy);
- *Cenchrus echinatus* (Walkaway Burr);
- *Cenchrus setaceus (*Fountain Grass);
- *Ricinus communis* (Castor Oil Plant); and
- *Hyparrhenia hirta* (Tambookie Grass).

The above eight species comprise the 'significant weed species' that have been identified by baseline studies as occurring in the approved development envelope. Of note, baseline studies have not identified any significant weed species within the Waitsia-03 Vegetation Area. The list of significant weeds will be reviewed and amended as necessary.

No dieback infestations are known to be present within the approved development envelope.

Flora and vegetation and dieback studies are summarised in Attachment 1. MEPAU plan to complete supplementary studies to further define weed diversity/density to enable ongoing comparison as required. The details of these studies are provided in Table 4-4.

Table 4-4 Supplementary Baseline Monitoring Events

Monitoring Event	Location	Phase	Frequency	Survey Method
Weed presence	Approved Development Envelope	Prior to construction	One-off	Conduct a detailed weed baseline survey across the approved Development Envelope.
Weed presence	Waitsia-03 Vegetation Area	Prior to construction	One-off	Conduct a Detailed baseline flora and vegetation survey to set up permanent sampling points (Table 3-6) to monitor potential changes in weed species presence, density / abundance and vegetation health. Quadrat sampling techniques are to be used to provide comparability between future survey datasets. The survey will also set up at least two permanent quadrats within the Yardanogo Nature Reserve to understand the abundance, density and diversity of weed species at these locations within the Nature Reserve.
Ejarno Spring floristic diversity and vegetation condition	Ejarno Spring	Prior to construction	One-off	Conduct a Detailed baseline vegetation condition survey that details vegetation quality and diversity prior to the WGP2 commencing. The survey will also record presence and condition of invasive weeds, having regard to weed density and category of weed species (i.e. declared, national significance etc.).

4.2.2 Identify If the Presence of Significant Weeds and Dieback has been Impacted by the WGP2

A Weed and Hygiene Protocol has been developed to align with existing operational documentation. Specifically, the Weed and Hygiene Protocol describes in greater detail the locations and method for monitoring weed and *Phytophthora* dieback presence. However, Table 4-5 provides the basis on which the monitoring program will be developed.

Table 4-5 Weed and Dieback Monitoring Events

Monitoring event	Location	Phase	Frequency	Survey Method

Phytophthora Dieback Presence	Waitsia-03 Vegetation Area	Construction	Quarterly	Observations will be undertaken by MEPAU personnel with a focus on vegetation health in the vegetation adjacent to the Waitsia-03 access track and wellsite. Specifically, observations will focus on the health of known dieback susceptible species including Banksia and Hakea species, Zamia palms and *Xanthorrhoea* species.
				The annual detailed Flora and Vegetation survey will identify any areas potentially impacted by *Phytophthora* dieback, which can then be confirmed during the biennial monitoring.
				During this survey, the following will be recorded in terms of dieback:
				• Pathogen attack – visual evidence of dieback;
				• Plant death:
				  • Number of dead shrubs or trees and a percentage for grasses/lower storey within each quadrat;
				  • Percentage death of upper, mid and lower storeys for transects.

		Operations	Annual	
Dieback Presence	Waitsia-03 Vegetation Area	Construction and Operations	Biennial	Biennial monitoring (linear assessment) along the Waitsia-03 access track for dieback presence will be performed by a DBCA accredited dieback specialist to standards and procedures defined in FEM047 – *The Phytophthora Dieback Interpreter's Manual for Lands*. During the assessment, soil and tissue samples will be collected, if required, to support any field diagnosis. Sample points will be logged, and, when identified, infestations mapped.
Weed Presence	Waitsia-03 Vegetation Area	Construction	Quarterly	Observations will be undertaken by MEPAU personnel within the Waitsia-03 Vegetation Area to identify any significant weed species present. A weed monitoring procedure will be developed for personnel to capture the following information: • Date and time of monitoring;

Monitoring event	Location	Phase	Frequency	Survey Method
				• Weed species observed at specific locations within the development envelope (a visual guide will be available for identification of previously recorded significant weed species); • GPS location of any species not previously identified and not present within the visual guide; • Estimate number of plants at each location; • Reproductive status of weed if possible (eg. Flowering, Non-flowering, seed set, seeding); • Observations relevant to the presence of the new species (ie. proximity to roads, water sources); • Any control actions taken (ie. manual removal).
Weed presence	Waitsia-03 Vegetation Area	Construction (+1 year following commencement of operations)	Annually	An annual Detailed flora and vegetation survey will be undertaken during spring between the months of August and October (subject to appropriate weather conditions). The survey will include assessment of at least four permanent 10 m x 10 m quadrats (marked with metal stakes and flagging tape) which will be established within the Yardanogo Nature Reserve (2 quadrats) and the Waitsia-03 Vegetation Area (2 quadrats) during the initial baseline survey. The initial locations for these reference quadrats are summarised in Table 3-6. The survey will record flora species present (including introduced species – coordinates of any significant weed species or abundantly growing weed species will be recorded), an estimate of foliar cover as a percent value, life stage of the introduced species (ie. flowering, non-flowering, seed set, seeding) and vegetation condition (EPA 2016; Keighery 1994).

Table 4-6 Location of Baseline Monitoring Quadrats (GDA 94)

Plot	Location					
	Area	ID	Easting	Northing	Distance from Project Disturbance Footprint (m)	Vegetation and Substrate Association (WEC, 2018)
1	Yardanogo Nature Reserve	YNR_1	115.103603	-29.344991	35	VSA-1
2	Yardanogo Nature Reserve	YNR_2	115.103603	-29.339796	25	VSA-4
3	Waitsia-03 Vegetation Area	W03_1	115.102227	-29.348975	130	VSA-4
4	Waitsia-03 Vegetation Area	W03_2	115.104626	-29.349702	100	VSA-1

4.3 Reporting

The environmental outcome will be reported against Trigger and Threshold criteria (Table 3-2) and management targets (Table 3-3) for each calendar year in the Annual Compliance Assessment Report (CAR) for the WGP2.

The annual report will also include a summary of analysis of monitoring data to facilitate adaptive management.

In the event that Trigger and Threshold criteria are exceeded during the reporting period, the annual report will include a description of the effectiveness of any adaptive management actions that have been implemented to manage the impact.

5.0 ADAPTIVE MANAGEMENT

5.1 Monitoring and Corrective Actions

A monitoring program is required to measure the effectiveness of the management actions as defined in this FVMP. The outcomes of the monitoring program will be reviewed with an adaptive management approach to ensure all environmental impacts and risks continue to be reduced for the duration of the WGP2.

MEPAU will implement adaptive management to learn from the implementation of mitigation measures, monitoring and evaluation against trigger and threshold criteria, to more effectively meet the conditioned environmental outcome.

The following approaches will apply:

- Monitoring data will be systematically evaluated and compared to baseline; and
- The effectiveness and relevance of Trigger level and Threshold contingency actions will be evaluated on an annual basis to determine if any changes to management actions are required.

Adaptive management practices that will be assessed as part of this approach may include:

- Evaluation of the monitoring program, data and comparison to baseline data and reference sites on an annual basis to verify whether responses to project activities are the same or similar to predictions;
- Evaluation of assumptions and uncertainties of the management and monitoring program;
- Re-evaluation of the risk assessment and revision of risk-based priorities as a result of monitoring outcomes;
- Review of data and information gathered over the review period that has increased understanding of site environment in the context of the regional ecosystem; and
- Assessment of changes which are outside the control of the project and the management measures identified (i.e. a new project within the area or region; regional change affecting management).

5.2 Management Plan Review

This FVMP is intended to be dynamic and may be updated to reflect changes in management practices and the natural environment over time. This approach will allow flexibility to adopt new approaches/management measures.

Amendments to management actions will be made on an "as needs" basis. This will include:

- Amendment of management actions that are not achieving the desired outcomes;
- Monitoring that identifies additional impacts requiring additional management actions or changes to existing management actions;
- Changes to relevant legislation that may affect the implementation of management actions; and/or
- Improvements to management practices to achieve a greater environmental outcome.

6.0 STAKEHOLDER CONSULTATION

Consistent with the EPA's expectations for this FVMP to align with the principles of Environmental Impact Assessment, MEPAU consulted with relevant stakeholders. MEPAU will continue to maintain effective communication with local and regional stakeholders throughout the delivery of the WGP2.

A summary of stakeholder consultation outcomes completed as of August 2019 is provided in Table 3-1 of the *Environmental Referral Supporting Report* (MEPAU, 2019).

Any additional consultation regarding this FVMP will be captured in subsequent revisions.

7.0 PUBLIC AVAILABILITY

A copy of this FVMP is available on the MEPAU website. As per MEPAU's Compliance Assessment Plan [WAT-HSE-PLN-00004], this FVMP and any associated validated environmental data shall be made available to members of the public within 7 days of MEPAU receiving such a request.

8.0 REFERENCES

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ATTACHMENTS

ATTACHMENT 1
FLORA AND VEGETATION STUDIES

Year Survey Completed	Consultant	Survey Name[2]
2004	Woodman Environmental	Proposed Xyris Pipeline Vegetation Assessment. Unpublished report prepared for ARC Energy, July 2004.
2004	Woodman Environmental	Denison 3D Seismic Survey Flora and Vegetation Study. Unpublished report prepared for ARC Energy and Origin Energy, December 2004.
2004	Woodman Environmental	Proposed Xyris Area Gas Gathering System (XAGGS) Vegetation Assessment. Unpublished report prepared for ARC Energy, December 2004.
2015	Maia Environmental Consultancy	AWE Perth Pty Ltd, Waitsia Gas Field: Flora and Vegetation Desktop Study, February 2015
2016	Maia Environmental Consultancy	Xyris Production Facility Area, Combined Level 1 Flora and Vegetation Reconnaissance and Targeted Flora Survey, January 2016.
2016	Maia Environmental Consultancy	Waitsia-04 Area Level 1 Flora and Vegetation Reconnaissance and Targeted Flora Survey[3].
2018	Woodman Environmental	Waitsia-03 – Flowline Corridor - Flora, Vegetation and Fauna Assessment (including a Level 2 Flora and Vegetation assessment along the proposed flowline route and wider area).
2018	Woodman Environmental	Proposed Xyris Lateral – Flora and Vegetation Assessment
2019	Woodman Environmental	Waitsia Gas Project Stage 2 – Xyris West Vegetation Desktop Review.
2019	Woodman Environmental	Flora and Vegetation Assessment. Unpublished report prepared for Mitsui E & P Australia, June 2020.
2020	Woodman Environmental	Ejarno Spring – Reconnaissance Survey and Groundwater Dependent Ecosystem Assessment
2021	Biota Environmental Sciences	Waitsia Gas Project Stage 2 Annual Vegetation Monitoring, Weed and Dieback Assessment [WGP-HSE-REP-00018]
2022	Biota Environmental Services	Waitsia Weed Baseline Additional Survey and Field Assistance with MEPAU Weed Observations Program [WGP-HSE-REP-00019]

[2] Surveys were completed prior to IBSA requirement coming into effect.

[3] Note that the report title refers to initial well location name. Well location name was changed from Waitsia-04 to Waitsia-03 following the survey.

Year Survey Completed	Consultant	Survey Name[2]
2022	Biota Environmental Services	Waitsia-03 Annual Flora Monitoring Report (Waitsia Quadrat Monitoring) – 2022 [WGP-HSE-REP-00038]
2023	JBS&G	Waitsia Phase 2B Reconnaissance Flora and Vegetation Survey and Black Cockatoo Habitat Assessment
2023	Biota Environmental Services	Waitsia-03 Annual Flora Monitoring Report (Waitsia Quadrat Monitoring) – 2023

ATTACHMENT 2

WGP2 – OFFSETS POLICY - SUPPLEMENTARY INFORMATION (02) TO: WAITSIA GAS PROJECT STAGE 2: FLORA AND VEGETATION MANAGEMENT PLAN

DOCUMENT NO	REVISION	DATE OF REVISION
P-WGP2 – 071	Rev 0	28/04/2020

MITSUI E&P Australia

OFFSETS POLICY - SUPPLEMENTARY INFORMATION (02) TO: WAITSIA GAS PROJECT STAGE 2: FLORA AND VEGETATION MANAGEMENT PLAN - APPENDIX 2

P-WGP2-054

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1.0 PURPOSE

This Supplementary Information to: *Waitsia Gas Project Stage 2: Flora and Vegetation Management Plan (P-WGP2-054) - Appendix 2* has been developed to address the EPA request to:

- *Review the States offset policy against the projects impacts having specific regard to the Bamford Report and Commonwealth offsets calculator.*

1.1 Background

The Western Australian Government's Environmental Offsets Policy (WA Government, 2011) seeks to protect and conserve environmental and biodiversity values for present and future generations. The Western Australian Environmental Offsets Guidelines (WA Government, 2014) details the residual impact significance model (Figure 1-1), and outlines how significance is determined and when an offset is likely, or may be required, in relation to relevant EPA environmental factors.

An assessment against each of the 10 clearing principles was provided as Appendix D to the initial referral (MEPAU, 2019) and determined that even though Carnaby's Black-Cockatoo were known to be present, the Proposal was not considered to be at variance with Clearing Principle (b) (Bamford Consulting Ecologists, 2018). The reason for this was:

> *Given the small area of impact associated with this project and the widespread nature of the two VSAs present within the area, the project is considered unlikely to compromise significant habitat for Carnaby's Black-Cockatoo or any other conservation significant fauna species. The roost site is not likely to be directly impacted and there should be no direct impacts on nearby wetlands. The small scale of the project mitigates impacts on fauna in general.*

1.2 Method

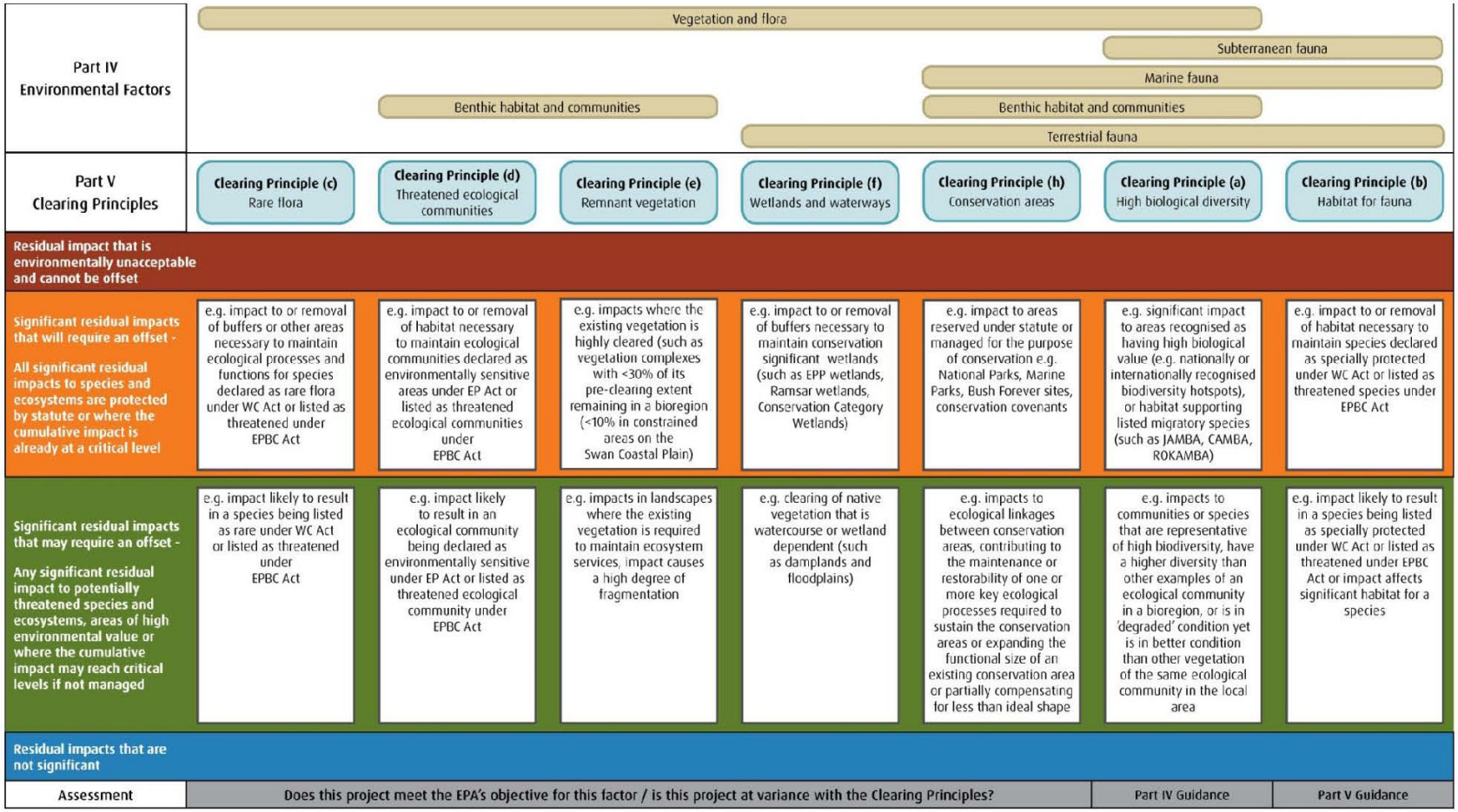
In the absence of a state calculator to support MEPAU's impact determination, the EPBC offset assessment guide (DSEWPaC, 2012) was utilised to provide a quantitative evaluation for the level of impact arising from the Proposal.

The EPBC offset assessment guide was developed to give effect to the EPBC Act Environmental Offsets Policy requirements. It utilises a balance sheet approach to quantify project impacts. Having specific regard to Clearing Principle B and the Proposal's potential *impact to Carnaby's Black-Cockatoo* habitat, the assessment focuses on the Proposal's disturbance to habitat. Specifically, the EPBC offset assessment guide considers the disturbance footprint against the habitat quality in quantifying the proposals impact.

In lieu of clear guidance around how to determine habitat quality, a simple justification method was devised (Table 1-1). This method considers various factors such as site condition, context and species stocking rate in line with the offset calculator guidance.

1.2.1 Vegetation areas

A separate calculation for both the Waitsia 03 and General Vegetation area was undertaken with the results added together to provide an accurate quantum of impact level for the Proposal.



Acronyms

WC Act	*Wildlife Conservation Act 1950*	JAMBA	Japan-Australia Migratory Bird Agreement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*	CAMBA	China-Australia Migratory Bird Agreement
EP Act	*Environmental Protection Act 1986*	ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
EPP	Environmental Protection Policy		

Figure 1-1: Residual Impact Significance Model (WA Government, 2014)

Table 1-1: Habitat Quality Classification

Habitat Quality Classification	
Site Condition	**Scoring**
What is the structure and condition of the vegetation on the site?	Good (2) Moderate (1) Poor (0)
What is the diversity of relevant habitat species present (including both endemic and non-endemic)?	High (1) Low (0)
What relevant habitat features are on the site?	Breeding (1) Foraging (0.5) None (0)
Site Context	
What is the connectivity with other suitable/known habitat or remnants?	High (1) Low (0)
What is the importance of the site in relation to the overall species population or the occurrence of the community?	High (1) Low (0)
What threats occur on or near site?	Many (1) Few (0)
Species Stocking Rate	
What is the presence of the species on the site? (i.e. confirmed / modelled).	Confirmed (1) Modelled (0.5) Not confirmed (0)
What is the density of species known to utilise the site?	>1(1) <1(0)
What is the role of the site population in regard to the overall species population?	Important (1) Not Important (0)

2.0 EPBC CALCULATION

2.1 Waitsia 03 Vegetation

MEPAU calculated the impact associated with the clearing of vegetation within the Waitsia 03 Vegetation area per Table 2-1. The justification for the habitat quality is provided as Table 2-2.

2.2 General Vegetation

MEPAU calculated the impact associated with the clearing of vegetation within the General Vegetation area per Table 2-3. The justification for the habitat quality is provided as Table 2-4.

Table 2-1: Impact Calculation for Waitsia 03 Vegetation Area

Impact calculator							
	Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
	Threatened species habitat						
Impact calculator	**Area of habitat**	Yes	The mixed tall shrublands were assessed for their foraging value for Carnaby's Black-Cockatoo (Bamford 2016) and it was concluded that: 3 ha of such vegetation in the Waitsia-03 Area Vegetation represented 0.31 % of similar vegetation across Yardanogo Nature Reserve; and that 3 ha had a carrying capacity of <0.2 birds/year (based on regional habitat assessments conducted by Williams *et al.* 2016). The proposal area was visited on 3 October 2016 by Bamford Consulting Ecologists to access the vegetation at the site to gain further information on banksia density and numbers of cones. The banksia shrubland within the Bamford Consulting Ecologists study area was dominated by *Banksia attenuate* with variable densities of *Banksia elegans* and a thicket of *Banksia prionotes*. As a food source, most of the banksias had very few cones at the time of the survey.	**Area**	3	Hectares	Bamford Consulting Ecologists. (2016) MEPAU (2019) Williams *et al. (*2016)
				Quality	**7**	Scale 0-10	
				Total quantum of impact	2.10	Adjusted hectares	
	Number of features e.g. Nest hollows, habitat trees	No	Within the Waitsia-03 Area Vegetation, no confirmed nesting trees were observed. A study completed by Bamford Consulting Ecologists (2018) identified four trees that had the potential to support Carnaby's Black Cockatoo breeding. None of these trees met the Black-Cockatoo nesting-tree criterion of the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2012) guidelines, as all measured <500mm DBH and none presented nest hollows.	0		Count	Bamford Consulting Ecologists (2018) DSEWPaC (2012)
	Condition of habitat Change in habitat condition, but no change in extent	No					

Table 2-2: Waitsia 03 Vegetation Area Habitat Characterization Justification

Habitat Quality Classification			
Site Condition	**Scoring**	**Waitsia 03 Score**	**Justification**
What is the structure and condition of the vegetation on the site?	Good (2) Moderate (1) Poor (0)	2	Woodman Environmental Consulting (2018) characterised the vegetation condition on-site as ranging from Completely Degraded to Excellent, with signs of historical human disturbance such as soil movement and rubbish, in some areas. The proposal area is located on areas originally mapped as VSAs 2 (Kwongan to open Banksia woodland on sand) and 4 (Eucalypt/Banksia/Acacia low forest on sand) (Bamford Consulting Ecologists 2015), which were noted to be of value to Carnaby's Black-Cockatoo. As such, the structure and condition of vegetation on site has been conservatively been assessed as Good (2).
What is the diversity of relevant habitat species present (including both endemic and non-endemic)?	High (1) Low (0)	1	The floral composition of the entire Study Area itself can be considered moderately diverse, however relevant vegetation types extend beyond the proposal area. As such, the diversity of relevant habitat species present is conservatively considered High (1).
What relevant habitat features are on the site?	Breeding (1) Foraging (1) None (0)	1	A study completed by Bamford Consulting Ecologists (2018) identified four trees that had the potential to support Carnaby's Black Cockatoo breeding. None of these trees met the Black-Cockatoo nesting-tree criterion of the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2012) guidelines, as all measured <500mm DBH and none presented nest hollows. Carnaby's Black-Cockatoo forages in proteaceous heath, Banksia woodlands and Eucalyptus woodlands. Within the proposal area, WEC (2018) identified VSA 1 (Mixed tall shrubland) to be present, which Carnaby's Black-Cockatoo may use as a seasonal food source. As such, the relevant habitat features on site are classified as Foraging (1).
Site Context			
What is the connectivity with other suitable/known habitat or remnants?	High (1) Low (0)	1	The Study Area and proposed flowline route is located in an area of remnant vegetation adjacent to the eastern boundary of the Yardanogo Class C Nature Reserve (C36203) (crown reserve), with remnant vegetation of road reserve, freehold tenure, and crown reserve (water reserve) on the eastern boundaries of the Study Area. Areas to the north and east have been heavily cleared for agriculture. The proposed clearing area is small, and there is a significant extent of remnant vegetation in the immediate vicinity. As such, the connectivity is considered High (1).
What is the importance of the site in relation to the overall species population or the occurrence of the community?	High (1) Low (0)	0	The mixed tall shrublands were assessed for their foraging value for Carnaby's Black-Cockatoo (Bamford 2016) and it was concluded that: 3 ha of such vegetation in the Waitsia-03 Area Vegetation represented 0.31 % of similar vegetation across Yardanogo Nature Reserve. As such, the importance of the site is considered Low (0).
What threats occur on or near site?	Many (1) Few (0)	1	The key threatening processes to fauna include degradation of habitat due to weed invasion; mortality from operations; increased interactions from feral and native species; and disturbance from dust, light and noise. As such, the potential threats are classed as Many (1).
Species Stocking Rate			

Habitat Quality Classification			
What is the presence of the species on the site? (i.e. confirmed / modelled).	Confirmed (1) Modelled (0.5) Not confirmed (0)	1	Fauna studies undertaken by Bamford Consulting Ecologists in 2017 determined that Carnaby's Black Cockatoo occur within the Proposal area. Although Carnaby's Black-Cockatoo was not observed during this field visit, evidence of use of the area was seen through recent foraging debris below Banksia prionotes trees along the flowline route and within the Hudson Resources Block As such, their presence is Confirmed (1).
What is the density of species known to utilise the site?	>1(1) <1(0)	0	The mixed tall shrublands were assessed for their foraging value for Carnaby's Black-Cockatoo (Bamford 2016) and it was concluded that 3 ha had a carrying capacity of <0.2 birds/year (based on regional habitat assessments conducted by Williams et al. 2016). As the density is <1, it is given a score of zero (0).
What is the role of the site population in regard to the overall species population?	Important (1) Not Important (0)	0	Carnaby's Black-Cockatoo may visit the Study Area. Carnaby's Black-Cockatoo forages in proteaceous heath, Banksia woodlands and Eucalyptus woodlands. Carnaby's Black-Cockatoo may use VSA 1 (Mixed tall shrubland) as a seasonal food source. Given the small area of impact associated with the proposal area and the widespread nature of the two VSAs present within the area, it is unlikely to compromise significant habitat for Carnaby's Black Cockatoo. As such, the site population is considered Unimportant (0).
Total		**7**	

Table 2-3: Impact Calculation for General Vegetation Area

Impact calculator							
Impact calculator	**Protected matter attributes**	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
	Threatened species habitat						
	Area of habitat	Yes	The General Vegetation area has been largely historically cleared, fragmented and/or disturbed (Maia, 2015).	**Area**	14	Hectares	Maia (2015) MEPAU (2019)
				Quality	**2**	Scale 0-10	
				Total quantum of impact	3.4	Adjusted hectares	
	Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					

Table 2-4: General Vegetation Area Habitat Characterization Justification

Habitat Quality Classification			
Site Condition	**Scoring**	**General Vegetation Score**	**Justification**
What is the structure and condition of the vegetation on the site?	Good (2) Moderate (1) Poor (0)	0	Maia (2015) noted that the general vegetation area has been historically cleared. The remnant vegetation within the area has been largely degraded by a mixture of clearing, burning and grazing. The vegetation structure is incomplete due to the historical loss of native vegetation when it was converted to farmland. As such, its quality is considered Poor (0).

What is the diversity of relevant habitat species present (including both endemic and non-endemic)?	High (1) Low (0)	0	Maia (2015) noted that the general vegetation area has been historically cleared. The remnant vegetation within the area has been largely degraded by a mixture of clearing, burning and grazing. The vegetation structure is incomplete due to the historical loss of native vegetation when it was converted to farmland. As such, the diversity of relevant habitat species present is considered Low (0).
What relevant habitat features are on the site?	Breeding (1) Foraging (1) None (0)	1	Within the general vegetation area, there is mixed tall shrubland (Woodman 2018) present which was identified as potential foraging habitat for Carnaby's Black Cockatoo (Bamford 2016). No nesting trees have been identified. As such, the relevant habitat features on site are classified as Foraging (1).
Site Context			
What is the connectivity with other suitable/known habitat or remnants?	High (1) Low (0)	0	The assemblage is incomplete due to the historical loss of native vegetation when it was converted to farmland and the consequent loss of habitats. Areas to the north and east have been heavily cleared for agriculture. As such, the connectivity is considered Low (0)
What is the importance of the site in relation to the overall species population or the occurrence of the community?	High (1) Low (0)	0	Typical of remnants within an agricultural landscape, this vegetation is considered to have negligible local and regional significance due to its fragmented and heavily impacted characteristics. As such, the importance of the site is considered Low (0).
What threats occur on or near site?	Many (1) Few (0)	0	As vegetation in this area has been historically cleared, and any residual habitat is isolated patches, their presence would be limited to fleeting foraging or resting on the way to more diverse habitat. Consequently, key threatening processes to fauna in this area would be limited.
Species Stocking Rate			
What is the presence of the species on the site? (i.e. confirmed / modelled).	Confirmed (1) Modelled (0.5) Not confirmed (0)	1	Fauna studies undertaken by Bamford Consulting Ecologists in 2017 determined that Carnaby's Black Cockatoo occur in the vicinity of the general vegetation area. Although Carnaby's Black-Cockatoo was not observed during this field visit, evidence of use of the area was seen through recent foraging debris. As such, their presence is Confirmed (1).
What is the density of species known to utilise the site?	>1(1) <1(0)	0	Based upon the presence of foraging habitat within the general vegetation area, but noting that the area was comprised of isolated vegetation in generally poor condition, it is concluded that 17 ha had a carrying capacity of <1 birds/year (based on regional habitat assessments conducted by Williams et al. 2016). As the density is <1, it is given a score of zero (0).
What is the role of the site population in regard to the overall species population?	Important (1) Not Important (0)	0	Carnaby's Black-Cockatoo may visit the area. Although Maia (2015) noted that the general vegetation area has been historically cleared and remnant vegetation has been largely degraded by a mixture of clearing, burning and grazing, isolated trees may provide foraging habitat for Carnaby's Black-Cockatoo. Any populations would not be entirely supported by the habitat within the generall vegetation area given it's degraded nature and consequently any site population is considered Unimportant (0).
Total		**2**	

3.0 CONSIDERATION OF STATE OFFSET POLICY

Having regards to the Western Australian Government's residual impact significance model (Figure 1-1), MEPAU believes that the Proposal will result in residual impacts that are not significant.

As only a small portion of the Proposal area is considered to provide good quality foraging habitat for the Carnaby's Black-Cockatoo, with the remaining area considered to provide low quality habitat, the proposal is not expected to result in impacts that would likely result in a species or ecosystem requiring protection under statute or increasing the cumulative impact to a critical level.

The output from the EPBC offset assessment guide indicates that the quantum of impact associated with the Proposal's disturbance to the:

- Waitsia-03 Vegetation Area = **2.10 (**Table 2-1), and
- General Vegetation Area = **3.4 (**Table 2-3).

To understand the total impact of the Proposal, these two values were added together and the quantum of impact for the Proposal was identified as **5.5**.

Although no specific scale is provided for consideration of the final quantum of impact value, MEPAU considered the value in terms of Figure 1-1: Residual Impact Significance Model (WA Government, 2014). As the EBPC calculation resulted in a low quantum of impact value of 5.5, it is reasonable to classify the impact as 'Residual impacts that are not significant'.

4.0 REFERENCES

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ATTACHMENT 3

WGP2 - FLORA AND VEGETATION IMPACT ASSESSMENT

DOCUMENT NO	REVISION	DATE OF REVISION
Attachment 3	Rev 2	6/06/2024

MITSUI E&P Australia

WGP2 – Flora and Vegetation Impact Assessment

REVIEW FREQUENCY

Next Revision Date	Revision Cycle
N/A	N/A

REVISION DETAILS

Rev	Revision Date	Amendment
0	30/01/2020	Initial Document Issued for Assessment
1	17/03/2020	Document updated in response to DWER Comments
2	06/06/2024	Updated to support s.45C amendment and MS11164 conditions

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TERMS, ABBREVIATIONS AND DEFINITIONS

Term or Abbreviation	Definition
BC Act	*Biodiversity Conservation* Act 2016
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth)
DMS	Document Management System
DWER	Department of Water and Environmental Regulation
EPBC Act	*Environment Protection and Biodiversity Conservation Act* 1999
EPA	Environmental Protection Authority
FVMP	Flora and Vegetation Management Plan
ha	hectares
MEPAU	Mitsui E&P Australia Pty Ltd
May, Should	Discretionary
MNES	Matter of National Environmental Significance
Must, Shall, Will	Mandatory, non-discretionary
PEC	Priority Ecological Communities
TEC	Threatened Ecological Communities
WGP2	Waitsia Gas Project Stage 2

1.0 PURPOSE

This Flora and Vegetation Impact Assessment has been written to provide an assessment of direct and potential indirect impacts on flora and vegetation associated with the implementation of the Proposal. It has been updated to reflect recent surveys and changes since pre-implementation.

2.0 OBJECTIVES

The objectives of this document are to:

- Define and describe the Vegetation System Associations present in the approved Development Envelope (refer Section 3.0);
- Define the direct impacts to native Vegetation System Associations from clearing (refer Section 4.0);
- Define the location of priority flora that has been recorded in the areas where native vegetation will be cleared (refer Section 4.2);
- Provide an assessment of the priority flora that will be cleared and the degree of impact to their overall known representation in the broader region (refer Section 4.3 to 4.7); and
- Describe the potential indirect impacts to flora and/or vegetation (refer Section 5.0).

3.0 VEGETATION SYSTEM ASSOCIATIONS

Using Beard (1976) and Shepherd *et al.* (2002), six Pre-European vegetation system associations have been determined to be present within the approved Development Envelope (Table 3-1). These system associations are relatively well represented with even the smallest system associations Eridoon_433 estimated to comprise 65% of the pre-European extent remaining (Table 3-1).

Greater than 60% of the pre-European extent of the three Eridoon associations remains and greater than 45% of the pre-European extent of the Illyarrie_433 association remains. The Irwin_352 and Tathra_379 associations have less than 30% of pre-European extent remaining. Only 0.01 ha of the Irwin_352 association (representing 0.0006% of the extent remaining in the IBRA subregion) and 2 ha of the Tathra_379 associations (representing 0.002% of the extent remaining in the IBRA subregion) are intersected by the approved Development Envelope. There is unlikely to be a significant residual impact on the vegetation associations due to the small percentage of the extent of these vegetation units that is intersected by the approved Development Envelope.

Table 3-1 Vegetation System Associations of the Approved Development Envelope (MEPAU, 2023)

System	Association	Pre-European Extent Within WA (ha)	Percent Remaining Within WA	Pre-European Extent Within IBRA Region (ha)	Percent Remaining Within IBRA Subregion	Extent Within Approved Development Envelope (ha)
Eridoon	378 – Mixed heath with scattered tall shrubs Acacia spp., PROTEACEAE and MYRTACEAE	93,523.98	65.04%	93,523.98	65.04%	36.33
Eridoon	392 – Wattle, casuarina and teatree acacia-allocasuarina-melaleuca alliance	439.11	97.89%	439.11	97.89%	1.77
Eridoon	433 – Low woodland / Scrub	192.14	69.08%	192.14	69.08%	0.63
Irwin	352 – Wheatbelt; York gum, salmon gum etc. *Eucalyptus loxophleba, E.* salmonophloia. Goldfields; gimlet, redwood etc. *E. salubris, E. oleosa*. Riverine; rivergum *E. camaldulensis*. Tropical; messmate, woolybush	12,998.75	13.44%	12,975.79	13.36%	0.01
Illyarrie	433 – Low woodland / Scrub	31,573.08	45.38%	31,573.08	45.38%	7.85
Tathra	379 – Shrublands; scrub-heath on lateritic sandplain in the central Geraldton Sandplain Region	545,938.38	23.74%	544,708.69	23.75%	2.00

A number of Flora and Vegetation surveys and assessments have been undertaken to support the Proposal[1]. Attachment 1 of the Flora and Vegetation Management Plan (FVMP) details these surveys and assessments. As stated in the FVMP, vegetation of the general approved Development Envelope has been largely historically cleared.

MEPAU completed detailed flora surveys and targeted searches in accordance with the EPA guidance (EPA, 2016a) of the proposed clearing area in Spring 2019. Across both the General Vegetation area and Waitsia-03 Area Vegetation (the two distinct vegetated areas in the Development Envelope), no threatened flora taxa, listed under the *Biodiversity Conservation* Act 2016 (BC Act) or the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act, are known to occur within or near the approved Development Envelope (Woodman, 2018a, Woodman, 2018b and Woodman, 2019). The data from these surveys relating to conservation significant flora are included in Section 4.0. A reconnaissance flora and vegetation survey was conducted by JBS&G in April 2023 (JBS&G 2023). Following the survey, the proposed Development Envelope was adjusted to avoid additional high value areas as recorded during the field work.

No Priority Ecological Communities (PECs) or Threatened Ecological Communities (TECs) were recorded in the proposed Development Envelope, nor are any likely to occur (JBS&G 2023).

Seven broad structural vegetation units were recorded within the proposed Development Envelope as shown in Table 3-2 (JBS&G 2023). The majority of the area (> 97%) is cleared farmland with no native vegetation. The dominant native vegetation unit is described as Banksia Shrubland. This vegetation is characteristic of vegetation types that are widespread in the bioregion and is not considered to be restricted or of conservation significance (JBS&G 2023).

Table 3-2 Vegetation Units in the Approved Development Envelope

Vegetation Unit	Description	Extent in Approved Development Envelope (ha)	Percentage of Approved Development Envelope
Banksia Shrubland	Mixed Banksia tall shrubland of *Banksia prionotes* and/or *Banksia menziesii*, *Acacia rostellifera* and *Calothamnus glaber* over *Eremaea pauciflora*, and/or *Petrophile macrostachya* and *Lomandra* sp., over *Mesomelaena pseudostygia* and weeds.	<0.1	<0.1%
Scattered trees over farmland cleared	Scattered *Acacia rostellifera* and/or occasional *Rhagodia preissii* subsp. o*bovata* and/or *Eucalyptus todtiana* and/or *Grevillea leucopteris* over farmland cleared with occasional exotic grasses.	8.0	1.4%
Open shrubland	Open scattered low shrub of *Acacia rostellifera*, with occasional *Jacksonia hakeoides*, *Conostylis*	2.6	0.4%

[1] Woodman flora and vegetation survey reports (2018a, 2018b and 2019) are provided as Appendix C in MEPAU, 2019. These reports conclude that no riparian vegetation, declared rare flora, threatened ecological communities or priority ecological communities, as listed under the BC Act or EPBC Act, have been recorded within the proposed clearing area, or the abutting area.

Vegetation Unit	Description	Extent in Approved Development Envelope (ha)	Percentage of Approved Development Envelope
	candicans subsp. *Candicans*, *Scholtzia umbellifera*, *Cenchrus setaceus* and *Hibbertia racemosa*.		
Acacia rostellifera mid shrubland	*Acacia rostellifera* mid shrubland with scattered *Banksia prionotes* and *Banksia elegans* (Priority 4) over *Dianella revoluta*, *Hibbertia hypericoides* and *Scholtzia umbellifera*.	0.1	<0.1%
Wind row Plantations	Planted *Eucalyptus* sp. Including but not limited to *Eucalyptus camaldulensis* var. *arida* and/or *Eucalyptus loxophleba* subsp. *Supralaevis* and/or *Eucalyptus gomphocephala* and/or *Allocasuarina* sp. And/or *Eucalyptus todtiana*.	0.1	<0.1%
Farmland cleared	Farmland cleared with exotic grasses and/or tagasaste plantations.	568.9	98.1%

As detailed in the supporting document (MEPAU, 2023) vegetation that will be cleared within the approved Development Envelope was split into two key areas (Table 3-3):

- General Vegetation: areas that have been previously disturbed and/or cleared, and
- Waitsia-03 Area Vegetation: areas that comprise vegetation in good condition.

Table 3-3 Vegetation Condition

Vegetation Condition	Approved Development Envelope	
	Extent (ha)	Percentage
Good	<0.1	<0.1%
Degraded	0.1	<0.1%
Completely Degraded	579.6	>99.9%

3.1 General Vegetation

The General Vegetation area has been largely historically cleared, fragmented and/or disturbed over many decades by a mixture of partial clearing, burning and grazing (Maia, 2015a, MEPAU 2023).

Most areas are fragmented remnants, exposed to continuing stock grazing, and the built road reserves have been disturbed by both road works and infrastructure, including a natural gas pipeline along the length of Pye Rd. Because of this degree of disturbance, weeds are common, the vegetation has been thinned and, in areas, dominated by a few disturbance preferring species.

3.2 Waitsia-03 Area Vegetation

The Waitsia-03 Area Vegetation is the largest intact portion of native vegetation. It is located on the southern boundary of the approved Development Envelope (as detailed in Figure 4-1). A detailed flora survey and targeted searches were conducted from 6th – 10th November 2017 to assess the flora and vegetation of this area (Woodman, 2018a). The survey verified that although four Vegetation System Associations were present, these broadly matched to the two vegetation types Eridoon_378 and Eridoon_392, noting that the wetland thickets present within the survey area were mapped as Eridoon_392 but did not contain *Melaleuca thyoides* (Woodman, 2018a). The survey also noted that vegetation within the Waitsia-03 area represented 0.31 % of similar vegetation across Yardanogo Nature Reserve.

4.0 IMPACT ASSESSMENT – DIRECT IMPACTS

Although the area of impact has been minimised to the lowest practicable extent by utilising existing cleared areas to locate infrastructure, the Proposal will result in a direct loss of vegetation and flora through clearing to construct some well sites, access roads and flowlines. The areas where vegetation clearing is proposed is detailed in Table 4-1 (and shown in Attachment H (Figures 1 [A to H] and Figure 2) of MEPAU, 2019). Table 3-1provides a breakdown of vegetation clearing areas by vegetation system.

The direct impacts of this Proposal are:

- The construction of well sites, access tracks and flowlines will result in clearing of approximately:
  - ~3 ha (or 0.5% of the approved Development Envelope) of Waitsia-03 Area Vegetation,
  - ~13.5 ha (or 2.3% of the approved Development Envelope) of General Vegetation; and
  - Removal of a number of individuals that are identified as four different priority listed taxa[2].

Table 4-1 Clearing of Vegetation in the Approved Development Envelope

Area of Impact	Hectares	% of Development Envelope
Development Envelope	580.9	100
Authorised Extent of native vegetation clearing	16.5	2.8
Waitsia-03 Area Vegetation		
Indicative Flowline Easement and wellpad clearing	~3 ha	0.5
Clearing Envelope	~5 ha	0.9
General Vegetation Area		

[2] MEPAU, 2019 states that 5 priority species would be impacted by the Proposal. *Austrostipa* sp. Cairn Hill (M.E. Trudgen 21176) was recorded by Woodman, 2018a, as detailed in Attachment 1, this species does not occur within the Disturbance Footprint.

Area of Impact	Hectares	% of Development Envelope
Indicative Flowline Easement and wellpad clearing	~13.5 ha	2.3%
Clearing Envelope	~24 ha	4.0%
Existing agricultural or other cleared land		
Disturbance Footprint	~564.4 ha	97.2%

4.1 Regional and Local Significance

Of the 16.5 ha native vegetation clearing total, ~5 ha is considered to be in good condition, with the remaining vegetation comprised of remnant disturbed vegetation in poor condition (Woodman, 2019). Vegetation that is in good condition is located within the proposed Waitsia-03 vegetation area which in turn is adjacent to the Yardanogo Nature Reserve which is comprised of similar vegetation. When considered in the context of the adjacent reserve, the vegetation associations within the Waitsia-03 area are well represented locally with the adjoining reserve comprising an area of approximately 7,000 ha. The small scale and low impact of the proposed flowline and wellpad suggest that clearing within this area is not expected to impact the adjoining reserve, nor exacerbate existing habitat fragmentation. Therefore, the loss of vegetation within the Waitsia-03 area of the approved Development Envelope is not considered to result in significant local or regional impacts.

Approximately 13.5 ha (or 2.3.% of the Development Envelope) of General Vegetation, broadly considered as poor-quality native vegetation, will be cleared for access roads and flowline and some wellpad construction. Typical of remnants within an agricultural landscape this vegetation (see Table 4-6 of MEPAU, 2019) is considered to have negligible local and regional significance due to its fragmented and heavily impacted characteristics.

4.2 Conservation Significant Flora – Priority Flora

No Threatened flora taxa were recorded in the approved Development Envelope as taxa listed under the EPBC Act or returned in the Matter of National Environmental Significance (MNES) search results. Five Priority flora species have been recorded (JBS&G 2023, Woodman 2020) as shown in Table 4-2 and listed below:

- *Comesperma griffinii* (Priority 2);
- *Acacia telmica* (Priority 3);
- *Baeckea* sp. Walkaway (A.S. George 11249) (Priority 3);
- *Banksia elegans* (Priority 4); and
- *Stawellia dimorphantha* (Priority 4).

The Priority taxa identified during detailed surveys that are known to occur within the clearing envelope are known to have a wider distribution outside of the Geraldton Sandplains IBRA region (DBCA, 2019). Of the significant taxa recorded in the Study Area, *Baeckea* sp. Walkaway (A.S. George 11249) (P3), *Banksia elegans* (P4) and *Stawellia dimorphantha* (P4) are known from relatively large distributions (120 km, 175 km and 89 km respectively) and consist of a large number of records (greater than 30 records). In addition, there are number of known locations of these taxa within 5 km of the Study Area (DBCA 2007, Maia 2015, 2016, Woodman 2004, 2009, 2012, 2018a), and the exception of *Comesperma girffinii,* all other conservation significant species directly impacted by the Proposal are known to occur within the adjacent

Yardanogo Nature Reserve indicating that priority taxa are well represented in the local area. Sections 4.3 to 4.6 provide an assessment of impacts to these priority taxa.

Proposed disturbance to these species for the WGP2 comprised:

- Clearing of one *Comesperma griffinii* individual as part of the Waitsia-03 Area construction;
- Clearing of two *Baeckea* sp. Walkaway (A.S. George 11249) (P3) individuals; and
- Clearing of no more than 17% of P4 individuals identified in the survey area, predominately in the Waitsia-03 well area.

The EPA (2020) considered that the conservation status of these priority flora species was unlikely to change as a result of the clearing activities.

The amendments to the approved Development Envelope approved under s.45C in October 2021 and April 2024 did not include any significantly different or additional environmental effects to those originally approved for the Waitsia Gas Project Stage 2 (WGP2).

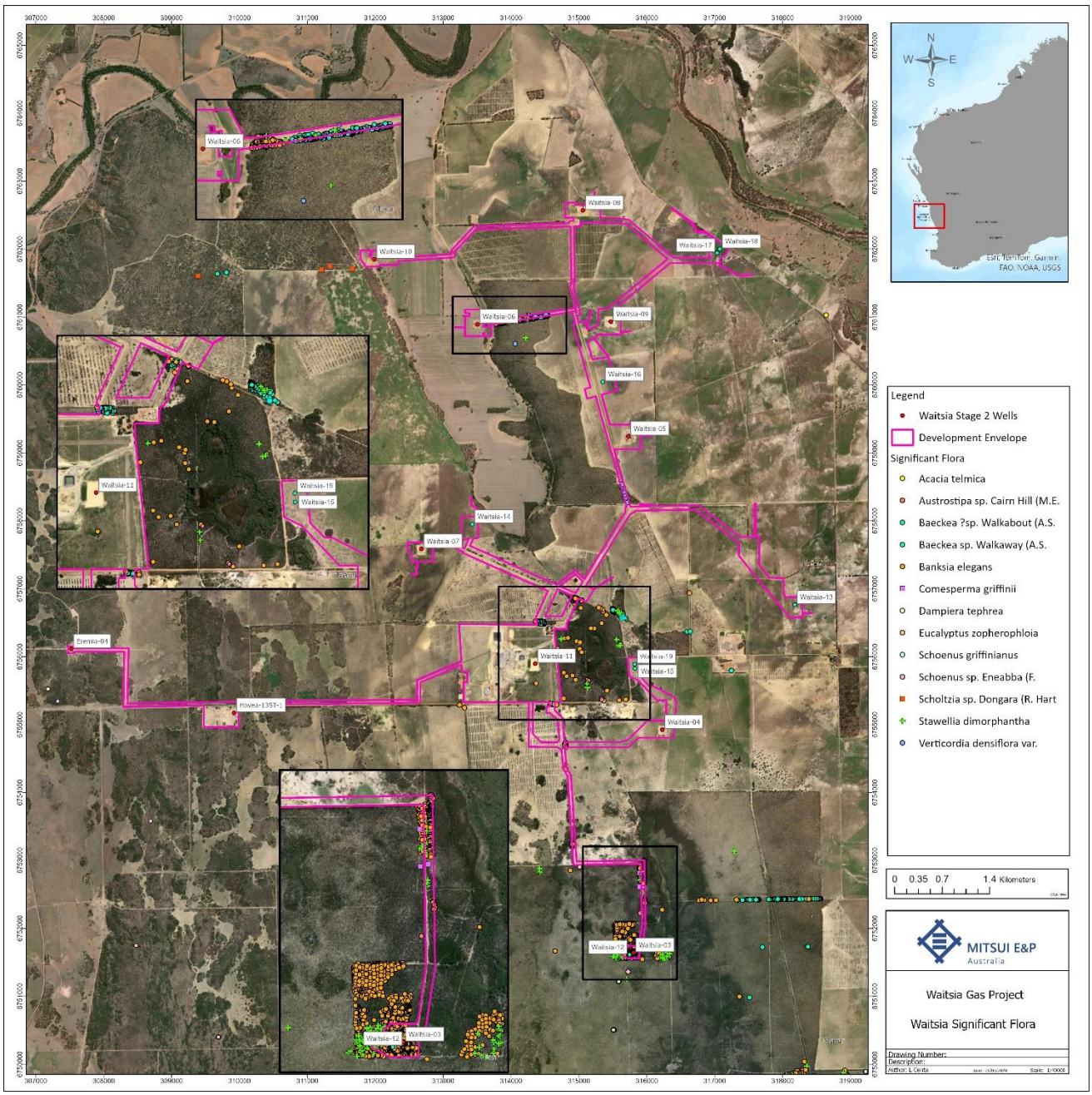

Figure 4-1 Significant Flora Known From the Approved Development Envelope

Table 4-2 Significant Flora Recorded within the Approved Development Envelope

			Wider Waitsia Development Envelope JBS&G, 2023		Waitsia-03 Area Vegetation - Flora Survey - Maia, 2016, Woodman, 2018a, Woodman, 2020			General Vegetation Area - Pipeline and flowline easements Flora Survey – Maia, 2015b, Woodman, 2018b		
Name	**Conservation Status**	**Species Distribution (Western Australian Herbarium, 1998)**	**Number of individuals recorded in survey area**	**Number of known individuals required to be cleared**	**Number of point locations recorded in survey area**	**Number of individuals recorded in survey area**	**Number of known individuals required to be cleared – Waitsia-03**	**Number of point locations recorded in survey area**	**Number of individuals recorded in survey area**	**Number of known individuals required to be cleared**
Acacia telmica	P3	Recorded within Geraldton Sandplains	1	0	0	0	0	0	0	0
Baeckea sp. Walkaway (A.S. George 11249)	P3	Recorded within the Avon Wheatbelt and Geraldton Sandplains IBRA regions	1	0	1431	5802	0	1	109	2
Banksia elegans	P4	Recorded within the Avon Wheatbelt and Geraldton Sandplains IBRA regions	62 (43 previously recorded)	0	340	3,175	333	1	5	4
Comesperma griffinii	P2	Recorded within the Avon Wheatbelt, Esperance Plains, Geraldton Sandplains, Mallee and Swan Coastal Plain IBRA regions	0	0	3	14	1	Not recorded	**0**	**0**
Stawellia dimorphantha	P4	Recorded within the Avon Wheatbelt, Esperance Plains, Geraldton Sandplains, Mallee and Swan Coastal Plain IBRA regions.	0	0	7035	14168	12	Not recorded	**0**	**0**

4.3 Assessment of Impacts to Priority Taxon - *Baeckea s*p. Walkaway

Baeckea sp. Walkaway (A.S. George 11249) (P3) is a dense, multi-stemmed shrub growing up to 2 m high which occurs on undulating plains and hillslopes on yellow/brown or white sand in Kwongan or Banksia woodland/heath (DBCA, 2024). It has a range of approximately 120 km in Western Australia (where it is endemic), from near Geraldton in the north-west, to south-east of Mullewa in the east and south-east of Dongara in the south. Outside of the approved Development Envelope this taxon is known from 39 records[3] (Table 4-2) representing approximately 32 broad localities, five of which occur within conservation reserves including Burma Road Nature Reserve, Indarra Spring Nature Reserve and Yardanogo Nature Reserve (DBCA, 2019).

Figure 4-1 details recorded distribution of *Baeckea sp.* within the approved Development Envelope (DBCA, 2019, Maia 2016, Woodman 2004, 2009, 2012, 2018a, JBS&G, 2023).

4.3.1 *Baeckea* sp. Walkaway in General Vegetation Area

Baeckea sp. Walkaway (A.S. George 11249) (P3) was recorded within the Xyris Production Facility North and Waitsia-07 (General Vegetation) area (Maia, 2015b) (Table 4-2, Figure 4-1).There are a number of known locations of this taxon within the broader region (DBCA, 2019, Maia, 2016, Woodman, 2004, 2009, 2018a, 2020, JBS&G, 2023).

4.3.2 Impact Assessment

Based upon the information available for this species (Maia, 2016 and Woodman, 2018a, 2018b, 2020, JBS&G, 2023), MEPAU understand that there are at least 114 known individuals that have been previously recorded and reported in the approved Development Envelope. Based upon the disturbance footprint of the Proposal, surveys undertaken by MEPAU indicate that two *Baeckea* sp. Walkaway (A.S. George 11249) (P3) individuals will be impacted by the Proposal. This equates to a disturbance of approximately 4% of the known records in this area.

This Proposal is not considered to result in a significant impact to the species as:

- The direct impact equates to a small portion (4%) of known individuals in the surveyed areas (Maia, 2016 and Woodman, 2018a);
- This taxon is also known from 39 records outside of the approved Development Envelope representing approximately 32 broad localities, five of which occur within conservation reserves (DBCA, 2019); and
- The species has a large known distribution indicating that any localised impacts are not expected to affect the wider overall population distribution.

4.4 Assessment of Impacts to Priority Taxon - *Banksia elegans*

Banksia elegans (P4) is a shrub growing up to 4 m high which occurs on sandplains and low consolidated dunes on yellow, white or red sand (DBCA, 2024It has a range of approximately 175 km in Western Australia (where it is endemic), from north-west of Dongara in the north-west, to near Hill River in the south-east. Outside of the approved Development Envelope this

[3] The abundance of plants at each known locality varies from four plants, 13 plants and 15 plants to 1,000+. There is likely at least 2,000 plants across all current populations when numbers are estimated from available data on FloraBase (Maia, 2015b).

taxon is known from 46 records representing approximately 19 broad localities, seven of which occur within conservation reserves including Beekeepers Nature Reserve, Lake Logue Nature Reserve, Lesueur National Park and Yardanogo Nature Reserve (DBCA, 2019).

Figure 4-1 details recorded distribution of *Banksia elegans* within the approved Development Envelope (DBCA, 2019Maia 2016, Woodman, 2004, 2009, 2012, 2018a, 2020, JBS&G, 2023).

4.4.1 *Banksia elegans* in Waitsia-03 Area Vegetation

Banksia elegans (P4) is common within the Waitsia-03 Area (Woodman, 2018a), with a total of 340 point locations recorded within the Study Area and 3,175 individuals recorded across these point locations (Woodman, 2018a, 2020, JBS&G, 2023) (Table 4-2).

4.4.2 *Banksia elegans* in General Vegetation Area

Five *Banksia elegans* (P4) plants were located in a moderately dense to open remnant in this small survey area[4] (Maia, 2015b)(Figure 4-1). Woodman, 2018b recorded 99 individual plants, at 14 locations, within 1 km of this location. JBS&G, 2023 recorded 62 individuals in the wider Waitsia survey area, 44 of which had been previously recorded by Woodman, 2020 (Table 4-2).

4.4.3 Impact Assessment

A total of 46 locations have been recorded previously via Naturemap (DBCA, 2019). A large number of individual plants have been recorded at both the Waitsia-03 Area Vegetation, General Vegetation area and wider Waitsia area.

4.4.3.1 Waitsia-03 Area Vegetation

Based upon the information available for this species (Maia, 2016, Woodman, 2018a, 2020), MEPAU understand that there are at least 3,175 known individuals that have been previously recorded in this area. Based upon the clearing footprint of the Proposal, surveys undertaken by MEPAU indicate that approximately 333 individuals will be directly impacted in the Waitsia-03 Area Vegetation by the Proposal. This equates to a disturbance of approximately 10% of the known records in this area.

4.4.3.2 General Vegetation Area

Based upon the information available for this species (Maia, 2015b and Woodman, 2018b), MEPAU understand that there are at least 104 known individuals that have been previously recorded in this area. Based upon the clearing footprint of the Proposal, surveys undertaken by MEPAU indicate that approximately 4 individuals will be impacted in the General Vegetation area by the Proposal. This equates to a disturbance of approximately 4% of the known records in this area.

4.4.3.3 Impact Assessment conclusion

This Proposal is not considered to result in a significant impact to the species as:

- The direct impact equates to a small portion (10% and 4% respectively) of known individuals in the surveyed areas (Woodman, 2018a and Maia, 2015b);

[4] Survey undertaken to meet the requirements for NVCP 6875. Survey area, 1.13 ha, comprises the NVCP 6875-1 area.

- This taxon is also known from 46 records outside of the approved Development Envelope, representing approximately 19 broad localities, seven of which are locations within conservation reserves (DBCA, 2019); and
- The species has a large known distribution indicating that any localised impacts are not expected to affect the wider overall population distribution.

4.5 Assessment of Impacts to Priority Taxon - *Comesperma griffinii*

Comesperma griffinii (P2) is an annual or perennial herb growing to 0.15 m high which occurs on plains on yellow or grey sand (DBCA, 2024). It has a large range of approximately 830 km in Western Australia (where it is endemic), from east of Geraldton in the north-west, to near Esperance in the south-east. Outside of the approved Development Envelope this taxon is known from 11 records representing approximately 10 broad localities, four of which occur within conservation reserves including Indarra Nature Reserve, Helms Forestry Reserve, Kenwick Wetland and South Eneabba Nature Reserve (DBCA, 2019).

Figure 4-1 details recorded distribution of *Comesperma griffinii* within the approved Development Envelope (DBCA, 2019, Maia, 2016 and Woodman, 2018a).

4.5.1 *Comesperma griffinii* in Waitsia-03 Area Vegetation

Comesperma griffinii (P2) was recorded at three point locations within the Waitsia-03 Study Area, with 14 individuals recorded across these point locations (Woodman, 2018a) (Table 4-2, Figure 4-1). There is one known location of this taxon approximately 15 km south-east of the broader approved Development Envelope. The next closest record is 60 km south of the Study Area (DBCA, 2019).

4.5.2 Impact Assessment

Based upon the information available for this species (Woodman, 2018a), MEPAU understand that there are 14 known individuals that have been previously recorded and reported in the Waitsia-03 Area, with other individuals existing outside of this area. Based upon the clearing footprint of the Proposal, surveys undertaken by MEPAU indicate that approximately 1 individual will be impacted by the Proposal. This equates to a disturbance of approximately 7% of the known records in this area.

- This Proposal is not considered to result in a significant impact to the species as: the direct impact equates to a small portion (7%) of known individuals in the surveyed areas (Woodman, 2018a);
- This taxon is also known from 11 records outside of the approved Development Envelope, representing 10 broad localities, four of which occur within conservation reserves; and
- The species has a large known range indicating that any localised impacts are not expected to affect the wider overall population distribution.

4.6 Assessment of Impacts to Priority Taxon - *Stawellia dimorphantha*

Stawellia dimorphantha (P4) is a stilt-rooted perennial herb growing up to 0.2 m high which occurs on white, grey and yellow sand (DBCA, 2024). It has a range of approximately 89 km in Western Australia (where it is endemic), from north of Dongara in the north, to near Eneabba in the south. This taxon is known from 65 records representing approximately 20 broad localities, 6 of which occur within conservation reserves including Beekeepers Nature Reserve, Lake Logue and Yardanogo Nature Reserve (DBCA 2019).

Figure 4-1 details recorded distribution of *Stawellia dimorphantha* within the approved Development Envelope (DBCA, 2019, Maia, 2016 and Woodman, 2018a).

4.6.1 *Stawellia dimorphantha* in Waitsia-03 Area Vegetation

Stawellia dimorphantha (P4) was recorded at 70 point locations within the Waitsia-03 Study Area, with 141 individuals recorded across these point locations (Woodman, 2018a). This taxon was relatively common within the Study Area (Woodman, 2018a). There are a number of known locations of this taxon within the broader approved Development Envelope (Table 4-2, Figure 4-1).

4.6.2 Impact Assessment

Based upon the information available for this species (Woodman, 2018a), MEPAU understand that there are 141 known individuals that have been previously recorded and reported in the Waitsia-03 Area, with other individuals existing outside of this area. Based upon the clearing footprint of the Proposal, surveys undertaken by MEPAU indicate that approximately 12 individuals will be impacted by the Proposal. This equates to a disturbance of approximately 8% of the known records in this area.

This Proposal is not considered to result in a significant impact to the species as:

- The direct impact equates to a small portion (8%) of known individuals in the surveyed area (Woodman, 2018a);
- This taxon is also known from 65 records outside of the approved Development Envelope representing approximately 20 broad localities, six of which occur within conservation reserves (DBCA, 2019); and
- The species has a large known distribution indicating that any localised impacts are not expected to affect the wider overall population distribution.

4.7 Assessment of Impacts to Priority Taxon - *Acacia telmica*

Acacia telmica (P3) is a dense, rounded shrub growing up to 1-3 m high which occurs on sand, loam or loamy clay (DBCA, 2024). It has a known distribution of approximately 65 km (DBCA, 2024) and was observed in the wider Waitsia study area.

4.7.1 *Acacia telmica* in General Vegetation Area

Acacia telmica (P3) was recorded at one location in the wider Waitsia survey area (JBS&G, 2023). Based upon the approved Development Envelope and clearing footprint, this individual will not be impacted by the Proposal.

5.0 IMPACT ASSESSMENT – INDIRECT IMPACTS

The area of potential indirect impacts has been minimised to the lowest practicable extent by utilising existing cleared areas to locate infrastructure. There is potential for indirect impacts to be associated with implementation of the Proposal.

5.1 Spread of Weeds

A search of the DoEE (now DCCEEW) Species Profile and Threats Database (Woodman, 2019) identified four significant invasive flora taxa or habitat for such taxa, that may occur within the broader approved Development Envelope. Woodman (2019) identified four introduced flora taxa via the DBCA *NatureMap* database search. None of these taxa are listed as Declared Pests under the *Biosecurity and Agriculture Management Act 2007.*

Vegetation in the majority of the approved Development Envelope (General Vegetation Area) has been subject to weed incursion which can be attributed to the disturbance of the land from historical land clearing, fragmentation of remnants and agricultural practices. Given the disturbed nature of the flora and vegetation in this area and the potential threat of significant invasive weed incursion, standard weed management measures are required during the construction and operation phases of the Proposal (MEPAU, 2019).

The flora and vegetation assessment of the Waitsia-03 Vegetation Area undertaken by Woodman (2018a) stated that no declared weeds or weeds of national significance were recorded within the Study Area. Of the four priority flora that will be impacted by the Proposal only one species has a conservation advice (CwA, 2008)[5]. However, CwA, 2008 states that the known populations are relatively healthy and threatening processes (e.g. weed infestation) are unlikely to severely impact on the species.

Given this finding, the nature of the flora and vegetation in this area, and the immediate proximity of this area to the Yardanogo Nature Reserve, effective weed assessment, management and monitoring during construction and operation phases of the Proposal is required. This is further supported in Woodman, 2018a.

The risk of spreading weeds through the implementation of the Proposal is credible, as weed species are known to be present within the Development Envelope, but is not considered a significant risk given:

- The spread of weeds is not considered a key threat to identified priority taxon or vegetation systems; and
- It is considered a standard construction risk manageable through the implementation of good industry practice and hygiene management actions.

5.2 Spread of *Phytophthora cinnamomi* (Dieback)

The approved Development Envelope lies at the northern limit of the portion of Western Australia where significant plant disease caused by *Phytophthora cinnamomi* (Dieback) is known to occur. The environmental conditions of the area significantly affect the pathogens ability to survive or flourish and spread over time. All land with an annual average rainfall of more than 400 millimetres and suitable soil composition (e.g. warm and moist) are considered vulnerable to Dieback (Department of Parks and Wildlife, 2015).

Given the condition of native vegetation in the General Vegetation Area, average rainfall[6] of the approved Development Envelope and the soil composition, the threat posed by and impact to vegetation from Dieback is considered minimal.

A specific dieback assessment was undertaken by subject matter experts (Glevan, 2018) relating to the area depicted in Waitsia-03 Vegetation Area prior to (in 2016) and post drilling of Waitsia-03 well (in 2018). Although the surveys were not able to conclusively verify that Dieback was not present in this area due to a lack of reliable indicator species, Glevan (2018) noted that there was no evidence to suggest that Dieback did occur in this area. Given the condition and species composition of vegetation in the Waitsia-03 Vegetation Area (Woodman, 2018a) and proximity of this area to the Yardanogo Nature Reserve, the potential

[5] No species currently have species recovery plans in place.

[6] The average rainfall of the Proposal area is approximately 440 millimetres (BoM, 2020) and declining (DoW, 2015).

threat of Dieback cannot be excluded as a potential indirect impact from the implementation of the Proposal in this area.

The risk of spreading dieback through the implementation of the Proposal is considered credible in certain areas of the approved Development Envelope (i.e. Waitsia-03 Vegetation Area). Although the known environmental condition requirements for the potential presence of Dieback may be present within the Development Envelope, it is not considered a significant risk given:

- The spread of dieback is not considered a key threat to identified priority taxa. However, some species identified during flora surveys are known to be susceptible; and
- It is considered a standard construction risk manageable through the implementation of good industry practice and hygiene management actions.

Surveys for Dieback have been undertaken during the early implementation phases of the Proposal in the Waitsia-03 Area Vegetation, pre-and post-flowline easement/access route disturbance activities, with no evidence of Dieback being observed from assessments in 2016, 2019, 2021, 2022 and 2023 (Glevan, 2023).

An area of the General Vegetation Area adjacent to the Waitsia Gas Plant paddock fenceline has also been assessed for the presence of Dieback and considered not likely to be Dieback (Glevan, 2022a).

5.3 Impacts from Dust

There is a general belief that dust accumulation on plant surfaces can cause negative impacts to plants. Matsuki et al, 2016 concluded that there was no evidence to support the perception that dust accumulation on plants causes negative impacts. Given the short duration of vegetation clearing and flowline installation works (MEPAU, 2019) impacts from dust on nearby vegetation is considered a low potential.

A long term monitoring program that investigated impacts of dust on vegetation for a significant development in the Pilbara over a 5 year period, where significantly higher volumes of vehicles (heavy and light) and earthworks were present, determined that no adverse impacts occurred to plant health or vegetation communities as a result of construction dust loads (Chevron Australia, 2015). Consequently, any potential impact is also not expected to be permanent. Therefore, no specific dust mitigation measures are proposed to be implemented.

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