



# Report and recommendations of the Environmental Protection Authority



## Waitsia Gas Project Stage 2

AWE Perth Pty Ltd

Report 1687

September 2020

## Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
31/10/2019	EPA decided to assess – level of assessment set	
31/10/2019	Request for Additional Information	0
22/04/2020	EPA accepted Additional Information	25
23/04/2020	Additional Information released for public review	1 day
07/05/2020	Public review period for Additional Information closed	2
06/07/2020	EPA provided preliminary view to proponent	8.5
27/08/2020	EPA received final information for assessment	7.5
02/09/2020	EPA provided report to the Minister for Environment	3 days
07/09/2020	EPA report published	3 days
21/09/2020	Close of appeals period	2

Timelines for an assessment may vary according to the complexity of the proposal and are usually agreed with the proponent soon after the Environmental Protection Authority (EPA) decides to assess the proposal and records the level of assessment.

In this case, the EPA met its timeline objective to complete its assessment and provide a report to the Minister.



Dr Tom Hatton  
Chairman

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# Summary

This document is an assessment report for Western Australia's Minister for Environment. It describes the outcomes of an Environmental Protection Authority (EPA) environmental impact assessment of the Waitsia Gas Project Stage 2 (the proposal), located about 16 kilometres east-south-east of the Dongara-Port Denison town sites. The proponent is AWE Perth Pty Ltd.

## Proposal

The proposal is to construct, operate and decommission a 250 terajoules per day gas plant and related infrastructure. Hydraulic fracture stimulation does not form part of the proposal.

## Background and Context

The proponent referred the proposal to the EPA on 23 August 2019. On 31 October 2019 the EPA decided to assess the proposal and set the level of assessment at Referral Information with additional information required, with two weeks public review.

The additional information was released for public review from 23 April 2020 to 7 May 2020. Forty three public comments and three agency comments were received.

## Public Submissions

Key issues raised in the public comment period included:

- uncertainty of the impacts to groundwater and surface water from abstraction, gas processing and waste water reinjection
- potential impacts on air quality
- impacts to flora and vegetation
- potential impacts from greenhouse gas emissions
- increase in seismic activity due to reinjection of waste water
- impacts on cultural heritage
- concern regarding future hydraulic fracturing as part of the proposal.

The proponent responded to these comments by updating the environmental management plans to address the majority of issues raised.

## Key Environmental Factor and Relevant Principles

The EPA identified the following key environmental factors during the course of its assessment:

1. **Flora and Vegetation** – potential direct impacts to flora and vegetation, through clearing and potential indirect impacts from dust deposition, weeds, dieback, fragmentation and changes to fire regimes.

2. **Air Quality** – potential impacts on air quality from the emission of particulates (including dust) from construction and operation of the gas plant.
3. **Greenhouse Gas Emissions** – direct emission of greenhouse gases throughout the life of the proposal.
4. **Inland Waters** – potential contamination of groundwater or surface waters from construction and operation of production wells, reinjection of produced formation water and drawdown impacts from groundwater abstraction.
5. **Social Surroundings** – potential impacts on air quality, visual amenity, Aboriginal heritage and noise.

In identifying the key environmental factors, the EPA had regard to the object and principles set out in s. 4A of the *Environmental Protection Act 1986*. The EPA considered that the following principles were particularly relevant to this assessment:

1. The precautionary principle
2. The principle of intergenerational equity
3. The principle of the conservation of biological diversity and ecological integrity
4. Principles relating to improved valuation, pricing and incentive mechanisms
5. The principle of waste minimisation.

## Conclusion

The EPA has taken the following into account in its assessment of the proposal as a whole:

- impacts to all the key environmental factors
- EPA's confidence in the proponent's proposed mitigation measures
- relevant EP Act principles and the EPA's objectives for the key environmental factors
- EPA's view that the impacts to the key environmental factors are manageable, provided the recommended conditions are imposed.

Given the above, the EPA has concluded that the proposal may be implemented subject to the conditions recommended in Appendix 4.

## Recommendations

The EPA recommends that the Minister for Environment notes:

1. That the proposal is for the construction and operation of the Waitsia Gas Project Stage 2 proposal, which includes a conventional gas facility and related infrastructure about 16 kilometres east-south-east of the Dongara-Port Denison town sites.
2. The key environmental factors identified by the EPA in the course of its assessment are Flora and Vegetation, Inland Waters, Greenhouse Gas Emissions, Air Quality, and Social Surroundings.

3. The EPA has concluded that the proposal may be implemented, provided the implementation of the proposal is carried out in accordance with the recommended conditions and procedures set out in Appendix 4. Matters addressed in the conditions include:
  - a) implementation of a Flora and Vegetation Management Plan to minimise impacts to Flora and Vegetation (condition 6)
  - b) implementation of the Water Management Plan to minimise impacts to groundwater and surface water (condition 7)
  - c) implementation of the Greenhouse Gas Management Plan to minimise greenhouse gas emissions (condition 8)
  - d) implementation of the Management of Flaring Plan to minimise impacts to visual amenity from flaring (condition 9)
  - e) implementation of condition 10 to minimise impacts to Aboriginal heritage.
4. Other advice provided by the EPA, set out in section 6.

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# 1. Introduction

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the outcomes of the EPA's environmental impact assessment of the Waitsia Gas Project Stage 2 proposal (referred to in this report as the proposal).

The proposal is to construct and operate a 250 terajoules (TJ) per day gas plant and related infrastructure about 16 kilometres (km) east-south-east of the Dongara-Port Denison town sites, in the Shire of Irwin (Figure 1). AWE Perth Pty Ltd is the proponent for the proposal and operates under the Mitsui E&P Australia brand.

The EPA has prepared this report in accordance with s. 44 of the *Environmental Protection Act 1986* (EP Act). This section of the EP Act requires the EPA to prepare a report on the outcome of its assessment of a proposal and provide this assessment report to the Minister for Environment. The report must set out:

- (a) what the EPA considers to be the key environmental factors identified during the assessment
- (b) the EPA's recommendations as to whether or not the proposal may be implemented and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may also include any other information, advice and recommendations in the assessment report as it thinks fit.

The proponent referred the proposal to the EPA on 23 August 2019. On 31 October 2019, the EPA decided to assess the proposal and set the level of assessment at Referral Information with additional information required, with two weeks public review.

The additional information was released for public review from 23 April 2020 to 7 May 2020.

## EPA Procedures

The EPA followed the procedures in the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (State of Western Australia 2016) and the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2020c).

## 2. The Proposal

The proposal will further develop the Waitsia gas field, a free-flowing conventional gas reservoir located beneath predominately cleared agricultural land. The proposed development envelope is 354 hectares (ha). The total disturbance footprint is 345 ha, which includes 328 ha of cleared and previously disturbed land, and 17 ha of native vegetation (Figure 2).

The proponent currently operates the Waitsia Gas Project Stage 1 (Stage 1), which was commissioned in 2016 and has been producing from existing wells through the Xyris Production Facility. Stage 1 was initially developed for an extended production test of the Waitsia gas reservoir and included two production wells, Waitsia-01 and Senecio-03 connected to the Xyris Production Facility. Gas processed through Stage 1 is delivered through the Parmelia Gas Pipeline for domestic consumption. The initial production capacity of Stage 1 was about 10 TJ per day, however this will increase to 20 TJ per day following completion of the proposed Waitsia 1 expansion. Stage 1 was not assessed by the EPA as the impacts were not so significant that they warranted referral to the EPA. Stage 1 has been regulated by the Department of Mines, Industry Regulation and Safety (DMIRS) under the *Petroleum and Geothermal Energy Resources Act 1967* (PGER Act) and the *Petroleum Pipelines Act 1969*, and by the Department of Water and Environmental Regulation (DWER) under Part V of the EP Act.

The Waitsia Gas Project Stage 2 proposal is separate from Stage 1 and refers to the infrastructure required for a fully producing gas field. It comprises the construction of a new gas processing facility, drilling of additional wells, construction of gas gathering hubs, and the construction of flowlines connecting wells to gathering hubs and the Waitsia gas plant.

Key elements of the proposal include:

- construction and operation of a new gas plant, with a maximum export capacity of 250 TJ per day
- drilling of up to six new production wells, supplementing the existing two suspended appraisal wells
- installation of a gas gathering system comprising of flowlines and hubs to transfer the extracted gas to the gas plant and gas distribution network
- installation of a flowline from the gas plant to disused petroleum production wells for disposal of produced formation water.

Gas extracted from the production wells will be conveyed to gas gathering stations, or hubs. Gas will then be directed via flowlines to the proposed Waitsia gas plant for processing, before being conveyed to the nearby Dampier to Bunbury Natural Gas Pipeline for both domestic and industrial consumption. Hydraulic fracturing is not proposed for this development.

At full production, total scope 1 greenhouse gas emissions (emissions released to the atmosphere as a direct result of an activity, or a series of activities at a facility

level) are estimated to be about 300,000 tonnes of carbon dioxide equivalence (t CO<sub>2</sub>-e) per year. This includes emissions related to reservoir carbon dioxide (CO<sub>2</sub>) removal and from the operation of the Waitsia gas plant.

The key characteristics of the proposal are summarised in Tables 1 and 2 below. A detailed description of the proposal is provided in section 2 of the Environmental Referral Supporting Report (AWE 2019).

**Table 1: Summary of the proposal**

Proposal title	Waitsia Gas Project Stage 2
Short description	The Waitsia Gas Project Stage 2 is a conventional gas proposal located about 16 km east-south-east of the Dongara-Port Denison town sites. The proposal includes the construction and operation of a 250 terajoules per day gas plant and related infrastructure.

**Table 2: Location and proposed extent of physical and operational elements**

Element	Location	Proposed extent
<i>Physical elements</i>		
Gas processing plant and associated infrastructure	Figure 2	Clearing of no more than 17 ha of native vegetation within the 354 ha development envelope
Gas production wells	Figure 2	Up to 8 (including 2 existing)
Produced formation water disposal wells	Figure 2	Up to 3
Total disturbance footprint	Figure 2	Up to 345 ha within the 354 ha development envelope
<i>Operational elements</i>		
Gas production facility capacity	Figure 2	Up to 250 TJ per day
Gas extraction method		Conventional
Greenhouse gas emissions (scope 1)		Up to 300,000 t CO <sub>2</sub> -e per annum
Project life		20 Years



**Figure 1: Regional location**

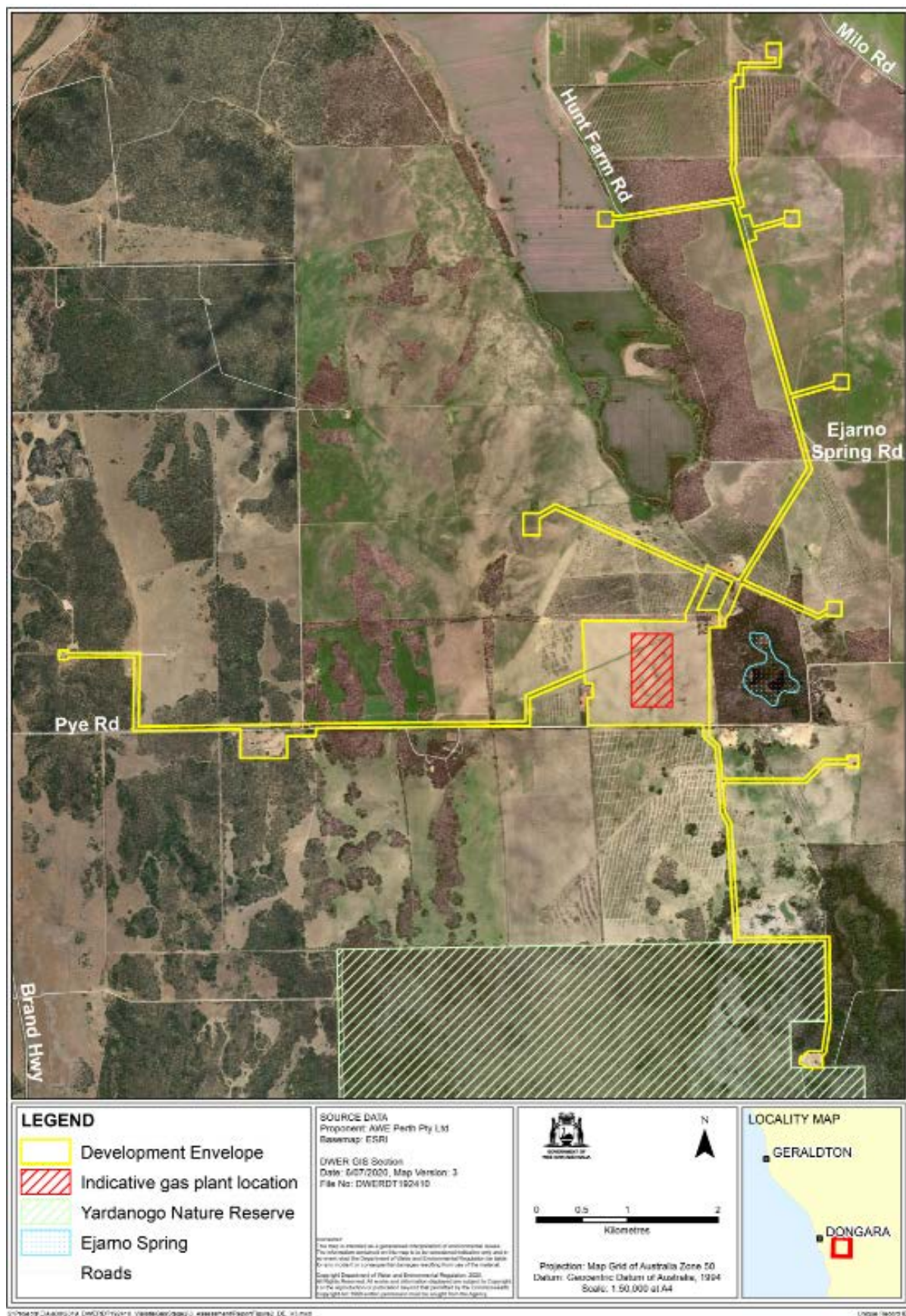


Figure 2: Development envelope

### 3. Consultation

The EPA advertised the referral information for the proposal for public comment in September 2019 and received 273 submissions. Three submissions requested 'Do Not Assess' and 270 submissions requested 'Assess – Public Environmental Review'.

The proponent consulted with government agencies and key stakeholders during the preparation of supplementary reports provided to support the referral information. The agencies and stakeholders consulted, the issues raised and the proponent's response to those issues are detailed in Table 3-1 of the Environmental Referral Supporting Report (AWE 2019).

The EPA required the proponent to provide environmental management plans as part of the assessment of the proposal, and these were released for public comment for two weeks between 23 April 2020 and 7 May 2020. Three agency submissions and 43 public submissions were received during the public comment period. Key issues raised in the public comment period included:

- uncertainty of the impacts to groundwater and surface water from abstraction, gas processing and wastewater reinjection
- potential impacts on air quality
- impacts to flora and vegetation
- potential impacts from greenhouse gas emissions
- increase in seismic activity due to reinjection of wastewater
- potential impacts on cultural heritage
- concern regarding future hydraulic fracturing as part of the proposal.

The proponent has addressed the comments raised following public review in the Response to Public Comments document (AWE 2020a) and updated the environmental management plans where appropriate.

The EPA considers that the consultation process has been appropriate and that reasonable steps have been taken to inform the community and stakeholders about the proposed development. Relevant significant environmental issues identified from this process were considered by the EPA during its assessment of the proposal.

## 4. Key Environmental Factors

In undertaking its assessment of the proposal and preparing this report, the EPA had regard for the object and principles in s. 4A of the EP Act to the extent relevant to the particular matters that were considered.

The EPA considered the following information during its assessment:

- proponent's referral information (AWE 2019), the environmental plans provided as part of the assessment and additional requested information
- public comments received on the referral, stakeholder comments received during the preparation of the proponent's documentation and public and agency comments received on the proponent's environmental management plans
- proponent's response to submissions raised during the public review of the environmental management plans
- EPA's own inquiries
- *Statement of Environmental Principles, Factors and Objectives* (EPA 2020d)
- relevant principles, policy and guidance referred to in the assessment of each key environmental factor in sections 4.1 to 4.5.

Having regard to the EP Act principles, the EPA considered that the following principles were particularly relevant to its assessment of the proposal:

1. **The precautionary principle** – the EPA has considered whether the proponent's investigations into the biological and physical environment provide the means to assess risk and identify measures to avoid or minimise impacts. Where greater certainty regarding risk to flora and vegetation, air quality and inland waters is required, the EPA has recommended conditions.
2. **The principle of intergenerational equity** – the proponent has undertaken measures to avoid, minimise, manage and rehabilitate impacts, including the preparation of environmental management plans, to maintain the environment for the benefit of future generations.
3. **The principle of the conservation of biological diversity and ecological integrity** – the EPA has considered the impacts on flora and vegetation and inland waters. The EPA has recommended conditions to manage the impacts on flora and vegetation and inland waters so that biological diversity is maintained.
4. **The principles relating to improved valuation, pricing and incentive mechanisms** – the proponent will bear the costs relating to the management of waste and pollution, including avoidance, containment, decommissioning, rehabilitation and closure.
5. **The principle of waste minimisation** – the proponent proposes to minimise waste by adopting the hierarchy of waste controls; avoid, minimise, reuse, recycle and safe disposal.

Appendix 2 of this report provides a summary of all the principles and how the EPA considered these principles in its assessment.

Having regard to the above information, the EPA identified the following key environmental factors during the course of its assessment of the proposal:

- **Flora and Vegetation** – potential impacts from clearing of native vegetation on flora and vegetation, and potential indirect impacts on flora and vegetation from dust deposition, weeds, dieback, fragmentation and changes to fire regimes.
- **Air Quality** – potential impacts on air quality from the emission of particulates (including dust) from construction and operation of the gas plant.
- **Greenhouse Gas Emissions** – direct emission of greenhouse gases throughout the life of the proposal.
- **Inland Waters** – potential contamination of groundwater or surface water from construction and operation of production wells, reinjection of produced formation water and drawdown impacts from groundwater abstraction.
- **Social Surroundings** – potential impacts on visual amenity, Aboriginal heritage and noise.

The EPA considered other environmental factors during the course of its assessment of the proposal. These factors, which were not identified as key environmental factors, are discussed in the proponent's referral documentation (AWE 2019). Appendix 3 of this report contains an evaluation of why these other environmental factors were not identified as key environmental factors.

The EPA's assessment of the proposal's impacts on the key environmental factors is provided in sections 4.1 to 4.5. These sections outline whether or not the EPA considers that the impacts on each factor are manageable. Section 7 provides the EPA's recommendation as to whether or not the proposal may be implemented.

## Changes to EPA Environmental Policy and Guidance

From 16 April 2020, the EPA has considered Air Quality and Greenhouse Gas Emissions to be separate environmental factors, rather than the single factor of Air Quality. The EPA's *Statement of Environmental Principles, Factors and Objectives* was updated to reflect this change.

At the same time, the EPA introduced separate environmental factor guidelines for Air Quality and Greenhouse Gas Emissions. These guidelines replaced the EPA's previous Air Quality environmental factor guideline that was current at the time of referral and Environmental Referral Supporting Report. Consistent with the EPA's current *Statement of Environmental Principles, Factors and Objectives*, the EPA has assessed the factors of Air Quality and Greenhouse Gas Emissions separately for this proposal.

## 4.1 Flora and Vegetation

The EPA's environmental objective for Flora and Vegetation is *to protect flora and vegetation so that biological diversity and ecological integrity are maintained.*

### Relevant Policy and Guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a)
- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016d)
- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offsets Guidelines* (Government of Western Australia 2014).

### EPA Assessment

#### Existing environment

The proposal area is located within the Northern Sandplains Region (Irwin Botanical District) which is considered to be equivalent to the Geraldton Sandplains Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion.

The proposed Waitsia gas plant site is 156 ha and will be located within a mostly cleared agricultural paddock. Clearing of about 17 ha of native vegetation will be required to construct access roads, flowlines and associated infrastructure to the Waitsia gas plant from the production well sites. Of the vegetation proposed to be cleared, 14 ha is disturbed remnant vegetation in poor condition. About 3 ha of vegetation in good condition is proposed to be cleared within the Waitsia 03 well area, situated adjacent to the Yardanogo Nature Reserve, which is comprised of similar condition vegetation.

Desktop assessments have been undertaken of the proposal area, with targeted and detailed surveys focused on those areas of native vegetation considered to be the most intact – namely the area of vegetation around the Waitsia 03 well area. This vegetation will be impacted by the construction of the flowline adjacent to the Yardanogo Nature Reserve.

Four broad scale vegetation communities were identified within the proposal area. These communities include Illyarrie\_433, Eridoon\_378, Eridoon\_392 and Eridoon\_433 which are well represented outside of the proposal area. The desktop assessment of the proposal area identified that 15 Priority taxa (P) are known to be present within the IBRA subregion.

The targeted survey conducted within the Waitsia 03 well area determined that four Priority taxa were present within the proposed clearing envelope:

- *Comesperma griffinii* (P2)
- *Baeckea* sp. Walkaway (A.S. George 11249) (P3)

- *Banksia elegans* (P4)
- *Stawellia dimorphantha* (P4).

## Potential impacts

Flora and vegetation could be potentially impacted, either directly or indirectly through:

- clearing of 17 ha of native vegetation
- introduction or promotion of weeds and/or dieback
- changes to fire regimes.

Of the 17 ha of proposed clearing, about 14 ha comprises degraded vegetation, and about 3 ha (or 0.8 per cent of the development envelope) of good quality vegetation in the vicinity of the Waitsia 03 well area will be cleared for access roads and flowline construction. The Waitsia Gas Project Stage 2 proposal will be co-located with infrastructure already in place for the Waitsia Gas Project Stage 1. The vegetation clearing for the Waitsia Gas Project Stage 1 was authorised under two clearing permits granted under section 51E of the EP Act for a total of 6 ha. The 6 ha did not involve clearing of significant species.

The proposed clearing of native vegetation will impact on all four identified vegetation communities within the proposal area. The impact to these communities will be less than 0.01 per cent of their regional extent.

Of the priority species identified in the development envelope, it is expected that:

- one individual of *Comesperma griffinii* (P2) will be cleared as part of the Waitsia-03 Area construction
- two *Baeckea* sp. Walkaway (A.S. George 11249) (P3) individuals will be cleared
- no more than 17 per cent of P4 individuals identified in the survey area will be cleared, predominately in the Waitsia 03 well area.

The EPA considers that the conservation status of these species is unlikely to change as a result of the clearing activities.

The Yardanogo Nature Reserve is located adjacent to the Waitsia-03 Area and contains native vegetation in good condition (EPA 2016d) (as adapted from Keighery 1994). Surveys undertaken by the proponent (Woodman 2018) identified that the vegetation within the Waitsia-03 area represented 0.31 per cent of similar vegetation within the Yardanogo Nature Reserve (AWE 2019).

Ejarno Spring is located about 500 metres (m) east of the proposed Waitsia gas plant and contains groundwater dependent ecosystems.

## Mitigation and management

The proponent has considered the application of the mitigation hierarchy in accordance with *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a).

The proponent has optimised the siting of the Waitsia gas plant and associated infrastructure to avoid and minimise potential impacts to Flora and Vegetation. The proposal occurs mostly within cleared agricultural land. Of the 17 ha of clearing required, 14 ha of native vegetation is of a degraded condition with 3 ha (about 0.8 per cent of the proposed development envelope) of vegetation in good condition. This vegetation is located within the Waitsia 03 well area. Clearing in the Waitsia 03 well area has been minimised by using an existing access track, however the existing cleared area needs to be widened and will result in the removal of about 3 ha of native vegetation in good condition. Following construction, the proponent has committed to partially rehabilitate the access track.

Groundwater dependent ecosystems within the adjacent Ejarno Spring have been predicted by the proponent to not be impacted based on their groundwater model. The modelled decline in groundwater levels at Ejarno Spring was 6 centimetres (cm) and it is likely that groundwater dependant ecosystems in the area are adapted to the annual groundwater level fluctuations of 0.3 m to 1.7 m. Based on the advice of the DWER, the model will require verification which is proposed through implementation of a Groundwater Plan. Further information on the assessment of potential groundwater impacts are detailed in section 4.4 of this report.

The EPA notes that the Department of Biodiversity, Conservation and Attractions (DBCA) considers the Yardanogo Nature Reserve to be a significant reserve for the purposes of conservation. To manage potential direct and indirect impacts on conservation significant flora and the Yardanogo Nature Reserve, the proponent has prepared a *Flora and Vegetation Management Plan* (AWE 2020b) (the Plan). The Plan outlines a monitoring program that aims to establish the presence of existing weed species and dieback infestations and identify if the presence of weeds and dieback is project attributable. The Plan includes a management program for the life of the proposal, including monitoring programs, management actions and management targets to minimise potential direct and indirect impacts to flora and vegetation.

The EPA considers the management actions provided in the Plan are adequate to protect the environmental values of the Yardanogo Nature Reserve and to meet the environmental objective for this factor. The EPA has considered the cumulative impacts on Flora and Vegetation from the proposal and the existing Waitsia Gas Project Stage 1 and considers that the cumulative impacts are not significant in a regional context.

## Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a)
- the flora and vegetation surveys undertaken within the local and regional context
- the scale of the impact on priority flora species and local vegetation
- proponent's application of the mitigation hierarchy to avoid and minimise impacts to priority flora and vegetation, and the Yordanogo Nature Reserve
- potential cumulative impacts on flora and vegetation from the proposal and the existing Waitsia Gas Project Stage 1
- the implementation of the *Flora and Vegetation Management Plan* (AWE 2020b) to manage potential direct and indirect impacts to conservation significant flora and the Yordanogo Nature Reserve.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Flora and Vegetation that the impacts to this factor are manageable and would no longer be significant, provided there is:

- control through authorised extent in Schedule 1 of the Recommended Environmental Conditions (Appendix 4)
- implementation of measures to manage direct and indirect impacts to conservation significant flora and the Yordanogo Nature Reserve through the implementation of a Flora and Vegetation Management Plan (condition 6).

## 4.2 Air Quality

The EPA's environmental objective for Air Quality is *to maintain air quality and minimise emissions so that environmental values are protected*.

### Relevant Policy and Guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Air Quality* (EPA 2020a)
- *Guidance Statement No. 3 – Separation distances between industrial and sensitive land uses* (EPA 2005).

### EPA Assessment

#### Existing environment

The proposal occurs in an area predominantly surrounded by agricultural properties with some nature reserves nearby. The proponent selected the Caversham Air Quality Monitoring Station, in consultation with the DWER, as the reference site as it most closely resembles the environmental conditions experienced in the proposal area.

Review of the 2019 air quality data for Caversham identified that the average annual concentrations of PM<sub>2.5</sub> were above the *National Environment Protection (Ambient Air Quality) Measure* (NEPM), however this exceedance occurs over much of the South West of WA and is the result of hazard reduction burning and bushfires. The proponent has considered cumulative impacts from other emission sources in the area as part of the impact assessment, including the Mondarra Gas Storage Facility, the Xyris Production Facility and the Patience Bulk Haulage sand quarry operation. The assessment analysed emission source, including current and potential future emission rates (Ramboll 2019). Due to the lack of background information and the exceedance of the PM<sub>2.5</sub> standard at the Caversham reference site, the proponent undertook additional background ambient air quality monitoring from July 2019 to March 2020 to further inform the original air dispersion modelling (Ramboll 2020).

#### Potential impacts

The proposal has potential to impact on air quality through:

- emissions from construction vehicles and equipment
- emissions from temporary power generation (generators)
- emission of dust from construction activities
- operational emissions.

The proponent has identified a number of sensitive receptors (Table 3) that could potentially be impacted by air emissions from the proposal, including neighbouring properties and facilities.

The nearest sensitive receptor is a residence located about 2,800 m west of the proposal area (Table 3). The proponent undertook air dispersion modelling to assess air quality impacts from the proposed Waitsia gas plant, comparing the ground level concentrations of potential contaminants predicted at sensitive receptor sites, to the air quality criteria. As a conservative measure, the modelling assessment was undertaken against the upper limit of normal operations and emergency operations.

**Table 3: Distance of sensitive receptors from the Waitsia Gas Plant**

Sensitive receptor	Distance to Waitsia Gas Plant (m)	Receptor elevation (m)
Residence	2,820	117
Mondarra Gas Storage Facility	3,058	83
Residence	4,421	120
Residence	4,770	125
Residence	6,472	93

The original air dispersion model compared the predicted ground level concentration of oxides of nitrogen (NO<sub>x</sub>), sulphur dioxide (SO<sub>2</sub>), carbon monoxide (CO), particulate matter including PM<sub>2.5</sub> and PM<sub>10</sub>, Volatile Organic Compounds (VOCs) (including benzene, toluene, ethylbenzene and xylene) (BTEX) and mercury (Hg) at sensitive receptors, against the relevant ambient air quality criteria (Ramboll 2019). The results of the modelling indicated that predicted ground level concentrations for the majority of emissions (in isolation and cumulatively) were below ambient air quality and workplace exposure standard criteria at the nominated receptor locations detailed in Table 3. The one exception was the scenario that considered annual average background concentrations of PM<sub>2.5</sub>. The additional air quality monitoring campaign was undertaken from July 2019 to March 2020 to record ambient concentrations for pollutants and more accurately determine background pollutant concentrations in the region (Ramboll 2020).

The additional air quality monitoring confirmed that the annual average concentrations of all pollutants including PM<sub>2.5</sub>, NO<sub>2</sub>, BTEX and elemental mercury from the Waitsia gas plant and other existing sources will be below the guideline levels at the sensitive receptor locations.

## Mitigation and management

The proponent has considered the application of the mitigation hierarchy in accordance with the *Environmental Factor Guideline – Air Quality* (EPA 2020a). Proximity to sensitive receptors was considered during the scoping phase of the proposal, with the current site being selected following consultation with local land owners. The nearest sensitive receptor, a residence, is located about 2,800 m west of the proposal area, which meets the recommended separation distance detailed in *Guidance Statement No. 3 – Separation distances between industrial and sensitive land uses* (EPA 2005).

Emissions to air have been reduced through the design and planning of the proposal by the:

- assessment of a range of processing technologies
- consideration of renewables
- use of combustion or flaring instead of cold venting.

The proponent completed studies to determine the various design components of the Waitsia gas plant to achieve emission reduction.

The proponent has incorporated a number of other design elements to reduce impacts to air quality, including:

- incineration of the CO<sub>2</sub> rejection stream from the Amine regeneration process to thermally destroy contaminants such as hydrogen sulphide (H<sub>2</sub>S), BTEX and other VOCs
- re-circulation of start-up and off-specification exported gas to avoid the need for flaring
- flaring of vented hydrocarbons to reduce greenhouse gas emissions from unburnt hydrocarbons
- nitrogen blanketing replacing fuel gas blanketing to reduce the methane fraction of the vented gas stream
- produced water reinjection preference over pond evaporation (though evaporation ponds will be required for operational reliability), reducing emissions to air from evaporation
- use of a pilot flame system for flaring, incorporating an automated pilot ignition system to reduce the fraction of unburnt hydrocarbons that could be vented, thereby reducing greenhouse gas emissions
- use of remote control for the operation and monitoring of well sites to reduce the frequency for operational visits, reducing vehicle emissions.

The EPA notes that the proponent has committed to implementing operational and maintenance programs and procedures to monitor operations, improve efficiencies, reduce wastes and minimise emissions. These include a maintenance program to monitor and minimise leaks from pressure relief valves, and pressure retaining equipment that could contribute to fugitive emissions. A leak detection and repair programme will be developed to identify and mitigate fugitive emissions.

A plant control system and safety system will be installed to monitor all plant operations. The control system will record the fuel, flare and emission variables during operations. The monitoring systems will be used to assess the operational performance of systems and measure the effectiveness of upgrades and modifications.

The EPA notes that the results of the air dispersion modelling and additional air quality monitoring determined that predicted ground level concentrations at nominated sensitive receptors for the proposal emissions (in isolation and

cumulatively) were below ambient air quality and workplace exposure standard criteria.

The EPA has consulted with the DWER and confirmed the impacts to this factor from the Waitsia gas plant can be managed under a works approval and operating licence issued under Part V of the EP Act.

## Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Air Quality* (EPA 2020a)
- *Guidance Statement No. 3: Separation Distances Between Industrial and Sensitive Land Uses* (EPA 2005)
- cumulative impacts to air quality from other regional sources
- predicted ground level concentrations of emissions at sensitive receptors, both cumulatively and in isolation are below ambient air quality and workplace exposure standards
- predicted PM<sub>2.5</sub> concentrations are below ambient air quality guidelines
- location of the proposal
- proposed management measures to avoid or minimise impacts to this factor.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Air Quality that the impacts on this factor are manageable and would not be significant, provided there is control on the maximum capacity of the gas processing plant through the authorised extent in schedule 1 of the Recommended Environmental Conditions (Appendix 4).

The EPA notes that there is a requirement for detailed assessment of air emissions under a works approval and licence application under Part V of the EP Act.

It is the EPA's view that the proposal's air emissions can be adequately regulated through Part V of the EP Act, rather than a condition under Part IV of the EP Act.

## 4.3 Greenhouse Gas Emissions

The EPA's environmental objective for Greenhouse Gas Emissions is *to reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change*.

### Relevant Policy and Guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Greenhouse Gas Emissions* (EPA 2020b).

### EPA Assessment

#### Existing environment and benchmarking

The proposal will be co-located mainly on cleared land with the existing infrastructure for the Waitsia Gas Project Stage 1. The estimated total scope 1 emissions for Stage 1 is about 6,432 t CO<sub>2</sub>-e per annum at the maximum production of 20 TJ per day.

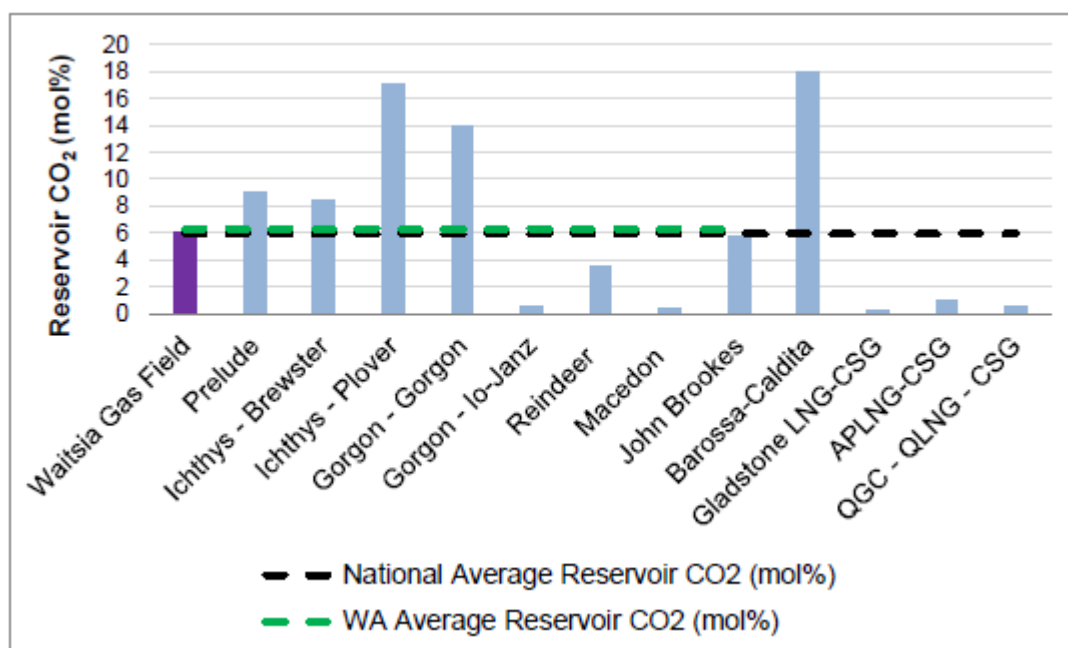
The proposal is being assessed as a stand-alone project from Stage 1 as it comprises the construction of a new gas processing facility (Waitsia Gas Plant), drilling of additional wells, construction of gas gathering hubs, and the construction of flowlines connecting wells to gathering hubs.

The proponent completed a benchmarking assessment for the proposal which included a comparison of the reservoir size and CO<sub>2</sub> concentration for the Waitsia Gas Field against other gas fields (Figure 3) and the estimated scope 1 greenhouse gas emissions against the Macedon Gas Project, another gas plant of similar size and processing configuration. Stage 1 was not included in the benchmarking assessment as the maximum production rate was not considered comparable with the proposal.

The results, as shown in the proposal's greenhouse gas management plan (AWE 2020c) demonstrated that the CO<sub>2</sub> content in the Waitsia Gas Field reservoir (4.5-7.5 mol per cent) is within the range of the national and Western Australian average (Figure 3). Total scope 1 emissions from the Waitsia Gas Plant at the maximum export gas production rate of 250 TJ per day is estimated to be 300,000 t CO<sub>2</sub>-e per annum, with an emissions intensity of approximately 3.29 t CO<sub>2</sub>-e per TJ. These emission levels are attributed to approximately 120,000 t CO<sub>2</sub>-e per year from both the Waitsia Gas Plant operations, with a gas processing emissions intensity of 1.32 t CO<sub>2</sub>-e per TJ; and approximately 180,000 t CO<sub>2</sub>-e per year related to reservoir CO<sub>2</sub> removal, with a reservoir related emissions intensity of 1.97 t CO<sub>2</sub>-e per TJ.

In comparison, based on the information provided for the original assessment (EPA 2010), the Macedon Gas Project total scope 1 emissions at a maximum production rate of 100 TJ per day is estimated to be approximately 115,000 t CO<sub>2</sub>-e per annum with an emissions intensity of approximately 3.15 t CO<sub>2</sub>-e per TJ, with the vast majority attributed to the operation of the Macedon Gas Plant. The benchmarking exercise indicates that the gas processing emissions intensity of the Waitsia Gas Plant is less than the Macedon gas processing emissions. The benchmarking

assessment demonstrated that the reservoir gas component of the total scope 1 emissions from the proposal has been estimated to be 60.8 per cent which is substantially higher than nearshore and offshore gas facilities that include a liquefaction plant.



**Figure 3: Australian Natural Gas Reservoir CO<sub>2</sub> Content (AWE 2020c)**

### Potential impacts

The EPA recognises that there are inherent links between the Greenhouse Gas Emissions factor and other environmental factors due to the relationship between anthropogenic greenhouse gas emissions and climate. It is acknowledged that the proposal would result in greenhouse gas emissions that would contribute to the global emissions of carbon dioxide (EPA 2020c).

The reservoir gas CO<sub>2</sub>-e component is estimated to contribute 60.8 per cent of the predicted total scope 1 emissions per year from the project. Reservoir CO<sub>2</sub> will be removed from the feed gas stream using the amine absorption method and subsequently vented to the atmosphere. The maximum concentration of CO<sub>2</sub> permitted in the gas stream for acceptance to the Dampier to Bunbury Gas Pipeline (DBGP) is 4.0 mol per cent, which is a requirement of the *Gas Supply (Gas Quality Specifications) Regulations 2010*. The removal of reservoir CO<sub>2</sub> in order to meet the DBGP acceptance criteria will result in about 180,000 t CO<sub>2</sub>-e per year emitted to the atmosphere at a maximum production rate of 250 TJ per day, this is in addition to approximately 120,000 t CO<sub>2</sub>-e per year from the operation of the Waitsia gas plant at full production.

The proposal will generate power on site from small scale solar systems and gas fired reciprocating engines and alternators. No produced power will be imported or exported and as such no scope 2 emissions (emissions from the consumption of an energy product) will be generated.

Based on publicly available factors for domestic gas consumption (NGERD 2008), the proponent has estimated total scope 3 emissions (greenhouse gas emissions generated in the wider community as a consequence of the proposal) to be 4.6 million t CO<sub>2</sub>-e per annum, or 37.7 million t CO<sub>2</sub>-e over the life of the proposal. The estimated total scope 3 emissions appear to be high due to the proportion of reservoir CO<sub>2</sub> being emitted as a result of on-processing by third parties, including domestic gas consumption and industrial processing. It is considered that a significant proportion of these scope 3 emissions will be regulated and reported on as a scope 1 emission from these third-party facilities.

## Management and mitigation

In accordance with the *Environmental Factor Guideline – Greenhouse Gas Emissions* (EPA 2020b) the proponent has prepared a *Greenhouse Gas Management Plan* (AWE 2020c) (the plan). The plan articulates the proponent's commitment to delivering a net zero greenhouse emissions trajectory for the proposal by 2050 (noting the proposal is due to end in 2043 – see Figure 4).

The plan outlines the proponent's rationale for its adoption of technology and greenhouse gas abatement to avoid and reduce greenhouse gas emissions in line with the mitigation hierarchy. The plan also includes monitoring programs, management actions and management targets to reduce greenhouse gas emissions. Reporting requirements are also detailed in the plan including annual and periodic reporting in accordance with the *National Greenhouse and Energy Reporting Act 2007* and publicly reporting on progress towards meeting its emission reduction targets.

The EPA notes that as part of the design phase of the proposal, the proponent completed a study on the commercially available technologies for gas processing to determine their suitability for the proposed Waitsia gas plant. A number of different combinations of technologies were identified, these provided improvements in plant efficiency (and associated greenhouse gas emissions), fuel consumption, air and water emissions, footprint, visual amenity, constructability, operability, plant capacity and plant life. Following completion of the study, a design competition was conducted to encourage the selection of appropriate plant technologies. As a result, the proponent selected a number of technologies that will result in the avoidance of greenhouse gas emissions, these include:

- direct fired gas boilers as opposed to electrical for heating efficiency
- gas engines for compression rather than gas turbines
- gas engines for onsite power generation due to a higher thermal efficiency
- chemical amine solvent for efficient reservoir CO<sub>2</sub> removal
- battery energy storage system to avoid the need to have a gas engine-generator running as spinning reserve
- gas recirculation upon plant start up to avoid the need to flare off-specification gas
- small scale solar power generation for administration building and remote wells

- use of instrument air reticulated to remote sites and used as the power mechanism for actuated valves
- delivery of remote well site chemicals by a centralised and reticulated system, reducing the frequency of vehicle movements
- use of a remote control system for the operation and monitoring of remote well sites to reduce vehicle movements.

Through the adoption of the above design technologies, the proponent claims to have avoided the release of greenhouse gas emissions by 121,528 t CO<sub>2</sub>-e per year.

The proponent undertook an investigation of renewable energy options for on-site electrical power generation and grid supply / export of power for the proposal. The analysis considered large-scale renewable energy systems including solar, wind and battery systems, in combination with either grid connection or on-site generation to power the gas plant. Based on the cost of connection to the South West Interconnected System, which would require double transmission lines to Eneabba located 80 km from the proposal, it was determined that the lowest net present cost (excluding the cost of gas) was on-site generation of power using gas fired reciprocating engines and alternators. The EPA notes that proponent has committed to reviewing greenhouse gas abatement opportunities annually as part of the implementation of the *Greenhouse Gas Management Plan* (AWE 2020c).

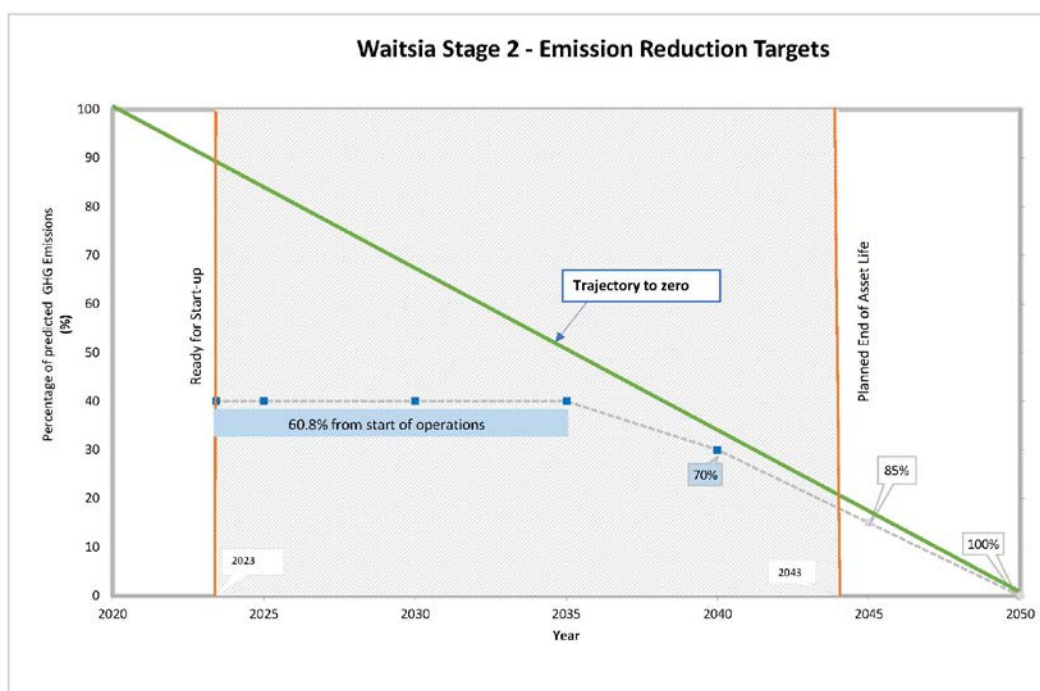
The proponent has detailed a number of management actions to minimise fugitive emissions of natural gas. These measures include the implementation of a leak detection and repair programme that will identify fugitive emission sources. The management actions include maintenance programs to minimise emissions from pressure relief valves, this will include an inspection and testing program and implementation of in-service monitoring programs. All fugitive emissions will be recorded and reported annually.

As part of the process of gas production, gas plants flare unburnt gas for maintenance or shutdown purposes or when a well is being tested, maintained or brought into production. This is undertaken for safety reasons and allows the controlled release of gas from the collection and processing system. The EPA understands that this differs from the practice of routine flaring of gas, which is flaring during normal gas or oil production operations in the absence of sufficient facilities or geology to re-inject the produced gas, use it on-site, or send it to market.

The EPA notes that the proponent has designed the Waitsia Gas Plant in accordance with the World Bank's "Zero Routine Flaring 2030" initiative to more efficiently manage natural gas resources and reduce greenhouse gas emissions to the atmosphere. To ensure greenhouse gas emissions are minimised, the proponent has adopted the applicable industry standards for the selection, design, specification, operation, and maintenance of flares. The proposal includes an enclosed flare which allows more efficient combustion of gas by maintaining temperature, air flow and more stable combustion conditions, maximising the conversion of methane to carbon.

The proponent has committed to emissions reduction targets that avoid, reduce or offset the equivalent of all scope 1 reservoir CO<sub>2</sub>-e emissions (calculated as 60.8 per

cent of total scope 1 emissions) for each year from the start of operations until the financial year ending 30 June 2035. Subsequent to this, the proposed net zero by 2050 trajectory for the proposal requires greater avoidance, reduction or offsetting of emissions, and the proponent has committed to following this trajectory (i.e. an aggregated reduction target of 70% of proposal scope 1 greenhouse gas emissions for the financial year ending 30 June 2040 – see Figure 4), noting the proposal's asset life is set to conclude in 2043.



**Figure 4: Waitsia Stage 2 Emission Reduction Targets (AWE 2020c)**

The emission reduction targets are proposed to be achieved through the adoption of renewable energy sources, and the offsetting of greenhouse gas emissions, where required. Additionally, the proponent has proposed to undertake a major refit of the plant and equipment after approximately 10 years of operation, which will provide an opportunity to adopt further greenhouse gas abatement measures if they become available due to market, technological or infrastructure changes. It is considered that the refit of gas processing infrastructure after 10 years of operations will provide sufficient time to plan, design, acquire and implement abatement opportunities ahead of the anticipated major refit milestone.

Greenhouse gas emissions will be monitored during operation of the proposal and any non-achievement of the emission reduction targets will be reported, investigated, rectified or mitigated as soon as possible to ensure ongoing reduction in greenhouse gas emissions. The proponent will report annually on the actual emission levels in accordance with the *National Greenhouse and Energy Reporting Act 2007* and detail the measures implemented to achieve the emission reduction targets.

The EPA notes that annual and periodic (every five years starting March 2026) reports will be provided to DWER and made publicly available on the proponent's website, detailing the actual quantity of greenhouse gas emissions generated from the proposal. The periodic reports will also provide details of the mitigation measures adopted to reduce emissions including type, quantity, and date of retirement or cancellation of any authorised offsets to meet the emission reduction targets.

To verify the accuracy of the annual and periodic reports, the proponent has proposed to undertake an audit and independent peer review of the calculations and information provided for the report. In addition, the proponent will undertake a review of the management actions detailed in the plan every five years to ensure the emission reduction targets are achieved and to ensure the management actions address key risks and State and/or Commonwealth legislation and policy.

The EPA notes that the proponent has applied the mitigation hierarchy through the adoption of various design components, benchmarking against other proposals, the provision of management actions, the investigation of renewable energy options and consideration of abatement opportunities. The EPA considers that the proponent has designed the plant appropriately to as low as is reasonably practical and acknowledges the ongoing commitment to avoid, reduce and/or offset greenhouse gas emissions aligned with (at worst) a net zero by 2050 trajectory over the life of the proposal.

The EPA has assessed the cumulative impacts on greenhouse gas emissions from the proposal and the existing Waitsia Gas Project Stage 1 and considers that the cumulative impacts are not significantly different to the impacts from the proposal only.

## Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Greenhouse Gas Emissions* (EPA 2020b)
- incorporation of best practice technologies by the proponent into the design of the proposal to avoid and/or reduce impacts associated with this factor
- adoption of an adaptive management approach by the proponent to ensure improvement opportunities are identified and implemented where appropriate
- potential cumulative impacts to greenhouse gas emissions from the proposal and the existing Waitsia Gas Project Stage 1
- the proponent's commitment to delivering against (at worst) a trajectory of net zero greenhouse gas emissions by 2050
- application of the *Environmental Factor Guideline: Greenhouse Gas Emissions* (EPA 2020b) by the proponent in the development of its Greenhouse Gas Management Plan.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for greenhouse gas emissions, that the impacts associated with this factor are manageable, provided there is:

- control on the maximum capacity of the gas process plant through the authorised extent in schedule 1 of the Recommended Environmental Conditions (Appendix 4)
- a condition requiring the implementation of the Greenhouse Gas Management Plan (AWE 2020c), which requires a reduction of the equivalent of the scope 1 reservoir greenhouse gas emissions from the start of operations and long-term emissions reduction targets aligned with net zero by 2050; proposed abatement measures; and the reporting of greenhouse gas emissions to the DWER and the public to ensure the proposed emission reduction targets are being achieved (condition 8).

## 4.4 Inland Waters

The EPA's environmental objective for Inland Waters is *to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected*.

### Relevant Policy and Guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Inland Waters* (EPA 2018).

### EPA Assessment

#### Existing environment

The Waitsia Gas Project is located above the Yarragadee Aquifer which is comprised of 500 m to 1,600 m of sandstone and siltstone in the Waitsia Reservoir. The proposed Waitsia gas plant is located 12 km south of the Allanooka-Dongara Water Reserve, which is situated on the northern side of the Irwin River. The nearest proposal production well is about 4 km from the Water Reserve. The Waitsia gas plant will be located approximately 7.5 km from the nearest point of the Irwin River, with the nearest surface water body being Ejarno Spring, located about 500 m to the east of the proposed Waitsia gas plant (see Figure 2).

#### Groundwater

Standing water levels vary from 75 m Australian height datum (m AHD) to 15 m AHD, corresponding to 0 to 100 m below ground surface. The Yarragadee Aquifer is typically fresh to marginal near the surface and increases in salinity with depth. The Eneabba Formation and Lesueur Sandstone which underlie the Yarragadee Aquifer, occur at a significant depth in the proposal area and are likely to consist of brackish to saline groundwater. The proposal site is located within the Arrowsmith Region, where the Yarragadee Aquifer is unconfined throughout.

#### Surface water

Ejarno Spring, located 500 m east of the proposed Waitsia gas plant (Figure 2) is a relic of palaeo-lake system, forming a permanently wetted depression of irregular morphology. The Ejarno Spring area is mapped as being underlain by the Guildford Formation, which with the topographic depression suggests that the spring discharges into a system that may be perched.

Surface water monitoring has been undertaken within Ejarno Spring, with total dissolved solids measurements indicating that water quality is marginal to brackish.

### Potential impacts

The proposal has the potential to impact on Inland Waters through the following:

- the degradation of surface and groundwater quality
- the lowering of groundwater levels

- impacts to water levels in Ejarno Spring.

The Total Produced Water volume (combination of Produced Formation Water and Condensed Water) required to be disposed of over the 20-year life of the operation will be about 1 gigalitre which equates to about 142 kilolitres (kl) per day in the initial stages, and is expected to peak at about 381 kl per day after about four years. Following this initial four-year period, it will reduce back to 142 kl per day.

The proponent plans to reinject the Total Produced Water into pre-existing petroleum wells to a petroleum reservoir in the Dongara Sandstone Formation beneath the Yarragadee aquifer, about 2 km below the surface. The Yarragadee aquifer is separated from the petroleum reservoir by more than 700 m, with the Cattamarra Coal Measures and Kockatea Shale formations providing a geological confining layer. The disused petroleum wells were originally associated with the existing Hovea Production Facility. Where required as a contingency measure, Produced Formation Water will be temporarily stored in double-lined evaporation ponds prior to reinjection.

The volume of groundwater that will be abstracted from the Yarragadee aquifer for operational needs is estimated to be up to 60 megalitres per year for the life of the proposal. This includes water for gas sweetening, dust suppression, ablutions irrigation and other requirements. The majority of water will be used in the removal of acid gas from the produced gas stream. The proponent proposes to construct up to four new abstraction bores to meet the water requirements of the proposal. The existing Waitsia Stage 1 project is currently limited to 1,000 kL per year by a groundwater abstraction licence issued under the *Rights in Water and Irrigation Act 1914* (RiWI Act).

Construction of the proposal will result in the drilling of an additional six production wells for a total of eight production wells.

The EPA notes that the proponent has undertaken seismic monitoring in the North Perth Basin between May 2017 and April 2018 and did not record any seismic activity in the development envelope, indicating the area is seismically stable. The EPA considers reinjection of Produced Formation Water into the depleted petroleum reservoir in the Dongara Sandstone Formation, with existing low hydrostatic conditions, is unlikely to result in a material increase in seismic activity.

## Management and mitigation

The proponent has considered the application of the mitigation hierarchy in accordance with the *Environmental Factor Guideline – Inland Waters* (EPA 2018).

To reduce impacts to inland waters, the proponent has committed to selecting low toxicity drilling fluids whilst constructing the top sections of the production wells. The Allanooka-Dongara Water Reserve is situated 4 km from the nearest gas production bore. Given the distance to water reserve, and the closest residential groundwater extraction bore (more than 10 km to the north-west of the proposal), impacts from well construction and operation are not expected to be significant.

The Total Produced Water will be reinjected to petroleum reservoirs beneath the Yarragadee Aquifer, about 2 km below the grounds surface. The use of the pre-

existing wells reduces potential risks of groundwater contamination from the construction of new disposal wells. Given the geological separation between the proposed reinjection reservoir and the presence of confining layers, the EPA considers that migration of the Total Produced Water from the reinjection reservoir is highly unlikely.

The EPA notes that evaporation ponds are planned to be used for contingency storage of Produced Formation Water. The evaporation ponds will use double-lined High Density Polyethylene liners and incorporate a leak detection system to ensure the Produced Formation Water is appropriately contained.

The proponent has undertaken numerical modelling to determine the potential impact of groundwater abstraction drawdown on existing groundwater users and the nearby Ejarno Spring. The modelling incorporated cumulative groundwater drawdown impacts from neighbouring licenced abstractions bores with annual abstraction rates greater than 50,000 kL per year. The modelling of the potential changes in the superficial aquifer at the western edge of the Ejarno Spring indicate a maximum decline in groundwater levels of 6 cm after five years of abstraction. Fluctuations in water levels in the superficial aquifer range from about 0.3 m to about 1.7 m in response to rainfall (DoW 2017). Based on the anticipated seasonal fluctuations and likelihood that Ejarno Spring discharges into a perched aquifer, it is anticipated that a 6 cm decline in groundwater levels will have a negligible effect on Ejarno Spring. The modelled change to the Yarragadee water levels demonstrate a decline of 19 cm which is anticipated to have a negligible effect on neighboring licensed bores due to the distance from the project site.

The EPA notes that the proponent has prepared a Water Management Plan (AWE 2020d) (the Plan) to manage potential direct and indirect impacts on groundwater and surface water. The Plan provides management and monitoring measures to protect existing systems as well as the groundwater-dependent ecosystems of the Ejarno Spring adjacent to the project development envelope. The EPA considers the Plan is sufficient to protect the environmental values of Ejarno Spring. The EPA considers the potential cumulative impacts from groundwater drawdown as a result of the proposal, including the existing Stage 1 project to be minimal. Additionally, the EPA considers potential impacts can also be adequately managed through a groundwater abstraction licence from the DWER under the RiWI Act, which will require groundwater levels and abstraction volumes to be monitored.

## Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Inland Waters* (EPA 2018)
- studies undertaken within the local and regional context
- the likelihood of re-injection water impacting on groundwater resources
- limited drawdown associated with groundwater abstraction
- the potential cumulative impacts to Inland Waters from the proposal and the Waitsia Gas Project Stage 1
- proposed management measures to avoid or minimise impacts to this factor.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Inland Waters, that the impacts on this factor are manageable and would not be significant, provided there is:

- control on the maximum capacity of the gas process plant through the authorised extent in schedule 1 of the Recommended Environmental Conditions (Appendix 4)
- a condition to prevent adverse impacts to groundwater quality and groundwater levels through the implementation of a Water Management Plan (AWE 2020d) (condition 7).

The EPA also notes that there is a requirement for:

- licensing of groundwater abstraction by the DWER under the RiWI Act.
- regulation of the construction and operation of the Waitsia gas plant by the DWER through a works approval and operating licence issued under Part V of the EP Act
- regulation of the construction and operation of the Waitsia gas plant by the DMIRS under the PGER Act.

## 4.5 Social Surroundings

The EPA's environmental objective for Social Surroundings is *to protect social surroundings from significant harm*.

### Relevant Policy and Guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Social Surroundings* (EPA 2016b).

### EPA Assessment

#### Existing environment

The Waitsia Gas Project Stage 2 proposal area will be co-located with infrastructure already in place for the Waitsia Gas Project Stage 1. The local land use is currently a mix of resource industry and agriculture with the occasional nature reserve. The distance to the nearest sensitive receptors (farm residences) from the Waitsia gas plant are detailed in Table 3.

#### Potential impacts

The potential impacts to social surroundings associated with the proposal include:

- disturbance to Aboriginal heritage from construction activities and operation of the proposal
- reduced visual amenity from construction and operation of the gas plant
- increased noise emissions during construction and operation of the gas plant.

#### *Aboriginal heritage and culture*

The proponent has undertaken several archaeological and anthropological surveys in the Waitsia project area. Two sites of significance were identified during a survey in 2015: DAA Site ID 5482 'Jenkins Hut Valley'14 and DAA Site ID 18907 'Irwin River SC04'. Both these sites occur outside of the proposed development envelope. Ejarno Spring, located about 500 m to the east of the proposal area was also identified as a place of significance.

During an exploration program in 2017 a "scar tree" was identified by Aboriginal monitors and site personnel in the vicinity of the Waitsia-03 Area. The construction of the well-pad was undertaken in a manner which avoided any potential impact to the tree. The tree is currently monitored by the proponent.

The proponent is currently finalising an agreement with the Traditional Owners. The proponent has committed to engage with Traditional Owner monitors and to seek subject matter expert advice, as required. This will be enforced during initial ground disturbing works within the areas of remnant vegetation, to further ensure identification and conservation of any Aboriginal heritage values.

The proponent has detailed measures to avoid and minimise impacts to Aboriginal heritage sites during the construction and operation of the proposal. In order to ensure the construction and operation of the Waitsia Gas proposal complies with the requirements of the *Aboriginal Heritage Act 1972*, the proponent has committed to developing and implementing a ground disturbance / unexpected finds heritage protocol, which will provide actions in the event a heritage artefact is uncovered during construction. The proponent has agreed to ensure Aboriginal representatives are present during construction to monitor ground disturbance activities within bushland areas and within 200 m of major water sources.

### *Visual amenity*

As part of the assessment of the proposal, the EPA have considered visual amenity, and the ability for people to live and recreate within their surroundings without any unreasonable interference with their health, welfare, convenience and comfort.

The location of the Waitsia gas plant site has been selected following consultation with relevant stakeholders. The proposed site is situated in an undulating landscape and in an area of low population density. The layout of the Waitsia gas plant has been designed to reduce potential impacts to visual amenity. The proponent has committed to designing lighting to be downward facing and to treating exposed surfaces to minimise reflection.

The proponent has designed the Waitsia gas plant in accordance with the World Bank's "*Zero Routine Flaring 2030*" initiative to more efficiently manage natural gas resources and reduce greenhouse gas emissions. The proponent has adopted the applicable industry standards for the selection, design, specification, operation, and maintenance of flares. As a result, flaring of gas will only be undertaken for safety and non-routine flaring purposes. By incorporating an enclosed pilot flame into the design of the gas plant, no flame will be visible during normal plant operations. It is anticipated that infrequent non-routine flaring or safety flaring events will result in a flame temporarily higher than the flare enclosure. In these situations the flame will be visible, however the flame is not expected to be visible at nearby sensitive receptors due to the plant location, the local terrain and the height of the flare. The EPA notes that flaring is not undertaken as part of the operation of the Stage 1 Xyris Production Facility.

The proponent has prepared a *Management of Flaring* (AWE 2020e) management plan to demonstrate commitment to World Bank's "*Zero Routine Flaring by 2030*" initiative and compliance with the Western Australian Government's position on no routine flaring. The document also outlines the management of flaring at the Waitsia gas plant site.

The EPA notes that design of the gas plant can be regulated through Part V of the EP Act. The DMIRS has advised that the gas plant would be licensed under the provisions of the PGER Act.

### *Noise*

The proponent commissioned an acoustic assessment to predict noise levels from the proposal at the nearest sensitive receptors (see Table 3). The assessment involved modelling of noise that would be generated from the Waitsia gas plant and

surrounding facilities, such as the existing Stage 1 Xyris Production Facility, to determine if the cumulative noise impacts on sensitive receptors would be significant.

The nearest noise sensitive premises are located about 2,800 m to the west southwest and 4,500 m to the east of the proposed Waitsia gas plant (see Table 3). Modelling results indicated that the highest predicted noise emissions for the nearest noise sensitive premises was 30 decibels (A) (dB(A)). The acoustic assessment concluded that the proposal would not exceed the most stringent assigned noise level of 35 dB(A) at the closest sensitive receptor and would comply with the requirements of the Environmental Protection (Noise) Regulations 1997 at all times.

## Management and mitigation

The EPA considers that the proponent has adequately considered the application of the mitigation hierarchy in accordance with the *Environmental Factor Guideline – Social Surroundings* (EPA 2016b) as detailed above in each sub-section.

## Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Social Surroundings* (EPA 2016b)
- studies and surveys undertaken by the proponent
- measures and procedures to avoid Aboriginal Heritage sites
- location of the proposal
- information demonstrating that cumulative noise impacts from the proposal and other surrounding facilities at the nearest sensitive receptor will meet the requirements of the Environmental Protection (Noise) Regulations 1997 at all times
- proposed management measures to avoid or minimise impacts to this factor.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Social Surroundings that the impacts on this factor are manageable and would not be significant, provided there is:

- a condition to prevent adverse impacts to visual amenity through the implementation of a *Management of Flaring Plan* (AWE 2020e) (condition 9)
- a condition to prevent adverse impacts to Aboriginal heritage in the proposal area (condition 10)

The EPA also notes that there is a requirement for:

- regulation of the Waitsia gas plant by the DWER under a works approval and operating licence issued under Part V of the EP Act
- regulation of the Waitsia gas plant by DMIRS under the PGER Act.

It is the EPA's view that the proposal can be adequately regulated through Part V of the EP Act, rather than a condition for noise under Part IV of the EP Act.

## 5. Conclusion

The EPA has considered the proposal by the proponent to construct and operate a conventional gas plant and related infrastructure about 16 km east-south-east of the Dongara-Port Denison town sites.

### Application of the Mitigation Hierarchy

Consistent with relevant policies and guidance, the proponent has addressed the mitigation hierarchy by identifying measures to avoid, minimise and rehabilitate environmental impacts including:

- managing and avoiding where possible, direct and indirect impacts to the Yardanogo Nature Reserve and Ejarno Spring
- minimising impacts to flora and vegetation by locating the majority of the proposal within predominately cleared agricultural land
- committing to undertake progressive rehabilitation and revegetation of areas no longer required
- avoiding and minimising impacts to Aboriginal heritage sites
- minimising and managing the impacts to social surroundings
- minimising and managing impacts on groundwater levels and quality in the vicinity of the proposal
- implementing management measures to reduce carbon emissions over the life of the proposal.

### Conclusion

The EPA has taken the following into account in its assessment of the proposal as a whole:

- impacts to all the key environmental factors
- EPA's confidence in the proponent's proposed mitigation measures
- relevant EP Act principles and the EPA's objectives for the key environmental factors
- EPA's view that the impacts to the key environmental factors are manageable, provided the recommended conditions are imposed.

Given the above, the EPA recommends that the proposal may be implemented subject to the conditions recommended in Appendix 4.

## 6. Other Advice

The EPA consulted with key regulators during the assessment. As a result of this consultation, the EPA considers that the proposal can be regulated, in appropriate areas, through other instruments, such as the Part V EP Act licence, a RiWI Act groundwater abstraction licence and a licence issued by the DMIRS under the PGER Act. The EPA provides the following advice regarding key aspects that require regulation.

### Emissions and Discharges

The EPA notes that a works approval and licence is a statutory requirement under Part V of the EP Act for this proposal and is the most appropriate regulatory instrument to regulate emissions and discharges from onshore oil and gas facilities. The DWER will assess emissions and discharges in detail, and management and monitoring conditions are expected to be applied to the proposal.

The EPA notes that the Waitsia Gas Project Stage 2 will be licensed by the DMIRS under the PGER Act and *Petroleum Pipelines Act 1969*. These Acts will apply further statutory requirements to limit potential impacts from the construction, operation and decommissioning of the proposal on the environment.

### Groundwater

The DWER administers the RiWI Act that provides for the granting of licences and permits to abstract groundwater and surface water. The Department will consider potential impacts on the State's water resources from future land planning and development proposals such as the Waitsia Gas Project Stage 2. The EPA notes that the groundwater abstraction licence will contain conditions to ensure that drawdown is carefully monitored, and impacts on nearby groundwater users (private bores, drinking water reserves and Ejarno Spring) are controlled. Further statutory requirements to limit potential impacts to groundwater from gas well operation will be applied by the DMIRS under the PGER Act.

### Community Consultation

The EPA notes there is community concern regarding this facility and its potential impact on the environment. The EPA recommends continued and ongoing consultation between the proponent and the community as the project progresses.

## 7. Recommendations

The EPA recommends that the Minister for Environment notes:

1. The proposal assessed is to construct and operate a 250 TJ per day gas plant and related infrastructure about 16 km east-south-east of the Dongara-Port Denison town sites.
2. The key environmental factors identified by the EPA in the course of its assessment are Flora and Vegetation, Inland Waters, Greenhouse Gas, Air Quality, and Social Surroundings, set out in section 4 of this report.
3. The EPA has recommended that the proposal may be implemented, provided that implementation is carried out in accordance with the recommended conditions and procedures set out in Appendix 4. Matters addressed in the conditions include:
  - a) implementation of a Flora and Vegetation management plan to minimise impacts to Flora and Vegetation (condition 6)
  - b) implementation of the Water Management Plan to minimise impacts to ground and surface water (condition 7)
  - c) implementation of the Greenhouse Gas Management Plan to minimise greenhouse gas emissions (condition 8)
  - d) implementation of the Management of Flaring Plan to minimise impacts to visual amenity from flaring (condition 9)
  - e) implementation of condition 10 to minimise impacts to Aboriginal heritage.
4. Other advice provided by the EPA, set out in section 6, regarding regulation under other complementary legislation and community consultation.

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NGERD 2008, *National Greenhouse and Energy Reporting (Measurement) Determination 2008*, Commonwealth of Australia 2008.

Ramboll, 2019, *Waitsia Gas Project – Stage 2 – Air Dispersion Modelling*.

Ramboll 2020, *Waitsia Gas Project – Stage 2 – Background Monitoring Summary Report*.

State of Western Australia 2016, *Western Australian Government Gazette, No. 223*, 13 December 2016.

Woodman 2018. *Waitsia-03 – Flowline Corridor - Flora, Vegetation and Fauna Assessment*, Woodman Environmental Pty Ltd.

# Appendix 1: List of Submitters

## Organisations

Department of Biodiversity, Conservation and Attractions (DBCA)  
Department of Mines, Industry Regulation and Safety (DMIRS)  
Department of Water and Environmental Regulation (DWER)  
Buddhists for the Environment WA  
Conservation Commission of WA  
Doctors for the Environment WA  
Frack Free WA  
Lock the Gate Alliance  
Transition Town Vincent Inc.  
Yamatji Marlpa Aboriginal Corporation

## Individuals

ANON-WNTE-47D3-Z  
ANON-WNTE-47D7-4  
ANON-WNTE-47DR-Y  
ANON-WNTE-47D8-5  
ANON-WNTE-47D9-6  
ANON-WNTE-47DX-5  
ANON-WNTE-47DJ-Q  
ANON-WNTE-47DA-E  
ANON-WNTE-47DP-W  
ANON-WNTE-47DC-G  
ANON-WNTE-47DF-K  
ANON-WNTE-47DV-3  
ANON-WNTE-47DN-U  
ANON-WNTE-47DZ-7  
ANON-WNTE-47DY-6  
ANON-WNTE-47D6-3  
ANON-WNTE-47DH-N  
ANON-WNTE-47D1-X  
ANON-WNTE-47DE-J  
ANON-WNTE-47DT-1  
ANON-WNTE-47D2-Y  
ANON-WNTE-47D5-2  
ANON-WNTE-47DU-2  
ANON-WNTE-47DS-Z  
ANON-WNTE-47DG-M  
ANON-WNTE-47DK-R  
ANON-WNTE-477Q-H  
ANON-WNTE-4773-K  
ANON-WNTE-4777-Q  
ANON-WNTE-477W-Q  
ANON-WNTE-4778-R  
ANON-WNTE-477X-R  
ANON-WNTE-477J-A  
ANON-WNTE-477A-1  
ANON-WNTE-477P-G  
ANON-WNTE-477C-3  
ANON-WNTE-477F-6

## Appendix 2: Consideration of Environmental Protection Act Principles

EP Act Principle	Consideration
<p><b>1. The precautionary principle</b></p> <p><i>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of this precautionary principle, decisions should be guided by –</i></p> <ul style="list-style-type: none"> <li><i>a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i></li> <li><i>b) an assessment of the risk-weighted consequences of various options.</i></li> </ul>	<p>In considering this principle, the EPA notes that Flora and Vegetation, Inland Waters, Social Surroundings, Air Quality and Greenhouse Gas could be significantly impacted by the proposal. The assessment of these impacts is provided in this report.</p> <p>Investigations into the biological and physical environment undertaken by the proponent have provided sufficient scientific certainty to assess the risks and identify measures to avoid or minimise impacts. The EPA notes that the proponent has identified measures to avoid or minimise impacts, which is detailed in the proponent's management plans. The EPA has considered these measures during its assessment.</p> <p>The EPA has recommended conditions to ensure these measures are implemented.</p> <p>From its assessment of this proposal the EPA has concluded that there is no threat of serious or irreversible harm.</p>
<p><b>2. The principle of intergenerational equity</b></p> <p><i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>	<p>In considering this principle, the EPA notes the proponent has taken measures to avoid, minimise and rehabilitate impacts in accordance with the mitigation hierarchy. In assessing this proposal, the EPA has recommended adaptive management mechanisms (through conditions requiring environmental management plans) be implemented to maintain ecological processes.</p> <p>From its assessment of this proposal the EPA has concluded that the environmental values will be protected and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations.</p>

EP Act Principle	Consideration
<p><b>3. The principle of the conservation of biological diversity and ecological integrity</b></p> <p><i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>	<p>This principle is a relevant consideration for the EPA when assessing and considering the impacts of the proposal on the environmental factors of Flora and Vegetation, and Inland Waters.</p> <p>In assessing the proposal, the EPA has considered these impacts and has taken into account measures proposed by the proponent to minimise impacts to the affected species. These include minimising the project disturbance footprint by locating the majority of the proposal on cleared agricultural land, undertaking partial rehabilitation following installation of the flow line to the Waitsia 03 well and the implementation of a monitoring and management program for groundwater, and flora and vegetation.</p> <p>From its assessment of this proposal, the EPA has concluded that the proposal would not compromise the biological diversity and ecological integrity of the affected areas.</p>
<p><b>4. Principles relating to improved valuation, pricing and incentive mechanisms</b></p> <p>(1) <i>Environmental factors should be included in the valuation of assets and services.</i></p> <p>(2) <i>The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i></p> <p>(3) <i>The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.</i></p> <p>(4) <i>Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimize costs to develop their own solution and responses to environmental problems.</i></p>	<p>In considering this principle, the EPA notes that the proponent would bear the cost relating to waste and pollution, including avoidance, containment, decommissioning, rehabilitation and closure.</p> <p>The proponent has considered incentives to reduce the environmental footprint and costs through promoting increased economic activity in the region, minimising emissions generated from the proposal through the assessment of operational efficiency of a wide range of processing technologies, consideration of the use of renewables to reduce the operational emissions and the investigation into greenhouse gas abatement opportunities.</p> <p>Hydrocarbon and putrescible wastes management during construction and operations can be contained and managed through standard practices.</p> <p>The EPA has had regard to this principle during the assessment of the proposal.</p>

EP Act Principle	Consideration
<p><b>5. The principle of waste minimisation</b></p> <p><i>All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.</i></p>	<p>In considering this principle, the EPA notes that the proponent proposes to minimise waste streams through implementation of management actions. The EPA has had regard to this principle during the assessment of the proposal.</p>

## Appendix 3: Evaluation of Other Environmental Factors

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
<b>Land</b>			
Terrestrial Fauna	Clearing of 3 hectares of potential Carnaby's black cockatoo ( <i>Calyptorhynchus latirostris</i> ) foraging habitat.	No comments were received on potential impacts to conservation significant fauna habitat.	<p>Terrestrial Fauna was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal.</p> <p>Having regard to the:</p> <ul style="list-style-type: none"> <li>proponent's investigations, including survey efforts for terrestrial fauna have concluded that no suitable breeding or roosting trees are present within the areas proposed to be disturbed</li> <li>proponent's assessment of impacts associated with the proposal using the <i>Environment Protection and Biodiversity Conservation Act 1999</i> Environmental Offsets Policy (AWE 2020f)</li> <li>proponent's commitment to minimising impacts to Carnaby's black cockatoo foraging habitat by siting of the proposal in predominately cleared and degraded agricultural land</li> </ul>

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			<ul style="list-style-type: none"> <li>proposal area being located near the boundary of the most northerly extent for Carnaby's black cockatoo distribution (EPA 2019)</li> <li>proposal area being outside the known breeding area for Carnaby's black cockatoo (SEWPAC 2012; EPA 2019)</li> <li>proposed clearing of potentially suitable foraging habitat representing about 0.31 per cent of similar vegetation across the adjacent Yandanogo Nature Reserve (an area of about 7,000 ha)</li> <li>proponent's commitment to partially rehabilitate native vegetation in the Waitsia 03 area adjacent to the Yandanogo Nature Reserve</li> <li>regional habitat assessment determining that the 3 ha of proposed clearing in the Waitsia03 area would be unlikely to have a significant impact on available Carnaby's black cockatoo potential foraging habitat</li> <li>consideration of the <i>WA Environmental Offsets Policy</i></li> </ul>

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			<p>(Government of Western Australia 2011)</p> <ul style="list-style-type: none"> <li>• significance considerations in the <i>Statement of Environmental Principles, Factors and Objectives</i> (EPA 2020d),</li> <li>• the proposal was referred to the Department of Agriculture, Water and Environment (DAWE) in March 2020 under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). In July 2020 DAWE advised that the proposed action was not a controlled action and did not require further assessment and approval under the EPBC Act,</li> </ul> <p>the EPA considers it is unlikely that the proposal would have a significant impact on <b>Terrestrial Fauna</b> and that the impacts to this factor are manageable and as such the EPA does not consider an offset is required.</p>

## Appendix 4: Identified Decision-Making Authorities and Recommended Environmental Conditions

### Identified Decision-Making Authorities

Section 44(2) of *Environmental Protection Act 1986* specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) of the *Environmental Protection Act 1986* requires the Minister for Environment to consult with decision-making authorities (DMAs), and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following DMAs have been identified:

Decision-Making Authority	Legislation (and Approval)
1. Minister for Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i> (Consent under section 18)
2. Minister for Mines and Petroleum	<i>Petroleum and Geothermal Energy Resources Act 1967</i> (Environment Plan) <i>Petroleum Pipelines Act 1969</i> (Well Management Plan, Field Management Plan, Safety Management System)
3. Minister for Water	<i>Rights in Water and Irrigation Act 1914</i> (Groundwater abstraction licence / Licence to construct bores)
4. Chief Dangerous Goods Officer	<i>Dangerous Goods Safety Act 2004</i> (Dangerous Goods licence)
5. Chief Executive Officer, Department of Water and Environment Regulation	<i>Environmental Protection Act 1986</i> (Works approval and licence / Clearing permit)
6. Director, Dangerous Goods and Petroleum Safety	<i>Petroleum and Geothermal Energy Resources Act 1967</i> (Environment Plan)
7. Chief Executive Officer, Shire of Irwin	<i>Planning and Development Act 2005</i> <i>Local Government Act 1995</i> (Development approval) <i>Building Act 2011</i> (Building permit) <i>Health Act 1911</i>

Note: In this instance, agreement is only required with DMAs 1 to 3, since these DMAs are Ministers.

## Recommended Environmental Conditions

### STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (*Environmental Protection Act 1986*)

#### WAITSIA GAS PROJECT STAGE 2

**Proposal:** The construction and operation of a 250 terajoules per day gas plant and related infrastructure approximately 16 kilometres east-south-east of the Dongara-Port Denison town sites.

**Proponent:** AWE Perth Pty Limited  
Australian Company Number 009 204 031

**Proponent Address:** Level 11 Exchange Tower  
2 The Esplanade, Perth WA 6000

**Assessment Number:** 2226

**Report of the Environmental Protection Authority:** 1687

Pursuant to section 45 of the *Environmental Protection Act 1986*, it has been agreed that the proposal described and documented in Tables 1 and 2 of Schedule 1 may be implemented and that the implementation of the proposal is subject to the following implementation conditions and procedures:

#### **1 Proposal Implementation**

- 1-1 When implementing the proposal, the proponent shall not exceed the authorised extent of the proposal as defined in Table 2 of Schedule 1, unless amendments to the proposal and the authorised extent of the proposal have been approved under the EP Act.

#### **2 Contact Details**

- 2-1 The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

### **3 Time Limit for Proposal Implementation**

- 3-1 The proponent shall not commence implementation of the proposal after five (5) years from the date of this Statement, and any commencement, prior to this date, must be substantial.
- 3-2 Any commencement of implementation of the proposal, on or before five (5) years from the date of this Statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of five (5) years from the date of this Statement.

### **4 Compliance Reporting**

- 4-1 The proponent shall prepare, and maintain a Compliance Assessment Plan which is submitted to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition 4-6, or prior to implementation of the proposal, whichever is sooner.
- 4-2 The Compliance Assessment Plan shall indicate:
  - (1) the frequency of compliance reporting;
  - (2) the approach and timing of compliance assessments;
  - (3) the retention of compliance assessments;
  - (4) the method of reporting of potential non-compliances and corrective actions taken;
  - (5) the table of contents of Compliance Assessment Reports; and
  - (6) public availability of Compliance Assessment Reports.
- 4-3 After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 4-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 4-1.
- 4-4 The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 4-1 and shall make those reports available when requested by the CEO.
- 4-5 The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known.
- 4-6 The proponent shall submit to the CEO the first Compliance Assessment Report fifteen (15) months from the date of issue of this Statement addressing the twelve (12) month period from the date of issue of this Statement and then

annually from the date of submission of the first Compliance Assessment Report, or as otherwise agreed in writing by the CEO.

The Compliance Assessment Report shall:

- (1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;
- (2) include a statement as to whether the proponent has complied with the conditions;
- (3) identify all potential non-compliances and describe corrective and preventative actions taken;
- (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and
- (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 4-1.

## **5 Public Availability of Data**

5-1 Subject to condition 5-2, within a reasonable time period approved by the CEO of the issue of this Statement and for the remainder of the life of the proposal, the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)), management plans and reports relevant to the assessment of this proposal and implementation of this Statement.

5-2 If any data referred to in condition 5-1 contains particulars of:

- (1) a secret formula or process; or
- (2) confidential commercially sensitive information,

the proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publicly available.

## **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 Yordanogo 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:
- (1) when implemented, substantiate and ensure that condition 6-1 is being met;
  - (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 Yordanogo Nature Reserve;
  - (3) specify threshold criteria to demonstrate compliance with condition 6-1;
  - (4) specify monitoring methodology to determine if trigger criteria and threshold criteria have been met;
  - (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 met; and
  - (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.
- 6-3 The proponent shall implement the most recent version of the *Waitsia Gas Project Stage 2: Flora and Vegetation Management Plan* which the CEO has confirmed by notice in writing, on advice of the Department of Biodiversity, Conservation and Attractions, addresses the requirements of condition 6-1 and condition 6-2.
- 6-4 In event that monitoring or investigations indicate an exceedance of threshold criteria specified in the *Waitsia Gas Project Stage 2: Flora and Vegetation Management Plan*, the proponent shall:
- (1) report the exceedance in writing to the CEO within seven (7) days of the exceedance being identified;
  - (2) implement the contingency actions required by condition 6-2(5) within seven (7) days of the exceedance being reported as required by condition 6-4(1) and continue implementation of those actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and implementation of the threshold contingency actions are no longer required.
- 6-5 The proponent:

- (1) may review and revise the *Waitsia Gas Project Stage 2: Flora and Vegetation Management Plan*; or
  - (2) shall review and revise the *Waitsia Gas Project Stage 2: Flora and Vegetation Management Plan* as and when directed by the CEO.
- 6-6 The proponent shall continue to implement the *Waitsia Gas Project Stage 2: Flora and Vegetation Management Plan (P-WGP2-054 Rev 2, May 2020)*, or any subsequent revisions as approved by the CEO in condition 6-3, until the CEO has confirmed by notice in writing that the proponent has demonstrated that the environmental objective detailed in condition 6-1 has been met.

## **7 Water Management Plan**

- 7-1 The proponent shall implement the proposal to achieve the following environmental objectives:
- (1) no adverse impact to Ejarno Spring as delineated in Figure 2 of Schedule 1 as a result of the implementation of the proposal; and
  - (2) no adverse impact to groundwater levels or quality as a result of the implementation of the proposal.
- 7-2 To achieve the objectives of condition 7-1, prior to groundwater abstraction 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: Water Management Plan (P-WGP2-055 Rev 1, May 2020)*. This plan shall:
- (1) when implemented, substantiate and ensure that condition 7-1 is being met;
  - (2) specify trigger criteria that will trigger the implementation of management and/or contingency actions to prevent further direct or indirect impacts to groundwater and/or Ejarno Spring;
  - (3) specify threshold criteria to demonstrate compliance with condition 7-1;
  - (4) specify monitoring methodology to determine if trigger criteria and threshold criteria have been met;
  - (5) specify management and/or contingency actions to be implemented if the trigger criteria required by condition 7-2(2) and/or the threshold criteria required by condition 7-2(3) have not been met; and
  - (6) provide a format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that condition 7-1

has been met over the reporting period in the Compliance Assessment Report required by condition 4-6.

- 7-3 The proponent shall implement the most recent version of the *Water Management Plan* which the CEO has confirmed by notice in writing addresses the requirements of conditions 7-1 and 7-2.
- 7-4 In the event that monitoring or investigations indicate an exceedance of threshold criteria specified in the *Water Management Plan*, the proponent shall:
- (1) report the exceedance in writing to the CEO within seven (7) days of the exceedance being identified; and
  - (2) implement the contingency actions required by condition 7-2(5) within seven (7) days of the exceedance being reported, as required by condition 7-4(1) and continue implementation of those actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and implementation of threshold contingency actions are no longer required.
- 7-5 The proponent:
- (1) may review and revise the *Water Management Plan*; or
  - (2) shall review and revise the *Water Management Plan* as and when directed by the CEO.
- 7-6 The proponent shall continue to implement the *Waitsia Gas Project Stage 2: Water Management Plan (P-WGP2-055 Rev 1, May 2020)*, or any subsequent revisions as approved by the CEO in condition 7-3, until the CEO has confirmed by notice in writing that the proponent has demonstrated the environmental objectives detailed in condition 7-1 have been met.

## **8 Greenhouse Gas Management Plan**

- 8-1 For the period ending 30 June 2025, and for every subsequent period of five financial years, the proponent shall avoid, reduce and/or offset the quantity of **Reservoir Emissions** released to the atmosphere in that period.
- 8-2 For the purposes of condition 8-1, **Reservoir Emissions** are avoided, reduced and/or offset for a period by the quantity of **GHG Emissions** represented by:
- (1) the amount of **Non-Reservoir Emissions** that have been avoided or reduced through a **Certified Improvement**; and/or
  - (2) the amount of **Authorised Offsets** that meet the **Timing and Reporting Requirements**.

- 8-3 The proponent shall submit a report to the CEO each year by 31 March, commencing on the first 31 March after the date of this statement, verifying for the previous financial year:
- (1) the quantity of **Proposal Emissions, Reservoir Emissions and Non-Reservoir Emissions**;
  - (2) the number of terajoules of gas processed at the proposal facility;
  - (3) the number of terajoules of gas produced from the proposal facility determined in accordance with **NGER Item 30(1)**;
  - (4) **Total Emissions Intensity and Non-Reservoir Emissions Intensity**, including calculations and calculation methodology for each.
- 8-4 The proponent shall submit to the CEO by 31 March 2026, and every fifth 31 March thereafter:
- (1) a report specifying:
    - (a) for each of the preceding five financial years, the matters referred to in conditions 8-3(1) to 8-3(4);
    - (b) for the period comprising five financial years which ended on 30 June in the year before the report is due:
      - (i) the amount of **Non-Reservoir Emissions** that have been avoided or reduced through a **Certified Improvement** as contemplated by condition 8-2(1), including describing the **Certified Improvement** that caused the avoidance or reduction;
      - (ii) the type, quantity, identification or serial number, and date of retirement or cancellation of any **Authorised Offsets** which have been retired or cancelled as contemplated by condition 8-2(2), including written evidence of such retirement or cancellation;
      - (iii) the progress towards meeting the interim and long-term reduction targets for **Proposal Emissions** as specified in the **Greenhouse Gas Management Plan**; and
      - (iv) any measures that have been implemented to avoid or reduce **Proposal Emissions**; and
  - (2) an audit and peer review of the report required by condition 8-4(1), carried out by an independent person or independent persons with suitable technical experience dealing with the suitability of the methodology used to determine the matters set out in the report,

whether the report is accurate and whether the report is supported by credible evidence.

8-5 Subject to, and to the extent that it is not inconsistent with, condition 8-1 or condition 8-2, the proponent shall implement:

- (1) The *Waitsia Gas Project Stage 2 Greenhouse Gas Management Plan (P-WGP2-059 Rev 5)* dated August 2020; or
- (2) if that plan has been revised, the latest version of the plan that the Minister has confirmed in writing meets the requirements of condition 8-7.

8-6 The proponent:

- (1) may revise a **Greenhouse Gas Management Plan** at any time; and
- (2) must revise a **Greenhouse Gas Management Plan** if directed to by the Minister, within the time specified by the Minister.

8-7 If the proponent wishes to or is directed to revise a **Greenhouse Gas Management Plan**, it shall submit a revised plan to the Minister that:

- (1) is not inconsistent with condition 8-1 and condition 8-2;
- (2) specifies the estimated **Proposal Emissions, Reservoir Emissions, Non-Reservoir Emissions, Total Emissions Intensity** and **Non-Reservoir Emissions Intensity** for the remainder of the life of the proposal;
- (3) includes comparison of each of the estimated **Emissions** and **Emissions Intensity** figures referred to in condition 8-7(2) for the remainder of the life of the proposal against other comparable projects;
- (4) specifies the estimated number of terajoules of gas to be processed at the proposal facility for the remainder of the life of the proposal;
- (5) specifies the estimated number of terajoules of gas to be produced at the proposal facility as determined in accordance with **NGER Item 30(1)** for the remainder of the life of the proposal;
- (6) identifies and describes any measures that the proponent will implement to avoid, reduce and/or offset **Proposal Emissions, Reservoir Emissions** or **Non-Reservoir Emissions**, and/or reduce **Total Emissions Intensity**;
- (7) specifies interim and long-term targets for avoiding, reducing and/or offsetting **Proposal Emissions**; and

- (8) provides for a program for the future review of the plan to:
  - (a) assess the effectiveness of measures referred to in condition 8-7(6); and
  - (b) identify and describe options for future measures that the proponent may or could implement to avoid, reduce and/or offset **Proposal Emissions, Reservoir Emissions or Non-Reservoir Emissions**, and/or reduce **Total Emissions Intensity**.

8-8 The proponent shall make all **Greenhouse Gas Management Plans** and the reports referred to in condition 8-3, condition 8-4(1) and condition 8-4(2) publicly available for the life of the proposal in accordance with conditions 5-1 and 5-2.

## **9 Flaring Management Plan**

9-1 The proponent shall implement the proposal to achieve the following environmental objective:

- (1) no adverse impact on visual amenity as a result of implementation of the proposal.

9-2 In order to meet the objective of condition 9-1, the proponent shall implement the *Waitsia Gas Project Stage 2: Management of Flaring Plan (P-WGP2-058 Rev 1, May 2020)* This plan shall:

- (1) specify the management actions for flaring at the Waitsia Gas Plant site;
- (2) identify impacts of flaring from the Waitsia Gas Plant to visual amenity;
- (3) identify impacts of flaring from the Waitsia Gas Plant on air quality; and
- (4) detail the commitment to World Banks Zero Routine Flaring by 2030 initiative.

9-3 The proponent:

- (1) may review and revise the *Management of Flaring Plan*; or
- (2) shall review and revise the *Management of Flaring Plan* as and when directed by the CEO.

9-4 The proponent shall implement the latest revision of the *Waitsia Gas Project Stage 2: Management of Flaring Plan (P-WGP2-058 Rev 1, May 2020)* or any subsequent revisions as approved by the CEO in condition 9-3, until the CEO has confirmed by notice in writing that the proponent has demonstrated that the environmental objective detailed in condition 9-1 has been met.

## **10 Heritage Management**

10-1 Prior to commencement of ground disturbing activities the proponent shall:

- (1) consult with the Southern Yamatji Native Title Claim group and ensure that the proponent has complied with its obligations under the *Aboriginal Heritage Act 1972*; and
- (2) ensure contractors are made aware of their obligations under the *Aboriginal Heritage Act 1972*.

Table 1: Summary of the proposal

<b>Proposal title</b>	Waitsia Gas Project Stage 2
<b>Short description</b>	The Waitsia Gas Project Stage 2 is a conventional gas proposal located approximately 16 kilometres east-south-east of the Dongara-Port Denison town sites. The proposal includes the construction and operation of a 250 terajoules per day gas plant and related infrastructure.

Table 2: Location and authorised extent of physical and operational elements

<b>Element</b>	<b>Location</b>	<b>Authorised extent</b>
<i>Physical elements</i>		
Gas plant and associated infrastructure	Figure 2	Clearing of no more than 17 ha of native vegetation within a 354 ha development envelope
Gas production wells	Figure 2	Up to 8 (including 2 existing)
Produced formation water disposal wells	Figure 2	Up to 3
Disturbance footprint	Figure 2	Up to 345 ha within the 354 ha development envelope
<i>Operational elements</i>		
Gas production facility capacity	Figure 2	Up to 250 TJ per day
Gas extraction method		Conventional
Greenhouse gas emissions (Scope 1)		Up to 300,000 tonnes CO <sub>2</sub> -e per annum
Project life		20 Years

Table 3: Abbreviations and Definitions

<b>Acronym or abbreviation</b>	<b>Definition or term</b>
<b>Authorised Offsets</b>	<p>Units representing <b>GHG Emissions</b> issued under one of the following schemes and cancelled or retired in accordance with any rules applicable at the relevant time governing the cancellation or retiring of units of that kind:</p> <ul style="list-style-type: none"> <li>(a) Australian Carbon Credit Units issued under the <i>Carbon Credits (Carbon Farming Initiative)</i> Act 2011 (Cth);</li> <li>(b) Verified Emission Reductions issued under the Gold Standard program;</li> </ul>

	<p>(c) Verified Carbon Units issued under the Verified Carbon Standard program; or</p> <p>(d) other offset units that the Minister has notified the proponent in writing meet integrity principles and are based on clear, enforceable and accountable methods.</p>
<b>CEO</b>	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the <i>Environmental Protection Act 1986</i> , or his delegate.
<b>Certified Improvement</b>	<p>An improvement to technology and/or processes approved by the Minister as an improvement that was or would be unlikely to occur in the ordinary implementation of the proposal (disregarding the effect of these conditions), and which is the subject of a report that:</p> <p>(a) describes the improvement;</p> <p>(b) demonstrates that the improvement was or would be unlikely to occur in the ordinary implementation of the proposal (disregarding the effect of these conditions); and</p> <p>(c) has been reviewed by a suitably qualified peer reviewer, who has been approved by the CEO, and who confirms that he or she agrees with the conclusions set out in the report.</p>
<b>Clearing</b>	The killing, destruction, removal severing or ringbarking of trunks or stems or doing of any other substantial damage to some or all the native vegetation in an area.
<b>CO<sub>2</sub>-e</b>	Carbon dioxide equivalent
<b>Emissions or GHG Emissions</b>	Greenhouse gas emissions expressed in tonnes of carbon dioxide equivalent (CO <sub>2</sub> -e) as calculated in accordance with the definition of 'carbon dioxide equivalence' in section 7 of the <i>National Greenhouse and Energy Reporting Act 2007</i> (Cth), or, if that definition is amended or repealed, the meaning set out in an Act, regulation or instrument concerning greenhouse gases as specified by the Minister.
<b>EP Act</b>	<i>Environmental Protection Act 1986</i>
<b>Greenhouse Gas or GHG</b>	Has the meaning given by section 7A of the <i>National Greenhouse and Energy Reporting Act 2007</i> (Cth) or, if that definition is amended or repealed, the meaning set out in an Act, regulation or instrument concerning greenhouse gases as specified by the Minister.
<b>Greenhouse Gas Management Plan</b>	<i>Waitsia Gas Project Stage 2 Greenhouse Gas Management Plan (P-WGP2-059 Rev 5)</i> dated August 2020 and any subsequent version of the plan that the Minister has confirmed in writing meets the requirements of condition 8-7.
<b>Ground-disturbing activities</b>	Activities that are associated with the substantial implementation of a proposal including but not limited to, digging (with mechanised equipment), blasting, earthmoving, vegetation clearance, grading, gravel extraction, construction of new or widening of existing roads and tracks.
<b>ha</b>	Hectare
<b>NGER Item 30(1)</b>	Item 30(1) of Schedule 2 to the <i>National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015</i> (Cth) in force at the date of this Ministerial Statement, or, if amended or repealed such that it no longer provides for the calculation of gas production, a provision of an Act, regulation or instrument specified by the Minister.

<b>Non-Reservoir Emissions</b>	<b>Proposal Emissions</b> other than <b>Reservoir Emissions</b> .
<b>Non-Reservoir Emissions Intensity</b>	<b>Non-Reservoir Emissions</b> per terajoule of gas produced from the proposal facility determined in accordance with <b>NGER Item 30(1)</b> .
<b>Proposal</b>	As defined in Table 1 of Schedule 1 of this Statement and delineated by coordinates detailed in Schedule 2.
<b>Proposal Emissions</b>	Scope 1 <b>GHG Emissions</b> released to the atmosphere as a direct result of an activity or series of activities that constitute the proposal, calculated in accordance with: <ul style="list-style-type: none"> <li>(a) the <i>National Greenhouse and Energy Reporting Act 2007</i> (Cth) and its subsidiary legislation; or</li> <li>(b) if that Act or the relevant subsidiary legislation is amended or repealed such that it does not provide a mechanism for calculating the <b>Proposal Emissions</b>, any other Act, regulation or instrument concerning greenhouse gases as specified by the Minister.</li> </ul>
<b>Reservoir Emissions</b>	<b>Proposal Emissions</b> that were separated (from natural gas or products produced from extracted hydrocarbons) in an acid gas removal unit and released unused and unprocessed.
<b>Timing and Reporting Requirements</b>	The <b>Timing and Reporting Requirements</b> are that the <b>Authorised Offsets</b> : <ul style="list-style-type: none"> <li>(a) were cancelled or retired between 1 July of the relevant period until 1 March in the year after the period ends;</li> <li>(b) have been identified as cancelled or retired in the relevant report as required by condition 8-4(1)(b)(ii);</li> <li>(c) have not been identified as cancelled or retired in any prior report as required by condition 8-4(1)(b)(ii); and</li> <li>(d) have not been used to offset any <b>GHG Emissions</b> other than <b>Proposal Emissions</b>; and</li> <li>(e) were not generated by avoiding <b>Proposal Emissions</b>.</li> </ul>
<b>Total Emissions Intensity</b>	<b>Proposal Emissions</b> per terajoule of gas produced from the proposal facility determined in accordance with <b>NGER Item 30(1)</b> .
<b>TJ</b>	<b>Terajoules</b>

### Figures (attached)

Figure 1 Regional location (this figure is a representation of the co-ordinates referred to in Schedule 2)

Figure 2 Development envelope (this figure is a representation of the co-ordinates referred to in Schedule 2)



Figure 1: Regional location

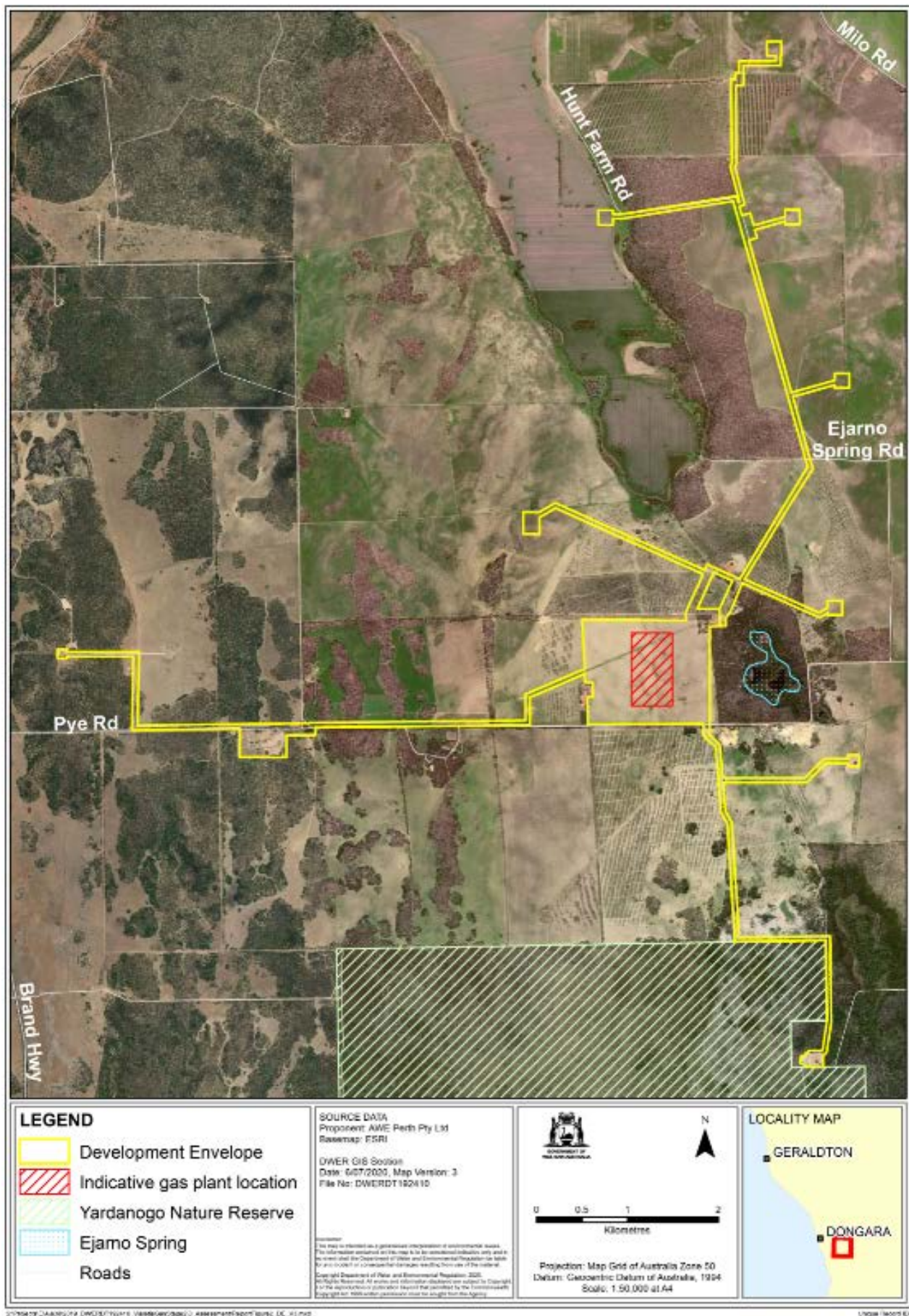


Figure 2: Development envelope

## **Schedule 2**

Coordinates defining the regional location and development envelope are held by the Department of Water and Environmental Regulation, Document Reference Number DWERDT196097.