



North West Shelf Project Extension Proposal

Draft Environmental Scoping Document

EPA Assessment No. 2186

EPBC 2018/8335

May 2019

INVITATION TO MAKE A SUBMISSION

The Environmental Protection Authority (EPA) invites people to make a submission on the draft Environmental Scoping Document (ESD) for this proposal.

Woodside Energy Ltd., as operator for and on behalf of the North West Shelf Joint Venture (NWSJV) proposes the ongoing operation of the NWS Project to enable the long-term processing of third-party gas and fluids and NWSJV field resources through the NWS Project facilities until around 2070. The draft ESD has been prepared in accordance with the EPA's Procedures Manual (Part IV Divisions 1 and 2). The draft ESD outlines the work required and key areas of focus for the environmental review. The proponent will undertake this work and the information will be used to prepare an Environmental Review Document.

The draft ESD is available for a public review period of 2 weeks from 6 June 2019, closing on 20 June 2019.

Why write a submission?

The EPA seeks information that will inform the EPA's consideration of the likely effect of the proposal, if implemented, on the environment.

The EPA will use the information in the submissions to identify any additional preliminary key environmental factors/issues and the type and extent of any additional work for the environmental review that should be included in the ESD.

Submissions will be treated as public documents unless provided and received in confidence, subject to the requirements of the *Freedom of Information Act 1992*.

Why not join a group?

It may be worthwhile joining a group or other groups interested in making a submission on similar issues. Joint submissions may help to reduce the workload for an individual or group. If you form a small group (up to 10 people) please indicate all the names of the participants. If your group is larger, please indicate how many people your submission represents.

Developing a submission

The draft ESD specifies the form, content, timing and procedure of the environmental review and outlines the work required to identify or predict the direct, indirect and cumulative impacts of the proposal. The likely environmental impacts and the proposed management measures will be addressed in the Environmental Review Document after the proponent undertakes the studies outlined in the ESD.

You may agree or disagree with, or comment on, the general issues discussed in the draft ESD or on specific elements.

When making comments on the draft ESD:

- Suggest other preliminary key (i.e. most important) environmental factors and/or any additional work you consider would be appropriate.
- Clearly state your point of view and give reasons for your conclusions.
- Reference the source of your information, where applicable.
- Suggest recommendations or alternatives.

What to include in your submission

Include the following in your submission to make it easier for the EPA to consider your submission:

- Your contact details – name and address.
- Date of your submission
- Whether you want your contact details to be confidential.
- Summary of your submission, if your submission is long.
- List points so that issues raised are clear, preferably by environmental factor.
- Refer each point to the page, section and if possible, paragraph of the draft ESD.
- Attach any reference material, if applicable. Make sure your information is accurate.

The closing date for public submissions is: 20 June 2019

The EPA prefers submissions to be made electronically via the EPA's Consultation Hub at <https://consultation.epa.wa.gov.au>.

Alternatively, submissions can be:

- posted to: Chairman, Environmental Protection Authority, Locked Bag 10, Joondalup DC WA 6919, or
- delivered to: Environmental Protection Authority, 8 Davidson Terrace, Joondalup, 6027.

If you have any questions on how to make a submission, please contact EPA Services at the Department of Water and Environmental Regulation on 6364 7000.

TABLE OF CONTENTS

1.	INTRODUCTION.....	5
1.1	Form	6
1.2	Content.....	6
1.3	Timing	6
1.4	Procedure.....	7
1.5	Assessment as an Accredited Assessment	7
2.	THE PROPOSAL.....	8
2.1	Existing NWS Project – not the subject of the Proposal.....	8
2.2	NWS Project Extension Proposal.....	10
2.3	Excluded from the Proposal	12
3.	PRELIMINARY KEY ENVIRONMENTAL FACTORS AND REQUIRED WORK	15
4.	OTHER ENVIRONMENTAL FACTORS OR MATTERS	26
5.	STAKEHOLDER CONSULTATION	27
6.	DECISION-MAKING AUTHORITIES	28
7.	REFERENCES.....	29

1. Introduction

Proposal Name:	North West Shelf Project Extension
Proponent:	Woodside Energy Ltd., as operator for and on behalf of the North West Shelf Joint Venture (NWSJV)
Assessment Number:	2186
Location:	<ul style="list-style-type: none"> • Karratha Gas Plant (KGP): De Wit Location Lot 199 on Plan 216680 [Crown Lease LGE I123606] • Karratha Gas Plant Buffer Zone: De Wit Location Lot 197 on Plan 30713, Burrup Road, Burrup [Crown Lease LGE I123606] • Southern Expansion Lease: De Wit Location Lot 379 and Part Lot 380 Burrup Road, Burrup [Crown Lease LGE I161020] • Plant Access Road (Northern and Southern): De Wit Location Lot 655 and Lot 195 Burrup Road, Burrup [Crown Lease LGE I237587] • King Bay Supply Base (KBSB): De Wit Location Lot 151 and Lot 204 Burrup Road, Burrup [Crown Lease LGE I154282] • Karratha Gas Plant Loading Jetties Seabed Leases • Pipeline licences: TPL 15 and TPL 16/ PL 58
Local Government Area:	City of Karratha
Public Review Period:	Environmental Review Document – 6 weeks
EPBC Reference Number:	EPBC 2018/8335

The Environmental Protection Authority (EPA) has determined that the North West Shelf (NWS) Project Extension Proposal is to be assessed under Part IV of the Western Australian (WA) *Environmental Protection Act 1986* (EP Act) at a Public Environmental Review level of assessment.

This draft Environmental Scoping Document (ESD) defines the form, content, timing, and procedure of the environmental review, as required by Section 40(3) of the EP Act. Woodside Energy Ltd. (the proponent) has prepared this draft ESD according to the EPA's Environmental Impact Assessment (Part IV Division 1 and 2) Procedures Manual (EPA 2018a).

1.1 Form

The EPA requires that the Environmental Review Document (ERD) required under Section 40 conforms with the EPA instructions on how to prepare an Environmental Review Document (EPA 2018b). This draft ESD has been prepared using the template outlined in the EPA instructions on how to prepare an Environmental Scoping Document (EPA 2018c).

1.2 Content

The EPA requires that the ERD includes the content outlined in Sections 2 to 6 of this draft ESD.

1.3 Timing

Table 1-1 sets out the proposed timeline for assessing the NWS Project Extension Proposal. This proposed timeline has yet to be finalised between the proponent and the EPA and will be confirmed once the EPA has endorsed the final ESD.

Table 1-1: Proposed Assessment Timeline

Key Assessment Milestones	Proposed Completion Date
EPA approves ESD	July 2019
Proponent submits first draft ERD	July 2019
EPA provides comment on first draft ERD (6 weeks from receipt of ERD)	September 2019
Proponent submits revised draft ERD	November 2019
EPA authorises release of ERD for public review (2 weeks from EPA approval of ERD)	November 2019
Proponent releases ERD for public review for 6 weeks	November 2019
Close of public review period	January 2020
EPA provides Summary of Submissions (3 weeks from close of public review period)	February 2020
Proponent provides Response to Submissions	March 2020
EPA reviews Response to Submissions (4 weeks from receipt of Response to Submissions)	April 2020
EPA prepares draft assessment report and completes assessment (6 weeks from EPA accepting Response to Submissions)	June 2020

EPA finalises assessment report (including two weeks public consultation on draft conditions) and gives report to Minister (6 weeks from assessment completion)	July 2020
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1.4 Procedure

The EPA requires the proponent undertake the environmental review according to the procedures in the Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures (EPA 2016a) and the Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual (EPA 2018a).

1.5 Assessment as an Accredited Assessment

The NWS Project Extension Proposal has also been referred to the Commonwealth Department of Environment and Energy (DoEE) which has been determined as a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Assessment of the Proposal will be undertaken by the State of Western Australia as an accredited assessment.

The relevant Matters of National Environmental Significance (MNES) which are the controlling provisions for the NWS Project Extension Proposal are:

- National Heritage (EPBC Act Section 15B and 15C), namely The Dampier Archipelago (including Burrup Peninsula)

This draft ESD includes work to be carried out and reported on in the ERD in relation to MNES. The ERD will also address the matters in Schedule 4 of the Commonwealth *Environment Protection and Biodiversity Conservation Regulations 2000*.

MNES that may be impacted by the NWS Project Extension Proposal will be identified and the potential impacts on these matters addressed within each relevant preliminary environmental factor identified in Section 3. Any proposed offsets to address significant residual impacts on MNES will be discussed in the ERD.

2. The Proposal

In summary, the NWS Project Extension Proposal is for the ongoing operation of the NWS Project to enable the long-term processing of third-party gas and fluids and NWSJV field resources through the NWS Project facilities until around 2070. The Proposal is described in its entirety in the NWS Project Extension Section 38 Referral Supporting Information (Woodside 2018) and is copied below (with updates as appropriate) in this draft ESD for ease of reference.

2.1 Existing NWS Project – not the subject of the Proposal

The Karratha Gas Plant (KGP) was originally commissioned in 1984 with feed gas and fluid sources from the North Rankin platform. The KGP has undergone a number of expansions and additional facilities have been installed since it was first commissioned. At present, and subject to Ministerial Statement 536 (MS 536), the existing NWS Project processes natural gas and associated fluids from NWSJV field resources to produce up to 18.5 mtpa of Liquefied Natural Gas (LNG) at the KGP. The onshore and State waters component of the existing NWS Project includes the following key processing, storage and offloading facilities (see **Figure 2.2**):

- Five LNG processing trains;
- Two domestic gas trains;
- Six condensate stabilisation units;
- Three LPG fractionation units;
- LPG, LNG and condensate storage facilities;
- Two jetties for export of condensate, LPG and LNG;
- Power generation and supporting utilities;
- Emergency, operational and storage and loading flares;
- Two subsea pipelines, described as 1TL and 2TL, within State waters and crossing onshore to the KGP;
- An offsite supply base, described as the King Bay Supply Base (KBSB), used for activities such as diesel storage, refuelling, pilotage and logistics; and
- Associated infrastructure necessary and incidental to conducting existing NWS Project activities.

These key components of the NWS Project are located approximately 18 km from Karratha and, with the exception of 1TL and 2TL, are bounded by Withnell Bay to the north, Mermaid Sound to the west, Murujuga National Park to the east and industrial land to the south, on the following leases:

- Karratha Gas Plant: De Wit Location Lot 199 On Plan 216680 [Crown Lease LGE I123606]
- Karratha Gas Plant Buffer Zone: De Wit Location Lot 197 On Plan 30713, Burrup Road, Burrup [Crown Lease LGE I123606]
- Southern Expansion Lease: De Wit Location Lot 379 and Part Lot 380 Burrup Road, Burrup [Crown Lease LGE I161020]

- Plant Access Road (Northern and Southern): De Wit Location Lot 655 and Lot 195 Burrup Road, Burrup [Crown Lease LGE I237587]
- King Bay Supply Base: De Wit Location Lot 151 and Lot 204 [Crown Lease LGE I154282]
- Karratha Gas Plant Loading Jetties Seabed Lease
- Pipeline licences: TPL 15 and TPL 16 / PL 58

Current NWSJV field resources are extracted by offshore facilities in Commonwealth waters. Gas and de-watered liquid hydrocarbons are then transported onshore to the KGP through two trunklines (1TL and 2TL), that run broadly parallel to each other, and extend from North Rankin Complex in Commonwealth waters, through State waters, and onshore to the KGP.

NWSJV field resources are processed at the KGP for export to international and domestic markets. LNG, Liquefied Petroleum Gas (LPG) and condensate are transported to the international market by marine vessels and natural gas is supplied to the domestic market via the Dampier to Bunbury Natural Gas Pipeline (DBNGP).

The ongoing operation of the Existing NWS Project, including implementing any changes which are approved to support continued operations of the Existing NWS Project, are outside the scope of the NWS Project Extension Proposal.

The Existing NWS Project (and any approved changes) will continue to operate regardless of the NWS Project Extension Proposal (including during the assessment of the Proposal). It is not possible to define all the Existing NWS Project changes which may be approved during the consideration of and before implementation of the NWS Project Extension Proposal, as some changes are currently in development, and some may not even be anticipated yet. For completeness, however, a summary of the key Existing NWS Project (and any approved changes) which may be implemented regardless of the NWS Project Extension Proposal include:

- Inspection, maintenance, repair (IMR) and improvement programs on equipment, plant, machinery and subsea infrastructure identified above as key processing, storage and offloading facilities and power generation/utilities;
- Modifications to, or replacement upon reaching end of life of equipment, plant, machinery and subsea infrastructure identified above as key processing, storage and offloading facilities and power generation/utilities, such as the Karratha Life Extension Program; and
- Processing (and associated tie-ins) from approved onshore feed gas sources as necessary to maintain production levels.

The NWSJV fields resources will deplete over time resulting in emerging ullage at the KGP. To fill this emerging ullage and allow for the long-term operation of the Existing NWS Project, the NWS Project Extension Proposal has been referred so that gas and fluids from third parties and NWS field resources can be processed. That NWS Project Extension Proposal is described below.

2.2 NWS Project Extension Proposal

To enable the future operation of the NWS Project and the ongoing supply of gas and fluids to domestic and international markets, the NWS Project Extension Proposal has been developed to seek approval to use the Existing NWS Project facilities for the:

- Long-term processing of third-party gas and fluids and NWSJV field resources through the NWS Project facilities, which includes:
 - Potential changes to feed gas composition;
 - Potential changes to composition of environmental discharge and emissions, although volumes of emissions and discharges are expected to be in line with current levels; and
 - Potential construction of additional operational equipment to accommodate potential changes to feed gas composition or management of environmental discharge and emissions.
- Ongoing operation of the NWS Project (from the date the Proposal is approved) to enable long term processing at the NWS Project facilities, currently expected to be until around 2070, which includes:
 - Ongoing use of Existing NWS Project facilities to process third-party gas and fluids and NWSJV field resources;
 - Inspection, maintenance, repair (IMR) and improvement programs;
 - Maintenance dredging associated with jetties and berthing pockets;
 - Replacement of equipment, plant and machinery as required (Woodside, as operator of the NWS Project, will look to adopt modern technology for any future plant modifications as reasonably practicable);
 - Ongoing emissions and discharges to the environment (Woodside, as operator of the NWS Project, will continue to assess emission reduction opportunities (including NO_x, CO₂ and VOCs)) that could result in a staged decrease in emissions over time during the NWS Project Extension Proposal scoping phase); and
 - Monitoring and management of environmental impacts.

As described in the NWS Project Extension Section 38 Referral Supporting Information (Woodside 2018), the NWS Project Extension Proposal, if approved, is proposed to operate under new Commonwealth and State environmental approvals, where the new State Ministerial Statement could incorporate the relevant conditions from, and then supersede, existing Ministerial Statements 320, 334, 482 and 536. New and consolidated environmental approvals are proposed to regulate the whole of the NWS Project from the date of the approvals to allow for the impacts to be managed in a holistic, site-wide, consolidated and environmentally effective and efficient manner.

The NWS Project Extension Proposal will be contained within the same development envelope which is currently relevant for the Existing NWS Project. No additional areas are proposed to be added to the Development Envelope. No additional area is proposed to be added to the disturbance footprint currently approved under existing Ministerial Statements.

The regional location of the NWS Project Extension Proposal is shown in Figure 2-1 and the development envelope is shown in Figure 2-2. The key physical and operational characteristics of the NWS Project Extension Proposal are listed in Table 2-1 and Table 2-2. These characteristics may change depending on the results of studies and investigations during the preparation of the ERD and the application of the mitigation hierarchy. The mitigation hierarchy involves three categories (avoid, minimise, and rehabilitate) to identify and prioritise management measures that will achieve sound environmental outcomes.

Where any activities associated with the NWS Project Extension Proposal that may have potential, if implemented, to have a significant effect on the environment, these have been listed in Table 3-1 as 'relevant activities'.

Table 2-1: Summary of the Proposal

Proposal Title:	North West Shelf Project Extension
Proponent Name:	Woodside Energy Ltd., as operator for and on behalf of the NWSJV
Short Description:	Ongoing operation of the NWS Project to enable the long-term processing of third-party gas and fluids and NWSJV field resources through the NWS Project facilities until around 2070

Table 2-2: Location and Proposed Extent of Physical and Operational Elements

Element	Location	Existing NWS Project	Change (as described in the Referral)	NWS Project Extension Proposal
Physical Elements				
NWS Project (Onshore component)	Development envelope	276 ha of disturbance ¹ within a 466 ha (onshore NWSJV Leases) and 58 ha (KBSB) development envelope	No change	524 ha development envelope (includes 466 ha onshore NWSJV leases and 58ha KBSB) ²
NWS Project (offshore component; State waters)	Development envelope	700 ha development envelope (includes 589 ha pipeline exclusion zone and 111 ha jetty lease)	No change	700 ha development envelope (includes 589 ha pipeline exclusion zone and 111 ha jetty lease)

¹ As approved under Ministerial Statement 536

² No additional area is proposed to be added to the disturbance footprint approved under existing Ministerial Statements.

Operational Elements				
Reserve source	Various	North Rankin, Goodwyn gas fields	NWSJV field resources and third-party gas and fluids	NWSJV field resources and third-party gas and fluids
LNG production capacity	Development envelope	18.5 mtpa	No change	18.5 mtpa
CO ₂ emissions	Development envelope	2.9 mtpa (Trains 4 & 5) 4.8 mtpa (Trains 1-3) ³	No change	7.7 mtpa
NO _x Emissions	Development envelope	Not specified	n/a	TBC ⁴
Project life		30+ years	Remove – not a key characteristic	n/a

Note: Operational elements that are subject to other environmental regulatory frameworks (e.g. Part V of the EP Act) are not included in the operational elements table. However, this does not preclude potential impacts from those elements of the NWS Project Extension Proposal being considered in the ERD.

2.3 Excluded from the Proposal

The NWS Project Extension Proposal does not include any of the following:

- Infrastructure to tie gas field sources into 1TL or 2TL (in Commonwealth or State waters). The tie-in infrastructure cannot be referred or assessed at this time because the commercial arrangements to identify and agree the relevant gas field sources are not complete. Separate approval will be obtained for the development and use of the tie-in infrastructure where required;
- Processing (and associated tie-ins) from approved onshore feed gas sources as necessary to maintain production levels. Separate approval will be obtained for the development and use of the tie-in infrastructure where required; and
- Development of gas fields. The development of the gas fields cannot be referred or assessed at this time because the commercial arrangements to identify and agree the relevant gas field sources are not complete. Separate approval will be obtained for the development of the fields where required.

³ NWSV Additional LNG Facilities Project Public Environment Review / Public Environment Report (Woodside 1998), as authorised by MS536.

⁴ To be defined in the NWS Project Extension Environmental Review Document

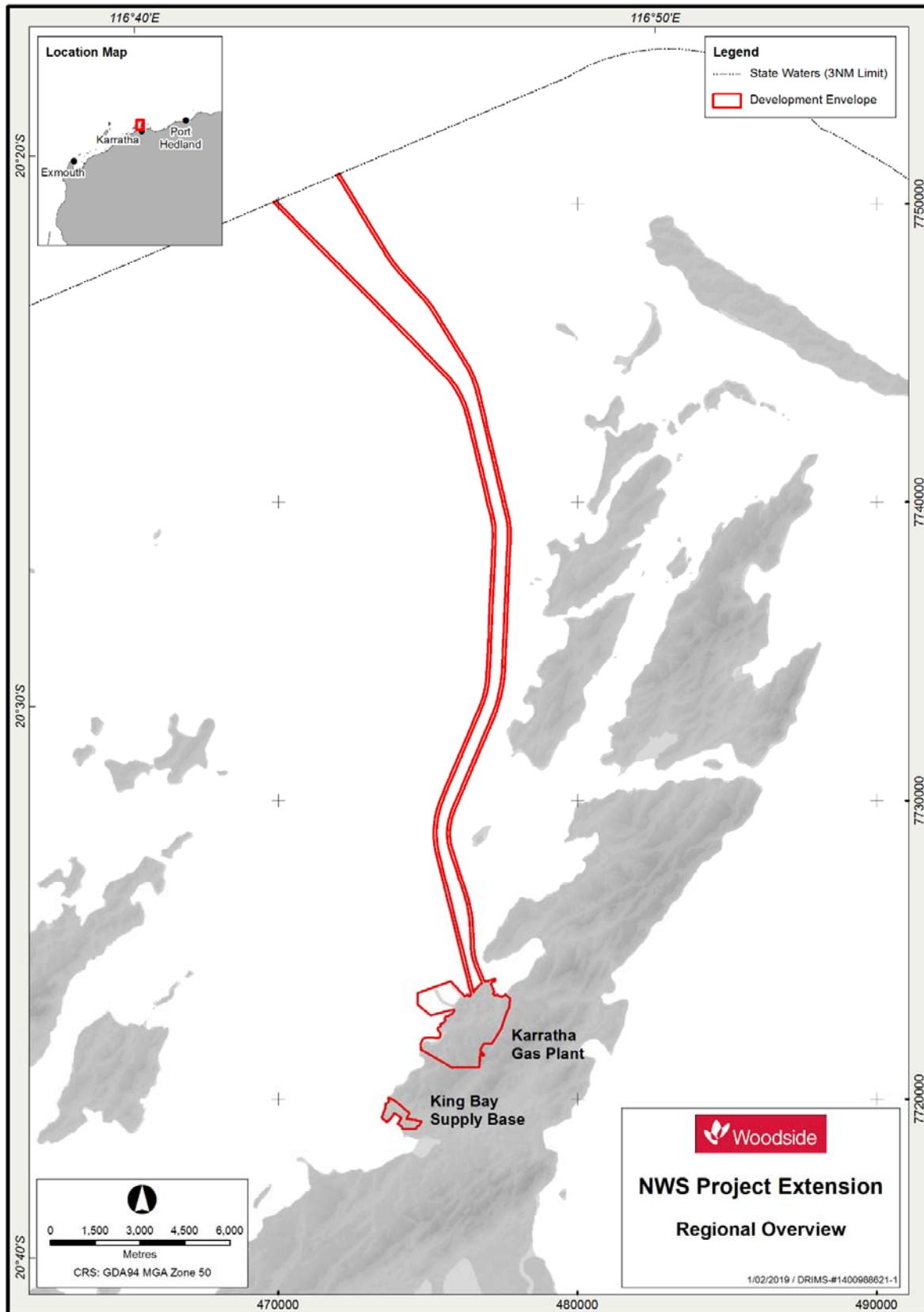


Figure 2-1: NWS Project Extension Proposal Regional Location

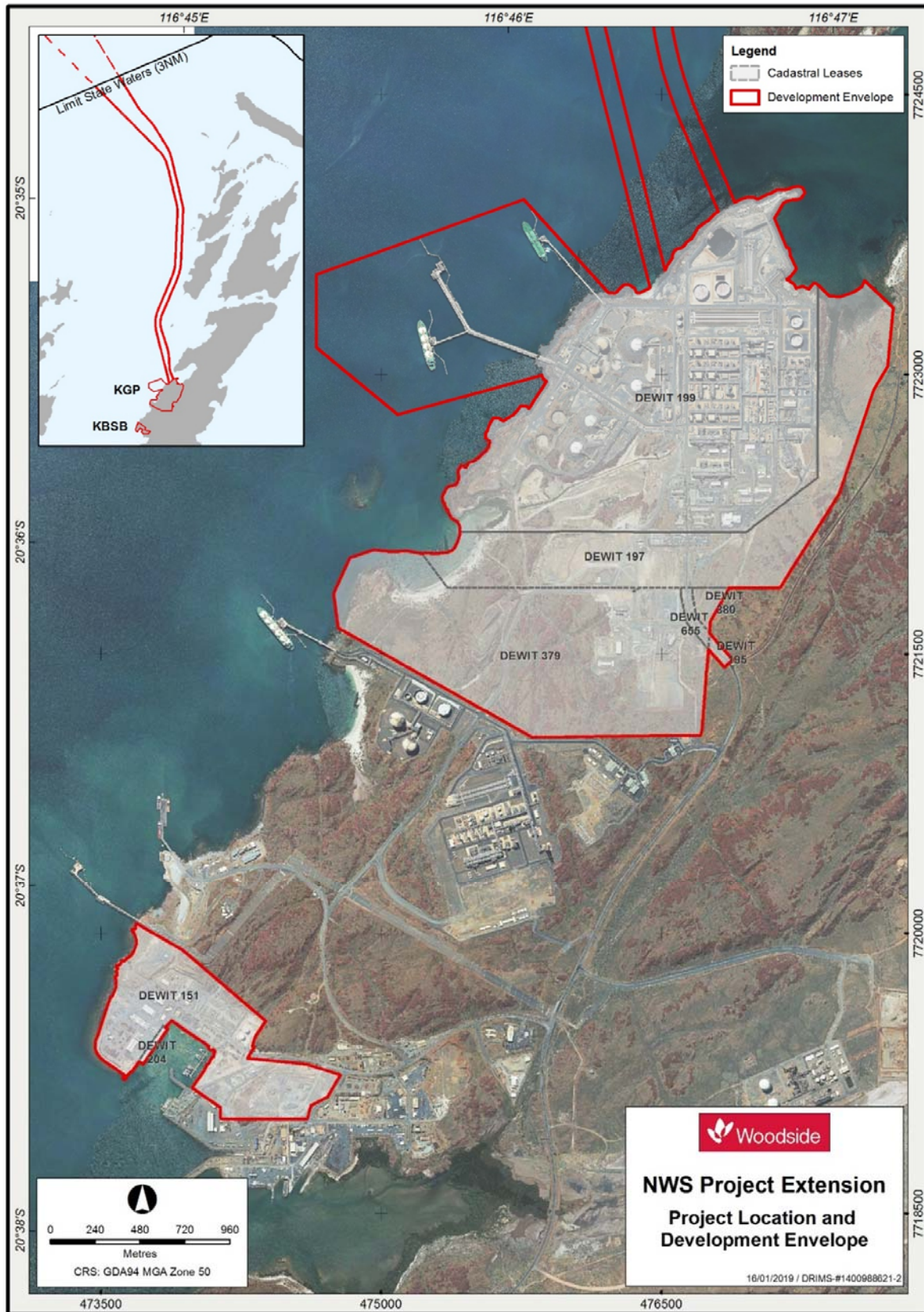


Figure 2-2: NWS Project Extension Proposal Development Envelope

3. Preliminary Key Environmental Factors and Required Work

The preliminary key environmental factors for the environmental review are:

- Air Quality
- Social Surroundings (Heritage)
- Marine Environmental Quality

Table 3-1 outlines the work required to be undertaken to assess each preliminary key environmental factor and contains the following information for each factor:

- **EPA factor and EPA objective for that factor**
- **Relevant activities** –the NWS Project Extension Proposal activities that may have a significant impact on that factor.
- **Potential impacts and risks to that factor**
- **Required work for that factor**
- **Relevant policy and guidance** – EPA (and other) guidance and policy relevant to the assessment.

Table 3-1: Preliminary Key Environmental Factors and Required Work

Air Quality	
EPA Objective	To maintain air quality and minimise emissions so that environmental values are protected (EPA 2016b).
Relevant Activities	<ul style="list-style-type: none"> • Ongoing emissions to air from the NWS Project Extension Proposal until around 2070. • Introduction of third-party gas and fluids, which may cause changes to air emission characteristics.
Potential Impacts and Risks	<p>Potential impacts to air quality include:</p> <ul style="list-style-type: none"> • Changes in air quality causing deposition on nearby heritage features, including national heritage places. • Changes in air quality causing deposits on nearby vegetation. • Contribution to ambient air quality from emissions of: <ul style="list-style-type: none"> ▪ odorous substances; and ▪ substances with the potential to impact human health. <p>Potential impacts from greenhouse gas emissions may include:</p> <ul style="list-style-type: none"> • Contribution of Proposal emissions to global greenhouse gas emission concentrations.

	<ul style="list-style-type: none"> Climate change influenced by changes to global greenhouse gas emission concentrations.
Required Work	<p><u>Air Quality</u></p> <ol style="list-style-type: none"> Characterise the existing environment, identify sensitive receptors and describe long-term trends for temperature, wind speed, wind direction, humidity and rainfall using local and regional meteorological information. Characterise the existing local and regional ambient air quality using existing monitoring data, audit results and observations. Supplement this information with data from publicly available reports and studies, including: <ul style="list-style-type: none"> Aggregated Emission Inventory for the Pilbara Airshed: Emissions Inventory Report 1999/2000 (Sinclair Knight Merz [SKM] 2003) Pilbara Air Quality Summary Report (DoE 2004) Burrup Peninsula Air Pollution Study: Final Report – April 2006 (Commonwealth Scientific and Industrial Research Organisation [CSIRO] 2006). Characterise the proposed emissions to air from the NWS Project Extension Proposal by developing an air emission inventory. Characterise current and reasonably likely future emissions from other local and regional industrial sources for input into air quality modelling. Review publicly available modelling studies and compare results with appropriate air quality standards to screen out pollutants and sources that present a low risk to ambient air quality. Undertake air quality modelling to determine impacts to ambient air quality resulting from the NWS Project Extension Proposal. Modelling will consider the following: <ul style="list-style-type: none"> Undertake, and provide information on the results of, a literature review of the past use of advanced models which included the (then) current and expected future emission sources in the region; Provide information on the selection and justification of an appropriate model for the region. This justification should focus on the model's ability to simulate the dispersion and photochemical transformation of the pollutants of concern and should be able to model those pollutants of concern from all industrial sources in the region; Provide a review of at least 10 years of meteorology;

	<ul style="list-style-type: none"> • Reporting of the modelling outcomes will include a discussion of the limitations of the chosen modelling; and • Comparisons with relevant ambient air quality criteria for the protection of human health. <p>7. Air quality modelling (item 6) results to include the following:</p> <ul style="list-style-type: none"> • Contour plots for the pollutants of concern, which describe modelling scenarios, and for the NWS Project Extension Proposal in isolation, as well as current and reasonably likely future emissions identified at item 4 above (i.e. cumulative impacts); and • Tables listing the modelled ambient concentrations for the pollutants of concern, including those generated by the NWS Project Extension Proposal in isolation, as well as current and reasonably likely future emissions identified at item 3 above (i.e. cumulative impacts). <p>8. Identify and evaluate potential credible opportunities to achieve a long-term reduction in air emissions of concern. Where practicable, use air modelling to quantify reductions that are reasonably achievable for future operations under different scenarios.</p> <p>9. Identify management and mitigation measures that will be implemented to ensure residual impacts are not greater than predicted. This will include:</p> <ul style="list-style-type: none"> • Developing an Air Quality Management Plan which incorporates an adaptive management program with due consideration of the Murujuga Rock Art Strategy; • Monitoring air emissions and air quality where relevant; • Summarising how the mitigation hierarchy will be addressed; • Identifying existing management and mitigation mechanisms that have been implemented for current NWS Project operations and that are proposed to be continued; and • Identifying management and mitigation measures that could be implemented over time to achieve continuous improvement in the long-term reduction in air emissions of concern. <p>10. Predict the extent, severity, and duration of any residual impacts from the NWS Project Extension Proposal that may be expected after implementing management and mitigation measures.</p> <p><u>Greenhouse gas emissions</u></p> <p>11. Characterise the existing environment, identify sensitive receptors and describe long-term trends for temperature, wind</p>
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	<p>speed, wind direction, humidity and rainfall using local and regional meteorological information.</p> <p>12. Characterise greenhouse gas emissions direct and indirect (types and volumes) from the NWS Project Extension Proposal and assess the relative contribution to regional, state, national and international greenhouse gas emissions.</p> <p>13. Based on the greenhouse gas emission characteristics, benchmark the emissions from the NWS Project Extension Proposal against comparable Australian and International LNG developments.</p> <p>14. Identify and justify contemporary best practice management and mitigation measures that will be implemented to reduce greenhouse gas emissions and improve operational efficiency, including:</p> <ul style="list-style-type: none"> • Developing a Greenhouse Gas Management Plan; • Summarising how the mitigation hierarchy will be addressed including benchmarking against other facilities where appropriate and where public information is available; • Identifying existing greenhouse gas management and mitigation mechanisms that have been successfully implemented for current operations and that will be continued; and • Identifying relevant contemporary best practice management and mitigation measures, including all reasonable and practicable emission reduction equipment and technologies, that can be implemented over time to achieve a long-term reduction in greenhouse gas emissions. <p>15. Predict the extent, severity, and duration of any residual impacts from the NWS Project Extension Proposal that may be expected after implementing management and mitigation measures.</p>
<p>Relevant Policy and Guidance</p>	<p><i>EPA Policy and Guidance</i></p> <ul style="list-style-type: none"> • Statement of Environmental Principles, Factors and Objectives (EPA 2016c) • Environmental Factor Guideline: Air Quality (EPA 2016b) <p><i>Other Policy and Guidance</i></p> <ul style="list-style-type: none"> • Air Quality Modelling Guidance Notes 2006 (DoE 2006) • Murujuga Rock Art Strategy (DWER 2019) <p><i>Relevant Legislation</i></p> <ul style="list-style-type: none"> • <i>National Greenhouse and Energy Reporting Act 2007 (Cth)</i>

	<ul style="list-style-type: none">• <i>National Environmental Protection (Ambient Air Quality) Measure 2016 (Cth)</i>
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Social Surroundings (Heritage)	
EPA Objective	To protect social surroundings from significant harm (EPA 2016d).
Relevant Activities	<ul style="list-style-type: none"> • Ongoing emissions to air from the NWS Project Extension Proposal until around 2070. • Continued presence and activity of people, vehicles, vessels, and equipment in the development envelope. • Ongoing marine discharges from the operation of the NWS Project facilities.
Potential Impacts and Risks	<p>Potential impacts on social surroundings include:</p> <ul style="list-style-type: none"> • Changes in air quality causing degradation, damage, notable alteration, modification, obscuring or diminishing the values of nearby heritage features including the national heritage place. • Changes in air quality causing deposition of pollutants on terrestrial and nearshore vegetation that have heritage values • Risk of direct, accidental physical damage to heritage features within the development envelope from people, vehicles, and equipment • Continued restricted access to heritage features within the development envelope until around 2070 • Risk of reduced amenity to heritage features outside the development envelope as a result of nuisance-causing emissions and discharges (e.g. odour from atmospheric emissions) • Impact to marine fauna and flora with heritage value from: <ul style="list-style-type: none"> • changes to water quality from planned and unplanned discharges; and • turbidity from maintenance dredging.
Required Work	<ol style="list-style-type: none"> 16. Describe the existing environment by identifying heritage features, using published sources as well as outcomes from engagement with relevant Aboriginal groups. 17. Characterise the heritage value and sensitivity of vegetation in and/or adjacent to the development envelope using existing monitoring data and consulting with local Indigenous groups and corporations with an interest in the area. 18. Characterise the heritage value and sensitivity of the marine environment in and/or adjacent to the development envelope using existing monitoring data and consulting with local Indigenous groups and corporations with an interest in the area.

	<p>19. Describe the elements of the proposal that may affect social surroundings.</p> <p>20. Describe the potential impacts of each element of the proposal on social surroundings, with an emphasis on:</p> <ul style="list-style-type: none"> • Potential impacts to petroglyphs from air emissions using: <ul style="list-style-type: none"> ○ publicly available scientific reports on the effects of atmospheric pollution on petroglyphs; and ○ results from air quality modelling of current and predicted future operations, under different scenarios (Refer to item 6 under Air Quality). • Potential impacts to vegetation with heritage values using publicly available information, air quality modelling and existing Woodside monitoring data • Potential impacts to aspects of the marine environment that have heritage value using existing Woodside monitoring data and outcomes of consultation with local Indigenous groups and corporations • Other aspects with heritage value as identified through consultation with local Indigenous groups and corporations. <p>21. Identify management and mitigation measures that will be implemented to ensure residual impacts are not greater than predicted, including:</p> <ul style="list-style-type: none"> • Developing a Cultural Heritage Management Plan that incorporates an adaptive management program and which has due consideration of the Murujuga Rock Art Strategy; • Summarising how the mitigation hierarchy will be addressed; • Identifying existing management and mitigation mechanisms that have been implemented for current operations and that will be continued; • Identifying management and mitigation measures that could be implemented over time to achieve a long-term reduction in air emissions of concern for petroglyphs; and • Identifying management and mitigation measures that could be implemented over time to reduce impacts to heritage features within the development envelope, vegetation with heritage value and aspects of the marine environment with heritage value. <p>22. Consult and incorporate feedback from local Indigenous groups on the management and mitigation measures that could be</p>
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	<p>implemented over time to reduce impacts to heritage features and petroglyphs.</p> <p>23. Predict the extent, severity, and duration of any residual impacts from the NWS Project Extension Proposal that may be expected after implementing management and mitigation measures.</p>
Relevant Policy and Guidance	<p><i>EPA Policy and Guidance</i></p> <ul style="list-style-type: none"> • Statement of Principles, Factors and Objectives (EPA 2016c) • Environmental Factor Guideline – Social Surroundings (EPA 2016d) • Guidance for the Assessment of Environmental Factors Assessment of Aboriginal Heritage No. 41 (EPA 2004) <p><i>Other Policy and Guidance</i></p> <ul style="list-style-type: none"> • Australia's National Heritage – Applying the Principles (Australian Government nd.) • Murujuga National Park Management Plan (DBCA 2013) • Murujuga Rock Art Strategy (DWER 2019) • Engage Early – Indigenous Engagement Guidelines (DoEE 2016) <p><i>Relevant Legislation</i></p> <ul style="list-style-type: none"> • <i>Aboriginal Heritage Act 1972 (WA)</i> • <i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cth)</i>

Marine Environmental Quality	
EPA Objective	To maintain the quality of water, sediment, and biota so that environmental values are protected (EPA, 2016e).
Relevant Activities	<ul style="list-style-type: none"> • Ongoing discharge of treated wastewater to Mermaid Sound and No Name Creek. • Ongoing discharge of stormwater to the marine environment. • Introduction of third-party gas and fluids, which may cause changes to marine discharge characteristics. • Maintenance dredging of the jetties and berthing pockets at the KGP and KBSB. • Ship loading and ship movements at the KGP and KBSB. • Unplanned discharges from offshore accidents or emergencies (e.g. vessel hydrocarbon spill, pipeline rupture). • Unplanned discharges from onshore accidents or emergencies (e.g. hydrocarbon spill). • Presence and potential migration of onshore contamination.
Potential Impacts and Risks	<p>Potential impacts on the marine environment include:</p> <ul style="list-style-type: none"> • Reduction of water quality from: <ul style="list-style-type: none"> ▪ discharges to the marine environment; ▪ turbidity during shipping activities and maintenance dredging activities; ▪ pollution from unplanned discharges; and ▪ changes to discharge characteristics resulting from the introduction of third-party gas and fluids. • Reduction of sediment quality from: <ul style="list-style-type: none"> ▪ discharges to the marine environment; ▪ pollution from unplanned discharges; and ▪ changes to discharge characteristics resulting from the introduction of third-party gas and fluids. • Potential for indirect impact to marine flora and fauna resulting from decreased water and sediment quality
Required Work	24. Characterise the existing marine environmental quality (baseline water and sediment quality) in the area potentially affected by the NWS Project Extension Proposal using existing operational monitoring data and, if required, additional field surveys for those contaminants that are not routinely monitored including fire-fighting foams.

	<p>25. Characterise the relevant activities from the proposal that have the potential to affect marine environmental quality.</p> <p>26. Characterise the quality of the different wastewater discharges to the marine environment, including through WET testing.</p> <p>27. Predict the spatial extent, temporary variability and concentration (or magnitude) of contaminants in the waste dispersion fields.</p> <p>28. Spatially define marine discharge mixing zone in relation to key sensitive biological receptors likely to be affected by the discharges.</p> <p>29. The baseline data acquisition should be adequate for the derivation of environmental quality criteria for indicators relevant to the discharge(s) e.g. water, sediment and/or biological quality indicators</p> <p>30. Characterise cumulative impacts by developing an inventory of marine discharges from other local industrial sources using publicly available monitoring results. Undertake a cumulative impact study if relevant.</p> <p>31. Identify management and mitigation measures that will be implemented to ensure residual impacts are not greater than predicted, including:</p> <ul style="list-style-type: none"> • Providing a Marine Environmental Quality Management Plan that includes the following: <ul style="list-style-type: none"> ○ Content, where relevant, will align with the updated Pilbara Coastal Water Quality Consultation Outcomes. Any departures from the Pilbara Coastal Water Quality Consultation Outcomes will be clearly shown and justified with clear rationale; ○ Environmental quality criteria for indicators relevant to the planned discharges; ○ Spatial definition of the waste discharge point using numerical modelling outputs and the results of any wastewater discharge toxicity testing; ○ The boundaries of low or moderate levels of ecological protection surrounding the discharges, depicted using a suitable scale; ○ Identification of environmental values to be protected; ○ Environmental quality objectives relevant to the Proposal; ○ Information to demonstrate that discharges would adequately protect the environmental values and meet the levels of ecological protection associated to the discharge areas;
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	<ul style="list-style-type: none"> ○ An adaptive management program that applies the environmental quality management framework, including monitoring at appropriate site, designed to ensure the Marine Environmental Quality Management Plan is achieved. • Providing a revised list of contaminants of concern for on-going monitoring and revised set of environmental quality criteria for the assessment and management of the discharge to ensure all relevant environmental values are protected; • Monitoring of the receiving waters at the boundary of each level of ecological protection and at reference sites to ensure compliance with the Marine Environmental Quality Management Plan; • Monitoring marine discharges as relevant; • Summarising how the mitigation hierarchy will be addressed; and • Identifying existing management and mitigation mechanisms that have been implemented for current operations and that will be continued. <p>32. Identify any additional management or mitigation measures, including monitoring, that could be implemented to minimise as far as reasonably practicable residual impacts to marine environmental quality.</p>
Relevant Policy and Guidance	<p><i>EPA Policy and Guidance</i></p> <ul style="list-style-type: none"> • Statement of Environmental Principles, Factors and Objectives (EPA 2016c) • Environmental Factor Guideline – Marine Environmental Quality (EPA 2016e) • Technical Guidance – Protecting the Quality of Western Australia’s Marine Environment (EPA 2016f) <p><i>Other Policy and Guidance</i></p> <ul style="list-style-type: none"> • Pilbara Coastal Water Quality Consultation Outcomes – Environmental Values and Environmental Quality Objectives (Department of Environment [DoE] 2006) • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)

4. Other Environmental Factors or Matters

No other environmental factors or matters were identified by the EPA or proponent as being relevant to the NWS Project Extension Proposal.

Note: The NWSJV is aware that other factors or matters may be identified during the course of the Public Environmental Review that were not apparent when this draft ESD was prepared. If this situation arises, the proponent will consult with the EPA to determine whether these factors and/or matters are to be addressed in the ERD and if so, to what extent.

5. Stakeholder Consultation

The proponent will consult with stakeholders who are affected by, or are interested in, the NWS Project Extension Proposal. These stakeholders include decision-making authorities (see Section 6), other relevant state (and Commonwealth) government agencies and local government authorities, the local community, environmental non-governmental organisations, academics and research authorities.

The proponent will consult with traditional owners and custodians including discussion on the Proposal. The proponent will evidence information provided to the Indigenous community and detail, in the ERD, how and when they have been provided opportunities to ask questions (and that those questions have been answered). Any outstanding concerns will also be identified.

The proponent has a range of ongoing community consultation programs and has commenced stakeholder engagement in relation to the NWS Project Extension Proposal, comprising project specific activities and using direct engagement wherever practicable. The proponent will undertake face-to-face meetings and stakeholder forums; distribute and disseminate activity specific correspondence, hard copy, and electronic communications materials; and communicate through mainstream and social media channels.

6. Decision-making Authorities

The EPA has identified the decision-making authorities (listed in Table 6-1) for the proposal. Additional decision-making authorities may be identified during the assessment.

Table 6-1: Decision-making Authorities

Decision-making Authority	Relevant Western Australian Legislation
Minister for State Development, Jobs and Trade	<i>North West Gas Development (Woodside) Agreement Act 1979</i>
Minister for Mines and Petroleum	<i>Petroleum (Submerged Lands) Act 1982</i> <i>Petroleum Pipelines Act 1969</i>
Chief Executive Officer, Department of Water and Environmental Regulation	<i>Environmental Protection Act 1986</i>
Chief Dangerous Goods Officer, Department of Mines, Industry Regulation and Safety	<i>Dangerous Goods Safety Act 2004</i>
Chief Executive Officer, City of Karratha	<i>Planning and Development Act 2005</i>

7. References

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TERMS

Terms	Definitions
1TL	Subsea trunkline 1 within State waters
2TL	Subsea trunkline 2 within State waters
Accredited Assessment	The process whereby the Commonwealth of Australia accredits the State of Western Australia's assessment process on a case-by-case basis and the State (EPA) assesses the controlled action on behalf of the Commonwealth.
CO ₂	Carbon dioxide
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DBNGP	Dampier to Bunbury Natural Gas Pipeline
Development envelope	The boundaries that define the maximum area within which the NWS Project Extension Proposal is located
DoE	Former Western Australian Department of Environment (now Department of Water and Environmental Regulation)
DoEE	The Commonwealth of Australia's Department of the Environment and Energy
EP Act	<i>Environmental Protection Act 1986</i> (Western Australia)
EPA	Western Australian Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
EPBC Act referral	Referral to the Commonwealth Department of the Environment and Energy under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> . Refer to North West Shelf Project Extension EPBC Act Referral .
ERD	Environmental Review Document. The document prepared to meet the requirements set out in the Environmental Scoping Document and which informs the EPA's assessment of the NWS Project Extension Proposal.
ESD	Environmental Scoping Document. The document that the EPA uses to define the form, content, timing, and procedure of an environmental review and/or the public review period for the Public Environmental Review or other additional assessment information.
ha	hectare

Terms	Definitions
IMR	All ongoing activities associated with the inspection, maintenance, and repair of infrastructure during operations
Karratha Life Extension Program	A program to modify or replace equipment, plant, machinery, and subsea infrastructure upon nearing or reaching end of life as part of the NWS Project.
KBSB	King Bay Supply Base
KGP	Karratha Gas Plant
LNG	Liquefied natural gas
LPG	Liquefied petroleum gas
MNES	Matters of National Environmental Significance
mtpa	million tonnes per annum
North West Shelf (NWS) Project	The North West Shelf (NWS) Project is one of the world's largest LNG producers, supplying oil and gas to Australian and international markets from offshore gas, oil, and condensate fields in the Carnarvon Basin off the north-west coast of Australia. The NWS Project is owned by the NWSJV participants and for more than 30 years, it has been WA's largest producer of domestic gas. The NWS Project currently processes resources owned by the NWSJV and CNOOC NWS Private Limited; it is proposed to also process third-party gas and fluids as part of the NWS Project Extension Proposal.
North West Shelf Joint Venture (NWSJV)	A joint venture comprising six companies: Woodside Energy Ltd. (operator), BHP Billiton Petroleum (North West Shelf) Pty Ltd, BP Developments Australia Ltd, Chevron Australia Ltd, Japan Australia LNG (MIMI) Pty Ltd, and Shell Australia Pty Ltd. The NWSJV owns the infrastructure used as part of the NWS Project and, together with CNOOC NWS Private Limited, the NWSJV owns the resources processed as part of the NWS Project.
NOx	Nitrogen Oxides
NWS	North West Shelf
Section 38 referral	Referral to the EPA under the <i>Environmental Protection Act 1986</i> . Refer to North West Shelf Project Extension Proposal Section 38 Referral Form and Supporting Information .
SKM	Sinclair Knight Merz

Terms	Definitions
Third-party gas and fluids	Gas and associated fluids from sources other than those produced by the NWSJV and CNOOC NWS Private Limited. The processing of third-party gas and fluids is subject to the necessary commercial arrangements being in place between the NWSJV and the relevant third parties as well as all relevant joint venture and regulatory approvals being obtained.
WA	Western Australia
WET	Whole Effluent Toxicity
Woodside	Woodside Energy Ltd., as Proponent of the NWS Project Extension Proposal and the operator of the NWS Project on behalf of the NWSJV.

North West Shelf Project Extension Proposal Draft Environmental Scoping Document

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