Ichthys LNG Acid Gas Removal Unit (AGRU) Upgrade & Carbon Capture Storage (CCS) Preparedness Project

Application Number: **03095** Commencement Date: **18/08/2025** Status: **Locked**

1. About the project

1.1 Project details

1.1.1 Project title *

Ichthys LNG Acid Gas Removal Unit (AGRU) Upgrade & Carbon Capture Storage (CCS) Prepa

1.1.2 Project industry type *

Energy Generation and Supply (non-renewable)

1.1.3 Project industry sub-type

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1.1.4 Estimated start date *

01/10/2026

1.1.4 Estimated end date *

31/12/2030

1.2 Proposed Action details

1.2.1 Provide an overview of the proposed action, including all proposed activities. *

INPEX Operations Australia Pty Ltd (INPEX) is actively working to decarbonise its operations, to provide a stable supply of diverse and clean energy sources. Key to the planned decarbonisation of the INPEX-operated Ichthys liquid natural gas (LNG) facility is the development of a carbon dioxide (CO_2) compression and export system at Bladin Point, near Darwin.

To support this, upgrades are required to the existing acid gas removal units (AGRUs) to improve their capability to separate CO_2 from reservoir feed gas. In addition, a new CO_2 compression and export system (CCES) and CO_2 export pipeline are proposed to be integrated into the existing Ichthys LNG facility processing systems (located in LNG Train 1 and Train 2 areas). This would enable CO_2 extracted during processing to be compressed and transported to an offshore storage location (the subject of separate referrals).

The following new infrastructure/equipment is proposed to be installed at the Ichthys LNG facility:

- modularised equipment to upgrade the two existing AGRUs
- CO_2 compressor modules (including auxiliary vents)
- an in-plant section of CO_2 export pipeline, export metering, and PIG (pipeline inspection gauge) launcher
- a modular building with combined electrical and control equipment to power and control the new facilities
- a common dehydration module
- a water treatment system/s, including water tanks, to treat and re-use water recovered from the CO_2 stream
- supplementary power infrastructure (i.e. a small battery energy storage system, electrical power distribution system and cabling).

Activities required to be undertaken to support the proposed AGRU upgrades and installation of the new CCES include:

- site-preparation
- construction (civil works, piling, drainage installation, etc.)
- installation/connection (i.e. module delivery/installation, installation of the CO_2 pipeline and cabling, and brownfield upgrades within the Ichthys LNG facility)
- pre-commissioning and cold commissioning of the upgraded AGRUs and CCES equipment/infrastructure
- preservation of the CO_2 pipeline, upgraded AGRUs and CCES infrastructure/equipment.

Once cold commissioning has been performed, the new CCES equipment/infrastructure would remain in place and preserved until such time it could be connected to future offsite carbon, capture and storage (CCS) infrastructure. The upgraded AGRUs would be preserved until such time Plover gas wells are brought on-line and the CO_2 capacity exceeds the existing AGRU system design.

A detailed description of the Ichthys LNG AGRU Upgrade & CCS Preparedness Project is provided within ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 2)*.**

Project footprint

The “Project Area” is defined as the area where activities associated with the Project may occur shown in **Figure 2-3** of ***Attachment 1 (Section 2.2)***. The Project Area encompasses areas which may be utilised for laydown, siting of plant equipment required for construction, temporary offices, the module offloading facility (MOF), etc. in addition to the area where civil construction activities would occur.

The “Project footprint” is defined as the area that would be disturbed as a result of the civil construction activities required to support the installation of new infrastructure within the Ichthys LNG facility. All construction work associated with AGRU upgrades, and the CO_2 compression and export system would be

completed in an area of vacant land, situated to the east of Ichthys LNG Trains 1 and 2 and positioned within the perimeter fence line of the existing facility, in Bulk Areas A and B, collectively referred to as the 'Bulk Area' (Shown in ***Figure 2-4*** of ***Attachment 1 (Section 2.2)***). All construction works for the pipeline would occur in a right of way (ROW), which extends from the Bulk Area, continues along the eastern boundary of Ichthys LNG facility and terminates at the western boundary of Ichthys LNG facility (Shown in **Figure 2-4** of ***Attachment 1 (Section 2.2)***). All construction works associated with installation of the supplementary power infrastructure would occur in vacant land east of the combined cycle power plant and main power substation (Shown in ***Figure 2-4*** of ***Attachment 1 (Section 2.2)***). Associated cables to support of importation of power would be located within a proposed supplementary power cable ROW ((Shown in ***Figure 2-4*** of ***Attachment 1 (Section 2.2)***). This follows the route of the CO_2 pipeline within the Ichthys LNG facility; however, the width varies in areas due to operational restrictions or presence of existing infrastructure.

The Project footprint comprises a total disturbance area of approximately 17 ha. The entire Project footprint was cleared of vegetation and was subject to standard cut and fill activities as part site preparation activities undertaken during the construction of the Ichthys LNG facility (2013-2016); approved as part of the Ichthys LNG Development Project (EPBC 2008/4208; ***Attachment 1 (Section 1.3.1)***). No further vegetation clearing is required for the proposed Project.

1.2.2 Is the project action part of a staged development or related to other actions or proposals in the region?

Yes

1.2.3 Is the proposed action the first stage of a staged development (or a larger project)?

Yes

1.2.5 Provide information about the staged development (or relevant larger project).

Ichthys CCS Project

INPEX on behalf of Ichthys LNG Pty Ltd, is proposing to develop a buried onshore pipeline system between Ichthys LNG and the inlet to potential CO_2 sequestration projects. Furthermore, it will operate capture, dehydration and compression facilities within Ichthys LNG facility as part of an integrated carbon capture storage (CCS) system.

The proposed onshore pipeline system would be comprised of two sections. The first section would extend from the Ichthys LNG facility boundary on Bladin Point to the proposed Bonaparte CCS Project onshore inlet station. The subsequent section would extend from the Bonaparte CCS Project onshore inlet station to a proposed CCS tie in/inlet station located adjacent to the Darwin LNG facility on Wickham Point.

In addition to the pipeline system on Middle Arm, the proposal includes the hot commissioning of the Ichthys LNG facility CO_2 compression and export system (CCES) and upgraded AGRUs, and the operations of the integrated CCS system to the point of custody transfer at a CCS sequestration project CO_2 onshore inlet station within the region.

A referral application supporting this project is planned to be submitted in Quarter 3 2025.

The submission of a separate referral is appropriate because:

- the Projects would be executed on different timeframes (a year apart)
- between the referrals, any significant impacts of the two proposed actions are, or would be assessed; and
- both referrals have considered the cumulative impacts of the proposed actions.

Bonaparte CCS Project

INPEX, as operator of the Bonaparte CCS Assessment Joint Venture is proposing to develop the Bonaparte CCS Project, a large-scale multi-user CCS facility partly located in the Northern Territory of Australia.

The Bonaparte CCS Project is proposing to develop infrastructure to receive, transport and permanently sequester CO_2 within a geological formation located approximately 2,000 m below the seabed.

The proposed infrastructure for permanent sequestration would be located approximately 250 km west of Darwin in the Joseph Bonaparte Gulf. The transport infrastructure would comprise of a CO_2 pipeline and control cable extending between the Joseph Bonaparte Gulf and the Middle Arm peninsula in Darwin where the onshore inlet station is proposed to be developed.

CO_2 emissions are intended to be collected from a range of potential customers in the region, including reservoir CO_2 from Ichthys LNG onshore facility.

A referral application supporting this project is planned to be submitted in Quarter 3 2025.

The submission of a separate referral is appropriate because:

- the Projects are owned by different Joint Ventures and would be managed separately
- commercial arrangements have not yet been agreed between the two Joint Ventures and are unlikely to be exclusive arrangements
- there are clear geographical boundaries
- between the referrals, any significant impacts of all the proposed actions are, or would be assessed; and
- all referrals have considered the cumulative impacts of the proposed actions.

1.2.6 What Commonwealth or state legislation, planning frameworks or policy documents are relevant to the proposed action, and how are they relevant? *

The following legislation is applicable to the Project; further detail is provided in ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 3)***.

Commonwealth legislation:

- ***Biosecurity Act 2015****:* The Act and its supporting legislation are the primary legislative means for managing risk of pests and diseases entering Australian territory and causing harm to animal, plant and human health, the environment and/or the economy. Approval is required from the Department of Agriculture, Forestry and Fisheries to re-establish the module offloading facility (MOF) as a first point of entry of ships entering from international waters and to unload modules and other equipment.
- ***Environment Protection and Biodiversity Conservation Act 1999****:* The Act provides for the protection and management of nationally and internationally important flora, fauna, ecological communities, and heritage places. Matters of national environmental significance (MNES) are protected under Part 3 of the Act and projects require approval under the Act if they are likely to result in a significant impact on MNES. While INPEX does not believe the Project will have a significant impact on MNES, a referral has been submitted to DCCEEW.

Northern Territory legislation:

- ***Environment Protection Act 2019****:* The Act aims to promote ecological sustainable development, manage significant disturbances through an environmental approval process, provide for broader community involvement and recognise the importance of participation of Aboriginal people and communities in environmental decisions. Under the Act, the NT EPA regulates the environment impact assessment process to identify potential environmental impacts of development proposals. Pre-referral screening determined the Project has the potential to impact on five environmental factors: terrestrial environmental quality; terrestrial ecosystems; marine environmental quality; community and economy; and culture and heritage. While INPEX does not believe the Project will have a significant impact on environmental factors, a referral will be submitted to NT EPA in parallel.
- ***Waste Management and Pollution Control Act 1998*****:** The Act provides for the protection, and where practicable the restoration and enhancement of the quality of, the Territory environment. Specifically, by preventing pollution, reducing the likelihood of pollution occurring, effectively responding to pollution, avoiding and reducing the generation of waste, increasing the re-use and re-cycling of waste, and effectively managing waste disposal. It also to encourages ecologically sustainable development and facilitates the implementation of national environment protection measures. Schedule 2 of Act outlines activities that require an approval or licence under the Act, which requires approvals and licences for activities that relate to processing of hydrocarbons to produce, store and/or despatch liquefied natural gas or methanol. INPEX will engage with the NT EPA on the requirement for approvals under the WMPC Act for construction activities associated with the Project. Waste management during the Project will be in compliance with the requirements of the Act.
- ***Water Act 1992****:* The Act Provides for the investigation, allocation, use, control, protection, management and administration of water resources, including extraction of ground water, wastewater management and water pollution. Under the Act waste discharge licences are required where an activity could affect a declared beneficial use of a water resource. A waste discharge licence may be required if wastewater associated with pre-commissioning activities is required to be discharged to Darwin Harbour.
- ***Weeds Management Act 2001****:* The Act allows for the declaration of weeds into classifications for the purposes of preventing a plant entering into, or managing the plant in, the Territory or a part of the Territory. The Act provides for statutory weed management plans, which prescribe management actions for high priority weeds. The Act also gives powers to authorised officers, including the power to order certain activities in relation to declared weeds.
- ***Territory Parks and Wildlife Conservation Act****:* The Act forms a framework for the establishment and management of parks and reserves and declaration of protected wildlife. This Act has been

considered with regard to the potential interactions with protected wildlife.

- ***Heritage Act 2011****:* Northern Territory's cultural and natural heritage. All Aboriginal or Macassan archaeological places or objects are automatically declared heritage places or objects under the Act. Other places or objects can be nominated, and if accepted, can be declared heritage places or objects under the Act. A works approval is required to carry out work on a heritage place or object. No heritage objects/places are known to exist within the fence line of Ichthys LNG facility, where the Project would occur. In the event a previously unidentified object is discovered during construction, an unexpected/chance finds procedure will be implemented.
- ***Northern Territory Aboriginal Sacred Sites Act 1989****:* The Act provides protection from unauthorised entry or damage to all sacred sites in the Northern Territory. Under the Act those wishing to undertake works on land or sea are required to obtain an Authority Certificate. Authority Certificates are a legal document that protects sacred sites from damage by setting out the conditions for carrying out specific works on an area of land and/or sea. INPEX has been issued an AAPA Authority for the area where Project activities would occur.
- ***Planning Act 1999****:* The Act regulates how land in the Northern Territory can be developed and used. This includes the establishment of planning schemes, development consent authority and planning commission. The Project is located entirely within the existing Ichthys LNG facility boundary (NT Portion 7002) and is zoned “Development”. For all new development at Ichthys LNG facility a new development permit is required, where this constitutes >5% change to the existing site.
- ***Ports Management Act 2015****:* The Act provides for the control, management and operation of ports, and for related purposes. A safety exclusion zone around the MOF is likely to be required during MOF offloading activities.

1.2.7 Describe any public consultation that has been, is being or will be undertaken regarding the project area, including with Indigenous stakeholders. Attach any completed consultation documentations, if relevant. *

INPEX believes effective stakeholder consultation is essential in maximising the safety of Company and Contractor personnel, and the community; and in establishing, building and maintaining community support and trust. INPEX works closely with identified stakeholders to provide integrated, timely and effective information to the community and provide mechanisms for feedback and response.

INPEX's approach to integrated stakeholder consultation is based on five key principles:

- regular personal contact with key stakeholders
- consistent, timely, coordinated and responsive communication across all stakeholder groups
- upfront communication about issues and impacts
- easily accessible information; and
- ongoing monitoring and improvement.

A stakeholder engagement plan has been prepared to meet the regulatory requirements for consultation under the EPBC Act (Cwlth) and the NT *Environment Protection Act 2019* (EP Act), and subordinate legislation (refer to ***Attachment 3: Ichthys LNG AGRU Upgrades and CCS Preparedness Project Stakeholder Engagement Plan***).

An overview of INPEX's approach to stakeholder consultation, the stakeholder consultation undertaken to inform the development of the ***Draft Ichthys LNG AGRU Upgrades and CCS Preparedness Construction and Commissioning Environment Management Plan*** (Draft CCEMP; ***Attachment 2***) approval applications, and the ongoing stakeholder consultation activities that would be undertaken throughout the execution of the Project is described in ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 7)***.

The complete stakeholder register, outlining stakeholders who were consulted during the pre-referral stage and any relevant information that was provided to them for consideration, is presented in ***Appendix C*** of ***Attachment 1***. Where feedback was received a summary of this and how it has been addressed in this supporting document and the Draft CCEMP is provided in ***Table 7-1*** of ***Attachment 1***.

1.3.1 Identity: Referring party

Privacy Notice:

Personal information means information or an opinion about an identified individual, or an individual who is reasonably identifiable.

By completing and submitting this form, you consent to the collection of all personal information contained in this form. If you are providing the personal information of other individuals in this form, please ensure you have their consent before doing so.

The Department of Climate Change, Energy, the Environment and Water (the department) collects your personal information (as defined by the Privacy Act 1988) through this platform for the purposes of enabling the department to consider your submission and contact you in relation to your submission. If you fail to provide some or all of the personal information requested on this platform (name and email address), the department will be unable to contact you to seek further information (if required) and subsequently may impact the consideration given to your submission.

Personal information may be disclosed to other Australian government agencies, persons or organisations where necessary for the above purposes, provided the disclosure is consistent with relevant laws, in particular the Privacy Act 1988 (Privacy Act). Your personal information will be used and stored in accordance with the Australian Privacy Principles.

See our Privacy Policy to learn more about accessing or correcting personal information or making a complaint.

Alternatively, email us at privacy@dcceew.gov.au.

☑ **Confirm that you have read and understand this Privacy Notice ***

1.3.1.1 Is Referring party an organisation or business? *

Yes

Referring party organisation details

ABN/ACN	48150217262
Organisation name	INPEX OPERATIONS AUSTRALIA PTY LTD
Organisation address	Level 22, 100 St Georges Terrace, Perth 6000 WA

Referring party details

Name	Obelia Akerman
Job title	Environmental Team Lead Approvals and Compliance
Phone	08 62136000
Email	obelia.akerman@inpex.com.au
Address	Level 22 100 St Georges Terrace, Perth WA, 6000

1.3.2 Identity: Person proposing to take the action

1.3.2.1 Are the Person proposing to take the action details the same as the Referring party details? *

No

1.3.2.2 Is Person proposing to take the action an organisation or business? *

Yes

Person proposing to take the action organisation details

ABN/ACN	48150217262
Organisation name	INPEX OPERATIONS AUSTRALIA PTY LTD
Organisation address	Level 22, 100 St Georges Terrace, Perth, 6000 WA

Person proposing to take the action details

Name	Christopher Justin Wilson
Job title	Director
Phone	0862136000
Email	chrisj.wilson@inpex.com.au
Address	Level 22, 100 St Georges Terrace, Perth 6000 WA

1.3.2.14 Are you proposing the action as part of a Joint Venture? *

Yes

Joint Venture Name	Business Address	ABN/ACN	Responsible Person	Email
Ichthys LNG Pty Ltd	Level 22, 100 St Georges Terrace, Perth WA 6000	42150217299	Tetsu Murayama	enquiries@inpex.com.au

1.3.2.15 Are you proposing the action as part of a Trust? *

No

1.3.2.17 Describe the Person proposing the action's history of responsible environmental management including details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the Person proposing to take the action. *

Historical Performance

INPEX Operations Australia Pty Ltd (INPEX) acts as the delegated operator for INPEX's operated Australian projects across various titles and in different joint ventures. INPEX is committed to meeting all our regulatory obligations within the prescribed legislation. INPEX has not been subject to proceedings by environmental regulatory agencies, either past or present, under a Commonwealth or State law for the protection of the environment or the conservation and sustainable use of natural resource.

INPEX confirms to the best of our information, knowledge and belief, the following incidences of non-compliance:

- On 2 April 2019, IOAPL was issued with one infringement notice for contravening condition 8 of EPBC 2008/4208. The infringement notice related to firefighting foam evaporation. INPEX paid the infringement.
- On 15 July 2013, IOAPL was issued with one infringement notice for contravening condition 10 of EPBC 2008/4208. The infringement noted related to the release of spoil outside DSDA. INPEX paid the infringement and recovered it from VOA (dredging contractor).
- On 4 September 2019, IOAPL was issued with four infringements under the *Waste Management and Pollution Control Act 1998* s30(2), s30(3) and s39(2). The infringement related to the boiling of wastewater containing PFAS (firefighting foam). INPEX paid the infringements.

Ichthys LNG Pty Ltd was subject to the following:

- On 15 September 2023, Ichthys LNG Pty Ltd was issued an infringement for contravening condition 17.2 of EPL228-05. The infringement related to a heating medium release. Ichthys LNG Pty Ltd paid the infringement.
- On 13 June 2014, Ichthys LNG Pty Ltd was issued two infringements for contravening conditions 6 and 31 of EPA8-01. The infringements related to the release of spoil outside dredge spoil disposal area. Ichthys LNG Pty Ltd paid the infringements.
- On16 July 2023, Ichthys LNG Pty Ltd was issued an infringement for contravening condition 6 of EPA8-01. The infringement related to a traverse through marine heritage exclusion zone (Catalina). Ichthys LNG Pty Ltd paid the infringement.

Prior EPBC Referrals

2012/6503	Removal of Potential Unexploded Ordnance within NAXA
2008/4208	Ichthys Gas Field, Offshore and onshore processing facilities and subsea pipeline

1.3.2.18 If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

INPEX's Business Management System (BMS) is a comprehensive, integrated system that includes standards and procedures necessary for the management of health, safety and environment (HSE) risks. Activities to manage HSE risks are planned, implemented, verified and reviewed under an iterative "plan, do, check, act" (PDCA) cycle. The PDCA cycle enables INPEX to ensure that processes are adequately resourced and managed and that opportunities for improvement are determined and acted on. Further details on INPEX's BMS are provided in ***Attachment 2: Draft Ichthys LNG AGRU Upgrades and CCS Preparedness Construction and Commissioning Environment Management Plan (Section 7.1)***

INPEX environmental performance is achieved through strong visible leadership, commitment and accountability at all levels of the organisation. Leadership includes defining performance targets and providing structures and resources to meet them. Achieving high levels of HSE performance is defined within the highest levels of management system documents (policies) and is cascaded through subsidiary documents.

The INPEX health, safety, security, environment and quality policy (Refer to ***Attachment 2 (Section 7.3)***) sets the direction and minimum expectations for environmental performance and is implemented through the standards and procedures of the BMS. The policy solidifies this commitment and states the minimum expectations for environmental performance. The policy applies to all INPEX controlled activities in Australia. All personnel, including contractors, are required to comply with the policy.

1.3.3 Identity: Proposed designated proponent

1.3.3.1 Are the Proposed designated proponent details the same as the Person proposing to take the action? *

No

1.3.3.2 Is Proposed designated proponent an organisation or business? *

Yes

Proposed designated proponent organisation details

ABN/ACN	48150217262
Organisation name	INPEX OPERATIONS AUSTRALIA PTY LTD
Organisation address	Level 22, 100 St Georges Terrace, Perth 6000 WA

Proposed designated proponent details

Name	Christopher Justin Wilson
Job title	Director
Phone	0862136000
Email	chrisj.wilson@inpex.com.au
Address	Level 22, 100 St Georges Terrace, Perth 6000 WA

1.3.4 Identity: Summary of allocation

Confirmed Referring party's identity

The Referring party is the person preparing the information in this referral.

ABN/ACN	48150217262
Organisation name	INPEX OPERATIONS AUSTRALIA PTY LTD
Organisation address	Level 22, 100 St Georges Terrace, Perth 6000 WA
Representative's name	Obelia Akerman
Representative's job title	Environmental Team Lead Approvals and Compliance
Phone	08 62136000
Email	obelia.akerman@inpex.com.au
Address	Level 22 100 St Georges Terrace, Perth WA, 6000

Confirmed Person proposing to take the action's identity

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	48150217262
Organisation name	INPEX OPERATIONS AUSTRALIA PTY LTD
Organisation address	Level 22, 100 St Georges Terrace, Perth, 6000 WA
Representative's name	Christopher Justin Wilson
Representative's job title	Director
Phone	0862136000
Email	chrisj.wilson@inpex.com.au
Address	Level 22, 100 St Georges Terrace, Perth 6000 WA

Confirmed Proposed designated proponent's identity

The Person proposing to take the action is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

ABN/ACN	48150217262

Organisation name	INPEX OPERATIONS AUSTRALIA PTY LTD
Organisation address	Level 22, 100 St Georges Terrace, Perth 6000 WA
Representative's name	Christopher Justin Wilson
Representative's job title	Director
Phone	0862136000
Email	chrisj.wilson@inpex.com.au
Address	Level 22, 100 St Georges Terrace, Perth 6000 WA

1.4 Payment details: Payment exemption and fee waiver

1.4.1 Do you qualify for an exemption from fees under EPBC Regulation 5.23 (1) (a)? *

No

1.4.3 Have you applied for or been granted a waiver for full or partial fees under Regulation 5.21A? *

No

1.4.5 Are you going to apply for a waiver of full or partial fees under EPBC Regulation 5.21A?

No

1.4.7 Has the department issued you with a credit note? *

No

1.4.9 Would you like to add a purchase order number to your invoice? *

No

1.4 Payment details: Payment allocation

1.4.11 Who would you like to allocate as the entity responsible for payment? *

Proposed designated proponent

2. Location

2.1 Project footprint

Project Area: 205.52 Ha **Disturbance Footprint:** 19.88 Ha

2.2 Footprint details

2.2.1 What is the address of the proposed action? *

144 Wickham Point Road Wickham NT 0830

2.2.2 Where is the primary jurisdiction of the proposed action? *

Northern Territory

2.2.3 Is there a secondary jurisdiction for this proposed action? *

No

2.2.5 What is the tenure of the action area relevant to the project area? *

The Project is located entirely within the existing Ichthys LNG facility perimeter fence line within NT Portion 7002 and is zoned under the NT Planning Scheme 2020 as “Development”. Tenure of the land is "Freehold".

3. Existing environment

3.1 Physical description

3.1.1 Describe the current condition of the project area's environment.

Location

All new infrastructure, equipment and activities associated with the Project would occur wholly within the perimeter fence line of the existing Ichthys LNG facility (NT Portion 7002). The area is zoned as "Development" under the NT Planning Scheme 2020. Access to the Project Area is via Wickham Point Road and the existing site access road within the Ichthys LNG facility. No changes are required to the existing road infrastructure.

The Ichthys LNG facility is located on Bladin Point, on the northern side of Middle Arm Peninsula in Darwin Harbour, approximately:

- 4 km from Palmerston (the nearest residential zone)
- 10 km south-east of the Darwin central business district (CBD), across Darwin Harbour waters; and
- 35 km by road (or 4 km by sea) from East Arm Wharf.

The existing Santos operated Darwin LNG processing and export facility is located on the west side of the Peninsula on Wickham Point.

Refer to ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 2.2, Figure 2-2)***) for further information.

All areas of work, including laydown areas, were previously developed during construction of the Ichthys LNG facility. An overview of the existing Ichthys LNG facility systems and activities is presented in ***Attachment 1 (Section 4)***.

Current condition

The entire Project footprint was cleared of vegetation and was subject to standard cut and fill activities as part site preparation activities undertaken during the construction of the Ichthys LNG facility (2013-2016); approved as part of the Ichthys LNG Development Project (refer to ***Attachment 1 (Section 1.3.1)***). No further vegetation clearing is required for the scope covered in the referral.

The Project footprint is largely located in hardstand areas that are covered by either concrete, sealed handstand, crushed rock material or asphalt roads. Supporting temporary offices, facilities and internal roads would be located within existing handstand areas.

3.1.2 Describe any existing or proposed uses for the project area.

All areas of work, including laydown areas, were previously developed during construction of the Ichthys LNG facility. An overview of the existing Ichthys LNG facility systems and activities that occur within the Project Area are presented in ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 4***)).

The Ichthys LNG facility, where activities would occur, is located on Bladin Point, on the northern side of Middle Arm peninsula in Darwin Harbour (refer ***Attachment 1 (Section 2.2, Figure 2-2)***). The Middle Arm peninsula is currently utilised by the following industries:

- the oil and gas industry (both the Darwin LNG and Ichthys LNG facilities)
- power stations (Channel Island and Weddel power stations)
- worker accommodation facilities (Bladin Village).

Other proposed uses of the Middle Arm peninsula include the proposed Middle Arm Sustainable Development Precinct, currently the subject of a Strategic Assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) and *Environment Protection Act 2019* (NT). It is proposed that this will be a hub for manufacturing, export and energy industries.

Darwin Harbour is adjacent to the Project Area, which is most intensively used for commercial shipping, recreational boating/fishing, tourism and naval activities (***Attachment 1 (Section 5.4)***).

3.1.3 Describe any outstanding natural features and/or any other important or unique values that applies to the project area.

There are no outstanding natural features within the Project Area or Project footprint. The entire Project footprint was cleared of vegetation and was subject to standard cut and fill activities as part site preparation activities undertaken during the construction of the Ichthys LNG facility (2013-2016); approved as part of the Ichthys LNG Development Project (refer to ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 1.31)***).

The area adjacent to Project Area, Darwin Harbour (Port of Darwin (NT029)), has been identified as a wetland of national significance in the Directory of Important Wetlands. Further, the mangrove communities within Darwin Harbour, and adjacent to the Project Area, are considered to have high conservation value for both cultural and biological reasons (refer to ***Attachment 1 (Sections 5.2.1 and 5.3)***).

3.1.4 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The Project Area, located on Bladin Point, is generally flat, varying only 10 m in topography. After rainfall, the majority of surface water flows east into the Elizabeth River and west into Lightning Creek, with some surface water discharging north into Darwin Harbour and south towards the isthmus and a tidal salt flat.

The 100-year storm surge level at Bladin Point is estimated at 4.9 m AHD and the 500-year storm surge level is estimated at 5.6 m AHD. Most the existing Ichthys LNG facilities (including all critical facilities) are located above 6.5 m AHD, with some non-critical support infrastructure located above 5.8 m AHD which provides 0.2 m above the estimated 500-year storm surge level to account for potential sea level increase. Further information is provided in ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 5.15)***).

3.2 Flora and fauna

3.2.1 Describe the flora and fauna within the affected area and attach any investigations of surveys if applicable.

Flora

Project Area

The entire Project Area and footprint was cleared of vegetation and was subject to standard cut and fill activities as part site preparation activities undertaken during the construction of the Ichthys LNG facility (2013-2016); approved as part of the Ichthys LNG Development Project (refer to ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 1.31)***).

Annual weed surveys have been undertaken in and around Ichthys LNG facility since 2008. Weed surveys have recorded the following weed species which are listed as declared weeds under the *Weeds Management Act 2001* (NT) within the Ichthys LNG facility boundary:

- Flannel weed (*Sida cordifolia*): located on the southeastern boundary of the operations complex
- Lion's tail (*Leonotis nepetifolia*): located on the southeastern boundary of the operations complex
- Barnyard grass (*Echinochloa colona*): located on the eastern boundary of Ichthys LNG
- Perennial mission grass (*Cenchrus polystachios*; formerly known as *Pennisetum polystachion*): located in the southwestern corner of the operations complex and south of Ichthys LNG.
- Mimosa (*Mimosa pigra*): recorded in small, isolated patches of the site.
- Sicklepod (*Senna obtusifolia*): recorded in small, isolated patches of the site.

Further information is provided in ***Attachment 1 (Section 5.2.3)***.

Adjacent Areas

Mangrove mapping by Brocklehurst et al (2018) indicates that the mangrove communities present adjacent to the proposed pipeline corridor include the following species:

- *Rhizophora stylosa*/*Camptostemon schultzii* low to mid closed-forest/open-forest (shoreline forest and tidal creek forest) (group 1a & 2a)
- *Rhizophora stylosa*/*Bruguiera* spp/*Ceriops* spp low closed-forest/low open-forest (transition zone) (group 3a)
- *Ceriops tagal* low closed-forest/low open-forest (tidal flats) (group 4a)
- Mixed species low closed-forest (hinterland) (group 4b)
- *Ceriops tagal* low closed-forest/open-forest (hinterland) (group 4c); and
- *Avicennia marina*/*Ceriops* spp low open-forest/low closed-forest (group 5b)
- Mixed species low open-forest/low closed-forest (group 5c)
- *Sonneratia alba* low woodland/low open forest (group 8).

These mangrove communities are considered regionally common and represented throughout Darwin Harbour. Further information is provided in ***Attachment 1 (Section 5.2.2 - Mangrove communities and Figure 5-5)***.

The EPBC Protected Matters Search Tool did not identify any threatened flora species known or likely to occur within the Project Area or any threatened ecological communities.

Fauna

Project Area

No fauna habitats exist within the proposed Project Area following completion of construction of the existing Ichthys LNG facility. Where fauna is located within the Ichthys LNG facility fence boundary these are removed and relocated by appropriately trained and qualified site personnel under Ichthys LNG Onshore Operations Environmental Management Plan. Further information is provided in ***Attachment 1 (Section 5.2.4)***.

Introduced terrestrial fauna species recorded on Bladin Point include the cane toad (*Rhinella marina*), feral pigs (*Sus scrofa*), cats (*Felis catus*), black rat (*Rattus rattus*) and insect pest species. The cane toad is the most widely occurring pest species recorded on Bladin Point (Refer to ***Attachment 1 (Section 5.2.4)***.

Adjacent areas

Areas adjacent to the Project Area support shorebirds and other marine species.

Twelve shorebird species have been recorded within the Middle Arm Peninsula. Of the 12 species recorded, seven migratory shorebird species are currently listed under the EPBC Act or *Territory Parks and Wildlife Conservation Act*, including:

- Far Eastern Curlew (*Numenius madagascariensis*)
- Bar-tailed Godwit (*Limosa lapponica baueri & menzbieri*)
- Common Greenshank (*Tringa nebularia*)
- Greater Sand Plover (*Charadrius leschenaultii*)
- Grey Plover (*Pluvialis squatarola*)
- Sharp-tailed Sandpiper (*Calidris acuminata*)
- Terek Sandpiper (*Xenus cinereus*).

Shorebird count data for Middle Arm between 2018 and 2022 is presented in ***Attachment 1 (Section 5.2.4 - Shorebirds, Figure 5-6***).

The intertidal areas along Middle Arm from Lightning Creek to the north-west of the Peninsula, including Cossack Creek, represent one of three key foraging sites within Darwin Harbour. Large congregations of shorebirds have been recorded during low tide aerial surveys on the intertidal mudflat between the Bladin Point (INPEX operations) and the Darwin LNG facility. However, survey records show that areas immediately surrounding Ichthys LNG (within 1 km buffer) are not core habitat in context to surrounding areas of the Middle Arm Peninsula (Refer to ***Attachment 1 (Section 5.2.4 - Shorebirds)***).

Six species of marine turtles are known to occur in Northern Territory waters, although the green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and flatback (*Natator depressus*) turtles are the only species known to frequent Darwin Harbour regularly. No turtle nesting sites are known to occur in Darwin Harbour, with the closest nesting site in the Darwin region located at Casuarina Beach. Other turtle nesting sites include Bare Sand Island and Quail Island located near the mouth of Bynoe Harbour (~50 km from Darwin). Within the Darwin region most turtle nesting is associated with flatback turtles, with only small numbers of other turtle species occasionally nesting in the area. There is no significant foraging habitat or suitable nesting habitat for marine turtles adjacent to the Project Area.

The saltwater crocodile (*Crocodylus porosus*) is a common resident of Darwin Harbour and surrounds. Preferred nesting habitat of the saltwater crocodile includes elevated, isolated freshwater swamps that do not experience the influence of tidal movements. Nesting within Darwin Harbour is limited.

The Australian snubfin (*Orcaella heinsohni*), the Australian humpback (*Sousa sahulensis*) and the Indo-Pacific bottlenose (*Tursiops aduncus*) are all dolphin species known to have resident populations within Bynoe Harbour, Darwin Harbour and Shoal Bay. Darwin Harbour has been identified as a biological important area (BIA) for breeding and foraging, for all three dolphin species. Dugongs (*Dugong Dugon*) are also known to occur in the Darwin region. The area adjacent to the Project Area is not considered significant foraging or breeding habitat for either coastal dolphins or dugongs.

3.2.2 Describe the vegetation (including the status of native vegetation and soil) within the project area.

Project Area

Vegetation

The entire Project Area and footprint was cleared of vegetation and was subject to standard cut and fill activities as part site preparation activities undertaken during the construction of the Ichthys LNG facility (2013-2016); approved as part of the Ichthys LNG Development Project (refer to ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 1.3.1)***).

Annual weed surveys have been undertaken in and around Ichthys LNG facility since 2008. Weed surveys have recorded the following weed species which are listed as declared weeds under the *Weeds Management Act 2001* (NT) within the Ichthys LNG facility boundary:

- Flannel weed (*Sida cordifolia*): located on the southeastern boundary of the operations complex
- Lion's tail (*Leonotis nepetifolia*): located on the southeastern boundary of the operations complex
- Barnyard grass (*Echinochloa colona*): located on the eastern boundary of Ichthys LNG
- Perennial mission grass (*Cenchrus polystachios*; formerly known as *Pennisetum polystachion*): located in the southwestern corner of the operations complex and south of Ichthys LNG.
- Mimosa (*Mimosa pigra*): recorded in small, isolated patches of the site.
- Sicklepod (*Senna obtusifolia*): recorded in small, isolated patches of the site.

Geology and geomorphology

Bladin Point is a low-lying peninsula, which is separated from the mainland by a mudflat. The area is underlain by Early Proterozoic and Burrell Creek Formation rocks, with some Cretaceous Darwin Formation rocks along the shoreline. Soils over half of the site are very gravelly, massive earths that range in depth from shallow (<0.25 m) to moderately deep (0.25 to <0.5 m) (Fogarty et al. 1984).

The following soil families have been identified at Bladin Point: Bladin (red, fine sandy clay loam); Hotham (brown, massive, fine sandy loam with medium gravel); Koolpinyah (yellow sandy loam over sandy clay loam); Mullalgah (deep, peaty soils on marine sediments); Euro (hydrosols on intertidal flats); Maand (poorly drained marine muds); and Rinamatta (siliceous sands).

The Mullalgah, Euro, Maand and Rinamatta soil families contain varying levels of ASS. Geotechnical investigations for Ichthys LNG construction phase identified areas of ASS within Ichthys LNG footprint, with key areas being the ground flare pad, tankage flare, condensate tank area, MOF causeway and tidal area of the haul road (JKC 2014; Coffey 2014). In addition to areas of ASS, geotechnical investigations also reported soils with natural non sulphuric acidity (pH levels as 3.4 to 6.8); natural acidity formed through hydrolysis reactions where the anions are leached and replaced with hydrogen soils.

The current finished ground surface consists of 'cut and fill'. The cut areas are generally covered by a layer of compacted general fill up to 2.5 m deep, which is underlain (in places) by aggregate rocks and low permeable geofabric material. Some filled areas located along the edges of the Site underwent significant ground improvement works.

Further information is provided in ***Attachment 1 (Section 5.1.4)***.

3.3 Heritage

3.3.1 Describe any Commonwealth Heritage Places Overseas or other places recognised as having heritage values that apply to the project area.

Commonwealth heritage places

There are no Commonwealth heritage places within the Project Area.

Heritage objects or sites

Middle Arm Peninsula is located within the traditional country of the Larrakia people. During archaeological surveys undertaken to support the construction of the Ichthys LNG facility, a number of Aboriginal heritage sites were identified in and adjacent to the onshore development area. Following consultation with the Larrakia Heritage Management Executive Committee and NT Heritage Branch the following actions were taken:

- sites and objects within the Ichthys LNG fence line were removed or relocated to an agreed location ("Heritage Hill")
- sites and objects outside of the Ichthys LNG fence line have been protected using measures such as the implementation of conservation zones.

Aboriginal heritage sites recorded adjacent to or near the Project Area are protected under the *Heritage Act 2011* (NT) are further described in ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 5.3.1)***. There are no known Aboriginal heritage sites within the fence line of the Ichthys LNG facility, where Project activities are planned to be undertaken.

In addition to Aboriginal heritage sites, archaeological surveys undertaken to support the Ichthys LNG Development Project identified World War II objects on Bladin Point. Objects found within the vicinity of Ichthys LNG were deemed to not be of heritage value and were removed following consultation with the NT Heritage Branch. There are no known World War II heritage sites within, where Project activities are planned to be undertaken.

Further information is provided in ***Attachment 1 (Section 5.3.1)***.

Sacred sites

Sacred sites are places within the landscape that have a special meaning or significance under Aboriginal tradition. In coastal and sea areas, sacred sites may include features that lie both below and above the water. There are several sacred sites in Darwin Harbour and the surrounding waters. All sacred sites within the NT are protected under the *Northern Territory Aboriginal Sacred Sites Act* (NT). There are no sacred sites within the Project Area or directly adjacent to it.

Anyone proposing to use or work on land in the NT may apply to the AAPA for an Authority Certificate to cover their proposed activities. Authority Certificates are issued following consultation with traditional custodians and include conditions on what can and cannot be done in and around identified sacred sites. The Larrakia people are acknowledged as the traditional owners of the area in and around Darwin.

INPEX holds two Authority Certificates, which cover the locations and the activities required to be undertaken by the Project: C2011/166 and C2014/007. Further information is provided in ***Attachment 1 (Section 5.3.2)***.

3.3.2 Describe any Indigenous heritage values that apply to the project area.

Heritage objects or sites

Middle Arm Peninsula is located within the traditional country of the Larrakia people. During archaeological surveys undertaken to support the construction of the Ichthys LNG facility, a number of Aboriginal heritage sites were identified in and adjacent to the onshore development area. Following consultation with the Larrakia Heritage Management Executive Committee and NT Heritage Branch the following actions were taken:

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- sites and objects outside of the Ichthys LNG fence line have been protected using measures such as the implementation of conservation zones.

Aboriginal heritage sites recorded adjacent to or near the Project Area are protected under the *Heritage Act 2011* (NT) are further described in ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 5.3.1)***. There are no known Aboriginal heritage sites within the fence line of the Ichthys LNG facility, where Project activities are planned to be undertaken.

In addition to Aboriginal heritage sites, archaeological surveys undertaken to support the Ichthys LNG Development Project identified World War II objects on Bladin Point. Objects found within the vicinity of Ichthys LNG were deemed to not be of heritage value and were removed following consultation with the NT Heritage Branch. There are no known World War II heritage sites within, where Project activities are planned to be undertaken.

Further information is provided in ***Attachment 1 (Section 5.3.1)***.

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Sacred sites are places within the landscape that have a special meaning or significance under Aboriginal tradition. In coastal and sea areas, sacred sites may include features that lie both below and above the water. There are several sacred sites in Darwin Harbour and the surrounding waters. All sacred sites within the NT are protected under the *Northern Territory Aboriginal Sacred Sites Act* (NT). There are no sacred sites within the Project Area or directly adjacent to it.

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INPEX holds two Authority Certificates, which cover the locations and the activities required to be undertaken by the Project: C2011/166 and C2014/007. Further information is provided in ***Attachment 1 (Section 5.3.2)***.

3.4 Hydrology

3.4.1 Describe the hydrology characteristics that apply to the project area and attach any hydrological investigations or surveys if applicable. *

Hydrology and hydrogeology

Bladin Point is generally flat and varies only 10 m in topography. After rainfall, the majority of surface water flows east into the Elizabeth River and west into Lightning Creek, with some surface water discharging north into Darwin Harbour and south towards the isthmus and a tidal salt flat.

Groundwater levels are generally shallow, with recharge mainly occurring by rainfall infiltration during the wet season. A semi-confined aquifer in the clayey sand/gravel horizons of the Darwin Formation generally follows the original topography of the site with the lowest levels located near the coast. The groundwater levels in this aquifer fluctuate seasonally between 0.5 and 5 m and are also influenced by the Darwin Harbour tides in coastal areas. Groundwater level contours indicate that groundwater flows radially from the central part of Ichthys LNG site towards low lying area typically inundated by tides. Construction of the Ichthys LNG facility has altered the topography of Bladin Point and subsequent recharge of groundwater through decreased permeability associated with compacted soil and fill, sealed surfaces and storm water drainage system. Ongoing groundwater monitoring throughout operations has measured both increases and decreases in seasonal groundwater levels compared to baseline.

Refer to ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Section 5.1.5)*** for further information.

Groundwater quality

Aquifers in the Darwin Formation are typically acidic to neutral, with a pH ranging from 4.1 to 7.6. Sampling of groundwater at Ichthys LNG site prior to construction recorded fresh to saline water with pH levels of 4.6 to 6.4. The natural acidity of groundwater reflects the natural acidic soils found at Bladin Point. Reported concentrations of aluminium, arsenic, cadmium, copper, manganese, nickel and zinc were higher than ANZG (2018) trigger values prior to commencement of construction. Reported concentrations are a likely result of historic groundwater interaction at different depths within the aquifer with soil stratigraphy for some time under acidic conditions resulting in metal mobilisation. Nutrients have likely been released into the uppermost aquifer by rainwater interaction with organic rich surface material, organic muds and inorganic minerals in rocks and soils.

Under the *Water Act 1992* (NT), beneficial uses for groundwater have been declared for the Darwin Rural Adelaide River Water Control District which includes Ichthys LNG site. These are listed as agriculture, aquaculture, public water supply, cultural, industry, rural stock and domestic, mining activity and petroleum activity. Water quality objectives for groundwater in the region have been set as listed in ***Attachment 1, Section 5.1.6, Table 5-3***.

Groundwater monitoring carried out throughout Ichthys LNG construction phase analysed a large number of bores and parameters. Groundwater parameters were not uniform across Ichthys LNG site, with natural pockets of acidic groundwater and variable metal concentrations. Natural groundwater pH values were consistently lower than pH 7 (median of 5.5) and in some cases were as low as pH 3, with no notable decreasing trend over the construction monitoring (AEC Environmental 2018). The groundwater levels during construction rose and fell in accordance with the season, with the lowest levels in in October (dry season end) and the peak levels being reached in late-March/early-April (wet season end). Measured salinity levels also indicated that majority of bores are brackish to hypersaline. Naturally elevated concentrations of metals and nutrients were consistently reported throughout construction. Majority of nutrient samples (88% of ammonia, 73% of total nitrogen, 67% of total phosphorus and 61% of oxides of nitrogen) exceeded water quality objectives for Darwin Harbour (NRETAS 2010). Similarly, metals frequently exceeded their relevant trigger values (41% of aluminium, 63% of arsenic, 25% of cadmium, 80% of cobalt, 22% of copper, 66% of manganese, 52% of nickel, 58% of zinc).

Refer to ***Attachment 1: (Section 5.1.6)*** for further information.

4. Impacts and mitigation

4.1 Impact details

Potential Matters of National Environmental Significance (MNES) relevant to your proposed action area.

EPBC Act section	Controlling provision	Impacted	Reviewed
S12	World Heritage	No	Yes
S15B	National Heritage	No	Yes
S16	Ramsar Wetland	No	Yes
S18	Threatened Species and Ecological Communities	Yes	Yes
S20	Migratory Species	Yes	Yes
S21	Nuclear	No	Yes
S23	Commonwealth Marine Area	No	Yes
S24B	Great Barrier Reef	No	Yes
S24D	Water resource in relation to large coal mining development or coal seam gas	No	Yes
S26	Commonwealth Land	No	Yes
S27B	Commonwealth Heritage Places Overseas	No	Yes
S28	Commonwealth or Commonwealth Agency	No	Yes

4.1.1 World Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.1.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.1.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no world heritage areas within the Project Area or within proximity to the Project Area.

4.1.2 National Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.2.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.2.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no National heritage areas within the Project Area or within proximity to the Project Area.

4.1.3 Ramsar Wetland

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.3.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.3.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no Ramsar wetlands within the Project Area or within proximity to the Project Area.

4.1.4 Threatened Species and Ecological Communities

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Threatened species

Direct impact	Indirect impact	Species	Common name
No	No	Acanthophis hawkei	Plains Death Adder
No	No	Antechinus bellus	Fawn Antechinus
No	Yes	Arenaria interpres	Ruddy Turnstone
No	No	Balaenoptera musculus	Blue Whale
No	Yes	Calidris acuminata	Sharp-tailed Sandpiper
No	Yes	Calidris canutus	Red Knot, Knot
No	Yes	Calidris ferruginea	Curlew Sandpiper
No	Yes	Calidris tenuirostris	Great Knot
No	No	Carcharodon carcharias	White Shark, Great White Shark
No	Yes	Caretta caretta	Loggerhead Turtle
No	Yes	Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover
No	Yes	Charadrius mongolus	Lesser Sand Plover, Mongolian Plover
No	Yes	Chelonia mydas	Green Turtle
No	No	Chloebia gouldiae	Gouldian Finch
No	No	Conilurus penicillatus	Brush-tailed Rabbit-rat, Brush-tailed Tree-rat, Pakooma
No	No	Dasyurus hallucatus	Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu]
No	No	Dermochelys coriacea	Leatherback Turtle, Leathery Turtle, Luth
No	Yes	Eretmochelys imbricata	Hawksbill Turtle
No	No	Erythrotriorchis radiatus	Red Goshawk
No	No	Falco hypoleucos	Grey Falcon
No	No	Geophaps smithii smithii	Partridge Pigeon (eastern)

Direct impact	Indirect impact	Species	Common name
No	Yes	Glyphis garricki	Northern River Shark, New Guinea River Shark
No	No	Lepidochelys olivacea	Olive Ridley Turtle, Pacific Ridley Turtle
No	Yes	Limnodromus semipalmatus	Asian Dowitcher
No	Yes	Limosa lapponica baueri	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit
No	Yes	Limosa limosa	Black-tailed Godwit
No	No	Macroderma gigas	Ghost Bat
No	No	Mesembriomys gouldii gouldii	Black-footed Tree-rat (Kimberley and mainland Northern Territory), Djintamoonga, Manbul
No	Yes	Natator depressus	Flatback Turtle
No	Yes	Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew
No	Yes	Orcaella heinsohni	Australian Snubfin Dolphin
No	No	Petrogale concinna canescens	Nabarlek (Top End)
No	No	Phascogale pirata	Northern Brush-tailed Phascogale
No	Yes	Pluvialis squatarola	Grey Plover
No	Yes	Pristis clavata	Dwarf Sawfish, Queensland Sawfish
No	Yes	Pristis pristis	Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish
No	Yes	Pristis zijsron	Green Sawfish, Dindagubba, Narrowsnout Sawfish
No	No	Rhincodon typus	Whale Shark
No	No	Rostratula australis	Australian Painted Snipe
No	No	Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat
No	Yes	Sousa sahulensis	Australian Humpback Dolphin
No	No	Sphyrna lewini	Scalloped Hammerhead
No	Yes	Sternula albifrons	Little Tern

Direct impact	Indirect impact	Species	Common name
No	No	Tiliqua scincoides intermedia	Northern Blue-tongued Skink
No	No	Trichosurus vulpecula arnhemensis	Northern Brushtail Possum
No	Yes	Tringa nebularia	Common Greenshank, Greenshank
No	No	Tyto novaehollandiae kimberli	Masked Owl (northern)
No	No	Uperoleia daviesae	Howard River Toadlet, Davies's Toadlet
No	No	Varanus mertensi	Mertens' Water Monitor
No	No	Varanus mitchelli	Mitchell's Water Monitor
No	No	Xeromys myoides	Water Mouse, False Water Rat, Yirrkoo

Ecological communities

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4.1.4.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.4.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Direct impacts

The Project will not result in direct impacts to threatened or migratory species (Refer to ***Attachment 1: Sections 6 and Appendix B***.

The Project Area does not contain any habitat suitable for threatened or migratory species.

Indirect impacts

The Project may result in indirect impacts to threatened or migratory species as a result of noise generated during in-situ bored piling and discharge of portable hydrotest water, as follows:

- threatened and migratory bird species: indirect impacts as a result of airborne noise during construction activities.
- threatened and migratory marine mammal species, marine reptile species and shark/fish species: indirect impacts as a result of discharge of hydrotest water.

These are described in further detail in ***Attachment 1 (Appendix B, Table B-1, Table B-2, Table B-3, Table B-4, Table B-5, Table B-6, Table B-7 and Table B-8)*** and summarised below. Mitigation and controls required to manage any potential indirect impacts are described in ***Attachment 2: Draft Ichthys LNG AGRU Upgrades and CCS Preparedness Construction and Commissioning Environment Management Plan (Section 6 and 7.14.1)***. No significant impacts are likely to occur as a result of indirect impacts.

<u>Noise and vibration</u>

Increased noise and vibration levels that occur as part of construction activities may disturb shorebirds (e.g. behavioural changes), however, the risk to shorebirds is anticipated to be low.

There are currently no Australian guidelines available for noise impacts on birds. A criterion of 60 dBA has been historically used. This is based on a review of traffic and road construction noise impacts on birds in the USA, which found that noise in the range of 50 to 60 dBA is unlikely to noticeably alter behaviours of birds (California Department of Transportation 2016). An assessment of the impact of road traffic noise on wetlands birds, including migratory shorebirds was undertaken by Phoenix Environmental Sciences (2011) at several sites within Western Australia. Some of the shorebird species in this assessment, also occur on Middle Arm Peninsula. The highest traffic noise reached 62 dBA, and at this limit, there was no observed correlation between noise and bird occupancy within the wetlands. A noise limit of 60 dBA has been adopted for this assessment of potential impacts of noise to shorebirds.

Construction noise and vibration modelling undertaken for the proposed activities at selected human sensitive receivers in the vicinity of Ichthys LNG Onshore (Wood 2024; Refer to ***Attachment 4: Phase 2C AGRU and CCS Construction Noise and Vibration Assessment***), predicted boundary noise level contours based on the worst-case scenario (driven piles in addition to general construction activities). The noise modelling contours indicate a noise level <70 dB(A) within the existing disturbance footprint of the Ichthys LNG boundary, and 60-70 dB(A) extending immediately to the east of the Ichthys LNG boundary, within the salt pan and mangrove habitat (***Attachment 1, Figure B-1***). Measured noise levels during Ichthys LNG operations along the boundary adjacent to the Project area have been in the range of 65 to 70 dB(A). The predictive noise modelling of the worst-case scenario is limited to within the Ichthys LNG boundary and does not extend into habitat readily used by shorebirds. The predicted levels of noise are also consistent with existing levels of noise. The noise emissions from Project are unlikely to impact on shorebirds based on the available international literature available.

The noise and vibration modelling and assessment (Wood 2024; Refer to **Attachment 4**) demonstrates that vibration levels at the nearest shoreline (200m) are expected to be negligible. Therefore, impacts to shoreline and associated fauna from construction vibrations are not anticipated.

<u>Discharge of hydrotest water</u>

The discharge of hydrotest wastewater into the environment could potentially cause impacts to the beneficial uses of Darwin Harbour – Water Quality (NRETAS 2010), and therefore temporarily indirectly impact on the quality of habitat utilised by threatened or migratory marine mammals, marine reptile species or shark/fish species adjacent to the Project Area.

Although hydrotest wastewater is predominantly scheme water (and therefore likely clean), it has the potential to absorb contaminants remaining in pipework and infrastructure. The most likely contaminant is nickel, which was found to be absorbed from infrastructure being hydrotested during Ichthys LNG construction.

Impacts to the water quality objectives will be minimised through the use of an appropriate diffuser, which will diffuse wastewater (and any contaminants within) to less than the Darwin Harbour Water Quality Objectives prior to the edge of an approved mixing zone. The wastewater is fresh, and therefore is more buoyant than the receiving water, and will rise up towards the surface which results in enhanced mixing of the wastewater and Darwin Harbour waters. The wastewater plume will also oscillate and change direction with each flood and ebb tide event.

Diffuser design and subsequent plume modelling will be undertaken prior to the generation of hydrotest water. Modelling for Ichthys LNG construction hydrotest water (with volumes of water approximately 5-10 times larger expected for the Project) indicated a 65-fold dilution was required, and this was met in the nearfield (approximately 8m 95% of the time). A conservative mixing zone of 50 m surrounding the diffuser was established for monitoring purposes.

Any impacts associated with changes to water quality as a result of hydrotest discharge would be temporary and short-term in nature.

Mitigation and controls required to manage any potential indirect impacts as a result of hydrotest discharges are described in ***Attachment 2 (Section 6 and 7.14.1)***.

4.1.4.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

No

4.1.4.6 Describe why you do not consider this to be a Significant Impact. *

No direct impacts are anticipated from the proposed Project. The Project may result in indirect impacts to threatened or migratory species as a result of noise generated during in-situ bored piling and discharge of portable hydrotest water. These are described in further detail in ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Appendix B, Table B-1, Table B-2 and Table b-3)***. Mitigation and controls required to manage any potential indirect impacts are described in ***Attachment 2: Draft Ichthys LNG AGRU Upgrades and CCS Preparedness Construction and Commissioning Environment Management Plan (Section 6 and 7.14.1)***.

Significant impacts to MNES (listed threatened and migratory species), relevant to the Proposed Action are unlikely as:

- The Proposed Project does not require clearing of habitat. All proposed activities will occur within the existing disturbance footprint of Ichthys LNG Facility (a pre-disturbed area, with no habitat).
- The habitat surrounding the disturbance footprint is not core habitat in context to broader areas of the Middle Arm Peninsula.
- There is very limited use of the mangrove and saltpan habitat by shorebirds within the modelled 60 to 70 dBA noise contours.
- Hydrotest water discharged to Darwin Harbour will meet required specifications as determined by Nothern Territory waste discharge licence.

Any potential indirect impacts identified on protected matters listed under the *EPBC Act* would be temporary and localised, and negligible on a regional, state and national scale.

4.1.4.7 Do you think your proposed action is a controlled action? *

No

4.1.4.9 Please elaborate why you do not think your proposed action is a controlled action. *

The proposed Project is not considered to be a controlled action for the following reasons:

- The Project Area does not contain any habitat that supports threatened or migratory species. All proposed activities will occur within the existing disturbance footprint of the Ichthys LNG Facility. The habitat surrounding the disturbance footprint is not core habitat in context to broader areas of the Middle Arm Peninsula. There is very limited use of the mangrove and saltpan habitat by shorebirds within the modelled 60 to 70 dBA noise contours. Refer to further information provided in ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Sections 2.2.1, Section 5.21, 5.2.2, 5.2.3 and Appendix B)***.
- Any potential indirect impacts identified on protected matters listed under the EPBC Act would be temporary and localised, and negligible on a regional, state and national scale. An assessment of the potential for significant impacts to matters of national environmental significance (MNES) was undertaken in consideration of the *Matters of National Environmental Significance: Significant impact guidelines 1.1 — Environment Protection and Biodiversity Conservation Act 1999* and determined the Project was unlikely to result in significant impacts to MNES. Refer to ***Attachment 1: (Section 6.3, Appendix B, Table B-1, Table B-2 and Table B-3)***.

4.1.4.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

Key mitigation and controls required to manage any potential indirect impacts on threatened and migratory species or habitat associated with airborne noise and discharge of hydrotest water include:

- Airborne noise mitigation and controls:
  - There is no significant habitat within the Project Area, or adjacent to the Project Area. Mangrove communities are well represented within Darwin Harbour.
  - The piling method selected "continuously flight augured/bored piles significantly reduces noise and vibration when compared with traditional pile driven techniques (refer to ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (2.4.9 Considered alternative construction methods - Onshore piling method)***)
  - Noise monitoring would be undertaken at the Ichthys LNG facility boundary to validate noise modelling presented in ***Attachment 4: Noise and Vibration Modelling Study***.
  - Acoustic barriers or enclosures will be installed around noisy activities, as required.
  - Where monitoring results indicate significant changes to predicted impacts, the adaptive management framework described in ***Attachment 2: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Draft Construction and Commissioning Environmental Management Plan (Section 7.14.3)*** will be implemented.
- Hydrotest water:
  - Construction wastewater will be reused where it remains fit for purpose.
  - The design of the temporary outfall (proposed for construction wastewater) will incorporate use of a multiport diffuser to allow for sufficient near-field dilution within the proximity of the discharge point.
  - Modelling will be undertaken to determine the extent of the required mixing zone, to enable dispersion of wastewater.
  - A waste discharge licence will be applied for under the *Water Act* (Northen Territory) and conditions will be adhered to.
  - A receiving environment water quality monitoring program will be implemented to verify modelling outputs and determine if receiving marine water is being adversely impacted.
  - Where monitoring results indicate significant changes to predicted impacts, the adaptive management framework described in ***Attachment 2: Draft Ichthys LNG AGRU Upgrades and CCS Preparedness Construction and Commissioning Environment Management Plan (Section 7.14.3)*** will be implemented.

Further controls are described in ***Attachment 1 (Section 6)*** and ***Attachment 2 (Section 6 and 7.14.1)***.

4.1.4.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

No offsets are proposed; there are no direct impacts to threatened or migratory species or their habitat.

4.1.5 Migratory Species

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Species	Common name
No	No	Acrocephalus orientalis	Oriental Reed-Warbler
No	Yes	Actitis hypoleucos	Common Sandpiper
No	Yes	Anous stolidus	Common Noddy
No	Yes	Anoxypristis cuspidata	Narrow Sawfish, Knifetooth Sawfish
No	No	Apus pacificus	Fork-tailed Swift
No	Yes	Arenaria interpres	Ruddy Turnstone
No	No	Balaenoptera edeni	Bryde's Whale
No	No	Balaenoptera musculus	Blue Whale
No	No	Balaenoptera omurai	Omura's Whale
No	Yes	Calidris acuminata	Sharp-tailed Sandpiper
No	Yes	Calidris alba	Sanderling
No	Yes	Calidris canutus	Red Knot, Knot
No	Yes	Calidris ferruginea	Curlew Sandpiper
No	Yes	Calidris melanotos	Pectoral Sandpiper
No	Yes	Calidris tenuirostris	Great Knot
No	No	Calonectris leucomelas	Streaked Shearwater
No	No	Carcharhinus longimanus	Oceanic Whitetip Shark
No	No	Carcharias taurus	Grey Nurse Shark
No	No	Carcharodon carcharias	White Shark, Great White Shark
No	Yes	Caretta caretta	Loggerhead Turtle
No	No	Cecropis daurica	Red-rumped Swallow
No	Yes	Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover
No	Yes	Charadrius mongolus	Lesser Sand Plover, Mongolian Plover

Direct impact	Indirect impact	Species	Common name
No	No	Charadrius veredus	Oriental Plover, Oriental Dotterel
No	Yes	Chelonia mydas	Green Turtle
No	No	Crocodylus porosus	Salt-water Crocodile, Estuarine Crocodile
No	No	Cuculus optatus	Oriental Cuckoo, Horsfield's Cuckoo
No	No	Dermochelys coriacea	Leatherback Turtle, Leathery Turtle, Luth
No	Yes	Dugong dugon	Dugong
No	Yes	Eretmochelys imbricata	Hawksbill Turtle
No	No	Fregata ariel	Lesser Frigatebird, Least Frigatebird
No	No	Fregata minor	Great Frigatebird, Greater Frigatebird
No	No	Glareola maldivarum	Oriental Pratincole
No	No	Hirundo rustica	Barn Swallow
No	Yes	Lepidochelys olivacea	Olive Ridley Turtle, Pacific Ridley Turtle
No	Yes	Limnodromus semipalmatus	Asian Dowitcher
No	Yes	Limosa lapponica	Bar-tailed Godwit
No	Yes	Limosa limosa	Black-tailed Godwit
No	No	Megaptera novaeangliae	Humpback Whale
No	No	Mobula alfredi	Reef Manta Ray, Coastal Manta Ray
No	No	Mobula birostris	Giant Manta Ray
No	No	Motacilla cinerea	Grey Wagtail
No	Yes	Motacilla flava	Yellow Wagtail
No	Yes	Natator depressus	Flatback Turtle
No	Yes	Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew
No	Yes	Numenius phaeopus	Whimbrel
No	Yes	Orcaella heinsohni	Australian Snubfin Dolphin
No	No	Orcinus orca	Killer Whale, Orca
No	Yes	Pandion haliaetus	Osprey

Direct impact	Indirect impact	Species	Common name
No	No	Phaethon lepturus	White-tailed Tropicbird
No	No	Phaethon rubricauda	Red-tailed Tropicbird
No	Yes	Pluvialis squatarola	Grey Plover
No	Yes	Pristis clavata	Dwarf Sawfish, Queensland Sawfish
No	Yes	Pristis pristis	Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish
No	Yes	Pristis zijsron	Green Sawfish, Dindagubba, Narrowsnout Sawfish
No	No	Rhincodon typus	Whale Shark
No	Yes	Sousa sahulensis	Australian Humpback Dolphin
No	Yes	Sternula albifrons	Little Tern
No	Yes	Tringa nebularia	Common Greenshank, Greenshank
No	Yes	Tursiops aduncus (Arafura/Timor Sea populations)	Spotted Bottlenose Dolphin (Arafura/Timor Sea populations)

4.1.5.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.5.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Direct impacts

The Project will not result in direct impacts to threatened or migratory species (Refer to ***Attachment 1: Sections 6 and Appendix B***.

The Project Area does not contain any habitat suitable for threatened or migratory species.

Indirect impacts

The Project may result in indirect impacts to threatened or migratory species as a result of noise generated during in-situ bored piling and discharge of portable hydrotest water, as follows:

- threatened and migratory bird species: indirect impacts as a result of airborne noise during construction activities.
- threatened and migratory marine mammal species, marine reptile species and shark/fish species: indirect impacts as a result of discharge of hydrotest water.

These are described in further detail in ***Attachment 1 (Appendix B, Table B-1, Table B-2, Table B-3, Table B-4, Table B-5, Table B-6, Table B-7 and Table B-8)*** and summarised below. Mitigation and controls required to manage any potential indirect impacts are described in ***Attachment 2: Draft Ichthys LNG AGRU Upgrades and CCS Preparedness Construction and Commissioning Environment Management Plan (Section 6 and 7.14.1)***. No significant impacts are likely to occur as a result of indirect impacts.

<u>Noise and vibration</u>

Increased noise and vibration levels that occur as part of construction activities may disturb shorebirds (e.g. behavioural changes), however, the risk to shorebirds is anticipated to be low.

There are currently no Australian guidelines available for noise impacts on birds. A criterion of 60 dBA has been historically used. This is based on a review of traffic and road construction noise impacts on birds in the USA, which found that noise in the range of 50 to 60 dBA is unlikely to noticeably alter behaviours of birds (California Department of Transportation 2016). An assessment of the impact of road traffic noise on wetlands birds, including migratory shorebirds was undertaken by Phoenix Environmental Sciences (2011) at several sites within Western Australia. Some of the shorebird species in this assessment, also occur on Middle Arm Peninsula. The highest traffic noise reached 62 dBA, and at this limit, there was no observed correlation between noise and bird occupancy within the wetlands. A noise limit of 60 dBA has been adopted for this assessment of potential impacts of noise to shorebirds.

Construction noise and vibration modelling undertaken for the proposed activities at selected human sensitive receivers in the vicinity of Ichthys LNG Onshore (Wood 2024; Refer to ***Attachment 4: Phase 2C AGRU and CCS Construction Noise and Vibration Assessment***), predicted boundary noise level contours based on the worst-case scenario (driven piles in addition to general construction activities). The noise modelling contours indicate a noise level <70 dB(A) within the existing disturbance footprint of the Ichthys LNG boundary, and 60-70 dB(A) extending immediately to the east of the Ichthys LNG boundary, within the salt pan and mangrove habitat (***Attachment 1, Figure B-1***). Measured noise levels during Ichthys LNG operations along the boundary adjacent to the Project area have been in the range of 65 to 70 dB(A). The predictive noise modelling of the worst-case scenario is limited to within the Ichthys LNG boundary and does not extend into habitat readily used by shorebirds. The predicted levels of noise are also consistent with existing levels of noise. The noise emissions from Project are unlikely to impact on shorebirds based on the available international literature available.

The noise and vibration modelling and assessment (Wood 2024; Refer to **Attachment 4**) demonstrates that vibration levels at the nearest shoreline (200m) are expected to be negligible. Therefore, impacts to shoreline and associated fauna from construction vibrations are not anticipated.

<u>Discharge of hydrotest water</u>

The discharge of hydrotest wastewater into the environment could potentially cause impacts to the beneficial uses of Darwin Harbour – Water Quality (NRETAS 2010), and therefore temporarily indirectly impact on the quality of habitat utilised by threatened or migratory marine mammals, marine reptile species or shark/fish species adjacent to the Project Area.

Although hydrotest wastewater is predominantly scheme water (and therefore likely clean), it has the potential to absorb contaminants remaining in pipework and infrastructure. The most likely contaminant is nickel, which was found to be absorbed from infrastructure being hydrotested during Ichthys LNG construction.

Impacts to the water quality objectives will be minimised through the use of an appropriate diffuser, which will diffuse wastewater (and any contaminants within) to less than the Darwin Harbour Water Quality Objectives prior to the edge of an approved mixing zone. The wastewater is fresh, and therefore is more buoyant than the receiving water, and will rise up towards the surface which results in enhanced mixing of the wastewater and Darwin Harbour waters. The wastewater plume will also oscillate and change direction with each flood and ebb tide event.

Diffuser design and subsequent plume modelling will be undertaken prior to the generation of hydrotest water. Modelling for Ichthys LNG construction hydrotest water (with volumes of water approximately 5-10 times larger expected for the Project) indicated a 65-fold dilution was required, and this was met in the nearfield (approximately 8m 95% of the time). A conservative mixing zone of 50 m surrounding the diffuser was established for monitoring purposes.

Any impacts associated with changes to water quality as a result of hydrotest discharge would be temporary and short-term in nature.

Mitigation and controls required to manage any potential indirect impacts as a result of hydrotest discharges are described in ***Attachment 2 (Section 6 and 7.14.1)***.

4.1.5.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

No

4.1.5.6 Describe why you do not consider this to be a Significant Impact. *

No direct impacts are anticipated from the proposed Project. The Project may result in indirect impacts to threatened or migratory species as a result of noise generated during in-situ bored piling and discharge of portable hydrotest water. These are described in further detail in ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Appendix B, Table B-1, Table B-2 and Table b-3)***. Mitigation and controls required to manage any potential indirect impacts are described in ***Attachment 2: Draft Ichthys LNG AGRU Upgrades and CCS Preparedness Construction and Commissioning Environment Management Plan (Section 6 and 7.14.1)***.

Significant impacts to MNES (listed threatened and migratory species), relevant to the Proposed Action are unlikely as:

- The Proposed Project does not require clearing of habitat. All proposed activities will occur within the existing disturbance footprint of Ichthys LNG Facility (a pre-disturbed area, with no habitat).
- The habitat surrounding the disturbance footprint is not core habitat in context to broader areas of the Middle Arm Peninsula or Darwin Harbour.
- There is very limited use of the mangrove and saltpan habitat by shorebirds within the modelled 60 to 70 dBA noise contours.
- Hydrotest water discharged to Darwin Harbour will meet required specifications as determined by Nothern Territory waste discharge licence.

Any potential indirect impacts identified on protected matters listed under the *EPBC Act* would be temporary and localised, and negligible on a regional, state and national scale.

4.1.5.7 Do you think your proposed action is a controlled action? *

No

4.1.5.9 Please elaborate why you do not think your proposed action is a controlled action. *

The proposed Project is not considered to be a controlled action for the following reasons:

- The Project Area does not contain any habitat that supports threatened or migratory species. All proposed activities will occur within the existing disturbance footprint of the Ichthys LNG Facility. The habitat surrounding the disturbance footprint is not core habitat in context to broader areas of the Middle Arm Peninsula. There is very limited use of the mangrove and saltpan habitat by shorebirds within the modelled 60 to 70 dBA noise contours. Refer to further information provided in ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (Sections 2.2.1, Section 5.21, 5.2.2, 5.2.3 and Appendix B)***.
- Any potential indirect impacts identified on protected matters listed under the EPBC Act would be temporary and localised, and negligible on a regional, state and national scale. An assessment of the potential for significant impacts to matters of national environmental significance (MNES) was undertaken in consideration of the *Matters of National Environmental Significance: Significant impact guidelines 1.1 — Environment Protection and Biodiversity Conservation Act 1999* and determined the Project was unlikely to result in significant impacts to MNES. Refer to ***Attachment 1: (Section 6.3, Appendix B, Table B-1, Table B-2 and Table B-3)***.

4.1.5.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

Key mitigation and controls required to manage any potential indirect impacts on threatened and migratory species or habitat associated with airborne noise and discharge of hydrotest water include:

- Airborne noise mitigation and controls:
  - There is no significant habitat within the Project Area, or adjacent to the Project Area. Mangrove communities are well represented within Darwin Harbour.
  - The piling method selected "continuously flight augured/bored piles significantly reduces noise and vibration when compared with traditional pile driven techniques (refer to ***Attachment 1: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Supporting Information Document (2.4.9 Considered alternative construction methods - Onshore piling method)***)
  - Noise monitoring would be undertaken at the Ichthys LNG facility boundary to validate noise modelling presented in ***Attachment 4: Noise and Vibration Modelling Study***.
  - Acoustic barriers or enclosures will be installed around noisy activities, as required.
  - Where monitoring results indicate significant changes to predicted impacts, the adaptive management framework described in ***Attachment 2: Ichthys LNG AGRU Upgrade & CCS Preparedness Project - Draft Construction and Commissioning Environmental Management Plan (Section 7.14.3)*** will be implemented.
- Hydrotest water:
  - Construction wastewater will be reused where it remains fit for purpose.
  - The design of the temporary outfall (proposed for construction wastewater) will incorporate use of a multiport diffuser to allow for sufficient near-field dilution within the proximity of the discharge point.
  - Modelling will be undertaken to determine the extent of the required mixing zone, to enable dispersion of wastewater.
  - A waste discharge licence will be applied for under the *Water Act* (Northen Territory) and conditions will be adhered to.
  - A receiving environment water quality monitoring program will be implemented to verify modelling outputs and determine if receiving marine water is being adversely impacted.
  - Where monitoring results indicate significant changes to predicted impacts, the adaptive management framework described in ***Attachment 2: Draft Ichthys LNG AGRU Upgrades and CCS Preparedness Construction and Commissioning Environment Management Plan (Section 7.14.3)*** will be implemented.

Further controls are described in ***Attachment 1 (Section 6)*** and ***Attachment 2 (Section 6 and 7.14.1)***.

4.1.5.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

No offsets are proposed; there are no direct impacts to threatened or migratory species or their habitat.

4.1.6 Nuclear

4.1.6.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.6.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The proposed Project does not relate to a nuclear action.

4.1.7 Commonwealth Marine Area

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.7.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.7.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The proposed action is not located within the Commonwealth marine area; it is wholly located within the Northern Territory.

4.1.8 Great Barrier Reef

4.1.8.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.8.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The proposed Project is wholly located within the Northern Territory.

4.1.9 Water resource in relation to large coal mining development or coal seam gas

4.1.9.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.9.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The proposed Project does not relate to a coal mining development or coal seam gas.

4.1.10 Commonwealth Land

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.10.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.10.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The proposed Project is not located on Commonwealth land and there is no adjacent Commonwealth land.

4.1.11 Commonwealth Heritage Places Overseas

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.11.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.11.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The proposed Project will not impact on Commonwealth heritage places overseas; it is wholly located within the Northern Territory.

4.1.12 Commonwealth or Commonwealth Agency

4.1.12.1 Is the proposed action to be taken by the Commonwealth or a Commonwealth Agency? *

No

4.2 Impact summary

Conclusion on the likelihood of significant impacts

You have indicated that the proposed action will likely have a significant impact on the following Matters of National Environmental Significance:

None

Conclusion on the likelihood of unlikely significant impacts

You have indicated that the proposed action will unlikely have a significant impact on the following Matters of National Environmental Significance:

- World Heritage (S12)
- National Heritage (S15B)
- Ramsar Wetland (S16)
- Threatened Species and Ecological Communities (S18)
- Migratory Species (S20)
- Nuclear (S21)
- Commonwealth Marine Area (S23)
- Great Barrier Reef (S24B)
- Water resource in relation to large coal mining development or coal seam gas (S24D)
- Commonwealth Land (S26)
- Commonwealth Heritage Places Overseas (S27B)
- Commonwealth or Commonwealth Agency (S28)

4.3 Alternatives

4.3.1 Do you have any possible alternatives for your proposed action to be considered as part of your referral? *

No

4.3.8 Describe why alternatives for your proposed action were not possible. *

INPEX Operations Australia Pty Ltd (INPEX) is actively working to decarbonise its operations, to provide a stable supply of diverse and clean energy sources. Key to the planned decarbonisation of the INPEX-operated Ichthys liquid natural gas (LNG) facility is the development of a carbon dioxide (CO_2) compression and export system at Bladin Point, near Darwin.

The development of carbon capture and storage facilities at the Ichthys LNG facility is a key component of INPEX Corporation's pathway to net zero, as described in INPEX Vision 2035. Other activities that contribute towards net zero occur in other regions or on different time horizons to the proposed action, therefore these were not considered as viable alternatives to the CCS activities described in this referral.

5. Lodgement

5.1 Attachments

1.2.1 Overview of the proposed action

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	22/09/2025	No	High

1.2.6 Commonwealth or state legislation, planning frameworks or policy documents that are relevant to the proposed action

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

1.2.7 Public consultation regarding the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Supporting information document	21/09/2025		High
#2.	Document	Attachment 3_ILNG AGRU Upgrade & CCS Preparedness_Stakeholder Engagement Plan.pdf Stakeholder engagement plan	20/08/2025	No	High

1.3.2.18 (Person proposing to take the action) If the person proposing to take the action is a corporation, provide details of the corporation’s environmental policy and planning framework

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 2_ILNG AGRU Upgrade & CCS Preparedness_Draft CCEMP.pdf Draft construction and commissioning environment management plan	22/09/2025	No	High

3.1.1 Current condition of the project area's environment

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

3.1.2 Existing or proposed uses for the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

3.1.3 Natural features, important or unique values that applies to the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

3.1.4 Gradient relevant to the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

3.2.1 Flora and fauna within the affected area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

3.2.2 Vegetation within the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

3.3.1 Commonwealth heritage places overseas or other places that apply to the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

3.3.2 Indigenous heritage values that apply to the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

3.4.1 Hydrology characteristics that apply to the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf	21/09/2025		High

Support information document

4.1.4.2 (Threatened Species and Ecological Communities) Why your action has a direct and/or indirect impact on the identified protected matters

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High
#2.	Document	Attachment 2_ILNG AGRU Upgrade & CCS Preparedness_Draft CCEMP.pdf Draft construction and commissioning environment management plan	21/09/2025		High
#3.	Document	Attachment 4_Noise and Vibration Modelling Study (2).pdf Construction noise and vibration assessment	12/12/2024	No	High

4.1.4.6 (Threatened Species and Ecological Communities) Why you do not consider the direct and/or indirect impact to be a Significant Impact

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High
#2.	Document	Attachment 2_ILNG AGRU Upgrade & CCS Preparedness_Draft CCEMP.pdf Draft construction and commissioning environment management plan	21/09/2025		High

4.1.4.9 (Threatened Species and Ecological Communities) Why you do not think your proposed action is a controlled action

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

4.1.4.10 (Threatened Species and Ecological Communities) Avoidance or mitigation measures proposed for this action

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High
#2.	Document	Attachment 2_ILNG AGRU Upgrade & CCS Preparedness_Draft CCEMP.pdf Draft construction and commissioning environment management plan	21/09/2025		High

#3.	Document	Attachment 4_Noise and Vibration Modelling Study (2).pdf Construction noise and vibration assessment	11/12/2024		High

4.1.5.2 (Migratory Species) Why your action has a direct and/or indirect impact on the identified protected matters

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High
#2.	Document	Attachment 2_ILNG AGRU Upgrade & CCS Preparedness_Draft CCEMP.pdf Draft construction and commissioning environment management plan	21/09/2025		High
#3.	Document	Attachment 4_Noise and Vibration Modelling Study (2).pdf Construction noise and vibration assessment	11/12/2024		High

4.1.5.6 (Migratory Species) Why you do not consider the direct and/or indirect impact to be a Significant Impact

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High
#2.	Document	Attachment 2_ILNG AGRU Upgrade & CCS Preparedness_Draft CCEMP.pdf Draft construction and commissioning environment management plan	21/09/2025		High

4.1.5.9 (Migratory Species) Why you do not think your proposed action is a controlled action

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High

4.1.5.10 (Migratory Species) Avoidance or mitigation measures proposed for this action

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment 1_ILNG AGRU Upgrade & CCS Preparedness_SID.pdf Support information document	21/09/2025		High
#2.	Document	Attachment 2_ILNG AGRU Upgrade & CCS Preparedness_Draft CCEMP.pdf	21/09/2025		High

Draft construction and commissioning environment management plan				
#3.	Document	Attachment 4_Noise and Vibration Modelling Study (2).pdf Construction noise and vibration assessment	11/12/2024	High

5.2 Declarations

Completed Referring party's declaration

The Referring party is the person preparing the information in this referral.

ABN/ACN	48150217262
Organisation name	INPEX OPERATIONS AUSTRALIA PTY LTD
Organisation address	Level 22, 100 St Georges Terrace, Perth 6000 WA
Representative's name	Obelia Akerman
Representative's job title	Environmental Team Lead Approvals and Compliance
Phone	08 62136000
Email	obelia.akerman@inpex.com.au
Address	Level 22 100 St Georges Terrace, Perth WA, 6000

☑ Check this box to indicate you have read the referral form. *

☑ Check this box to confirm these are the correct identification details. *

☑ By checking this box, I, **Obelia Akerman of INPEX OPERATIONS AUSTRALIA PTY LTD**, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. *

You may receive automated notifications that aim to assist you in tracking the progress of your project. You can opt out of these notifications by updating your communication preferences on your profile.

Completed Person proposing to take the action's declaration

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	48150217262
Organisation name	INPEX OPERATIONS AUSTRALIA PTY LTD
Organisation address	Level 22, 100 St Georges Terrace, Perth, 6000 WA
Representative's name	Christopher Justin Wilson

Representative's job title	Director
Phone	0862136000
Email	chrisj.wilson@inpex.com.au
Address	Level 22, 100 St Georges Terrace, Perth 6000 WA

☑ Check this box to indicate you have read the referral form. *

☑ Check this box to confirm these are the correct identification details. *

☑ I, **Christopher Justin Wilson of INPEX OPERATIONS AUSTRALIA PTY LTD**, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity. *

You may receive automated notifications that aim to assist you in tracking the progress of your project. You can opt out of these notifications by updating your communication preferences on your profile.

✔ Completed Proposed designated proponent's declaration

The Proposed designated proponent is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

ABN/ACN	48150217262
Organisation name	INPEX OPERATIONS AUSTRALIA PTY LTD
Organisation address	Level 22, 100 St Georges Terrace, Perth 6000 WA
Representative's name	Christopher Justin Wilson
Representative's job title	Director
Phone	0862136000
Email	chrisj.wilson@inpex.com.au
Address	Level 22, 100 St Georges Terrace, Perth 6000 WA

☑ Check this box to indicate you have read the referral form. *

- [x] Check this box to confirm these are the correct identification details. *

- [x] I, **Christopher Justin Wilson of INPEX OPERATIONS AUSTRALIA PTY LTD**, the Proposed designated proponent, consent to the designation of myself as the Proposed designated proponent for the purposes of the action described in this EPBC Act Referral. *

You may receive automated notifications that aim to assist you in tracking the progress of your project. You can opt out of these notifications by updating your communication preferences on your profile.

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