Bonaparte Carbon Capture and Storage Project

INPEX is actively working to decarbonise its operations and deliver a stable supply of diverse and clean energy sources[1]. Carbon capture and storage (CCS) is a safe and proven emissions reduction technology that can be applied to liquefied natural gas (LNG) production to capture naturally occurring carbon dioxide (CO_2) from the reservoir hydrocarbon stream[2].

INPEX Operations Australia Pty Ltd (INPEX), as operator of the Bonaparte CCS Assessment Joint Venture (consisting of INPEX Browse E&P Pty Ltd, TotalEnergies CCS Australia Pty Ltd and Woodside Energy Ltd) is proposing to develop the Bonaparte CCS Project, a large-scale multi-user CCS facility 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 metres below the seabed.

The geological formation proposed for development by the Bonaparte CCS Project has been assessed to have large-scale storage characteristics, including the potential to sequester in excess of 10 million tonnes per annum (mtpa) of CO_2.

The Bonaparte CCS Project has the potential for future expansion into a large-scale multi-user carbon storage hub for the Indo-Pacific region. For further details refer to www.inpex.com.au/projects/ccs-activities

The proposed infrastructure for permanent sequestration would be located approximately 250 kilometres 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 facilities. The development of CCS-related facilities at Ichthys LNG is being progressed by INPEX (as operator for Ichthys LNG Pty Ltd) as a separate project, referred to as the Ichthys CCS Project. Indicative outlines of how these two projects may interface is shown in Figure 1 and Figure 2.

The purpose of this factsheet is to provide information on the Bonaparte CCS Project. For more information on how CCS works and the proposed Ichthys CCS Project please visit www.inpex.com.au/projects/ccs-activities

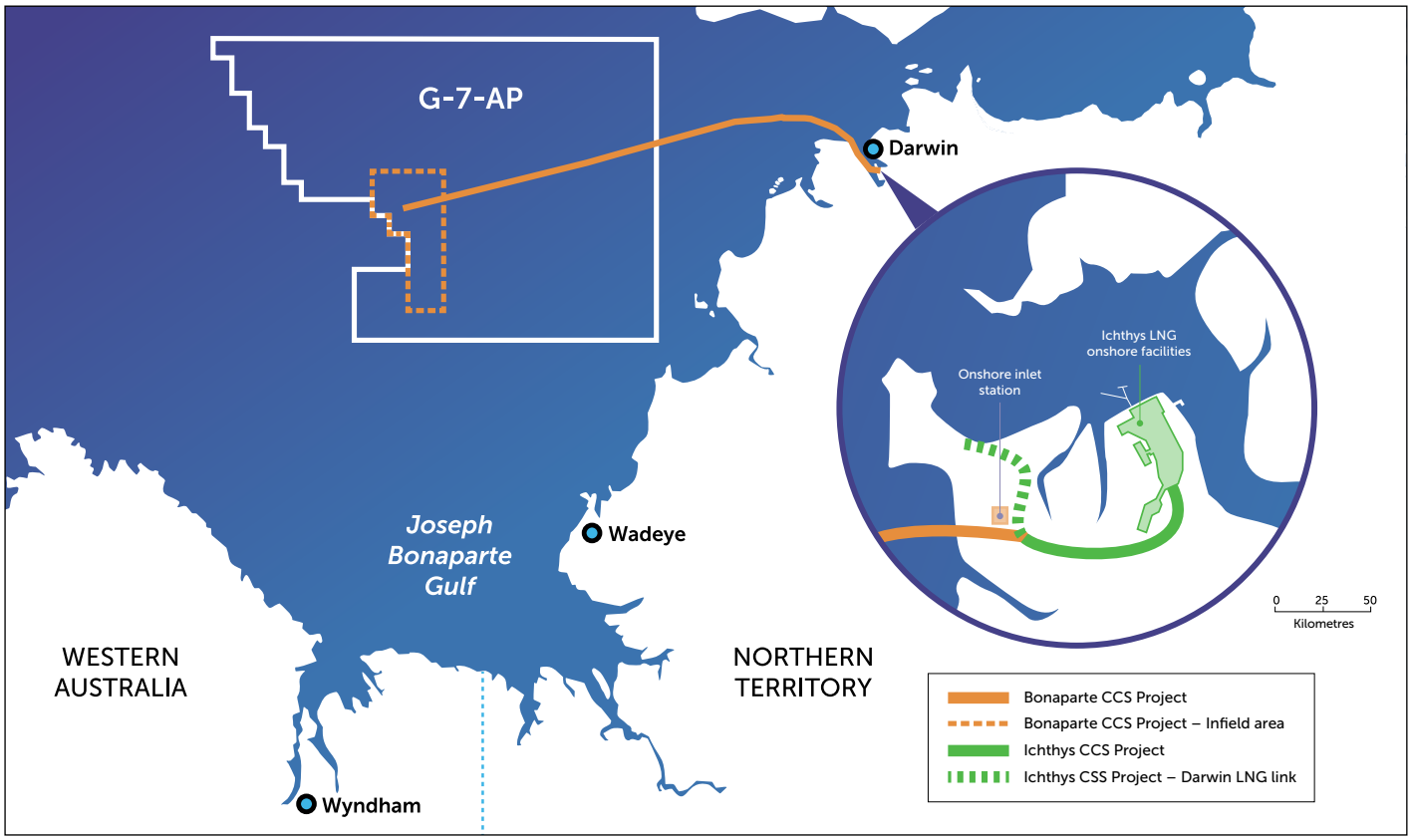


Figure 1: *Indicative locations of proposed Bonaparte CCS Project and Ichthys CCS Project. Not to scale.*

1 New Energy | INPEX

2 IEA (2021), About CCUS, IEA, Paris https://www.iea.org/reports/about-ccus, Licence: CC BY 4.0

Bonaparte CCS Project key components

- Onshore inlet station
- Offshore transport pipeline approximately 260 kilometres long and up to 22 inches in diameter
- Subsea facilities for permanent CO_2 sequestration, including wells and flowlines.

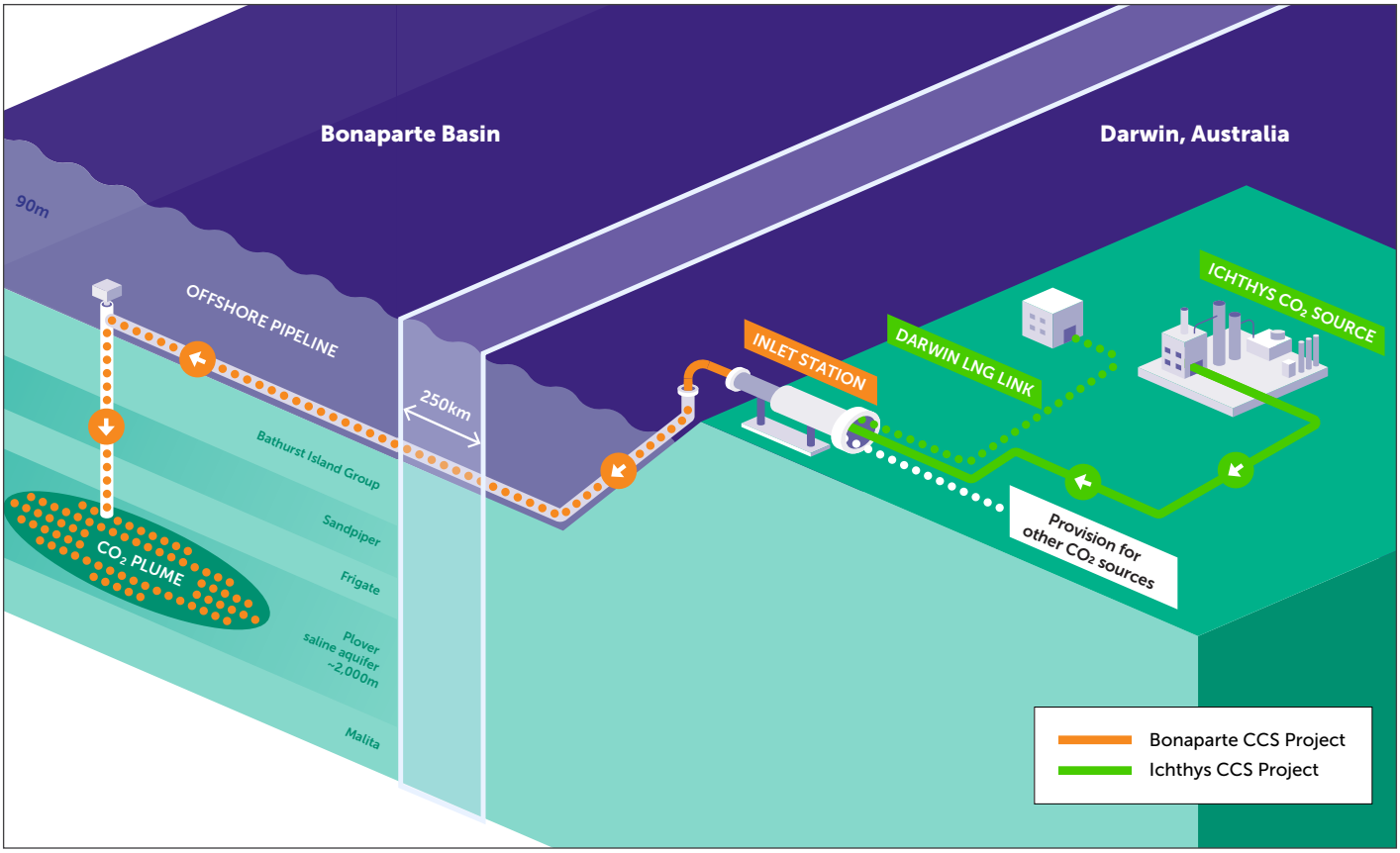


Figure 2: *Proposed Bonaparte CCS Project and Ichthys CCS Project. Not to scale.*

Environmental Impact Assessment

The Bonaparte CCS Assessment Joint Venture intends to refer the Bonaparte CCS Project to the Northern Territory Environmental Protection Authority for consideration under the *Environment Protection Act* 2019 (NT) and Commonwealth Department of Climate Change, Energy, the Environment and Water under the *Environment Protection and Biodiversity Conservation Act* 1999 (Cth). Environmental impact assessments of the proposed project would be made publicly available and assessed by Territory and Commonwealth regulators, with opportunities for public comment.

G-7-AP Assessment Permit Background

In December 2021, the Australian Government released five greenhouse gas (GHG) storage acreage areas offshore of Western Australia and the Northern Territory for the purpose of GHG storage exploration and assessment.

The Bonaparte CCS Assessment Joint Venture was successfully awarded a GHG assessment permit over one of these areas, G-7-AP, located offshore in the Joseph Bonaparte Gulf off northern Australia (Figure 1).

At the end of 2024, the Bonaparte CCS Assessment Joint Venture completed a subsurface acquisition program within G-7-AP and is currently analysing the data to further understand the characteristics and suitability of G-7-AP for CO_2 storage.

Bonaparte CCS Project

Project Description

The proposed Bonaparte CCS Project would involve the development of onshore and offshore infrastructure to gather CO_2 emissions and enable their transportation and permanent storage within a geological formation located in the Joseph Bonaparte Gulf.

The proposed onshore infrastructure (Figure 2) includes an onshore inlet station to gather and filter CO_2 located next to the existing Ichthys Gas Export Pipeline (GEP) beach valve station on the west side of Wickham Point Road. The inlet station would also provide for potential future installation of booster pumping facilities. The proposed station is anticipated to cover an area of approximately 0.9 hectares.

Commencing from this onshore inlet station, an approximately 260 kilometre long CO_2 pipeline would extend through Darwin Harbour to the injection facilities at the proposed storage site.

The CO_2 pipeline is proposed to enter the Harbour immediately south of the existing Ichthys GEP shore crossing. It would be positioned outside of the main Darwin Port shipping channel and run parallel to the existing Ichthys GEP on the south-west side for a minimum of 165 kilometres. Within inner Darwin Harbour, the CO_2 pipeline would be located at a separation of approximately 70 metres from the Ichthys GEP and be protected by trenching and rock armouring.

Several pipeline routes are under consideration for the final approach to the proposed storage site in Commonwealth waters (Figure 3).

A subsea power and fibre optic cable is proposed to provide power and control functionality to the Bonaparte CCS subsea injection facilities. The cable is proposed to be installed adjacent to the offshore CO_2 pipeline along the entire route. To provide redundancy, a back-up cable may also be installed in Darwin Harbour parallel and slightly offset to the primary cable.

At the offshore injection site, all facilities would be designed to be placed on the seabed so as to avoid the need for any permanent facilities on the sea surface (Figure 4). The offshore CO_2 pipeline is proposed to be connected to a subsea manifold structure, while short infield pipelines would distribute CO_2 to each of the remotely operated injection wells. A power and fibre-optic cable connected to each of the wells is also proposed.

To safely and permanently sequester CO_2 a total of up to six injection wells are planned including two contingent wells.

All elements of the proposed Bonaparte CCS injection system would be monitored and operated from an onshore facility via a single integrated control system.

The Bonaparte CCS Project is proposed to have a 30-year operational life. Ongoing inspection, maintenance and repair work would be performed periodically by a combination of crewed and autonomous vessels.

Schedule

The indicative schedule for the Bonaparte CCS Project construction phase spans the period 2028 to 2031 and is dependent on public consultation, regulatory approvals, weather and commercial considerations.

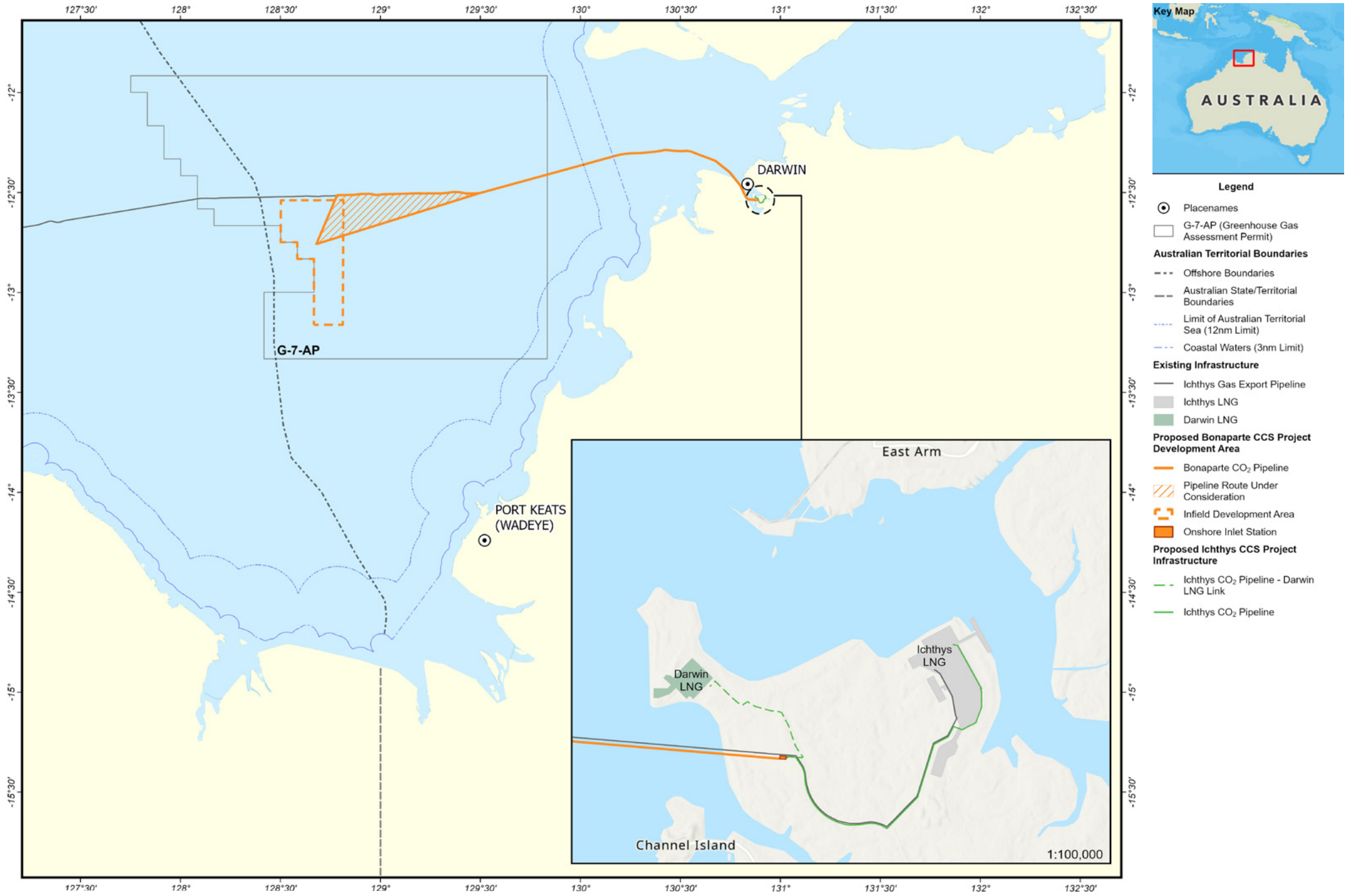
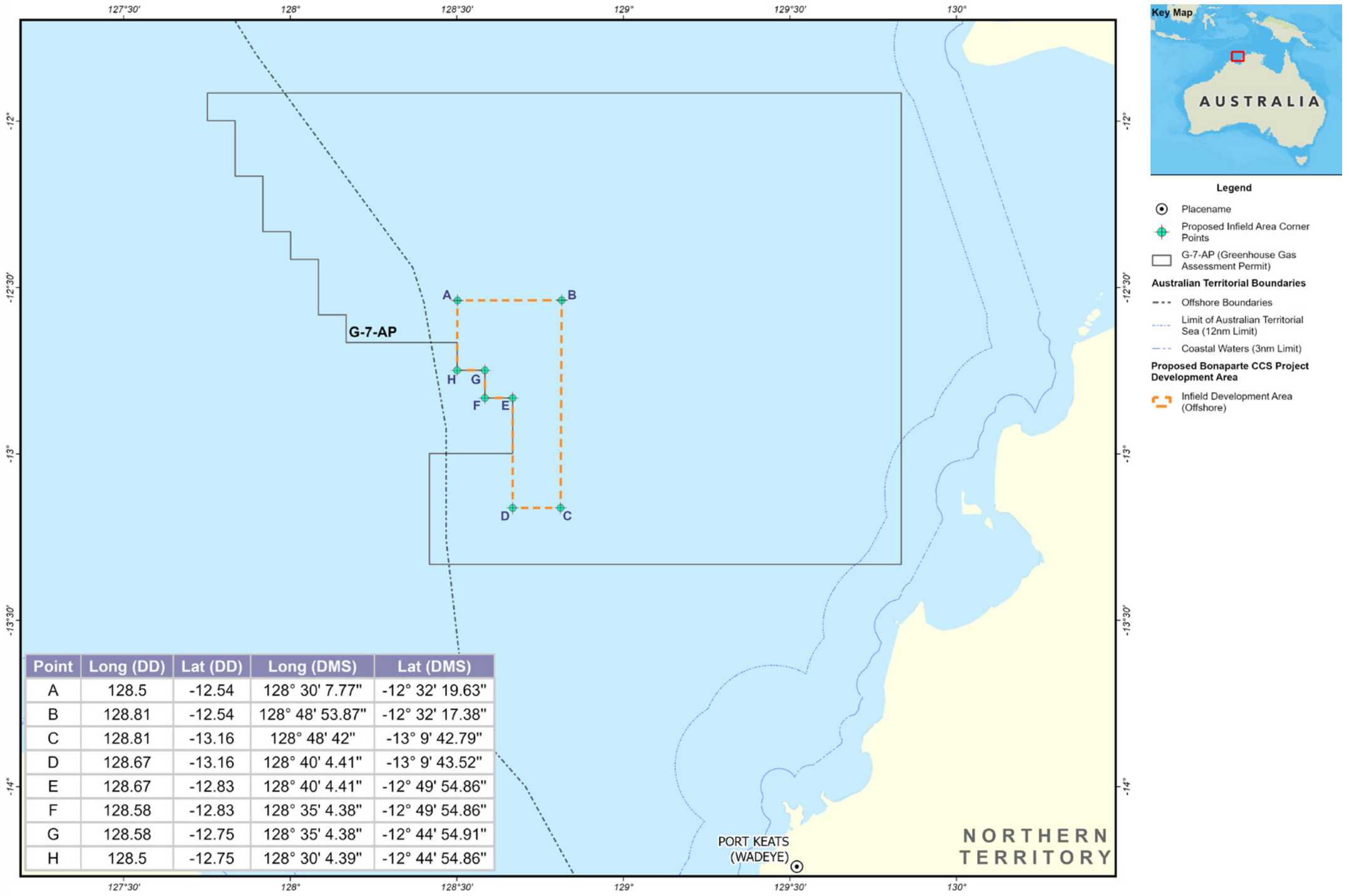


Figure 3: *Proposed infrastructure location*



Point	Long (DD)	Lat (DD)	Long (DMS)	Lat (DMS)
A	128.5	-12.54	128° 30' 7.77"	-12° 32' 19.63"
B	128.81	-12.54	128° 48' 53.87"	-12° 32' 17.38"
C	128.81	-13.16	128° 48' 42"	-13° 9' 42.79"
D	128.67	-13.16	128° 40' 4.41"	-13° 9' 43.52"
E	128.67	-12.83	128° 40' 4.41"	-12° 49' 54.86"
F	128.58	-12.83	128° 35' 4.38"	-12° 49' 54.86"
G	128.58	-12.75	128° 35' 4.38"	-12° 44' 54.91"
H	128.5	-12.75	128° 30' 4.39"	-12° 44' 54.86"

Figure 4: *Infield extent area of the proposed Bonaparte CCS Project*

Overview of Proposed Activities

Site preparation and construction of onshore inlet station

Onshore, initial site preparation works would be undertaken to establish a suitable foundation to operate construction equipment.

> Construction of an onshore inlet station for the offshore CO_2 pipeline; to amalgamate, filter, and meter CO_2.

Establishment of the onshore inlet station involves construction and testing of piping, valves, instrumentation, equipment room, fencing and security facilities.

All construction and preparation works would avoid restricted work areas identified on Authority Certificates issued by the Aboriginal Areas Protection Authority (AAPA) and any declared heritage protection zones.

Dredging, trenching and shore-pull preparation

The pipeline will be pulled from a shallow water lay barge using a winch located onshore.

The pipeline is anticipated to approach the shore-pull location through a sheet pile cofferdam trench across the tidal flat area.

Dredging is proposed to be conducted for two purposes: firstly, to create the intertidal trench for pipelay barge access to the shore-pull location and secondly to create a trench for sections of the pipeline route within Darwin Harbour.

Shallow water pipelay

It is anticipated that up to 90 kilometres of the CO_2 pipeline will be laid out using a shallow water pipelay barge and supported by small vessels.

Temporary exclusion zones would be established around the pipelay barge during pipelay activities which are anticipated to be performed over several months.

Power and control cable installation

It is anticipated an approximately 260 kilometre long cable will be installed using specialised telecommunications cable installation equipment and vessels. A back-up cable, approximately 15 kilometres in length, may also be installed through Darwin Harbour parallel and slightly offset to the main cable.

Typically, the cable would be ploughed or jetted into the seabed for protection and the section within Darwin Harbour may also be covered with rock armour.

Offshore pipelay

The pipeline will be laid progressively using an offshore pipelay vessel supported by smaller vessels bringing pipe joints and general supplies to the pipelay vessel.

Approximately 170 kilometres of pipeline would be installed in this manner depending on the final route selected. This activity is anticipated to be performed over a period of several months.

Pipeline pre-commissioning

Following installation, the pipeline would be filled with treated seawater and pressure-tested to confirm its integrity. Once testing is complete, the water would be removed, the internal walls dried and preserved with nitrogen in preparation for the later introduction of CO_2.

Drilling and completion of injection wells

A mobile offshore drilling unit would be used to drill up to six wells over the life of the project. Each well is estimated to take a period of approximately two months to drill.

Infield facilities

> Construction of subsea infrastructure to permanently sequester CO_2 in the G-7-AP storage formation at an annual capacity of up to 10 mtpa.

Facilities such as infield pipelines, cables and a manifold are required to inject CO_2 and monitor pressure at the injection site. Construction of these facilities would be performed in stages and may occur concurrently with the drilling activity, requiring multiple vessels working together.

Pre-commissioning testing of these facilities would occur in a similar manner to the CO_2 pipeline process outlined above.

Pipeline facilities and commissioning

The pipeline is prepared for operation by gradually filling it with pressurised CO_2. First filling of the infield injection infrastructure system with CO_2 would be conducted following first fill of the transport pipeline.

Commissioning of sensors, valves and control systems would be conducted in a sequential process with continual monitoring of the entire system throughout (both at the physical infrastructure and from the control station).

Commence injection

CO_2 injection into the geological formation would start gradually, progressively increasing until the target injection rate is achieved.

Operations

Once operational, all elements of the Bonaparte CCS injection system would be monitored and operated from an onshore facility via a single integrated control system.

Measurement, monitoring and verification

During operations, well rates, pressures, and temperatures would be continuously monitored to ensure safe and continuous CO_2 injection and that the integrity of the storage cap rock is maintained.

Inspection, maintenance and repair

The offshore CO_2 pipeline and CCS injection system would be periodically inspected and maintained.

Decommissioning

Decommissioning will be performed at the end of the proposed 30-year field life in accordance with the relevant legislation in place at the time.

Decommissioning will consider a range of options and methodologies including flushing of the pipelines and infrastructure, with full isolation of the injection wells by cement plugging.

Environmental values, potential impact and mitigation

Environmental and social values

The environmental values associated with, or in proximity to, the Bonaparte CCS Project area include, but are not limited to:

- Listed and migratory species
- Marine reserves and important habitats
- Key ecological features
- Sacred sites and cultural heritage sites
- Commercial shipping
- Commercial fishing
- Recreational fishing/activities
- Defence activities.

Potential environmental impacts and management

INPEX is in the process of preparing an environmental impact assessment to support the Bonaparte CCS Project approval applications. To support this process a range of environmental studies/surveys may be undertaken. These studies/surveys assist INPEX in further understanding the potential impacts/risks associated with the proposed activities and inform the development of appropriate management strategies to mitigate these, as far as practicable.

A preliminary environmental impact assessment has identified the following key potential environmental impacts/risks associated with the development of the Bonaparte CCS Project:

- Seabed disturbance
- Underwater noise emissions
- Light emissions
- Air emissions
- Marine discharges
- Dropped objects
- Invasive marine species
- Other marine user interactions
- Marine fauna disturbance
- Unplanned scenarios (disturbance to cultural heritage sites, vessel collision or pipeline rupture).

INPEX recognises stakeholder consultation is an integral part of the environmental impact assessment process. Feedback received during the stakeholder consultation process will be used, where relevant, to inform the environmental impact assessment and development of controls that may be adopted to prevent/mitigate identified environmental risks/impacts.

Working with the local community

At INPEX, we believe community engagement is essential to forging trusted and strong relationships within the communities in which we operate. We engage and work with stakeholders and ensure information is readily available to the community, as well as providing mechanisms for feedback and response.

Further information and feedback

INPEX welcomes your feedback on the proposed activities. To provide feedback or to request additional information, please see the 'Comments and enquiries' section below. All communications will be logged, assessed and acknowledged with a response.

For more information on how CCS works, proposed onshore CCS preparedness activities and what happens to CO_2 once it is stored underground please visit www.inpex.com.au/projects/ccs-activities

How is your feedback used?

Feedback received will be used to inform relevant Commonwealth and Northern Territory Government approval applications required for the management framework of the activity. A summary of the feedback received from stakeholders and how INPEX has addressed this feedback will be provided to the regulatory authorities as part of the submissions.

Comments and enquiries

If you would like to provide comment or seek further information, or if you do not wish to receive future communications about project activities, please contact:

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Via website

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Via phone

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