



# Port Kembla Gas Terminal Modification 4

## Modification Report

Australian Industrial Energy

13 October 2022

→ **The Power of Commitment**



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# Acronyms and definitions

Term	Definition
ACM	asbestos containing materials
AEMO	Australian Energy Market Operator
AHD	Australian Height Datum
AIE	Australian Industrial Energy
AQMP	Air Quality Management Plan
ASS	Acid Sulfate Soil
ASSMP	Acid Sulfate Soil Management Plan
BaP	benzo(a)pyrene
BC Act	<i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
CEMP	Construction Environment Management Plan
CoPC	Contaminants of Potential Concern
CSP	Contaminated Spoil Protocol
CSSI	Critical State Significant Infrastructure
CTMP	Construction Traffic Management Plan
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEMP	Dredge and Excavation Management Plan
DPE	Department of Planning and Environment
EGP	Eastern Gas Pipeline
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
FHA	Final Hazard Analysis
FSRU	Floating Storage and Regasification Unit
GJ	gigajoule
HAZOP	Hazard and Operability Study
HDD	Horizontal Directional Drilling
HIPAP	Hazardous Industry Planning Advisory Paper
kPag	kilopascal gauge
LNG	liquefied natural gas
MAOP	Maximum allowable operating pressure
Mbgl	metres below ground level
MNES	Matters of national environmental significance
MPaG	megapascals
MW	Megawatts

<b>Term</b>	<b>Definition</b>
NEM	National Electricity Market
NVMP	Noise and Vibration Management Plan
ORF	Onshore Receiving Facilities
PCT	Plant community type
Pipelines Act	<i>Pipelines Act 1967</i>
PHA	Preliminary Hazard Analysis
Planning Systems SEPP	State Environmental Planning Policy (Planning Systems) 2021
PJ	petajoules
PKCT	Port Kembla Coal Terminal
PKGT EIS	Port Kembla Gas Terminal Environmental Impact Statement
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Resilience and Hazards SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
Roads Act	<i>Roads Act 1993</i>
RTS	Response to Submissions
SMP	Spoil Management Plan
The project	Port Kembla Gas Terminal
TRH	Total recoverable hydrocarbon
Transport and Infrastructure SEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021
VOC	volatile organic compounds
WQMP	Water Quality Monitoring Plan

# 1. Introduction

## 1.1 Overview

Australian Industrial Energy (AIE) is developing the Port Kembla Gas Terminal (the project). The project involves the development of a liquefied natural gas (LNG) import terminal at Port Kembla, south of Wollongong in New South Wales (NSW).

The project consists of four key components:

- LNG carrier vessels — marine vessels transporting LNG from production facilities all around the world to demand centres.
- Floating Storage and Regasification Unit (FSRU) — a cape-class ocean-going vessel, which would be moored at Berth 101 in Port Kembla.
- Berth and wharf facilities — including landside offloading facilities to transfer natural gas from the FSRU into an underground natural gas pipeline located on shore.
- Gas pipeline — a Class 900 carbon steel high-pressure pipeline connection from the berth to the existing gas transmission network.

AIE proposes to modify their existing Infrastructure Approval (SSI 9471) for the following project elements:

- Minor changes to the alignment, pipeline length and operating pressure of the pipeline for connection to the existing gas network to the Port Kembla Looping Lateral, which forms part of Jemena's Eastern Gas Pipeline (EGP).
- Mercaptan storage volume increase (from 400 kilograms to 2,400 kilograms).
- Removal of the cold vent initially included in design plans for Berth 101.
- Installation of an 11kV transmission cable and telecommunications cable within Berth 101.

## 1.2 The approved project

The project received Infrastructure Approval (SSI 9471) from the then Minister for Planning and Public Spaces on 29 April 2019. The project has been declared Critical State Significant Infrastructure (CSSI) in accordance with Section 5.13 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Schedule 5 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP).

The approved project has been subject to three previous modifications:

- Modification 1 – Capacity Increase (SSI-9471-Mod-1) determined 20 April 2020.
- Modification 2 – Compliance Reporting Guideline (SSI-9471-Mod-2) determined 1 September 2020.
- Modification 3 – Addition to Schedule of Land (SSI-9471-Mod-3) determined 13 October 2021.

An application for a sea dumping permit application is also currently being sought through the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection (Sea Dumping) Act 1981 (Cth)* which has been submitted as Modification 5.

Construction of the project commenced in January 2022. Works currently underway for the project are subject to AIE's Environment Protection Licence (EPL) No 21529 and the approved management plans made under Infrastructure Approval SSI 9471.

An overview of the approved project is presented in Figure 1.1.

## 1.3 Purpose and structure

The purpose of this report is to provide environmental assessment of the proposed modification in support of a request for a Minister's approval under section 5.25 of the EP&A Act.

Prior to the preparation of this modification report a scoping letter was prepared and submitted to the Department of Planning and Environment (DPE), which set out the relevant environmental matters and their appropriate level of assessment. It was confirmed by DPE that a formal Scoping Report was not required for the proposed modification and no additional environmental assessment or community engagement was required.

This modification report has been prepared in accordance with the scoping letter, subsequent correspondence from DPE and the *State significant infrastructure guidelines – preparing a modification report* (DPIE, 2021).

The structure and content of this report is as follows:

- Section 1 – introduction and overview of the approved project and proposed modification
- Section 2 – strategic context
- Section 3 – description of proposed modification
- Section 4 – statutory context
- Section 5 – summary of community engagement to date
- Section 6 – environmental assessment of proposed modification
- Section 7 – justification and conclusion.



Figure 1.1 Approved project overview

## 2. Strategic context

NSW is the only mainland eastern state that does not have its own material local gas supplies and relies on Queensland, Victoria and South Australia for more than 95 per cent of its gas needs. NSW is widely exposed to supply and/or price disruptions from other states while the requirement to transport natural gas over large distances via on-shore transmission networks puts gas consumers at an immediate financial disadvantage.

According to reports by the Australian Competition and Consumer Commission, consumers in NSW may pay as much as an additional \$3.50 per gigajoule (GJ) in gas transportation costs due to these constraints. Forecasts from a range of market analysts and the Australian Energy Market Operator (AEMO) note the east coast gas market is becoming increasingly reliant on undeveloped, contingent or prospective sources of supply in order to meet forecast demand. In addition, gas producers in the north are expected to continue to focus on export markets while gas producers in the south continue to note declining production levels and increasing extraction costs.

The AEMO quarterly report for Q2 2022 (1 April to 30 June 2022) (AEMO, 2022) states that wholesale spot prices in the National Electricity Market (NEM) and eastern gas markets rose to unprecedented levels during Q2 2022. NEM gas-fired generational output increased to 2,211 megawatts (MW), 818 MW higher than the previous quarter and 472 MW higher than Q2 2021, representing the highest level of gas-fired generation since 2017 as displayed in Figure 2.1. In NSW gas fired generation increased by 340 MW, its highest Q2 average since 2014.

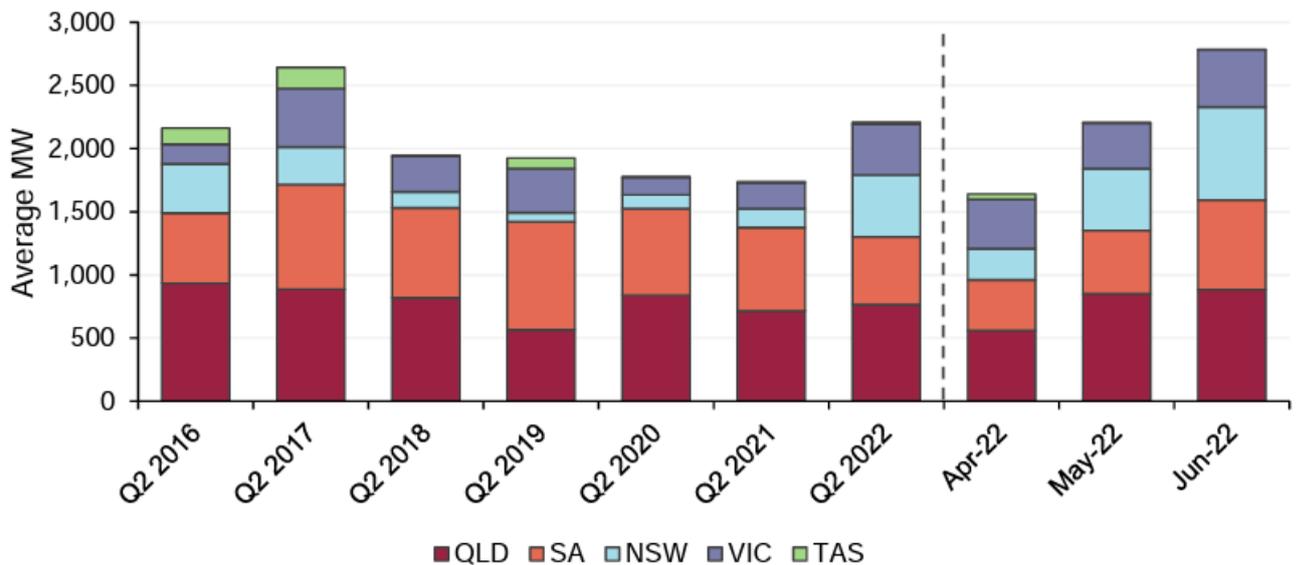
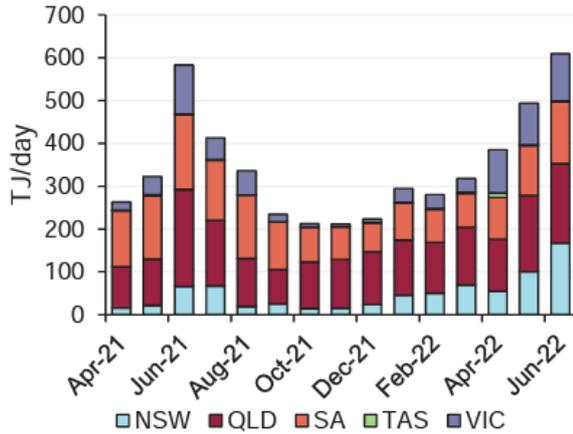


Figure 2.1 Average gas-fired generation by state (source: AEMO, 2022)

The average daily demand from gas-fired generators increased significantly during Q2, increasing in NSW by 210 per cent compared to the Q2 2021 time period. Cumulative gas-fired generation demand also significantly increased in NSW to 14.7 petajoules (PJ) from 4 PJ in 2021 (refer to Figure 2.2).

The energy supply issues and significant increase in demand being felt across the east coast of Australia reinforces the significance and need for the supply of a reliable source of gas for NSW consumers.

Average daily demand for gas-fired generation by month



Cumulative annual demand for gas-fired generation in NSW

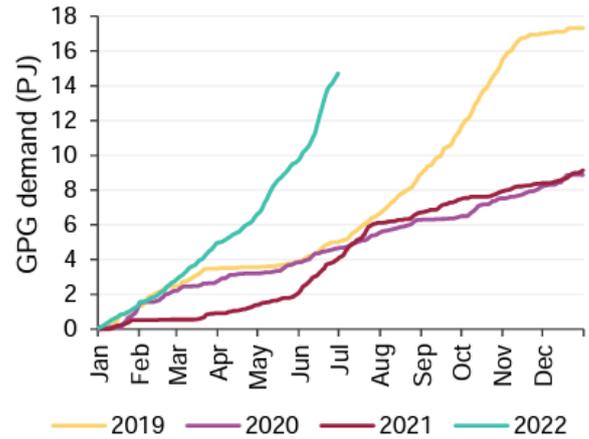


Figure 2.2 Gas-fired generation demand increases for NSW (source: AEMO, 2022)

The Port Kembla Gas Terminal is being developed by AIE to help address this strategic need and is predicted to deliver in the order of 100 petajoules of gas per annum or greater. The product gas would be delivered to market through Jemena’s EGP, a major infrastructure asset supplying natural gas to the eastern market and spanning between gas fields in the Gippsland Basin through to NSW and the Australian Capital Territory.

The modification is required to address minor design changes that have arisen during detailed project planning following the initial approval of SSI 9471 in 29 April 2019. The design changes are not consistent with the development described in the Port Kembla Gas Terminal Environmental Impact Statement (PKGT EIS) (GHD, 2018), but will continue to address the project objectives and the strategic need for gas supply in NSW.

## 3. Proposed modification

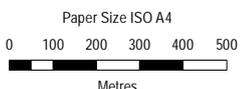
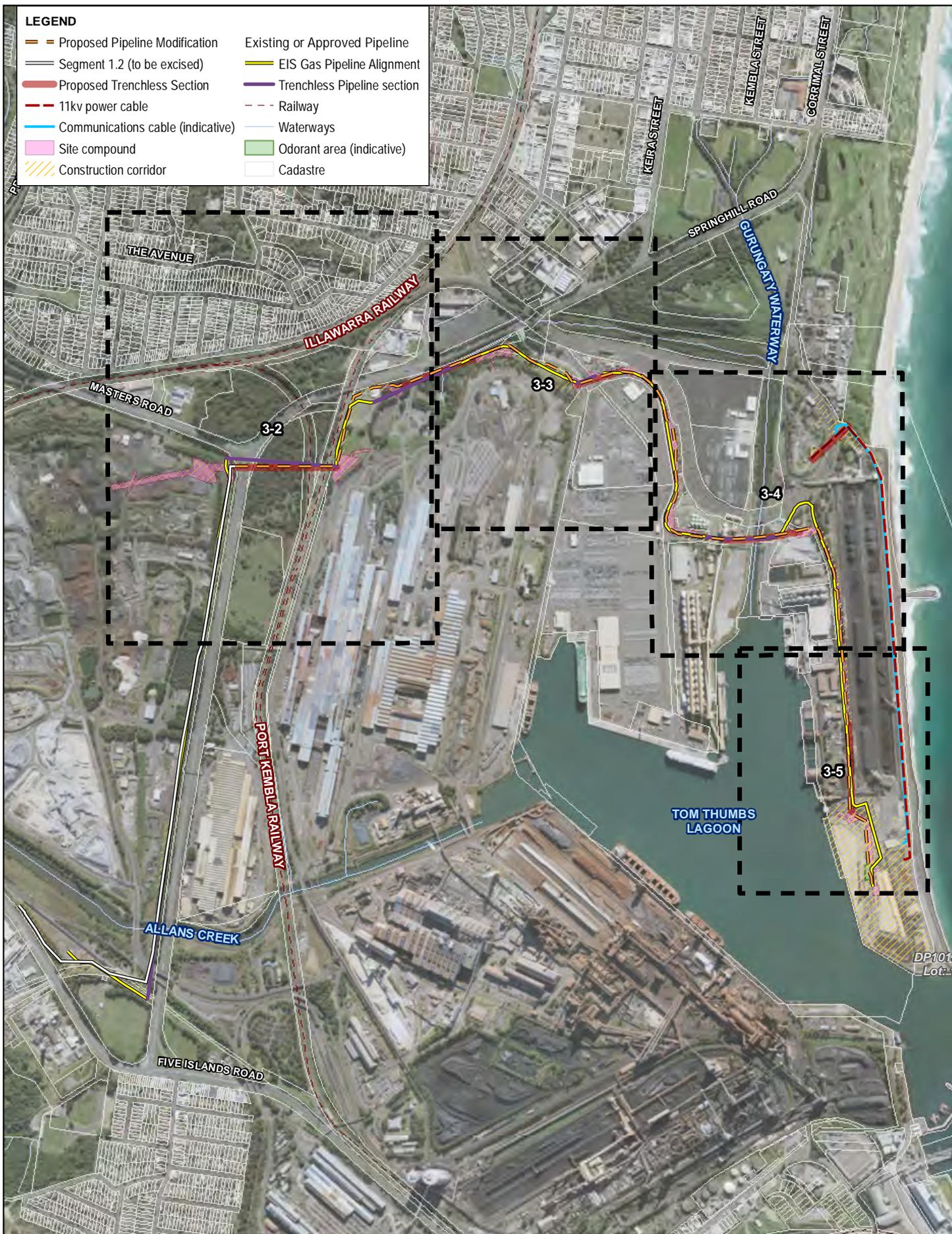
### 3.1 Overview

An overview of the proposed modification is provided below in Table 3.1. A supplementary Construction Environment Management Plan (CEMP) has been prepared for the proposed modification and is included in Appendix A.

**Table 3.1** Comparison of project modifications and approved project

Project element	Summary of approved project	Summary of proposed modification
Pipeline alignment	Gas pipeline would run from Berth 101 to the tie-in point at Cringila to be connected to the EGP. The length of the pipeline would be about 6.3 km, following road verges, traversing waterways and vegetation with construction via a combination of open trenches and Horizontal Directional Drilling (HDD).	<p>For the purpose of the proposed modification, the gas pipeline for the project has been divided into two sections: the section from the Berth 101 to the crossing of Springhill Road (Segment 1.1) and the section from the western side of Springhill Road to a connection point with the EGP (Segment 1.2) (refer to Figure 3.1).</p> <p>Minor modifications to the alignment in Segment 1.1 will occur in various locations to incorporate a more direct route at the most northern point of the Port Kembla Coal Terminal (PKCT) property and within the vegetated area in the northern portion of the BlueScope steel works property on the southern side of Springhill Road.</p> <p>The construction footprint has also been amended to include areas identified as laydown and stockpiling areas during detailed construction planning.</p> <p>Segment 1.2 of the pipeline has been recently incorporated into the Infrastructure Approval (SSI 9973) for the EGP and will be operated under a licence under the <i>Pipelines Act 1967</i> (Pipelines Act).</p> <p>Excision of this section of pipeline (Segment 1.2) which has been transferred to the EGP Infrastructure Approval SSI-9973 is proposed as part of this modification.</p>
Modification to Schedule of Land	Schedule 1 of SSI 9471 includes a list of land subject to the Infrastructure Approval in Appendix 1.	The pipeline modifications will require the addition of new land parcels in Segment 1.1 and removal of lots in Segment 1.2.
Operational pressure	Operating pressure for gas pipeline of 12 MPa.	Alignment of operational parameters with the approved Jemena EGP with a notional operating pressure of 16.55 Mpa.
Mercaptan storage volume increase	Mercaptan is the proposed odorant for the project with on-site storage anticipated to be 2 x 200 kg tanks (400 kg total).	Mercaptan storage volume increase to up to 4 x 500 litre tanks (capable of storing between 2,000 - 2,400 kg).
Cold vent removal	A cold vent stack to be constructed within the berth and wharf facilities infrastructure.	Removal of cold vent stack from Berth 101 facilities.
Utility connections	A range of ancillary features will also be situated at the wharf, including telecommunications, electricity and other utilities.	Installation of a 1.6 km 11kV transmission cable along Seawall Road via both trenching and HDD construction methods to connect to an existing Endeavour Energy substation. A telecommunication cable will also be installed to a tie-in point near the intersection of Seawall Road and the PKCT access road.

A detailed description of the modified project is detailed below, and an overview is presented in Figure 3.1.



Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 56



Australian Industrial Energy  
 Port Kembla Gas Terminal - Modification 4

Project No. 2127477  
 Revision No. A  
 Date 11 Oct 2022

Proposed modification overview

FIGURE 3-1

## 3.2 Pipeline alignment

### 3.2.1 Overview

For the purpose of the proposed modification, the gas pipeline for the project has been divided into two sections: the section from the terminal to the crossing of Springhill Road (Segment 1.1) and the section from the western side of Springhill Road to a connection point with the Eastern Gas Pipeline (Segment 1.2) (refer to Figure 3.1).

The PKGT EIS (GHD, 2018) assessed the construction of the gas pipeline from Berth 101 to the tie-in point at Cringila to be connected to the EGP. The assessed alignment is about 6.3 kilometres in length with a 20-metre corridor (10 metres either side of the pipeline centre line) as the project application area. The alignment was selected to minimise disruption to public access, port operations and avoid area of environmental and cultural sensitivity. Construction of the pipeline involves a combination of open trenching and HDD adopted for key road, rail and waterway crossings, and to avoid previously undisturbed areas of biodiversity and heritage values.

Segment 1.1 of approved pipeline alignment follows a route from Berth 101 to the north along the road verge of Road No 1 within Port Kembla Coal Terminal (PKCT). It would then turn west along the road verge of Tom Thumb Road, including HDD beneath the Gurungaty Waterway. It would continue along the road verge of Tom Thumb Road to the north and west, generally following the boundary of the existing car storage facilities and BlueScope facilities, including HDD beneath the crossings of Tom Thumb Road, the Pacific National railway and BlueScope's Northgate access. It would then continue south-west including HDD beneath the crossing of NSW RailCorp's South Coast Line and Springhill Road and the intervening vegetated area, concluding Segment 1.1. Segment 1.2 of the approved pipeline then follows the western road verge of Springhill Road south including HDD beneath Allans Creek and would then tie-in to the EGP at Cringila adjacent to Five Islands Road.

### 3.2.2 Proposed modification

The proposed modification would excise Segment 1.2 from the PKGT Infrastructure Approval SSI 9471 and transfer to the Jemena EGP Infrastructure Approval SSI 9973. A separate modification report has been prepared for this and was approved by DPE on 4 May 2022 (GHD, 2021a). This reduces the length of pipeline approved under SSI 9471 from 6.3 kilometres to 4.1 kilometres.

Minor modifications to the alignment in Segment 1.1 will occur in various locations to incorporate a more direct route at the most northern point of the PKCT property and within the vegetated area in the northern portion of the BlueScope steelworks property. The construction footprint has also been amended to include areas identified as being required for laydown and stockpiling during detailed construction planning in consultation with landowners.

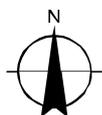
A detailed overview of the pipeline alignment changes is presented in Figure 3.2 through Figure 3.5.



**LEGEND**

- Proposed Pipeline Modification
- Segment 1.2 (to be excised)
- Proposed Trenchless Section
- Site compound
- Construction corridor
- Existing or Approved Pipeline
- EIS Gas Pipeline Alignment
- Trenchless Pipeline section
- Railway
- Waterways
- Cadastre

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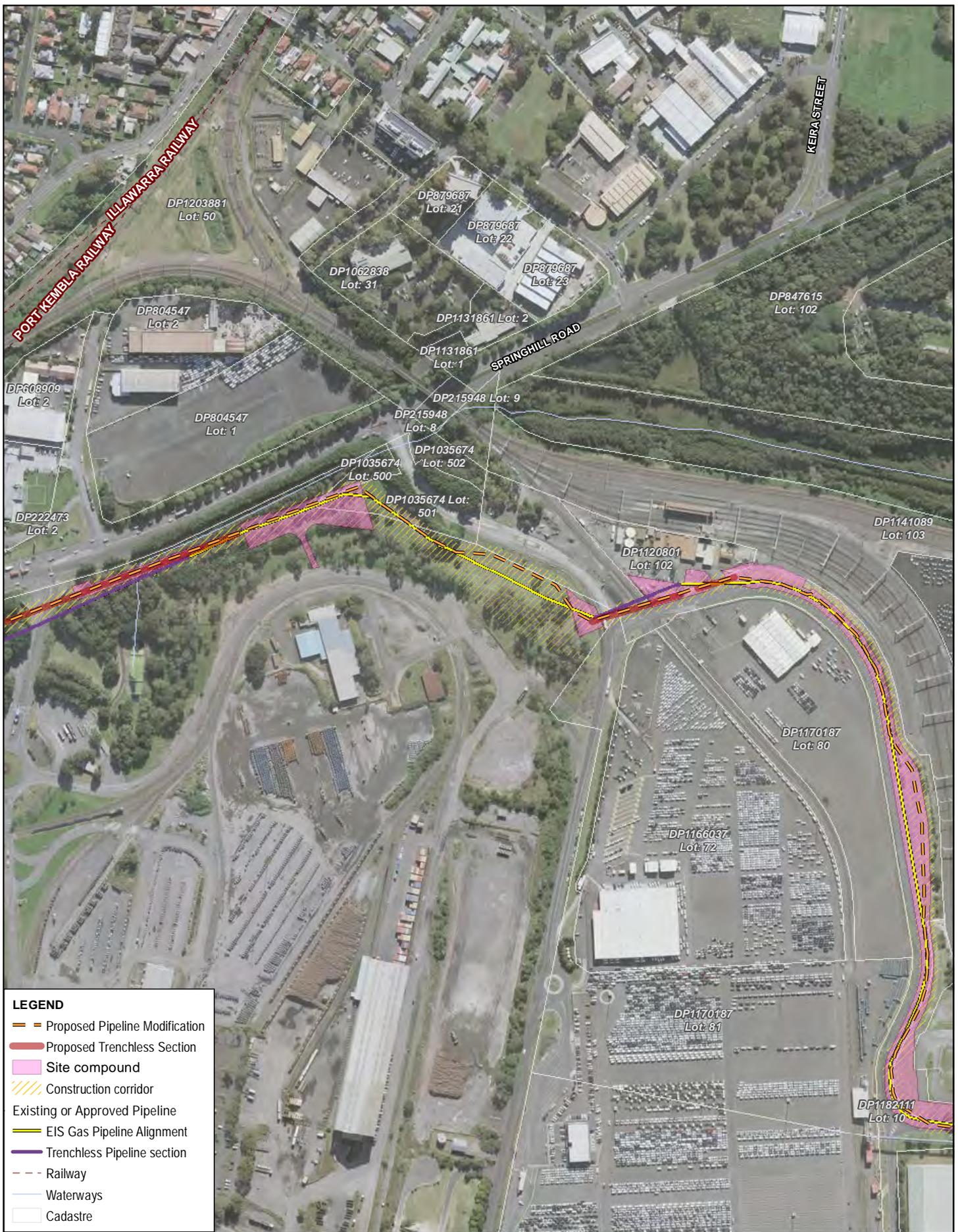
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 Date 11 Oct 2022

Map Projection: Transverse Mercator  
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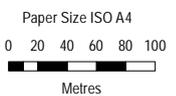
Proposed modification - detailed

FIGURE 3-2



**LEGEND**

- Proposed Pipeline Modification
- Proposed Trenchless Section
- Site compound
- Construction corridor
- Existing or Approved Pipeline
- EIS Gas Pipeline Alignment
- Trenchless Pipeline section
- Railway
- Waterways
- Cadastre



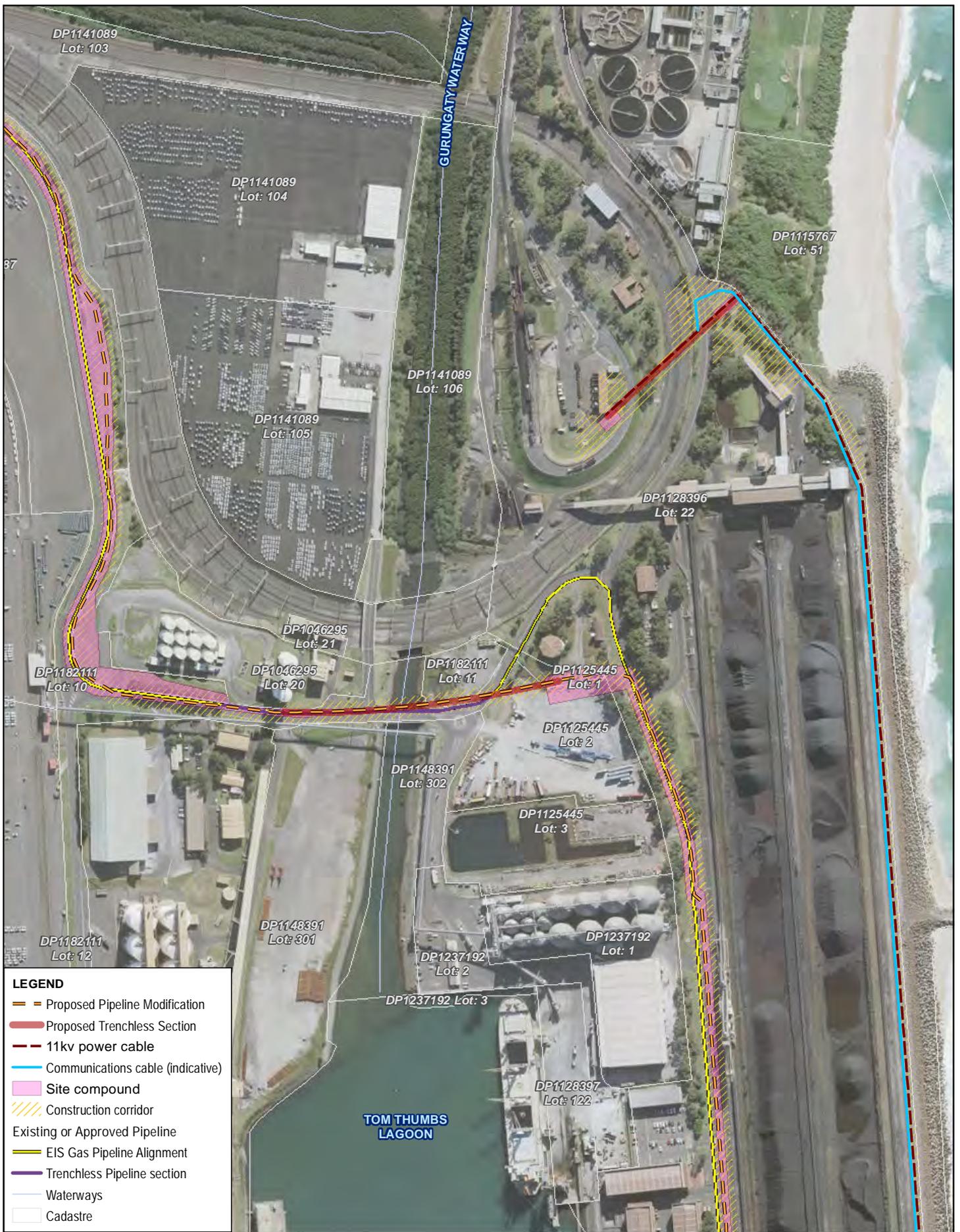
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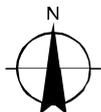
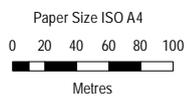
Proposed modification - detailed

FIGURE 3-3



**LEGEND**

- Proposed Pipeline Modification
- Proposed Trenchless Section
- 11kv power cable
- Communications cable (indicative)
- Site compound
- Construction corridor
- Existing or Approved Pipeline
  - EIS Gas Pipeline Alignment
  - Trenchless Pipeline section
  - Waterways
  - Cadastre

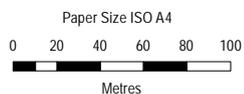


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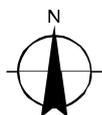
Project No. 2127477  
Revision No. A  
Date 11 Oct 2022

Proposed modification - detailed

FIGURE 3-4



Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 56



Australian Industrial Energy  
 Port Kembla Gas Terminal - Modification 4

Project No. 2127477  
 Revision No. A  
 Date 11 Oct 2022

Proposed modification - detailed

FIGURE 3-5

## 3.3 Modification to Schedule of Land

### 3.3.1 Overview

Appendix 1 of Infrastructure Approval SSI-9471 includes a list of land subject to the project.

### 3.3.2 Proposed modification

The proposed pipeline alignment changes will require additional land parcels for Segment 1.1 and the removal of lots in Segment 1.2. An overview of the existing schedule of land and the land parcels to be added and removed as part of the modification is outlined in Table 3.2.

Table 3.2 Additional Lot/DP modification comparison

SSI-9471 Schedule of Land lots	Proposed modification
<p>Land lots identified in Infrastructure Approval SSI 9471 Appendix 1 as part of the project include:</p> <ul style="list-style-type: none"> <li>- Pipeline:               <ul style="list-style-type: none"> <li>• Lot 1/DP1125445</li> <li>• Lot 22/DP1128396</li> <li>• Lot 12/DP1182111</li> <li>• Lot 10/DP1182111</li> <li>• Lot 102/DP1120801</li> <li>• Lot 1/DP606434</li> <li>• Lot 501/DP103674</li> <li>• Lot 500/DP103674</li> <li>• Lot 64/DP1188514</li> <li>• Lot 3/DP837554</li> <li>• Lot 6/DP837554</li> <li>• Lot 2/DP837554</li> <li>• Lot 103/DP801243</li> <li>• Lot 1/DP203783</li> <li>• Lot 1/DP785374</li> <li>• Lot 3/DP606430</li> <li>• Lot 2/DP570107</li> <li>• Lot 1/DP785374</li> </ul> </li> <li>- Disposal area               <ul style="list-style-type: none"> <li>• Lot 6/DP1236743</li> <li>• Lot 2/DP1182823</li> <li>• Lot 105/DP1013971</li> </ul> </li> <li>- Berth 101               <ul style="list-style-type: none"> <li>• Lot 8/DP1154760</li> <li>• Lot 22/DP1128396</li> <li>• Lot 70/DP1182824</li> <li>• Lot 101/DP1013971</li> <li>• Lot 2/DP1040783</li> </ul> </li> </ul>	<p>Additional land lots required as the result of minor alignment changes and constructability for Segment 1.1 are as follows:</p> <ul style="list-style-type: none"> <li>- Lot 2/DP1125445</li> <li>- Lot 11/DP1182111</li> <li>- Lot 20/DP1046295</li> <li>- Lot 81/DP1170187</li> </ul> <p>Removal of the following lots for the excision of Segment 1.2:</p> <ul style="list-style-type: none"> <li>- Lot 2/DP570107</li> <li>- Lot 1/DP203783</li> <li>- Lot 3/DP606430</li> <li>- Lot 1/DP785374</li> </ul>

## 3.4 Operational pressure

### 3.4.1 Overview

The PKGT Response to Submissions (RTS) (GHD, 2019) specifies that the maximum allowable operating pressure (MAOP) of the gas pipeline is 14.7 megapascals (MPaG) but is limited by the maximum supply pressure of the FSRU at 12 MPaG. Submissions made referred to pressures in the EGP ranging from 14 – 16 MPaG, however at the time of the PKGT RTS (GHD, 2019) it was understood the normal operating pressure was about 8-11 MPaG. As such, the project was anticipated to provide gas at a suitable pressure to the pipeline. The applicable Infrastructure Approval SSI 9471 condition (Schedule 2, condition 6) states the gas pipeline must not be operated at a pressure exceeding 12 MPaG.

### 3.4.2 Proposed modification

It is proposed to increase the MAOP of the gas pipeline to 16.55 MPaG to align with the MAOP of the Jemena EGP and Port Kembla Looping Lateral. The proposed modification for increasing the PKGT MAOP will ensure consistency across the entire EGP pipeline network and associated infrastructure approvals, and it is not anticipated to materially impact the project Final Hazard Analysis (FHA) or Fire Safety Study (refer to Appendix B).

## 3.5 Mercaptan volume increase

### 3.5.1 Overview

The Preliminary Hazard Analysis (PHA) Addendum (Worley Parsons, 2019) prepared for the PKGT RTS (GHD, 2019) described methyl mercaptan as the odorant for the project. It was planned that mercaptan would be stored on the Berth 101 site in two 200-kilogram tanks (400 kilograms total) and injected through a specialised skid prior to entering the gas pipeline. It was anticipated that up to 400 kilograms of mercaptan would be stored between the two tanks at Berth 101 and empty tanks would be refilled by truck or swapped out with refilled tanks.

### 3.5.2 Proposed modification

The selected odorant for the project is Spotleak 1005 which is a 70:30 blend of Tetra Hydro-Thiopene and Tert-Butyl Mercaptan (herein referred to as 'mercaptan'). The mercaptan would be stored on site in two 500 litre semi bulk containers and housed within a 40-foot shipping container. Allowance has been made for two additional tanks to be stored onsite, bringing the total potential storage onsite to between 2000 – 2400 kilograms of mercaptan.

The shipping container would also contain the injection pumps. The mercaptan would be injected into the natural gas at a rate of 0.6 – 6 litres an hour (L/hr) and a concentration of 9 mg per standard cubic metre (mg/Sm<sup>3</sup>). The semi bulk containers would be loaded into the shipping container using forklifts. Changeout of containers is expected to be required every 3 – 13 days, depending on the send out rate from the FSRU. Levels within the semi bulk containers would be monitored using load cells with a signal provided to the offsite control room.

A technical note has been prepared by the AIE Hazards and Risk consultants to define the potential hazards related to the mercaptan increase volume and reported as part of this modification report, which is attached as Appendix B.

## 3.6 Cold vent removal

### 3.6.1 Overview

A cold vent located within the berth and wharf topside facilities is shown on design drawings in Appendix A of the PKGT EIS (GHD, 2018) and the PKGT RTS (GHD, 2019). The purpose of the cold vent would be for use in an emergency, such as to mitigate the impacts of a loss of gas containment or fire event. The cold vent was designed to be able to depressurise the inventory of gas to 690 kilopascal gauge (kPag) in 15 minutes via the piping systems of the Marine Loading Arms and the Onshore Receiving Facilities (ORF) pipework up to the shutdown

valve in the above ground section of the pipeline, a combined process known as 'blowdown'. Following design changes, the requirement to blowdown the ORF piping has been removed.

Risk assessment of cold venting operations is required as per the Final Hazard Analysis (FHA) Infrastructure Approval SSI 9471 Schedule 3, Condition 21(c).

## 3.6.2 Proposed modification

An assessment of the removal of the cold vent has been undertaken as part of the preliminary work on the Fire Safety Study for the project in accordance with the NSW Planning Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 – Hazard Analysis (Department of Planning, 2011). The assessment has found that removal of the cold vent is considered acceptable, provided the appropriate current and proposed mitigation measures are implemented in accordance with the Fire Safety Study (Worley, 2021a). The Fire Safety Study forms part of the FHA analysis required under the Infrastructure Approval SSI 9471.

Additionally, the tie-in facility at Kembla Grange included as part of the Jemena EPG Infrastructure Approval (SSI-9973) includes a blowdown vent and actuated shutdown valve. This infrastructure is able to segregate the EGP from the PKGT during an emergency situation and provides an additional mitigation strategy and management measure.

A technical note has been prepared by the AIE Hazards and Risk consultants to define the potential hazards related to the mercaptan increase volume and reported as part of this modification report, attached as Appendix B.

## 3.7 Utility connections

### 3.7.1 Overview

The proposed utility installations along Seawall Road were not explicitly described and assessed as part of the PKGT EIS (GHD, 2018), though section 5.3.2 does state *“a range of ancillary facilities will also be situated at the wharf including access roads, fencing and other security, lighting, telecommunications, electricity, water, sewerage and other utilities”*.

### 3.7.2 Proposed modification

Following design and feasibility investigations into the required utility connections to service the PKGT site, an 11kV transmission cable and communications cable is proposed to be installed via open trenching along the length of Seawall Road. The 11kV cable will run for about 1.6 kilometres, commencing at Berth 101, running north along Seawall Road with HDD beneath existing rail infrastructure for connection to the existing Endeavour Energy substation.

The communications cable will be installed along the same route as the 11kV transmission cable, but running south east to connect to a tie-in point near the intersection of Seawall Road and the Coal Terminal access road (refer to Figure 3.1, Figure 3.4 and Figure 3.5).

Installation will be undertaken via a combination of open trenching to a depth of approximately 1 metre, and HDD beneath existing rail and road infrastructure and other environmental constraints (i.e., trees and other vegetation) to a depth of approximately 5.5 mbgl. A Geotechnical Assessment and Design Report (GHD, 2022) has been prepared to assess the subsurface conditions along the proposed transmission line route, including potential contamination and Acid Sulfate Soil (ASS) presence. Potential impacts associated with these environmental factors are discussed further in Section 6.3.

### 3.7.3 Duration and working hours

Construction hours will be in accordance with Infrastructure Approval SSI 9471 condition 27, Schedule 3 which includes the following:

Unless the Secretary agrees otherwise, the Proponent may only undertake construction activities on site between:

- a. 7 am to 6 pm Monday to Friday;

- b. 8 am to 1 pm Saturdays; and
- c. at no time on Sundays and NSW public holidays.

The following construction activities may be undertaken outside these hours without the approval of the Secretary:

- a. the delivery of materials as requested by the NSW Police Force or other authorities for safety reasons.
- b. emergency work to avoid the loss of life, property and/or material harm to the environment.
- c. construction works that cause LAeq (15 mins) noise levels that are:
  - no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009); and
- d. no more than the noise management levels specified in Table 3 of the Interim Construction noise Guideline (DECC, 2009) at other sensitive land uses; and
  - continuous or impulsive vibration values, measured at the most affected residence, are no more than those for human exposure to vibration, specified in Table 2.2 of *Assessing vibration: a technical guideline* (DEC, 2006); and
  - intermittent vibration values measured at the most affected residence are no more than those for human exposure to vibration, specified in Table 2.4 of *Assessing vibration: a technical guideline* (DEC, 2006); or
- e. where a negotiated agreement has been reached with affected receivers.

Out of Hours Approvals issued by the Secretary of NSW DPE in November 2020, February 2022 and September 2022 to permit out of hours construction for the following activities:

- Quay wall construction at Berth 101 including excavation, bentonite slurry and concrete pours
- Dredging and loading at Berth 101, and disposal to the Outer Harbour
- Underboring at five locations using HDD along the new pipeline route
- Earth moving at the Berth 101 and disposal site.
- Piling activities for the construction of the quay wall at Berth 101.

The construction activities for the proposed modification are commensurate with activities subject to Out of Hours work approval and are located more than 1.23 kilometres from the nearest sensitive residential receivers.

The modification therefore seeks approval for construction activities including trenching and underboring to be undertaken outside of standard construction hours in accordance with the existing Out of Hours noise approvals for the project.

## 4. Statutory context

This section describes the relevant legislation and environmental planning instruments detailed in the PKGT EIS (GHD, 2018) applicable to the proposed modification. An overview is provided in Table 4.1.

Table 4.1 Proposed modification legislative compliance

Legislation	Compliance
<b>Federal</b>	
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	<p>Approval from the Commonwealth Minister for the Environment and Water under the EPBC Act is required where an activity is likely to have a significant impact on listed matters of national environmental significance (MNES). The PKGT EIS (GHD, 2018) considered potential impacts upon MNES. No impacts were identified that could be considered to be significant and no referral to the Minister was made.</p> <p>The proposed modification will not result in any additional impacts, or likely impacts to MNES compared to what was assessed in the PKGT EIS (GHD, 2018). As such, no referral under the EPBC Act is required for the proposed modification.</p>
<b>State</b>	
EP&A Act	<p>The project has been declared as CSSI as per Part 5, Division 5.2 of the EP&amp;A Act. Development Consent was granted under section 5.19 of the Act on 24 April 2019.</p> <p>Section 5.25 of the EP&amp;A Act states that a Development Consent may be modified with the Minister's approval. The Minister's approval is not required if the CSSI as modified will be consistent with the existing approval. It has determined that the proposed modification is not consistent with the SSI-9471 Development Consent, and modification of the project is required as per Section 5.25 of the Act.</p>
<i>Protection of the Environment Operations Act 1997</i> (POEO Act)	<p>The POEO Act provides the environmental regulatory framework and licencing requirements for certain Scheduled Activities, listed in Schedule 1 of the Act. EPLs are issued by the NSW Environment Protection Authority (NSW EPA). AIE has been issued EPL No. 21529 for the project. An amendment to the EPL and premises map will be required to incorporate the 11Kv transmission and communications cable to form part of the scheduled development work authorised by the licence.</p>
Pipelines Act	<p>The Pipelines Act establishes a licensing regime for pipelines within NSW. Segment 1.2 of the alignment has been transferred to the Jemena EGP approval. The EGP has an existing pipeline licence (No. 26) and as per section 26 of the Pipelines Act a variation will be undertaken by Jemena to amend the licence to include Segment 1.2.</p> <p>Section 5 of the Pipelines Act states that nothing in the Act requires a person to hold a licence in respect of a pipeline of the prescribed class for the conveyance of dangerous goods within the meaning of the <i>Dangerous Goods (Road and Rail Transport) Act 2008</i>. A prescribed class means a pipeline of a length of less than 10 kilometres or other length specified by the Minister</p> <p>A Pipeline's Licence is therefore not required for Segment 1.1 of the proposed pipeline.</p>
<i>Biodiversity Conservation Act 2016</i> (BC Act)	<p>A Biodiversity Development Assessment Report (BDAR) was prepared for the PKGT EIS (GHD, 2018a) in accordance with section 7.9 of the BC Act. The BDAR indicated the project would be unlikely to have a significant impact on any threatened species, populations or ecological communities listed under the BC Act and EPBC Act. Schedule 3, condition 20 of the Infrastructure Approval SSI 9471 states AIE must retire biodiversity credits prior to the commencement of construction. Payments to the Biodiversity Conservation Fund have been made to retire these obligations.</p> <p>The proposed pipeline alignment changes near the BlueScope Northgate access point will avoid a drainage channel and reduce potential impacts to planted native vegetation present (refer to Figure 3.2). A review of the BDAR</p>

Legislation	Compliance
	<p>and a site visit was undertaken in June 2022 to assess the current state of the vegetation present to inform the potential impacts for the proposed modification. Based on the review of the BDAR and site visit, impacts to biodiversity values are anticipated to be consistent with those described in the PKGT EIS (GHD, 2018). Detailed information on the proposed modification biodiversity impacts is discussed in Section 6.2.</p>
<p><i>Roads Act 1993</i> (Roads Act)</p>	<p>Section 138 of the Roads Act requires consent from Transport for NSW for the erection of a structure, or carrying out work in, on or over a public road, or the digging up or disturbance of the surface of a road. The PKGT EIS (GHD, 2018) concluded that a Section 138 permit would be required for the project. However, Seawall Road is located within the NSW Ports lease boundary and is part of the NSW Ports road network. Installation of utility connections within Seawall Road are located within the NSW Ports road network, and prior notification in accordance with Port Kembla Direction 2021 (No Unauthorised Works) is required to NSW Ports prior to the commencement of works. No Section 138 permit is required for the utility connection installation.</p> <p>Previous notification and consent has been obtained from NSW Ports for the construction works currently underway for the project associated with excavation and dredging. Additional notification will be given to NSW Ports to inform them of the proposed modification works to be undertaken on Seawall Road.</p> <p>For works outside of the NSW Ports boundary (refer to Figure 6.4) on public roads, a permit under Section 138 of the Roads Act will be required.</p> <p>Traffic impacts related to the proposed modification are detailed in Section 6.5.</p>
<p><b>Environmental planning instruments</b></p>	
<p>Planning Systems SEPP</p>	<p>The project was declared as CSSI in accordance with Section 5.13 of the EP&amp;A Act and Schedule 5, section 10 of the Planning Systems SEPP (formerly the State Environmental Planning Policy (State and Regional Development) 2011). Infrastructure Approval (SSI 9471) for the project was granted under Section 5.19 of the EP&amp;A Act based upon the development described in the CSSI declaration and the PKGT EIS (GHD, 2018).</p> <p>The provisions of Schedule 5, section 10(3) indicates that development that is ancillary to any other development in this section, including the carrying out of works to upgrade or construct access roads, fencing and safety and communications infrastructure. The utility connections are considered ancillary to the operation of the gas terminal and form part of the project described in the CSSI declaration. However, they could also be considered exempt development under the State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP), which is discussed below.</p> <p>As the 11kV transmission cable and communications cables were not explicitly described in the PKGT EIS (GHD, 2018) or subsequent modifications, it was determined that they should be assessed and approved through a modification to consent and form part of this modification report. Impacts associated with the installation of the utility connections are detailed in Section 6.</p>
<p>Transport and Infrastructure SEPP</p>	<p>The PKGT EIS (GHD, 2018) assessed the statutory requirements for the project in accordance with the now repealed State Environmental Planning Policy (Three Ports) 2013 and State Environmental Planning Policy (Infrastructure) 2007. Both instruments have been consolidated into Chapter 5 and Chapter 2, respectively, of the Transport and Infrastructure SEPP.</p> <p>Schedule 10, clause 38 states that utilities and service facilities are exempt development for the purpose of Chapter 5, which includes the previous State Environmental Planning Policy (Three Ports) 2013 provisions. The utility connections are located on land zoned under Chapter 5. As detailed above the utility connections could be considered to be exempt development and would not require development consent or activity approval, however it was determined they be included in the assessment and approval of a modification to consent.</p>
<p>State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP)</p>	<p>The PKGT EIS (GHD, 2018) assessed hazard and risks associated with the project in accordance with the now repealed State and Environmental Planning</p>

Legislation	Compliance
	<p>Policy No 33 – Hazardous and Offensive Development. This has since been consolidated into Chapter 3 of the Resilience and Hazards SEPP.</p> <p>A PHA was undertaken for the PKGT EIS (GHD, 2018), with a PHA addendum (Worley Parsons, 2018) also undertaken as part of the Response to Submissions report. A technical note (Appendix B) has been prepared to assess the potential hazards related to the proposed mercaptan increase, operational pressure increase and removal of the cold vent stack. Impacts associated with the hazards and risks of the proposed modification are detailed in Section 6.2.</p> <p>Infrastructure Approval SSI 9471 Schedule 3, condition 21 requires the development of a Fire Safety Study, Hazard and Operability Study (HAZOP) and FHA prior to the commencement of the gas pipeline and commencement of operations as part of the projects Final Hazard Studies. These will be reviewed in accordance with the technical note provided for the proposed modification and submitted as part of the Final Hazard Studies for the project.</p>

## **5. Community engagement**

A significant amount of stakeholder engagement has been carried out for the project to date including the exhibition of the environmental impact statement, the response to submissions, and numerous briefings, community meetings and consultation materials produced throughout the assessment process.

AIE has and will continue to engage with relevant stakeholders including landholders, interest groups and other community bodies, and authorities throughout the implementation of the project.

## 6. Environmental assessment

### 6.1 Overview

This section provides further assessment of the impacts of the proposed modification. Table 6.1 compares the summary of approved impacts assessed in the PKGT EIS (GHD, 2018) to impacts likely to result from the proposed modification in order to scope the need for further assessment of specific environmental factors. Where changes are identified, further consideration is provided in the identified section.

Table 6.1 *Environmental impacts associated with the proposed modification*

Environmental factor	PKGT EIS approved impact	Proposed modification impact
Port navigation	<p>Port Kembla has a deep-water shipping channel that can accommodate vessels with ship length of up to 311 m and has capacity for Capesize vessels at nominated berths. Pilotage is compulsory for all vessels over 30 metres in length.</p> <p>Marine vessels, such as barges and tugs, will be used to transport dredged materials during the construction works for the project. Around 2 barge loads per day (4 to 6 vessel movements) would be required for the duration of the construction period with a typical capacity of about 1200 cubic metres.</p> <p>During operation the project proposes an LNG shipment every two to three weeks, which equates to around 4 vessel movements on average per month. The LNG carrier movements are low in proportion to the vessel's movements anticipated from other operational arrangements at the port (1,680 to 2,380 vessel movements per year) and are not expected to significantly increase vessel movements or restrict navigability within the port.</p>	<p>No impacts to port navigation are anticipated from the proposed modification. Impacts described in the PKGT EIS (GHD, 2018) are consistent with the proposed modification and no further consideration of port navigation impacts is provided.</p>
Hazard and risk	<p>A PHA was carried out for the PKGT EIS (GHD, 2018) in accordance with the NSW DPE guideline Hazardous Industry Planning Advisory Paper No 6 Hazard Analysis (Department of Planning, 2011a), including quantitative risk assessment of the LNG carriers, FSRU, berth and wharf facilities and the gas pipeline. The PHA involved the identification of specific hazardous events, the probability of them occurring and the consequences for people and property if they did occur. The main hazards identified related to a loss of containment of liquid natural gas from a LNG carrier or the FSRU, or a loss of containment of natural gas from the FSRU, the gas pipeline or connecting unloading arms and pipes at the berth and wharf facilities.</p>	<p>The proposed modification includes changes to operational pressure, mercaptan volume increase and removal of the cold vent in Berth 101. Additional hazard and risk assessment has been undertaken to define potential risks associated with the modification.</p> <p>Further details of the minor changes associated with the proposed modification regarding hazards and risk are provided in Section 6.2 below.</p>
Soils and contamination	<p>The project site is located primarily within industrial land that has been reclaimed from Tom Thumb Lagoon during the establishment of Port Kembla. Investigation into the contamination status of the site has been undertaken on behalf of AIE for the purpose of the PKGT EIS (GHD, 2018) and subsequent targeted site assessments and baseline condition reports have been prepared. Contamination in the fill material at Berth 101 was assessed to be relatively minor and generally consistent across the development area. Only two soil samples exceeded adopted criteria for benzo(a)pyrene (BaP) (health limits)</p>	<p>The pipeline and utility connections will be installed within areas where contamination and ASS are potentially present. Additional geotechnical assessment has been undertaken by GHD in relation to the installation of utility connections within Berth 101.</p> <p>Further details of the minor changes associated with the proposed modification regarding soils and contamination are provided in Section 6.3 below.</p>

Environmental factor	PKGT EIS approved impact	Proposed modification impact
	<p>and for heavy end petroleum hydrocarbons (TRH) (management limits) near the inferred base of fill material between four metres and five metres below ground level.</p> <p>The 1:25,000 Port Kembla ASS Risk Map (DLWC, 1997) indicates that Berth 101 is situated in an area mapped as disturbed terrain at an elevation greater than 4 m (refer to Figure 6.2). Estuarine sediments exist within the Port Kembla Harbour and are mapped as having a high probability of ASS.</p>	
Water resources	<p>Water quality within the Inner Harbour and Outer Harbour of Port Kembla has historically been impacted by urban and industrial discharges as well as port activities. In particular, these past activities led to contamination of marine sediments, groundwater and harbour waters.</p> <p>Water quality impacts during construction of the project are managed under EPL No 21529 and the approved Stage 2A and Stage 2B Water Quality Monitoring Plan (WQMP).</p>	<p>No impacts to water quality are anticipated from the proposed modification. Impacts described in the PKGT EIS (GHD, 2018) are consistent with the proposed modification and no further consideration of water quality impacts is provided.</p>
Marine ecology	<p>Marine habitat within Port Kembla is primarily restricted to the hard substrates and the soft sediments. Hard substrate habitat consists of infrastructure such as piles, quay walls and breakwater around the perimeter of the port, which presents ideal habitat for biofouling communities within the sheltered environment. Assemblages are generally sparse with community structures reflective of the highly disturbed environment with introduced species accounting for more than half of the hard substrate assemblages in the Inner Harbour.</p> <p>The different habitats within the Inner and Outer Harbour have been found to support varying diversities in fish assemblages and compositions. A number of listed marine species are considered to potentially occur on occasions within Port Kembla despite the disturbed nature of the marine environment.</p> <p>Impacts on marine ecology during construction of the project are managed under the approved Stage 2A and Stage 2B Flora and Fauna Management Plan.</p>	<p>No impacts to marine ecology are anticipated from the proposed modification. Impacts described in the PKGT EIS (GHD, 2018) are consistent with the proposed modification and no further consideration of marine ecology impacts is provided.</p>
Terrestrial biodiversity	<p>The project is located in a highly disturbed and modified industrial environment with minimal native vegetation and associated habitat for threatened species present in the area.</p> <p>A single patch of native vegetation is located on the pipeline's alignment on the western side of Springhill Road. This patch comprises a small area of dense revegetation on modified/cleared lands and does not constitute a threatened ecological community. The project will result in the removal of 0.25 hectares of planted native vegetation (PCT 1326 Woollybutt – White Stringybark – Forest Red Gum grassy woodland) and is not expected to have a significant impact upon the habitat values of the locality.</p> <p>Potential impacts upon native vegetation and fauna habitat have been further avoided by the use of HDD instead of open trenching for pipeline construction (in particular to avoid areas of</p>	<p>The proposed pipeline alignment changes at the BlueScope Northgate access point will avoid a drainage channel and reduce potential impacts to planted native vegetation present. A BDAR was prepared for the PKGT EIS (GHD, 2018) which has been reviewed for the proposed modification. A site visit was undertaken in June 2022 to assess the current state of vegetation assessed under the BDAR.</p> <p>Further details of the minor changes associated with the proposed modification regarding terrestrial biodiversity are provided in Section 6.4 below.</p>

Environmental factor	PKGT EIS approved impact	Proposed modification impact
	Illawarra Lowlands Grassy Woodland and natural swamp areas that intersect the proposed alignment).	
Heritage	<p>The Aboriginal heritage assessment showed that areas of potential for Aboriginal heritage features and archaeological deposits are located on Spring Hill, to the east and west of Springhill Road. The proposed pipeline route has been designed to avoid impacts to areas of potential for Aboriginal cultural material and no significant impacts are anticipated to either tangible or intangible heritage values.</p> <p>Results of the historic heritage assessment showed that the study area has been heavily modified with little to no potential for historical features and/or archaeological deposits to survive. Pockets of less disturbed land with potential for historical heritage features and archaeological deposits are located on Spring Hill to the east and west of Springhill Road. Industrial moveable heritage items are also on display in the study area as part of the Inside Industry Visitor Centre on Bluescope Steel land.</p> <p>The pipeline route avoids areas of potential historical heritage values and items of moveable heritage, and no impacts are anticipated.</p>	No impacts to Aboriginal and historic heritage are anticipated from the proposed modification. Impacts described in the PKGT EIS (GHD, 2018) are consistent with the proposed modification and no further consideration of heritage impacts is provided.
Traffic and transport	<p>A detailed assessment of traffic and transport impacts from the project was undertaken for the PKGT EIS (GHD, 2018).</p> <p>Results showed that the majority of key roads in the vicinity of the project are expected to operate well within the acceptable capacity for weekday morning and evening peak periods. Traffic modelling indicates that the key intersections in the study area would operate with a satisfactory level of service under the construction traffic conditions.</p> <p>The additional traffic generated by the construction activities and minor increase in traffic during operation are not anticipated to impact pedestrians, bicycle riders, pedestrian or bicycle facilities, and public transport (train or bus) services operating in the vicinity of the site.</p> <p>Impacts on traffic and transport during construction of the project are managed under the approved Stage 2A and Stage 2B Construction Traffic Management Plan (CTMP).</p>	Further details of the minor change associated with the proposed modification regarding traffic and transport are provided in Section 6.5 below.
Noise and vibration	<p>The noise modelling demonstrates that project related noise for construction and operation of the LNG import terminal is expected to be compliant with the project noise trigger levels. The closest sensitive residential receivers are located approximately two kilometres from Berth 101 and will not be impacted by the project.</p> <p>No vibration impacts above the vibration criteria are predicted from construction of the project due to the large distance between the construction area and the nearest residential receivers.</p> <p>The predicted noise levels are expected to exceed the noise management levels during pipeline construction works located in the closest proximity to the residential receivers. However, the impacts</p>	Further details of the minor change associated with the proposed modification regarding noise and vibration are provided in Section 6.6 below.

Environmental factor	PKGT EIS approved impact	Proposed modification impact
	<p>from pipeline construction activities would be intermittent in duration as the pipeline construction would progress sequentially along the construction corridor and will not impact upon any individual receiver for an extended period of time.</p> <p>Impacts on noise and vibration during construction of the project are managed under the approved Stage 2A and Stage 2B Noise and Vibration Management Plan (NVMP) and Out of Hours Works approval issued by the NSW EPA in November 2020, February 2022 and September 2022.</p>	
Air quality	<p>Key sensitive receptors within proximity to the project site include residential areas located approximately 2 kilometres from the proposed LNG import terminal site.</p> <p>The project has potential to generate dust through construction activities, notably earthworks and the handling and transfer of earth and other material. Modelling results show that sensitive receptors in the study area will not experience dust related impacts during construction.</p> <p>The predicted pollutant emissions from the project are expected to comply with the relevant criteria when assessed in accordance with the EPA Approved Methods. The application of standard dust mitigation measures will assist to minimise potential impacts from construction of the project. Compliance with International Maritime Organization legislation and guidelines will minimise the impacts from the operations of the project.</p>	<p>Further details of the minor change associated with the proposed modification regarding air quality are provided in Section 6.7 below.</p>
Landscape and visual	<p>The landscape and visual assessment showed significant landscape characteristics within the study area included the Illawarra Escarpment, the escarpment foothills, the coastal plain, beaches and foreshore, and Lake Illawarra. Key urban features include the Wollongong City Centre, the port precinct, and the residential development on the surrounding foothills.</p> <p>Key views were found to be achieved from elevated locations within the study area, and headland locations with clear open views across the water. The most important of these are sensitive receptor locations such as tourist lookouts, as well as residential areas.</p> <p>While the FSRU and visiting LNG carrier will be visible from a variety of viewer locations, the magnitude of change is considered low as they will be visually integrated with other industry and port infrastructure at Port Kembla.</p>	<p>No impacts to landscape and visual amenity are anticipated from the proposed modification. Impacts described in the PKGT EIS (GHD, 2018) are consistent with the proposed modification and no further consideration of landscape and visual impacts is provided.</p>
Social and economic	<p>A social and economic impact assessment was prepared for the PKGT EIS (GHD, 2018) with reference to relevant guidelines including the NSW Department of Environment and Planning Social impact assessment guideline.</p> <p>Existing social and economic conditions were considered with reference to stakeholder feedback received during consultation as well as publicly available demographic and economic data from sources including the Australian Bureau of Statistics and Wollongong City Council.</p>	<p>No social and economic impacts are anticipated from the proposed modification. Impacts described in the PKGT EIS (GHD, 2018) are consistent with the proposed modification and no further consideration of social and economic impacts is provided.</p>

Environmental factor	PKGT EIS approved impact	Proposed modification impact
	<p>Construction of the project is predicted to generate social and economic benefits directly through capital investment and job creation, and indirectly through industrial and supply chain effects such as the supply of goods and services to the construction workforce. It found that construction of the gas pipeline could lead to some temporary amenity impacts at nearby residences such as noise and dust from pipeline construction activities and equipment as well as additional road traffic.</p> <p>Development of a contracting and procurement strategy, which seeks to maximise local content for both construction and operation, will support local employment and business opportunities. During operation the project will seek to work with interested local parties to support new qualification/certification pathways for some of the specialised roles on the FSRU, which is unique to Australia at this stage and is both a marine vessel and a regasification plant.</p>	
Waste management	<p>Waste management matters relevant to the project was identified as part of the PKGT EIS (GHD, 2018) including type and quantities of waste that may be generated during the construction and operation of the project.</p> <p>Construction would have various waste streams including demolition and construction waste, excavated and dredged material and waste vegetation. The largest waste stream will be excavated and dredged sediment and soil material, which will primarily be placed within the Emplacement Cell in the Outer Harbour generally in accordance with NSW Ports reclamation plans.</p> <p>Waste generated by construction of the project is managed in accordance with the waste hierarchy defined in the <i>Waste Avoidance and Resource Recovery Act 2001</i> and the approved Stage 2A and Stage 2B Spoil Management Plan (SMP).</p>	<p>No impacts to waste management are anticipated from the proposed modification. Impacts described in the PKGT EIS (GHD, 2018) are consistent with the proposed modification and no further consideration of waste management impacts is provided.</p>
Greenhouse gas and climate change	<p>The greenhouse gas assessment was undertaken in accordance with the National Greenhouse and Energy Reporting Act 2007 and National Greenhouse and Energy Reporting (Measurement) Determination 2008 and supplementary documentation in line with good accounting practice.</p> <p>The assessment estimated that greenhouse gas emissions would be about 8,314 tonnes of carbon dioxide equivalent (t CO<sub>2</sub>-e) during construction, mainly due to diesel consumption, and 44,145 t CO<sub>2</sub>-e each year during operation, mainly due to electricity generation on board the FSRU.</p> <p>A preliminary climate change risk assessment was also undertaken to inform the project proponent of potential vulnerabilities of the proposed asset from climate change and identify ways to address and minimise this vulnerability. The assessment has been prepared in accordance with Australian Standard 5334-2013 <i>Climate change adaptation for settlements and infrastructure – A risk based approach</i>.</p> <p>This preliminary climate change risk assessment identified eleven risks which are applicable to the</p>	<p>No impacts to greenhouse gas and climate change are anticipated from the proposed modification. Impacts described in the PKGT EIS (GHD, 2018) are consistent with the proposed modification and no further consideration of greenhouse gas and climate change impacts is provided.</p>

Environmental factor	PKGT EIS approved impact	Proposed modification impact
	<p>proposed FSRU and associated infrastructure. The risks were associated with climate variables including extreme temperatures, sea level rise, storm surge, sea water temperature, east coast lows, hail and extreme winds. An FSRU and associated wharf infrastructure may inherently be more resilient to the effects of climate change than a fixed asset.</p> <p>An FSRU is a moveable, seaworthy vessel designed to operate in a wide variety of climates across the world, which may be more extreme than Australia's under the effect of climate change for some variables. Given that FSRUs are also required and designed to travel across the sea in rough conditions, risks from storm surge and hail were assessed as low. Typically impacts identified have consequences for the infrastructure service, causing delays or early renewal, and financial cost to the operation of the asset.</p>	
Cumulative impacts	<p>An assessment was undertaken to consider the potential for cumulative impacts of the project with other existing or proposed major developments. The main areas where potential cumulative impacts could occur were considered to be hazard and risk, water resources, traffic and access, noise and vibration, air quality and visual impacts.</p> <p>The potential for cumulative hazards and risks was assessed in accordance with propagation risk criteria under HIPAP No 4, Risk Criteria for Land Use Safety Planning. The propagation risk criteria define the extent to which a hazardous event at one facility could trigger another hazardous event at an adjoining facility.</p> <p>The assessment found that the propagation risk from potential hazard events caused by the project, including the LNG carriers, FSRU, berth and wharf facilities, and gas pipeline, would not extend to adjacent industrial facilities including the PKCT and proposed Port Kembla Bulk Liquids Terminal. Further, a review of the available hazard assessments undertaken for adjacent industrial facilities found that the propagation risk from potential hazard events from those facilities would similarly not extend to the project.</p> <p>The potential for cumulative impacts was considered limited, drawing on specialist assessments of the project and the other identified projects where relevant.</p>	No cumulative impacts are anticipated from the proposed modification. Impacts described in the PKGT EIS (GHD, 2018) are consistent with the proposed modification and no further consideration of cumulative impacts is provided.

## 6.2 Hazards and risk

### 6.2.1 Overview

The PHA undertaken for the project was carried out in accordance with planning guidelines for hazardous development adopted by the NSW DPE including the HIPAP No 6 Hazard Analysis (2011a). The PHA involved the identification of specific hazardous events, the probability of them occurring and the consequences for people and property if they did occur. The overall risk associated with the hazards was determined in relation to defined criteria under HIPAP No 4 Risk Criteria for Land Use Safety Planning (2011b).

The main hazards that were identified included the following:

- a loss of containment of liquid natural gas from an LNG carrier or the FSRU
- a loss of containment of natural gas from the FSRU, the gas pipeline or connecting unloading arms and pipes at the berth and wharf facilities.

The main hazardous material to be used by the project would be natural gas that would be expected to contain mostly methane and a proportion of ethane and other trace substances such as propane, butane, pentane and nitrogen depending on its particular properties. The probability of uncontrolled release of gas from the gas pipeline was determined to be very low.

The assessment found that risk to people or property in sensitive areas, residential areas or commercial areas in the area was very low and complied with the stringent risk thresholds in the Department of Planning and Environment guideline HIPAP No 4 Risk Criteria for Land Use Safety Planning (2011b). Risk at adjacent industrial areas or open land were also assessed to be low given the low probability of a hazard event occurring. The PKGT itself is located more than two kilometres from the nearest residence. The pipeline is about 6.3 kilometres and runs mainly through industrial land and is more than 200 metres from the nearest residence. Seawall Road, the road which services the terminal, is a private road and not a through road. Seawall Road terminates shortly after the terminal, is only open to the public in daylight hours and is often closed due to port operations, such as coal loading/unloading.

The RTS (GHD, 2019) outlined that an odorant would be injected into the gas to assist in leak detection. Odorant would be stored in two 200-kilogram drums at Berth 101 and when empty refilled by truck or swapped out with refilled tanks. Odorant would be a non-toxic liquid which has the potential to cause eye, skin, or respiratory irritation in the event of exposure. As such the odorant would need to be stored and handled appropriately including the use of personal protective equipment.

Given the small volume of odorant stored, and the low pressure at which it is stored, it presents a low on-site and off-site risk. In the unlikely event of a spill the potential impacts to residential areas would be negligible given the nearest of these areas is in the order of two kilometres from Berth 101. Odorant is flammable and would be under pressure in the gas pipeline. These potential hazardous characteristics were incorporated in the PHA undertaken for the PKGT EIS (GHD, 2018) and would not result in a material change to the overall risk profile or consequence contours of the project.

## 6.2.2 Impact assessment

The pipeline alignment changes are minor and would still primarily run through industrial land and remain over 200 metres away from residential properties. The Segment 1.2 of pipeline proposed to be excised from Infrastructure Approval SSI 9471 and transferred to the Jemena EGP Infrastructure Approval SSI 9973, has been separately assessed in a separate modification report and approved by DPE on 4 May 2022 (GHD, 2021a).

A technical note has been prepared by AIE's hazard and risk consultants to assess the impacts of the proposed modification regarding the pipeline operating pressure, mercaptan volume increase and removal of the cold vent. The technical note is included as Appendix B and summarised below.

### 6.2.2.1 Operational pressure

As per Infrastructure Approval SSI 9471 Schedule 3, condition 21, final hazard studies are required for the project prior to the commencement of the gas pipeline and commencement of project operations. The condition requires a Fire Safety Study, HAZOP and FHA to be undertaken. The reports would draw on the findings of the PHA undertaken for the PKGT EIS (GHD, 2018) and a quantitative risk assessment.

The change in MAOP to 16.55 MPa to align with the Jemena EGP and Port Kembla Looping Lateral would ensure consistency across the entire EGP pipeline network and associated infrastructure approvals. The increase in MAOP is not anticipated to materially impact the quantitative risk assessment to be conducted as part of the FHA or the Fire Safety Study for the project. The FSRU has a lower design pressure than the pipeline and is not a source of overpressure for the ORF and pipeline. The maximum supply pressure from the FSRU is 12 MPaG and is limited based on the specifications of the regasification plant process equipment, FSRU process control and safety systems associated with the regasification and export of LNG. As such, the operating conditions of the FSRU and ORF in the FHA and PKGT Fire Safety Study shall remain aligned with the updated hazard and risk assessment undertaken for the PKGT Proposed Modification 1 Submissions Report (GHD, 2020).

The detailed design phase of the HAZOP and Safety Integrity Level Determination study identified two potential sources of overpressure for the ORF and pipeline:

- Failure of nitrogen injection flow control coincident with blocked discharge
- EGP operating at a higher level may provide a source of potential overpressure for the pipeline.

These are scenarios based on upset conditions which have protections and controls in place to reduce the likelihood of their occurrence. Overpressure of the pipeline from the EGP would require various controls to fail and would take time to occur. It is expected there would be sufficient time to detect any overpressure in the network and intervene.

A Final Hazard Analysis (Worley, 2021) was undertaken for the Segment 1.2 of pipeline proposed to be excised from Infrastructure Approval SSI 9471 and transferred to the Jemena EGP Infrastructure Approval SSI 9973. The quantitative risk assessment considered the operating pressure of the Segment 1.2 pipeline to be 16.55 MPa. Risk exposure associated with the pipeline is expected to be below the fatality risk criteria outlined in the HIPAP No 4 Risk Criteria for Land Use Safety Planning (2011b). Risk modelling for Segment 1.1 of the AIE pipeline is anticipated to align with this and will be verified in the project FHA.

### **6.2.2.2 Mercaptan volume increase**

Mercaptan has been selected as the odorant for the project. The mercaptan would be stored onsite in two 500 litre semi bulk containers housed in a 40-foot shipping container. Allowance has been made for two additional tanks to be stored on site. The potential onsite storage of odorant would be between 2000 – 2400 kilograms.

Mercaptan is flammable and toxic and has similar hazards as natural gas, fire and/or explosion depending on the location of release and/or presence of an ignition source. Two loss of containment scenarios were identified and modelled for the Fire Safety Study:

1. Loss of containment within the shipping container, with the worst-case scenario being the shipping container side fully open
2. Loss of containment in the odorant injection line (release rate limited to injection rate).

Flammable, explosion, and toxic consequence modelling of the loss of containment events have been assessed by AIE's hazards and risk consultants. The results are provided in Appendix B and summarised below.

The assessment considered the risks associated with the mercaptan increase and storage in accordance with the HIPAP No 4 Risk Criteria for Land Use Safety Planning (2011b) criteria. Modelling considered the leak size, inventory size, storage pressure and temperature, leak elevation and orientation, flammable effects criteria, toxicity criteria and explosion parameters and effects criteria.

The identified potential flammable and toxic dispersion consequences from a loss of containment scenario described above would generally be localised or not produced due to the low flow rates as limited by the injection pump. A loss of containment during changeout of a semi bulk container would have an impact distance of 2.48 kilometres, noting effects are not disabling, are transient and reversible upon cessation of exposure. During normal operations, any loss of containment would occur within the shipping container which has an activated carbon filter system implemented.

Injury risk will be further assessed and verified in the FHA, however injury risk levels are not expected to meet the criteria of the HIPAP No 4 Risk Criteria for Land Use Safety Planning (2011b) as concentration levels do not reach any of the nearest residential neighbours.

Potential jet fire and pool fire consequences results indicate impacts would be localised and, in most circumstances, contained within the shipping container, or not produced due to low flow rates. The shipping container is identified as a confined area with the potential for a vapour cloud explosion to occur. Explosion overpressure contours generated from an explosion in the shipping container are presented in Figure 6.1. The distance to the 7 kPa and 14 kPa explosion overpressure levels are 25.7 metres and 12.7 metres respectively.

Based on the modelling no significant onsite or offsite impacts are anticipated.

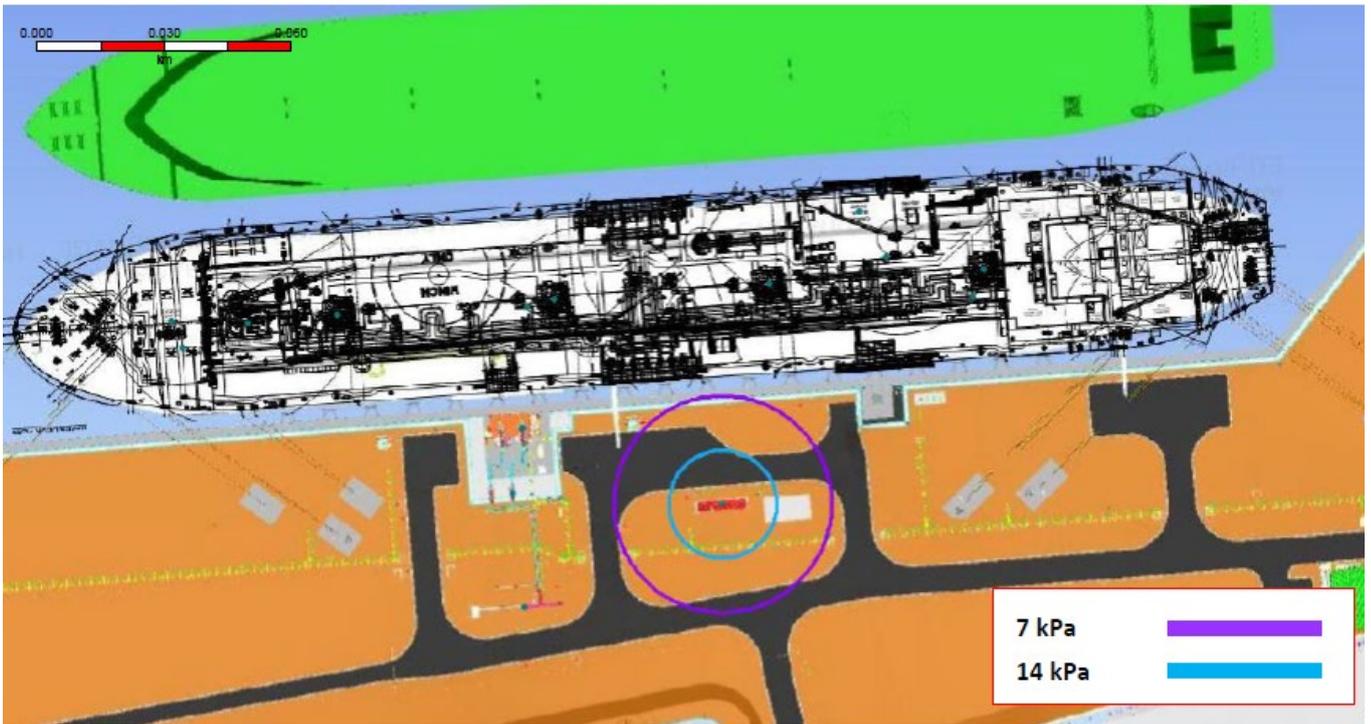


Figure 6.1 Shipping container explosion (Worley, 2022)

### 6.2.2.3 Cold vent removal

An escalation risk assessment was carried out in accordance with the HIPAP No 6 Hazard Analysis (2011a). The extent of fire impacts, risk of a fire event occurring and confirmation the risk meets the nominated acceptance criteria was assessed.

Modelling results of the extent of fire impacts from removal of the cold vent indicate large hole size releases (50 millimetres and greater) are expected to deplete the inventory in less than two minutes once shutdown and isolation have been initiated. Small hole size releases (i.e., 10 millimetres and 25 millimetres) have potential to impact adjacent inventories resulting in an escalation event. As such, fire risk for these scenarios have been calculated.

Fire escalation risk calculation considered the leak frequency and ignition probabilities from the ORF previously connected to the cold vent system were less than the industry criteria for escalation. Based on the rapid depletion of inventory at large hole sizes and fire frequency less than the escalation criteria at smaller hole sizes, removal of the cold vent is considered acceptable.

## 6.2.3 Proposed mitigation measures

Based upon the potential impacts of the proposed modification, additional measures to avoid, mitigate and manage impacts are not necessary. The findings of the assessment are consistent with the PKGT EIS (GHD, 2018). The relevant mitigation measures established for the PKGT EIS would be implemented as relevant for the proposed modification.

## 6.3 Soils and contamination

### 6.3.1 Overview

Investigations into the contamination status of the project site have been undertaken on behalf of AIE for the purpose of the PKGT EIS (GHD, 2018) and subsequent targeted site assessments and baseline condition reports.

The PKGT EIS (GHD, 2018) identified that construction of the project within the Berth 101 area has the potential to disturb contaminated soils and groundwater with isolated hotspots of contaminated materials exceeding relevant health criteria, which have subsequently been remediated and/ or managed during the Stage 1 construction works.

All known/identified asbestos has been removed from the excavation zone and validation complete. Impacted material has been disposed of offsite, contained onsite in T5 cell or segregated and stockpiled prior to planned transfer to the Outer Harbour Emplacement Cell.

The ASS Risk Map (DLWC, 1997) indicates Berth 101 is mapped in an area of disturbed terrain at elevations 2-4 m Australian Height Datum (AHD) and >4 m AHD as shown in grey shading in Figure 6.2 below. Estuarine sediments exist within the Inner Harbour and Gurungaty Waterway and are mapped as high probability of ASS (pink shading). The yellow shaded area immediately north-east of the site has been identified by the ASS Risk Map as a beach deposit but has no known occurrence of ASS.

Construction of the project is currently underway with Stage 2A and Stage 2B works comprising of excavation and dredging in Berth 101 commencing January 2022. A project Spoil Management Plan (SMP) and sub-plans comprising of a Contaminated Spoil Protocol (CSP), Acid Sulfate Soil Management Plan (ASSMP), Erosion and Sediment Control Plan (ESCP), WQMP and Dredge and Excavation Management Plan (DEMP) have been approved by DPE in accordance with the Infrastructure Approval SSI 9471 and EPL No 21529 conditions to manage contamination encountered during the project's construction.



Figure 6.2 ASS risk map (DLWC, 1997)

## 6.3.2 Impact assessment

The utility connections cables would be installed from the AIE lease area in Berth 101 along the western side of Seawall Road and then continuing west at the intersection of Port Kembla Road (refer to Figure 3.4 and Figure 3.5). The length of the utility connections cables is about 1.6 kilometres with a trench excavation depth to about 1 metre below ground level (mbgl) and HDD to about 5.5 mbgl at the deepest point.

A geotechnical investigation and contamination assessment has been undertaken by GHD (2022) to assess the proposed cable transmission route and identify any contamination or ASS. Eight borehole locations were drilled along the length of the proposed transmission route to a depth of 2 metres for open trenching sections and 10.4-10.5 metres for HDD sections, with one groundwater monitoring well placed at one borehole location. Soil samples were collected to screen for volatile organic compounds (VOC), Contaminants of Potential Concern (CoPC) and ASS. The locations of boreholes are presented in Figure 6.3.

The results of the assessment as are follows:

### Groundwater

Groundwater was not encountered at borehole locations (B01-B04) within Berth 101 along Seawall Road but was encountered within the general area between the northern extent of Seawall Road, southwest across to Port Kembla Road at borehole locations BH06-BH08 at depths ranging from 2.8-3.5 mbgl (refer to Figure 6.3). Due to the granular nature of the soil on the site (generally logged as gravel or sand), it is expected that the soils will be largely permeable. Zones of fill soil with higher fine grained soil content may be less permeable. It is envisaged that during the HDD works for the utility cable installation, water will readily enter both the pilot hole and reamed hole and will likely need to be fully supported by drilling 'mud' or cased/sheathed to stop hole collapse behind the auger head.

### Contamination

Berth 101 and Seawall Road forms part of a heavy industrialised area of Port Kembla and has been subject to extensive filling with blast furnace slag (a waste product from the steel making process) from the Port Kembla Steelworks, and some coalwash. Some areas of the site, in particular the southern parts of the proposed trench section, were reclaimed with sand dredged from the Inner Harbour in the 1960's.

Soil sampling results were generally consistent with field observations. No exceedances of the adopted assessment criteria were reported in samples tested for the CoPCs identified. At borehole location BH08 (located to the immediate southwest of Port Kembla Road), a weak effluent odour was noted at 5.5 mbgl, and weak to very weak sulphur dioxide odour was noted between 8.7 m and 10 mbgl. No other odours or evidence of contamination such as asbestos containing materials (ACM) or staining were observed during fieldwork. Although ACM was not observed, boreholes only provide a one-dimensional view of the soil profile, and therefore it cannot be precluded that ACM may exist within fill units.

### Waste classification

Laboratory results were compared to the waste classification criteria (NSW EPA, 2014) to provide a general indication of a potential waste classification. Based on this comparison, the potential waste classification for materials at the site could be General Solid Waste. This comparison does not constitute a waste classification assessment, as there is insufficient data presently available to adequately characterise the material.

The HDD process will generate a slurry and therefore be a liquid waste. Liquid waste classification will be assessed by the receiving waste facility.

### Acid Sulfate Soils

A relatively thin layer (0.1 metres) of potential ASS was identified within fill (reworked natural) at the southern end of the 11kV route on Seawall Road within borehole BH01 at a depth of 1.6 mbgl. Given the proposed cable trench excavation will be 1 mbgl, it is unlikely the potential ASS layer will be intercepted. ASS laboratory results indicate that ASS is likely to be encountered in the HDD section of the utility cable route alignment. ASS will need to be appropriately managed during the installation of the utility connections cables.



Figure 6.3 Site layout showing borehole locations

### 6.3.3 Proposed mitigation measures

Impacts on contamination and ASS during construction of the project are managed under the approved Stage 2A and Stage 2B SMP and associated sub-plans ASSMP, CSP, WQMP and DEMP.

A supplementary CEMP (refer to Appendix A) has been prepared to manage the occurrence of potential contamination buried waste, ASS and ACM for the utility connections cable installation that was not assessed in the PKGT EIS (GHD, 2018) and were not included in the approved Stage 2A and Stage 2B management plans.

## 6.4 Terrestrial biodiversity

### 6.4.1 Overview

A Biodiversity Development Assessment Report (BDAR) was prepared as part of the PKGT EIS (GHD, 2018) which assessed the potential biodiversity impacts of the project. Surveys were undertaken of the proposed pipeline alignment to assess impacts of its construction and estimate any offset obligations in accordance with the Biodiversity Assessment Method. Payments to the Biodiversity Conservation Fund have been made to retire these obligations.

The assessment of the proposed modification involved a review of the BDAR (GHD, 2018a), a field survey of the proposed pipeline alignment and reappraisal of impacts on biodiversity values. The field survey was undertaken by two GHD personnel on 29 June 2022 to confirm the status of a vegetated area in the northern portion of the Bluescope Steelworks site. This vegetation was assessed as non-native vegetation within the original BDAR and PKGT EIS, as it comprised mixed landscape plantings of native and non-native over-storey, over mown groundcover dominated by exotic plant species. The vegetation was classified as 'non-native' because it is predominately composed of exotic plant species cover, provides limited habitat resources for native fauna, does not form a functioning or potentially self-sustaining ecosystem. These areas are managed as open recreational and operational land including through period slashing, which would further limit any potential for the establishment of a functional native plant community.

The results of the field survey and consideration of impacts in comparison to the approved project is outlined below.

### 6.4.2 Existing environment

#### Flora

The pipeline alignment extends along a section of planted open space on the eastern side of Springhill Road between Tom Thumb Road and the Port Kembla Railway Line. Aspect of the site is northerly, and the topography consists of a gently inclined (constructed) bund which provides a visual buffer between Springhill Road and adjacent industrial sites. A creek line which flows through the site flows eastwards along Springhill Road and connects with Gurungaty Waterway to the south of Wollongong Greenhouse Park.

The original soils would have been derived from the Fairy Meadow (fa) Swamp Landscape Group (Hazelton and Tille 1990), although, as a result of long-term disturbances and surface modifications, the original soil is only apparent within the banks of the creek line. Original vegetation would have consisted of low open-forest and woodland, with a canopy of *Melaleuca styphelioides*, *Melaleuca decora*, *Casuarina glauca*, *Eucalyptus tereticornis*, *Eucalyptus longifolia* and *Eucalyptus paniculata* subsp. *paniculata* (Fuller 2021).

Existing vegetation consists of a series of groups of trees, mainly occurring in lines roughly parallel with Springhill Road. It is apparent that the trees were planted after formation of the bunds, although the lines of vegetation along the creekbanks are more likely to have self-recruited from swamp vegetation associated with the remaining patches of Tom Thumb Lagoon. The groundcover is regularly mown and consists of a mixture of native and exotic grass species. The most commonly occurring exotic grass species are Kikuyu (*Cenchrus clandestinus*), Panic Veldtgrass (*Ehrharta erecta*), Paspalum (*Paspalum dilatatum*) and Carpet Grass (*Axonopus fissifolius*). Native grass species are uncommon and occur as small patches beneath tree canopies. Species include Weeping Grass (*Microlaena stipoides* var. *stipoides*), Kangaroo Grass (*Themeda triandra*), Wiry Panic (*Entolasia stricta*), Couch (*Cynodon dactylon*) and Brown's Lovegrass (*Eragrostis brownii*).

The most noticeable tree plantings are the lines of Hill's Weeping Fig (*Ficus macrocarpa* var. *hillii*). Although this species only occurs naturally in north-east Queensland (Tracey 1982), it is a popular planting as a park or street specimen in Coastal NSW. The specimens in the subject site are in good health and it is apparent that their fruit provides forage for a range of native fauna species. No nests or dreys were recorded within the canopies of the trees in the subject site, although it is likely that the dense foliage provides temporary shelter for native bird species.

Later plantings of species which are indigenous to the Wollongong Local Government Area (LGA) include Forest Red Gum (*Eucalyptus tereticornis*), Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum (*Corymbia maculata*),

Prickly-leaved Paperbark (*Melaleuca styphelioides*) and Hybrid Bangalay (*Eucalyptus saligna/E. botryoides* hybrid). Brush box (*Lophostemon confertus*) is also common within these plantings. Brush box is not indigenous to the Wollongong LGA but is a popular street tree selection. The later plantings vary in form and vigour. It is possible that they have been planted in areas with inadequate topsoil, as is the case with the Hill's Weeping Figs, which have established dense surface root systems.

The lines of Swamp Oak (*Casuarina glauca*) may have developed from initial planting but have self-recruited (mainly apomictically) along the creek line to form dense thickets.

## Fauna

The field survey undertaken for the BDAR (GHD, 2018a) identified 25 fauna species in the Project area, comprising 23 bird species, one mammal species and one frog species. No threatened or migratory species were recorded during site investigations (GHD, 2018a).

Berth 101 provides limited habitat resources for fauna species. The hardstand areas and artificial sediment ponds located throughout the site provide limited and minimal habitat for potential threatened species.

Green and Golden Bell Frogs (*Litoria aurea*) are a threatened species that has been previously recorded in the area surrounding Port Kembla. They are listed as endangered under the BC Act and vulnerable under the EPBC Act. The species is believed to utilise drainage features, rail easements, roads, culverts and other low-lying features, with their associated vegetation, as habitat. The use of these habitat features may be transient, intermittent and dependent on suitable weather conditions (DEC 2007). The GHD Biodiversity Development Assessment Report (GHD 2018a) identified an area as a potential Green and Golden Bell Frog movement corridor located within the Port Kembla Road loop. The subject area was assessed as having little value to the key population of the species given the absence of native vegetation, limited shelter substrate and the risk of harm to frogs arising from existing industrial land uses.

## 6.4.3 Potential impacts

Disturbance associated with the utility installations will be limited to the road carriageway / verge of Seawall Road and Coal Terminal access road and will not impact upon any habitat values.

It is assumed that the lines of Swamp Oak growing along the creek banks would not require clearing as HDD would be carried out in this part of the alignment. Most of the existing lines of planted trees would also be avoided, with trenching mostly taking place in grassed areas adjacent to the lines of trees.

Any trenching and HDD works within the low value potential Green and Golden Bell Frog movement corridor to the north of the utility installation alignment would be transient and temporary in nature. Following construction, the ground would be rehabilitated, and these areas could continue to be used by the species as a movement corridor and would have equivalent value to the current situation. (GHD, 2018a).

The assessment found that the proposed modification would generate similar impacts to those undertaken for the PKGT EIS (GHD, 2018). The minor changes to the pipeline alignment remain within the area assessed as non-native vegetation assessed within the BDAR and the extent of impacts is commensurate with the original assessment.

## 6.4.4 Mitigation measures

Based upon the potential impacts of the proposed modification, additional measures to avoid, mitigate and management impacts are not necessary. The findings of the assessment are consistent with the PKGT EIS (GHD, 2018). The relevant mitigation measures established for the PKGT EIS (GHD, 2018) would be implemented as relevant for the proposed modification.

## 6.5 Traffic and transport

### 6.5.1 Overview

Detailed modelling and investigations into potential traffic and transport impacts during construction and operation of the project were undertaken as part of the PKGT EIS (GHD, 2018). The construction analysis focussed upon traffic volume impacts to the road network generated by the project.

Construction of the project is currently underway with Stage 2A and Stage 2B works comprising of excavation and dredging in Berth 101 commencing in January 2022, and construction / implementation of the Emplacement Cell within the Outer Harbour commencing in September 2022. A project CTMP has been approved by DPE in accordance with the Infrastructure Approval SSI 9471 conditions to manage construction traffic generated during the project construction.

### 6.5.2 Potential impacts

Potential construction traffic impacts generated by the proposed modification will be largely consistent with the approved project. Specific management controls have been developed as part of the approved CTMP. The majority of traffic movements associated with the current stage of construction works are marine vessel movements associated with dredging and disposal activities. The proposed modification does not require any modification to the dredging works or marine vessel movements.

The pipeline alignment changes at the northern end of PKCT land (refer to Figure 3.4) will reduce traffic disruptions on Tom Thumb Road as the pipeline will now be installed via HDD through lot 1/DP 1125445 instead of trenching within the road verge.

The installation of the utility connections cables was not assessed in the PKGT EIS (GHD, 2018). The utility connection cables are proposed to be installed along the western boundary of Seawall Road. Seawall Road is located within the NSW Ports lease boundary and is part of the NSW Ports road network, as presented in Figure 6.4. A section 138 permit under the Roads Act will not be required as Seawall Road is not a public road (refer to Table 4.1). NSW Ports utilise Direction 3 of 2021 issued under Section 38 of the *Ports and Maritime Administration Act 1995* which prohibits any person from undertaking any works within the port lease boundary, including roads, without the written consent of NSW Ports. Notification to NSW Ports at least seven days to the commencement of the utility connection cable works is required.

Seawall Road has previously been publicly accessible; however, it is currently closed to the public. Access is controlled via security access points on Port Kembla Road and Tom Thumb Road and Berth 101 is restricted to authorised personnel only. Partial road closures of Seawall Road will be required for the installation of the utility connection cables; however, this will not impact on the general public's access to Berth 101 as this is currently restricted. Neighbouring tenants within the NSW Ports lease boundary may be impacted by the works which will be addressed when obtaining consent from NSW Ports for the works as per Direction 3.

The utility connections cables installation will traverse the PKCT unloading rail loop (refer to Figure 3.4). Track monitoring will be undertaken during HDD works for safety compliance.

There will be a slight reduction in vehicle movements during operation associated with less frequent, larger volume deliveries of odorant to the site.

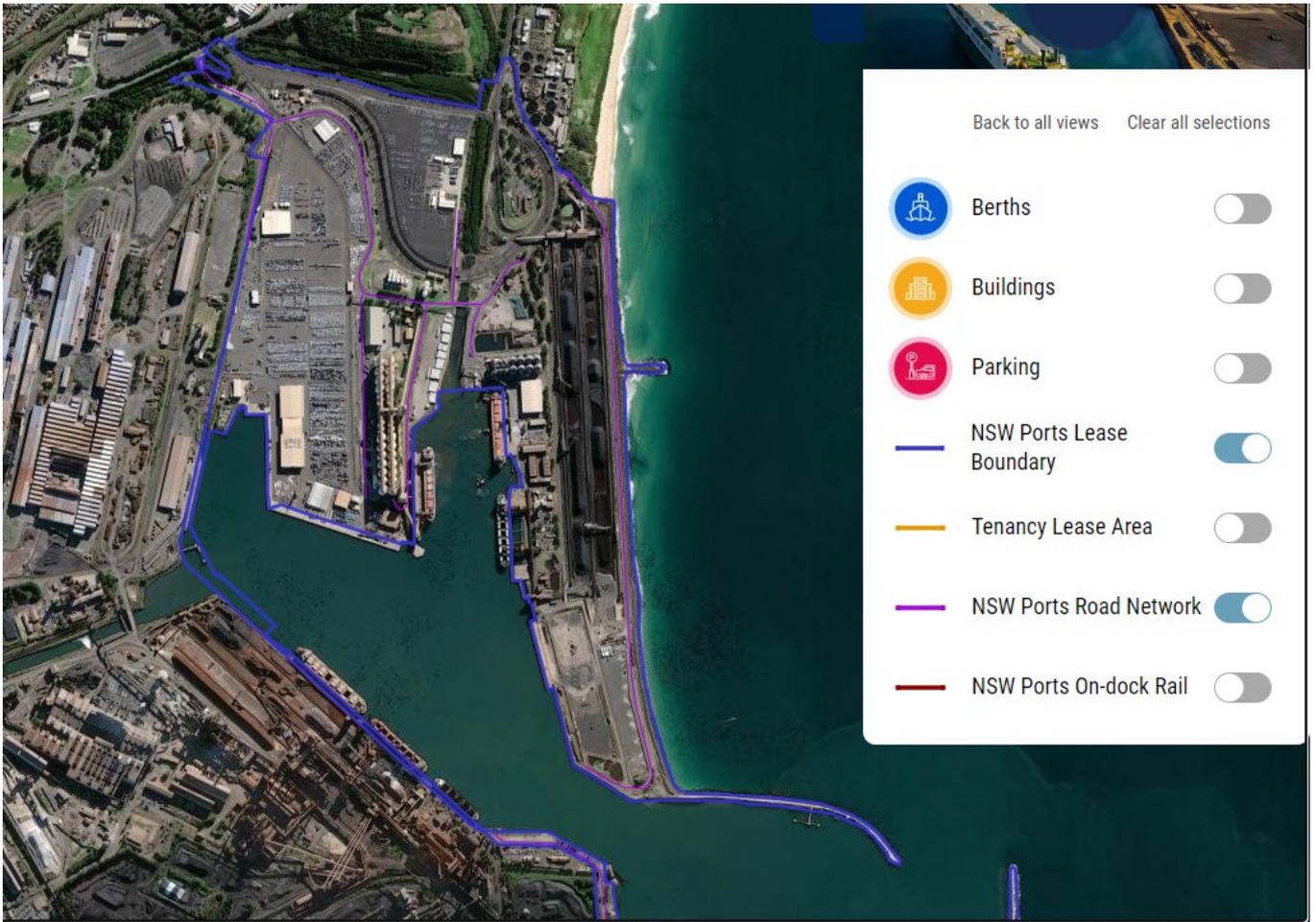


Figure 6.4 NSW Ports road network and lease boundary (source: NSW Ports, 2022)

### 6.5.3 Mitigation measures

As the utility connections cables were not assessed as part of the PKGT EIS (GHD, 2018) and therefore not included in the preparation of the approved CTMP, a supplementary CEMP has been prepared to address mitigation measures related to the works. The CEMP is attached as Appendix A.

## 6.6 Noise and vibration

### 6.6.1 Overview

Detailed modelling and investigations into potential noise and vibration impacts during construction and operation of the project were undertaken as part of the PKGT EIS (GHD, 2018). The construction analysis focused upon impacts to nearby sensitive receivers associated with plant and equipment and construction traffic.

Construction of the project is currently underway with Stage 2A and Stage 2B works comprising of excavation and dredging in Berth 101 commencing in January 2022 and construction / implementation of the Emplacement Cell within the Outer Harbour commencing in September 2022. A project NVMP has been approved by DPE in accordance with the Infrastructure Approval SSI 9471 conditions to manage noise and vibration generated during the project construction.

Out of Hours Approvals issued by the NSW DPE in November 2020, February 2022 and September 2022. The approvals allow for out of hours construction for the following activities:

- Quay wall construction at Berth 101 including excavation, bentonite slurry and concrete pours
- Dredging and loading at Berth 101, and disposal to the Outer Harbour
- Underboring at five locations using HDD along the new pipeline route

- Earth moving at the Berth 101 and disposal site.
- Piling activities for the construction of the quay wall at Berth 101.

## 6.6.2 Impact assessment

Potential noise and vibration impacts generated by the proposed modification will be largely consistent with the approved project. Additional assessment and modelling was undertaken for the Out of Hours Approvals approved by the NSW DPE. Specific management controls have been developed as part of the approved NVMP, which included both additional assessments for the Out of Hours Approvals.

The installation of the utility connections cables was not assessed in the PKGT EIS (GHD, 2018). The utility connections cables installation would contribute to noise and vibration impacts during the construction phase of the project. Impacts are anticipated to be consistent with those modelled for trenching and HDD activities associated with construction works for the pipeline. The utility connection cables will be undertaken within an industrial land use area, the nearest residential area located about 1.23 kilometres to the northwest of the northern most point of the works. Noise levels at this distance would be anticipated to be below the noise management levels for the project and are not expected to impact upon any sensitive receiver.

Additionally, the excision of Segment 1.2 of the pipeline would reduce the overall noise and vibration impacts generated by the project during construction.

## 6.6.3 Proposed mitigation measures

As the utility connections cables were not assessed as part of the PKGT EIS (GHD, 2018) and therefore not included in the preparation of the approved NVMP, a supplementary CEMP has been prepared to address mitigation measures related to the works. The CEMP is attached as Appendix A.

# 6.7 Air quality

## 6.7.1 Overview

Detailed modelling and investigations into potential air quality impacts during construction and operation of the project were undertaken as part of the PKGT EIS (GHD, 2018). The construction analysis focussed upon impacts to nearby sensitive receivers associated with dust and particulate matter generated by construction activity, and emissions from vehicles and plant.

Construction of the project is currently underway with Stage 2A and Stage 2B works comprising of excavation and dredging in Berth 101 commencing in January 2022 and construction / implementation of the Emplacement Cell within the Outer Harbour commencing in September 2022. A project Air Quality Management Plan (AQMP) has been approved by DPE in accordance with the Infrastructure Approval SSI 9471 and EPL No 21529 conditions to manage air quality during the project's construction.

AIE are required to undertake air quality monitoring during the construction works of the project in accordance Infrastructure Approval SSI 9471 Schedule 3, Condition 33(c) and the issued EPL No. 21529 Condition P1.1 and Condition M2.2. Reporting of results for all monitoring points are published in the monthly environmental monitoring report made available on the AIE project website. Locations of air quality monitoring points are presented in Figure 6.5.

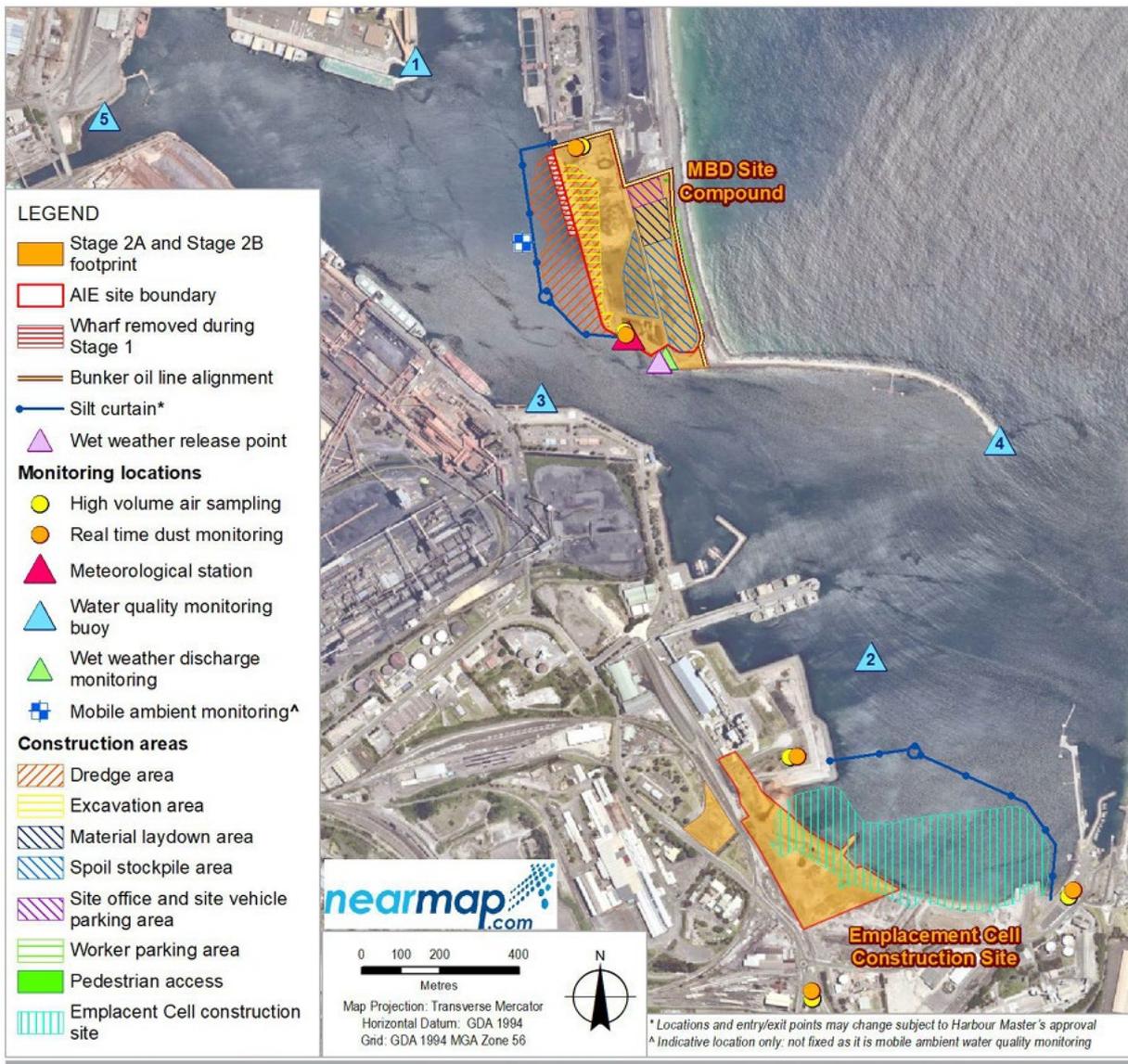


Figure 6.5 Air quality monitoring locations (orange and yellow circles)

## 6.7.2 Impact assessment

Potential air quality impacts will be largely consistent with the approved project. Specific management controls have been developed as part of the approved AQMP and ESCP.

Potential emissions during construction will occur primarily during pipeline construction activities associated with trenching works, transport of materials, pipe laying and rehabilitation works. Relatively small volumes of soil will be disturbed during pipeline construction. Excision of Segment 1.2 of the pipeline will reduce the total soil volume expected to be disturbed during the construction of the pipeline.

The installation of the utility connections cables was not assessed in the PKGT EIS (GHD, 2018). Open trenching and HDD from the AIE lease area in Berth 101 running north along Seawall Road for about 1.3 kilometres would occur to install the utility connections cables. Additional volumes of soil will be required to be disturbed during the installation of the utility connections cables and would therefore contribute to the primary potential emissions source for the construction phase of the project. Construction emissions associated with the utility connection cables are not expected to be significant. Additionally, the excision of Segment 1.2 of the pipeline would reduce the overall air quality impacts generated by the project during construction.

Emissions associated with vehicles and plant during construction activities will be consistent with the approved project with impacts predicted to be commensurate with the assessment in the PKGT EIS (GHD, 2018).

### 6.7.3 Proposed mitigation measures

As the utility connections cables were not assessed as part of the PKGT EIS (GHD, 2018) and therefore not included in the preparation of the approved AQMP, a supplementary CEMP has been prepared to address mitigation measures related to the works. The CEMP is attached as Appendix A.

## 7. Justification and conclusion

AIE is seeking to modify Infrastructure Approval SSI 9471 for the project under section 5.25 of the EP&A Act. The proposed modification follows design and operational amendments related to pipeline alignment and operating pressure changes, the excision of Segment 1.2 of the pipeline (which is now included in the Jemena EGP Infrastructure Approval), mercaptan storage volume increase, removal of the cold vent and installation of utility communication cables.

Works currently underway for the project are subject to EPL No 21529 and the approved management plans under Infrastructure Approval SSI 9471. Environmental compliance is continually monitored on site through the EPL and implementation of the approved management plans.

The proposed modification will result in minimal potential environmental impact that can primarily be managed in accordance with the existing management plan conditions. A supplementary CEMP has been prepared to address additional management measures related to the proposed modification which were not assessed as part of the PKGT EIS and approved management plans. The CEMP is attached as Appendix A.

Overall, the proposed modification is considered to be substantially the same development as the project described in the PKGT EIS (GHD, 2018). The proposed amendments to the design are considered to be relatively minor and do not introduce new environmental impacts that have not been previously considered as part of the PKGT EIS (GHD, 2018).

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# Appendices

# **Appendix A**

## **Construction Environmental Management Plan**



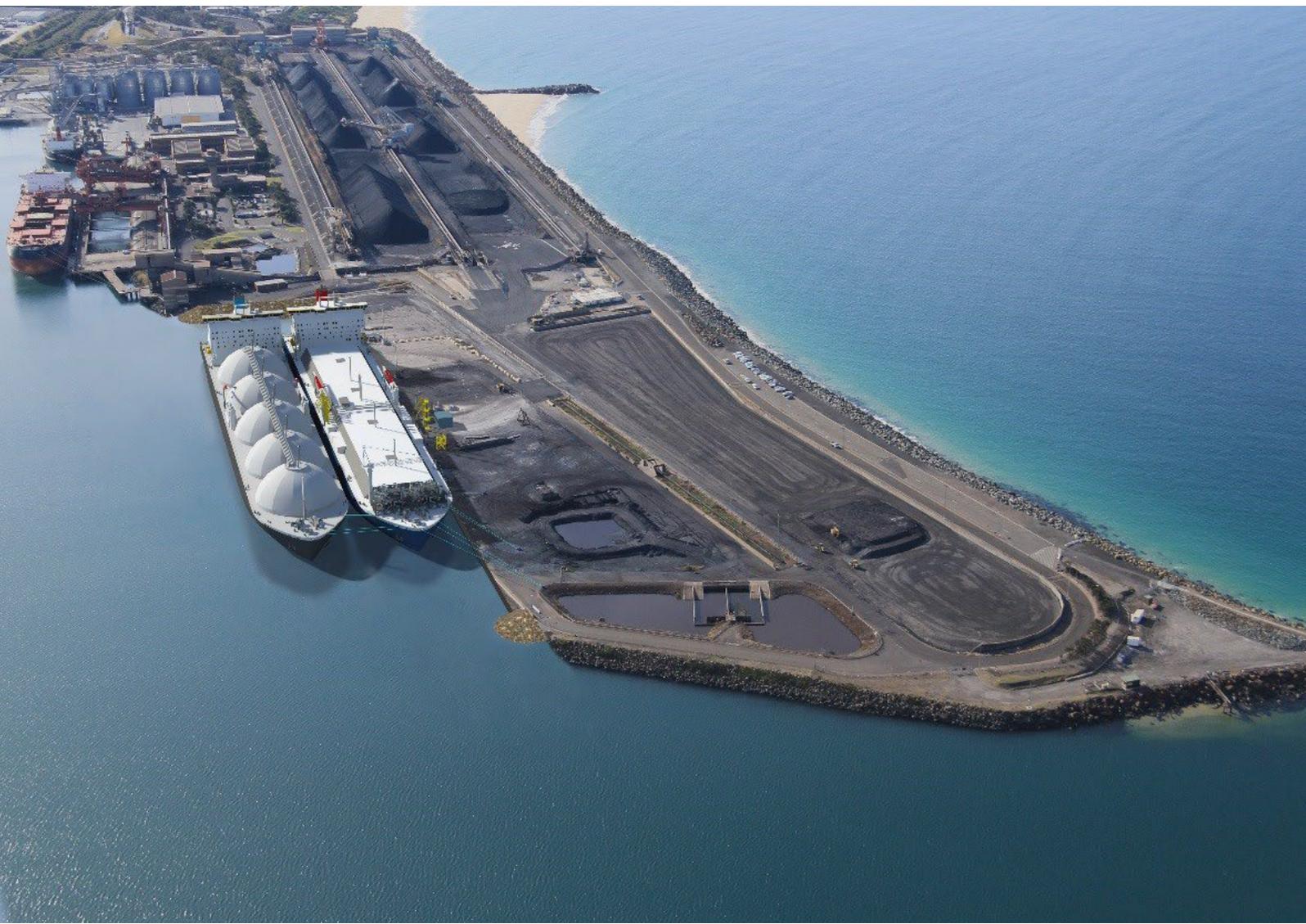
# Port Kembla Gas Terminal

## Construction Environmental Management Plan – Utility installations

Australian Industrial Energy

13 October 2022

→ **The Power of Commitment**



<b>Project name</b>		East Coast Gas Project					
<b>Document title</b>		Port Kembla Gas Terminal   Construction Environmental Management Plan – Utility installations					
<b>Project number</b>		2127477					
<b>File name</b>		2127477-REP-PKGT Modification 4 Report-AppendixA CEMP.docx					
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			Name	Signature	Name	Signature	Date
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S4	0	Emily Kate Marsh, C Dengate	Karl Rosen		Karl Rosen		11/10/22
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[Status code]							

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# 1. Introduction

## 1.1 Overview

Australian Industrial Energy (AIE) is developing the Port Kembla Gas Terminal (the project). The project involves the development of liquefied natural gas (LNG) import terminal at Port Kembla, south of Wollongong in NSW.

The project consists of four key components:

- LNG carrier vessels —transporting LNG from production facilities all around the world to demand centres.
- Floating Storage and Regasification Unit (FSRU) — a cape-class ocean-going vessel, which would be moored at Berth 101 in Port Kembla.
- Berth and wharf facilities — including landside offloading facilities to transfer natural gas from the FSRU into an underground natural gas pipeline located on shore.
- Gas pipeline — a Class 900 carbon steel high-pressure pipeline connection from the berth to the existing gas transmission network.

The project has been declared Critical State Significant Infrastructure (CSSI) in accordance with Section 5.13 of the EP&A Act and Schedule 5 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). The project received Infrastructure Approval (SSI 9471) from the then Minister for Planning and Public Spaces on 29 April 2019 and an overview of the approved project is provided on Figure 1.1.

Modification 4 (collectively referred to as MOD 4) has been submitted to the Department of Planning and Environment (DPE) for approval. MOD4 includes the installation of an 11kV transmission cable and telecommunications cable along the length of Seawall Road. A Supplementary CEMP (this document) has been developed to address additional environmental risks associated with the 11kV transmission cable and telecommunications cable works.

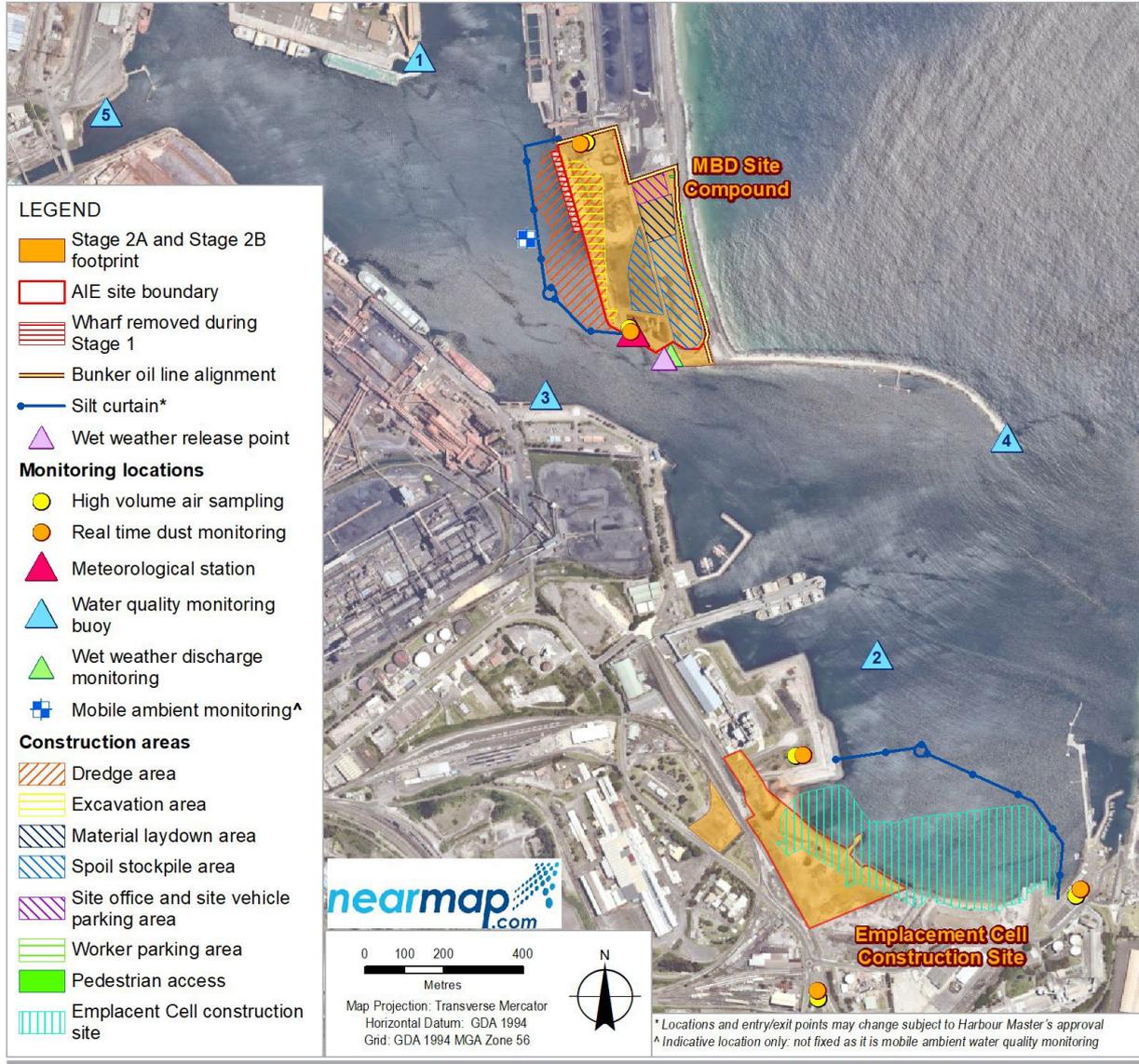
## 1.2 Construction staging

The project construction scope of work has been divided into three main packages (with associated activities), as outlined in Table 1.1.

**Table 1.1** Construction stages/work packages

Stage	Package	Activities
1	Early Enabling Works	Demolition of Berth 101, removal of structures and land based excavation works, and Cone Penetration Testing in the Outer Harbour to inform Emplacement Cell design and relocation of Bunker Oil Pipeline.
2A	Marine Berth Construction – Land Based	Completion of excavation works undertaken during Stage 1. Transport of spoil materials to Emplacement Cell Construction Site.
		Quay wall construction.
		Installation of communications conduit, potable water line, 11kV power cable, and padmount substation within the MBD Site Compound.
		Construction of the ORF, which comprises three areas: Wharf Topside Area; Utility Area; and Common Area.
		Pipeline construction and associated ancillary infrastructure within MBD Site Compound
2B	Marine Berth Construction and Dredging – Land and Marine Based	Excavation/dredging of the MBD Site Compound in the Inner Harbour and construction of the Emplacement Cell in the Outer Harbour
		Marine based construction activities including installation of navigational aids and revetment shore protection.

3	Pipeline Installation including tie-ins (NGP)	Construction of an 18" onshore natural gas pipeline approximately 6.3km in length from the Berth 101 site boundary to tie-in facility at Cringila for connection to the Eastern Gas Pipeline Pipeline construction to occur concurrently with Jemena, subject to separate set of management plans.
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Data source: Aerial imagery - nearmap 2022 (image date 16/04/2018, date extracted 18/02/2019); General topo - NSW LPI DTDB 2017 & 2015; Cadastre - NSW LPI DCDB 2017. Created by: eibbertson

**Figure 1.1** Stage 2A and Stage 2B works and location of MBD Site Compound, Emplacement Cell and Emplacement Cell Construction Site

Construction of the project commenced in January 2022. Works are currently underway for Stage 2A and Stage 2B works located at Berth 101 (referred to as the 'Marine Berth Construction and Dredging (MBD) Site Compound') and the Outer Harbour Dredged Spoil Containment Area (referred to as 'OHDSCA' or the Emplacement Cell) (refer to Figure 1.1). Collectively, these locations are referred to as "the site".

Construction of the project is subject to AIE's Environment Protection Licence (EPL) No 21529 and the approved management plans made under Infrastructure Approval SSI 9471:

- Environmental Management Strategy (EMS)
- Spoil Management Plan (SMP), including sub-plans:
  - Acid Sulfate Soil Management Plan (ASSMP)

- Water Quality Monitoring Plan (WQMP)
- Contaminated Spoil Protocol (CSP)
- Erosion and Sediment Control Plan (ESCP)
- Dredge and Excavation Management Plan (DEMP)
- Construction Traffic Management Plan (CTMP)
- Emergency Spill Plan
- Flora and Fauna Management Plan (FFMP)
- Noise and Vibration Management Plan (NVMP)
- Air Quality Management Plan (AQMP)
- Heritage Unexpected Finds Protocol (HUFPP).

## 1.3 Purpose of this report

This Supplementary Construction Environment Management Plan (CEMP) has been prepared as part of the Modification Report submitted to the Department of Planning and Environment (DPE) for approval requesting modification for the following project elements (collectively referred to as MOD 4):

- Minor changes to the gas pipeline alignment, length and operating pressure for connection into the existing Port Kembla Looping Lateral gas network, which forms part of Jemena’s Eastern Gas Pipeline (EGP).
- Mercaptan storage volume increase (from 400 kilograms to 2,400 kilograms).
- Removal of the cold vent initially included in design plans for Berth 101.
- Installation of an 11kV transmission cable and telecommunications cable along the length of Seawall Road.

This Supplementary CEMP has therefore been prepared to address the MOD 4 components that have not been previously addressed under other management plans and that require environmental management during the construction phase (i.e., excluding design related and operational components). The management plans applicable to the MOD 4 components of work are summarised below in Table 1.2.

*Table 1.2 Management plans applicable to MOD 4 work components*

<b>MOD 4 component</b>	<b>Nature of change</b>	<b>Applicable management plan(s)</b>
Pipeline alignment, length and pressure changes	Design and construction	Stage 3 Management Plans
Mercaptan storage volume increase	Design, construction and operational	Construction covered by Stage 2A/B Management Plans Operation to be covered by the Operational Environmental Management Plan (OEMP)
Cold vent removal from Berth 101	Design change only	Not applicable
Installation of an 11kV transmission cable and telecommunications cable	Design and construction	This Supplementary CEMP in conjunction with the approved Stage 2A and 2B Management Plans

This CEMP applies as a supplement to the activities approved under the Stage 2A and Stage 2B management plans to described how the proposed utility connections along Seawall Road will be managed in accordance with the approved management plan framework for Stage 2A and 2B construction.

The construction contractor may be required to prepare additional, site-specific environmental management documentation, inclusive of procedures, protocols and Safe Work Method Statements (SWMS) compliant with this document.

## 1.4 Supplementary CEMP objectives

This Supplementary CEMP applies to the installation of an 11kV transmission cable and telecommunications cable (utility installations) along Seawall Road forming an extension to the construction activities undertaken as part of

Stage 2A and Stage 2B of the project (refer to Section 1.2). An overview of the utility installations is presented in Figure 1.2. This Supplementary CEMP was developed considering the following guidelines and reports:

- *Guideline for Preparation of Environmental Management Plans* (DIPNR, 2004)
- Port Kembla Gas Terminal Environmental Impact Statement (PKGT EIS) (GHD, 2018)
- Port Kembla Gas Terminal Modification 4 Report (GHD, 2022a)
- Approved project management plans (refer to Section 1.2).

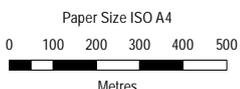
This Supplementary CEMP has been developed to meet the following objectives associated with the utility installations:

- Describe the environmental setting and sensitivities of the site
- Identify the applicable regulatory framework to construction of the works
- Identify the potential environmental impacts associated with construction of the works
- Describe the mitigation measures required to be implemented to manage the potential construction environmental impacts, and where relevant include suitable cross-referencing to the approved Stage 2 and 2B management plans
- Allocate responsibilities for the implementation and management of this Supplementary CEMP
- Identify the monitoring, reporting and review requirements for this Supplementary CEMP.

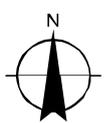


**LEGEND**

- Proposed Pipeline Modification
- Existing or Approved Pipeline
- Segment 1.2 (to be excised)
- EIS Gas Pipeline Alignment
- Proposed Trenchless Section
- Trenchless Pipeline section
- 11kv power cable
- Railway
- Communications cable (indicative)
- Waterways
- Site compound
- Odorant area (indicative)
- Construction corridor
- Cadastre



Paper Size ISO A4  
 Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 56



Australian Industrial Energy  
 Port Kembla Gas Terminal - Modification 4

Project No. 2127477  
 Revision No. A  
 Date 12 Oct 2022

Proposed modification overview

FIGURE 3-1

## 2. Utility installation construction works

### 2.1 Construction works

The methodology for Stage 2A and Stage 2B works are detailed in the project's approved management plans. The utility connections is proposed to be constructed as follows:

- Installation of approximately 1.6 kilometres of an 11kV transmission and communications cable from the AIE lease area, along the western side of Seawall Road.
- The 11kV transmission cable will turn west where Seawall Road ends for connection to the existing Endeavour Energy substation.
- The communications cable will be installed along the same route as the 11kV transmission cable, but running south east to connect to a tie-in point near the intersection of Seawall Road and the Coal Terminal access road.
- Installation will be undertaken via a combination of open trenching to a depth of approximately 1 metre, and HDD beneath existing rail and road infrastructure and other environmental constraints (i.e., trees and other vegetation) to a depth of approximately 5.5 mbgl.
- Where possible, the backfilling of the cable trench will reuse excavated material to the extent practicable. It is noted that specialised backfill material with an appropriate thermal resistivity value will be required to surround the cable, which will result in surplus material being generated. Pavement materials (e.g., base and subbase) will be retained and reused during the reinstatement of trenches or launch and receive pits where possible. Material that cannot be reused during the reinstatement process will be taken to either the MDB Site Compound or the Outer Harbour Emplacement Cell. Subject to waste classification or resource recovery exemption, material may alternatively be taken to an appropriate off-site waste facility for disposal.
- The HDD process will generate a slurry and will therefore be a liquid waste. Liquid waste would be taken to the Outer Harbour Emplacement Cell or to an off-site waste facility via road or barge (in the case of the Outer Harbour Emplacement Cell).

The location of the utility installations is presented in Figure 2.1.

#### 2.1.1 Plant and equipment

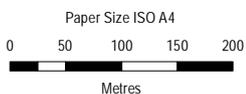
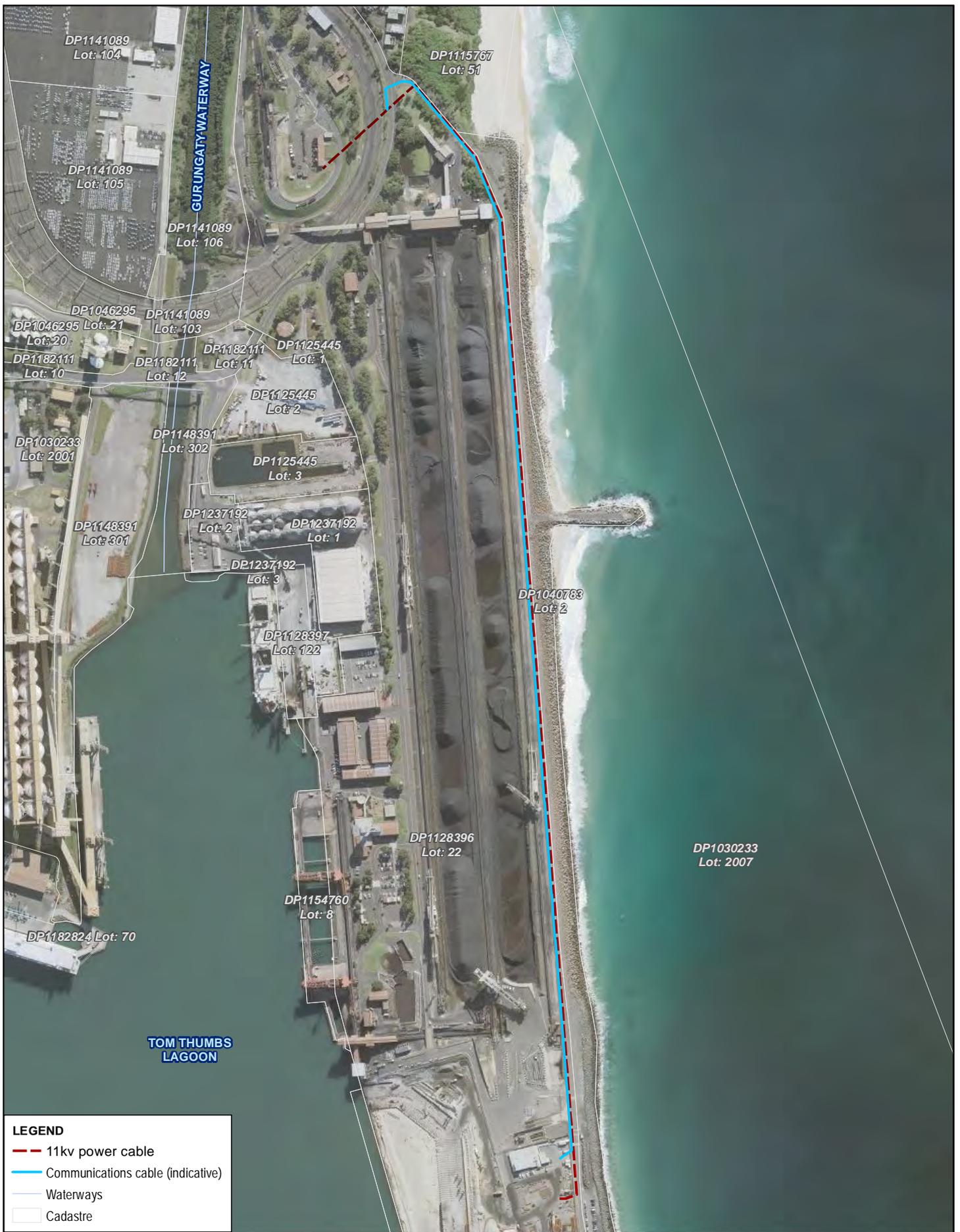
Plant and equipment likely to be used during construction of the utility connections are:

- Excavator
- Trenching machine
- Boring machine
- Compactor / roller
- Trucks

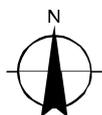
Plant and equipment likely to be used during construction of the project are detailed in the approved management plans, including the DEMP, CTMP and SMP.

#### 2.1.2 Site access

Light and heavy vehicles will access (enter / exit) the MBD Site Compound from the single entry and exit on Seawall Road. Access to Seawall Road is managed by NSW Ports and controlled via security access points on Port Kembla Road and Tom Thumb Road. Seawall Road will be accessed for installation of the utility connections along the majority of the alignment.



Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56



Australian Industrial Energy  
Port Kembla Gas Terminal - Modification 4

Project No. 2127477  
Revision No. A  
Date 07 Oct 2022

Proposed modification - detailed

FIGURE 3

## 2.1.3 Community consultation

AIE is committed to keeping the local community and relevant agencies informed about the development of the Project. The principal external communication objectives are, therefore, to:

- Continue to maintain open communication with relevant stakeholders.
- Minimise environmental impacts.
- Be proactive in addressing any concerns that the community / external stakeholder may express.

AIE will build upon the stakeholder and community engagement phase undertaken during project development including multiple group or one on one briefings. A project website ([www.ausindenergy.com](http://www.ausindenergy.com)) has been developed and provides comprehensive, clear, and accessible information that is updated on a regular basis.

As well as the local Port Kembla and broader community of the Wollongong region, extensive engagement was also undertaken with a range of other interested key stakeholders, such as local commerce organisations, the Port Authority and local and state government.

Consultation with key stakeholders and the wider community on the Project will continue throughout Stage 2A and Stage 2B and subsequent construction phases. Table 2.1 below provides details of the key methods of engagement to be provided on an on-going basis.

**Table 2.1** Ongoing community consultation tools

Engagement tool	Description
Community Information Line	1800 789 177, community enquiries number established for the Project.
Company Website	Project website - <a href="https://ausindenergy.com">https://ausindenergy.com</a> Provides extensive FAQs, fact sheets, and project updates. Also provides clear information on alternative ways to seek information: email, 1800 telephone number and/or subscription service.
Website / email enquiries	A dedicated project email has been established for receipt of any enquiries / complaints. A link to the enquiry email ( <a href="mailto:info@ausindenergy.com">info@ausindenergy.com</a> ) can be located on the project website
Subscriber updates	A range of individuals / organisations have recorded their interest in receiving regular email updates on Project developments through the Subscriber feature on the AIE website. These subscribers will receive regular updates around key Project milestones.
Community newsletter	Community newsletters will be prepared, published, and distributed (hardcopy & electronic) to provide an update on key milestones for the Project.
In-person group briefings	Briefing of local business and community groups such as Illawarra Business Chamber & Regional Advisory Council, i3net, Australian Industry Group, Port Kembla Chamber of Commerce, Community Neighbourhood Forums 5 & 7.
NSW EPA	Regular EPA focussed discussion which is aligned with program schedule. Frequency dependent on activity and works.
Department of Planning and Environment (DPE)	Ad hoc.
NSW Ports	Monthly meeting which includes environmental, safety and relevant approval discussions. The meeting also includes a project update and commercial discussions.
PKCT	Ongoing consultation, as required.
CCC briefings	e.g., Port Kembla Harbour Environment Group – meetings organised by group.
1:1 meetings/telephone /discussions/email exchanges	Daily activity, as required.
Media engagement	On-going responsiveness to media enquiries, as well as proactive distribution of key Project developments to local, state and national media.

## 2.1.4 Duration and working hours

Construction hours for the utility installations will be in accordance with Infrastructure Approval SSI 9471 condition 27, Schedule 3 which includes the following:

Unless the Secretary agrees otherwise, the Proponent may only undertake construction activities on site between:

- a. 7 am to 6 pm Monday to Friday;
- b. 8 am to 1 pm Saturdays; and
- c. at no time on Sundays and NSW public holidays.

The following construction activities may be undertaken outside these hours without the approval of the Secretary:

- d. the delivery of materials as requested by the NSW Police Force or other authorities for safety reasons;
- e. emergency work to avoid the loss of life, property and/or material harm to the environment;
- f. construction works that cause LAeq (15 mins) noise levels that are:
  - no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009); and
- g. no more than the noise management levels specified in Table 3 of the Interim Construction noise Guideline (DECC, 2009) at other sensitive land uses; and
  - continuous or impulsive vibration values, measured at the most affected residence, are no more than those for human exposure to vibration, specified in Table 2.2 of *Assessing vibration: a technical guideline* (DEC, 2006); and
  - intermittent vibration values measured at the most affected residence are no more than those for human exposure to vibration, specified in Table 2.4 of *Assessing vibration: a technical guideline* (DEC, 2006); or
- h. where a negotiated agreement has been reached with affected receivers;

Out of Hours Approvals issued by the Secretary of NSW DPE in November 2020, February 2022 and September 2022 to permit out of hours construction for the following activities:

- Quay wall construction at Berth 101 including excavation, bentonite slurry and concrete pours
- Dredging and loading at Berth 101, and disposal to the Outer Harbour
- Underboring at five locations using HDD along the new pipeline route
- Earth moving at the Berth 101 and disposal site.
- Piling activities for the construction of the quay wall at Berth 101.

The utility installations are commensurate with construction activities subject to Out of Hours Approvals and are located approximately 1.23 kilometres from the nearest sensitive residential receivers.

The modification therefore seeks approval for construction activities to be undertaken outside of standard construction hours in accordance with the existing Out of Hours noise approvals for the project.

### **3. Legislative framework**

The *Environmental Planning and Assessment Act 1979* (EP&A Act) provides the statutory basis for planning and environmental assessment in New South Wales. The Minister for Planning, statutory authorities and local councils are responsible for implementing the EP&A Act. The EP&A Act provides the framework for environmental planning and development approvals and includes provisions to ensure that the potential environmental impacts of a development are assessed and considered in the decision-making process.

The project has been declared CSSI in accordance with section 5.13 of the Environmental Planning and Assessment Act 1979 (EP&A Act) and Schedule 5 of the Planning Systems SEPP. The PKGT EIS (GHD, 2018) was prepared to support the development application for determination by the NSW Minister for Planning.

A detailed overview of the applicable legislation for the project and proposed modification are outlined in the PKGT EIS and Modification Report 4.

# 4. Environmental management

The following section outlines the overarching management arrangements for the project including roles and responsibilities, reporting, records, training, incident management and complaints.

## 4.1 Roles and responsibilities

All personnel working for AIE, and the Principal Contractor(s) are responsible for:

- Reporting all environmental incidents or near misses to their supervisor.
- Carrying out work duties at all times in an environmentally sensitive and responsible manner.

The responsibilities for key roles involved in the project are outlined in Table 4.1.

**Table 4.1** Roles and responsibilities

Role	Responsibilities
AIE Project Director	<ul style="list-style-type: none"> <li>– Responsible for the overall funding and direction of works associated with Stage 2A and Stage 2B.</li> <li>– Ensuring provision of adequate resources to achieve the environmental objectives for the project including ensuring sufficient resourcing for the Environmental Team, Engineering and Construction Teams.</li> </ul>
AIE Construction Manager	<ul style="list-style-type: none"> <li>– Proactively stewards the effective implementation of Stage 2A and Stage 2B in accordance with requirements of the Infrastructure Approval (SSI 9471), Environmental Strategy and all related sub-plans.</li> <li>– Demonstrate proactive support for environmental requirements.</li> </ul>
AIE HSE Manager	<ul style="list-style-type: none"> <li>– Develop and update of all Health, Safety and Environmental (HSE) Management Strategies and sub-plans.</li> <li>– Ongoing liaison and engagement with government agencies and point of escalation for any environmental incidents.</li> <li>– Identifying environmental issues as they arise and proposing solutions.</li> <li>– Coordinate and facilitate periodic environmental inspections with the key contractors.</li> <li>– Environmental Reporting.</li> </ul>
Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager	<ul style="list-style-type: none"> <li>– On-site project management and control.</li> <li>– Decision-making authority relating to environmental performance of the construction program.</li> <li>– Authority over project construction and site activities in accordance with the EMS and sub-plans.</li> <li>– Ensure relevant training is provided to all project staff prior to commencing individual activities.</li> <li>– Reports to AIE Construction Manager on environmental matters.</li> <li>– Ensures appropriate Contractor resources are allocated to implement the environmental requirements.</li> <li>– Responsible for planning and scheduling of construction, and to ensure operations are conducted in accordance with statutory requirements and the EMS and sub-plans.</li> <li>– Monitors performance against environmental Key Performance Indicators (KPIs).</li> <li>– Ensures that all environmental objectives associated with the project are achieved.</li> <li>– Day-to-day decision-making authority relating to environmental performance of construction activities and direct site activities and construction.</li> <li>– To provide resources to ensure environmental compliance and continuous improvement.</li> <li>– Ensure all personnel are aware of any changes to EMS and sub-plans and improved procedures.</li> <li>– Ensure the EMS and sub-plans are implemented for the duration of Stage 2A and Stage 2B.</li> </ul>

Role	Responsibilities
Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman	<ul style="list-style-type: none"> <li>– Implement requirements contained in the EMS and sub-plans, work procedures and standard drawings.</li> <li>– Maintaining open and transparent communication with other project discipline managers and other areas of the project.</li> <li>– Reporting of hazards and incidents and implementing any rectification measures.</li> <li>– Ensures appropriate contractor resources are allocated.</li> <li>– Orders STOP WORK for any environmental breaches and reports incidents to the Project Manager.</li> <li>– Ensure the EMS and sub-plans are implemented for the duration of Stage 2A and Stage 2B.</li> </ul>
Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative	<ul style="list-style-type: none"> <li>– Delivers environmentally focussed toolbox talks and provides applicable site inductions.</li> <li>– Provides environmental advice, assistance, and direction to Project Manager to ensure construction activities are conducted in accordance with regulatory legislation and the EMS and sub-plans.</li> <li>– Participate and cooperate with AIE HSE Manager with regards to undertaking of joint periodic environmental site inspections.</li> <li>– Coordinate / undertake wet-weather inspections as per EPL No.21529 and report accordingly to the AIE HSE Manager.</li> <li>– Develop strong working relationships with the AIE team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Ensure communication of relevant environmental information to project personnel.</li> <li>– Provide specialist advice and input as required.</li> <li>– Ensure construction manager, superintendents and field supervisors fully understand the environmental constraints and how construction practices must ensure any such constraints are considered and mitigated against during construction.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to Principal Contractor Project Manager and AIE HSE Manager.</li> </ul>
Independent Discipline Engineering Consultants	<ul style="list-style-type: none"> <li>– Certify the design and that the works have been completed in accordance with the design.</li> </ul>
AIE Environmental Representative and AIE Environmental Contractor	<ul style="list-style-type: none"> <li>– Develop strong working relationships with the Principal Contractor Team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Instruct and advise management team on compliance issues.</li> <li>– Provide specialist advice and input as required.</li> <li>– Co-ordinate internal audits of the EMS and sub-plans.</li> <li>– Conduct audit review as required.</li> <li>– Reports on the performance of the EMS and sub-plans, and recommends changes or improvements to Project Manager.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to the AIE Construction Manager and AIE HSE Manager.</li> <li>– Conducts investigation and response to environmental complaints and inquiries, where required.</li> <li>– Undertake all required environmental monitoring for this phase of the Project.</li> </ul>
Subcontractors and construction personnel	<ul style="list-style-type: none"> <li>– Undertake an environmental induction prior to accessing to site.</li> <li>– Comply with legislative requirements.</li> <li>– Participate in inspections and audits.</li> <li>– Follow environmental procedures.</li> <li>– Report all environmental incidents and hazards.</li> <li>– Introduce environmental topics to prestart meetings.</li> <li>– Ensure that all relevant permits and clearances are in place prior to commencing work.</li> </ul>

## 4.2 Monitoring, inspections and auditing

### 4.2.1 Reporting and monitoring

Environmental reporting and monitoring and audit requirements for the project are undertaken in accordance with the approved management plans (refer to Section 1.2) and AIE's EPL No 21529.

### 4.2.2 Environmental inspections and auditing

#### 4.2.2.1 Environmental inspections

As a minimum, the AIE HSE Manager (or nominated delegate) will undertake periodic inspection of the work sites with the relevant Principal Contractor's environmental personnel (Environmental Representative or similar) to evaluate the effectiveness of environmental controls (inclusive of erosion and sediment control measures) and general compliance with the implementation of the EMS (and associated sub-plans) for site-based activities.

In addition to the joint periodic environmental site inspection with AIE, the Principal Contractors will be required to undertake daily site environmental inspections, targeting key environmental risks commensurate with the activity being undertaken. The daily environmental site inspection will be documented on a checklist or similar to be prepared and completed by the Principal Contractors.

In accordance with Condition O4.4 of the EPL No 21529, the Contractor will undertake wet-weather inspections daily during periods of rainfall and within 24 hours of cessation of a rainfall event causing runoff to occur on or from the premises (based on site observation, this equates to 10 millimetres of rainfall in a 24-hour period).

Daily inspections of water pollution controls for the project will be undertaken in accordance with Condition M.10.1 of the EPL No 21529 and recorded. Records will include the date and time of inspection, location of dredging operations and conditions of silt curtains and other water pollution controls. Records will be produced to an EPA authorised officer on request.

The Principal Contractor(s) must record all such inspections including observations and works undertaken to repair and/or maintain erosion and sediment controls.

#### 4.2.2.2 Auditing

Environmental audits will be undertaken in accordance with Section 8.3 of the approved Stage 2A and 2B EMS. The audit scope where applicable, will be broadened to include the works covered by the utility installation works.

## 4.3 Environmental training

All personnel working on the site, including sub-contractors, shall be competent to conduct their work without harm to people, environment or assets. Personnel shall complete all necessary site training and induction requirements before commencing work on site.

Communication on environmental issues within the project team will be maintained, as a minimum, through the following forums (organiser as noted):

- Weekly project construction team meetings (AIE Construction Manager or delegate).
- Periodic Environmental management team meetings with relevant contractors (AIE HSE Manager or Delegate).
- Toolbox talks and daily pre-start briefings (Principal Contractor Project Manager or delegate).
- Minutes of formal meetings will be taken and distributed to record issues raised and actions required, with action status established at subsequent meetings.
- Monthly review of the internal AIE Environmental Compliance Tracking register (AIE HSE Manager or delegate).

All internal meetings include appropriate documentation in the form of agenda and formal distribution via the project's document system.

In addition to the above, the AIE Environment Team will undertake informal planning sessions and resource review meetings to plan and forecast for upcoming key construction dates, critical issues and other relevant matters associated with environmental planning and approvals.

## 4.4 Incident management and emergency response

Incident management and emergency response are detailed in the approved management plans. A summary is provided in the sections below.

### 4.4.1 Incident management

All incidents including those of the Principal Contractors, its subcontractors, and visitors that occur during the undertaking of the construction works for the Project will be managed to satisfy the requirements of AIE's Incident Reporting and Investigation System Requirements. Whilst it is noted that key Contractors will be implementing their own environmental management system procedures and processes, AIE will be responsible for ensuring that these systems and processes satisfy the requirements of the AIE EMS, including the incident management components. The Contractor will be responsible for providing all necessary documentation with regards to the incident investigation and close-out actions where required. The timing of the provision of this documentation is to align with the AIE requirements.

The AIE HSE Manager must be notified immediately of any environmental incident or near miss. These may include, but are not limited to the following:

- Exceedance of monitoring criteria as required under the Project EPL (EPL No. 21529) (refer to the individual Sub-plans for specific criteria and incident reporting requirements for individual environmental aspect such as air quality, water quality, traffic management, waste and resource management and noise and vibration management).
- Spill of any dangerous goods or hazardous substance to ground or water.
- Substantiated complaints received from members of the community or regulatory authorities.
- Regulatory breaches such as fines, prosecutions, improvement notices, breaches of licence conditions.
- All incidents of third-party property damage or loss.
- Incidents involving impact or potential damage to items or places of cultural heritage significance.
- Land-based off-site sediment loss to the environment, including sediment tracking onto the roadway.

In the event of a Notifiable Incident as defined under the *Protection of the Environment Operations Act 1997* (POEO Act), AIE is responsible for immediately notifying the EPA, and any other relevant authority, of pollution incidents on or around the site via the EPA Environment Line (telephone 131 555) in accordance with Part 5.7 of the POEO Act. The circumstances where this will take place include:

- *If the actual or potential harm to the health or safety of human beings or ecosystems is not trivial.*
- *If actual or potential loss or property damage (including clean-up costs) associated with an environmental incident exceeds \$10,000.*

Follow-up written notification to the EPA and any other relevant authorities will be required in accordance with the POEO Act and requirements of the EPA. This includes the provision of written details of the notification to the EPA within 7 days of the date on which the incident occurred.

All notifiable incidents will also be managed, documented, and reported in accordance with the AIE *Incident Reporting and Investigation System Requirement*.

### 4.4.2 Emergency response

Actual or potential emergency situations will vary in type and severity. The required level of response and notification will be at the discretion of the AIE Construction Manager in consultation with the AIE HSE Manager.

Any emergency situation may require only isolated containment and control or may require the complete evacuation of the site and notification of relevant emergency services. Consideration should be made of the response requirements for different situations. If at any time there is uncertainty on how to proceed, response

should be for the worst possible scenario. Ultimately, the AIE Construction Manager or representative has authority and responsibility to instigate an evacuation if he/she feels it is warranted.

In the event of an emergency, the following plans listed in Table 4.2 shall be consulted and implemented, as relevant.

**Table 4.2**      *Emergency plans*

<b>Plan</b>	<b>Reference</b>	<b>Application</b>
Principal Contractor Local Emergency Response Plan	-	Principal Contractor's emergency response plan implemented in the event of any incident occurring during a Project activity as per the Contractor's policies and management framework.
AIE Port Kembla Gas Terminal Emergency Spill Plan	PKGT-AIE-PRO-039	Developed as a sub-plan to the EMS to be implemented detailing: <ul style="list-style-type: none"> <li>– Response plans in the event of land or water-based spill events.</li> <li>– Inspections, notification, and incident management requirements in accordance with the Infrastructure Approval (SSI 9471) and EPL No 21529 in relation to spills.</li> </ul>
PIRMP	PKGT-AIE-PRO-007	Implemented immediately in the event of a pollution incident occurring during a Project activity. The PIRMP: <ul style="list-style-type: none"> <li>– Outlines the actions to be taken during or immediately after a pollution incident.</li> <li>– Lists details of relevant authorities to be notified, as required.</li> <li>– Outlines community and neighbour notification details, as required.</li> </ul>
AIE Emergency Management Procedures	PKGT-AIE-PRO-014	Implemented immediately in the event of any emergency incident occurring during the Project. Procedures include: <ul style="list-style-type: none"> <li>– Types of emergencies and the detailed steps to be taken in response.</li> <li>– Notification details to relevant authorities and AIE Project team.</li> <li>– Incident response to follow up from incident and preventative actions to be implemented, if applicable.</li> </ul>

## 4.5 Complaints

All complaints, where a third party has identified a construction activity as being unsatisfactory or unacceptable, will be dealt with promptly and efficiently in accordance with the complaint and dispute response flow chart shown in Figure 4.1.

AIE will operate a free 24-hour Community Information Line (1800 789 177) where members of the community can leave details about an inquiry, they may have regarding construction activities and this message will be passed on to site personnel and/or the Stakeholder Engagement Team, as appropriate. The phone number is listed on the AIE website (<https://ausindenergy.com/contact-us/>) and will be provided on all community newsletters. The AIE HSE Manager has notified the Port Kembla Harbour Environment Group of the Community Information Line.

In addition, a dedicated project email has been established (info@squadronenergy.com) for receipt of any enquiries / complaints with a link provided on the AIE website.

Initial responses to complaints will be provided within 24 hours of the complaint being received. As part of the response, a review of the activity will be undertaken. If required and possible, immediate changes will be made to reduce any impact on the community. In some cases, the issues cannot be resolved immediately, ongoing actions might be required to resolve the issue.

All complaints will be recorded in a Complaints and Disputes Register. The following information will be recorded for each complaint:

1. The date and time of the complaint.
2. The method by which the complaint was made.
3. Any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.
4. The nature of the complaint.
5. The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant.
6. If no action was taken by the licensee, the reasons why no action was taken.

The Complaints and Disputes Register will be maintained by the Project's HSE Manager or delegate, and will detail what the issue was, initial response provided, how and when the issue was resolved, and by whom. Records will be kept for at least four years after the complaint was made and will be produced on request by any authorised officer of the EPA.

Where resolving a complaint with a third party is protracted or develops into a dispute, the AIE HSE Manager shall escalate proactively to Senior Project Leadership (e.g., AIE Project Manager and/or Project Director) to assist with resolution. AIE will work proactively with the complainant to resolve the dispute including having face to face meetings, site familiarisation sessions and agreeing on actions to resolve the dispute. All communications and agreed actions shall be documented.

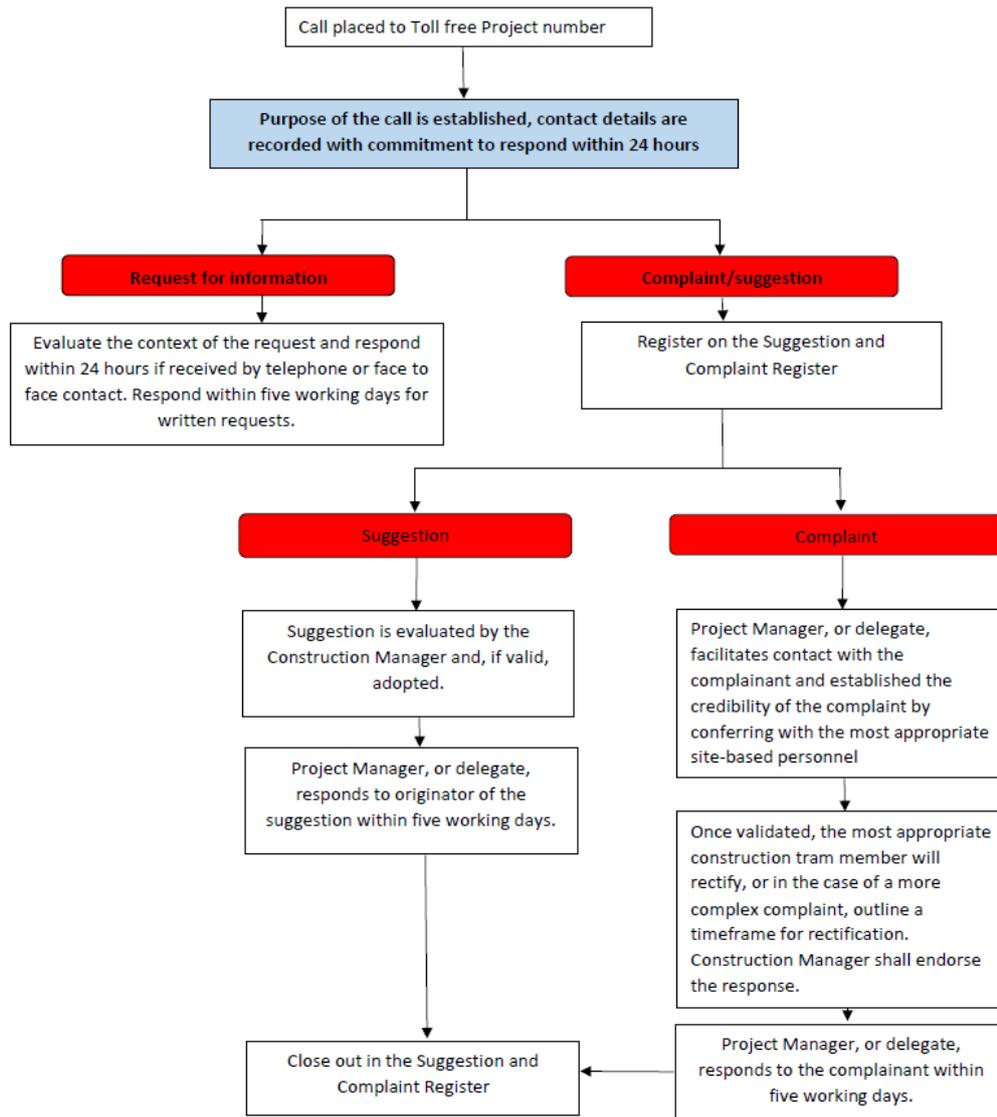


Figure 4.1 Complaint and dispute response flow chart

## 5. Mitigation measures

The following section outlines identified environmental risks and measures to mitigate impacts on the environment from the utility installation works in addition to those already identified in the approved Stage 2A and 2B management plans. All environmental risks (aspects and impacts) and associated mitigation measures and controls as detailed in this Supplementary CEMP are to be considered and implemented in conjunction with the approved Stage 2A and 2B management plans.

### 5.1 Risk assessment

The Port Kembla Modification 4 report assessed risks associated with the utility installation works which identified the following potential environmental impacts:

- Soils and contamination
- Traffic and transport
- Noise and vibration
- Air quality.

Further details for the above impacts, including appropriate mitigation measures and controls are included in the following sections.

### 5.2 Soils and contamination

#### 5.2.1 Overview

The proposed installation of an 11kV and communications cable will be undertaken within Seawall Road, which is mainly used for the delivery, storage and processing of coal by PKCT. Pacific National operate the Inner Harbour Balloon Loop railway corridor, which is used to receive the delivery of coal and grain.

The site forms part of a heavy industrialised area of Port Kembla and has been subject to extensive filling with blast furnace slag (a waste product from the steel making process) from the Port Kembla Steelworks, and some coalwash. Some areas of the site, in particular the southern parts of the proposed trench section, were reclaimed with sand dredged from the Inner Harbour in the 1960's.

A contamination assessment (GHD, 2022b) was undertaken where the utility cable will be installed. No exceedances of the adopted assessment criteria were reported in samples tested for the contaminants of potential concern (COPCs) identified. Results were generally consistent with field observations and PID readings which were typically less than 4 ppm. At one borehole location at the northern point of the utility cable installation, a weak effluent odour was noted at 5.5 metres below ground level (mbgl), and weak to very weak sulphur dioxide odour was noted between 8.7 m and 10 mbgl. No other odours or evidence of contamination such as asbestos containing materials (ACM) or staining were observed during fieldwork. Although ACM was not observed, boreholes only provide a one-dimensional view of the soil profile, and therefore it cannot be precluded that ACM may exist within fill units.

Management limits for total recoverable hydrocarbons (TRH) fractions were not exceeded, indicating that the detectable concentrations of TRH are unlikely to adversely affect the integrity of the utility connections cable. Although there were no reported exceedances of the human health assessment criteria and management limits, the site passes through areas that have been used for heavy industrial purposes for almost 60 years and could have contamination; therefore, it cannot be precluded that contamination exists in other parts of the proposed utility connections cable route alignment.

The ASS Risk Map (DLWC, 1997) indicates Berth 101 is mapped in an area of disturbed terrain at elevations 2-4 m Australian Height Datum (AHD) and >4 m AHD (shown in grey shading) in Figure 5.1 below. Estuarine sediments exist within the Inner Harbour and Gurungaty Waterway and are mapped as high probability of ASS (pink shading). The yellow shaded area immediately north-east of the site has been identified by the ASS Risk Map as a beach deposit but has no known occurrence of ASS.

For the trench section of the cable route alignment, ASS were encountered at 1.6 m bgl within the southern portion of the trench section; therefore unlikely to be encountered as the proposed maximum trench depth is 1 m bgl. ASS laboratory results indicate that ASS are likely to be encountered in the HDD section of the cable route alignment. Based on the depth of groundwater and HDD design, groundwater will also be intercepted during HDD activities.



Figure 5.1 ASS risk map (DLWC, 1997)

## 5.2.2 Objectives

The objectives with respect to soils and contamination are as follows:

- Negative impacts from potential contamination and ASS are avoided and minimised
- Impacts from soil and contamination issues are remediated to minimise environmental harm
- Ensure that any contaminated waste is managed in accordance with EPA requirements
- Manage waste using the principles of avoidance and minimisation and following the waste management hierarchy.

## 5.2.3 Mitigation measures

Table 5.1 Soils and contamination mitigation measures

Actions	Relevant Stage 2A and 2B sub plan	Responsibility
The Unexpected Finds Protocol (UFP) outlined in the Stage 2A and Stage 2B Remedial Works Plan (RWP) and CSP will be implemented in conjunction with the contingency measures outlined in Section 8.6 and Table 8.4 of the SMP to manage the occurrence of potential contamination, buried waste, demolition waste, ACM etc. which may be encountered during the utility installation works.	UFP CSP SMP	Contractor
Backfilling of the utility trench will reuse excavated material where suitable. Where specialised backfill material is required (e.g. backfill requiring an appropriate thermal resistivity value), backfill will comply with the requirements outlined in Section 7.4.2 of the SMP.	SMP	Contractor
Any surplus material not used in backfill is to be taken to the MBD Compound Site or the Outer Harbour Emplacement Cell via road or barge. This may include excavated material from the trench.	SMP	Contractor
Any liquid waste (e.g., drill muds/slurry) generated by the HDD process must be disposed off-site to an appropriately licensed waste facility and disposed in accordance with the EPA's Waste Classification Guidelines (NSW EPA 2014).	SMP	Contractor
All handling of material associated with trenching, HDD, backfill or disposal activities will be documented in accordance with the Material Tracking Control requirements outlined in Section 7.4.3 of the SMP.	SMP	Contractor
Segregation of materials for re-use on-site shall be in accordance with the methodology outlined in Section 8.2 and Table 8.1 of the SMP.	SMP	Contractor
Stockpiling of materials shall be in accordance with Section 8.4 of the Stage 2A and Stage 2B SMP, AQMP and ESCP.	SMP	Contractor
Management measures outlined in the approved Stage 2A ASSMP will be implemented to manage the occurrence of ASS/PASS which may be encountered during HDD construction activities.	ASSMP	Contractor
ASS/ PASS material will be identified in accordance with Section 8 of the Stage 2A ASSMP.	ASSMP	Contractor
Any ASS/ PASS encountered during the HDD activities will be treated on site in accordance with section 9 of the Stage 2A ASSMP or disposed off-site to an appropriately licensed waste facility and disposed in accordance with the EPA's Waste Classification Guidelines (NSW EPA 2014).	ASSMP	Contractor
Management measures outlined in the approved Stage 2A and Stage 2B ESCP will be implemented throughout construction.	ESCP	Contractor
A Progressive ESCP (PESCP) will be prepared in accordance with the Blue Book Section 7 of the Stage 2A and Stage 2B ESCP and updated throughout construction, so it remains relevant to the activities	ESCP	Contractor
Utilities will be installed in accordance with the International Erosion Control Association (IECA) practices for pipelines included in Section 7.2.4 of the Stage 2A and Stage 2B ESCP.	ESCP	Contractor
Sediment and erosion control devices would be installed within and/or around the site to minimise transport of sediment to the stormwater system. Any damage to erosion and sediment controls will be rectified immediately.	Activity-specific ESCP Inspection record	Construction manager Contractor
Standard dust control measures will be implemented on site for both open earthworks and stockpiles, where required (i.e., during high	Activity-specific ESCP Inspection record	Construction manager Contractor

Actions	Relevant Stage 2A and 2B sub plan	Responsibility
wind day). Measures may include the regular use of a watercart and/or water spray equipment.		
Any material that is required to be transported for off-site disposal will be done so in accordance with the conditions of the Infrastructure Approval (SSI 9471), the CTMP and Section 8.3 of the SMP.	CTMP SMP	Construction manager Contractor

## 5.3 Traffic and transport

### 5.3.1 Overview

The utility installations are proposed to be installed along the western boundary of Seawall Road. Seawall Road is located within the NSW Ports lease boundary and is part of the NSW Ports road network, as presented in Figure 5.2.

Seawall Road has previously been publicly accessible; however, it is currently closed to the public. Access is controlled via security access points on Port Kembla Road and Tom Thumb Road and Berth 101 is restricted to authorised personnel only. Partial road closures of Seawall Road will be required for the installation of the utility installations; however, this will not impact on the general public's access to Berth 101 as this is currently restricted. Neighbouring tenants within the NSW Ports lease boundary may be impacted by the works which will be addressed when obtaining consent from NSW Ports for the works as per Direction 3 (NSW Ports, 2021).

NSW Ports utilise Direction 3 of 2021 which prohibits any person from undertaking any works within the port lease boundary, including roads, without the written consent of NSW Ports. Notification to NSW Ports at least seven days to the commencement of the utility connection cable works is required.

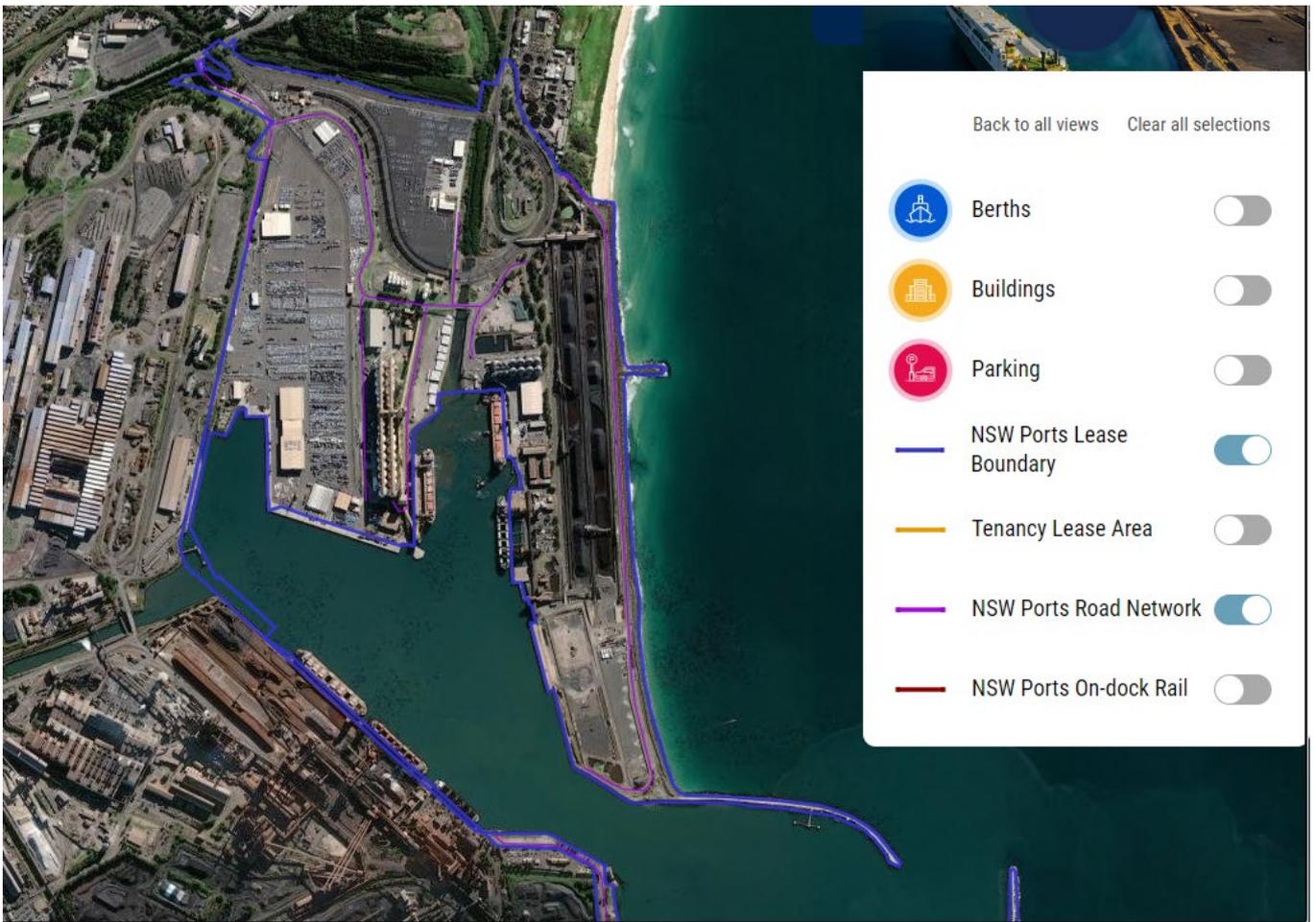


Figure 5.2 NSW Ports road network and lease boundary (source: NSW Ports, 2022)

### 5.3.2 Objectives

The objectives with respect to traffic and access are as follows:

- Minimise disruption and disturbance to road users and neighbouring properties
- Ensure compliance with the Port Kembla Direction 3 of 2021.

### 5.3.3 Mitigation measures

Table 5.2 Traffic and transport mitigation measures

Actions	Relevant Stage 2A and 2B sub plan	Responsibility
Management measures outlined in the approved Stage 2A and Stage 2B CTMP will be implemented to manage traffic impacts associated with the utility installations.	CTMP	Contractor
An activity specific CTMP is to be prepared in accordance with the NSW Ports Port Kembla Direction 3 of 2021, including: <ol style="list-style-type: none"> <li>1. Notify the appropriate contact person at least 7 days prior to commencement of such Works, and provide the following information (as a minimum):               <ul style="list-style-type: none"> <li>• exact location(s) of the proposed Works, including a layout plan or marked-up map or diagram</li> <li>• date(s) on which the works are to be performed</li> <li>• a scope of works for the works</li> </ul> </li> </ol>	CTMP	Contractor

Actions	Relevant Stage 2A and 2B sub plan	Responsibility
<ul style="list-style-type: none"> <li>• details of persons engaged to perform works</li> <li>• contact details for a designated person who will supervise/manage the works</li> <li>• a communication plan to notify other relevant stakeholders (e.g. neighbouring tenants) as required; and</li> <li>• provide applicable safe work method statements, job safety analyses and/or safety management plans that address any risks or hazards relevant to the location and the proposed Works including, but not limited to, those which may be advised to you by NSW Ports.</li> </ul> <ol style="list-style-type: none"> <li>1. Complete the registration of all persons undertaking the Works in NSW Ports' Rapid Global system (or as otherwise directed by NSW Ports), which involves providing relevant contact details, submitting insurances and answering a HSE pre-qualification questionnaire (NSW Ports contact person will supply details on how to do this step); and</li> <li>2. Provide evidence, which in the opinion of the contact person is satisfactory, that all persons nominated as undertaking the Works have successfully completed all applicable induction/s (via Rapid Global or as otherwise directed by NSW Ports) plus any other relevant third-party inductions.</li> </ol>		
<p>All transport of material associated with trenching, HDD, backfill or disposal activities will be documented in accordance with the requirements outlined in Section 8.1 of the SMP.</p>	CTMP	Contractor
<p>All vehicles will be well maintained in a good working condition applicable to the vehicle specifications. Vehicles will be operated in a safe and proper manner by qualified drivers. The type and volume of heavy and light vehicles will be in accordance with Table 6.1 and Section 6.1 of the CTMP.</p>	CTMP	Contractor
<p>Light and heavy vehicles will access the utility installation construction area via Seawall Road and Port Kembla Road. Similarly, vehicles will access (enter / exit) the Emplacement Cell Construction Site via Flinders Street (which turns into Old Port Road), onto Christy Drive, and then Arawata Drive.</p> <p>Traffic movements will be minimised, where possible, during the morning and afternoon peak hours. Construction workers will be encouraged to carpool or to use public transport, where practicable.</p>	CTMP	Contractor

## 5.4 Noise and vibration

### 5.4.1 Overview

Port Kembla is a busy industrial port operating across two harbours. The existing environment is influenced by the industrial uses within the port. Land use surrounding Berth 101 is predominantly heavy industrial or special uses associated with port operations. The closest residential properties to Berth 101 are located approximately two kilometres to the north in Coniston, to the west in Cringila and to the south at Port Kembla and Warrawong. Transport corridors along Springhill Road and Masters Road are the two main vehicular traffic routes which are heavily trafficked transport corridors and influence the existing noise levels.

The utility installations would contribute to noise and vibration impacts during the construction phase of the project. Impacts are anticipated to be consistent with those modelled for trenching and HDD activities associated with construction works for the pipeline. The utility installations will be undertaken within an industrial land use area, the nearest residential area located about 1.23 kilometres to the northwest of the northern most point of the works. Noise levels at this distance would be anticipated to be below the noise management levels for the project and are not expected to impact upon any sensitive receiver.

## 5.4.2 Objectives

The objectives with respect to noise and vibration are as follows:

- Avoid and minimise noise and/or vibrations emissions.
- Minimise noise pollution impacts.

## 5.4.3 Mitigation measures

Table 5.3 Noise and vibration mitigation measures

Actions	Relevant Stage 2A and 2B sub plan	Responsibility
<p>Prior to the commencement of works all individuals involved with the works will be given an induction on matters related to noise management and considerations. The induction will include:</p> <ul style="list-style-type: none"> <li>– All relevant project specific and standard noise and vibration mitigation measures.</li> <li>– Relevant licence and approval conditions.</li> <li>– Permissible hours of work.</li> <li>– Any limitations on noise generating activities with special audible characteristics.</li> <li>– Location of nearest sensitive receivers.</li> <li>– Construction employee parking areas.</li> <li>– Designated loading/unloading areas and procedures.</li> <li>– Site opening/closing times (including deliveries).</li> <li>– Environmental incident procedures.</li> <li>– Community related considerations such as:               <ul style="list-style-type: none"> <li>• No swearing or unnecessary shouting or loud stereos/radios on site.</li> <li>• No dropping of materials from height, throwing of metal items and slamming of doors.</li> <li>• No excessive revving of plant and vehicle engines.</li> <li>• Controlled release of compressed air.</li> </ul> </li> </ul>	NVMP	All personnel
<p>Where possible, quieter construction methods should be utilised such as:</p> <ul style="list-style-type: none"> <li>– Use of quieter and less vibration emitting plant and equipment.</li> <li>– Plant and equipment to be well maintained and include noise suppression methods such as mufflers, where possible.</li> <li>– Equipment to be turned off after use.</li> <li>– Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work, including delivery vehicles.</li> <li>– Stationary noise sources, such as pumps, should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.</li> <li>– Plant used intermittently to be throttled down or shut down.</li> </ul>	NVMP	All personnel
All complaints to be managed in accordance with Section 4.5.	NVMP	AIE HSE Manager AIE Project Director

## 5.5 Air quality

### 5.5.1 Overview

Based on the Air Quality Impact Assessment for the Project (GHDb, 2018), dust and particulate matter were identified as the primary emission to air during the construction phase of the project. PM10 was identified as the primary pollutant of concern. The predicted daily and annual maximum PM10 concentration in the ambient air (including background concentration) during the construction phase within the project footprint would be 360ug/m<sup>3</sup> and 130ug/m<sup>3</sup> respectively, with no expected exceedance of the 24-hour and annual averages criteria of the Approved Methods (NSW EPA, 2016) at sensitive receptors. This is consistent with the air quality data obtained from surrounding land uses in Port Kembla, which demonstrates results indicative of the heavily industrialised surrounds of the project.

AIE are required to undertake air quality monitoring during the construction works of the project in accordance Infrastructure Approval SSI 9471 Schedule 3, Condition 33(c) and the issued EPL No. 21529 Condition P1.1 and Condition M2.2. Reporting of results for all monitoring points are published in the monthly environmental monitoring report made available on the AIE project website. Locations of air quality monitoring points are presented in Figure 1.1. Whilst the EPL monitoring locations are not located in close proximity to the entire utility installations corridor, the monitoring results will assist with the determining general background / prevailing air quality conditions. The EPL monitoring will be supplemented during the utility installation works with daily visual observations with regards to dust generation and the effectiveness of environmental controls.

### 5.5.2 Objectives

The objectives with respect to air quality are as follows:

- Minimise potential for unplanned emissions to the atmosphere including dust.
- Prevent the generation of dust in preference to applying dust suppression measures.

### 5.5.3 Mitigation measures

Table 5.4 Air quality mitigation measures

Actions	Relevant Stage 2A and 2B sub plan	Responsibility
Potential dust from construction works shall be managed, if required, through a range of methods which may include wet suppression (water sprays), wind breaks, and reducing or ceasing associated activities during high wind events	AQMP	<ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Principal Contractor Project Manager</li> </ul>
Weather forecasts are to be reviewed daily to assess associated risks with the following day's programmed activities, modifying the activities where appropriate and ensuring appropriate controls are available.	AQMP	<ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Principal Contractor Construction Foreman</li> </ul>
Erosion and sedimentation controls will be checked and maintained regularly during construction	AQMP ESCP	<ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Principal Contractor Construction Foreman</li> <li>– Principal Contractor Environmental Representative</li> </ul>
Surface disturbance is to only occur within the approved project development boundary.	ESCP	<ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Principal Contractor Construction Foreman</li> </ul>

Actions	Relevant Stage 2A and 2B sub plan	Responsibility
		<ul style="list-style-type: none"> <li>– Principal Contractor Environmental Representative</li> </ul>
<p>Construction area will be delineated on drawings and on site (e.g., installation of fencing or flagging where appropriate).</p>	<p>ESCP</p>	<ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Principal Contractor Construction Foreman</li> <li>– Principal Contractor Environmental Representative</li> </ul>

## **6. Document management and review**

### **6.1 Record management**

Record management will be as required under Section 10.1 of the approved Stage 2A and 2B Environmental Management System.

### **6.2 Document review and revision**

This Supplementary CEMP will be reviewed and updated, as required under Condition 3 of Schedule 4 of Infrastructure Approval (SSI 9471) to ensure the objectives of the applicable approval conditions contained within are being met throughout Stage 2A and Stage 2B. In addition, as required under Condition 4 of Schedule 4 of Infrastructure Approval (SSI 9471), this Supplementary CEMP must be reviewed, and if necessary, revised within 3 months (unless otherwise agreed with DP&E) for any of the following:

- Following the submission of an incident report as per Condition 5, Schedule 4 in Infrastructure Approval (SSI 9471) (refer to Section 9 of the Stage 2A and 2B EMS).
- Following approval of any modification to the conditions of approval outlined in Infrastructure Approval (SSI 9471).
- At the direction of the Planning Secretary as per Condition 4, Schedule 2 in Infrastructure Approval (SSI 9471).

Where a review leads to a revision of this plan, within four weeks the revised document will be submitted to the Planning Secretary for approval unless otherwise agreed with the Planning Secretary.

# References

DIPNR, 2004, *Guideline for Preparation of Environmental Management Plans*.

Environment Protection Licence No. 21529, dated 3 December 2021.

GHD 2018, Port Kembla Gas Terminal Environmental Impact Statement.

GHD 2022a, Port Kembla Gas Terminal Modification 4 Report

GHD 2022b, East Coast Gas 11kV Feeder — Geotechnical Assessment and Design Report.

Infrastructure Approval SSI 9471, dated 13 October 2021.



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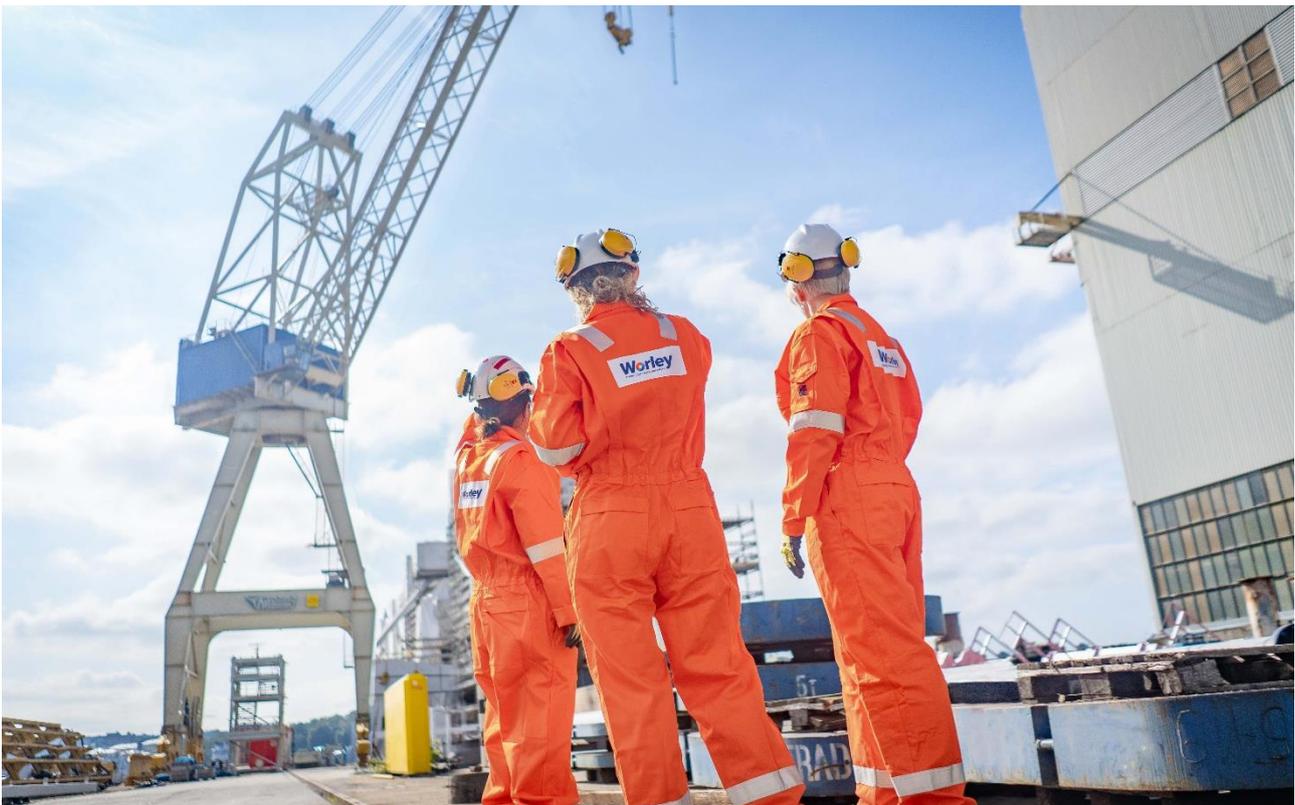
# **Appendix B**

**Hazards and Risk technical note**

AUSTRALIAN INDUSTRIAL ENERGY

# Port Kembla Gas Terminal Project

## MOD4 Technical Note



Document No. Rev 1: PKGT-WOR-ORF-SAF-TNO-0002  
Worley Document No. Rev 1: 411010-00417-SR-TEN-0001  
4 October 2022

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**COVID-19**

***Worley is committed to providing the proposed Services to you in a timely and professional manner. Worley is also committed to ensuring the health and safety of everyone, including our people and our customers. In some cases, the COVID-19 pandemic has caused us to modify our working practices. Worley employees and collaborators may therefore provide some or all of the proposed Services from offices within their homes. In addition, the ability to travel for attendance to business meetings or site may be affected.***

***Worley will take reasonable steps to mitigate any delays associated with the measures necessary to keep everyone safe and comply with all government regulations and proclamations regarding the COVID-19 pandemic. Customers will be informed if there is any foreseeable impact on providing the proposed Services.***

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**PROJECT 411010-00417 - Port Kembla Gas Terminal Project - MOD4 Technical Note**

Rev	Description	Originator	Reviewer	Worley Approver	Revision Date	Customer Approver	Approval Date
Rev 0	Issued for Use	AS	AF	FL	21 September 2022		
		A. Stembridge	A. Fergusson	F. Losty			
Rev 1	Re-Issued for Use				4 October 2022		
		A. Stembridge	A. Fergusson	F. Losty			

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## Appendices

### Appendix A. Detailed Odourant Modeling Results

## 1. Introduction

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AIE are developing a Liquefied Natural Gas (LNG) import terminal on the east coast of NSW to provide gas to industrial and wholesale customers. AIE is planning to supply up to 115PJ per annum, depending on seasonal demands and corresponding to approximately 75% of NSW gas demand.

LNG will be sourced from worldwide suppliers and transported by Liquefied Natural Gas Carrier (LNGC) vessels to the Port Kembla LNG import terminal. The LNG will then be regasified on the Floating Storage Regasification Unit (FSRU) for input into the NSW gas transmission network. The project will be the first of its kind in NSW and provide a simple, flexible solution to the state's gas supply challenges. As such, the project consists of four key components:

- LNGC — There are many of these in operation worldwide transporting LNG from production facilities all around the world to demand centres.
- FSRU — the Höegh Galleon has been selected as the FSRU for the project and is a Cape-class ocean-going vessel which would be moored at Berth 101 in Port Kembla.
- Berth and wharf facilities – wharf topside facilities (also referred as the onshore receiving facility) include marine loading arms to transfer natural gas from the FSRU to shore, and odourant storage and injection facilities.
- Natural Gas pipeline – the Port Kembla Pipeline (PKP) is a DN450, high-pressure pipeline connection from the berth to the Eastern Gas Pipeline (EGP) which is part of the existing gas transmission network. The PKP is a new pipeline to be designed, constructed and commissioned by Jemena. Jemena currently operate a number of distribution and transmission pipelines across northern Australia and Australia's east coast.

The project was declared Critical State Significant Infrastructure in accordance with section 5.13 of the Environmental Planning and Assessment Act 1979 (EP&A Act). An environmental impact statement (EIS) was prepared for the project and the project subsequently received Infrastructure Approval [1] from the Minister for Planning and Public Spaces on the 24th of April 2019.

### 1.1 Proposed Modifications

Approval of the project was based upon the development described in the Port Kembla Gas Terminal EIS (GHD 2018) as amended in the Response to Submissions (RTS) (GHD 2019) [2].

In 2020, AIE submitted a modification (MOD1) of the Minister's approval to allow increased volumes of gas to flow through the Terminal, satisfying the market need for more gas during winter months. It was proposed that this will be achieved by increasing the permitted output of the Terminal, as well as increasing the number of LNG cargoes able to be received by the Terminal [3]. This modification (MOD1) of the Minister's approval was accepted in April 2020.

Following design and operational amendments, AIE proposes to further modify Infrastructure Approval SSI-9471 [1] under section 5.25 of the EP&A Act 1979 for the following project elements [4]:

1. Minor changes to the alignment, pipeline length and maximum operating pressure of the pipeline for connection to the existing gas network to the Port Kembla Looping lateral, which forms part of Jemena's EGP.

2. Mercaptan storage volume increase; and
3. Removal of the cold vent initially included in design plans for Berth 101.

This proposed modification to Infrastructure Approval SSI-9471 [1] shall be further referred as MOD4.

## 1.2 Objectives

The objective of this document is to assess the safety impacts of the proposed increase to pipeline operating pressure, increased odourant storage volume and the removal of the cold vent, using recognised methods to support the changes proposed as part of MOD4.

The scope excludes the additional MOD4 pipeline elements (i.e. alignment and length) which shall be covered by others.

## 1.3 Acronyms and Abbreviations

In this document, the following acronyms and abbreviations apply.

Table 1-1: Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AEGL	Acute Exposure Guideline Level
EGP	Eastern Gas Pipeline
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
ERPG	Emergency Response Planning Guideline
FHA	Final Hazard Analysis
FSRU	Floating Storage Regasification Unit
HAZOP	Hazard and Operability
HIPAP4	NSW Planning Hazardous Industry Planning Advisory Paper No. 4
IDTL	Immediately Dangerous to Life
LNG	Liquified Natural Gas
LNGC	Liquefied Natural Gas Carrier
LOC	Loss of Containment
MLAs	Marine Loading Arms
ORF	Onshore Receiving Facility
PKGT	Port Kembla Gas Terminal
PKP	Port Kembla Pipeline
QRA	Quantitative Risk Assessment

Acronym/Abbreviation	Definition
RTS	Response to Submissions
SBC	Semi Bulk Containers
SIL	Safety Integrity Level
SLOD	Significant Likelihood of Death
SLOT	Specific Level of Toxicity
STEL	Short-Term Exposure Limit
TBM	Tert-Butyl Mercaptan
THT	Tetra Hydro-Thiophene
UKOOA	United Kingdom Offshore Operators Association
VCE	Vapour Cloud Explosion

## 2. Description and Assessment of Proposed Changes

---

### 2.1 Port Kembla Pipeline Tie-in -Increase in Operating Pressure

The Port Kembla Gas Terminal EIS RTS document (GHD 2019) specifies that the maximum allowable operating pressure of the gas pipeline is 14.7 MPag but is limited by the maximum supply pressure from the FSRU at 12 MPag [1]. It was noted that submissions referred to pressures in the EGP of up to 14 to 16 MPag. However, at the time it was understood that the normal operating pressure is about 8 to 11 MPag and as such, the project was expected to be able to provide gas at a suitable pressure to the pipeline. Noting Infrastructure Approval [1] Condition 6 states *the gas pipeline must not be operated at a pressure exceeding 12 megapascals (MPag)*.

To align with the maximum allowable operating pressure of the Jemena EGP (including the Port Kembla Looping Lateral) it is proposed to increase the Maximum Allowable Operating Pressure (MAOP) to 16.55 MPag to ensure consistency across the network and associated infrastructure approvals.

This change is not expected to materially impact the quantitative risk assessment (QRA) to be conducted as part of the Final Hazard Analysis (FHA) for the project or the Port Kembla Gas Terminal (PKGT) Fire Safety Study [5]. The FSRU has a lower design pressure than the PKP and is not a source of overpressure for the Onshore Receiving Facility (ORF) and pipeline. The maximum supply pressure from the FSRU is 12 MPag and is limited based on specifications of the regasification plant process equipment, FSRU process control and safety systems associated with the regasification and export of LNG. As such, the operating conditions of the FSRU and ORF in the FHA and PKGT Fire Safety Study [5] shall remain aligned with the PKGT Proposed Modification Submissions Report (GHD 2020) [3].

The detailed design phase Hazard and Operability (HAZOP) study and Safety Integrity Level (SIL) Determination study [6, 7] identified the following two sources of overpressure for the ORF and pipeline:

- Failure of nitrogen injection flow control coincident with blocked discharge; and
- EGP operating at a higher may provide a source of potential overpressure for the PKP.

Noting, these scenarios are upset conditions and have protections in place to reduce the likelihood of them occurring. Overpressure of the PKP from the EGP would require various controls to fail and is assumed only likely to occur when line packing as a result of multiple consumers not taking gas. Given the volume in the network, an overpressure event would take time to occur and it is expected there is sufficient time to detect and intervene [7].

A Safety Management Study (SMS) has been carried out for the PKP [9] in accordance with the Australian Standard for Pipelines – Gas and Liquid Petroleum (AS 2885) and concluded that no unusual threats that cannot be controlled through the current design process were identified. The scope of the SMS covers the entirety of the new lateral pipeline route from the PKGT to the existing EGP. The SMS has been reviewed by NSW Department of Planning and Environment and confirmed the study was conducted appropriately by all relevant stakeholders, in line with the requirements of AS 2885 and that it considered changes to accommodate MOD4 [10].

The QRA conducted as part of the Jemena PKGT to EGP FHA [8] considered the operating pressure of the PKP to be 16.55 MPa and concluded that risk exposure associated with the PKP is expected to be below the fatality risk criteria specified in NSW Planning Hazardous Industry Planning Advisory Paper No. 4 (HIPAP4), with no risks recorded above 5E-05 per annum (limit for commercially developed land) or 5E-07 per annum (sensitive land use) impacting on residential areas. Risk modelling for the AIE section of the PKP is expected align with this and shall be verified in the FHA.

## 2.2 Odourant Storage

At the time of submission of the Port Kembla Gas Terminal EIS RTS document (GHD 2019) it was planned that odourant would be injected into gas to assist in leak detection [1]. Odourant would be stored in 200 kg drums and injected through a specialised skid prior to it entering the gas pipeline.

It was expected that up to 400 kg of odourant would be stored in two 200 kg drums at Berth 101. Once empty they would be refilled by truck or swapped out with refilled tanks. The odourant was assumed to be methyl mercaptan.

The design has since progressed and odourant will be stored onsite in two 500L semi bulk containers (SBC) housed within a 40ft shipping container. Provision has been made for a third tank and a potential additional tank onsite bringing the total potential storage onsite to between 2,000 and 2,400kg. [11]. The shipping container will also contain the injection packages. Odourant shall be injected into the natural gas at a rate be 0.6 – 6 L/hr and a concentration of 9mg/Sm<sup>3</sup>. The SBC's will be loaded into the shipping container onsite using forklifts, with the long side of the container adjacent to the road being open and accessible via forklift (i.e. shipping container will not be fully enclosed during these activities). SBC changeout is expected to occur every 3 to 13 days depending on the send out rate from the FSRU.

The level within the SBC's onsite will be monitored using load cells, with a signal provided to the offsite control room. The odourant injection rate will be set based on the gas send out rate, supplied from the site control room to the package PLC.

The odourant selected for use is Spotleak 1005 [11] which is a 70:30 blend of Tetra Hydro-Thiophene (THT) and Tert-Butyl Mercaptan (TBM). THT is a flammable material while TBM is both flammable and toxic. Like natural gas, hazards associated with Spotleak 1005 are fire and/or explosion depending on the location of a release and/or presence of an ignition source. The following Loss of Containment (LOC) scenarios have been identified and are remain modelled in the PKGT Fire Safety Study [5]:

1. LOC within the shipping container at storage conditions. Noting, the worst case scenario has the shipping container side fully open for changeout of a Spotleak 1005 SBC; and
2. LOC in the odourant injection line (release rate limited to injection rate).

Analysis of the flammable, explosion and toxic consequences of LOC events are summarised below.

### 2.2.1 Modelling Basis and Assumptions

Flammable, explosion and toxic consequence modelling has been conducted for the odourant storage tanks using PHAST with the following inputs:

- Leak size: 10, 25 mm (a 25 mm leak is conservatively assumed the largest potential line size with the odourant storage and injection system);
- Inventory size: 2400 kg;
- Storage pressure: 250 kPag [11];
- Storage temperature: 1°C [11];
- Injection rate: 0.6 – 6 L/hr (approx. 0.0015 kg/s) [11];
- Leak elevation: 1 m;
- Leak orientation (within container): Horizontal, vertical down (impinged);
- Flammable effects criteria: Lower flammable limit (dispersion) and 3, 4.7 and 23 kW/m<sup>2</sup> (radiant heat levels);
- Explosion parameters: Odourant tank shipping container identified as a confined area with potential for a vapour cloud explosion (VCE). Assumed a stoichiometric mass of odourant can fill the space. Explosion modelled using the TNO Yellow Book Multi-Energy Explosion method [12] with a blast strength of 5 (i.e. ignition strength – low, obstruction – low, parallel plane confinement – yes).
- Explosion effects criteria: 7 and 14 kPa (explosion overpressure levels);
- Toxic criteria: There is no suitable toxicity data published for THT or TBM to be used to assess potential injury impacts (i.e. Emergency Response Planning Guideline (ERPG), Acute Exposure Guideline Level (AEGL), Short-Term Exposure Limit (STEL), or Immediately Dangerous to Life (IDTL)). However, AEGL toxicity data is available for Ethyl Mercaptan. Noting the following definitions for AEGL:
  - AEGL 1 is defined as the airborne concentration of a substance above which it is predicted that the general population could experience notable discomfort, irritation or certain asymptomatic, non-sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
  - AEGL 2 is defined as the airborne concentration of a substance above which it is predicted that the general population could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

UK HSE Specific Level of Toxicity (SLOT) and Significant Likelihood of Death (SLOD) DTLs data [13] indicates the DTL for Ethyl Mercaptan is 6 times higher compared to TBM. Therefore, based on the 6 times difference in toxicity levels of Ethyl Mercaptan to TBM, the AEGL 1 and 2 for TBM are estimated to be 6 ppm and 900 ppm, respectively, for 30 minutes exposure duration [13]. The HIPAP4 injury risk criteria specify exposure to a short duration and hence AEGL thresholds with 30 minutes exposure time have been used.

All other consequence modelling parameters in PHAST are aligned with those in the PKGT Fire Safety Study [5] and FHA.

### 2.2.2 Modelling Results

The worst case flammable and toxic dispersion modelling results are summarised in Table 2-1 and the detailed results are provided in Appendix A.

Table 2-1: Spotleak1005 Flammable and Toxic Dispersion Modelling Results

Description	Hole Size	Release Rate (kg/s)	Release Duration (s) after isolation	Distance downwind to concentration of interest [m]		
				LFL	6 ppm	900 ppm
FSS 9: Odourant storage & pipework	10mm	1.1	2323	6.9	2480.0	54.4
	25mm	6.7	373	10.4	2485.0	89.6
FSS 9: Odourant storage & pipework (Limited to Injection Rate)	10mm	0.0015	-	0.6	2.8	1.9
	25mm	0.0015	-	Not Reached		

The results indicate that the furthest impact distance at the 6ppm from a 25mm leak is 2.48 km. While the furthest impact distance at 900 ppm is 89.6 m. However, this scenario will only occur during changeout of a Spotleak 1005 SBC. During normal operation, a LOC will occur within the shipping container which is provided with an activated carbon filter system. Results at the odourant injection conditions (i.e. dosing) are either very localised or not produced due to the low flow rates as limited by the injection pump.

Figure 2-1 presents the location of the nearest residential neighbours which may be impacted by 6 ppm concentrations (effects are not disabling and are transient and reversible upon cessation of exposure) during SBC changeout. The injury risk shall be verified in the FHA. However, injury risk levels are expected to meet the criteria outlined in HIPAP4 as the 900 ppm concentrations do not reach any of the nearest residential neighbours.



Figure 2-1: Neighbouring Residential Areas

The worst case jet fire and pool fire modelling results are summarised in Table 2-2 and Table 2-3 and the detailed results are provided in Appendix A. Like the flammable and toxic dispersion modeling, results are not produced at the odourant injection conditions due to the low flow rate. In these circumstances, a LOC of high pressure natural gas is likely to occur instead.

Table 2-2: Spotleak1005 Jet Fire Modelling Results

Description	Hole Size	Release Rate (kg/s)	Flame Length (m)	Downwind Distance (m) to Thermal Radiation Level (kW/m <sup>2</sup> )			
				3	4.7	23	35
FSS 9: Odourant storage & pipework	10mm	1.1	9.0	15.7	14.2	10.6	9.9
	25mm	6.7	17.6	31.6	28.4	20.5	19.4

Table 2-3: Spotleak1005 Pool Fire (Unconfined) Modelling Results

Description	Hole Size	Release Rate (kg/s)	Pool Diameter (m)	Downwind Distance (m) to Thermal Radiation Level (kW/m <sup>2</sup> )			
				3	4.7	23	35
FSS 9: Odourant storage & pipework	10mm	1.1	4.5	21.7	18.9	12.0	8.3
	25mm	6.7	11.3	49.8	42.4	25.3	20.3

The above fire scenarios impacts are localised and, in most circumstances, shall be contained within the odourant shipping container. All equipment within the container shall be hazardous area rated suitable for Zone 1 [11]. It is expected that provision for fire detection shall be provided.

The odourant tank shipping container is identified as a confined area with potential for a VCE. Figure 2-1 presents the explosion overpressure contours generated from an explosion in the shipping container. The distance to the 7 kPa and 14 kPa explosion overpressure levels are 25.7 m and 12.7 m respectively. Noting, the peak overpressure generated is 20 kPa. Note the modeling is conservative and takes no account for blast attenuation provided by the shipping container. Based on the modeling completed no significant onsite or offsite impacts are expected.

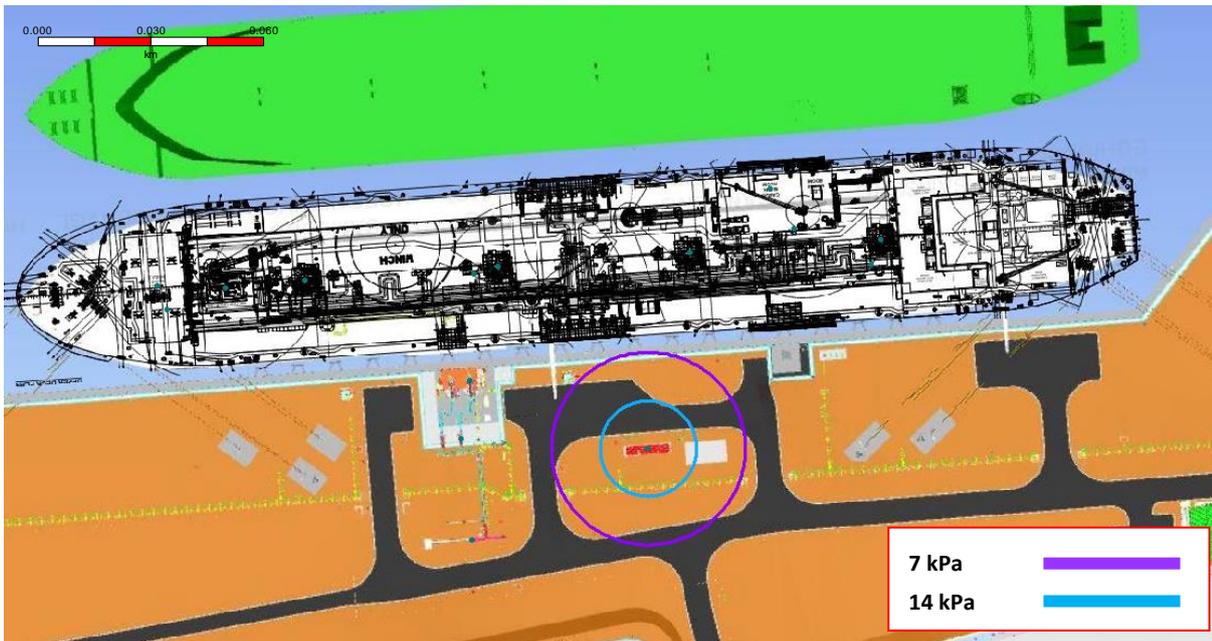


Figure 2-2: Odourant Shipping Container Explosion

### 2.3 Cold Vent Removal

At the time of submission of the Port Kembla Gas Terminal EIS RTS document (GHD 2019) the berth and wharf topside facilities included a cold vent for use in an emergency (i.e. to mitigate the impacts of a loss of containment and/or fire event). Piping systems able to be depressured via the cold vent included the Marine Loading Arms (MLAs), and the ORF pipework up to the shutdown valve in the above ground section

of the PKP. The cold vent system was designed to depressure the inventory to 690 kPag in 15 minutes. Subsequent to the submission, the ability to blowdown the ORF piping was removed.

An escalation risk assessment has since been carried out in line with the guidance detailed in NSW Planning Hazardous Industry Planning Advisory Paper No. 6 (HIPAP6) as detailed in the following steps.

1. Determine extent of fire impacts;
2. Calculate the risk of fire event;
3. Confirm the risk meets nominated acceptance criteria; and
4. If the risk does not meet the nominated acceptance criteria, consider other risk mitigation and management options.

### 2.3.1 ORF Fire Event Consequence

Jet fire modelling for ORF systems previously connected to the cold vent systems are contained in the PKGT Fire Safety Study [5]. Modelling is based on the initial release rate (i.e. prior to fire detection and isolation) and the release rate after shutdown and isolation occurs. It is assumed automatic detection, shutdown, and isolation shall take 60 seconds and impairment of equipment / vessels occurs after 5 minutes of direct jet fire impingement [14]. As such, jet fire impacts following shutdown, isolation and depressurisation is therefore based on the release rate at 240 seconds (automatic ESD and depressurisation). Noting the release rate will decrease over time as the inventory available is limited (via isolation through ESD valves) and system pressure drops (via depressurisation of the isolatable section). Depressurisation occurs as inventory is lost from the isolatable section and via the leak.

Table 2-4 presents the PKGT ORF release rate and jet fire modelling results as detailed in the PKGT Fire Safety Study [5].

Table 2-4: ORF HP Gas Jet Fire Modelling Results

Description	Hole Size	Release Duration (s)	Initial Downwind Impact Distance (m)					5 Min Downwind Impact Distance (m)				
			Rate (kg/s)	Flame Length (m)	3 kW/m <sup>2</sup>	4.7 kW/m <sup>2</sup>	23 kW/m <sup>2</sup>	Rate (kg/s)	Flame Length (m)	3 kW/m <sup>2</sup>	4.7 kW/m <sup>2</sup>	23 kW/m <sup>2</sup>
FSS 6: NG from FSRU ESD Valve to ORF (up to SDV-064001 / SDV-064002) including MLA	10mm	2801	2.1	22.8	35.1	31.4	25.0	1.0	16.5	20.9	20.0	17.8
	25mm	448	13.2	45.5	79.5	70.8	51.3	0.7	12.6	21.0	19.2	15.0
	50mm	112	52.8	81.3	147.4	131.0	91.0	-	-	-	-	-
	100mm	28	211.3	145.1	273.0	241.7	167.0	-	-	-	-	-
	FB	<2s	7605	642.1	1394	1199	793.3	-	-	-	-	-
FSS 7: ORF pipework (from XV-064001 / XV-064002 to SLV-064003)	10mm	2310	2.1	22.8	35.1	31.4	25.0	0.9	15.6	19.7	18.6	16.8
	25mm	370	13.2	45.5	79.5	70.8	51.3	0.4	9.9	16.4	16.1	11.9
	50mm	92	52.8	81.3	147.4	131.0	91.0	-	-	-	-	-
	100mm	23	211.3	145.1	273.0	241.7	167.0	-	-	-	-	-
	FB	<2s	3380	459.1	963.9	823.3	558.7	-	-	-	-	-

Large hole size releases (i.e. 50mm and greater) are expected to deplete the inventory in less than two minutes once shutdown and isolation have been initiated.

Small hole size releases (i.e. 10mm and 25mm) have potential to impact adjacent inventories resulting in an escalation event. As such, fire risk for these scenarios have been calculated.

### 2.3.2 ORF Fire Event Risk

Calculation of the fire escalation risk considers the leak frequency and ignition probabilities from the ORF systems previously connected to the cold vent systems. The leak frequency was determined by conducting a parts count using the issued for construction piping and instrumentation diagrams (P&IDs) for the ORF and as built P&ID for the Höegh Galleon FSRU. For each item identified (i.e.

vessels, valves, flanges, instrumentation, piping, etc.) the IOGP failure rate data was applied (frequency data from 2006-2015 inclusive).

Ignition probabilities are determined using the United Kingdom Offshore Operators Association (UKOOA) overall ignition correlations. These correlations are applied to the release rates. For the ORF the “Small Plant Gas LPG” correlation was applied (i.e. specific for a gas or LPG release from small onshore plant). The resulting escalation risk calculated is summarised in Table 2-5.

Table 2-5: ORF HP Gas Fire Escalation Frequencies

Description	Hole Size	Release Freq. (pa)	Ignition Probability	Escalation Risk (pa)
FSS 6: NG from FSRU ESD Valve to ORF (up to SDV-064001 / SDV-064002) including MLA	10mm	5.41E-03	8.08E-03	4.37E-05
	25mm	5.10E-04	4.16E-02	2.12E-05
FSS 7: ORF pipework (from XV-064001 / XV-064002 to SLV-064003)	10mm	1.58E-03	8.08E-03	1.28E-05
	25mm	1.43E-04	4.16E-02	5.93E-06

The overall escalation risk frequency for the ORF systems previously connected to the cold vent system is 8.37E-05 per annum. This is less than the industry criteria for escalation of 1E-04 per annum. Based on the rapid depletion of inventory at large hole sizes and fire frequency less than the escalation criteria at smaller hole sizes. Removal of the ORF pipework blowdown vent is considered acceptable.

### 3. References

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1. Infrastructure Approval, Application SSI-9471
2. PKGT Response to Submissions Report, February 2019 - <https://ausindenergy.com/file/2019/04/PKGT-Response-to-Submissions.pdf>
3. PKGT Proposed Modification – Submissions Report, January 2020 - <https://ausindenergy.com/file/2020/02/Submissions-Report-final.pdf>
4. GHD Letter to NSW Department of Planning and Environment, Port Kembla Gas Terminal potential modification to consent, May 2022
5. PKGT Fire Safety Study, Document No. PKGT-WOR-ORF-SAF-STY-0001
6. PKGT Detail Design HAZOP Study Report, Document No. PKGT-WOR-ORF-SAF-RPT-0001
7. PKGT SIL Determination Study Report, Document No. PKGT-WOR-ORF-SAF-RPT-0002
8. PKGT to Eastern Gas Pipeline Final Hazard Analysis, Document No. GAS-599-RP-RM-001
9. Port Kembla Pipeline, Detailed Design SMS Report, Document No. GAS-556-RP-RM-002
10. NSW Department of Planning and Environment Letter to Alexandra Lovell, Subject: Safety Management Study for Port Kembla Gas Terminal (SSI-9471), 22<sup>nd</sup> September 2022
11. PKGT Technical Note - Parameters of the Odourant Injection System for Hazard Studies, Document No. PKGT-AIE-ORF-TEC-TNO-0002
12. TNO Yellow Book, CPR 14E
13. UKE HSE Toxicity Levels of Chemicals - <https://www.hse.gov.uk/chemicals/haztox.htm>
14. CMPT, A Guide to Quantitative Risk Assessment for Offshore Installations, 1999

## **Appendix A. Detailed Odourant Modeling Results**

Table A - 1: Spotleak1005 Flammable and Toxic Dispersion Modelling Results (LOC at storage conditions, during SBC changeout)

Hole Size (mm)	Release Rate (kg/s)	Downwind Distance (m) to Concentration (ppm)								
		Calm (Night)			Average			Windy		
		LFL	6	900	LFL	6	900	LFL	6	900
<b>Horizontal</b>										
10	1.1	6.9	2451.0	54.4	6.2	758.8	37.0	6.4	588.9	27.3
25	6.7	10.4	2485.0	89.6	8.9	1011.0	75.9	9.1	852.5	55.2
<b>Vertical Down</b>										
10	1.1	3.0	2480.0	34.6	0.8	762.0	27.6	1.2	595.8	20.7
25	6.7	4.0	2440.0	28.4	0.6	810.5	37.9	0.9	709.5	36.2

Table A - 2: Spotleak1005 Flammable and Toxic Dispersion Modelling Results (Limited to Odourant Injection Rate)

Hole Size (mm)	Release Rate (kg/s)	Downwind Distance (m) to Concentration (ppm)								
		Calm (Night)			Average			Windy		
		LFL	6	900	LFL	6	900	LFL	6	900
<b>Horizontal</b>										
10	0.0015	Not Reached	1.3	0.01	0.2	1.5	1.0	Not Reached	2.8	1.9
<b>Vertical Down</b>										
10	0.0015	0.1	1.4	0.01	0.0	1.4	1.0	0.6	2.7	1.9

Table A - 3: Spotleak1005 Jet Fire Modelling Results (LOC at storage conditions)

Hole Size (mm)	Release Rate (kg/s)	Downwind Distance (m) to Thermal Radiation Level (kW/m <sup>2</sup> )														
		Calm (Night)				Average				Windy						
		Flame Length (m)	3	4.7	23	35	Flame Length (m)	3	4.7	23	35	Flame Length (m)	3	4.7	23	35
<b>Horizontal</b>																
10	1.1	9.0	15.7	14.2	10.6	9.9	7.3	14.4	12.9	9.4	8.7	6.4	13.8	12.3	8.8	8.2
25	6.7	17.6	31.6	28.4	20.5	19.4	14.4	29.5	26.2	18.5	17.1	12.8	28.8	25.4	17.7	16.4
<b>Vertical Down</b>																
10	1.1	2.9	5.3	4.7	3.4	3.2	3.0	6.5	5.8	4.0	3.7	3.2	7.5	6.6	4.7	4.4
25	6.7	3.7	7.3	6.5	4.8	4.4	4.0	8.9	7.9	5.6	5.3	4.6	11.3	9.9	6.9	6.5

Table A - 4: Spotleak1005 Pool Fire Modelling Results (LOC at storage conditions)

Hole Size (mm)	Release Rate (kg/s)	Downwind Distance (m) to Thermal Radiation Level (kW/m <sup>2</sup> )														
		Calm (Night)					Average					Windy				
		Pool D (m)	3	4.7	23	35	Pool D (m)	3	4.7	23	35	Pool D (m)	3	4.7	23	35
10	1.1	4.5	21.2	17.6	8.3	5.8	4.5	21.7	18.6	10.3	6.9	4.5	21.7	18.9	12.0	8.3
25	6.7	11.3	48.8	40.3	19.4	14.1	11.3	49.8	42.0	23.1	17.1	11.2	49.4	42.4	25.3	20.3



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