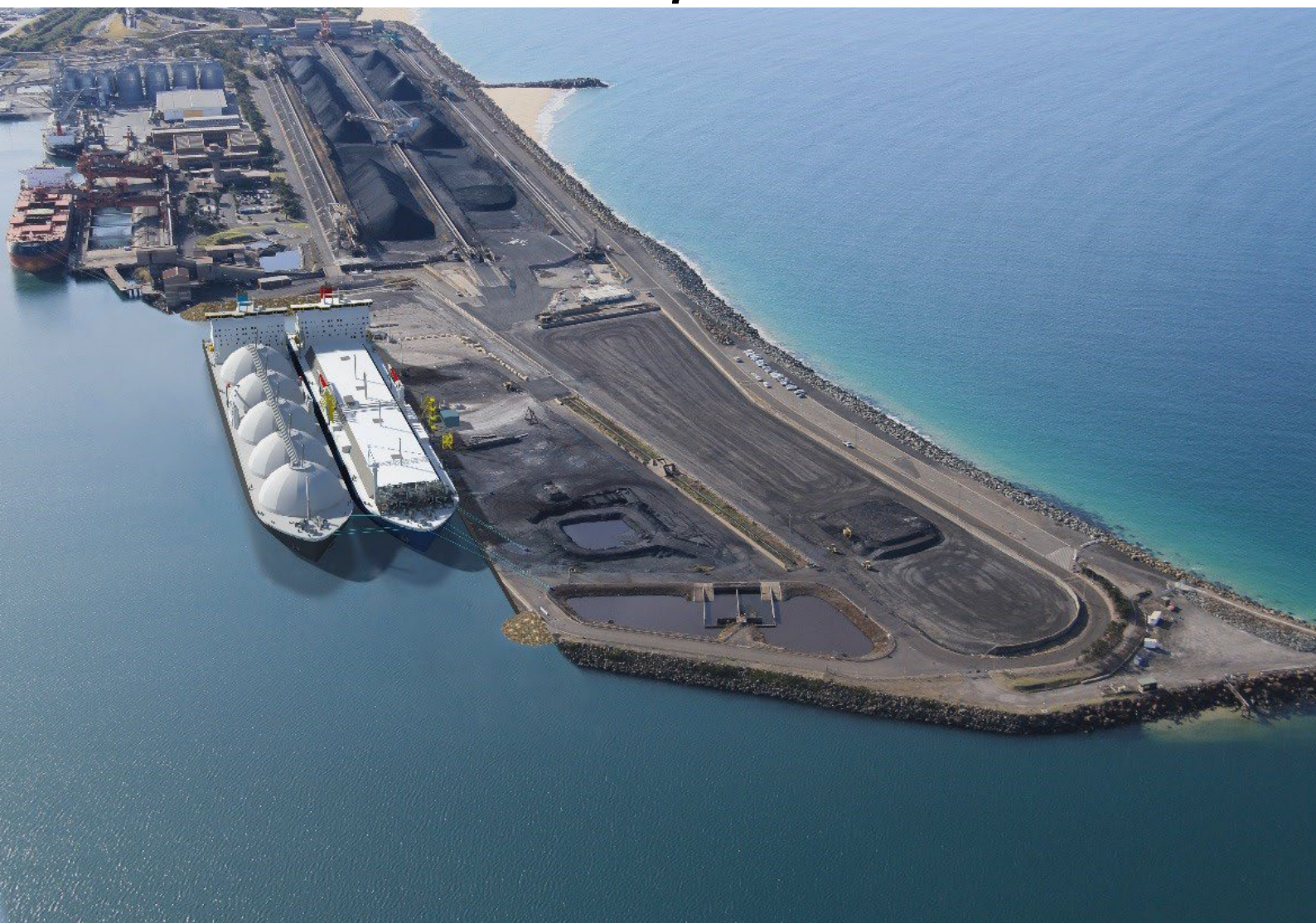
Port Kembla Gas Terminal

Contaminated Spoil Protocol Stage 2A and 2B Marine Berth Construction and Dredging – Land and Marine Based

Australian Industrial Energy

30 May 2022

→ **The Power of Commitment**



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Acronyms

Acronym	Definition
ACM	Asbestos containing materials
AF	Asbestos fines
AHD	Australian Height Datum
AIE	Australian Industrial Energy
AMP	Asbestos Management Plan
ANZG	Australian and New Zealand Guideline
ASS	Acid Sulfate Soils
ASSMP	Acid Sulfate Soil Management Plan
BaP	Benzo(a)Pyrene
Berth 101	MBD Site Compound
BTEXN	Benzene, toluene, ethyl benzene and xylenes plus naphthalene
CD	Chart Datum
CLM Act	*Contaminated Land Management Act 1997*
COPC	Contaminant of potential concern
CRS	Certified Reference Standard
CSM	Conceptual Site Model
CSP	Contaminated Spoil Protocol
CSSI	Critical State Significant Infrastructure
CTMP	Construction Traffic Management Plan
DEMP	Dredge and Excavation Management Plan
DGV	Default Guideline Values
DP&E	Department of Planning and Environment
DQI	Data quality indicators
DQO	Data quality objectives
EHMP	Ecological Health Monitoring Program
EIL	Ecological Investigation Level
EIS	Environmental Impact Statement
EMP	Environment Management Plan
EMS	Environmental Management Strategy
ENM	Excavated Natural Material
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environmental Protection Licence
FA	Fibrous asbestos
FSRU	Floating Storage and Regasification Unit
GHD	GHD Pty Ltd
GV-high	Upper guideline value
HIL	Health Investigation Level

Acronym	Definition
HSE	Health, Safety and Environment
HSL	Health Screening Levels
KPIs	Key Performance Indicators
LAT	Lowest Astronomical Tide
LNG	Liquified natural gas
LOR	Limit of reporting
LTEMP	Long Term Environment Management Plan
MBD	Marine Berth Construction and Dredging
mbgl	Metres below ground level
mg/kg	Milligrams per kilogram
NATA	National Association of Testing Authorities of Australia
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
ORF	Onshore Receiving Facilities
PAH	Polycyclic aromatic hydrocarbons
PASS	Potential Acid Sulfate Soils
PCB	Polychlorinated Biphenyl
PFAS	Per- and polyfluoroalkyl substances
PIRMP	Pollution Incident Response Management Plan
PKCT	Port Kembla Coal Terminal
PKGT	Port Kembla Gas Terminal
PKGT EIS	Port Kembla Gas Terminal Environmental Impact Statement
PKHD	Port Kembla Height Datum
Planning Systems SEPP	State Environmental Planning Policy (Planning Systems) 2021
POEO Act	*Protection of the Environment Operations Act 1997*
QA/QC	Quality assurance/quality control
RPD	Relative percentage difference
RWP	Remediation Work Plan
Senversa	Senversa Pty Ltd
SMP	Spoil Management Plan
SPR	source-pathway-receptor
SVR	Site Validation Report
TEQ	Toxicity Equivalence Quotient
The Project	Port Kembla Gas Terminal
TOC	Total organic carbon
TRH	Total recoverable hydrocarbons
µm	micrometres
UFP	Unexpected Finds Protocol
VENM	Virgin Excavated Natural Material
WA DoH	Western Australian Department of Health
WHS	Work Health and Safety
WHS Act	*Work Health and Safety Act 2011* (NSW)

Acronym	Definition
WHS Codes of Practice	*Work Health and Safety Codes of Practice 2011*
WHS Regulations	*Work Health and Safety Regulations 2017* (NSW)
WHSP	Work Health and Safety Plan
WQMP	Water Quality Monitoring Plan

Contents

Table index

Figure index

Appendices

1. Introduction

1.1 Overview

This Contaminated Spoil Protocol (CSP) has been developed as a Sub - plan to the Port Kembla Gas Terminal Project (the Project) Spoil Management Plan (SMP). The SMP is a Sub - plan to the Project's overarching Environmental Management Strategy (EMS). This CSP has been prepared by GHD Pty Ltd (GHD) on behalf of Australian Industrial Energy (AIE) to apply to construction activities associated with Stage 2A and Stage 2B of the Project. This Stage 2A and Stage 2B CSP supersedes the Stage 2A CSP.

This CSP interfaces with the other associated Sub - plans, which together describe the proposed structure for environmental management and monitoring requirements for the Project. This CSP addresses the requirements of the Port Kembla Gas Terminal Environmental Impact Statement (PKGT EIS) and associated Infrastructure Approval (SSI 9471) and Environment Protection Licence (EPL) No. 21529 and has been prepared in consultation with the NSW Environment Protection Authority (EPA), Department of Planning and Environment (DP&E) Water, NSW Ports, Port Authority of NSW (PANSW) and an EPA accredited contaminated site auditor.

1.2 Background

AIE is developing the Project which involves the development of a liquefied natural gas (LNG) import terminal at Port Kembla, south of Wollongong, NSW. The Project will be the first of its kind in NSW and will provide a simple and flexible solution to the state's gas supply challenges.

NSW currently imports more than 95 percent of the natural gas it uses from other eastern states. In recent years, gas supplies to the Australian east coast market have tightened, resulting in increased natural gas prices for both industrial and domestic users.

The Project provides an immediate solution to address the predicted shortages and will result in significant economic benefits for both the Illawarra region and NSW. The Project will have a capacity to deliver more than 100 petajoules of natural gas, equivalent to more than 70 percent of NSW gas needs and will provide between 10 to 12 days of natural gas storage in case of interstate supply interruption. LNG will be sourced from worldwide suppliers and transported by LNG carriers to the gas terminal at Port Kembla where it will be re-gasified for input into the NSW gas transmission network.

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) (NSW) and Schedule 5 of the State Environmental Planning Policy ((Planning Systems) 2021 (Planning Systems SEPP). The Project received Infrastructure Approval from the Minister for Planning and Public Spaces on 29 April 2019.

The construction of the Project is primarily associated with the establishment of a new berth facility at Port Kembla to enable an LNG carrier to berth alongside the Floating Storage and Re-gasification Unit (FSRU) and new infrastructure to connect the terminal to the existing gas network. Excavation and dredging would be required to establish the new berth facility, with spoil deposited in a cell (referred to as the 'Emplacement Cell') in the Outer Harbour.

The development has progressed to 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). Collectively, these two locations are referred to as "the site". The Stage 2A works include:

– Completion of excavation works undertaken during Stage 1 (including transport of spoil materials to the Emplacement Cell Construction Site).
– Construction of the quay wall at the MBD Site Compound.
– Construction of Onshore Receiving Facilities (ORF) at the MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
– Installation and commissioning of power, communications, and potable water.
– Installation of gas pipeline within the MBD Site Compound as part of ORF.

The Stage 2B works include:

– Continuation of Stage 2A works.
– Excavation and dredging of the MBD Site Compound in the Inner Harbour and the Emplacement Cell in the Outer Harbour.
– Construction of the Emplacement Cell in the Outer Harbour.
– Marine based construction activities including installation of navigational aids and revetments at the MBD Site Compound.

A detailed description of the site and the Project construction scope of works is included in the Stage 2A and Stage 2B SMP.

1.3 Purpose of the CSP

This CSP has been prepared in accordance with the PKGT EIS and associated Infrastructure Approval (SSI 9471) and EPL No. 21529. It describes how the management measures and commitments in the PKGT EIS, Infrastructure Approval (SSI 9471) and EPL No. 21529 relating to contaminated spoil are to be implemented by the Principal Contractors during Stage 2A and Stage 2B of the Project. AIE and its contractors acknowledge that appropriately managing spoil and waste in the vicinity of the Project site is paramount to the successful delivery of the construction phase of the Project. AIE is committed to ensuring this CSP is implemented, reviewed, and updated regularly to ensure its objectives are met and that the approval conditions outlined in the Infrastructure Approval (SSI 9471) and EPL No. 21529 are achieved.

This CSP is applicable to all staff, employees, subcontractors, and any statutory service authorities undertaking Stage 2A and Stage 2B works. The CSP implementation and on - going development will be managed by the Project Team (refer to Section 2).

2. Roles and responsibilities

The Project Team is responsible for all activities associated with Stage 2A and Stage 2B, including the implementation and maintenance of the various mitigation/management measures outlined in this CSP. Relevant roles and responsibilities of the Project Team are outlined in Table 2.1.

Table 2.1 Roles and responsibilities of Project team

Project Role	Responsibility
AIE Project Director	– Responsible for the overall funding and direction of works associated with Stage 2A and Stage 2B. – 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.
AIE Construction Manager	– Proactively stewards the effective implementation of Stage 2A and Stage 2B in accordance with requirements of the Infrastructure Approval (SSI 9471), this CSP, Environmental Strategy, and all related Sub - plans. – Demonstrate proactive support for environmental requirements.
AIE HSE Manager	– Develop and update all Health, Safety and Environmental (HSE) Management Strategies and Sub - plans. – Ongoing liaison and engagement with government agencies and point of escalation for any environmental incidents. – Identifying environmental issues as they arise and proposing solutions. – Coordinate and facilitate periodic environmental inspections with the key contractors. – Environmental Reporting.
Emplacement Cell Auditor	Audit the construction of the Emplacement Cell and verify that works have been completed in accordance with the design intent (Emplacement Cell), The auditor role is to satisfy Condition 10 Schedule 3 of the Infrastructure Approval and any other relevant conditions therein.
Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager	– On-site Project management and control. – Decision-making authority relating to environmental performance of the construction program. – Authority over Project construction and site activities in accordance with the EMS. – Ensure relevant training is provided to all Project staff prior to commencing individual activities. – Reports to AIE Construction Manager on environmental matters. – Ensures appropriate Contractor resources are allocated to implement the environmental requirements. – Responsible for planning and scheduling of construction, and to ensure operations are conducted in accordance with statutory requirements and the EMS. – Monitors performance against environmental Key Performance Indicators (KPIs). – Ensures that all environmental objectives associated with the Project are achieved. – Day-to-day decision-making authority relating to environmental performance of construction activities and direct site activities and construction. – To provide resources to ensure environmental compliance and continuous improvement. – Ensure all personnel are aware of any changes to EMS, this CSP and improved procedures. – Ensure this CSP is implemented for the duration of Stage 2A and Stage 2B
Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman	– Implement requirements contained in the EMS and Sub - Plans, work procedures and standard drawings. – Maintaining open and transparent communication with other Project discipline managers and other areas of the Project. – Reporting of hazards and incidents and implementing any rectification measures. – Ensures appropriate contractor resources are allocated.

Project Role	Responsibility
	– Orders STOP WORK for any environmental breaches and reports incidents to the Project Manager. – Ensure this CSP is implemented for the duration of Stage 2A and Stage 2B.
Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative	– Delivers environmentally focussed toolbox talks and provides applicable site inductions. – Provides environmental advice, assistance, and direction to Project Manager to ensure construction activities are conducted in accordance with regulatory legislation and this CSP. – Participate and cooperate with AIE HSE Manager with regards to undertaking of joint environmental site inspections. – Coordinate / undertake wet-weather inspections as per EPL No.21529 and report accordingly to the AIE HSE Manager. – Develop strong working relationships with the AIE team and Consultants. – Ensure environmental risks are appropriately identified, communicated, and effectively managed. – Ensure communication of relevant environmental information to Project personnel. – Provide specialist advice and input as required. – 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. – Orders STOP WORK for any environmental breaches and immediately reports incidents to Principal Contractor Project Manager and AIE HSE Manager.
AIE Environmental Representative and AIE Environmental Contractor	– Develop strong working relationships with the Principal Contractor Team and Consultants. – Ensure environmental risks are appropriately identified, communicated, and effectively managed. – Instruct and advise management team on compliance issues. – Provide specialist advice and input as required. – Co-ordinate internal audits of this CSP. – Conduct audit review as required. – Reports on the performance of this CSP and recommends changes or improvements to Project Manager. – Orders STOP WORK for any environmental breaches and immediately reports incidents to the AIE Construction Manager and AIE HSE Manager. – Conducts investigation and response to environmental complaints and inquiries, where required. – Undertake all required environmental monitoring for this phase of the Project.
Environmental Consultant (GHD)	– Engaged by AIE. Responsible for providing technical guidance to the Contractor in appropriately implementing the requirements of the CSP, monitoring of work areas for environmental purposes, collection and analysis of validation and characterisation samples, and advising AIE of appropriate actions based on observations, sampling, and analysis. Responsible for preparing the Site Validation Report (SVR) at the completion of remediation.
Subcontractors and construction personnel	– Undertake an environmental induction prior to accessing to site. – Comply with legislative requirements. – Participate in inspections and audits. – Follow environmental procedures. – Report all environmental incidents and hazards. – Introduce environmental topics to prestart meetings. – Ensure that all relevant permits and clearances are in place prior to commencing work.

3. Legislative requirements

The legislative requirements applicable to Stage 2A and Stage 2B are listed in Table 3.1.

Table 3.1 Legislation and relevant policy applicable to this CSP

Legislation and Regulation	Description	Applicability
Federal		
National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM)	The *National Environment Protection (Assessment of Site Contamination) Measure 1999* (referred to here as the NEPM) was produced by the federal National Environmental Protection Council (NEPC) in 1999 and was revised and updated in 2013 by way of the National Environmental Protection (Assessment of site Contamination) Amendment Measure 2013 (NEPC, 2013). The amended NEPM is still referred to as the NEPM 1999. The NEPM provides a national framework for conducting assessments of contaminated sites in Australia. The purpose of the NEPM is to "*establish a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices by the community which includes regulators, site assessors, environmental auditors, landowners, developers and industry."* The desired environmental outcome for this NEPM is "*to provide adequate protection of human health and the environment, where site contamination has occurred, through the development of an efficient and effective national approach to the assessment of site contamination."*	The NEPM addresses assessment of contamination and does not provide specific guidance for remediation or management of risk, although principles for remediation and management of contaminated sites are presented in Volume 1 of the NEPM. The NEPM includes two Schedules: Schedule A comprises a flowchart of the recommended general process for the assessment of site contamination and its relationship to the management of site contamination and Schedule B consists of technical guidelines about site assessment criteria, site investigation procedures, laboratory analyses, human health risk assessment, ecological risk assessment, derivation of investigation levels, groundwater risk assessment, community engagement and risk consultation and competencies and acceptance of environmental auditors and related professionals. In broad terms, the assessment process can be described as: – Tier 1 Preliminary investigation, laboratory analysis and interpretation, development of a conceptual site model (CSM) and assessment of results with reference to investigations or screening levels. The need for risk-based remediation assessment to derive response levels and/or the need for remediation is evaluated. – Where required, Tier 1, Tier 2 or 3 Detailed investigation/Site specific risk assessment, laboratory analysis and interpretation are completed, and the requirement for remediation is evaluated.
Work Health and Safety Act 2011	The Federal *Work Health and Safety Act 2011* provides a nationally consistent framework to ensure the health and safety of workers and workplaces. AIE has a duty under the Act to provide the highest level of protection possible against harm to health, safety and hazards and risks to all workers.	As there is a potential for asbestos to be encountered within fill or as subsurface structures at the site, the primary legislative requirements detailing AIE's obligations regarding the presence of asbestos (if it is encountered) on the site are listed as follows: – *Work Health and Safety Act 2011*(NSW) (WHS Act) – *Work Health and Safety Regulations 2017* (NSW) (WHS Regulations) – How to Manage and Control Asbestos in the Workplace, 2019 SafeWork NSW (SafeWork NSW, 2019a). – How to Safely Remove Asbestos, 2019 SafeWork NSW (SafeWork NSW, 2019b).

Legislation and Regulation	Description	Applicability
Work Health and Safety Codes of Practice 2011 (WHS Codes of Practice)	The WHS Codes of Practice are instruments which provide detailed information on specific hazards and risks, such as management and control of asbestos, safe removal of asbestos and hazardous chemical management.	The WHS Codes of Practice are made under the Federal *Work Health and Safety Act 2011* and applies to all persons who have a duty under the Act. The Codes of Practice provide guidance on meeting obligations under the WHS Act and WHS Regulations.
State		
Contaminated Land Management Act 1997 (CLM Act)	The CLM Act establishes a process for investigation and remediation of land that the EPA considers to be significantly contaminated. The Act sets out contamination management protocols, outlines the role of the EPA in the assessment and supervision of contaminated land and provides for accreditation of site auditors. The CLM Act has a comprehensive suite of guidelines related to assessment and management of contamination administered by the EPA, including: – NSW EPA (1995), *Contaminated Sites: Sampling Design Guidelines*. (NSW EPA, 1995). – NSW EPA (2020), *Consultants reporting on contaminated land – Contaminated land guidelines* (NSW EPA, 2020). – NSW EPA (2017), *Contaminated Sites: Guidelines for NSW Site Auditor Scheme (3rd ed.)* (NSW EPA, 2017). – NSW EPA (2014a). *Waste Classification Guidelines Part 1: Classification of Waste* (NSW EPA, 2014a). – NSW EPA (2014b). *Waste Classification Guidelines Part 4: Acid sulfate soils* (NSW EPA, 2014b). Guidelines approved under the CLM Act also include: – *National Environment Protection* (Assessment of Site Contamination) Measure 1999 as amended 2013 (NEPC, 2013). – *Australian and New Zealand - Toxicant Default Guideline Values for Sediment Quality* (ANZG, 2018a). – *Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Canberra ACT, Australia and New Zealand Governments and Australian state and territory governments* (ANZG, 2018b). – Friebel, E and Nadebaum, P (2011). *Health screening levels for petroleum hydrocarbons in soil and Groundwater*. CRC CARE Technical Report no. 10. CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia, 2011 (Friebel & Nadebaum, 2011).	Contamination assessment for the Project has been undertaken in accordance with the CLM Act and its guidelines. An EPA accredited site auditor, Melissa Porter from Senversa, has been appointed as the auditor for the Project.
Protection of the Environment Operations Act 1997 (POEO Act)	The objectives of the POEO Act are to protect, restore and enhance the quality of the environment, in recognition of the need	Clause 9 of Schedule 1 applies to chemical storage facilities and includes developments with capacity to store more than 200 tonnes of liquefied gases. The FSRU will be permanently

Legislation and Regulation	Description	Applicability
	to maintain ecologically sustainable development. The POEO Act provides for an integrated system of licensing and contains a core list of activities requiring an EPL from the NSW EPA. These activities are called 'Scheduled Activities' and are listed in Schedule 1 of the POEO Act.	moored at the MBD Site Compound and will therefore likely constitute a scheduled activity requiring an EPL. Clause 15 of Schedule 1 applies to contaminated soils treatment which includes treatment or storage of more than 30,000 m^3 of contaminated soils. EPL No 21529 has been issued for the Project by the EPA.
WHS Regulations	The WHS Regulations set out the specific requirements for hazards and risks related to workplaces in NSW.	Division 6 of the WHS Regulations outlines the duties for health monitoring. Part 8.3 provides management of asbestos and associated risks.

3.1 Guidelines

The framework for the management of spoil for the Project was developed with reference to guidelines listed below, with detailed assessment criteria included in Section 4.

3.1.1 National Environmental Protection (Assessment of site Contamination) Measure 1999 (as amended 2013) (NEPC, 2013)

The NEPM provides a national framework for conducting assessments of contaminated sites in Australia. The purpose of the NEPM is to "*establish a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices by the community which includes regulators, site assessors, environmental auditors, landowners, developers and industry."*

The desired environmental outcome for this NEPM is "*to provide adequate protection of human health and the environment, where site contamination has occurred, through the development of an efficient and effective national approach to the assessment of site contamination."*

The NEPM addresses assessment of contamination and does not provide specific guidance for remediation or management of risk, although principles for remediation and management of contaminated sites are presented in Volume 1 of the NEPM, as discussed in Section 6.

The NEPM includes two Schedules:

– Schedule A comprises a flowchart of the recommended general process for the assessment of site contamination and its relationship to the management of site contamination.
– Schedule B consists of technical guidelines about site assessment criteria, site investigation procedures, laboratory analyses, human health risk assessment, ecological risk assessment, derivation of investigation levels, groundwater risk assessment, community engagement and risk consultation and competencies and acceptance of environmental auditors and related professionals.

In broad terms, the assessment process can be described as:

– Tier 1 Preliminary investigation, laboratory analysis and interpretation, development of a CSM and assessment of results with reference to investigations or screening levels. The need for risk-based remediation assessment to derive response levels and/or the need for remediation is evaluated.
– Where required, Tier 1, Tier 2 or Tier 3 Detailed investigation/Site specific risk assessment, laboratory analysis and interpretation are completed, and the requirement for remediation is evaluated.

3.1.2 State guidelines

NSW has a comprehensive suite of guidelines relating to assessment and management of contamination, administered by the EPA under the CLM Act and the POEO Act. These include the following:

– NSW EPA (1995), *Contaminated Sites: Sampling Design Guidelines* (NSW EPA, 1995).

– NSW EPA (2020), *Consultants reporting on contaminated land – Contaminated land guidelines* (NSW EPA, 2020).
– NSW EPA (2017), *Contaminated Sites: Guidelines for NSW Site Auditor Scheme (3rd ed.)* (NSW EPA, 2017).
– NSW EPA (2014a). *Waste Classification Guidelines Part 1: Classification of Waste* (NSW EPA, 2014a).
– NSW EPA (2014b). *Waste Classification Guidelines Part 4: Acid Sulfate soils* (NSW EPA, 2014b).

Guidelines approved under the CLM Act also include:

– *National Environment Protection (Assessment of Site Contamination) Measure 1999* as amended 2013 (NEPC, 2013).
– Australian and New Zealand - *Toxicant Default Guideline Values for Sediment Quality* (ANZG, 2018a).
– Australian and New Zealand *Guidelines for Fresh and Marine Water Quality*. Canberra ACT, Australia and New Zealand Governments and Australian state and territory governments (ANZG, 2018b).
– Friebel, E and Nadebaum, P (2011). He*alth screening levels for petroleum hydrocarbons in soil and Groundwater*. CRC CARE Technical Report no. 10. CRC for *Contamination Assessment and Remediation of the Environment,* Adelaide, Australia, 2011. (Friebel & Nadebaum, 2011).

As there is a potential for asbestos to be encountered within fill or as subsurface structures at the site, the primary legislative requirements detailing AIE's obligations regarding the presence of asbestos (if it is encountered) on the site are listed as follows:

– *Work Health and Safety (National Uniform Legislation) Act 2011* (NSW).
– WHS Regulations.
– *How to Manage and Control Asbestos in the Workplace,* 2019 SafeWork NSW (SafeWork NSW, 2019a).
– *How to Safely Remove Asbestos,* 2019 SafeWork NSW (SafeWork NSW, 2019b).

3.2 Conditions of approval

The planning requirements and the corresponding contaminated spoil management measures applicable to Stage 2A and Stage 2B are listed in Table 3.2. Management measures are detailed in Section 5 through Section 8.

The planning requirements include the conditions set out in the Infrastructure Approval (SSI 9471) dated 13 October 2021, EPL No. 21529 and the mitigation/management measures outlined in the PKGT EIS.

Table 3.2 Planning requirements

Requirement	Reference	Responsibility	Evidence	Applicability to this CSP
Infrastructure Approval Requirements (SSI 9471)				
Spoil Management Plan Prior to the commencement of construction, the proponent must prepare a SMP to the satisfaction of the Planning Secretary and in consultation with the EPA, DP&E Water, NSW Ports, PANSW and an EPA accredited contaminated site auditor. The plan must be consistent with the ECR and include: (a) CSP that includes: – procedures for identifying and managing unexpected finds of contaminated or asbestos containing materials along the pipeline route and at Berth 101. – a strategy for addressing any contamination that has been encountered, if required (including the remediation and/or removal of contaminated soil or groundwater); and – details on how environmental and health risks will be mitigated and managed.	Schedule 3, Condition 11	– AIE HSE Manager – Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative – Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman	Section 7.3.3 Section 6.3 Section 7.4.2 Section 6.2.1 Section 4.2.1 Section 8	Applicable
At the completion of any dredging, excavation and disposal works, the Proponent must engage a site auditor accredited by the EPA to issue a Section A Site Audit Statement confirming the suitability of the site for its intended use.	Schedule 3, Condition 13	– AIE	Section 6.2.1 Section 7.4	Applicable
PKGT EIS Management Measures				
Inclusion of an Unexpected Finds Protocol (UFP) for contamination in the EMS for the work associated with construction activities.	EIS Measure C03	– AIE HSE Manager – Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager	Section 6.5	Applicable

3.3 Environment Protection Licence

AIE have been issued an EPL under the POEO Act as of 2 June 2021. The conditions of EPL No. 21529 related to contaminated spoil management are provided in Table 3.3.

Table 3.3 EPL No. 21529 conditions applicable to contaminated spoil

Condition	Reference	Evidence
Processes and management Silt curtains must be installed and operated at the premises to minimise the pollution of waters beyond the boundary of the premises during any marine based works. Marine based works includes but is not limited to: pile removal; or any dredging; or construction of the Outer Harbour Emplacement Cell. Note: Any reclamation of material to the Emplacement Cell is subject to a licence variation in accordance with Licence Condition A1.4	Condition O4.6 – O4.9	Refer to WQMP and DEMP
Waste management Excavated material and/or dredged spoil must not be stockpiled in Outer Harbour unless it will be re-used within the proposed Outer Harbour Emplacement Cell. Stockpiles of material stored at the premises must either be used as on-site backfill or Emplacement Cell construction or disposed offsite to a facility licensed to accept the material, within 12 months following stockpile creation.	Condition O5.1 – O5.2	Section 6.4
Other operating conditions Any material that is proposed to be crushed or grinded or screened at the premises must not contain any asbestos. Excavated material will need an asbestos clearance certificate from a third party licensed asbestos assessor prior to being crushed or grinded or screened. For the purposes of the condition above, 'excavated material' excludes raw slag, concrete or basecourse.	Condition O6.1 – O6.2	Section 6.3.3
Monitoring records The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition. All records required to be kept by this licence must be: a. in a legible form, or in a form that can readily be reduced to a legible form. b. kept for at least 4 years after the monitoring or event to which they relate took place; and c. produced in a legible form to any authorised officer of the EPA who asks to see them. The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a. the date(s) on which the sample was taken. b. the time(s) at which the sample was collected. c. the point at which the sample was taken; and d. the name of the person who collected the sample.	Condition M1.1 – M1.3	Refer to SMP
Recording of pollution complaints The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies. The record must include details of the following: a. the date and time of the complaint. b. the method by which the complaint was made. c. any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect. d. the nature of the complaint.	Condition M7.1 – M7.4	Refer to SMP

Condition	Reference	Evidence
e. the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f. if no action was taken by the licensee, the reasons why no action was taken. The record of a complaint must be kept for at least 4 years after the complaint was made. The record must be produced to any authorised officer of the EPA who asks to see them.		
Telephone complaints line The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence. The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint. The preceding two conditions do not apply until 1 month after the date of the issue of this licence.	Condition M8.1 – M8.3	Refer to SMP
Requirement to monitor volume or mass The licensee must record the volume of material that is crushed or grinded at the premises.	Condition M9.1	Section 6.3 Section 6.4 Refer to SMP
Other monitoring and recording conditions The licensee must carry out, as a minimum, daily inspections of all water pollution control measures required by this licence. A record of each inspection must be made and produced to an EPA authorised officer if requested. The record must include: a. Date and time of inspection. b. Details of the location of dredging operations. c. Condition of silt curtains and other water pollution controls. Note: No movement of dredge spoil is permitted when a silt curtain required by this licence has not been maintained or is not achieving the requirements of this licence.	Condition M10.1	Refer to SMP
Notification of environmental harm Notifications must be made by telephoning the Environment Line service on 131 555. Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act. The licensee must provide written details of the notification to the EPA within 7 days of the date on which they became aware of the incident.	Condition R2.1 – R2.2	Refer to SMP
Emplacement Cell Report Condition of consent No. 8 for the project (SSI 9471) requires that an ECR is prepared to the satisfaction of the Planning Secretary prior to the commencement of dredging, disposal, and emplacement activities. The licensee must provide a ECR to the EPA for comment. The report must be provided to the EPA at least four weeks prior to commencement of dredging disposal and emplacement activities.	Condition E1.1	Section 7.4 Refer to ECR (SMEC, 2022)
Pollution Incident Response Management Plan (PIRMP) The Licensee must prepare a PIRMP that complies with Part 5.7A of the POEO Act (1997) in relation to the activity to which the licence relates. The PIRMP must be in the form required by the 'Regulations' and include the following: – - the procedures to be followed by the holder of the relevant environment protection licence, or the occupier of the relevant premises, in notifying a pollution incident to: • the owners or occupiers of premises in the vicinity of the premises to which the environment protection licence or the direction under section 153B relates, and	Condition E2.1	Refer to SMP

Condition	Reference	Evidence
• the local authority for the area in which the premises to which the environment protection licence or the direction under section 153B relates are located and any area affected, or potentially affected, by the pollution, and • any persons or authorities required to be notified by Part 5.7, – a detailed description of the action to be taken, immediately after a pollution incident, by the holder of the relevant environment protection licence, or the occupier of the relevant premises, to reduce or control any pollution, – the procedures to be followed for co-ordinating, with the authorities or persons that have been notified, any action taken in combating the pollution caused by the incident and the persons through whom all communications are to be made, – any other matter required by the regulations, including 'Keeping of Plan', 'Testing of Plan', 'Making Plan Readily Available' and 'Implementation of Plan'.		

4. Assessment criteria

4.1 Relevant guidelines

The framework for the contamination assessment was developed with reference to relevant guidelines relating to assessment and management of contamination, as detailed in Section 3.

In the first instance, the most sensitive assessment criteria will be compared with the concentrations of any contamination identified at the site. If these are exceeded, the specific land use and exposure scenarios relevant to the area and depth at which the subject material is located will be examined, and the concentrations compared with the appropriate criteria for those circumstances. If the relevant criteria are exceeded, the material will be managed or remediated in accordance with this CSP.

4.2 Assessment/validation criteria - soil

4.2.1 Health investigation and screening levels

The assessment criteria proposed for the CSP were sourced from the following references:

– NEPM (NEPC, 2013).
– CRC CARE Technical Report No. 10 – Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater (Friebel & Nadebaum, 2011).

The NEPM (NEPC, 2013) presents health-based investigation levels for different land uses (e.g., industrial / commercial, residential, recreational, etc.) as well as ecological investigation levels.

The MBD Site Compound is situated within a heavy industrial area of Port Kembla. The site land use has been and will continue to be industrial. If any material is transported off-site for reuse as capping material in the Emplacement Cell, the land use would be similar.

The potential secondary receptors are site workers in a commercial/industrial land use setting. It is expected during remediation, site workers may be in direct contact with soil for short periods.

Based on the likely receptors identified for this site, the following assessment criteria will be adopted for soil assessment purposes:

– Health investigation level (HIL) for remaining Contaminants of Potential Concern (COPC) (Table 1A (1) HIL D (NEPC, 2013).
– Direct contact screening values for petroleum hydrocarbons listed in Tables B3 and B4 (Friebel & Nadebaum, 2011).

The assessment criteria selected for the key COPC are listed in Table 4.1.

Table 4.1 Human Health assessment criteria

COPC	HIL (mg/kg)	Direct contact screening values (HSL-D) (mg/kg)
Heavy Metals		
Arsenic	3,000	
Cadmium	900	
Chromium (III+VI)	3,600	
Copper	240,000	
Lead	1,500	
Mercury	730	
Nickel	6,000	
Zinc	400,000	
TRH		
F1 (C6-C10)		
F1 (C6-C10 less BTEX)		26,000
F2 (>C10-C16)		
F2 (>C10-C16 less naphthalene)		20,000
F3 (>C16-C34		27,000
F4 (>C34-C40)		38,000
PAH		
Carcinogenic PAHs (as BaP) TEQ	40	
Total PAH	4,000	
PCB	7	

In addition to human health risks, ecological risks also need consideration for the above land uses. The ecological risks consider contaminant impacts to vegetation and transitory wildlife. The risk to those receptors is dependent on the exposure pathway and site activities, which may degrade ecological values. The site and surrounding areas have been used for heavy industrial activities for over 50 years, which has significantly reduced the potential habitat value for ecological receptors. Therefore, terrestrial ecological values are significantly degraded and are not considered to be required for further site assessment or validation in relation to land-based use of materials. Aquatic ecological risks are discussed in Section 4.3 below.

4.2.2 Asbestos

The NEPM provides guidance relating to the assessment of known and suspected asbestos contamination in soil and addresses both friable and non-friable forms of asbestos. The health screening levels for asbestos in soil have been adopted from the Western Australian Department of Health (WA DoH) *Guidelines for Remediation and Management of Asbestos Contaminated Sites in Western Australia* (WA DoH, 2009). It is noted that an updated version of the Western Australian guidelines was issued in 2021 (WA DoH, 2021), but the health screening levels have not changed.

The NEPM guidance emphasises that the assessment and management of asbestos contamination should consider the condition of the asbestos materials and the potential for damage and resulting release of asbestos fibres. Therefore, for the purposes of assessing the significance of asbestos in soil contamination, three terms are used as summarised below:

– Bonded asbestos containing material (ACM) – sound condition although possibly broken or fragments and the asbestos is bound in a matrix.
– Fibrous asbestos (FA) – friable asbestos materials such as severely weathered ACM and asbestos in the form of loose fibrous materials such as insulation.

– Asbestos fines (AF) – including free fibres of asbestos, small fibre bundles and fragmented ACM that passes through a 7 millimetres x 7 millimetres sieve.

From a risk to human health perspective, FA and AF are considered by the NEPM to be equivalent to “friable” asbestos in SafeWork NSW Codes of Practice (SafeWork, 2019a). Bonded ACM in sound condition represents a low human health risk. However, both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres and may represent a significant human health risk if disturbed and fibres are made airborne.

As per Section 4.2.1, the commercial / industrial (D) Health Screening Levels (HSLs) were adopted as the most appropriate to the site, as presented in Table 4.2.

Table 4.2 Asbestos assessment criteria

Form of Asbestos	HSL (%w/w)
	Commercial/industrial D
Bonded ACM	0.05%
FA and AF[a] (friable asbestos)	0.001%
All forms of asbestos	No visible asbestos for surface soil

[a]The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF can be quantified by gravimetric procedures. This screening level is not applicable to free fibres.

A tiered approach to risk assessment of asbestos contamination is recommended, including the development of an appropriate CSM. A weight of evidence approach is recommended with consideration given to factors such as the distribution of different fill types, the heterogeneity of the contamination and the uncertainty associated with the sampling methodology.

The NEPM states that if the Tier 1 screening levels are not exceeded, and an appropriate level of investigation has been carried out, then no contamination management actions are required except for ensuring the surface soil is free of visual asbestos. Final visual inspection of the assessment and remediated areas should not detect any visible asbestos.

GHD notes that these HSLs do not necessarily equate to requirements under the WHS Regulation or WHS Codes of Practice, which may impose requirements regardless of the concentration or proportion of asbestos in soil.

4.2.3 Dioxin

The NEPM does not provide human health guidelines for dioxin in soil, and therefore a toxicity assessment was completed as part of a human health risk assessment (GHDa, 2021) to identify a set of toxicity criteria that have then been used to derive site-specific screening criteria for soil.

The *Human health risk assessment of dioxins in Australia* (Office of Chemical Safety, Australian Government Department of Health and Ageing, 2005) represents the most recent toxicity assessment undertaken by Australia regulators. This document recommends a toxicity reference value (TRV) of 2.3 pg/kg/day and this value has been adopted in this assessment for the incidental ingestion and dermal exposure pathways.

The NHMRC (2005) does not present TRV for the inhalation exposure pathway and therefore a route-to-route extrapolation method has been adopted based on US EPA (2009) *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual*, as recommended in the NEPM. The route-to-route extrapolation methodology can be summarised as follows:

$$Extrapolated\ inhalation\ unit\ risk = Oral\ TRV\ x\ \frac{Adult\ body\ weight\ (70\ kg)}{Adult\ inhalation\ rate\ (20\ m^3/_{day}}$$

The inhalation TRV calculated using this method is 8.1 x 10^{-9} mg/m^3. The toxicity data adopted in this assessment is summarised in Table 4.3.

Table 4.3 Summary of adopted human health toxicity data for dioxin

Exposure pathway	TRV	Source
Incidental ingestion	2.3 pg/kg/day	NHMRC (2005) oral TRV
Inhalation	8.1 x 10^{-9} mg/m^3	Extrapolated from the NHMRC (2005) oral TRV using the approach recommended by the NEPM
Dermal contact	2.3 pg/kg/day	NHMRC (2005) oral TRV using a gastrointestinal absorption factor (GAF) of 1, sourced from US EPA (2004)

An exposure assessment was completed using a series of 18 parameters which consider the duration and rate of exposure, potential pathways and the physical and chemical properties of the receptor and dioxins, generally assuming a commercial/industrial land use of defined in the NEPM. This model was used to calculate site-specific screening criteria for Berth 101 material, as summarised in Table 4.4.

Table 4.4 Site specific assessment criteria for Berth 101 materials

Exposure scenario	Site-=specific screening criteria (ng/kg)	Dioxin concentration measures in Berth 101 material (ng/kg)
OHDSCA construction worker	490	Maximum: 118 ng/kg (Total WHO Mammalian TEQ (0.5 LoR)
Future onsite worker (exposed to dioxin in capping material) *	2320	
* Also protective of occasional dioxin exposure to revetment maintenance workers		

The site-specific screening criteria of 490 ng/kg and >2000 pg/g for construction workers and future onsite commercial/industrial workers respectively are substantially higher than the dioxin TEQ concentrations measured in Berth 101 soils.

Notably, the “risk driving” exposure pathways in these calculations (i.e., the pathways associated with the greatest exposure) are dermal absorption and the incidental ingestion of soil. The NEPM commercial/industrial scenario assumes that 19% of the skin surface area is exposed, which relates to the head, hands, and forearms. The use of safety clothing (i.e., long sleeves and gloves) would be an effective way to minimise dermal exposure for Emplacement Cell construction workers. Protocols to reduce the potential for incidental ingestion (e.g., providing washing facilities at the work site) will also reduce the potential for exposure.

4.2.4 Acid Sulfate Soils (ASS)/ Potential ASS (PASS)

There are no human health guidelines for ASS/PASS in soil. The Stage 2A and Stage 2B ASSMP provides an overview of the applicable ASS guidelines and their application to the works.

4.3 Assessment criteria – sediment

4.3.1 ANZG guideline values

For soils that may be re-used in an aquatic environment, the assessment criteria selected for this assessment were sourced from the following reference: Australian and New Zealand - Toxicant Default Guideline Values for Sediment Quality (ANZG, 2018a).

ANZG (2018a) provides criteria that allow for the assessment of toxicant effects on sediment biota. Toxicant concentrations reported below the Default Guideline Values (DGVs) are considered to present a low risk of unacceptable effects to aquatic ecosystems. However, toxicant concentrations exceeding the upper guideline value (GV-high) are an indicator of potential high-level toxicity problems, and therefore not a guideline value that will ensure protection of ecosystems without further lines of evidence with respect to toxicity affects. Based on the aquatic receptors identified in Section 5.2 of this CSP, these guidelines are considered appropriate for the purposes of this assessment.

In addition to the assessment criteria, the guideline also recommends that “the <2-millimetre sediment particle size fraction should be used for chemical analyses for comparison with sediment quality guideline values so that the

potential risk posed by contaminants is not diluted by a large mass of larger materials (gravel and other debris). The <63 µm sediment particle size fraction (clay and silt) is considered a suitable representation of the sediment materials that are mostly readily resuspended or potentially ingested by organisms" (ANZG, 2018a).

Because the bioavailability and toxicity of contaminants is influenced by sediment grain size and organic carbon content, particle size distribution and total organic carbon (TOC) testing has also been carried out on selected samples representing a particular sediment unit. Total recoverable hydrocarbons (TRH), Polycyclic aromatic hydrocarbons (PAH) and Polychlorinated Biphenyl (PCB) concentrations will be normalised to 1% OC based on the TOC result.

The sediment assessment criteria selected for the COPC identified on site in GHD (2021b) and (2021c) are listed in Table 4.5.

Table 4.5 Sediment assessment criteria

COPC	DGV (mg/kg)	GV-high (mg/kg)
Chromium (III+VI)	80	370
Copper	65	270
Lead	50	220
Nickel	21	52
Zinc	200	410
Total TRH	280	550
Total PAH	10	50
PCB	0.034	0.28
TBT (as Sn, µg/kg dry weight, 1% OC))	9	70

4.3.2 Dioxins

There are currently no environmental quality guidelines published by Australian regulators for dioxins in soil or sediment. An ecological risk assessment (ERA) (GHD, 2021a) was conducted to ascertain appropriateness of material to be used in the bund wall of the Emplacement Cell. This approach was in general accordance with that recommended in the National Assessment Guidelines for Dredging (NAGD) (DAWE, 2009). The Lines of Evidence (LoE) relevant to assessing the risks posed by the reuse of Berth 101 Unit 1A and Unit 1B material within the Emplacement Cell bund included the following:

– Chemistry
– Bioavailability and toxicity; and
– Bioaccumulation

No site-specific criteria for dioxin were derived, however using the LoE approach it is considered unlikely that an unacceptable ecological risk would be posed to the marine environment by Berth 101 Unit 1A and Unit 1B materials being used in the Emplacement Cell bund. Therefore, dioxin characteristics as established for Unit 1A or Unit 1B material will be used as initial criteria for assessing the suitability of material to be used in the Emplacement Cell bund.

4.4 Application of selected criteria

The methodology used when assessing contamination levels in soils during remediation/characterisation and validation at the site will be to use the relevant HSLs, HILs, sediment (DGV and GV-high) where required as cut off points to classify materials either as:

– Not contaminated, which pose no risk to the environment or human health and warrant no further action, i.e., concentrations less than or equal to the selected criteria.
– Containing elevated concentrations of contaminants, which may pose a risk to the environment (aquatic ecosystems) but pose no risk to human health under the proposed land use scenario i.e., concentrations greater than the DGVs and less than the adopted HILs or HSLs. A qualitative risk assessment may be sufficient to evaluate the potential impact for the proposed land use.

– Significantly contaminated which pose a risk to both human health and aquatic ecosystems, i.e., concentrations significantly greater than relevant health investigation or DGVs. Soils or sediment in this category would likely require management or disposal off site (including potential containment within the Emplacement Cell), or further assessment by way of site-specific health and/or ERA (Tier 2 or 3) carried out as appropriate for the proposed land use. This may require the collection of additional site data.

4.5 Waste classification criteria

Materials that may require offsite disposal as part of site remediation will be classified using the six-step process and criteria detailed in *Waste Classification Guidelines – Part 1: Classification of Waste* (NSW EPA, 2014a).

In accordance with the Waste Classification Guidelines (NSW EPA, 2014a), the applicable classification principles include (but are not limited to) the following:

– "If asbestos waste is mixed with any other class of waste, all the waste must be classified as asbestos waste. For example, asbestos waste mixed with building waste, must be managed as asbestos waste."
– 'Special waste' is a class of waste that has unique regulatory requirements. The potential environmental impacts of special waste need to be managed to minimise the risk of harm to the environment and human health.
– Special wastes are:
    - Clinical and related waste.
    - Asbestos waste.
    - Waste tyres.

Producers of special waste do not need to make any further assessment of their waste if it falls within the definitions of special wastes, except for asbestos waste. Asbestos waste means any waste that contains asbestos. Chemical classification of soil contaminated with asbestos is still required.

Materials that may comprise Acid Sulfate Soils (ASS) will be classified and handled as per the *Waste Classification Guidelines – Part 4: Acid Sulfate Soils* (NSW EPA, 2014b). Additional information is provided in the Stage 2A and Stage 2B ASSMP.

5. Site contamination status

The following review of the site contamination status is based on the results from GHD (2018a), (2021a), (2021b), GHD (2021d) and Fox Environmental Consulting (2022).

5.1 Contaminated materials

Based on the review of all previous investigations at the site, the following areas were identified as potentially posing a risk to human health and/or the environment for redevelopment of the site and were remediated and/or managed during Stage 1 works.

The current contamination status is summarised in Table 5.1 below.

Table 5.1 Summary of identified and potential contamination currently on site

Item	Location of impact	Outcome	Current status
Exceedance of human health criteria and management levels for BaP TEQ and TRH (NEPC, 2013). Identified in GHD (2018).	MBD Site Compound	Further delineation samples were taken, no further exceedances were identified.	Following additional investigations, delineated vertically and in all directions and deemed to be localised. Located at 4.2-4.4 metres below ground level (mbgl), this equates to 1.74 – 1.54 m Port Kembla Height Datum (PKHD). As this material is below +2.5 mPKHD (the depth of the current excavation) this material is still in situ and should be appropriately managed if excavation is to occur in this area.
Exceedance of human health criteria and management levels for BaP TEQ and TRH F3 (NEPC, 2013) Identified in GHD (2018)	MBD Site Compound	Further delineation samples were taken, no further exceedances were identified.	Following additional investigations, the lateral extent for GBH26 is unknown to the west, as underground services and limited space prevented a borehole from being advanced in this direction. Located in a sample at 4.75 – 4.90 mbgl, this equates to 0.13 – -0.02 mPKHD. As this material is below +2.5 mPKHD (the depth of the current excavation) this material is still in situ and should be appropriately managed if excavation is to occur in this area. Risks can be managed by implementing standard contaminated site hygiene and OH&S measures.
Exceedance of human health criteria and DGV for BaP TEQ and TRH (NEPC, 2013) Identified in GHD (2021a)	MBD Site Compound	N/A	The lateral extent has not been delineated however the impact is considered localised. Located in a sample at 3.4-3.5 m (HIL-D exceedance), this equates to 1.49-1.39 mPKHD. As this material is below +2.5 mPKHD (the depth of the current excavation) this material is still in situ and should be appropriately managed if excavation is to occur in this area.
Dioxins	MBD Site Compound	Dioxins were identified in fill and natural soils across the site. The congener profile associated with the Berth 101 materials is like that reported by Horri *et al.* for kaolin clays, with OCDD being predominant and no furan compounds detected. This suggests a possibly natural rather than anthropogenic dioxin source.	Dioxins are ubiquitous within the fill and natural soils present on the site; however, concentrations are below those which would present an unacceptable risk to human health for workers who may come into contact with materials during works on the site. The risk can be further appropriately managed by implementing standard contaminated site hygiene and OH&S measures.

Item	Location of impact	Outcome	Current status
Asbestos impacted soil	Site wide	All 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.	Asbestos impacted soil relocated to former Conveyor C6 Stockpile and/or T5 containment cell.
ASS/PASS	MBD Site Compound		Refer to Stage 2A and Stage 2B ASSMP.
Contaminated sediments (HM/HS) (GHD, 2018b)	Inner and Outer Harbour	The presence of contaminated sediments, being heavy metals above screening criteria, were found within the proposed dredging and disposal areas. Sampling indicated PASS conditions present within the dredging footprint. Dioxins were present in both the dredging and disposal areas within the range of Australian background levels.	Refer to Stage 2A and Stage 2B DEMP and ASSMP.
Contaminated soil in Outer Harbour (GHD, 2021e) (GHD, 2021f)	Emplacement Cell Construction Site	Eastern portion of the Emplacement Cell Construction Site “Site 1”: lead exceedances of the human health criterion in boreholes to 1 mbgl at eastern and western ends of the site. Only identified at surface (0.0 – 0.2 m) in north-eastern corner of the site. Western portion of the Emplacement Cell Construction Site “Site 2”: BaP TEQ, PAH and TRH above the human health guideline criterion were detected to 1 mbgl in the eastern end of the site. Detections at surface levels (0.0 – 0.2 m) were restricted to two locations for BaP TEQ and one location for TRH. Surface asbestos materials were also detected.	Site 1: contamination identified still present at site. Site 2: asbestos clearance has been undertaken. Other contaminants identified remain in situ.

BaP: Benzo(a)Pyrene
TEQ: Toxicity Equivalence Quotient
HM/HS: Harbour Muds/Harbour Silts

Other contaminants

Per- and polyfluoroalkyl substances (PFAS) are not considered to be a potential contaminant of concern for the site. GHD understands that no storage of PFAS chemicals or firefighting activities have occurred at the site. There has been no evidence of disposal of other wastes or products that may contain PFAS chemicals (e.g., household waste) identified. Based on this, PFAS has not been included in the sampling program.

5.2 Updated conceptual site model

A CSM is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The development of a CSM is an essential part of all site assessments and provides the framework for identifying contamination sources and how potential receptors may be exposed to contamination.

5.2.1 Potential sources

Potential sources of contamination are as outlined in Section 5.1 and include:

– Fill used in the construction of Berth 101 and adjoining areas including identified hot spots of contamination. Contaminants of concern include TRH, Benzene, toluene, ethyl benzene and xylenes plus naphthalene (BTEXN), PAH and heavy metals.
– Material across the site was excavated and stockpiled on site during the Stage 1 works. No gross contamination was identified in the material during previous assessments (as summarised in Section 6.3.1).
– Dioxins in fill and natural materials across the site.

5.2.2 Potential exposure pathways

The primary exposure pathways by which potential receptors could be exposed to the COPC are considered to be:

– Direct contact with contaminated soil or groundwater
– Inhalation of dust from contaminated soils.
– Inhalation of vapours/gases generated by contaminated soil.

5.2.3 Potential receptors

Fill material from the berth is proposed to be excavated, stockpiled and then either re-used on site or relocated to the Emplacement Cell. Accordingly, the key receptors of interest include:

– Future site workers and users:
– Site workers involved in the Project works at the site in which the impacted material is disturbed.
– Individuals involved in potential future construction and maintenance of the site. Intrusive maintenance workers: carrying out repairs or installation on subsurface utilities. It is expected that minor excavation activity could occur in the future (e.g., for installation of additional services).
– Marine ecological receptors: The primary receptor of any identified contamination is considered to be marine aquatic ecosystems of the Inner and Outer Harbour following placement of excavated materials in the Emplacement Cell, particularly for the construction of the bund. The Inner and Outer Harbours are highly modified industrial settings, receiving stormwater runoff and waste discharge from neighbouring industries. Further information regarding the marine ecological receptors for the project site can be found in the Ecological Health Monitoring Program (EHMP, Appendix C of WQMP).

5.2.4 Source-pathway-receptor (SPR) linkages

Initial receptors are considered to be site workers involved with earth works associated with excavation activities, that is, those coming into direct contact with soil or potentially hazardous materials. Earthworks are to involve shallow to deep excavations across the site to achieve required construction levels or to remove identified contamination, stockpile management, including stockpiled materials which have been identified as unsuitable for placement in the Emplacement Cell Construction Site. This exposure scenario provides an increase likelihood that workers will be in direct contact with soil and exposed to dust via inhalation generated during excavation and stockpiling.

Based on results of the previous investigation, vapours and gases have not been identified as exposure pathways. Therefore, the SPR linkages are assessed incomplete for vapour inhalation as this form of contamination has not been identified. Based on review of the potential SPR linkages, the proposed development may provide direct contact/ingestion exposure pathways to contamination, if present, to workers involved in remediation of impacted soils and to aquatic ecosystems.

Remediation works for identified contamination have been completed during Stage 1 Early Enabling Works construction, so potential SPR linkages are significantly reduced for ongoing construction activities at the site.

6. Remediation works plan

A remediation options review was conducted prior to Stage 1 Early Enabling Works of the Project and is included in the Remediation Works Plan (RWP) for that stage (GHD, 2021g). The adopted remediation approach for Stage 1 Early Enabling Works is considered to still be applicable in Stage 2A and Stage 2B and can be summarised as follows:

– Re-use (including at the new berth or in construction of the Emplacement Cell) of suitable materials.
– Recycling of waste materials that are capable of being readily reused, reprocessed, recycled, or otherwise recovered.
– Containment of fill and other suitable materials within the Emplacement Cell.
– Disposal off site for bulky wastes not suitable for recycling and unexpected finds of contamination (if any are encountered) that are not considered suitable to be placed within the Emplacement Cell.

This section provides a description of the remediation works steps and procedures required to protect health, safety, and the environment for Stage 2A and Stage 2B works.

The roles and responsibilities of the AIE Project Manager and Stage 2A and Stage 2B Principal Contractors are outlined in Section 2.

6.1 Site mobilisation for Stage 2A and Stage 2B

Management of the site mobilisation process is to be included in the Stage 2A and Stage 2B Principal Contractor's work plans including the following:

– **Site access and security** – Principal Contractors will be responsible for ensuring the security of all work areas and all plant and equipment maintained on-site during the works. This includes signage, control of site access (authorised personnel and vehicles only) and safety inductions and documentation.
– **Plant re-fuelling/maintenance/cleaning** – Principal Contractors will be responsible for designating locations/areas for equipment refuelling, maintenance, and cleaning activities undertaken during the site works (as required) and to ensure all vehicles leaving the site are free of any contaminated material. Some equipment, such as static generators, drill rigs and cranes, may require re-fuelling in situ and not within designated areas. The refuelling procedure will be followed with spill controls outlined in the Emergency Spill Plan.
– **Traffic control** – Principal Contractors will be responsible for ensuring adequate traffic control measures are in place to ensure site safety and take into consideration the entry and egress of vehicles from the main site entrance in accordance with the Stage 2A and Stage 2B Construction Traffic Management Plan (CTMP).
– **Environmental controls** – Principal Contractors will be responsible for installing and maintaining environmental controls consistent with relevant management plans.

6.2 MBD Site Compound

6.2.1 Asbestos-containing materials

AIE is required to appropriately manage the occurrence of unexpected finds to satisfy condition S5.7 *Discovered Contamination* under the *Deed of Surrender and Grant of New Lease between Port Kembla Operations Pty Ltd as trustee of Port Kembla Unit Trust and Port Kembla Coal Terminal Limited and Australian Industrial Energy Pty Ltd (*Surrender Deed), and also from a land contamination aspect, as the lease area (southern part of Part Lot 22 DP 1128396) requires a Section A Site Adit Statement at the completion of construction, confirming the suitability of the site for its intended use.

A RWP addendum (GHD, 2021h) has been prepared to provide remediation and validation methodologies for ACM, specifically addressing asbestos impacts associated with the discovered contamination. The addendum was approved by the independent site auditor, and the methodologies within it and the RWP it supports, will be applied going forward if ACM is encountered during Stage 2A and Stage 2B works. The Auditor has provided feedback on both the RWP and RWP Addendum (refer to IAA14) with response pending. These are summarised in Section 7.3.3.

6.3 Excavation

6.3.1 Overview

Excavation and backfilling from the Stage 1 Early Enabling Works has been completed as of January 2022 to allow for construction of structures within the MBD Site Compound. A nominal 15-metre-wide section on the northern end and a circa 60-metre 'wedge' at the south- west corner of the excavation zone was left to facilitate contractor access which has been completed. Excavation during Stage 2A and Stage 2B does not relate to remediation but to construction of the new wharf and land-based facilities. However, any unexpected finds that will require removal of contamination and excavation will follow the unexpected finds protocol detailed in Section 6.5. Excavated materials from the Stage 1 Early Enabling Works to have been stockpiled within the Eastern and Western Stockyards of the MBD Site Compound and within Emplacement Cell Construction Site**.**

The excavated materials stockpiled at the MBD Site Compound include:

– Approximately 9,700 m³ of demolished concrete crushed to nominal 70mm minus.
– Approximately 12,500 m³ of heavily bound base course crushed to nominal -150mm minus.
– Approximately 33,900 m³ of mixed slag, general fill, and coal nominally < 150mm in size.
– Approximately 10,700 m³ of predominantly sand material.
– Approximately 8,600 m³ of asbestos impacted soils.

The excavated materials stockpiled at the Emplacement Cell Construction Site include:

– Approximately 44,000 m³ of sand material.

6.3.2 Validation sampling

Where material has not been adequately characterised by existing investigations, characterisation sampling of stockpiles will involve sample collection and analysis in accordance with the Vic EPA IWRG 702 as referenced in the NEPM Schedule B2. The assessment criteria are outlined in detail in Section 4.

6.3.3 Backfill or reinstatement requirements

On completion of excavation and subsequent validation approval, backfilling of excavations may be required (i.e., for site levelling or safety reasons). Significant backfilling at the site is not anticipated during the Stage 2A and Stage 2B works. If required, backfilling procedures will be as follows:

– Excavations should be backfilled with either:
  - Materials excavated during Stage 1 Early Enabling Works which includes crushed concrete, heavily bound base course, mixed slag, general fill, and coal (refer to Section 6.3.1). Reused crushed concrete and fill has been validated to be free from contamination prior to stockpiling for reuse, and thus is deemed to be free from asbestos. Excavated material will need an asbestos clearance certificate from a third party licensed asbestos assessor prior to being crushed or grinded or screened. For the purposes of Condition O6.1-6.2, 'excavated material' excludes raw slag, concrete or basecourse.
  - Asbestos impacted material will be placed in designated containment areas / cells at the MBD Site and shall not be mixed with other clean backfill material. Containment of these asbestos impacted materials will follow the relevant guidelines and legislation for managing asbestos impacted material on site.
  - If required, Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM) can be sourced externally. Material considered to be VENM or ENM should be assessed by an appropriately qualified environmental consultant/advisor to confirm that the material meets the relevant regulatory requirements. Analytical results must report non-detects for all contaminants with exception of heavy metals, which would be representative of background concentrations, or by review of any associated waste classification documentation obtained.
  - Materials sourced from commercial/ licensed premises that are deemed clean, uncontaminated, and suitable for purpose. Materials may include but are not limited to, quarry aggregates, sand materials, and landscaping materials.
– Backfill material must be of suitable composition and must meet geotechnical and other material property requirements for the area of use and not present hazards to future development. It must be validated to

confirm suitability for use from a contamination perspective with the sampling density and suite of analysis commensurate with import source/material type, supported by appropriate source documentation and visual inspection to confirm free from contamination.

– VENM or ENM materials are not to be stockpiled in areas still undergoing remediation or encounter contaminated soils either through storage or from equipment/plant handling contaminated materials.
– Validation samples should be collected from on-site or imported material (if required) to confirm its suitability for use.
– Fill material and concrete suitable for reuse will be used for the wharf construction. Materials will be crushed on site and stockpiled at the MBD Site Compound or Emplacement Cell Construction Site. This material will be segregated and validated for use.

Reinstatement, compaction, and further redevelopment works will be undertaken in accordance with the requirements of AIE.

6.4 Waste management

The Principal Contractors shall establish appropriate waste disposal containers as part of site mobilisation, which shall be maintained on site for the duration of the works. All waste materials (e.g., garbage) must be disposed of using safe waste disposal practises. No waste shall be disposed of on-site. The waste disposal containers shall be emptied as necessary to avoid overflowing, and the contents disposed of to a licensed waste disposal facility approved for the relevant waste type.

A Waste Management Plan (Section 9 of the SMP) has been prepared that identifies materials that can be re-used or recycled, and how these will be managed during the remediation works.

All potential pollutant materials will be stored away from any poorly drained areas, flood-prone areas, and stormwater drainage areas. Such materials will be stored in an appropriately designated area. Containment bunds will be constructed with provision for collection and storage of any spilt material.

Excavated material and/or dredged spoil will not be stockpiled in Outer Harbour unless it will be re-used within the proposed Outer Harbour Emplacement Cell.

Stockpiles of material stored at the premises will either be used as on-site backfill or Emplacement Cell construction or disposed offsite to a facility licensed to accept the material, within 12 months following stockpile creation.

6.5 Unexpected finds protocol

The site has been investigated for contamination as detailed in previous investigation reports. However, a degree of uncertainty is inherent in any site contamination investigation and a potential exists for undetected contaminated soils or wastes to be identified during the proposed remediation works. There is a potential for previously unidentified contamination to be present beneath the remaining above and below ground structures and services and with the extensive fill units across the site. Indications of potential contamination may include:

– Stained or discoloured fill, soils, or seepage water.
– Odorous fill, soils, or seepage waters.
– Construction wastes such as concrete, bricks, timber, tiles, asbestos sheeting, fragments, and pipes.
– General rubbish such as plastic, glass, packaging.
– Imported materials.
– Additional high-risk PASS within Unit 1A and Unit 1B (i.e., Unit 1C)

An UFP has been developed and is illustrated below in Figure 6.1, which outlines the suggested procedures that should be followed in the event of an unexpected find.

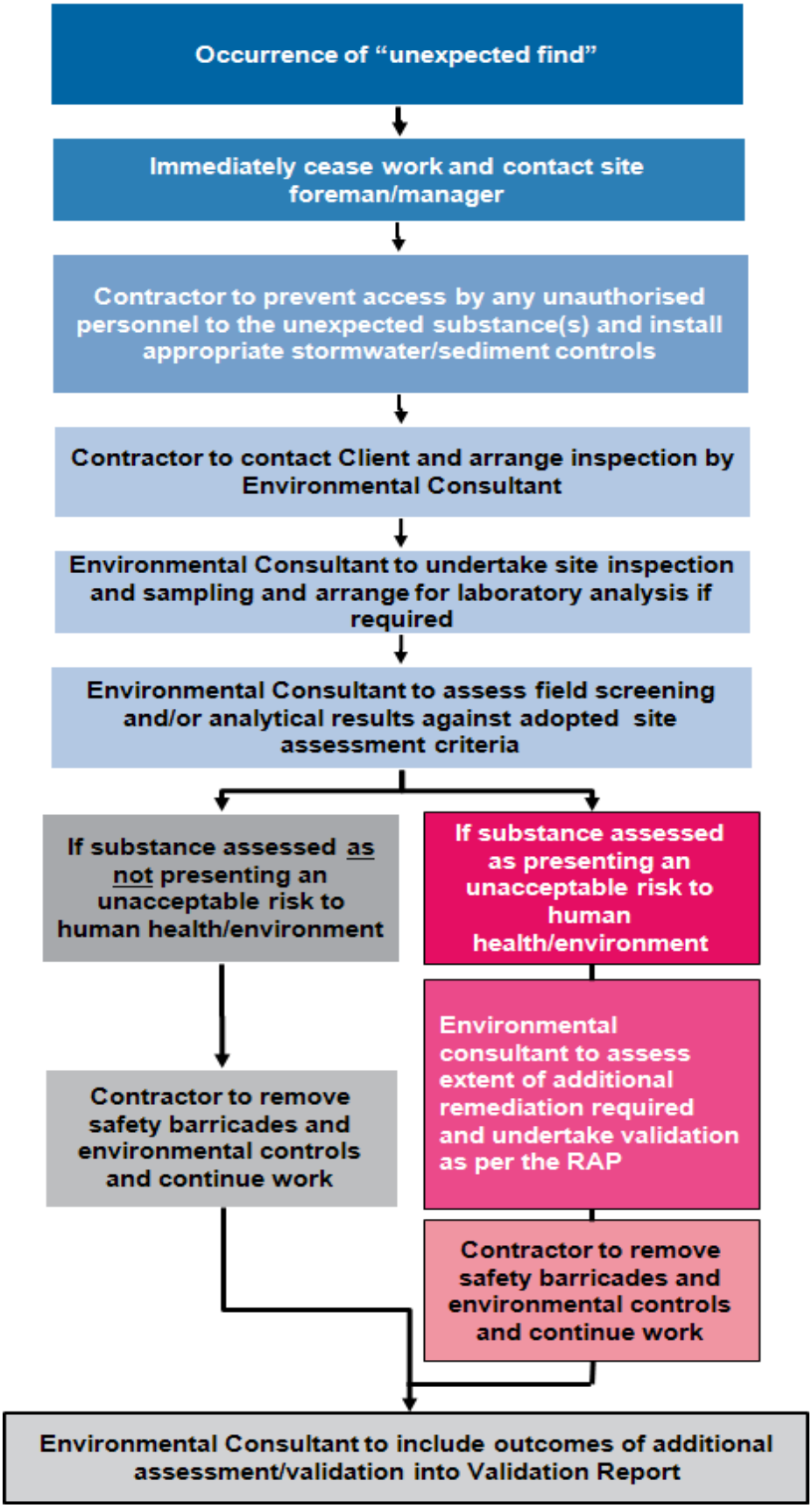

Figure 6.1 Unexpected finds decision process

6.6 Material tracking control

A critical aspect of Stage 2A and Stage 2B is how materials are controlled throughout all stages of the works. The following tracking control requirements for each stage shall be implemented by the Principal Contractors to ensure all materials are accounted for:

- Excavation:
  - The area to be excavated shall be clearly delineated.
  - Qualified supervision shall be used during excavation to ensure that all contaminated materials are removed but disturbance of uncontaminated soils is minimised.
  - Materials shall be segregated to the extent practical during excavation to minimise mixing of materials with different degrees or types of contamination.
  - The final extent of excavation and location of validation sampling points shall be measured and recorded by GPS or survey, as required by AIE. Excavation records also indicate ASS/PASS status so that the material is managed appropriately (including timeframes for placement in the emplacement cell) as well as depth placement.
- Stockpiling/backfilling:
  - Stockpiles shall be kept separate, to minimise mixing of materials (as above).
  - All stockpiling and backfilling operations will only move material from one location to another when approved by the Stage 2A and Stage 2B Principal Contractor Environmental Representatives. All such movements shall be clearly documented by the Principal Contractor in a material tracking register equivalent to that used during Stage 1 works. The materials tracking register shall document (at a minimum) the following information:
    - Stockpile identification.
    - Source of material.
    - Volume of material.
    - Destination (including on-site locations for intermediate movement).
    - Date of movement.
    - Authorisation.
    - Material description.

Segregation of material will also be undertaken in accordance with the ASSMP, to allow for segregation of low risk and high-risk ASS material.

6.7 Dredging

Additional land-based works will be undertaken prior to the commencement of marine-based dredging. Once the new quay wall at the MBD Site Compound has progressed to a stage that the dredging can proceed continuously, the Machiavelli dredge and Materials Handling Barge will be mobilised to site as the primary equipment for dredging.

A brief outline of the sequencing is described in the sections below for the following activities:

- Silt curtain installation at both the MBD Site Compound and surrounding the Emplacement Cell.
- Excavation of the toe trench for the Emplacement Cell bunds (split program).
- Removal of the existing armour rock from RL2.5m down, loading into barges and unloading at the Emplacement Cell.
- Dredging of remaining fill, Unit 1 materials and placing in the Emplacement Cell bunds.
- Progressively dredging wedges of material within the exclusion zone to within 0.5 metres of the pile face (subject to mobilisation timing review).
- Potentially washing of material trapped within the pile line to provide clearance.
- Clean up cut and possible sweeping of the dredge area.
- Dredging of Outer Harbour site toe trench
- Dredging of HS / HM, Unit 2, and Unit 3 materials and placing in the Emplacement Cell

6.8 Remediation contingency plan

The site has been investigated for contamination as detailed in previous investigation reports. However, a degree of uncertainty is inherent in any site contamination investigation. Due to the size of the site and nature of the fill material, there is a potential for unidentified areas of contamination across the site.

A contingency response plan for unexpected situations shall be prepared by the Contractor and the Contractor will be required to follow the contingency response plan if unexpected situations are encountered. Table 6.1 outlines some of the unexpected situations that may arise.

Table 6.1 Contingency procedures

Issue	Response
A greater volume of soil contamination may be encountered than is presently estimated, or other types of contamination may be encountered.	If significant additional volumes of contamination or previously unidentified types of contaminants are identified, work would cease in the area of concern. An assessment of the impact of the additional contaminated materials would be undertaken by the Environmental Consultant. Updated or new documentation is to be prepared to support management/validation of any previously unidentified contamination if encountered. The presence of previously unidentified types of contaminants may be identified during remedial works. If previously unidentified types of contaminants are detected, then the validation criteria may have to be revised to incorporate those contaminants. Any potential contaminated material in addition to the type already identified will be treated in a method considered suitable for the type of contaminant. Additional testing would be undertaken to determine requirements in this respect.
Identification of friable ACM	Bonded asbestos is expected at this site and removal will be undertaken in accordance with the Asbestos Management Plan (AMP). However, if friable asbestos is encountered, the contingency procedures in the AMP are to be implemented. An assessment of the impact of the ACM would be undertaken by the Environmental Consultant and the appropriate remediation measures implemented (usually removal).
Wastes, previously unidentified, buried in the work area may be encountered	If buried wastes are encountered during remediation works, the extent of the impact from the buried wastes will be assessed. Following assessment, if required, the waste will be removed, stored, classified, and disposed of in accordance with NSW EPA 2014a and/or 2014b.
Dewatering of excavations may be required.	If dewatering of excavations is required, the water will be pumped into suitable storage and either used for dust suppression or compaction (following appropriate testing), treated, and tested prior to discharge (once discharge criteria are met) or disposed of at a licenced facility approved to accept potentially contaminated groundwater. If excavations are unstable, demolition and excavation works will be reassessed in consultation with the AIE Project Manager.
Unacceptable Environmental Impacts because of remediation activities	The Stage 2A and Stage 2B SMP has considered the potential environmental impacts of side effects of the works remediation such as noise, odour, dust, and surface runoff. These shall be further considered in relevant management plans prepared by the Principal Contractors. However, if unacceptable levels of such side effects are detected at the site boundaries during remedial works, the Principal Contractors shall cease work and the Environmental Consultant will assess the situation and direct corrective action in accordance with the following: – Existing management plans – Current EPA regulations and requirements – In consultation with the AIE Project Manager.

6.9 Site management

6.9.1 Interim site management

As the Project site is secure with limited potential for unauthorised access and based on the current site usage (former port operations), occupation of the site for current land uses is considered acceptable to continue until remediation commences. However, the proposed remediation works may generate exposure hazards to sensitive

receptors. Mitigation measures shall be included as part of the Work Health and Safety Plan (WHSP) as prepared by the Stage 2A and Stage 2B Principal Contractors.

6.9.2 Long term site management

Implementation of a long-term site management plan for any contamination that remains on site, including potential contamination remaining at depths not disturbed by the redevelopment and the Emplacement Cell, will likely be required, and a long-term management plan for the MBD Site Compound will be developed as part addressing relevant approval conditions.

7. Validation

The process as outlined in the following sections applies to all areas of the site proposed for remediation and/or validation and will be based on aesthetic issues/visual observations combined with collection of soil samples from the walls and base of excavation and trenches with analysis for the contaminants of concern as discussed in Section 5.1. It is noted that the validation process was developed for Stage 1 of the construction process and remediation works are largely complete. The validation process will continue to apply for any unexpected finds of contamination identified within the remaining areas of excavation for Stage 2A and Stage 2B. It should be noted that the Auditor has provided feedback on the dioxin assessment works in IAA15, with response and updated report pending.

7.1 Data quality objectives

Data Quality Objectives (DQOs) have been established for this CSP to assist the design and implementation of data collection activities, to ensure the type, quantity and quality of data obtained are appropriate and address the project objectives. The DQO process as described in Schedule B2, Appendix B, of the NEPM (NEPC, 2013) was adopted for this project. The DQO process involves seven steps as described below.

The DQO steps defined above have been addressed as follows.

Step 1 - State the problem

AIE intend to redevelop Berth 101 of the Port Kembla Coal Terminal (PKCT) with the construction of facilities for an LNG import facility. The development will involve the excavation of hardstand and fill materials to RL 2.5 m PKHD (this equates to approximately 1.6 metres to 4.2 mbgl) (completed in January 2022 as Stage 1), the excavation of piles and footings that extend into bedrock and dredging to accommodate the Marine Berth.

Uncontaminated materials previously identified as fill (“Fill”), reclaimed sands and alluvium (“Unit 1”) will be used to develop the Emplacement Cell perimeter bund wall which will then contain remaining excavated materials (i.e., estuarine sands, residual soils, harbour sediments and muds).

Contamination has been identified at the site that may adversely impact the suitability of the fill to be used in the Emplacement Cell and/or may have adverse impacts upon environmental receptors.

GHD carried out an evaluation of existing data to assess the suitability of Fill and Unit 1 to be reused in the perimeter bund wall. It was concluded that “*the majority of Fill and Unit 1 are considered to pose a low risk to the marine aquatic environment based on the characterisation carried out, however some limited supplementary assessment would be beneficial to confirm this*.” (GHD, 2020). The majority of Fill and Unit 1 are still considered unlikely to pose an unacceptable risk to the marine aquatic environment. The Unit 1 materials have been assessed for dioxins and the ERA concluded that there is unlikely to be an unacceptable risk posed from dioxin in the material used in the bund wall. With regards to ASS, it is concluded that “placement of high-risk ASS below mean sea level 0.9m Chart Datum (CD) (0.0m Australian Height Datum (AHD)) will not lead to oxidation of sulphides that would cause long term environmental harm” based on the current Emplacement Cell configuration (Fox Environmental Consulting, 2022). Asbestos contaminated materials are present at the site in two areas: a stockpile at the former C6 conveyor area, and the T5 containment cell.

Construction of the Emplacement Cell and redevelopment of the site as an LNG facility (continued commercial/industrial land use) requires appropriate management of contaminated soils.

Step 2 – Identify the decisions

The decisions are those required to ensure the successful management or remediation of contamination at the site and consequently the protection of the environment and human health. Key decisions include:

– Have the identified data gaps been adequately addressed?
– Have the surface and subsurface structures and services been removed, and appropriate assessment of previously inaccessible soils been undertaken?
– Have known areas of contamination been remediated and validated to achieve residual concentrations of contamination less than the adopted criteria?

– Has excavated materials (hardstand, fill, sands etc) been adequately segregated and validated suitable for reuse on site, in the Emplacement Cell perimeter bund or capping or for placement with the Emplacement Cell?
– Have any unexpected finds encountered during site works been appropriately managed or remediated?

Step 3 – Identify inputs to the decision

Data to be input to the decision-making process includes:

– Information from previous investigations and prior validation works.
– Information from additional investigations (if required).
– Current assessment criteria as discussed in Section 4.
– Consideration of future land use / material placement.
– Monitoring the Principal Contractor's work and site conditions.
– Review of relevant documentation to be provided by the remediation contractor.
– Observations and analyses to be undertaken during the site remediation and validation works.

Step 4 - Define the study boundaries

The lateral boundaries of the study area are defined by the extent of the excavation area which extends from Road No. 7 at the northern end of the West Stockyard to the South Ponds and across to Road No. 9 and includes the MBD Site Compound area as shown in Appendix A.

The vertical boundaries of the study are the vertical extent of proposed earthworks generally noted between the surface and approximately 25 mbgl (depth of dredging).

Step 5 – Develop a decision rule

Review of previous site investigations has been used to identify the main contaminants of concern and areas requiring remediation or management prior to site redevelopment.

Concentrations of contaminants for validation (where required) will be compared with the criteria discussed in Section 4, considering the proposed use or placement of material, to assess the success of the remediation and/or screening processes and/or to assess waste disposal requirements.

To decide whether the data obtained is precise, accurate, reliable, and reproducible for the site at the time of the investigation, field and laboratory quality control and quality assurance (QA/QC) procedures will be utilised throughout the sampling programs. All sampling work will be carried out in accordance with Standard Operating Procedures for field activities, based on standard industry practices. QA/QC results will be compared to nominal acceptance limits (as outlined in in Section 7.2).

Step 6 - Specify limits on decision errors

The guidelines as listed in Section 4 will be used to assess the contamination status of the soils within the subject site. Data quality indicators (DQIs) as described in Section 7.2 will be used to evaluate the acceptability of the data.

Where quantitative data is used as a basis for decisions, data will be evaluated on a statistical basis as described in the NEPM (NEPC, 2013), to a 95% confidence level.

Step 7 - Optimise the design for obtaining data

A sampling and analytical program has been prepared as included in Section 7.3 below.

7.2 Data quality indicators

The DQIs for sampling techniques and laboratory analysis of collected samples defines the acceptable level of error required for this investigation. The data quality objectives will be assessed by reference to data quality indicators as follows:

– **Data Representativeness** - expresses the degree which sample data accurately and precisely represents a characteristic of a population or an environmental condition. Representativeness is achieved by collecting

samples in an appropriate pattern across the site, and by using an adequate number of sample locations to characterise the site. Consistent and repeatable sampling techniques and methods are utilised throughout the sampling.

– **Completeness** - defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study. If there is insufficient valid data, then additional data are required to be collected.
– **Comparability** - is a qualitative parameter expressing the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples and ensuring analysing laboratories use consistent analysis techniques and reporting methods.
– **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the data is assessed by calculating the Relative Percent Difference (RPD) between duplicate sample pairs.

$$RPD(\%) = \frac{|C_o - C_d|}{C_o + C_d} \times 200$$

Where Co = Analyte concentration of the original sample
Cd = Analyte concentration of the duplicate sample

GHD adopts a nominal acceptance criterion of ± 30% RPD for field duplicates and splits for inorganics and a nominal acceptance criterion of ± 50% RPD for field duplicates and splits for organics, however it is noted that this will not always be achieved, particularly in heterogeneous soil or fill materials, or at low analyte concentrations.

– **Accuracy:** measures the bias in a measurement system. Accuracy can be undermined by such factors as field contamination of samples, poor preservation of samples, poor sample preparation techniques and poor selection of analysis techniques by the analysing laboratory. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes, laboratory blanks and analyses against reference standards. The nominal “acceptance limits” on laboratory control samples are defined as follows:
  - Laboratory spikes – 70-130% for metals/inorganics 60-140% for organics.
  - Laboratory duplicates - <30% for metals/inorganics, <50% for organics.
  - Laboratory blanks - <practical quantitation limit.

Accuracy of field works is assessed by examining the level of contamination detected in equipment blanks. Equipment blanks should return concentrations of all organic analytes as being less than the practical quantitation limit of the testing laboratory.

The individual testing laboratories will conduct an assessment of the laboratory QC program, internally; however, the results will also be independently reviewed and assessed by the Environmental Consultant.

7.3 Validation methodology

The validation methodology outlined in the subsequent sections will be implemented in excavations where the removal of material identified as contaminated has to be undertaken. No items have been identified as requiring remediation in this CSP, however there is potential for unexpected finds to be encountered during excavations.

ASS/PASS is not considered contamination for the purpose of validation. Processes and procedures for ASS/PASS management is included in the Stage 2A and Stage 2B ASSMP.

7.3.1 Validation for dredged materials

Placement of materials excavated or dredged from the site in accordance with the ECR (SMEC, 2022), Stage 2A and Stage 2B DEMP and ASSMP will be documented in accordance with material tracking requirements as described in Section 6.4, based on the results of previous investigations. No further validation sampling or analysis is required unless materials are encountered which are not consistent with currently identified site characteristics.

7.3.2 Validation of excavations resulting from unexpected finds

Where required, validation of the remediation excavations will be undertaken in accordance with the NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines*.

The Environmental Consultant will record and document the excavation and removal activities of contaminated soils, encountered as unexpected finds, from the excavations and trenches. Systematic sampling will be undertaken on the base and walls of the excavations. The validation sampling procedure will comprise:

– Documentation of the excavation activities.
– Visual confirmation that the extent of excavation has removed all contaminated fill material (stained and odorous).
– Validation will be required following excavation of impacted soils. The resultant excavations will be validated to confirm the removal of the contaminated material with collection of at least five samples (four wall samples, one base sample) from any excavation and analysis for contaminants of concern (based on the results of previous investigations and observations during the remediation). Base samples will be collected at a minimum rate of one per 25 metres^2, and wall samples at a minimum rate of one per five linear metres, with samples collected from each distinct strata of soil.
– Ensuring detailed material tracking by maintaining and reviewing a material tracking register (including on-site soil movement) and waste disposal dockets, to be provided by the Principal Contractors.

Validation sampling locations will be systematic, or biased towards areas of apparent contamination, if present (to provide a conservative approach). Photographs of the excavation will be taken as part of the validation works. The extent and depth of the completed excavation shall be measured by the environmental consultant, with reference to site boundaries or physical features.

7.3.3 Validation resulting from unexpected finds – asbestos

If the unexpected find encountered is asbestos contamination and lies within the excavation zone, the Environmental Consultant will undertake a visual assessment of the remedial excavation, providing an accurate log/description of its condition and a photographic record of the soils within the resulting excavation. These observations along with copies of documentation (including details of source, quality, and records of material movement) for the excavated material will be required to support the Environmental Consultant's assessment and will be included in the Validation Report. Visual validation of contaminated material transport routes will also be required. Validation of the remedial excavation will be carried out by a component person and in general accordance with the WA DoH: *Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia* (WA DoH, 2021).

Validation for asbestos is primarily concerned with asbestos remediation works related to removal of the ACM building materials and conduit in the substation and removal of the ACM water pipeline (estimated to be 418 m in length) which has now been completed as a part of Stage 1 works.

Handling, transporting, storing and disposing of ACM or any contaminated material in general are described in Section 8 of the SMP. Any identified ACM fragments will be managed in accordance with the AIE Unexpected Finds Protocol, including the removal of any visible fragments by a licenced removalist in accordance with relevant SafeWork NSW codes of practice. Following removal, a licenced asbestos assessor should inspect the site and provide a clearance certificate confirming removal of asbestos.

Within the excavation zone the following will be applied:

– Visual validation procedure:
  - Visually checking the walls and base of the remedial excavation to confirm absence of ACM.
  - Test pitting the base of the excavation to confirm the vertical extent of impact and test pitting 2 m beyond the excavation wall to assess condition of fill with respect to ACM if terminated within the excavation zone. If the impact can be observed to be restricted to a specific area i.e., in the case of asbestos pipes or conduit, test pitting would not be required. Visual inspection for ACM on exposed surfaces and within test pits will be the primary method of validation, with verification as described below a second line of evidence.
  - The location, description (including size and condition) and number of any fragments encountered, and during which pass/test pit they were encountered, will be documented. One complete pass without encountering any additional fragments is necessary for validation, or further assessment of any remaining ACM is required.

- Any ACM fragments observed will, in the interim, be placed into labelled asbestos waste bags or suitable containers, then transferred to the designated asbestos stockpile area.

– Validation soil sampling procedure:
  - Once the visual assessment confirms no residual ACM fragments are present in the excavation, validation soil sampling will be undertaken.
  - Sampling will be carried out every 5 m along the excavation walls at one or two depth intervals down the soil profile (or per 1 m depth). If the remedial excavation terminates at the extent of the excavation zone, no validation samples will be undertaken, the walls will be assumed to contain ACM and documented in the Environment Management Plan (EMP).
  - Collection of one sample per every 100 m^2 of the base (i.e., 10 m x 10 m grid). Samples will be collected over a depth interval of approximately 0.1 m and an area of approximately 0.3 m x 0.3 m. Where base of the excavation is a trench less than 10 m wide, one sample per every 10 linear metres along the base will be collected.
  - Per sample location, 10 litres of material will be spread out for inspection on a contrasting colour material or sieved through a 7 mm sieve. Any fragments of suspected asbestos greater than 7 mm will be placed in a zip lock bag then submitted to the laboratory for weighing and confirmatory testing. Alternatively, fragments may be weighed on-site with an appropriately accurate scale and assumed to contain asbestos.
  - One wetted 500 ml sub sample will be collected for laboratory analysis for asbestos identification (AS4964-2004) or for quantification, as indicated below.
  - Where asbestos is detected in any sample, the concentration of asbestos as fragments (ACM) and as AF or FA will be compared with the validation assessment criteria listed in Table 4.2 in Section 4.2.2.
  - Asbestos analysis will be carried out by a National Association of Testing Authorities of Australia (NATA) accredited laboratory.
  - Samples used to validate excavations resulting from the removal of redundant infrastructure will be initially analysed using non-quantitative methods (i.e., absence/presence). This approach is commensurate with the known source of ACM and its general embedment in the redundant infrastructure. Should asbestos be identified in these samples, quantitative analysis will be required.

At this stage, residual asbestos impacts in areas of outside the dredging or excavation zone will not be removed. Where the impacts are encountered, surface ACM will be removed by the licenced asbestos removalist and surface clearance performed by the Hygienist. The nature, condition and abundance of any ACM removed should be documented. The spatial position and the surface Reduced Level (RL) of impact or assumed impact will be recorded by a registered surveyor. As an interim control measure, the area will be cordoned off, and sign posted identifying the presence of asbestos below the ground surface. The asbestos impacted area will be documented in the EMP.

The impacted area will require ongoing monitoring/management by either the Hygienist or the Environmental Monitoring Consultant until the area is capped, which is anticipated to occur at the completion of the construction phase. The construction phase is scheduled for completion in 2022/2023.

7.3.4 Validation of imported material

Significant importation of materials at the site is not anticipated during this phase of the redevelopment. However, if materials will be imported to site, options include VENM (as defined by NSW EPA (2014a)), ENM or other materials subject to a Resource Recovery Order and Exemption.

Materials may only be classified as VENM if they have been excavated from an area that is not contaminated with other waste materials or by manufactured chemicals. Imported materials should be validated as VENM, ENM or otherwise suitable for importation to site by an appropriately qualified environmental professional. Classification of all imported materials involves the following steps:

– The history of the site of origin of the material should be understood and documented to identify whether any potentially contaminating activities have been undertaken at that location.

– An inspection of the source site or materials should be undertaken by an appropriately qualified environmental professional, including a visual inspection of the stockpiled materials. Findings of the inspection should be fully documented.
– Validated as suitable for use with reference to NEPM Schedule B2 / EPA Victoria Industrial Waste Resource Guidelines 702 (Vic EPA, 2009) which may involve collection of samples at a prescribed rate depending on the volume of material, with at least three samples from any source.
    - VENM samples would be analysed for a general contamination suite including heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), TRH, BTEXN, PAH and OCPs. Results would be compared to the relevant HILs and Ecological Investigation Levels (EILs) for the proposed land use.
    - ENM samples would be analysed for the suite of contaminants as listed in Column 1 of Table 4 of the NSW EPA Excavated natural material order 2014, which includes asbestos. Results would be compared to the concentrations listed in Columns 2 and 3 of the same Table 4.
– A visual inspection of the VENM, ENM or any other imported materials should be undertaken as it is imported onto site to ensure that the material is consistent with documented observations.
– Materials tracking of any imported materials to confirm imported material source, volume imported and final location on site.

7.3.5 Validation of excavated material stockpiles

Following the conclusion of Stage 1 works in January 2022, all stockpiled materials (refer to Section 6.3.1) have been appropriately characterised and validated. Thus the remediation and validation testing described in this Plan relates only to unexpected finds, following steps in the UFP detailed in Section 6.5.

Where additional materials have not been adequately characterised by existing investigations, characterisation sampling of stockpiles including those to be disposed off-site will involve sample collection and analysis in accordance with the Vic EPA IWRG 702 (Vic EPA, 2009) as referenced in the NEPM Schedule B2 (NEPC, 2013). Characterisation sampling of stockpiles will involve sample collection and analysis at a minimum rate of 1 sample per 25 metres^3, or at least three samples from each distinct area of excavation or “batch” of material.

Material exhibiting visual evidence of heterogeneity may require sampling at a higher rate to ensure all characteristic elements of the material are sampled. “Procedure B” from the *Sampling Design Guidelines* (NSW EPA, 1995) will be used to assess if the number of samples is adequate to show that the average concentrations of contaminants are below the relevant criteria.

Analysis will be undertaken for contaminants of potential concern to include heavy metals, TRH, BTEXN, PAHs, PCBs, and asbestos for the “batch” of material being tested and results compared to the following:

– Re-use on site – Results compared to relevant health and ecological criteria and use of the segregating materials decision tree (refer to Figure 8-1 in the Stage 2A and Stage 2B SMP).
– Disposal off site – Results compared to the NSW EPA Waste Classification Guidelines (2014a and/or 2014b). If necessary for additional waste classification purposes or for assessment of potential environmental impacts, a Toxicity Characteristics Leaching Procedure test for selected parameters will be undertaken in conjunction with total concentration analysis.

7.3.6 Quality assurance

All fieldwork will be conducted in general accordance with Standard Operating Procedures for field activities, which are aimed at collecting environmental samples using uniform and systematic methods. Key requirements of these procedures are as follows:

– Decontamination procedures - including the use of new disposable gloves for the collection of each sample, decontamination of the sampling equipment between each sampling location and the use of dedicated sampling containers provided by the laboratory.
– Sample identification procedures - collected samples will immediately be transferred to sample containers of appropriate composition and preservation for the required laboratory analysis. All sample containers will be clearly labelled with a sample number, sample location, sample depth and sample date. The sample containers will then be transferred to a chilled cooler for sample preservation prior to and during shipment to the testing laboratory.

– Chain of custody information requirements - a chain-of-custody form, for each batch of samples, will be completed and forwarded to the testing laboratory.
– Sample duplicate frequency approximately 10% (5% each for intra and inter laboratory duplicates) – for chemical analysis only.

Field quality control procedures to be used during the project include the collection and analysis of the following (for chemical analysis only):

– **Intra Laboratory (Blind) duplicates/replicates:** Comprise a single sample that is divided into two separate sampling containers. Both samples are sent anonymously to the project laboratory. Blind duplicates/replicates provide an indication of the analytical precision of the laboratory but are inherently influenced by other factors such as sampling techniques and sample media heterogeneity. It is proposed to collect and analyse blind duplicate samples at a rate of at least 5%.
– **Inter Laboratory duplicates/replicates:** Individual samples are split in two in the field by the sampling crew and are placed in two separate containers. One sample is sent to the project laboratory and one sample is sent to an independent check laboratory. Field split duplicate samples provide an indication of the analytical accuracy of the project laboratory but may be affected by other factors such as sampling methodology and the inherent heterogeneity of the sample medium. It is proposed to collect and analyse blind duplicate samples at a rate of at least 5%.

Rinse blanks will be collected where sampling equipment is used but may not be analysed daily unless cross contamination is considered an issue.

It is noted that based on the contaminants of concern for the site (i.e., no volatile contaminants have been identified), the use of trip blank and trip spike samples is not required.

7.3.7 Laboratory program

The NATA accredited project laboratory will use their internal procedures and NATA accredited methods in accordance with their quality assurance system. The environmental consultant is to ensure that the laboratory analytical methods and limits of reporting are acceptable for analysis required.

Laboratory quality control procedures used during the project should include (where relevant):

– **Laboratory duplicate samples**: Duplicate sub samples collected by the laboratory from one sample submitted for analytical testing at a rate equivalent to one in twenty samples per analytical batch, or one sample per batch if less than twenty samples are analysed in a batch. A laboratory duplicate provides data on the analytical precision and reproducibility of the test result.
– **Spiked Samples**: An authentic field sample is spiked by adding an aliquot of known concentration of the target analyte(s) prior to sample extraction and analysis. A spike documents the effect of the sample matrix on the extraction and analytical techniques. Spiked samples will be analysed for each batch where samples are analysed for organic chemicals of concern.
– **Certified Reference Standards**: A reference standard of known (certified) concentration is analysed along with a batch of samples. The Certified Reference Standard (CRS) or Laboratory Control Spike provides an indication of the analytical accuracy and the precision of the test method and is used for inorganic analyses.
– **Surrogate Standard/Spikes**: These are organic compounds which are like the analyte of interest in terms of chemical composition, extractability, and chromatographic conditions (retention time), but which are not normally found in environmental samples. These surrogate compounds are spiked into blanks, standards and samples submitted for organic analyses by gas-chromatographic techniques prior to sample extraction. Surrogate Standard/Spikes provide a means of checking that no gross errors have occurred during any stage of the test method leading to significant analyte loss.
– **Laboratory Blank**: Usually an organic or aqueous solution that is as free as possible of analytes of interest to which is added all the reagents, in the same volume, as used in the preparation and subsequent analysis of the samples. The reagent blank is carried through the complete sample preparation procedure and contains the same reagent concentrations in the final solution as in the sample solution used for analysis. The reagent blank is used to correct for possible contamination resulting from the preparation or processing of the sample.

The individual testing laboratories will assess the laboratory QC program, internally; however, the results will also be independently reviewed and assessed by the Environmental Consultant.

Laboratory duplicate samples should return RPDs within the NEPM acceptance criteria of ±30%. Per cent recovery is used to assess spiked samples and surrogate standards. Per cent recovery, although dependent on the type of analyte tested, concentrations of analytes and sample matrix; should normally range from about 70-130%. Method (laboratory) blanks should return analyte concentrations as 'not detected'.

7.3.8 Dispatch and transport of samples

All samples will be dispatched and transported in accordance with laboratory procedures and requirements. The Environmental Consultant will conduct a review of these procedures and requirements to ensure that all statutory requirements are complied with.

The Environmental Consultant will seek to ensure that the specified holding times for analytes are not exceeded due to delays between sample dispatch and laboratory receipt.

7.4 Reporting

7.4.1 Site Validation Report

Where remediation has been carried out, the site must be 'validated' to ensure that the objectives stated in the CSP have been achieved. Verification of material movements in accordance with the ECR (SMEC, 2022), Stage 2A and Stage 2B DEMP and ASSMP will also be required. A SVR is required to be prepared in accordance with the relevant requirements of NSW EPA (2020) detailing extent of remediation and validation results. Because the site works have been broken down into stages with respective remediation and validation goals guided by the CSP for each stage the SVRs will be prepared at the culmination of each stage by the Environmental Consultant (GHD). The Stage 1 validation report is currently in preparation. The SVRs will be submitted to the Site Auditor, Melissa Porter of Senversa, for review and approval.

The Stage 2A and Stage 2B SVR will be completed in accordance with NSW EPA (2020) and will document the implementation of the remediation work plan as outlined in this CSP and assess any results of the validation observations and sampling against the assessment criteria stated in the CSP and approved addenda. Where validation has not been achieved, reasons must be stated, and additional site work proposed to achieve the CSP objectives. The SVR will also include information confirming that all NSW EPA and other regulatory conditions and approvals have been met. The focus of the Stage 2B works is dredging, therefore the SVR will document evidence of material movements, reconciling the volumes of soil removed and disposed of off-site and reused on-site, confirm that any disposal of waste materials off-site has been completed in accordance with the CSP and relevant regulatory requirements, and that re-use of materials has been conducted as per its contamination status (i.e. only permitted materials have been used in the bund wall), in accordance with the ECR (SMEC, 2022), Stage 2A and Stage 2B DEMP and ASSMP.

The SVR will reference the CSP and any addenda, the ECR (SMEC, 2022), Stage 2A and Stage 2B DEMP and ASSMP and verify that remediation and validation activities undertaken were in substantial compliance with these documents. Any unexpected finds that will require removal of contamination and excavation will follow the unexpected finds protocol detailed in Section 6.5. The report will provide a concluding statement on the MBD Site Compound site suitability with respect to ongoing industrial / commercial land use, make recommendations for further work (if required) and state any ongoing management/monitoring requirements.
Construction of the Emplacement Cell will be documented by a separate verification process, to be completed by the Emplacement Cell Auditor in accordance with Schedule 3, Condition 10 of Infrastructure Approval (SSI 9471).

7.4.2 Long Term Environment Management Plan

Once the installation of any capping layers required are complete, including containment of any contaminated materials, a Long Term Environmental Management Plan (LTEMP) will be prepared. The LTEMP will be expanded to include:

– A drawing clearly identifying the locations of remaining impacted materials and the capping details (works as executed drawings).
– Advice on how to recognise if the cap has been breached.
– A long-term maintenance and monitoring/inspection program for the cap.

– Provision of additional control measures and their application for any future works that may penetrate through the cap including road repair/maintenance.

Information to be provided by the Contractor during the preparation of the LTEMP shall include the details of any standard protocols relevant to the LTEMP.

The LTEMP will require review and approval by the Site Auditor, Melissa Porter.

8. Health and safety

8.1 Work health and safety

Work Health and Safety (WHS) is a necessity to ensure the health and safety of all personnel working/visiting the site. Therefore, work shall be carried out in accordance with a site-specific WHSP. The Stage 2A and Stage 2B Principal Contractors shall prepare a site specific WHSP (or combined HSE Plan) for the works, addressing as a minimum the requirements of this CSP, and shall appoint a Site Safety Officer for the duration of the works.

The purpose of the plan is to provide all relevant health and safety information for all personnel undertaking work at the site and to provide and maintain safety standards and practices which offer the highest practical degree of personal protection to the on-site workers, based on current knowledge.

The plan will recognise the legislative obligations of the Stage 2A and Stage 2B Principal Contractors and of AIE and will in particular:

– Recognise that the work to be undertaken as part of the CSP may involve a “construction project” (as defined in the relevant legislation) in respect of which AIE and/or the Contractors have obligations as Principal Contractors. These obligations will be expressly dealt with in the plan.
– Recognise that the work to be undertaken as part of the CSP includes “high risk construction work” (as defined in the relevant legislation) in respect of which both the Stage 2A and Stage 2B Principal Contractors and AIE have obligations. These obligations will be expressly dealt with in the plan.

It is the responsibility of the Stage 2A and Stage 2B Principal Contractors and the AIE Project Manager to take all necessary practicable actions to safeguard the safety and health of all employees and subcontractors while they are on the site.

All work undertaken shall be performed in accordance with the provisions of the WHS Act, the WHS Regulations and any other relevant regulations or directions issued by regulatory authorities.

8.2 Community health and safety

To ensure the protection of the local community, the Stage 2A and Stage 2B Principal Contractors shall control the exposure pathways identified in this section.

Control mechanisms will include the following:

– Site security measures to control direct contact with the contamination.
– Dust suppression measures to control inhalation exposure.
– Cleaning and tarping trucks to control direct contact from migration of contaminated soils.

These measures shall be documented in detail in relevant management plans prepared by the Stage 2A and Stage 2B Principal Contractors.

9. CSP conclusions

The purpose of this CSP is to manage contamination issues during Stage 2A and Stage 2B works.

Stage 2A and Stage 2B works covered by the CSP will comprise:

– Stage 2A
  - Construction of the quay wall at MBD Site Compound incorporating finalisation of excavation works undertaken during Stage 1 (including transport of spoil materials to Emplacement Cell Construction Site).
  - Installation of and commissioning of power, communications, and potable water line.
  - Construction of ORF at MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
  - Installation of gas pipeline within MBD Compound site.
– Stage 2B
  - Continuation of Stage 2A works.
  - Installation of site facilities and preparatory earthworks at Emplacement Cell Construction Site.
  - Marine-based construction activities including installation of silt curtains, navigational aids, and revetment shore protection at the MBD Site Compound.
  - Construction of the Emplacement Cell in the Outer Harbour.
  - Excavation and dredging of the MBD Site Compound in the Inner Harbour.

The CSP sets management requirements for the removal and on-site or off-site placement of excavated or dredged soils,ensuring it will pose no unacceptable risk to human health or the environment. The CSP also outlines the remediation techniques, procedures and validation sampling requirements (should the need occur), and the procedures for appropriate material management and movement. In addition, the safeguards to ensure works relating to contamination are handled in a safe and environmentally acceptable manner are documented, and the necessary approvals and licences required by regulatory authorities in order to enable Stage 2A and Stage 2B works to proceed (in relation to contamination issues only) are detailed.

The investigations that have been undertaken to date are considered sufficient to develop this CSP. Additional areas may require remediation should unexpected finds pertaining to contamination be encountered . Provided the measures detailed in this CSP are appropriately implemented, contamination will be unlikely to be present on the site at concentrations which would be considered a risk to human health or the environment under ongoing commercial/industrial land use, subject to an accompanying environmental management plan.

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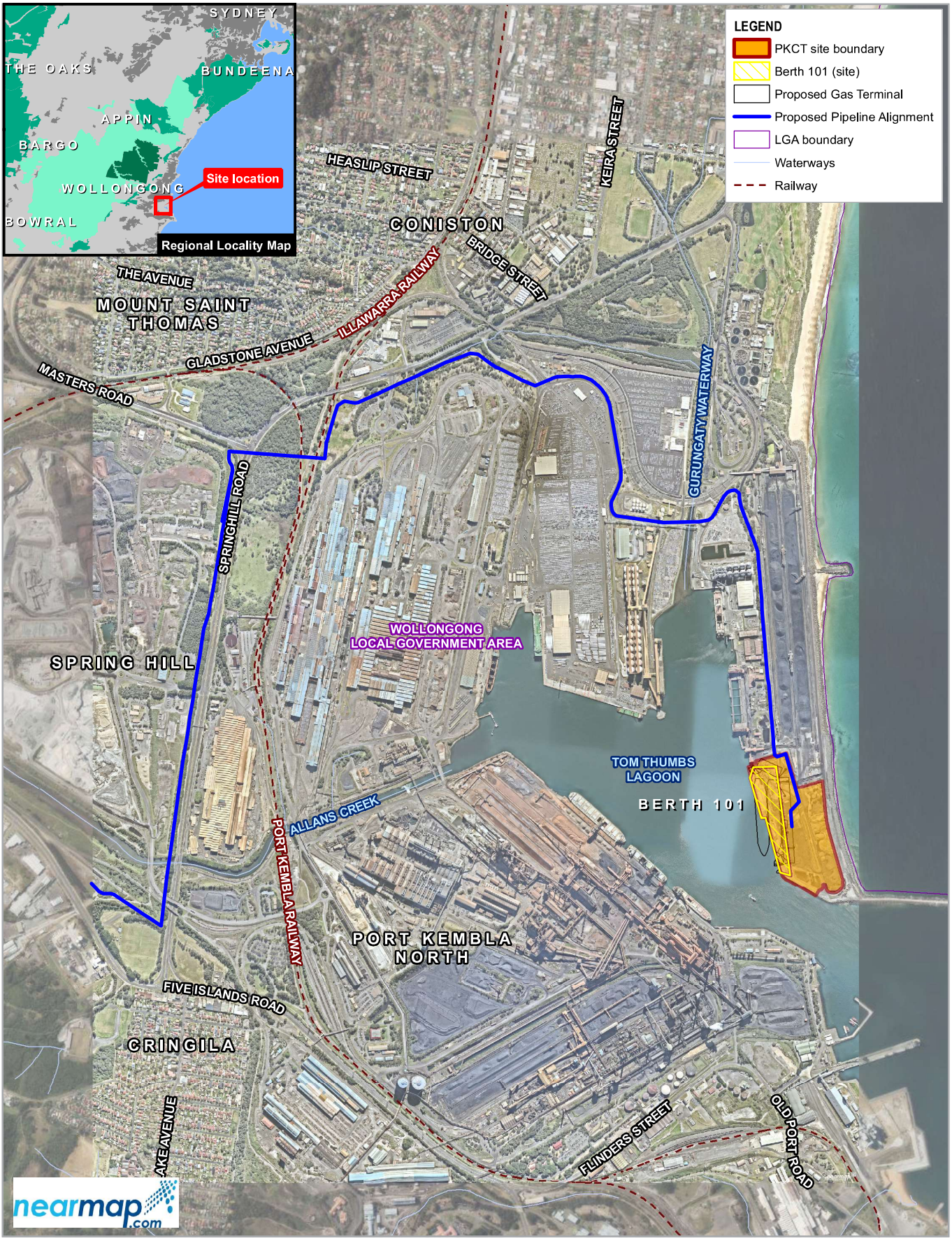
Appendices

Appendix A

Figures



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Australian Industrial Energy
Berth 101 LNG Facility, Port Kembla, NSW
Remediation Works Plan

Project No. **21-27477**
Revision No. **-**
Date **25/02/2021**

Remediation Works Plan – Berth 101

FIGURE 1

Data source: Aerial imagery - nearmap 2021 (image date 16/04/2018, date extracted 01/08/2018) & sixmaps 2021 © Department of Customer Service 2020; General topo - NSW LPI DTDB 2017, 2015 & 2015; Inset map - Geoscience Australia; Berth footprint - Australian Industrial Energy. Created by: kschroder-turner

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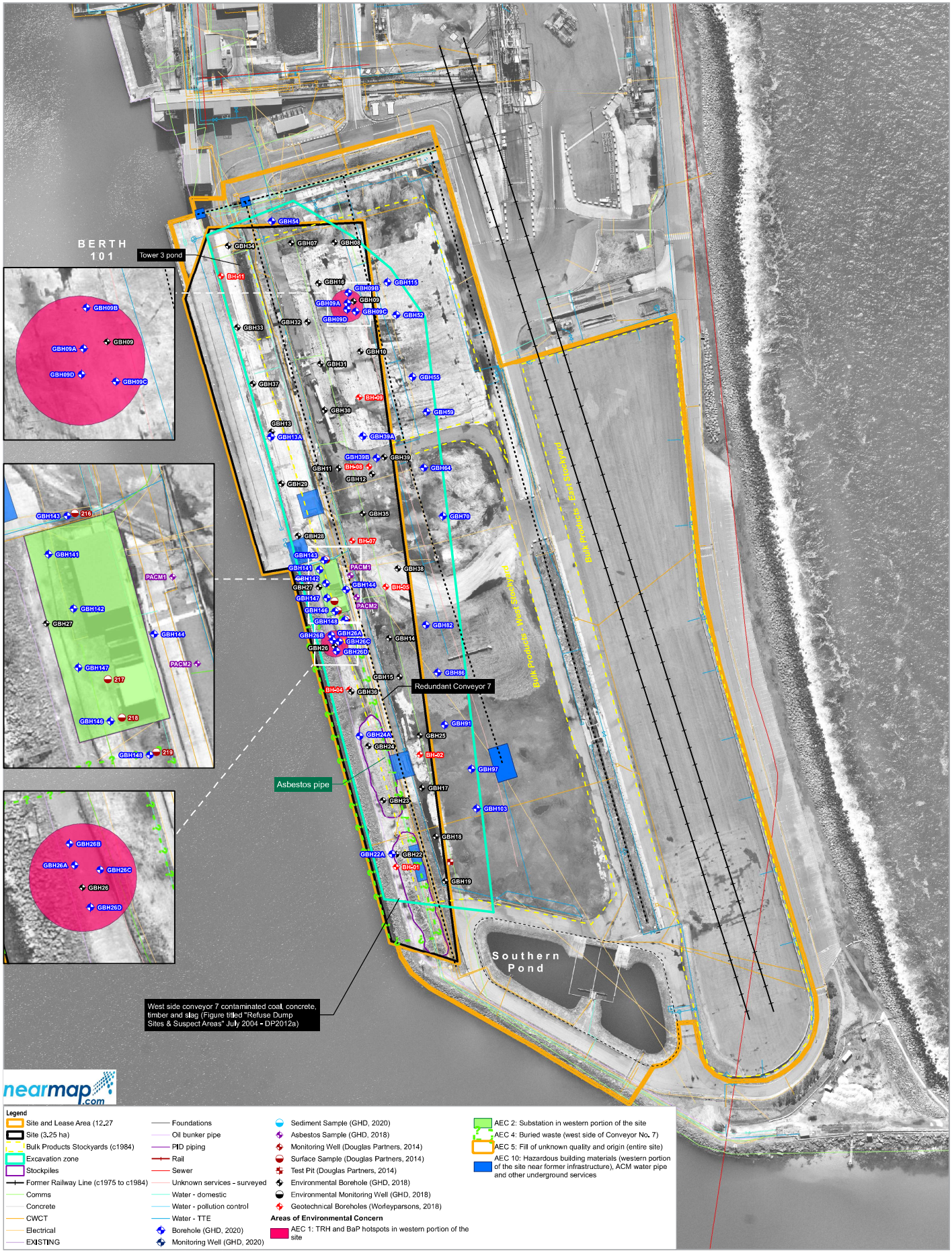

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Australian Industrial Energy
Berth 101 LNG Facility, Port Kembla, NSW
Baseline Contamination Assessment

Project No. 21-27477
Revision No. A
Date 25/02/2021

Site Layout Plan showing AECs

FIGURE 2

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Data source: Aerial imagery - nearmap 2021 (image date 05/09/2020, date extracted 20/10/2020); General topo - NSW LPI DTDB 2017, 2015 & 2012; Berth footprint - Australian Industrial Energy; Survey - PKCT 2020. Created by: kschroder-turner

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