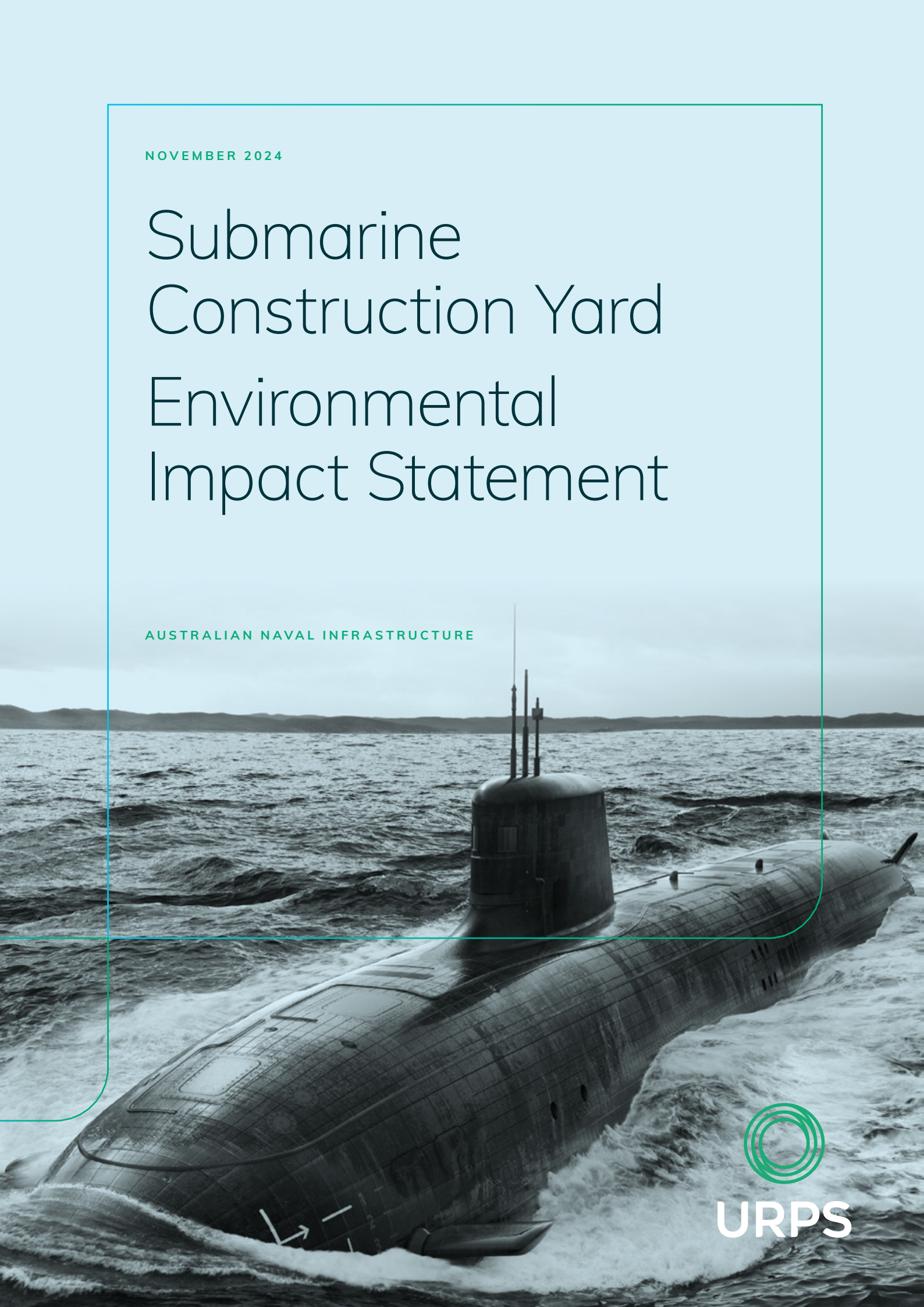
NOVEMBER 2024

Submarine Construction Yard Environmental Impact Statement

AUSTRALIAN NAVAL INFRASTRUCTURE



URPS

Environmental Impact Statement Executive Summary

We acknowledge and pay our respects to the Traditional Owners, the Kaurna people of the Adelaide Plains. It is upon their ancestral lands that the development is proposed.

We pay respect to Elders past and present. We respect their spiritual beliefs and connection to land, waters and culture which are of continuing importance to the living Kaurna people today. We further acknowledge the contribution and important role that First Nations people continue to play in our shared community.

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Acronyms

Acronym	In full
ABS	Australian Bureau of Statistics
ADS	Adelaide Dolphin Sanctuary
ADS Act	*Adelaide Dolphin Sanctuary Act 2005*
AEP	Annual Exceedance Probability
AH Act	*Aboriginal Heritage Act 1988*
AHD	Australian Height Datum
ANI	Australian Naval Infrastructure Pty Ltd
AQMP	Air Quality Management Plan
ARPANS Act	*Australian Radiation Protection and Nuclear Safety Act 1998*
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ANNPS	Australian Naval Nuclear Power Safety Bill 2024
ANNPSR	Australian Naval Nuclear Power Safety Regulator
ASA	Australian Submarine Agency
ASS	Acid Sulfate Soils
ASSMP	Acid Sulfate Soil Management Plan
BMP	Biosecurity Management Plan
CAQMP	Construction Air Quality Management Plan
CEMP	Construction Environmental Management Plan
CNVMP	Construction Noise and Vibration Management Plan
CO_2	Carbon dioxide
CT	Certificate of Title
CTMP	Construction Traffic Management Plan
CWMP	Construction Waste Management Plan
DA	Development Application
dB	Decibels
DCCEEW	Department of Climate Change, Energy, the Environment and Water

Acronym	In full
DEW	Department for Environment and Water
DIT	Department for Transport and Infrastructure
DMP	Dredge Management Plan
DMPA	Dredge Material Placement Area
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMD	Estimated Maximum Demand
EP Act	*Environment Protection Act 1993*
EPA	Environment Protection Authority
EPBC Act	*Environment, Protection and Biodiversity Conservation Act 1999 (cth)*
EPPs	Environment Protection Policies
ESD	Environmentally Sustainable Design
GARP	Greater Adelaide Regional Plan
GBE	Government Business Enterprise
GGERS	Greenhouse Gas Emissions Reduction Strategy
GHG	Greenhouse Gas
IAEA	International Atomic Energy Agency
IEMA	Institute of Environmental Management and Assessment
ISO	International Organisation for Standardisation
KV	Kilovolt
MCEMP	Marine and Coastal Environmental Management Plan
Minister	Minister for Planning
MT	Million Tonnes
MVA	Mega Volt Amps
NEPM	National Environment Protection Measure
NPW Act	*National Parks and Wildlife Act 1972*
NSRP	Nuclear Steam Raising Plant
NV Act	*Native Vegetation Act 1991*

Acronym	In full
OEMP	Operational Environmental Management Plan
OHCD	Outer Harbor Channel Deepening
OHCW	Outer Harbor Channel Widening
ONS	Osborne Naval Shipyard
PASS	Potential Acid Sulfate Soils
PDI Act	*Planning, Development and Infrastructure Act 2016*
PDI Regulations	*Planning, Development and Infrastructure (General) Regulations 2016*
PIRSA	Primary Industries and Regions South Australia
PM	Particulate Matter
PMTP	Power Unit Transport Package
POMS	Pacific Oyster Mortality Syndrome
PPE	Personal Protective Equipment
PPV	Peak Particle Velocity
PRT	Power Range Testing
RCPs	Representative Concentration Pathways
RMP	Radiation Management Plan
SAQP	Sampling Analysis and Quality Plans
SCAP	State Commission Assessment Panel
SCY	Submarine Construction Yard
SEB	Significant Environmental Benefit
SECMP	Soil, Erosion and Contamination Management Plan
SEIFA	Socio-Economic Indexes for Areas
SHP	State Heritage Place
SIA	Social Impact Assessment
SMP	Stormwater Management Plan
SPPs	State Planning Policies
SSIEPs	State Significant Industrial Employment Precincts
SSN-AUKUS	Submersible Ship Nuclear

Acronym	In full
STEM	Science, Technology, Engineering, Maths
TFFMP	Terrestrial Flora and Fauna Management Plan
TMP	Traffic Management Plan
VOC	Volatile Organic Compounds
WDF	Waste Derived Fill
WMMP	Waste Management and Minimisation Plan
WSUD	Water Sensitive Urban Design

Glossary

Term or phrase	Meaning
Assessment Requirements	The project specific assessment requirements set by the State Planning Commission which identify the major potential issues associated with the development which the EIS should address
AUKUS	Trilateral security partnership between Australia, the United Kingdom, and the United States of America.
Baseline	Existing baseline: conditions that currently exist within the development site and surrounds. Future baseline: the likely evolution of the baseline conditions without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort based on the availability of environmental, social and economic information and scientific knowledge.
Commission	State Planning Commission
Cumulative effect	Potential cumulative effects are categorised into two types: • Intra-project effects: The combined effects of individual effects resultant from the development upon a set of defined sensitive receptors, for example, noise, dust and visual effects; and • Inter-project effects: The combined effects arising from another project(s), which individually might be insignificant, but when considered together, could create a significant cumulative effect. For example, dust effects from multiple construction sites affecting the same receptor.
Dewatering	The removal of water from a location.
Development	The nuclear-powered Submarine Construction Yard development as assessed for the purpose of the environmental impact assessment in the Environmental Impact Statement – ie. Area 1, 2 and 3 and associated construction and operation of these areas.
Development site	The site area assessed for the purpose of the environmental impact assessment in the Environmental Impact Statement – ie. Area 1, 2 and 3.
Effect	Used to express the consequence of an impact (refer definition for impact). For example, removal of underlying soils (impact) has the potential to disturb underlying buried heritage receptors (effect).

Term or phrase	Meaning
Environmental Impact Statement	This document is the Environmental Impact Statement (EIS). The EIS process is the highest level of assessment under the *Planning, Development and Infrastructure Act 2016 (PDI Act)* and enables the holistic consideration of projects that are considered to be of economic, social or environmental importance to South Australia.
Environmental Impact Assessment	The Environmental Impact Assessment (EIA) process provides a comprehensive assessment of a development or project proposal and the expected effects on the receiving environment and within the broader context of its setting, which could relate to a local area, region, state or nation.
Impact	A change that is caused by an action. For example, excavation works would lead to a removal of underlying soils (impact). There are multiple types of impact: • Direct impact: an event or circumstance that is caused by the action. • Indirect impact: an event or circumstance that is substantially caused by the action. • Facilitated impact: an event or circumstance that occurs because of a separate and unrelated party (that is, not related to the person that took the original action) undertaking a separate action that is able to occur because the original action occurred. • Cumulative impact: the effect of the action in combination with other known development impacts, or other projects or activities to occur concurrently in the region of the development.
Impact Assessed Development	On 15 February 2024, the Minister for Planning declared that the proposed development of a Nuclear-Powered Submarine Construction Yard (SCY) by proponent Australian Naval Infrastructure Pty Ltd at Osborne (subject land identified in Figure 1.1) be assessed as an Impact Assessed development pursuant to section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016*.
Land-based portion of the development site	The terrestrial portion of the development site, located outside of the Port River.
Magnitude of impact	Magnitude of impact takes into account the spatial extent, duration, frequency and reversibility of an impact.
Marine-based portion of the development site	The portion of the development site located within the Port River.

Term or phrase	Meaning
Mitigation measures	Measures that aim to avoid, reduce, or offset potential adverse effects and maximise potential beneficial effects. There are several categories of mitigation measures considered in the EIS: • Inherent mitigation measures - those which are modifications to the location or design of the development during the pre-application phase that are 'designed in' or an inherent part of the development and do not require additional action to be taken. • Additional mitigation measures - those that require further action to be taken to achieve the anticipated outcome or those that require a controlling mechanism or legal undertaking to be implemented, but are under the control of the ANI, the Contractor (during construction), the Shipbuilder (during operation) or statutory agencies, e.g. Monitoring and Reporting; Operating Procedures; Agreements; Separate Licenses and Approvals; and Stakeholder Engagement and Agreements. • Standard mitigation measures – those that would occur notwithstanding the EIA to meet with legislative requirements or standard practices, e.g. construction mitigation with a high degree of certainty over delivery, e.g. measures to be included in the Construction Environmental Management Plan ('CEMP'). Inherent and standard mitigation measures are considered as 'embedded mitigation' for the EIA.
Nuclear-powered propulsion system	Nuclear power units (reactors) that will be sourced from overseas to provide submarines power for the entire design life of the vessel. Also known as the nuclear steam raising plant (NSRP).
Optimal pathway	Timing and phasing to achieve the construction and delivery of the nuclear-powered submarines.
Osborne Naval Shipyard	Refers to the Osborne Naval Shipyard facilities currently under operation and in construction on property administered by Australian Naval Infrastructure.
Practise Direction 17	Rules for the assessment process for impact assessed development applications.
Project	The entire SSN-AUKUS submarine project, including all works required to support Australia to acquire conventionally-armed nuclear-powered submarines. The scope of the project is larger than that of the development assessed in the Environmental Impact Statement.

Term or phrase	Meaning
Residual effects	Residual effects are those that remain following the consideration of mitigation within the assessment (i.e., once all Embedded Mitigation and secondary mitigation is taken into account).
Sensitive receiver	Sensitive receivers are affected persons, premises or matters. They can include: • Human beings (e.g. existing surrounding residential / future site users). • Built resources (e.g. houses, buildings, heritage structures, other premises or open areas). • Natural resources (e.g. plants, animals or ecosystems).
Significance of effect	'Significance' reflects the relationship between the magnitude of an impact and the sensitivity (or value) of the affected resource or receptor.
SSN-AUKUS	A planned class of nuclear-powered fleet submarine intended to enter service with the United Kingdom's Royal Navy in the late 2030s and Royal Australian Navy in the 2040s.
Subject site	The site area gazetted on 15 February 2024 when the development was declared as an Impact Assessed development. This area is larger than that actually assessed in the Environmental Impact Statement due to change in scope of the development following gazettal.

CHAPTER 1

Introduction and Need for the Development

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1. Introduction and Need for the Development

1.1 Background to the Proposal

This Environmental Impact Statement (EIS) has been prepared on behalf of Australian Naval Infrastructure Pty Ltd (ANI) for the nuclear-powered Submarine Construction Yard (SCY) (the 'development') at the preferred site at Osborne, Adelaide.

In September 2021, the AUKUS trilateral security partnership (AUKUS), formed between Australia, the United Kingdom, and the United States was announced. The AUKUS partners agreed to support Australia to acquire conventionally-armed nuclear-powered submarines to meet Australia's defence requirements for future decades (hereafter referred to as the 'Project'). Australia will begin building its first SSN-AUKUS in Adelaide, South Australia, by the end of this decade. Australia plans to deliver the first Australian-built SSN-AUKUS to the Royal Australian Navy in the early 2040's[1].

SSN-AUKUS will incorporate the best submarine technology from all three nations to deliver a world-class submarine. SSN-AUKUS will be operated by both the UK and Australian Navies, and will be equipped for intelligence, surveillance, under-sea warfare and strike missions. They will enhance the ability of our three nations to deter aggression and contribute to stability in the Indo-Pacific and globally.

Importantly, the United Kingdom and United States have demonstrated operation of more than 500 naval nuclear reactors that have collectively travelled more than 150 million miles without incident or adverse effect on human health or the quality of the environment. A sophisticated security and safety architecture will surround Australia's nuclear-powered submarine program to uphold these same standards[2].

With the preferred site, which is adjacent to the Osborne Naval Shipyard (ONS), being announced, the design and planning process is now underway to support the delivery of the SCY.

To support the Project, the Commonwealth and State have signed a Cooperation Agreement, outlining government's commitment to supporting the construction of Australia's SSN-AUKUS in Adelaide. This agreement includes land exchanges, acquisition, construction of a Skills and Training Academy, increased university places in STEM (science, technology, engineering and maths) disciplines and investment in research capability and infrastructure within South Australia.

[1] Australian Submarine Agency 2024, AUKUS, accessed via <https://www.asa.gov.au/aukus>
[2] The White House 2023, FACT SHEET: Trilateral Australia-UK-US Partnership on Nuclear-Powered Submarines, accessed via <https://www.whitehouse.gov/briefing-room/statements-releases/2023/03/13/fact-sheet-trilateral-australia-uk-us-partnership-on-nuclear-powered-submarines/#:~:text=For%20over%2060%20years%2C%20the,the%20quality%20of%20the%20environment>

1.2 Purpose and Structure of this Environmental Impact Statement

On 15 February 2024, the Minister for Planning declared the SCY ('the development') as an Impact Assessed development under section 108 (1)(c) of the *Planning, Development and Infrastructure Act 2016* (PDI Act). The Impact Assessed process is the highest level of assessment under the PDI Act and enables the holistic consideration of projects that are of economic, social or environmental importance to South Australia. Given the extensive investigations required to support the Impact Assessed process, section 76(2)(d) of the PDI Act enables the Code to be amended to align with an Impact Assessed development authorisation.

The Impact Assessed process provides a comprehensive assessment of a development or project proposal and the expected effects on the receiving environment and within the broader context of its setting, which could relate to a local area, region, state or nation. This process requires the preparation of an EIS.

1.2.1 Objectives

The EIS reports on an Environmental Impact Assessment ('EIA') process undertaken for the development. EIA is a systematic process that aims to prevent, reduce or offset the significant adverse effects of development proposals and enhance beneficial effects. It ensures that planning decisions are made considering the likely significant effects and with engagement from statutory agencies and other stakeholders including the public.

The EIS identifies measures required to prevent, reduce or offset any significant adverse effects (known as 'mitigation measures'), together with any monitoring that may be appropriate, to help inform decision-making.

The EIS is being undertaken in parallel with Commonwealth approvals under the *Environment, Protection and Biodiversity Conservation Act 1999* (EPBC Act) (as described in Chapter 3 of this EIS). The objectives of the EIS are to:

- Explain the need for the SCY.
- Identify and assess the potential impacts of the SCY on the environment, community and economy, and the measures to avoid, minimise and mitigate negative impacts.
- Provide a source of information for stakeholders to facilitate informed consultation and feedback.
- Address the Commission's Assessment Requirements to inform the approvals process.

1.2.2 Structure of this EIS

The EIS has been prepared to respond to the Assessment Requirements approved by the independent State Planning Commission (Commission) in August 2024. These requirements are provided in Appendix 3. The Assessment Requirements and Practice Direction 17 identify the information for inclusion in an EIS. Appendix 3 provides a summary of where the Commission's requirements under Part 5 are addressed within the EIS.

The EIS has where possible been structured around the Commission's requirements of the EIS, as outlined with Table 1.1 below. Specialist studies supporting this EIS are provided in the Appendices.

Table 1.1: EIA Structure

Chapter	Title	Summary
1	Introduction and Need for the Development	Addresses matters under Section 5.3 & 5.4 of the Assessment Requirements (other than legislative requirements which is in Chapter 3).
2	Description of the Development	Addresses matters under section 5.5 (Description of the Proposal), 5.6 (Project Alternatives), 5.7 (Summary of Proceeding Actions) of the Assessment Requirements.
3	Legislation and Regulatory Approvals	Identifies the relevant legislative requirements for the development, including approvals and licenses.
4	General EIS Requirements	Includes an assessment against the State Planning Policies, Regional Plan, Planning and Design Code, General Environmental Duty, Environment Protection Authority (EPA) Policies and Protected Matters. It also addresses matters that fall outside of the EIA process but have been requested by the Commission to be included within the EIS.
5	Receiving Environment	Provides a summary of the existing conditions and environment that could be impacted by the development
6	Impact Assessment Methodology	This chapter sets out the impact assessment methodology which was adopted in the EIS.
7 to 24	Technical Chapters	Includes 17 Technical Chapters that provide an assessment of likely significant effects of the development and directly respond to the Commission Requirements.
25	Summary of Significant Effects	Summarises the conclusions from the assessment of the residual significant effects of the development.

1.3 Assessment Requirements

This chapter addresses the following Commission Assessment Requirements for the Introduction to the EIS:

- Background and objectives of the proposal.
- Purpose and description of the EIS process.
- Staging and timing of the proposal.
- Proponent details.
- Relevant legislative requirements and approval processes (this is covered separately in Chapter 3).
- The specific objectives that the proposal is intended to meet, including market requirements or government requirements.
- Expected local, regional and State benefits and costs, including those that cannot be adequately described in monetary or physical terms (e.g. effects on aesthetic amenity) (Note: Chapter 17: Local, regional and state economies provides the impact assessment).
- A summary of environmental, economic and social arguments to support the proposal including the consequences of not proceeding with the proposal.

1.4 Development Description

To support the preparation of the Assessment Requirements, on 5 April 2024 ANI lodged a scoping development application with the Commission. The development broadly includes the following:

- Development associated with the construction and operation of the SCY.
- Development associated with any change in the use of land and coastal waters.
- Development associated with the construction, installation or provision of specified infrastructure, facilities and services (outlined in the declaration notice).
- Development (including development undertaken on land or coastal waters in the State, inclusive but not limited to the land and coastal waters specified in the gazette) associated with any excavation or filling of land associated with any development.
- Development (including development undertaken on land or coastal waters in the State, inclusive but not limited to the land and coastal waters specified in the gazette) associated with the division of land associated with the development.
- Any related or ancillary development (including development undertaken on land or coastal waters in the State, inclusive but not limited to the land and coastal waters specified in in the gazette).

It is noted that associated works for the development, comprising of a grade separated link road over the rail corridor, has been the subject of a separate crown sponsored development application, and the dredging of the Port River navigational channel and basin (to support the movement of vessels to and from the new shipyard) and ongoing maintenance dredging, are not part of this assessment process.

Other exclusions include the relocation of utility services and some infrastructure associated with training or early project demonstration (refer to Chapter 2).

The 'development site' is the area shown in Figure 1.1. For the purpose of the assessment within this EIS, the development site is smaller than the gazetted 'subject site' shown in Figure 1.2 which was prepared before the exact extent of the development was confirmed. The development site is located on the north-eastern side of the Lefevre Peninsula in Osborne, South Australia. It encompasses the area shown in Figure 1.1. A more detailed description of the development is provided in Chapter 2 of this EIS.

Figure 1.1 – Development Site

Figure 1.2 – Gazetted Subject Site

1.4.1 Exclusion of the Nuclear-powered Propulsion System

The nuclear-powered propulsion systems for the SSN-AUKUS will be sourced from overseas, and these units provide submarines power for the entire design life of the vessel. The nuclear-powered propulsion system will be sealed during manufacture offsite overseas and delivered to the development site for assembly into the nuclear-powered propulsion system. It is at that time that the submarine and its systems will be tested, commissioned and then deployed. As these units are sealed during manufacture off the development site, and this process is undertaken overseas this component, and that of the of the nuclear-powered propulsion system construction is excluded from this EIS.

Limited quantities of low level waste are anticipated to be generated throughout later stages of the submarine build. This waste will be collected, sorted and categorised before being taken off-site for disposal (once a suitable facility becomes available). No intermediate-level or high-level (Spent Nuclear Fuel) radioactive waste will be generated during construction of the submarines. See Chapter 4, Section 4.13 for further details on this matter.

1.5 Strategic Context

1.5.1 The AUKUS Partnership

Australia, the United Kingdom and the United States announced the AUKUS trilateral security partnership in September 2021. The AUKUS partners agreed to support Australia to acquire conventionally-armed nuclear powered submarines (known as 'submersible ship nuclear' or SSN).

The approach for Australia to develop a conventionally-armed nuclear-submarine capability (the 'Optimal Pathway') was announced on 13 March 2023 (Figure 1.3). Five conventionally-armed nuclear-powered submarines, to be known as the SSN-AUKUS, are planned to be built in Australia under AUKUS.

Australia's acquisition of SSN capability is one of the greatest industrial endeavours Australia has ever undertaken. It will be a whole-of-nation, multi-generational undertaking enhancing our individual and collective capacity to support security, peace and economic prosperity in the Indo-Pacific.

Figure 1.3 – Benefits of nuclear-powered submarines[7]

1.5.2 The 2024 National Defence Strategy

The 2024 National Defence Strategy outlines the government's strategic framework to guide the significant and urgent changes required to address Australia's challenging strategic circumstances[3].

Together with the rebuilt Integrated Investment Program, the National Defence Strategy is a blueprint to deliver an ambitious transformation of the Australian Defence Force to an integrated, focused force capable of safeguarding Australia's security for decades to come.

The adoption of National Defence also means the Australian Defence Force will shift to an integrated, focused force designed to address Australia's most significant strategic risks. This will ensure the Australian Defence Force has the capacity to:

- Defend Australia and our immediate region.
- Deter through denial any potential adversary's attempt to project power against Australia through our northern approaches.
- Protect Australia's economic connection to the region and the world.
- Contribute with our partners to the collective security of the Indo-Pacific.
- Contribute with our partners to the maintenance of the global rules-based order.

AUKUS is a key part of this Strategy. As the Defence State and the nation's maritime capital, South Australia is well equipped to deliver on this strategic priority[4]. Renowned for its innovation, world-class research and development, and a highly skilled workforce, the state's defence industry has a proud history of delivering some of Australia's largest and most complex defence projects.

South Australia is also already home to Australia's largest naval shipbuilding hub[5]. This existing infrastructure will complement the major upgrades required to expand this precinct and build the future SCY at Osborne to deliver Australia's nuclear-powered submarines.

1.5.3 Defence State Sector Strategy

The Defence State Sector Strategy prepared by the Government of South Australia and Defence SA has key priorities for delivery by 2030[6]. In relation to the SCY they are:

- Success in submarine construction, maintenance and design.
- The state is established as the premier location for information warfare.
- World-class infrastructure at Osborne is delivered.
- Upgrades to the state's Defence infrastructure is completed.

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[3] Australian Government Defence 2024, 2024 National Defence Strategy and 2024 Integrated Investment Program, <https://www.defence.gov.au/about/strategic-planning/2024-national-defence-strategy-2024-integrated-investment-program>

[4] Defence SA 2024, Why Defence SA?, accessed via <https://defencesa.com/about-defence-sa/why-defence-sa/>

[5] Australian Naval Infrastructure 2024, Home, accessed via <https://www.ani.com.au/>

[6] Defence SA 2024, Defence Sector Strategy, accessed via https://defencesa.com/about-defence-sa/defence-sa-strategy/

- South Australia recognised as the place to go for a highly skilled career in the defence industry.
- South Australia's defence industry grows in size and sophistication.
- South Australia successfully delivers key naval shipbuilding projects.
- South Australia is world-renowned for its defence research, development and innovation.

The SCY seeks to deliver on the objectives of the Defence Sector Strategy by expanding the capability and capacity of shipbuilding infrastructure on the Lefevre Peninsula. The state has a unique opportunity to create a sustainable and globally competitive defence industry, while contributing to our nation's sovereign capability.

The Strategy recognises the importance of naval shipbuilding projects to South Australia's economy,

1.5.4 Rationale for Nuclear-Powered Submarines[7]

Australia's SSN-AUKUS will incorporate the best submarine technology from all three nations to deliver a world-class submarine. SSN-AUKUS will be operated by both the UK and Australian Navies, and will be equipped for intelligence, surveillance, under-sea warfare and strike missions. They will enhance the ability of our three nations to deter aggression and contribute to stability in the Indo-Pacific and globally.

Submarines are an essential part of Australia's naval capability and provide a strategic advantage in terms of surveillance and protection of our maritime approaches. As a maritime nation, Australia relies on international trade for our economic prosperity and on multiple seabed cables to connect us to the global trading system. There would be substantial impact on the Australian economy and security through disrupting transport of essential goods such as fuel and medicines and restricted ability to export to international markets if sea lanes were to be closed or blocked. The submarine capability provides security and a means to protect Australian waters and interests.

The acquisition of conventionally-armed, nuclear-powered submarine is the Australian Government's response to deteriorating strategic circumstances and military build-up in the Indo-Pacific region. Through boosting our defence capability, Australia seeks to deter any state that would wish to aggressively pursue its national interests in the Indo-Pacific region. In doing so, the capability forms part of Australia's contribution to a secure and prosperous Indo-Pacific.

Although conventionally-powered submarines have met Australia's submarine capability needs to date, conventionally-armed nuclear-powered submarines have a greater endurance, mobility and stealth than other available conventionally powered submarines, and are expected to meet Australia's defence requirements in the decades ahead.

The ability of the current conventionally-powered diesel submarines to meet Australia's capability needs will diminish because of the availability of more advanced and proven technological solutions such as nuclear-power. SSN-AUKUS is expected to include well developed and proven systems and would combine the strengths and innovations of each AUKUS partner to deliver capable conventionally-armed nuclear-powered submarines.

The United Kingdom Royal Navy and United States Navy retired their last conventionally-powered submarines in the early 1990s because SSNs have superior stealth, speed, manoeuvrability, survivability and endurance when compared to diesel-electric powered submarines. The benefits of SSN are summarised in Figure 1.4 and 1.5.

Figure 1.4: Advantages of nuclear-powered submarines[7]

[7] Australian Submarine Agency 2024, The AUKUS Nuclear-powered Submarine Pathway A Partnership For The Future, Public Report. accessed via <https://www.asa.gov.au/aukus>

1.5.5 Project Objectives

While there are a range of Defence related objectives for this development, there are opportunities to leverage off of this significant investment and achieve a broader range of outcomes as described in Table 1.2 below.

Table 1.2: Project objectives

Category	Objectives
Defence	• Defend Australia and our immediate region. • Deliver Nuclear-Powered Submarines in accordance with international agreements. • Build South Australia's recognition as the Defence State.
Economic	• Protect Australia's economic connection to the region and the world. • Capitalise on the economic and employment opportunities of a significant capital investment for South Australia. • Build skills and capacity within the technology and defence sectors. • Capitalise on the skills and knowledge of South Australia's ship building industry.
Environment	• Contribute towards Australia's international obligations. • Protect important environmental assets including Mutton Cove and the Adelaide Dolphin Sanctuary. • Minimises impacts to ecological communities. • Deliver sustainability outcomes for South Australia.
Social	• Build the social license of defence by undertaking genuine engagement with communities. • Create a fully functioning facility that addresses impacts such as noise, traffic, air quality impacts on the community.

1.5.6 Project Benefits Summary

There are a range of social, environmental and economic benefits of this program which are summarised below and in Figure 1.5. These are explored further through this EIS report.

Economic and Employment Benefits

- $2 billion invested in infrastructure in South Australia. Future sustainment of the SSN-AUKUS will not be undertaken at Osborne.
- Significant employment opportunities:
  - At its peak, up to 4,000 Australian workers employed to design and build the infrastructure for the SCY in Osborne.
  - A further 4,000-5,500 direct jobs created to build nuclear-powered submarines in South Australia when the program reaches its peak.
  - Jobs will be sustainable, transferrable and well-paying manufacturing and knowledge-intensive jobs, contributing to a more resilient and productive economy.
- Additional training, skilling and educational programs established to achieve workforce growth for the local submarine and shipbuilding industry.
- Significant opportunities for small, medium and large enterprises to support the construction and sustainment of nuclear-powered submarines, which will boost Australia's technical capabilities and provide flow on benefits to related industries.
- Social and economic benefits for the local community, with provision of well-paying local jobs and educational opportunities.
- There is also likely to be some level of flow on economic activity from workers at the SCY supporting local businesses in retailers, hospitality businesses, and local service providers.
- Significant investment in industry has a range of flow on effects to the community and can result in gentrification. Gentrification often leads to increased investment in a neighbourhood, which can spur economic growth, create jobs, and boost local businesses.

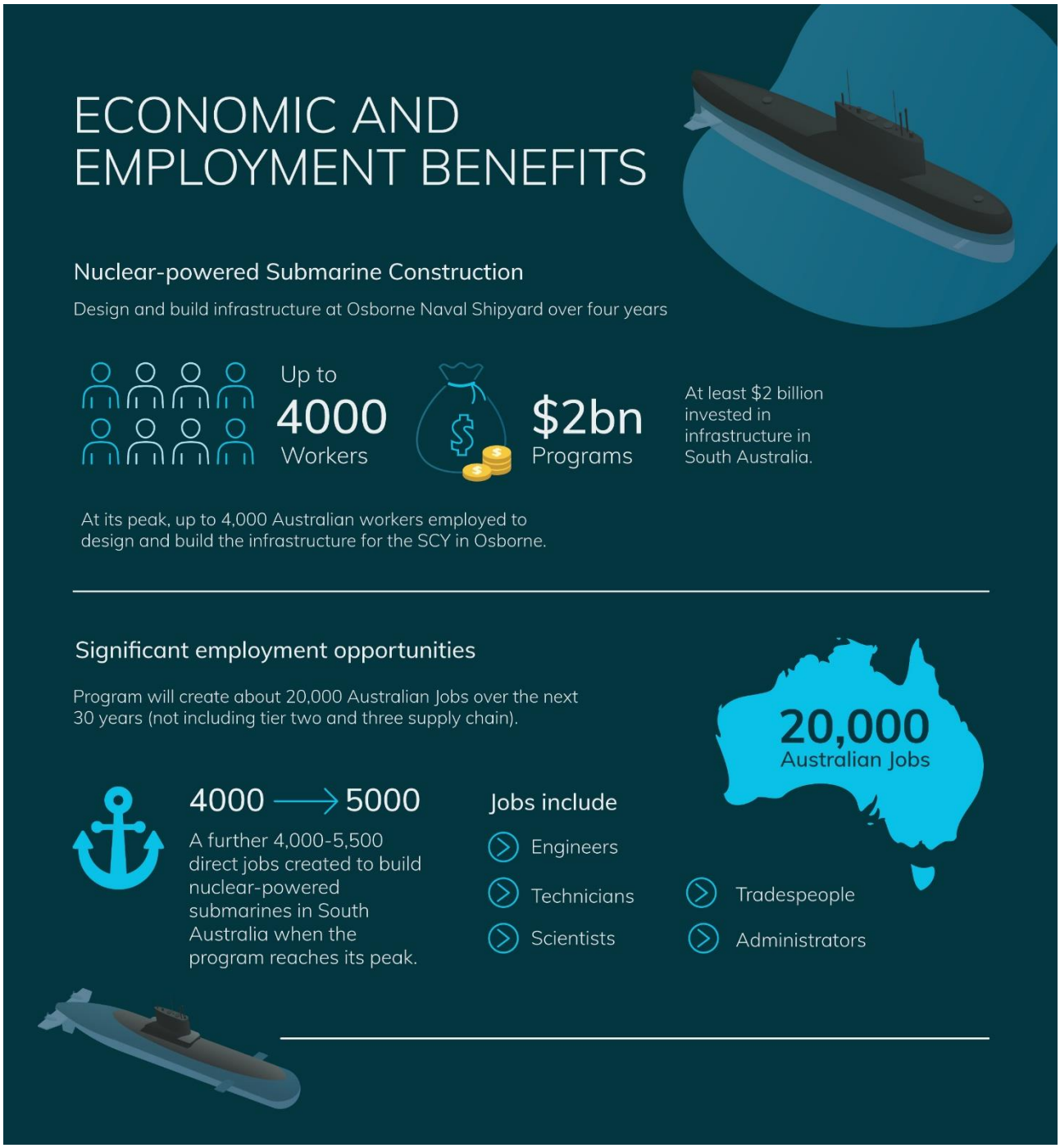
Social

- Potential increases in property values, which can benefit homeowners by increasing their equity and providing opportunities for higher resale values.
- It may be anticipated that the revitalisation will result in better infrastructure, such as upgraded roads, public transportation, and public spaces, and potential local services such as schools and healthcare facilities. Amenities like cafes, restaurants, and retail stores may also increase.

Environment

- Contribute to maintaining the biodiversity values of Mutton Cove.
- Where not limited by safety and security requirements, seek opportunities in design to incorporate measures that provide habitat and reduce potential for impact to listed threatened or migratory species.

Figure 1.5 – Economic and employment benefits of nuclear-powered submarines (URPS generated figure from various sources[7,8,9])



[8] https://www.minister.defence.gov.au/speeches/2024-02-22/opening-unsw-innovation-centre
[9] https://www.minister.defence.gov.au/statements/2024-03-22/aukus-trilateral-statement

1.6 Consequences of Not Proceeding

The SCY is critical to Australia's long-term defence strategy. Not developing a modern future submarine capability could impact upon national security.

If the SCY were not developed for the purposes of construction of Australia's SSN-AUKUS, it is most likely that it would be utilised for another industrial development related to ship building or Defence.

The benefits outlined above would also not be achieved, which would be a significant loss to South Australia's long-term economic growth.

1.7 Staging and Timing of the Proposal

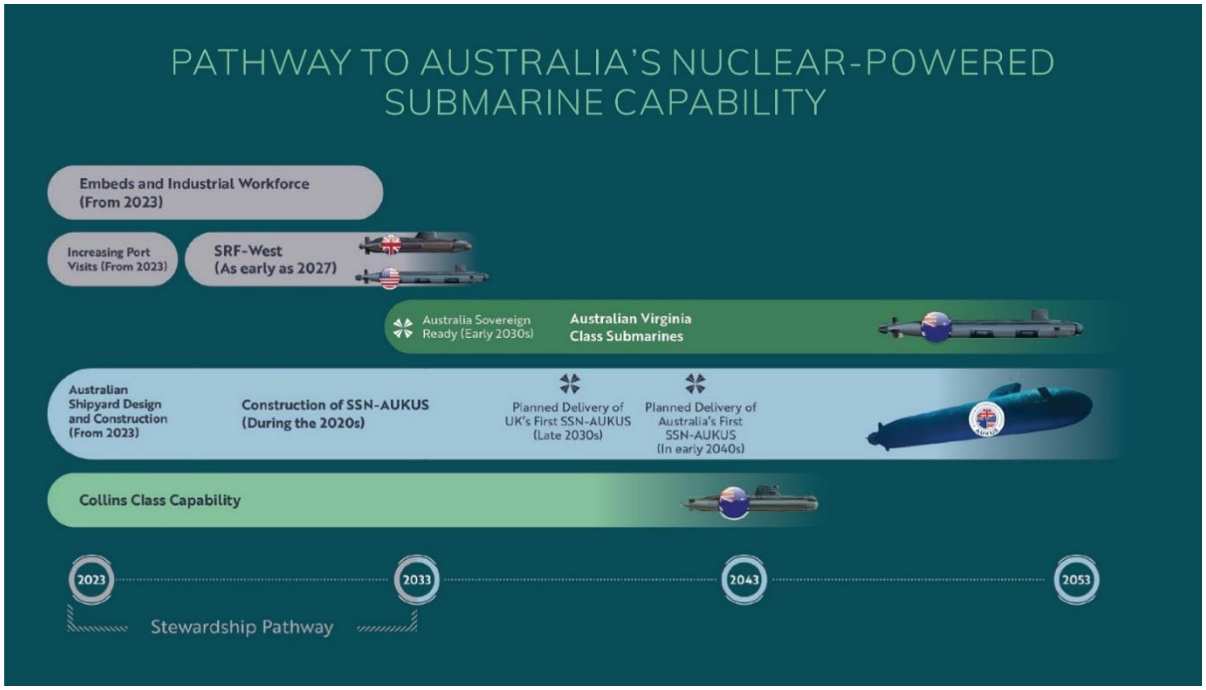
AUKUS partners have identified an Optimal Pathway to achieve the construction and delivery of the nuclear-powered submarines (Figure 1.6).

Enabling works commenced in 2023 with the establishment of a laydown area and carpark. Enabling works have continued through 2024 with the commencement of utility relocation and delivery of a grade separated link road.

The construction of nuclear-powered submarines at the SCY will begin by the late 2020s and the planned delivery of the first Australian built nuclear-powered submarine is anticipated by the early 2040s.

The Australian Government plans to manufacture components at the future submarine construction yard for use by the United Kingdom and Unites States of American production lines, before commencing construction of the first nuclear-powered submarine.

Figure 1.6 - Optimal Pathway[7]



Site preparation works are proposed to commence as soon as approvals are in place and procurement activities are completed. Construction works may occur across the development site at different times, and as soon as possible following site establishment works.

Table 1.3: Indicative Construction Timeline

Stage	Status	Description
Site establishment, earthworks and piling	To commence as soon as possible following receipt of development approval.	Preparation of site, which could include pre-loading.
Construction works	To commence in mid to late 2025, subject to approvals. This stage will include services, infrastructure and building work.	Commence services, infrastructure and building work.
Operations	Some parts of the site are anticipated to be operational from the mid to late 2020's, with operational completion of infrastructure anticipated in the mid 2030's	Commence ship building activities.

1.8 Details of the Proponent and Project Partners

The Project partners and their role are summarised in Table 1.4 and described below:

1.8.1 Australian Submarine Agency

The Australian Submarine Agency (ASA) was established on 1 July 2023 to safely and securely acquire, construct, deliver, technically govern, sustain and dispose of Australia's conventionally-armed nuclear-powered submarine capability for Australia, via the AUKUS partnership.

1.8.2 Australian Naval Infrastructure Pty Ltd

ANI was created in March 2017 as a Commonwealth Company and Government Business Enterprise (GBE). As a GBE, ANI is required to follow the GBE guidelines. Wholly owned GBEs (including ANI) are required to prepare a Corporate Plan and Statement of Corporate Intent in consultation with Shareholder Ministers. These documents focus on the purpose and corporate outlook of the GBE and express the expectations of its management in relation to future financial and non-financial performance. ANI's 2022-23 Corporate Plan and Statement of Corporate Intent were developed in June 2022, with the Statement of Corporate Intent being published in August 2022 on ANI's website.

ANI has been tasked with developing and managing naval shipbuilding infrastructure and related facilities and is the proponent for this application. ANI is the owner and developer of the ONS. Through the ASA, ANI is the Commonwealth's partner to deliver the SCY.

1.8.3 The Shipbuilder

In March 2024, the Australian Government announced that shipbuilders ASC Pty Ltd and BAE Systems will form a Joint Venture to lead the build of Australia's submarines. This Joint Venture establishes an enduring partnership between ASC and BAE Systems to bring together and leverage the unique and complementary capabilities, skills, expertise and resources of the two partners to deliver Australia's SSN-AUKUS submarines.

Table 1.4: Project partners roles and responsibilities

Legal Entity	ANI	ASA	Sovereign Submarine Build Partner'
Role	Construction and management of infrastructure at the SCY	Technical governance to support delivery	Operation of the Shipyard and construction of the submarines
Description of Corporate Structure	Commonwealth Company and Government Business Enterprise	Commonwealth Agency	Joint Venture

The Proponent details are as follows:

Table 1.5: Proponent Details

Legal Entity	ANI
Registered ABN:	ABN 45 051 762 639
Registered Address:	61 Veitch Road Osborne SA 5017
Nominated Contact	John Mortimer
Phone	81319000
Website	www.ani.com.au

ANI will oversee the development under the guidance of the board of directors. The board operate in accordance with GBE guidelines. A number of corporate policies have been developed to guide operations and key policies are set out below.

- Environmental Policy, Environmental Management Plan, Hazardous Substance Control and Incident Reporting and Investigation Framework.
- Security Policies and Plan.
- Quality Policy.
- Anti-corruption Policy.
- Delegations of Authority Policy.
- Information Management Policy.
- Whistle Blower Policy.
- Conflict of Interest.
- Privacy Policy.
- Asset Management Policy.
- Equitable and Inclusion Policy.
- Reconciliation Action Plan.
- A range of Health and Safety Policies and procedures.

ANI also has an Environmental Management System that has been certified under ISO 14001:2015, ISO 9001:2015 and ISO 45001:2018. ANI has extensive induction procedures for staff to ensure awareness and compliance of this range of policy.

1.9 Project Team

ANI has engaged urban and regional planning consulting firm URPS to lead the delivery of the EIS for the SCY. To support the delivery of the EIS a number of subject matter expert subconsultants were engaged to provide specialist assessments and advice on specific disciplines. The project team is described in Table 1.6.

Table 1.6: Proponent Details

Subject Matter Experts	Discipline investigation and reporting
URPS	Preparation of this EIS, social impact assessment, visual amenity report and land use.
VIPAC Engineers & Scientists	Air quality
Resonate	Noise & vibration
SMEC	Traffic and transport

Subject Matter Experts	Discipline investigation and reporting
Succession Ecology	Biosecurity, marine flora and fauna and terrestrial flora and fauna
GHD	Climate change adaptation In addition, content from ASA Strategic Assessment (as part of a separate Commonwealth approval for the purposes of the EPBC Act) has contributed to the preparation of this EIS.
Colby Phillips Advisory	Greenhouse gas emissions, sustainable use of resources, waste management, dangerous substances
TSA Management	Local, regional and state economies
AECOM	Stormwater
JBS&G	Soils and groundwater
Independent Heritage Consultants	Aboriginal cultural heritage
DASH Architects	Heritage places and areas

CHAPTER 2

Description of the Development

URPS

2. Description of the Development

2.1 Introduction

This chapter provides a description of the development which forms the basis of the EIS. The physical characteristics of the development are described alongside the activities that will be undertaken during the construction and operation phases. The information included in this chapter informs each of the technical assessments in Chapters 7 to 24.

Given the nature of this Project as a defence high security precinct, not all information is publicly available. The EIS has sought to provide as much information to the community as possible to assist in understanding the Project and its potential impacts. However, the information contained within this chapter is considered sufficient to inform to EIS and the assessment of significant effects.

2.2 Assessment Requirements

This chapter addresses many of the Assessment Requirements outlined below, however a description of the receiving environment is addressed in Chapter 5 - Receiving Environment. The Planning Assessment, including the relevant Zones and Overlays in the Planning and Design Code has been addressed in Chapter 4 - General EIS Requirements.

Commission Assessment Requirements

The Commission requirements ask that the description of the proposal addresses all aspects of the proposed development that are assessed by the EIS, and address the following information:

- Nature of the proposal and location.
- Scale and intensity of the project.
- Key elements of the receiving environment (refer to Chapter 5).
- A project plan to outline objectives, constraints, key activity schedule and quality assurance (topics generally covered in this Chapter).
- Site layout plans (including indicative land division plan if relevant) (Provided separately to agencies).
- Construction and commissioning timeframes (including staging) (Chapter 1).
- Description of working hours.
- Description of the existing environment (including the immediate and broader location, identifying sensitive receptors and adjacent land uses which may lead to cumulative impacts) (Chapter 5, 6 and Technical Chapters 7 to 24).
- Description of the current commercial activities occurring in the area (refer to Chapter 5).
- Details of all buildings and structures associated with the proposal (this section).

Details of any other infrastructure requirements and availability:

- Details on the operation of the proposal, including operating hours.
- Relevant Zones and Overlays defined by the Planning and Design Code (Chapter 3 and 5).
- Management arrangements for the construction and operational phases (including Environmental Management and Monitoring Plans) (Chapter 7 to 24 and 25).

2.3 Development Site

The development site is located on the north-eastern side of the Lefevre Peninsula in Port Adelaide, South Australia.

When the SCY was declared as an Impact Assessed development and gazetted on 15 February, the scope of works of the EIS was not finalised. Therefore, a conservative boundary (see Figure 2.1) was used for inclusion in the gazette. The gazetted 'subject site' encompasses the following Certificate of Titles shown in Table 2.1 and Figure 2.1. Many of the technical reports, included as Appendices to the EIS, have been based on this subject site.

Table 2.1: Gazetted Subject Site Certificate of Titles

CT6191/179	CT6191/180	CT6191/181	CT6191/182	CT6268/862	CT6236/388
CT6262/182	CT6289/763	CT6088/174	CT6088/171	CT6088/170	CT6088/177
CT6282/172	CT6088/175	CT6282/178	CT5858/214	CT5855/133	CT5856/12
CT6088/188	CT6088/186	CT6088/185	CT6088/184	CT6088/183	CT6231/17
CT6231/5	CT6282/169	CT6088/193	CT6088/190	CT6088/189	CT6191/178
CT6191/176	CT6060/497	CT6282/175			

Figure 2.1 – Gazetted Subject Site

Since the development was declared and gazetted, the scope of works for the EIS has been finalised. Most notably the Port River channel dredging for the operations of the development, including navigational channel, swing basins (to support the movement of vessels to and from the new shipyard) and ongoing maintenance, was confirmed to be excluded from assessment within the EIS scope. The final 'development site' for the EIS is shown in Figure 2.2 below. All assessment undertaken within the EIS chapters are based on this area.

Figure 2.2 Development Site

2.4 Scale and Intensity of the Development and Operating Hours

The scale of the development is substantial and will expand the role of the Lefevre Peninsula as a key shipbuilding precinct within Australia. The development includes a range of industrial buildings, supported by services and infrastructure to support a significant workforce.

The impact of day/night operations has been carefully considered in the development of this proposal in relation to traffic management, car parking, lighting, noise, vibration and other amenity impacts.

Construction and operation hours are outlined within Table 2.2 below.

Table 2.2: Hours of Operation

Phase	Hours
Construction	It is currently anticipated that construction activities will occur between 7 am and 7 pm, Monday to Saturday. Activities outside of these hours will comply with noise levels as defined in the guidelines set by the EPA 425/23 Construction noise Information Sheet (EPA, 2023d) and EP Act.
Operations	Operational hours are yet to be confirmed. However, it is anticipated the SCY will be operational both day and night, up to 24 hours, and 7 days per week. Hours of operation and number of shifts will vary dependant on task of workers and function of each individual building within the SCY. Multiple shifts (day and late afternoon until early morning) are undertaken currently at the existing ONS.

2.5 Development Overview and Site Layout

This EIS is guided by content from an Infrastructure Master Plan that has been prepared for the SCY (Figure 2.4 and 2.5). The Master Plan has been prepared in accordance with functional design requirements for similar nuclear-powered submarine construction yards operated by AUKUS partners overseas. The development site will be fully secure, and access managed through strict security protocols.

The development site layout has sought to maximise the use of available land by locating infrastructure in accordance with the functional design requirements. The infrastructure layout has regard to building floor area and construction type, whilst retaining the necessary functional requirements and workflow patterns typical for nuclear-powered submarine construction sites to optimise operating efficiency.

In general terms, the development is structured into three key areas as shown within Figures 2.2 to 2.4 and outlined below:

- Submarine fabrication (Area 1): This area includes fabrication buildings which are substantial to accommodate a range of workshops for the processing of raw steel material to manufacture submarine components and traditional manufacturing facilities (including abrasive blasting and painting activities). The Production Demonstration Facility is included within Area 1, however the Production Demonstration Facility has specifically been excluded from this EIS and is subject to a separate assessment process (refer to Chapter 6).
- Submarine outfitting (Area 2): Buildings in this area will accommodate the outfitting of submarine sections and other structures with welded components.
- Submarine consolidation, launching, testing and commissioning (Area 3): This area will provide for the assembly, testing and commissioning of the submarines. The area will include the submarine launch facility, wet basin, wharf and supporting facilities. Some localised dredging works within the Port River (not within the main channel) are required and the edge will be hardened to support these activities. It is anticipated that Area 3 will be the focus of the nuclear license for the development site, as the

nuclear-powered propulsion system is expected to be stored and fitted to the submarines within this Area. The final area licensed for the development site will be subject to federal nuclear safety and safeguards, licences and permits.

Supporting these areas will be infrastructure and services, roads, worker amenities, security huts, lighting, CCTV and offices. Some on-site accommodation (for navy personnel) and car parking will also be required.

Figure 2.3 - Area 1, 2 and 3

The Infrastructure Master Plan is shown in Figure 2.4 and 2.5. The numbers shown in this plan correlate to Table 2.3 which identifies the building category and dimensions. Buildings have been categorised and colour coded to assist in identifying the types of actives on the site. Lower impact activities include offices and administration, worker amenities, warehouse and storage. Higher impact activities are including manufacturing and marine infrastructure. These have been carefully assessed through this EIA process.

Figure 2.4 – Infrastructure Master Plan – View from the East

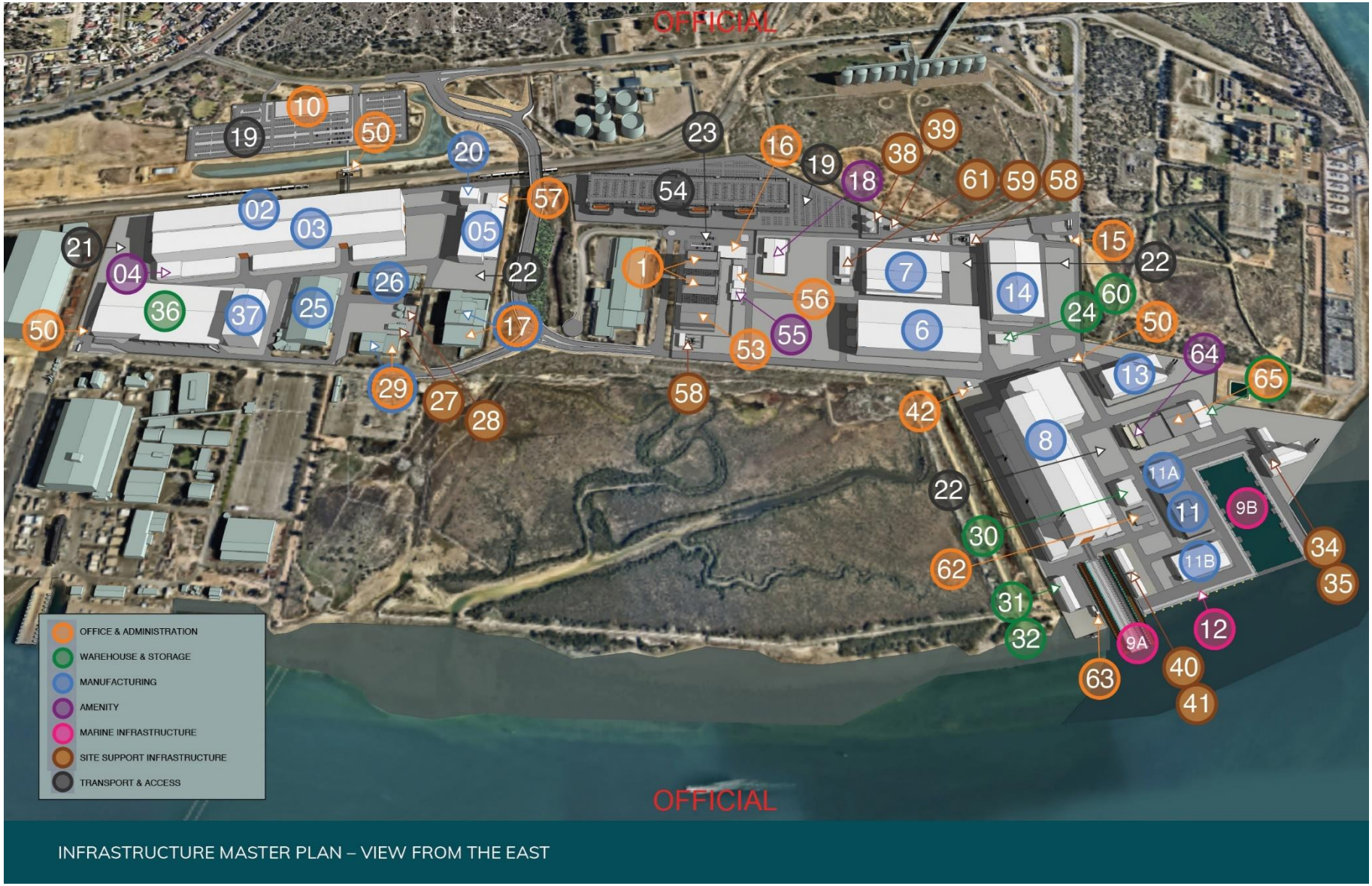


Figure 2.5 – Infrastructure Master Plan – View from the West

Table 2.3: Infrastructure Master Plan Legend

Area	Structure/Building No.	Building category	Structure/Building Dimensions (L,= length, W = width and H = height)
2	1	Office & Administration	60m X 39m X 35.8m (X 2 buildings)
1	2 (234)	Manufacturing	430m X 42m X 40m
1	3 (234)	Manufacturing	430m X 43m X varies
1	4 (234)	Amenity	31m X varies X varies
1	5	Manufacturing	122m X 65m X varies
2	6	Manufacturing	200m X 91m X 33m
2	7	Manufacturing	126m 90m X 15m
3	8	Manufacturing	286m X 150m X 49m
3	9	Marine Infrastructure	220m X 130m X 0m
1	10	Office & Administration	140m X 40m X 9m
3	11	Manufacturing	L,W, H varies.
3	12	Marine Infrastructure	175m X 25m X 0m
3	13	Manufacturing	100m X 46m X 20m
2	14	Manufacturing	152m X 71m X 22m
2	15	Office & Administration	12m X 5.5m X 5m
2	16	Office & Administration	24m X 22m X 5m
1	17	Manufacturing	Existing Facility
2	18	Amenity	72m X 38m X 6m
1	19	Transport & Access	380m X 120m X 0m
2	19	Transport & Access	500m X 150m
1	20	Manufacturing	24m X 32m X 26m
1	21	Transport & Access	120m X 80m x 0m
1,2,3	22	Transport & Access	L,W varies. H=0
2	23	Transport & Access	60 X 40m X 0m
2	24	Warehouse & Storage	20m X 20m X 10m
1	25	Manufacturing	Existing Facility
1	26	Manufacturing	Existing Facility
1	27	Site Support Infrastructure	Existing Facility
1	28	Site Support Infrastructure	Existing Facility
1	29	Manufacturing	Existing Facility
3	30	Warehouse & Storage	41m X 26m X 11m
3	31	Warehouse & Storage	24m X 18m X 9m

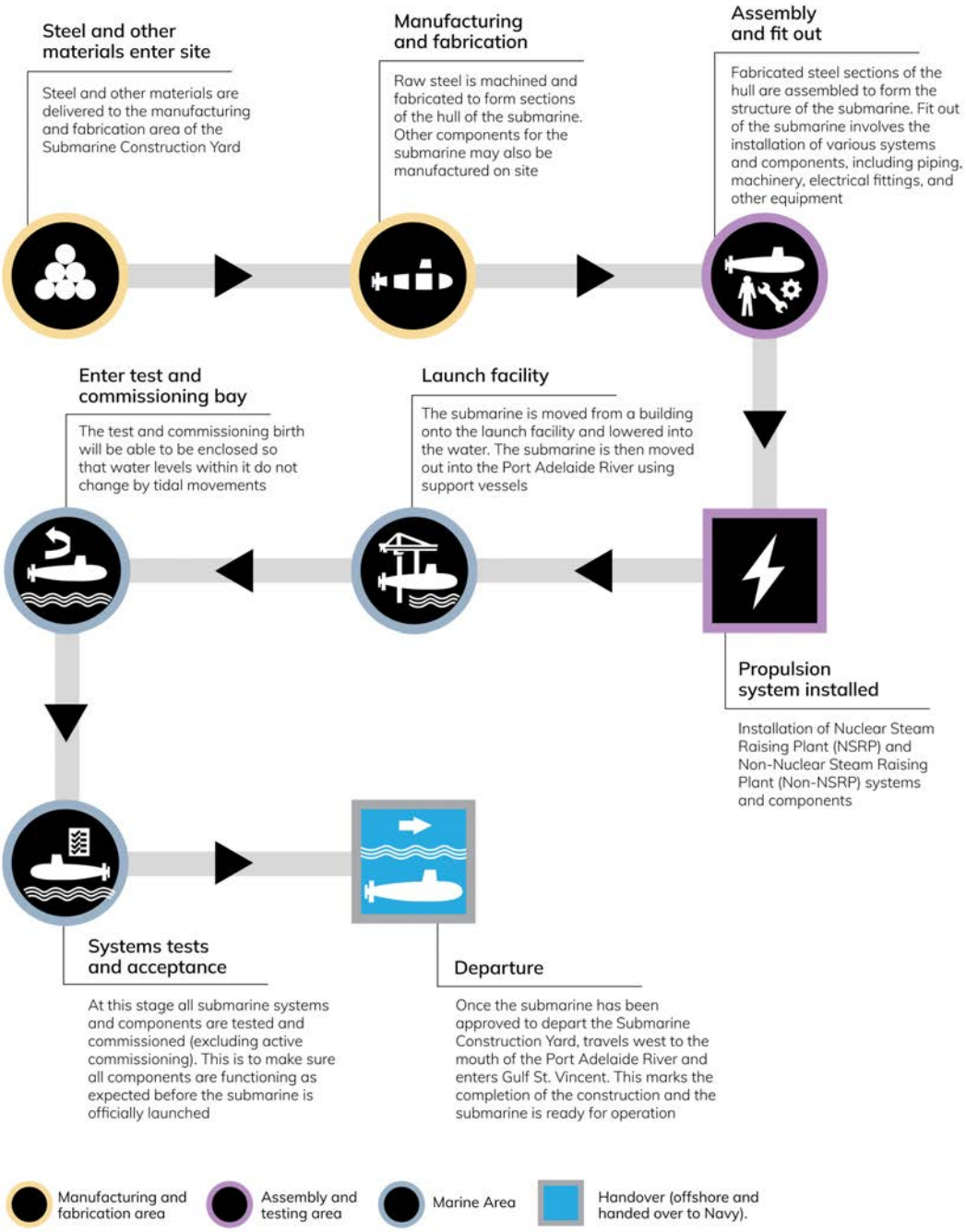
Area	Structure/Building No.	Building category	Structure/Building Dimensions (L,= length, W = width and H = height)
3	32	Warehouse & Storage	312m X 18m X 9m
3	34	Site Support Infrastructure	65m X 15M X 21m
3	35	Site Support Infrastructure	37m X 15M X 11m
1	36	Warehouse & Storage	200m X 100m X 20m
1	37	Manufacturing	91m X 52m X 21m
2	38	Site Support Infrastructure	15m X 9m X 7m
2	39	Site Support Infrastructure	15m X 9m X 7m
3	40	Site Support Infrastructure	37m X 15M X 11m
3	41	Site Support Infrastructure	37m X 15M X 11m
3	42	Office & Administration	5m X 8m X 5m
1,3	50	Office & Administration	Varies
2	53	Office & Administration	60m X 40m X 18m
2	54	Transport & Access	355m X 65m X 15m
2	55	Amenity	33m X 22m X 6m
2	56	Office & Administration	41m X 16m X 6m
1	57	Office & Administration	35m X 29m X 6m
2	58	Site Support Infrastructure	25m X 11m X 5m (x2 buildings)
2	59	Site Support Infrastructure	16m X 8m X 4m
2	60	Warehouse & Storage	12m X 12m X 9m
2	61	Site Support Infrastructure	61m X 20m X 8m
3	62	Office & Administration	30m X 25m X 6m
3	63	Office & Administration	15m X 6m X 8m
3	64	Amenity	43m X 18m X 12m
3	65	Office & Administration	113m X 46m X 11m

Before understanding the stages of construction, it is helpful to understand how the development is intended to operate. This section outlines operations, followed by construction (onshore and offshore) to support these operations.

2.6 Site Operation Overview

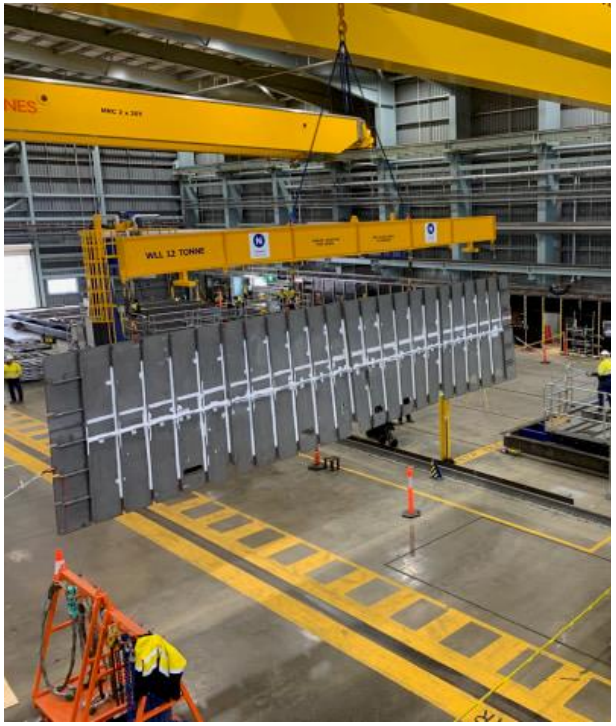
Operation of the development will involve a range of activities associated with the manufacturing of parts, assembly of submarine components and fit out, as well as day to day maintenance and ongoing sustainment of the SCY. The following graphic illustrates the overarching process of operations within the development (Figure 2.6). Depending on completion of construction activities in different areas, operations will commence in various areas of the development concurrent with ongoing construction and handover of buildings occurs from ANI to the shipbuilder.

Figure 2.6 – Submarine construction process



The photos below, have been taken from the EPBC Act Strategic Assessment and illustrate various stages of submarine manufacturing, fitout and launch (Figures 2.6.1 to 2.6.6).

Figure. 2.6.1 – 2.6.6 – Stages of submarine manufacturing, fitout and launch



1. Steel fabrication at Osborne Naval Shipyard (Source: ADM 2021)

2. Photo of submarine module being delivered to the Barrow-in-Furness shipyard operated by BAE Systems Submarines (Source BAE Systems 2024)

3. Photo of Collins-class submarine under construction in Osborne Naval Shipyard (Source: ADM 2016)

4. Photo of Collins-class submarine entering launching facility in Henderson, Western Australia (Source: ASC 2022)

5. Photo of Anson Astute class submarine in launching facility at the Barrow-in-Furness shipyard (Source: Naval News 2021)

6. Photo of Artful Astute class submarine preparing for sea trials at the Barrow-in-Furness shipyard (Source: gCaptain 2015)

2.7 Construction of Development

2.7.1 Phase 1 - Site Establishment and Preparation Works

The construction of the land-based portion of the development will involve site establishment work, bulk earthworks and services to make the development site ready for construction. These works will be undertaken across the whole of the development site. It may be that stages will occur concurrently across the development site.

A description of these activities is set out below.

Table 2.4: Phase 1 Construction Stages

Stages	Description
Stage 1 - Site establishment	• Set up access points and security (i.e., fencing, gates, signage etc.). • Clear vegetation. • Demolish and remove unneeded existing structures. • Identify and dispose of any hazardous materials still located or stored on site from past industrial activities, including soils. • Installation of site offices and facilities including temporary buildings, ablutions, parking (excluding exempt builders offices). • Establishing laydown and storage areas for plant and equipment. • Some removal of mangroves may be required along the shoreline. **Figure 2.7 - Photo showing site establishment at Osborne North Car Park site.** 

Stages	Description
	Figure 2.8 - Site preparation works for the former Osborne North Development Project. Aerial photo looking north (Source: ANI 2024a) 
Stage 2 Excavation and filling of land	• Bulk earthworks and ground improvement techniques, including preloading. Excavation and fill are extensive to ensure site levels comply with Coast Protection Board site and floor level requirements. • Finished floor levels are anticipated to be in the order of 3.5-3.9m AHD in Area 1, with comparatively limited fill volumes (anticipated to be approximately 60,000m^3) required for this area given previous site works undertaken for the previous Attack Class Submarine project. • Finished floor levels are anticipated to be in the order of 4.5-4.6m AHD in Area 2. Fill volumes for bulk earthworks will require in the order of approx. 200,000m^3. • Finished floor levels are anticipated to be in the order of 5.0m AHD in Area 3. Fill volumes for bulk earthworks will require in the order of 350,000m^3. • This will include bringing in clean fill to the site, and excavation to create levels for required infrastructure. • Deep excavation in Area 3 for example for the wet dock will likely require dewatering. • Sedimentation and erosion controls will be part of the proposal. Temporary retaining and permanent retaining works will be required. Note: bulk earthwork volumes have been produced using high level assumptions based on the project detail confirmed to date.

Stages	Description
Stage 3 Piling	• The development of structures across the development site will require piling to establish foundations and stabilise soil for development.
Stage 4 Services and Drainage	• Stormwater drainage, power, water, sewer and other services.

2.7.2 Phase 2 - Onshore Construction

The general construction for onshore will include:

Table 2.5: Phase 2 Construction Stages

Stages	Description
Stage 1 Infrastructure	• Services installation. • Road, hardstand, car park and lay-down areas for construction. • Construction of marine infrastructure (submarine launch facility, wet basin and wharf). • Lighting and security.
Stage 2 Buildings	• Construction of buildings, structures and infrastructure including warehouses (facilitating electrical, piping, machining, hull fabrication, abrasive blasting, painting and tiling and submarine outfitting and consolidation works), offices, supporting buildings (commercial canteen, amenities and health centre). The site layout includes buildings of varying dimensions as outlined in Table 2.3.

2.7.3 Phase 3 Construction – Marine

Construction of maritime infrastructure within the Port River would involve the installation of piles along the waterfront and hardening of the coastal edge to accommodate marine infrastructure. This will be similar to the appearance of the existing ONS.

Table 2.6: Phase 3 Construction Stages

Activity	Description
Stage 1 Piling and Dredging	The development of the coastal edge into the submarine launch facility, wet basin and wharf will require piling to establish foundations and stabilise the area for development. This application excludes dredging of the Port River Channel, and only relates to dredging that is required to accommodate the launch facility, wet basin and wharf.

Activity	Description
Stage 2 Maritime infrastructure	• A dock or maritime structure that would be able to maintain non-tidal conditions and ancillary infrastructure such as cranes, services, such as water, power and backup facilities. • Wharf facilities. • Coastal armouring, or similar, to protect infrastructure and stabilise the riverbank. • All marine infrastructure will be designed and constructed to meet nuclear licensing requirements. These include requirements to withstand all current and future natural disasters and human induced hazards. The infrastructure will have redundant systems in place which provide alternative systems to provide reliability and minimise or avoid risks. **Figure 2.9 - Photo showing maritime facilities at Barrow in the United Kingdom (HMS Audacious prior to launch) (Source: BAE Systems 2023a)**  **Figure 2.10 - Photo showing 9 Dock at Devonport in the United Kingdom (Source: Navy Lookout 2020)** 

2.8 Operational Activities

2.8.1 Manufacturing Facilities

Manufacturing activities associated with the operation of the SCY may include:

- Fabrication and welding.
- Painting.
- Abrasive blasting.
- Warehousing and storage.
- Manufacturing, assembly and testing of equipment.
- General workshop operations.
- Fit out of manufactured or prefabricated components.

In most cases, these activities will be undertaken within substantial buildings, that may be in the order of 400 metres long and 50 metres tall (refer to Table 2.3 for more detail). These buildings will have a similar appearance to those in the existing ONS facility (refer to Figure 2.11).

Some activities may require the storage, or use of substances, that require a license from the EPA under Schedule 1 of the *Environment Protection Act 1993* (refer to Chapter 4).

Figure 2.11 –Example of existing ONS building for manufacturing

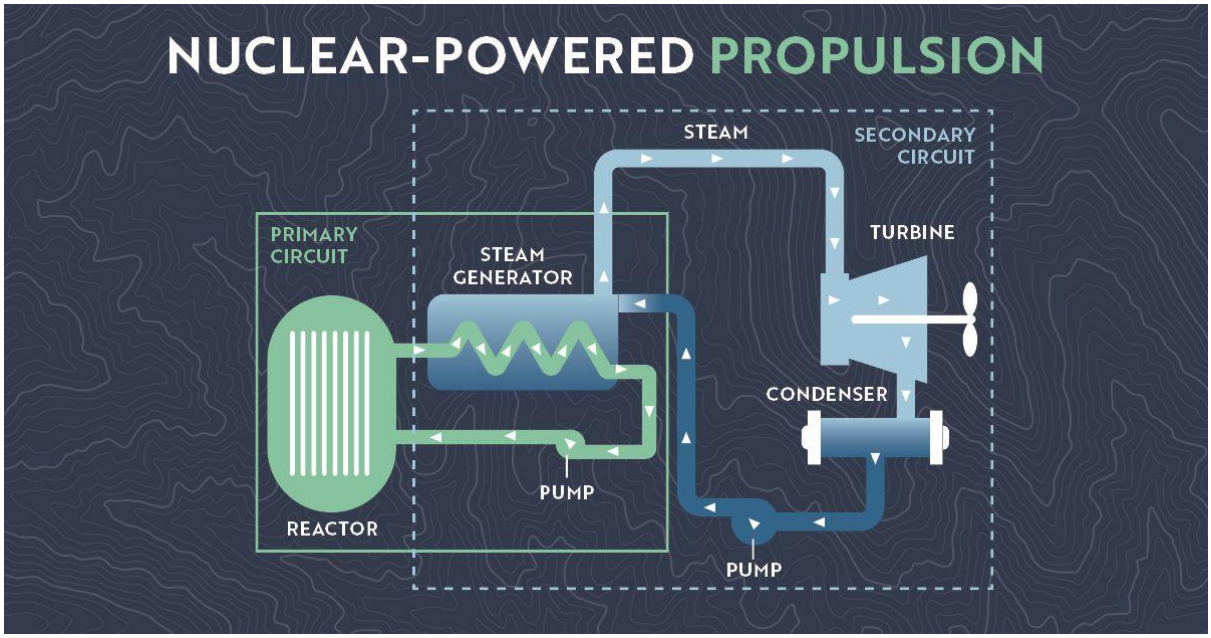
2.8.2 Submarine Fit-Out and Assembly Facilities

The construction of the submarine includes the installation of the propulsion system and components. The nuclear-powered propulsion system is also referred to as a NSRP. The propulsion is generated by two circuits:

- The primary circuit is the NSRP. Energy is generated by the reactor which creates heat within a sealed system (i.e is fully contained with no cross-contamination of the water used to generate steam).
- The secondary circuit being the Non-NSRP which creates steam that turns the submarine turbine. The steam is then condensed back to water and then the cycle starts again.

The nuclear-powered propulsion system will be delivered on site in an inert state and stored in a dedicated location within the licensed area. The nuclear-powered propulsion system will be stored in a highly secure location until it is required for insertion into the submarine. More detail regarding nuclear licensing is provided in Chapter 3 and Chapter 4.

Figure 2.12 – Nuclear-Powered Propulsion System[10]



2.8.3 Site Movement

An internal road network has been designed within the site to enable some of the largest components, submarine modules, to be moved around the shipyard. Parts and components will be required to be transferred around the site for each production stage.

Beyond the boundaries of the development site a separate application has been approved for a new Grade Separated Road connecting Pelican Point Road into the development site. This new link will allow for:

[10] Image taken from the EPBC Act Strategic Assessment.

- Direct access for materials and personnel to shipbuilding facilities in development site (northern section) without delays, particularly for time-sensitive delivery of materials.
- Reduced trip times and improved productivity.
- Improved safety.
- Improved performance against future traffic demand and reduction in traffic queuing back to Victoria Road.
- Direct and unimpeded access for emergency services and in particular as an egress point in the event of a major emergency.

There will be a direct access into the development site via this road, as occurs from Veitch Road today.

2.8.4 Ancillary Support Facilities

Ancillary facilities to support the workforce would also be provided, including:

- Canteen.
- Office buildings.
- First aid.
- Accommodation (navy personnel).
- Car parking for workers and visitors.

These services will be contained in lower scale buildings across the site to meet the needs of workers.

2.8.5 Site Security and Access

On land, the construction and operation of the SCY will result in changes to access and security. Changes in the availability for public access to areas that are currently publicly accessible, including Mutton Cove, Falie Reserve and the Snapper Point carpark should be anticipated with the development of the SCY. Opportunities for public access, once the SCY is fully operational are yet to be confirmed, as any access will be subject to security requirements for the SCY and any future license under the *Australian Radiation Protection and Nuclear Safety Act 1998* and the incoming *Australian Naval Nuclear Power Safety Bill 2024*.

Accessibility within the Port River is envisaged to be implemented in a manner similar to the existing ONS. The marine portion of the Gazetted Subject Site intersects the Port Adelaide Operating limits. Movement of large vessels is regulated under the *South Australian Harbors and Navigation Regulations 2023* and the *Commonwealth Navigation Act 2012*. Movement of SSN-AUKUS or other vessels associated with the SCY within the Port River would be communicated with relevant authorities to manage traffic within the Port River as is currently undertaken with the existing ONS facility.

2.9 Summary of Preceding Actions / Approvals

Separate planning approvals have been granted or will be considered separately to this EIS include:

Table 2.7: Summary of Preceding Actions / Approvals

Element	Status	Timeline
Preliminary enabling works	On 12 December 2023, the Chief Executive of the Department for Transport and Infrastructure agreed to support the proposed Link Road as Essential Infrastructure pursuant to section 131(2)(c) of the PDI Act. This application has completed public notification and will soon be considered by the Minister for Planning. The car park and pedestrian links are exempt from requiring approval under the regulations.	Approved
Utility relocation works	Planning approval may be required for the relocation of high voltage powerlines.	Late 2024 / Early 2025
Production Demonstration Facility	The repurposing of existing infrastructure and development of new buildings on land formerly under construction to support the Attack-Class Program and within and immediately adjacent to existing infrastructure located on Mersey Road North within the ONS. The upgraded existing infrastructure and the Product Demonstration Facility itself will enable smaller submarine components to be manufactured to supply AUKUS shipbuilding partners in advance of submarine manufacturing here in Australia. Planning consent has been granted by the State Planning Commission for this proposal.	November 2024
Dredging of the Port River channel	Dredging of the Port River channel and swing basins has also been excluded from this proposal as it is not required for a number of years. A future assessment will apply the environmental standards and processes in place at the time of lodgement.	Mid 2030s

CHAPTER 3

Legislation and Procedural Requirements

URPS

3. Legislation and Procedural Requirements

This chapter identifies the relevant legislative requirements for the development, including approvals and permits or licences for specific activities. It describes the key legislation and statutory and non-statutory instruments relevant to the development, and identifies the relevant policies, standards, guidelines and Codes of Practice that will be applied to development activities. Assessment of the development against the Planning and Design Code (the Code), State Planning Policies (SPPs) and Environment Protection Policies (EPPs) is provided in Chapter 4 - General EIS Requirements.

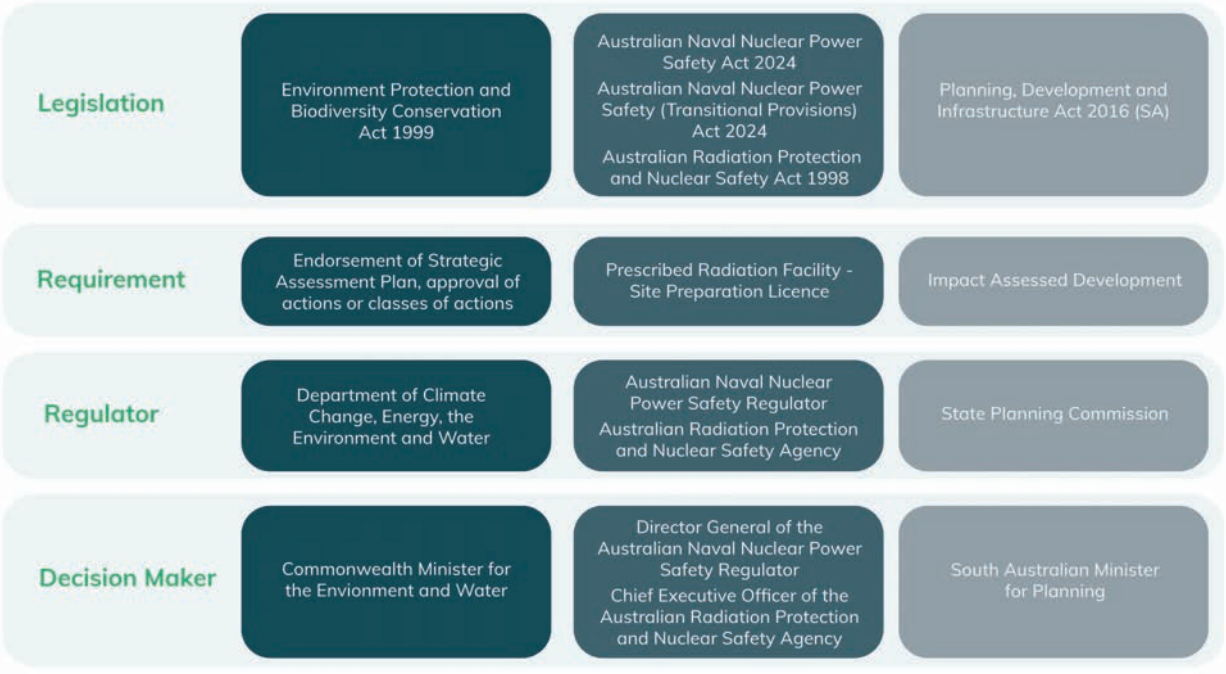
3.1 Introduction

This EIS has been prepared to meet the requirements of the *Planning, Development and Infrastructure Act 2016* (PDI Act). However, the construction and operation of development is subject to a range of legislation and approvals from the Commonwealth and State governments.

There are three approvals required, which are in addition to standard licenses issued by the Environmental Protection Authority (EPA):

- Development approval under the PDI Act which is being progressed through this Impact Assessed Development Application.
- Commonwealth approvals under the *Environment, Protection and Biodiversity Conservation Act 1999* (EPBC Act) which is being progressed through a Strategic Assessment.
- Nuclear Licensing for the site is currently under the *Australian Radiation Protection and Nuclear Safety Act 1998* (ARPANS Act). Provisions from the Australian Naval Nuclear Power Safety Bill 2024 will also apply. This requires significant and detailed assessments against a range of internationally recognised standards.

Figure 3.1 – Key Legislation Applicable to the Development

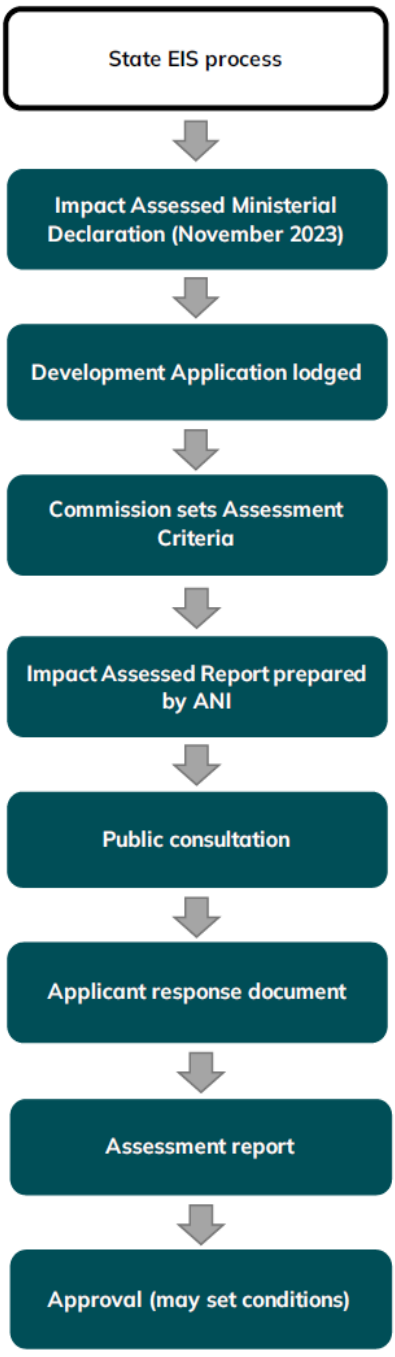


3.2 Planning, Development and Infrastructure Act 2016

3.2.1 Environmental Impact Assessment

The EIS process is described under section 108 (1)(c) of the PDI Act. This requires the preparation of an EIS.

Under the Act, the State Planning Commission will determine the nature of the assessment based on consideration of the scale of the impact, nature of the impact, sensitivity of the environment, ability to avoid or offset impacts and the level of technical assessment required.



3.2.2 Key Steps

- ✓ Declaration by the Minister for Planning.
- ✓ Preparation of a Scoping Development Application by the applicant.
- ✓ Preparation of assessment criteria by the State Planning Commission.
- ✓ Preparation of an EIS that responds to the assessment criteria (this document) by the State Planning Commission.
- ☐ Consultation on the EIS (public, councils, agencies).
- ☐ Response to public comment and preparation/review of Response Document by applicant.
- ☐ Preparation of Assessment Report by the State Planning Commission.
- ☐ Recommendation to the Minister for Planning.
- ☐ Decision by the Minister for Planning.
- ☐ Variations following decision / Satisfy conditions and reserve matters.

3.2.3 Assessment Requirements

The Commission has consulted state agencies and Councils in setting the assessment requirements for the proposal, which are extensive. Given the nature of this development as a defence high security precinct, not all information is able to be made public. However, we have sought to provide as much information to the community as possible, relevant for the purposes of the EIS, to assist in understanding the development and its potential impacts.

3.3 Environment Protection and Biodiversity Conservation Act 1999

On 24 November 2023, the Commonwealth Minister for the Environment and Water and the ASA entered into an agreement to undertake a Strategic Assessment of the SCY under the EPBC Act[11].

A Strategic Assessment is a process undertaken for endorsement and approval of actions and classes of actions under Part 10 of the EPBC Act for a policy, program or plan. It is a collaborative partnership between the regulator, the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and a Strategic Assessment Partner and are typically undertaken for projects that involve multiple actions and activities, are large in scale, or are to be undertaken over an extended time period.

Terms of Reference for the Strategic Impact Assessment Report ('the Report') were drafted in accordance with clause 7 of the Agreement. These Terms of Reference were made available for public comment between 4 December 2023 and 28 January 2024. The Terms of Reference were approved by the Commonwealth Minister for the Environment and Water on 25 March 2024 in accordance with clause 7.6 of the Agreement.

The Strategic Assessment Plan (the Plan) contains a description of what is involved in the construction and operation of the Submarine Construction Yard and is informed by the endorsement criteria referenced in the Strategic Assessment Agreement. The Plan also outlines how the approval of the Strategic Assessment would be implemented. The Strategic Impact Assessment Report (the Report) provides an assessment of the impacts of implementing the Plan on the environment. Implementation documents will be developed following endorsement of the Plan to monitor implementation of the actions and classes of actions.

Key Steps

- ✓ Strategic agreement signed.
- ✓ Terms of Reference Finalised.
- ✓ Strategic Impact Assessment Report and Plan prepared.
- ☐ Public consultation.
- ☐ Supplementary report.
- ☐ Assessment report.
- ☐ Ministerial determination.

[11] Department of Climate Change, Energy, the Environment and Water 2023, Osborne Submarine Construction Yard strategic assessment, accessed via <https://www.dcceew.gov.au/environment/epbc/approvals/strategic-assessments/sa-osborne-submarine-construction-yard>

- Approval of actions.

Other approvals under the EPBC Act that have been granted or that will currently be considered in future are set out below:

Table 3.1: Outcome of EPBC Act Referral for Preliminary Enabling Works

Element	Status	Timeline
Preliminary enabling works	The ASA submitted a Referral under EPBC Act Part 7 to 9 for the development of a car park, pedestrian bridge and grade separated road to DCCEEW. The delegate for the Minister for the Environment and Water decided on 8 December 2023 that the proposed action under referral (2023/09662) is a not controlled action if taken in a particular manner. This means that, provided the action is taken in accordance with the particular manners outlined in the referral decision, it does not require further assessment and approval under the EPBC Act before it can proceed. The referral decision and further details are available on the EPBC Public Portal.	EPBC Act Referral Decision received 8 December 2023

3.4 Nuclear Regulation and Licensing Legislation and Agreements

The nuclear-powered propulsion system will be designed and built to international safety standards and transported from the host nation to Osborne, South Australia, where they will be integrated into the submarine hull at the SCY. The submarine and its systems will be tested, commissioned and then deployed to sea and are not currently anticipated to return to Osborne, South Australia for regular routine maintenance works.

Up to low level radioactive waste, similar to hospital type waste, are anticipated to be generated throughout the later stages of the build process. This will be collected, sorted and categorised prior to being taken off-site for long-term disposal (once a suitable facility becomes available). The site design does not cater for the storage of any intermediate-level or high-level (Spent Nuclear Fuel) radioactive waste.

Australia will work with the UK and the US to implement the highest standards of nuclear safety and security. Australia will draw from decades of UK and US experience with safe naval nuclear propulsion and build on Australia's record of safely and effectively operating a nuclear research reactor since 1958.

The following sets out the rigorous process required to license the new shipyard.

3.4.1 *Australian Radiation Protection and Nuclear Safety Act 1998*

The objective of the ARPANS Act is to protect the health and safety of people, and to protect the environment, from the harmful effects of radiation. The Australian Radiation Protection and Nuclear Safety Agency (Australia's current 'nuclear regulator') and Radiation Health and Safety Advisory Council were established under the Act.

The ARPANS Act applies to the regulation of Commonwealth entities. It prohibits the construction and operation of a radioactive waste storage or disposal facility unless the Commonwealth entity has been licenced to do so under Section 32 by the Australian Radiation Protection and Nuclear Safety Agency. In addition to licensing, the Act also gives effect to certain obligations that Australia has under the international Joint Convention on the Safety of Spent Fuel Management and on the Safety of Nuclear Waste Management.

The construction and operation of the SCY fall within the definition of a controlled facility. The Commonwealth process to prepare a site for a controlled activity (site licence) application for the SCY is being prepared by the ANI for submission to the Australian Radiation Protection and Nuclear Safety Agency. This requires the following information:

- A detailed site evaluation that establishes the suitability of the site – A description of the characteristics of the site, including the extent to which the site may be affected by natural and human events.
- Any environmental impact statement (however described) requested or required by a Commonwealth, State, territory or local government agency in relation to the site or facility and the outcome of the environmental assessment.

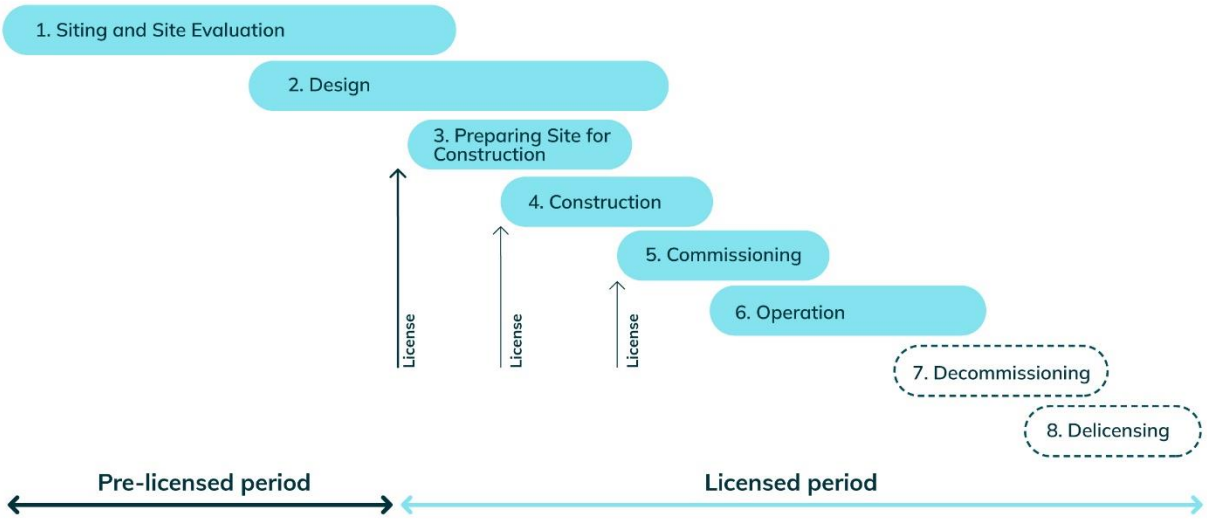
The above information is to be included within a Siting and Site Evaluation Report that supports the licence application to prepare the site.

Key Steps

The process for gaining a site licence for a controlled activity is comprehensive and iterative and in accordance with International Atomic Energy Agency Safety Standards. Several licences are to be sought through the course of the planning, construction and operation phases of the Submarine Construction Yard. These include:

- Prepare a site.
- Construct facility.
- Possess or control a facility.
- Operate a facility.
- Decommission.
- Dispose of or abandon a facility.

Figure 3.2 – Process for Gaining a Site License for a Controlled Activity



Assessments are being developed based upon a range of specific technical studies, carried out in line with the International Atomic Energy Agency Safety Standards, to assess all natural and human induced hazards at the preferred site. An independent peer review process has been implemented to verify the interpretation and conclusion of the site specific and regional studies that are conducted and then peer reviewed. A robust defensible process is in place to meet international best practice required of the International Atomic Energy Agency. The findings of the technical studies would support the suitability of the preferred site including any mitigations to identified hazards.

The Siting and Site Evaluation Report would also inform the basis of design of the Submarine Construction Yard, so that design can incorporate practicable engineering solutions to manage potential hazards. Due to the comprehensive site evaluation and licensing process, the facility would be subject to ongoing monitoring and periodic review by the nuclear regulator to make sure that the facility adheres to the site safety requirements of the International Atomic Energy Agency.

3.4.2 Nuclear Non-Proliferation (Safeguards) Act 1997

The *Nuclear Non-Proliferation (Safeguards) Act 1997* (Commonwealth) gives effect to certain obligations Australia has in relation to:

- The Treaty on the Non-Proliferation of nuclear weapons.
- The Application of Safeguards in connection to the Treaty with the Non-Proliferation of Nuclear Weapons (the Agency Agreement).
- The Supplementary Agency Agreements, which are agreements with the International Atomic Energy Agency.
- Prescribed international agreements.

Commitments under these international treaties are managed through a system of permits issued by the Australian Safeguards and Non-proliferation Office for the possession of nuclear material, equipment and technology. The design of the SCY must allow for the implementation of Australian safeguards system in-line with these obligations.

3.4.3 *Australian Naval Nuclear Power Safety Bill 2024 (passed October 2024)*

The *Australian Naval Nuclear Power Safety Bill 2024*, will establish a new regulator and new regulatory framework to promote and regulate the nuclear safety of activities relating to AUKUS submarines. This framework includes the establishment of a new independent regulator, the Australian Naval Nuclear Power Safety Regulator (ANNPSR). The Regulator will be responsible for:

- Granting Australian naval nuclear power safety licences to authorise Commonwealth-related persons to undertake regulated activities related to facility activities, submarine activities and material activities.
- Monitoring and enforcing compliance with nuclear safety duties and other conditions of those licences.

Promoting nuclear safety of AUKUS submarine-related activities, including through consultation and cooperation with others including Commonwealth, State and Territory work, health and safety regulators, the Australian Radiation Protection and Nuclear Safety Agency and the Department of Defence Office of the Defence Seaworthiness Regulator.

Any requirements set out in the forthcoming Act will need to be considered. Under the Australian Naval Nuclear Power Safety regulatory framework, the Regulator for the operation of the licenced area will be established. The Regulator will assess the proposed operation, provide operational licence conditions and undertake compliance activities. As the Australian Naval Nuclear Power Safety Regulator has not yet been established, protection of the health and safety of the public and environment from nuclear radiation is currently regulated by ARPANSA as governed by the ARPANS Act.

3.5 Other State-Based Legislation

There is a range of state-based legislation that is relevant to this EIS. This legislation is referenced throughout this EIS including:

3.5.1 *Aboriginal Heritage Act 1988*

Aboriginal heritage is protected in South Australia in accordance with provisions of the *Aboriginal Heritage Act 1988* (AH Act), administered by the Department of Premier and Cabinet's Aboriginal Affairs and Reconciliation Division. All Aboriginal sites, objects and/or remains, whether previously recorded or not, are protected in accordance with provisions of the AH Act.

In accordance with Section 23 of the AH Act it is an offence to damage, disturb or interfere with Aboriginal sites, objects or remains unless written authorisation from the Minister for Aboriginal Affairs and Reconciliation has been obtained.

Relevance

The closest reported Aboriginal site recorded on the Taa Wika cultural heritage database and register is an archaeological site on Torrens Island east of the development site.

As no known Aboriginal archaeological sites, objects or remains have been recorded or discovered within the development site, no prior authorisation is required in accordance with the AH Act. However, this EIS sets out procedures that should be adopted to minimise potential damage in the unlikely event Aboriginal archaeological sites, objects or remains are discovered during construction.

3.5.2 Adelaide Dolphin Sanctuary Act 2005

Special Legislative Schemes are laws that have a direct link to the planning system and are of significant environmental importance to the state. They are defined under the PDI Act. The *Adelaide Dolphin Sanctuary Act 2005* (ADS Act) is one such scheme.

The ADS Act establishes a sanctuary to protect the dolphin population of the Port River estuary and Barker Inlet and to protect the habitat on which they rely.

The Adelaide Dolphin Sanctuary (ADS) is located in an area that is economically, socially, culturally and historically important. It contains infrastructure, industries, the State's major port, significant redevelopment and European and Aboriginal heritage. It is also an important area for a range of water related recreational activities. It is one of the most intensively used marine environments in the State and one of the few places in the world where bottlenose dolphins live in such close proximity to a major city.

The ADS Act provides a mechanism to manage and regulate the cumulative effect of the combination of uses to ensure efficient and appropriate planning and the ecological sustainability of the area. Development undertaken within or adjacent the sanctuary needs to be cognisant of and consistent with the objectives of the ADS Act and its Management Plan.

Relevance

The ADS Management Plan provides guidance to protect and restore the dolphins and their habitat, including stormwater and pollution management, vegetation protection, and control of marine pests.

This EIS considers the potential impact on dolphins, including through pest management and water quality.

3.5.3 Climate Change and Greenhouse Emissions Reduction Act 2007

The *Climate Change and Greenhouse Emissions Reduction Act 2007* assists in achieving ecologically sustainable development in the state by addressing issues associated with climate change, in particular through the reduction of greenhouse gas emissions and an increase in renewable energy usage.

Relevance

The Act provides emissions reduction targets for the State for which the development site is a part of.

3.5.4 Coast Protection Act 1972

The *Coast Protection Act 1972* was formed to protect, restore and manage the coast to prevent erosion, damage, deterioration, pollution and misuse. Under the Act the Coastal Protection Board is formed and provides a number of guidelines specific to coastal environments.

Relevance

The Act establishes the Coast Protection Board which has established a series of policies for coastal development. These policies will be relevant in relation to water quality and the potential for

impacts on coastal processes. Relevant policies for development have been included within the Planning and Design Code and these apply to the development site.

3.5.5 Dangerous Substances Act 1979 Dangerous Substances (General) Regulations 2017

The *Dangerous Substances Act 1979 Dangerous Substances (General) Regulations 2017* regulates the keeping, handling, transporting and the conveyance, use, disposal and quality of dangerous substances, administered with respect to the Australian Code for the Transport of Dangerous Goods by Road and Rail.

Relevance

The development requires the keeping, handling and use of dangerous substances so this Act applies to the development site.

Approvals

Licences will be obtained as required, as detailed in Section 4.6.3.

3.5.6 Environment Protection Act 1993

The *Environment Protection Act 1993* (EP Act) provides for the protection of the environment in South Australia. It establishes a framework for regulating pollution, waste management, and environmental impact through licensing, compliance, and enforcement measures. The EP Act also empowers the EPA to oversee environmental protection efforts and promote sustainable practices. A number of Environment Protection Policies are set out under the EP Act.

Relevance

The development must comply with the EP Act's requirements, including assessments, licenses, permits and management plans, to protect air, water and land quality and manage waste.

3.5.7 Heritage Places Act 1994

The *Heritage Places Act 1994* identifies, protects and manages State Heritage Places and objects (along with the *Heritage Places Regulations 2020 (SA))* and archaeological artefacts of heritage significance, irrespective of whether a site is subject to a heritage designation.

Relevance

There are no state heritage places, state heritage areas, local heritage places and historic areas affected by this development, and a low risk of discovering an archaeological artefact of significance. The development must comply with the Act's requirements in the unlikely event heritage items are discovered during construction.

3.5.8 Historic Shipwrecks Act 1981

Under the State-based *Historic Shipwrecks Act 1981* It is unlawful to damage, destroy, interfere with or remove an historic shipwreck (and in Commonwealth waters), aircraft or relic/artefact without a permit. In state waters, only historic shipwrecks are protected by this Act.

Relevance

There are known shipwrecks within the study area. An assessment of the impact of this development on these wrecks has been undertaken and summarised in this report. The

development must comply with the Act's requirements. This EIS sets out measures that should be adopted to minimise potential damage to shipwrecks during construction.

3.5.9 Landscape South Australia Act 2019

The *Landscape South Australia Act 2019* provides for the protection and management of the State's natural resources, including provisions relating to land management, water resources management and pest plant and animal control. Regional landscape plans and control policies are in force under the Act to guide management of water, soil and biological assets and define water affecting activities which require a permit and the regulation framework for surface and groundwater quantity in prescribed areas.

The proposed development is within the Green Adelaide Landscape Management Region.

Relevance

Landholders, and those undertaking work on behalf of landholders have a legal responsibility to manage declared pest plants/animals and prevent degradation to land and water. So this Act applies to the development site.

3.5.10 National Parks and Wildlife Act 1972

The *National Parks and Wildlife Act 1972* (NPW Act), administered by the Department for Environment and Water provides formal legal recognition for threatened flora and fauna species in South Australia, including those that are endangered, vulnerable or rare.

Relevance

There is potential, albeit low, for threatened fauna species protected under the NPW Act to occur within the development site. Should they need to be locally relocated during the development a permit may be required. So this Act could potentially apply to the development site.

3.5.11 Native Title (South Australia) Act 1994

The *Native Title (South Australia) Act 1994* provides for the registration of native title rights, investigations on native title rights, claims and determinations of native title rights and compensation for acts affecting native title rights in South Australia.

Relevance

The development site is within the native title claim area of the Kaurna People. The Federal Court has determined that native title does not exist in the development site. Therefore, there are no direct or indirect impacts on native title as a result of the development.

3.5.12 Native Vegetation Act 1991

Native vegetation in South Australia is protected in accordance with provisions of the *Native Vegetation Act 1991* (NV Act) by the Department for Environment and Water.

The NV Act provides for protection of native vegetation in South Australia and sets out a process for applying to clear vegetation where required. The Act ensures that areas of high conservation value are protected, and that clearances are subject to a thorough assessment process and a Significant Environmental Benefit (SEB) must be paid when clearance cannot be avoided.

Relevance

The NV Act is not applicable to terrestrial vegetation on the Lefevre Peninsula or Torrens Island but does apply to aquatic vegetation in the Port River. In particular it is relevant to the removal of seagrass that may be affected within the river. A Native Vegetation Clearance permit will be required once the extent of clearance to construct the marine infrastructure is confirmed.

3.5.13 Nuclear Waste Storage Facility (Prohibition) Act 2000

The *Nuclear Waste Storage Facility (Prohibition) Act 2000* prohibits the establishment of certain nuclear waste storage facilities in South Australia; and for other purposes. The objects of this Act are to protect the health, safety and welfare of the people of South Australia and to protect the environment in which they live by prohibiting the establishment of certain nuclear waste storage facilities in this State.

Relevance

The objects of this Act are to protect the health, safety and welfare of the people of South Australia and to protect the environment in which they live by prohibiting the establishment of certain nuclear waste storage facilities in this State.

This Act does not apply in relation to radioactive material that has been used or handled in accordance with the *Radiation Protection and Control Act 1982* pursuant to a licence, permit or other authority granted under that Act; or the storage or disposal of which has been authorised by or under that Act.

3.5.14 Radiation Protection and Control Act 2021

The purpose of this Act is to control activities involving radiation sources and to provide for the protection of people and the environment from the effects of radiation, to make related amendments to the EP Act, to repeal the *Radiation Protection and Control Act 1982*, and for other purposes.

Relevance

This Acts sets the level of radioactive material that can be transported from sites across Adelaide and sets up licensing that will be required. In the event that transport of radioactive material requires transport, this Act will apply to the development.

CHAPTER 4

General EIS Requirements

URPS

4. General EIS Requirements

This chapter includes matters which are required to be dealt with by the EIS under the PDI Act and Practice Direction 17, and/or raised by the Commission within the Assessment Requirements (Part 5 and 6). However, these matters are not considered to fall under the EIA regime or have been assessed elsewhere within the EIS and thus do not warrant individual chapters.

This chapter deals with the following aspects as outlined within the Assessment Requirements:

- Assessment against the State Planning Policies
- Assessment against the Greater Adelaide Regional Plan
- Assessment against the Planning and Design Code
- General Environmental Duty / Environment Protection Act Requirements
- Protected Matters
- Project Alternatives
- Site and Concept Design
- Sustainable Use of Resources
- Hazards Assessment and management
- Dangerous substances
- Nuclear-powered propulsion systems and radiation exposure from accident
- Land Tenure, Protected Areas and Land Use
- Soils, landform and geology
- Urban design and placemaking.

4.1 Assessment against the State Planning Policies

Conclusion: The proposal is consistent with the objectives and policies of the State Planning Policies.

State Planning Policies (SPPs) represent the highest level of policy in the planning system, and address the economic, environmental and social planning priorities for South Australia.

SPPs are the overarching umbrella polices that identify current and future planning issues and set the direction for how the planning system responds to them. The policy direction and priorities are then defined within Regional Plans and the Planning and Design Code.

Developments assessed through an EIA process must be consistent with relevant SPPs and provide any commitments regarding avoidance, mitigation or management of impacts. The following provides a summary of the most relevant SPPs for this development.

4.1.1 Integrated Planning

The proposal seeks to develop a large area of highly underutilised land almost entirely zoned Strategic Employment or Employment. The development site's location next to the existing Osborne Naval Shipyard (ONS) provides the opportunity to deliver defence infrastructure within a consolidated and managed precinct. The development site has been identified for future defence sector growth in the State's strategic planning work.

Investigations and collaboration with relevant infrastructure service providers is currently underway. The SCY will be able to be serviced by the necessary site services and utilities including electricity, gas, telecommunications, water, wastewater and stormwater. The site has access to deep water which is essential for the function of the development.

4.1.2 Biodiversity

The proposed development will occur adjacent to areas of identified natural character. Impacts across land and water-based activities have been considered in detail. As far as possible the development will reduce the impacts on the natural environment and ensure that ongoing mitigation measures are put in place to protect the areas and species of identified value. Biodiversity has been carefully assessed within this EIS and the separate EPBC Act Strategic Assessment.

4.1.3 Climate change

Future development will be constructed to protect against hazards including flooding and sea level rise. At a very minimum, surface and building levels across the development site will be set above the 1% AEP design flood envelope, with an appropriate allowance for increased rainfall, sea level rise, land subsidence or uplift, and coastal erosion. To achieve this, finished surface levels will be set above a minimum level of 3.30m AHD and building floor levels set above a minimum level of 3.55m AHD.

The development's greenhouse gas emissions are considered to be a small component of State carbon budgets over the development's lifecycle. The development has the opportunity to adopt good practice measures to avoid and minimise greenhouse gas emissions during the construction and operation phases and will support South Australia's transition to net zero by or before 2050.

4.1.4 Cultural heritage

A range of supporting investigations have been undertaken to address matters of First Nations cultural heritage and significance. Cultural heritage associated with existing shipwrecks, which have legislative protection, is also carefully investigated through this EIS.

4.1.5 Employment Lands

Consistent with this SPP, the proposal will see the development of a clustering of services for defence in a strategically identified locality. This will support economic growth and ensure the

development of a knowledge and industry hub that has the capability and capacity to deliver on its strategic goals.

4.1.6 Strategic Transport Infrastructure

Traffic generated as a result of the development workforce during the operational phase, in combination with other planned growth on the Lefevre Peninsula, has the potential to exceed the road network design capacity from Port Adelaide, northwards up the Lefevre Peninsula.

However, there are a range of operational measures and infrastructure improvement options identified to manage capacity and cater for future demand to offset the future planned growth of the Lefevre Peninsula. The State and Commonwealth Government's are committed to work collaboratively to ensure the optimal solution is identified ahead of demand.

4.1.7 Coastal Environments

The development requires a coastal location for the launching and docking of submarines. The area for development has been identified because of the water access and the established defence infrastructure in place. Coastal impacts will be minimised as far as practical, and the potential impacts on marine life, and removal of coastal vegetation have been carefully assessed. Water quality is also an important consideration that has been evaluated with mitigations identified through the EIS.

4.1.8 Emissions and Hazardous Activities

A key component of the EIS is to ensure the safety of the surrounding community from the industrial activities proposed to support the development and the construction of submarines. Most of the activities envisaged on the development site are consistent with the types of activities that are undertaken within the existing ONS yard. The potential for low-level radioactive waste generated during commissioning of the nuclear-powered propulsion system at the final stage of the submarine build process, will be assessed through the Radiation Protection and Nuclear Safety Agency (ARPANSA) and ultimately the Australian Naval Nuclear Power Safety Regulator (ANNPSR).

4.1.9 Special Legislative Scheme Adelaide Dolphin Sanctuary Act 2005

The future development will occur within and adjacent to the ADS. Necessary mitigation measures will be put in place to ensure the protection of the ADS. Some key considerations outlined in the EIS include noise and vibration, water quality, and stormwater management. The movement of the submarines in and out of the facility will be very limited and are unlikely to have any impact that is additional to the existing use of port infrastructure in the locality.

4.1.10 Conclusion

The development is consistent with the SPPs as it capitalises on strategically identified land that will cluster services in a connected locality. Expansion of defence infrastructure on the Lefevre Peninsula will align with zoning objectives and ensure other areas better suited to housing and community services are not impacted. The development will provide important economic and employment benefits for the locality and the state. The alignment of the proposal against relevant

SPPs is further detailed in Attachment A of Appendix 1.16 Land Tenure, Protected Areas and Land Use.

4.2 Assessment against the 30-Year Plan for Greater Adelaide

Conclusion: The key finding is that the proposal meets the objectives of the Regional Plan.

The 30-Year Plan for Greater Adelaide Update prepared in 2017 describes the state government's plan for how Greater Adelaide should grow to become more liveable, competitive and sustainable. The Plan will soon be superseded by the Greater Adelaide Regional Plan (refer to section 4.3).

The core objectives of the Plan are:

- Maintain and improve liveability.
- Increase competitiveness.
- Drive sustainability and resilience to climate change.

Relevant to the proposed development, the Plan seeks to:

- Support and promote defence, science and technology clusters ensuring they are linked by high quality road, rail and telecommunications infrastructure and connect to universities.
- Create sufficient buffer activities and design guidelines to prevent manufacturing and defence lands being lost to encroachment by residential activities and to prevent land-use conflicts between these activities.
- Provide sufficient strategic employment land options with direct access to major freight routes to support activities that require separation from housing and other sensitive land uses.
- Ensure there are suitable land supplies for the retail, commercial and industrial sectors.
- Coordinate and link strategic infrastructure across Greater Adelaide to ensure it meets the needs of a growing population with a changing demographic profile and supports a more productive economy.
- Define and protect strategic infrastructure sites and corridors from inappropriate development to ensure the continued functionality of the services they provide.
- Protect major economic infrastructure such as airports, ports and intermodals from encroachment by incompatible development and facilitate further economic activity in these locations.
- Protect coastal features and biodiversity including:
  - Habitats that are highly sensitive to the direct impacts of development.
  - Important geological and/or natural features or scientific educational or cultural importance.
  - Landscapes of very high scenic quality.
- Minimise or offset the loss of biodiversity where this is possible and avoid such impacts where these cannot be mitigated (for areas not covered by the *Native Vegetation Act 1991*).

- Protect key coastal areas where critical infrastructure is at risk from sea level rise, coastal erosion and storm surges, and ensure new coastal development incorporates appropriate adaptation measures.

This proposal is consistent with this Plan, by building on an existing business and industry cluster identified at Osborne for defence purposes.

4.3 Assessment against the draft Greater Adelaide Regional Plan

Conclusion: The key finding is that the proposal is consistent with the objectives of the draft Greater Adelaide Regional Plan.

- The draft Greater Adelaide Regional Plan (GARP) was released in September 2024. It describes the state government's plan for how Greater Adelaide can achieve its vision of a liveable, connected region, with world-leading industries, thriving communities and a cherished natural environment.
- There are four key themes to the draft Plan, one of which is Productive Economy. The GARP directly references the SCY development within this theme:

  " The construction of AUKUS nuclear-powered submarines at the Osborne Naval Shipyard will exceed any major project in the state's history and will have flow-on effects across a range of other sectors, including manufacturing, innovation, quantum technology and artificial intelligence."
- The Plan clearly identifies that the development site on the Lefevre Peninsula is to be used for the AUKUS project. It identifies the development as a "key driver of economic development in South Australia".
- The Plan identifies State Significant Industrial Employment Precincts (SSIEPs). Some of these precincts also align with National Employment Clusters identified by the National Reconstruction Fund Corporation. The SCY and ONS are identified this way in the Plan.
- SSIEPs are precincts of (actual or potential) scale, whose current and future activities are strongly linked with strategic and economic objectives of the state, and which accommodate (or will eventually accommodate) a critical mass of economic activity and employment. For example, SSIEPs:
  - Align with state strategic growth objectives.
  - Align with transport and trade networks.
  - Present opportunities for growth of knowledge precincts.
  - Are of a scale that can accommodate a large number of workers and support a significant share of the state's economic activity.
- The plan sets a number of long-term strategic directions within the Productive Economy theme. Those of particular relevance to the development have been identified below.
- Employment lands:

  - Provide sufficient land supply for employment generating uses that supports economic growth and productivity.
  - Support expansion and clustering of key economic growth areas.
  - Encourage development of underutilised lands where integrated with housing, infrastructure, transport and essential services.
  - Encourage the regeneration of former or underperforming employment lands where a net community benefit can be achieved.
- State Significant and Prime Industrial Employment Precincts
  - Identify, maintain and support state significant operations and prime industrial employment land by protecting them from encroachment by incompatible and/or more sensitive land uses to ensure their long-term and uninhibited operation.
  - Guide local employment land strategic planning to determine the role and function of employment lands and additional policy and investment required to support and grow these precincts.
- The development is also mentioned in the Transport and Infrastructure theme. In this theme it is identified that master planning for the Lefevre Peninsula is a priority for strategic transport networks given it comprises a growing residential area, mixed with significant industry development including the Port of Adelaide and ONS.

4.4 Assessment against the Planning and Design Code

Conclusion: The key finding is that the proposed development is broadly consistent with the zoning that is currently in place within the Code. Section 76(2)(d) of the PDI Act enables changes to be made following approval of an Impact Assessed Development to ensure alignment. We have recommended one Zone for the whole of the ONS and related activities, as well as some streamlining of assessment pathways.

4.4.1 Introduction

The purpose of this section is to establish the extent to which the development aligns with the outcomes for development envisaged by the Code, as required by Practice Direction 17 and the formal Assessment Requirements issued by the Commission.

The Code sets out the policies, rules and procedures that apply for the purposes of development assessment where it relates to performance assessed, deemed-to-satisfy or accepted development.

For an Impact Assessed application, the assessment authority is not bound by the Code. The proposal is assessed against the Assessment Requirements adopted by the Commission. This process recognises that some proposals need to be assessed in a more strategic way, and based on the potential impacts of the development.

Given the extensive investigations required to support an EIA process, section 76(2)(d) of the PDI Act enables the Code to be amended to align with an Impact Assessed development authorisation. While this proposal is largely consistent with the Code, it would be beneficial to include the whole

of the SCY within one zone and sub zone rather than the multiple zones that currently apply. There are also opportunities to streamline future assessment processes as discussed in more detail.

4.4.2 Nature of the Development

The nature of the development is well defined within Chapter 2. In general terms, the proposal includes a series of manufacturing activities which are defined as 'Industry' with some supportive and ancillary activities, such as canteen and amenities, office, accommodation, car parking, security buildings and the like. The proposal includes shipbuilding and marine infrastructure.

The definitions of the Code classify Light Industry, Special Industry and General Industry based on the potential impact on the receiving environment. Refer to Table 4.1. All of these categories of industry are anticipated within the development area.

Tables 4.1: Definitions of the Code

Development	Definition
Light Industry	Means an industry where the process carried on, the materials and machinery used, the transport of materials, goods or commodities to and from the land on or in which (wholly or in part) the industry is conducted and the scale of the industry does not: a. Detrimentally affect the amenity of the locality or the amenity within the vicinity of the locality by reason of the establishment or the bulk of any building or structure, the emission of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit, oil, spilled light or otherwise howsoever; Or; b. Directly or indirectly cause dangerous or congested traffic conditions in any nearby road.
Special Industry	Means an industry where the processes carried on, the methods of manufacture adopted or the particular materials or goods used, produced or stored, are likely to: a. Cause or create dust, fumes, vapours, smells or gases; or b. Discharge foul liquid or blood or other substance or impurities liable to become foul, And thereby: c. Endanger, injure or detrimentally affect the life, health or property of any person (other than any person employed or engaged in the industry); or d. Produce conditions which are, or may become, offensive or repugnant to the occupiers or users of land in the locality of or within the vicinity of the local.
General Industry	Means any industry other than a light industry or a special industry.

4.4.3 Zone

Land within the study area is covered by five zones, two subzones and a number of overlays that capture a range of technical matters and state interests. The existing zones and subzones are illustrated in Figure 4.1 below.

Figure 4.1 Existing Zones and Sub Zones Map

Strategic Employment Zone

The Strategic Employment Zone supports development that generates wealth and employment for the state. It calls for a range of industrial, logistical, warehousing, storage, research and training land uses with compatible business activities. Related to the setting and land use, development should be arranged to support the efficient movement of goods and materials in the vicinity of ports, enhance existing business clusters and maintain access to waterfront areas for uses that benefit direct water access such as ship building. The Strategic Employment Zone is supportive of further industry development and expansion of ship building.

The Planning Development and Infrastructure (General) Regulations assign the State Commission Assessment Panel as the relevant planning authority within this Sub Zone. To-date this has been effective in bringing the shipyard under one regulatory authority.

This development satisfies the intent and purpose of the Strategic Employment Zone.

National Naval Shipbuilding Sub Zone

The National Naval Shipbuilding Sub Zone applies within this Zone and supports the development of shipbuilding, and the long-term growth of defence related support industry uses generating wealth and employment for the state and nation.

The development achieves the intent of the National Naval Shipbuilding Sub Zone because:

- It will deliver increased ship building capabilities. This increase will support the long-term growth of the desired defence industry contributing to increased employment.
- The land development is supplemented by existing and additional waterfront development. This development will enable the movement of waterborne vessels between land and water.
- Waterfront development is limited to the periphery of the Port River and Light Passage. Development does not extend beyond nor obstruct the ongoing use of the Port River.
- This Sub Zone only forms a portion of the development site. It is proposed that the subzone be extended to encapsulate all the land being developed within this proposal. This will ensure the Sub Zone reflects the true boundaries of the areas utilised for shipbuilding.

Ports Sub Zone

The Strategic Employment Zone also includes the Ports Sub Zone (See Figure 4.1) which envisages a range of port related activities that support the ongoing strategic and economic state significance of the area for the handling of export and import commodities. This Sub Zone is more focused on cargo and ship repair facilities than shipbuilding activities. The National Naval Shipbuilding Sub Zone would be better aligned with the proposal.

Notwithstanding the National Naval Shipbuilding Sub Zone is a better fit, the development will satisfy the Port Sub Zone because:

- Naval related industry contributes to and complements the import and export of commodities.
- The development will be a key employment base for the state. Its development will contribute to the state's economic significance.
- Naval defence infrastructure involving the launching of constructed vessels represents a port related function. The facility cannot operate outside of a port waterfront environment.

Employment Zone

The Employment Zone supports a diverse range of low-impact industrial, commercial and business activities that complement the role of other zones accommodating significant industrial, shopping and business activities. The maximum building height in this zone is 24.5 meters.. The visual amenity of any development should be well considered and articulated to complement the surrounding.

These provisions are satisfied because the range of activities proposed in this Zone, largely car parking, have been purposely sited to minimise impacts. This ensures the more intensive use of the

land is located within the Strategic Employment Zone. This aids in managing the interface with land outside of the development.

Open Space Zone

The Open Space Zone applies to the north of Area 1 (i.e., Falie Reserve) and the linear connections to the north and west of the Mutton Cove. Approval has been granted for a grade separated road over this land, connecting Pelican Point Road into the ONS and SCY. The improved infrastructure is to support the sustainment of the existing ONS as well as to facilitate future construction and operations for the SCY.

While the Reserve was previously identified as Community Land under the Local Government Act 1993, this status was revoked via the *AUKUS (Land Acquisition) Act 2024* which transferred this land to Renewal SA and subsequently ANI to be part of the SCY.

Given the change in land classification, the Zone's intent is no longer suitable for the land. It is therefore proposed that the Open Space Zone located within the development be converted to Strategic Employment Zone.

This will ensure consistency between the relevant Zone boundaries and any development approval granted by the Minister.

Coastal Waters and Offshore Islands Zone

The Coastal Waters and Offshore Islands Zone applies to Light Passage and the Port River. Its application is limited to the proposed launch facility and the support craft berth only. The proposed development complies with the above provisions because:

- The development is situated within an existing and operative port. The continued use of the port is expressly desired by the Strategic Employment Zone and the National Naval Shipbuilding Subzone. Its application and intent needs to be considered in this context.
- The proposed berth and launch facility supplements existing facilities to the south.
- The development has a limited and acceptable impact on the marine and coastal environment. This is documented within the EIS.

Conservation Zone

Small parts of the Conservation Zone are included within Area 1, 2, and 3 as shown within Figure 4.1. The Desired Outcome for this zone is the conservation and enhancement of the natural environment and natural ecological processes for their ability to reduce the effects of climate change, for their historic, scientific, landscape, habitat, biodiversity, carbon storage and cultural values and provision of opportunities for the public to experience these through low-impact recreational and tourism development.

- The development will result in some limited impacts to seagrass along the coastal edge at the north-eastern extent of the development area. This is because the edge will need to be hardened to accommodate the wharf and associated submarine infrastructure.
- These impacts have been assessed within the impact assessment report.

- This hardening is limited to the section of the Zone between the Strategic Employment Zone and the Rivers edge. It is necessary to provide functional delivery between the development and the Port River. The balance of the land within the Conservation Zone will be maintained within its current state. This will ensure the intent of the Zone is reasonably achieved.

It is proposed that a slight boundary realignment be undertaken to ensure consistency between the relevant zone boundary and any development authorisation.

4.4.4 Current Overlays

Overlays within the Planning and Design Code have a direct relationship to state interests that are described in the State Planning Policies, or Special Legislative Schemes under the PDI Act. For ordinary development applications, some of these overlays also describe referrals to State Agencies to assess the impact of development on these state interests.

The relevant Overlays are set out below. These aspects are covered in the EIS.

Table 4.2: Relevant overlays to the development

Overlay	Description	Relevance
Adelaide Dolphin Sanctuary	Provides guidance about stormwater and pollution management to protect and restore dolphin habitat.	Relevant in relation to acoustic impacts of construction, and water quality. The development will implement strategies to minimise impacts on dolphins and their habitat, including for vessel movements and pollution control. This is covered further in Chapter 12 - Marine Flora and Fauna.
Coastal Areas	Seeks to ensure the conservation of the natural coastal environment, provide for natural coastal processes and recognise and respond to coastal hazards.	Relevant to Area 3 where the coastal edge will be hardened and infrastructure developed. This Overlay also sets out requirements regarding site and floor levels. Finished ground level is 3.3 AHD, and minimum finished floor level is 3.55m AHD. This is covered further in Chapter 12 - Marine Flora and Fauna.
Defence Aviation Area	All structures over 90 meters – seeks to ensure building height does not pose a hazard to the operational and safety requirements of Defence Aviation Areas.	This has little relevance as building heights are not proposed to exceed 90 metres.

Overlay	Description	Relevance
Gas and Liquid Petroleum Pipelines	Seeks to manage the risk to public safety and the environment and secure the energy supply from the encroachment of development on gas and liquid petroleum pipelines and associated infrastructure.	The two existing high pressure gas pipelines will require relocation out of the development site to facilitate the development. This will require changes to the Gas and Liquid Petroleum Pipelines Overlay within the Planning Design Code at a later date. The separation of pipelines from the SCY footprint has been an important consideration in the shipyard design.
Gas and Liquid Petroleum Pipelines (Facilities)	Seeks to manage the risk to public safety and the environment and secure the energy supply from the encroachment of development on gas and liquid petroleum pipeline facilities.	As above.
Hazards (Flooding)	Seeks to minimise flood hazard risk to people, property, infrastructure and the environment.	This is relevant to the stormwater strategy that will be discussed in Chapter 18 and 21.
Hazards (Flooding – General)	Seeks to minimise impacts of general flood risk through appropriate siting and design of development.	As above.
Historic Shipwrecks – State	Aims to protect historic shipwrecks and historic relics from encroaching development.	Historic shipwrecks have been considered in detail within Chapter 24.

Overlay	Description	Relevance
Major Urban Transport Routes	Seeks to ensure safe and efficient vehicle movement and access along major urban transport routes.	Victoria Road which borders the land is a Major Urban Transport Route and a State Maintained Road. The proposal will result in increased ship building capacity and staff numbers. This in turn will result in increased vehicle volumes. The increase in vehicle volumes will be managed through the construction of the new Grade Separated Road. The road is proposed within a separate development application (24012501). The Grade Separated Road will integrate with car parking and access arrangements contained within the proposed development to ensure: • Safe vehicle access and egress • Acceptable impacts to traffic flow of State Maintained Roads. • Sufficient on-site queuing. • No buildings encroach or restrict access to State Maintained Roads. Traffic impacts are further considered within Chapter 9.
Native Vegetation	Seeks to protect, retain and restore areas of native vegetation.	The NV Act only applies to the Port River. Some patchy seagrass is likely to be present along the edge of Area 3 where dredging is proposed. This is covered in Chapter 12 Marine Flora and Fauna.
Prescribed Wells Areas	Seeks to ensure sustainable water use in prescribed wells areas.	The development will not be reliant on water licensed under the *Landscape South Australia Act 2019*. The Overlay is not impacted by the proposed uses.
Regulated and Significant Trees	Seeks to mitigate the loss of regulated trees through appropriate development and redevelopment.	There are no Significant or Regulated Trees identified on the development site.

Overlay	Description	Relevance
Traffic Generating Development	Aims to ensure safe and efficient vehicle movement and access along urban transport routes and major urban transport routes.	Similar to the Major Urban Transport Routes Overlay, this Overlay seeks for the safe and efficient operation of State Maintained Roads. The construction of the new Grade Separated Road via a separate development application (24012501) will contribute to this outcome. Traffic has been further considered within the impact assessment report.
Water Resources	Seeks to protect the quality of surface waters in South Australia.	The overlay seeks to protect surface water from adverse water quality impacts and maintain the function and natural flow paths of watercourses. The development will provide for the collection and management of stormwater through the implementation of contemporary engineering practices. This will ensure: Post development stormwater flows are appropriately managed and restricted. Water quality and discharge measures are implemented to manage impacts on aquatic ecosystems are reduced. Soil erosion is minimised. Interference with existing flow paths is minimised and where required, appropriately substituted. Refer to Chapter 18 Flooding for more information.

4.4.5 Proposed Code Changes

The following changes to the Code are recommended:

- Align the zone and sub zone boundaries with those shown on Figure 4.2.
- Amend the Strategic Employment Zone to list the following as Accepted Development (Building Rules consent only) where located within the National Navy Shipbuilding Sub Zone:
  - Demolition and replacement of existing buildings for substantially the same use.
  - Worker's facilities such as canteen and amenities.
  - Retaining walls , fencing, hoardings, signage, guard huts, security measures, site office, lighting, parking and other minor activities.
  - Alterations and additions to existing buildings, including canopies, floor area extensions and/or replacement buildings that are largely of a similar scale and use as existing.

Figure 4.2 Proposed Zones and Subzones Map

4.5 General Environmental Duty / South Australian Environment Protection Act Requirements

Conclusion: The key finding is that the proposed development can, with the right mitigations in place, achieve the general environmental duty and be consistent with EP Act requirements. Prescribed activities have been identified that will require a license. Most of these are at the operational stage of the development.

Environment protection in South Australia is managed in accordance with provisions of the EP Act by the SA EPA. The EP Act provides protection for the environment, including land, air and water. The Act includes subordinate legislation including the *Environment Protection Regulations 2009*, and EPP's for specific areas, such as waste, water, air and noise. The EP Act carries a general environmental duty to take all reasonable and practical steps to prevent or minimise any resulting environmental harm.

4.5.1 General Environmental Duty

The EP Act is the regulatory framework for pollution management and general environmental protection in South Australia. The objective of the EP Act is to protect the environment, promote the principles of ecologically sustainable development (ESD) and ensure that all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment, having regard to ESD principles.

The EP Act establishes a general environmental duty of care for persons and entities undertaking development activities and prescribes activities of environmental significance that require approval and licensing under the EP Act, in addition to EPPs developed for specific issues based around standardised and endorsed sampling, testing and monitoring methodologies derived from relevant Guidelines.

4.5.2 Environmental Protection Policies

There are a range of policies and guidelines under the EPA legislation that development must comply with and have been considered in this EIS under the relevant chapters. Maritime Construction Works, listed wastes, and storage of hazardous activities may all require a license.

Table 4.3: Policies and Guidelines relevant to the development under the EPA legislation

Topic	Policy	Description	Relevance/ EIS Reference
Air Quality	• Environment Protection (Air Quality) Policy 2016 (Air Quality EPP)	The main objective of the Air Quality EPP is to protect air quality and minimise the emission of air pollutants. The Air Quality EPP aligns with the National Environment Protection Measure, and includes statutory limits on	The Air Quality EPP is relevant to aspects of the development relating to the emission (Chapter 7 Air Quality).

Topic	Policy	Description	Relevance/ EIS Reference
		the emission rates, emission concentrations and cumulative concentrations of air pollutants.	
	• Evaluation Distances for Effective Air Quality and Noise Management (Evaluation Distances) 2024	Provides proposed evaluation distances beyond which the EPA is unlikely to request specific evaluation of impacts predicated on typical activities, except where there is a potential for ground level concentrations of pollutants to exceed criteria.	These separation distance have been considered by VIPAC in the air quality assessment and outcomes summarised in Chapter 7 Air Quality.
	• Ambient Air Quality Assessment 2016	Support assessment of ambient air quality under the EP Act. Outlines approaches and methods for obtaining information that best facilitate the EPA's assessment of a proposal.	Chapter 7 Air Quality
	• Guideline: Construction environmental management plan (CEMP), EPA1095/24, EPA SA 2024b.	Guide the preparation of CEMPs.	The proposal includes a commitment to prepare Construction Environmental Management Plans, which will comply with this Guideline.
Noise	• Guideline for the Management of Noise and Vibration: Construction and Maintenance Activities,	Environment Protection (Commercial and Industrial Noise) Policy 2023 (Noise EPP) provides a statutory framework for the	The Noise EPP is relevant to the development as pertaining to the emission of noise

Topic	Policy	Description	Relevance/ EIS Reference
	Government of South Australia 2021 • Environment Protection (Commercial and Industrial Noise) Policy 2023 (SA)	assessment of noise issues, in particular the emission of noise from premises and its impact on nearby sensitive receivers, both natural and built. The emission of noise is considered a form of pollution and is controlled as such, with limits on the emission of noise determined by development type and the sensitivity of receivers, and measured according to the Evaluation Distances.	from construction and operations, including noise impacts from increased traffic movements. (Refer Chapter 8 Noise and Vibration).
Waste	• Environment Protection (Waste to Resources) Policy 2010 • Environment Protection (Movement of Controlled Waste) Policy 2014	The objective of the Waste to Resources EPP is to achieve sustainable waste management by applying the waste hierarchy consistently,	Chapter 16 Waste Management
Water Quality	• Environment Protection (Water Quality) Policy 2015 (Water Quality EPP)) • Stormwater Pollution Prevention Code of Practice for local, state and federal government.	Aims to achieve the sustainable management of water and the protection of the environmental values of water, particularly by controlling the emission of pollutants to surface, ground and marine waters.	Chapter 18 Flooding
Contamination	• Guidelines: Site contamination – acid sulfate soil materials, EPA 638/07, SA EPA 2007, • Standard for the production and use of	The National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) provides nationally consistent	Chapter 19 Contamination

Topic	Policy	Description	Relevance/ EIS Reference
	Waste Derived Fill, SA EPA 2013, • Guidelines for the assessment and remediation of site contamination, SA EPA, 2019 • Practice Direction	guidance on assessment and management of	

4.5.3 Prescribed Activities of Environmental Significance

Schedule 1 of the EP Act prescribes particular activities as being of environmental significance, requiring licensing under the EP Act. Prescribed activities of environmental significance are also reflected in the provisions requiring referral of proposals to agencies under Part 9.1 of the Code, and Schedule 9 of the Regulations. The potential prescribed activities of environmental significance pertaining to the development are listed in Table 4.4 and are further discussed in various sections of this EIS.

Table 4.4: Prescribed activities of environmental significance pertaining to the development

Category	Activity	Construction	Operation
1 - Petroleum and Chemical	(1) Chemical Storage and Warehousing Facilities the storage or warehousing of chemicals or chemical products that are, or are to be, stored or kept in bulk or in containers having a capacity exceeding 200 litres at facilities with a total storage capacity exceeding 1 000 cubic metres.	✓	✓
2 - Manufacturing and Mineral Processing	(1) Abrasive Blasting the cleaning of materials by the abrasive action of any metal shot or mineral particulate propelled in a gaseous or liquid medium (otherwise than solely by using blast cleaning cabinets less than 5 cubic metres in volume or totally enclosed automatic blast cleaning units).		✓
	(12) Surface Coating the conduct of— (a) works for metal finishing, in which metal surfaces are prepared or finished by means of electroplating, electrolyse plating, anodising (chromating, phosphating and colouring), chemical etching or		✓

Category	Activity	Construction	Operation
	milling, or printed circuit board manufacture, being works producing more than 5 kilolitres per day of effluent; or (b) works for hot dip galvanising; or (c) works for spray painting or powder coating with a capacity to use more than 100 litres per day of paint or 10 kilograms per day of dry powder.		
	(14) Maritime Construction Works the conduct of works for the construction or repair of ships, vessels or floating platforms or structures, being works with the capacity to construct or repair ships, vessels or floating platforms or structures of a mass exceeding 80 tonnes.		✓
3 - Resource recovery, waste disposal and related activities	(5) Activities involving listed wastes: (a) an activity producing listed waste—the conduct of an activity in which a listed waste is produced as waste or becomes waste (c) treatment of listed waste—the conduct of a depot, facility or works for the treatment of a listed waste, or wastewater containing a listed waste, by immobilising, stabilising or sterilising the waste by any process (before its further treatment or disposal) but excluding an activity in respect of which the Authority is satisfied, having regard to the prescribed factors, that an environmental authorisation is not justified.		✓
7 - Materials Handling and Transportation	(4) Dredging removing solid matter from the bed of any marine waters or inland waters by any digging or suction apparatus, but excluding works carried out for the establishment of a visual aid to navigation and any lawful fishing or recreational activity.	✓	
	(6) Earthworks Drainage the conduct of earthworks operations in the course of which more than 100 kilolitres of wastewater containing suspended solids in a concentration exceeding 25 milligrams per litre is discharged	✓	

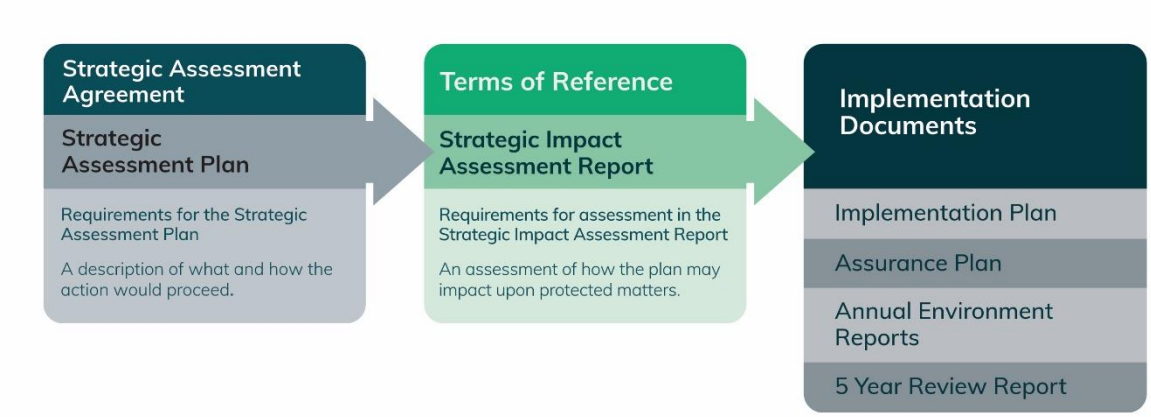
Category	Activity	Construction	Operation
	directly or indirectly to marine waters or inland waters.		
Other	(4) Marinas and Boating Facilities the conduct of— (a) facilities comprising pontoons, jetties, piers or other structures (whether on water or land) designed or used to provide moorings or dry storage for 50 or more powered vessels at any one time; or (b) works for the repair or maintenance of vessels with the capacity to handle 5 or more vessels at any one time or vessels 12 metres or more in length.		✓
	(7) Discharges to Marine or Inland Waters: the conduct of operations, other than a desalination plant referred to in subclause (6a), involving discharges into marine waters or inland waters where— (b) the total volume of the discharges exceeds 50 kilolitres per day.	✓	✓

4.6 Commonwealth Protected Matters

Conclusion: There a range of Commonwealth Protected Matters that apply to the Development, including threatened species and communities, listed migratory species, protection of the environment from nuclear actions and protection of the environment from Commonwealth actions.

The EPBC Act Strategic Assessment described in Chapter 3 of this EIS, has been prepared to undertake a full assessment of all Protected Matters under the EPBC Act. The Strategic Assessment includes three key steps:

Figure 4.3 – Three Key Steps in the Strategic Assessment



Protected Matters that are related to the Strategic Assessment Area were identified in The Plan based upon:

- A Protected Matters Search Tool Report for the Strategic Assessment Area, with a 10 km buffer.
- Review of the EPBC Act provisions for Protected Matters (that is, a matter protected by a provision of Part 3, Section 34 of the EPBC Act).

A summary of relevant Protected Matters is included in Table 4.5. The impacts of the proposal on these matters is discussed in the relevant sections of this EIS.

Table 4.5 – Relevant Protected Matters

Matter Protected	EPBC Act provisions	Matter Protected
Listed threatened species and communities	Subsection 18(2)	A listed threatened species in the critically endangered category
	Subsection 18(3)	A listed threatened species in the endangered category
	Subsection 18(4)	A listed threatened species in the vulnerable category
Listed migratory species	Section 20A	A listed migratory species
Protection of the environment from nuclear actions	Section 21 Section 22a	The environment
Protection of the environment from Commonwealth actions	Section 28	The environment

4.7 Development Alternatives

Conclusion: The Commonwealth has identified Osborne as the preferred site given its strategic location. The Development is crucial for Australia's national security.

This section describes the reasonable alternatives to the development considered by ANI. The alternatives that have been considered include:

- Alternative locations/sites.
- The 'Do Nothing' alternative.

Given the nature of this development as a defence high security precinct, not all information is publicly available. As such, it is not possible to provide an assessment of alternative designs (e.g. layout, heights, massing and other aspects). As a result, this is not considered further in this application.

4.7.1 Alternative locations/sites

The preferred site for construction of SSN-AUKUS within Australia is at Osborne on the Lefevre Peninsula, approximately 19 km north of Adelaide. The Strategic Assessment states that the:

> *"Australian Submarine Agency undertook a comprehensive analysis of potential locations to inform a government decision on a suitable site for the nuclear-powered submarine construction yard. The preferred site location is the Strategic Assessment Area located on the Lefevre Peninsula, South Australia."*

This location will enable the development to build upon the existing ONS which is already the most advanced and modern shipbuilding hub in Australia. The preferred site (i.e., the development site):

- Is land previously prepared for industrial development that has and was available for use by the Australian and South Australian Governments.
- Is adjacent to the existing previously established Osborne Naval Shipyard, which is owned and managed by ANI.

The infrastructure on the existing ONS is owned and managed by ANI. The facilities have been integral to Australia's naval shipbuilding enterprise, with major naval surface combatants including the Hobart Class Air Warfare Destroyers, Offshore Patrol Vessels, and Hunter Class Frigates and the facilities supporting the full cycle dockings of the Collins Class Submarines. The operations of the development have built skills, knowledge and infrastructure that is well placed to support a growing shipbuilding operation. The AUKUS program, undertaken at the preferred site, will contribute to sustained shipbuilding activities at Osborne into the future.

As outlined previously within this chapter, the development site is consistent with the State Planning Policies, Greater Adelaide Regional Plan, Planning and Design Code. As such, the development site is considered to be a suitable site for the development.

4.7.2 The 'Do Nothing' alternative

A 'Do Nothing' alternative, or 'no development' as an alternative to the development, has not been considered in this EIS as a need has been identified by the Australian Government. The 'Do Nothing' scenario would not contribute to the future national security of Australia, as identified with the EPBC Act Strategic Assessment. The Strategic Assessment states that:

"Not developing a modern future submarine capability could impact upon national security and diminish the contribution of Australia to security in the Indo-Pacific region."

The 'Do Nothing' alternative can therefore be discounted as a reasonable alternative and is not considered in detail in this chapter.

4.8 Site and Concept Design

The following table sets out the Commission Assessment Requirements and where they are addressed within the EIS.

Table 4.6: Site and Concept Design Assessment Requirements

Assessment requirement No.	Location addressed within EIS
AA1: Standard Requirements	
Describe location and design options considered, reasons for selection and how the proposed location and /or design avoids and / or mitigates potential impacts and risks to the surrounding environment. Outline and justify any trade-offs in the design or operation of the development.	As outlined within Section 4.7 above, the detailed analysis of alternative sites and designs has not been undertaken as part of this EIS. The development is described within Chapter 2: Description of Development and the development site is described within Chapter 5: Receiving Environment. Chapters 7 to 24 provided an assessment of effects and includes information, if relevant, on how the proposed location and /or design avoids and / or mitigates potential impacts and risks to the surrounding environment.

4.9 Sustainable Use of Resources

The following table sets out the Commission Assessment Requirements and where they are addressed within the EIS.

Table 4.7: Sustainable Use of Resources Assessment Requirements

Assessment requirement No.	Location addressed within EIS
CCRE3: Standards Requirements	
Describe the sustainability objectives of the development and the approach and methodology used to achieve these objectives.	Section 4.9 of this chapter and Appendix 1.10 - Sustainable Use of Resources Report

Assessment requirement No.	Location addressed within EIS
Describe design guidelines for aspects of the development (including transport options) that would be adopted to ensure sustainability.	Section 4.9 of this chapter and Appendix 1.10 - Sustainable Use of Resources Report
Describe how sustainability of the development will be audited.	Section 4.9 of this chapter and Appendix 1.10 - Sustainable Use of Resources Report
Identify ways in which power use can be minimised or supplemented, especially using alternative energy sources, energy efficient measures and energy conservation.	Section 4.9 of this chapter and Appendix 1.10 - Sustainable Use of Resources Report

4.9.1 Overview

Colby Phillips Advisory has prepared an initial preliminary Sustainable Use of Resources Report for the construction and operational phases of the development. The full report is provided in Appendix 1.10. The sustainable use of resources report fulfills the Assessment Requirements and provides the following:

- Recommends sustainability objectives for the development.
- Recommends design guidelines and proposed approaches to achieve these sustainability objectives for matters including design, construction methods, procurement of materials and equipment, energy use, waste, transport and water during both construction and operation.
- Outlines how sustainability for the development will be monitored and reviewed.
- Recommends ways in which power use can be minimised or supplemented, especially using alternative energy sources, energy efficient measures and energy conservation.

Key findings of the sustainable use of resources report include:

- The importance of using resources sustainably is being increasingly recognised around the world. Major projects such as the development have some scope to contribute to efforts to improve sustainable practise.
- There are a number of South Australian and Australian requirements to use resources sustainably, in addition to community expectation.
- The development will put in place a range of measures to ensure the efficient use of energy, materials and water, minimise emissions and waste, and contribute to a circular economy.
- Given the early stages of the development, a range of recommended design standards and target outcomes have been identified for each stage and area of the development. These will be used to inform the design, construction and operation of the development wherever possible.
- Recognised, established design guidelines and methods will be used where possible as they automatically incorporate and consolidate within them relevant design standards, guidance, industry best practice performance targets, and/or provide assessment and design tools that

can help ensure high levels of sustainable resource use outcomes for the development. These may include Environmental Management Systems that comply with AS/NZS ISO 14001: 2016.

4.10 Hazards Assessment and Management

The following table sets out the Commission Assessment Requirements and where they are addressed within the EIS.

Table 4.8: Assessment Requirements and where addressed within the EIS

Assessment requirement No.	Location addressed within EIS
HR1: Detailed Requirements	
Undertake a risk assessment which describes the potential risks to people and property that may be associated with the proposed project for all components of the development. The assessment must address the following matters (where relevant): a) Potential hazards during construction and/or operation of the facility, including • the storage, installation and use of nuclear-powered propulsion systems, dangerous substances, accidents, fire, occurrence of contaminated land and abnormal events that may occur during all stages of the proposed project, including estimated probabilities of occurrence, and • associated with Major Hazard Facilities, transmission lines, petroleum and gas pipelines, storage and use of dangerous substances and explosives, both onsite and associated with neighbouring land uses / facilities (including Quantem (bulk storage terminal of petrol and diesel), Ixom (chlorine storage) and the approved Venice Energy LNG Storage Facility (floating storage and regasification unit)). • Describe measures that would be taken to minimise the risks of these events and mitigate impacts of incidents at nearby facilities on the proposed development (such as siting considerations).	Appendix 1.15 - Dangerous Substances. Section 4.10 to 4.12 of this chapter.
b) Assess the vulnerability of the area to natural and induced hazards, including floods, coastal inundation and storm events. Consider the relative frequency and magnitude of these events together with the risk they pose to the construction, operation and decommissioning of the proposed project, as well as the rehabilitation of the site. Describe measures that would be taken to minimise the risks of these events.	Section 4.10 of this chapter. Chapter 14 - Climate change adaptation. Chapter 18 – Flooding.
c) Evaluate the risk of fire, explosion, containment facility failure or other high consequence events at the site and any potential impacts on human health and to the environment (including marine and terrestrial flora and fauna), particularly from the	Section 4.10 and 4.11 of this chapter.

Assessment requirement No.	Location addressed within EIS
storage, installation and use of nuclear-powered propulsion systems. This should include a description of the critical controls (and how they will be maintained) that will be used to minimise the risks and mitigate the impacts from these catastrophic risks.	
Hazard analysis and risk assessment in accordance with AS/NZS ISO 31000:2018 Risk management guidelines and with HB203:2006 Environmental risk management principles and processes.	Appendix 1.15 - Dangerous Substances Section 4.10 to 4.12 of this chapter. Note that a full risk assessment in accordance with AS/NZS ISO 31000:2018 and HB203:2006 would be completed once the final design of development is known.

4.10.1 Major Accidents or Disasters

This section describes the vulnerability of the development to risks of major accidents and / or disasters which are relevant to the development.

'Accidents' can be defined as an occurrence resulting from uncontrolled incidents in the course of construction and operation (e.g. major emission, fire or explosion). 'Disasters' are naturally occurring extreme weather events or ground related hazard events (e.g. subsidence, landslide, earthquake). Major events therefore includes both human induced and naturally occurring events.

The following list of risks and events within Table 4.9 have been taken forward for further consideration.

Table 4.9: Major Accidents and/or disasters relevant to the Development

Major Accident or Disaster	Receptors	Comments
Flooding	People and properties in areas of increased flood risk, including development infrastructure and workers.	The vulnerability of the development to flooding (including climate change allowances), and the potential for the development to exacerbate flooding are addressed in Chapter 18 – Flooding. No significant flooding effects are identified and therefore this issue is not considered further in this chapter.

Major Accident or Disaster	Receptors	Comments
Climate Change	Development infrastructure	The future effects of climate change are taken into account in the assessment in Chapter 18 – Flooding. Chapter 14 - Climate change adaptation provides assessment of the development's resilience to climate change. Further consideration is therefore not given to accidents and disasters relevant to climate change in this chapter.
Fire	Local residents, properties, habitats, species and development infrastructure	Health and safety on the subject would be managed by the contractor during construction phase to mitigate risks of fire in line with legislative safety requirements. A detailed Emergency Preparedness Plan will be developed for the development during construction. The development is therefore not expected to have a significant effect on the environment due to the risk of a major accident occurring as a result of fire during construction. Construction fire risks are therefore not considered further. Health and safety would be managed by the Shipbuilder during operation to mitigate risks of fire in accordance with legislative safety requirements. The operational phase of the development would involve routine maintenance and servicing of equipment to ensure the safe operation. Relevant measures would be delivered through the Operational Environmental Management Plan (OEMP). Fire risks from routing maintenance and servicing is therefore not considered further in this chapter.
Storage or otherwise handling large quantities	Local residents, properties, habitats, species and	As outlined within Section 4.12 of this chapter, all dangerous substances will be used, stored, treated and disposed of

Major Accident or Disaster	Receptors	Comments
of hazardous industrial chemicals	development infrastructure	in accordance with strict legislative requirements and guidelines to ensure utmost safety for workers, the community and the environment. No significant effects are identified and therefore this issue is not considered further in this chapter.
Road Accidents	Nearby road networks	The effects of traffic related accidents and safety during the construction and operation, including abnormal load movements are assessed in Chapter 9 - Transport and traffic. No significant effects are identified and therefore this issue is not considered further in this chapter.
Radiation Exposure	Local residents, properties, habitats, species and development infrastructure	This is discussed within Section 4.12 of this chapter.

4.11 Dangerous substances

The following table sets out the Commission Assessment Requirements and where they are addressed within the EIS.

Table 4:10: Commission Assessment Requirements

Assessment requirement No.	Location addressed within EIS
HR4: Standard Requirements	
Identify all dangerous and hazardous substances and any explosives to be used, transported, stored, bunded, processed or produced and the rate of usage.	Section 4.11 of this chapter and Appendix 1.15 Dangerous Substances Report.
Describe the use, handling and disposal of these materials during construction and operation, with reference to storage (including any associated fire protection facilities).	Section 4.11 of this chapter and Appendix 1.15 Dangerous Substances Report.

Assessment requirement No.	Location addressed within EIS
Describe how hazardous contaminants and waste substances produced by the development will be treated, contained and bunded until their disposal at an approved facility.	Section 4.11 of this chapter and Appendix 1.15 Dangerous Substances Report.
Evaluate the potential effects of any accidents involving dangerous substances on the environment and public health in the vicinity of the site.	Section 4.11 of this chapter and Appendix 1.15 Dangerous Substances Report. Chapters 7 to 24 provided an assessment of effects for any accidents involving dangerous substances on the environment and public health in the vicinity of the development site.

4.11.1 Overview

Colby Phillips Advisory has prepared a Dangerous Substances Report for the development to inform this EIS. The full report is provided in Appendix 1.15. The Dangerous Substances Report provides:

- A preliminary inventory of potentially dangerous substances and hazardous materials that may be used or produced by the development during its construction and operational phase.
- Makes recommendations for further planning, design development and management of the development to ensure that potentially dangerous substances and hazardous materials can be safely stored and managed at the development site.
- An early review of potential risks from these dangerous substances and hazardous materials to workers, the development and public property, and the environment and public health in the vicinity of the development site.

The key findings of the Dangerous Substances Report are summarised below.

- A range of dangerous substances will be used or produced through the construction and operation of the development. These include the classes of dangerous substances and wastes identified in Table 4.11 and 4.12.
- All dangerous substances will be used, stored, treated and disposed of in accordance with strict legislative requirements and guidelines to ensure utmost safety for workers, the community and the environment.

Table 4.11: Dangerous substances procured for the development

Material class	Examples of materials/site activities/uses
Gases	Welding gas, LPG (Liquefied petroleum gas) and natural gas as an energy source, refrigerant gases, fire extinguishers, water treatment chemicals.

Material class	Examples of materials/site activities/uses
Flammable liquids	Diesel, petrol, adhesives, paints, alcohols.
Flammable solids	Metal powders, alkali metals (various salts), reactive metals.
Oxidising substances and organic peroxides	Fertiliser, chemicals, acids.
Toxic and infectious substances	Heavy metals, pesticides, fire extinguishers, other toxic chemicals.
Radioactive material	Nuclear- powered propulsion system, smoke detectors, laboratory radiochemicals, material testing radiation gauges, sealed sources for radiology and health physics instrumentation calibration.
Corrosive substances	Acids, Alkalis.
Miscellaneous dangerous substances and articles	Asbestos from demolition waste or soils, electrical transformers and capacitors, e-waste, lithium batteries, dry ice, engines, first aid and chemical kits, life-saving devices (e.g., self-inflating, flares).

Table 4.12: Dangerous wastes produced through the development

Waste classification	Examples of materials/site activities/uses
Medical waste &/or sharps	From on-site medical areas
Pharmaceutical waste	From on-site medical areas
Biosecurity / quarantine waste	From on-site medical areas.
Cytotoxic waste	From on-site medical areas.
Listed or other hazardous wastes	Waste from the above list, e.g. waste fuels, paints, materials, by-products etc.
Contaminated commercial & industrial waste	Identified during demolition or construction activities or produced during operational phase activities.
Waste soil	From earthworks and site establishment.
Radiation waste	Which may include End of life (EOL) detectors, Personal Protective Equipment (PPE), monitoring devices and radiation gauges, sealed sources for radiography, solid and liquid low level waste from testing and commissioning activities.

4.12 Nuclear-powered propulsion systems and radiation exposure from accident

The following table sets out the Commission Assessment Requirements and where they are addressed within the EIS.

Table 4.13: Addressed Requirements

Assessment requirement No.	Response / Location addressed within EIS
HR5: Detailed Requirements	
Describe the process to transport, receive, secure, store, install, test and commission a nuclear-powered propulsion system.	Section 4.12 of this chapter.
Describe and assess the radiation exposure pathways to workers, the public and non-human biota from relevant components of the development during construction and operation (including incident scenarios).	Section 4.12 of this chapter.
Describe the measures to control and optimise (reduce) any identified radiation exposure pathways to workers, the public and non-human biota from nuclear powered propulsion system componentry during construction and operation, as well as longer term, the framework for the eventual decommissioning and rehabilitation of the site.	Section 4.12 of this chapter.
Outline how the radiation exposure pathways to workers, the public and the environment from relevant components of the development would be monitored during construction and operation of the site.	Section 4.12 of this chapter.
Describe existing radiological characteristics of the environment that could be impacted by construction or operation of the development and the eventual decommissioning and rehabilitation of the site (e.g. air quality, soils, surface and groundwater, marine, etc).	Section 4.12 of this chapter.
In considering the above, ARPANSA's Radiation Protection Series must be referenced in the consideration of potential impacts on planned, existing and emergency situations for the public, workers and the environment.	Section 4.12 of this chapter.

4.12.1 Introduction

Given the nature of this development as a defence high security precinct, not all information is publicly available. The information provided below is considered sufficient to respond to the questions raised within the Assessment Requirements.

4.12.2 Transport, receive, secure, store, install, test and commission of Nuclear Steam Raising Plant (NSRP)

The nuclear-powered propulsion system (Power Unit) will be delivered to the development site as a fully welded and sealed component contained within the Power Unit Transport Package (PMTP).

The transportation of the PMTP to the development site will follow the required international and national legislative requirements, and drawing on well-established protocols from over 70 years of industry knowledge from the USA and UK. This will ensure the transport of the PMTP are handled with the highest standards of safety, security, and compliance.

Once received at the development site, the PMPT will be stored inside a safe and secure area, purposely constructed to house the PMTP within the nuclear licenced site. The PMTP will remain here until the Power Unit is ready for integration with the NSRP within the submarine. Once installed, the NSRP, its support systems, and its operators, will undergo a series of test and commissioning activities. These test and commissioning activities are iterative in nature, ensuring that the submarine, systems and components are functionally capable of supporting submarine operations, and its crew are trained and competent to operate the submarine.

4.12.3 Radiation Exposure Pathways

Prior to the first criticality[12] of the Power Unit (during PRTs), there are no post fission products present in the NSRP, and therefore the NSRP poses a limited external radiological hazard to people or the environment in this state. Reactor plant operation is only initiated with the submarine in the water (e.g. within the test and commissioning berth).

Due to the robust, resilient and conservative design, there is no release path for any radioactive post fission products into the environment.

Planned

The following planned, indirect exposure paths could potentially eventuate from:

- Generation of low level radioactive liquid samples and waste during and after PRTs – Liquid sampling is used extensively during PRTs, and throughout the NSRP lifecycle, as a key indicator of unexpected integrity issues.
- Generation of solid, low level radioactive and/or contaminated waste – This is a product of conducting work inside the reactor compartment (maintenance and/or repairs) following first criticality of the NSRP.

All low level waste will be collected, sorted, categorised and temporary stored in suitable containers, prior to being taken off-site for disposal (once a suitable facility becomes available) in accordance with relevant legislation and Regulatory guidance.

Unplanned

Unplanned exposure pathways:

[12] First criticality represents the first time energy is generated by the NSRP

- Loss of control of any liquid or solid waste could result in the release of radioactive material and therefore pose a hazard to individuals and the environment. This type of release would generally be very localised (within the submarine or facility). An aquatic release into the Port River could result in a wider spread of contamination, and would be dependent on quantity of the release and the tidal flow at the time of the release.
- A loss of fuel element integrity within the power unit, while highly unlikely, could result in a radiological release direct from the NSRP into the atmosphere. Based on the design of the submarine, there is no direct path from the power unit to an aquatic release, and a release to atmosphere would require the failure of multiple containment boundaries.

However, a number of scenarios that could lead to a radioactive release from the Power Unit have been extensively modelled by the NSRP Design Authority and engineering mitigations designed into the plant to minimise these already low probability, high consequence events.

Measures to control and optimise (reduce) radiation exposure pathways

Precise detail on these matters cannot be included this the EIS given the nature of this Project, however the following controls and optimisation would include:

- Multiple layers of engineered containment boundaries and infrastructure design.
- Inherent plant design that minimises the potential for high consequence events to initiate and develop.
- Selection of materials – using 70 years of NSRP operating experience to guide the selection of propulsion plant materials required to support NPS operations, reducing through-life and decommissioning dose uptake, and includes plant systems and radiation shielding.
- Monitoring – This includes fixed, and portable detection and monitoring systems, to provide early detection of radiological issues, and personal dosimetry monitors that continuously measure and record individual doses during both planned and unplanned operations associated with the development site and the NSRP.
- The use of highly trained and competent personnel using, appropriately authorised processes and procedures, and applying the 'so far as is reasonably practicable' (SFARP) and as low as reasonably achievable (ALARA) principles.
- All potentially low level radioactive solid and liquid waste generated from planned operations will be captured, treated and temporarily stored at the development site prior to its disposal offsite (once a suitable facility becomes available), subject to monitoring results and relevant discharge criteria being met.
- Any potentially low level radioactive gaseous releases will be captured and subject to monitoring results and relevant discharge criteria being met discharged via authorised routes.
- It is anticipated that Area 3 will be the focus of the nuclear license for the development site, as the nuclear-powered propulsion system is expected to be stored and fitted to the submarines within this Area. As such design of the development site itself maximizes the geographic separation containing these activities from existing human receptors.

4.12.4 Radiation exposure monitoring and existing characteristics

As part of the ARPANSA licensing requirements, the radiological baseline conditions at the development site needs to be established and through-life monitoring maintained to ensure any

deviations from the established baseline conditions can be detected and the extent of those deviations quantified.

Monitoring would include fixed, and portable detection and monitoring systems, which would provide early detection of radiological issues, and personal dosimetry that measure and record individual doses during both planned and unplanned operations or events associated with the development site and the submarine.

4.12.5 ARPANSA's Radiation Protection Series

As outlined within Chapter 3 – Legislation and Regulatory Approvals, nuclear licensing under the ARPANS Act requires significant and detailed assessments against a range of internationally recognised standards. The ARPANSA's Radiation Protection Series will be referenced within the Siting and Site Evaluation Report that will support the licence application.

4.13 Land Tenure, Protected Areas and Land Use

The following table sets out the Commission Assessment Requirements and where they are addressed within the EIS.

Table 4.14: Assessment Requirements

Assessment requirement No.	Location addressed within EIS
LUSC1: Standard Requirements	
Provide details of the existing land uses (including relevant Planning Code Overlays and Zones), land tenures and protected areas at, overlapping or adjoining the development site.	Section 4.1 to 4.5 and 4.13 of this chapter.
Provide details of site services and infrastructure including utility services (water, gas, electricity, sewerage disposal, wastewater, drainage, trenches or conduits); location of ground and roof plant and equipment (electricity transformers; air conditioning; solar panels etc).	Chapter 5 – Receiving Environment
Provide high-level energy demand profile (including gas and electricity) for the construction and operational phases of the development, noting current network capacity to meet expected future demand, including consideration of the need for back-up power supplies for the facility.	Section 4.13.6 of this chapter
Provide details of the development (activities or structures) with the potential to impact on existing land uses, land tenures and protected areas that overlap, adjoin or are in the region of the development.	Chapter 2 – Description of Development and Chapter 5 – Receiving Environment.

Assessment requirement No.	Location addressed within EIS
	Chapters 7 to 24 provided an assessment of effects for the development.
Describe existing or potential native title rights, claims and interests which may be impacted by the development (including with the use of maps) the following native title considerations: • land or waters where native title has been determined to exist by the Federal Court • land or waters that are covered by a native title determination application. • land or waters that are covered by a registered Indigenous Land Use Agreement.	Chapter 2 – Description of Development and Chapter 5 – Receiving Environment.
Describe in general terms the potential impacts of the development on existing or adjoining land use. [Note that many impacts and mitigation measures will be addressed under Assessment Requirements for other environmental attributes and should be cross-referenced accordingly in the EIS].	Chapters 7 to 24 provided an assessment of effects for the development.
Describe (where relevant) potential impacts of the development for Crown land (including the Port River) and Native Vegetation Heritage Agreements or any other relevant land tenures (including leases and licences).	Section 4.13 of this chapter. Chapter 12- Marine flora and fauna and Chapter 13 - Terrestrial flora and fauna
Describe the existing policy and legislative considerations underpinning the Adelaide Dolphin Sanctuary which apply to the development.	Chapter 3 – Legislation and Regulatory Approvals Chapter 12 - Marine flora and fauna
Describe (where relevant) potential impacts of the development or areas protected under legislation or Special Legislative Schemes, including consideration of interface issues with the adjoining Mutton Cove including if the proposal will contribute to an 'edge effect' and discuss how this impact can be mitigated.	Section 4.13 of this chapter. Chapter 12 - Marine flora and fauna and Chapter 13 - Terrestrial flora and fauna
Provide an assessment of local impacts to adjoining land uses identified in the scoping application (e.g., property access (fencing, gates), privacy and enjoyment, conduct of regular or seasonal activities (e.g., harvesting, spraying, lambing) and describe any measures to mitigate these impacts.	Chapters 7 to 24 provided an assessment of effects for the development.

4.13.1 Overview

The State Planning Commission Assessment Requirements ask that the Proponent identifies areas where the proposal varies from the State Planning Policies or Planning and Design Code (the Code). This is addressed in sections 4.1 to 4.5 of this chapter.

The following therefore identifies where the development is consistent with, and inconsistent, with the Code. Section 76(2)(d) of the *Planning, Development and Infrastructure Act 2016* enables changes to the Code to align with an impacted assessed development approval. This will ensure consistency between the subzone boundaries and the shipyard.

A summary analysis of the assessment against the zones, subzones and overlays is provided below. A detailed assessment is provided in Appendix 1.16 – Land Tenure, Protected Areas and Land Use Review.

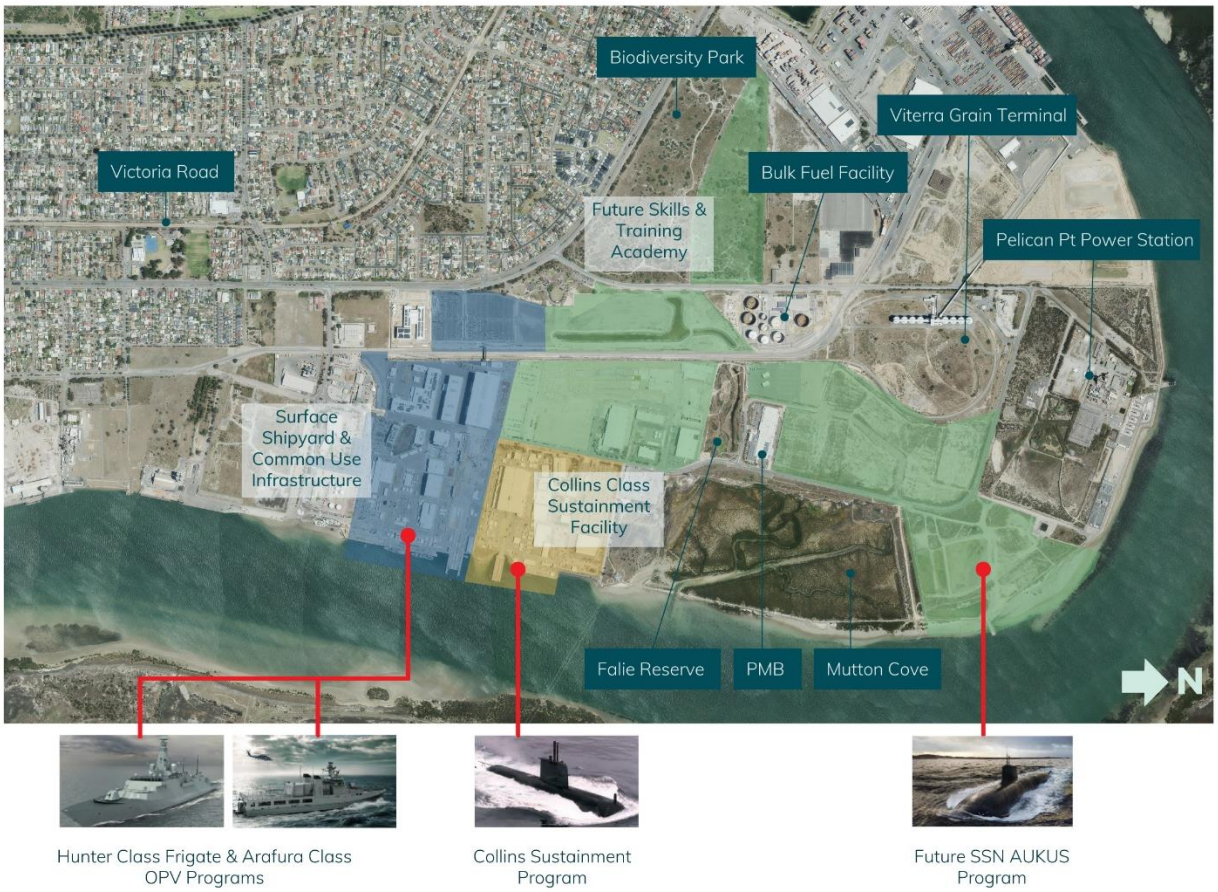
4.13.2 Current Land Use, Tenure and Approvals Over the Land

The Existing Osborne Naval Shipyard (ONS)

The existing ONS has been progressively developed over the last 37 years since the site, initially known as Techport was initially established in 1987. The current facilities have been integral to the shipbuilding enterprise with major naval surface combatants including the Hobart Class Air Warfare Destroyers, Offshore Patrol Vessels, Hunter Class Frigates, and the facilities supporting the full cycle dockings of the Collins Class.

This work has been delivered within the existing shipyard comprising the Surface Shipyard and Common Use Infrastructure and the Collins Class Sustainment Facility. Common Use Infrastructure includes a wharf, hardstands, two shiplifts and a variety of supporting facilities. There are also a number of tenanted businesses currently within the shipyard.

Figure 4.4 – Current and Future Shipyard



Area 1 – Former Attack-Class Project Area and Car Park

The former Attack-Class Submarine construction site is part of the development site. At the time, and upon completion of the then submarine construction yard, the submarines were planned to enter service in the early 2030s with construction extending until 2050.

On 16 September 2021, the then Prime Minister announced the cancellation of the contract with Naval Group and the creation of AUKUS, a trilateral security pact between the United States, the United Kingdom, and Australia.

As initial construction works had commenced at the site at the time off the project's cancellation, the development site currently has existing infrastructure which, where possible subject to construction methodology and ship size, can be re-purposed for the new SCY. However, not all existing infrastructure can be retained as some buildings will require replacement to accommodate larger submarines, alternative building functions and changing technologies.

Approvals have previously been granted over this land for a range of activities as described in the Table 4.15.

Areas 2 and 3 – Industrial Allotments and Dredge Pond Land

On 10 November 2023, the Australian Government and South Australian Government signed a land exchange agreement. As part of the land exchange Areas 2 and 3 are now held by ANI for the development of the SCY.

Area 2 was land formerly held by Renewal SA that had been subject to filling and ground improvements and subdivision ready for industrial land use. As the land has been subject to ground improvement the land is cleared. Some future provision for road and services connections were previously also made at the site.

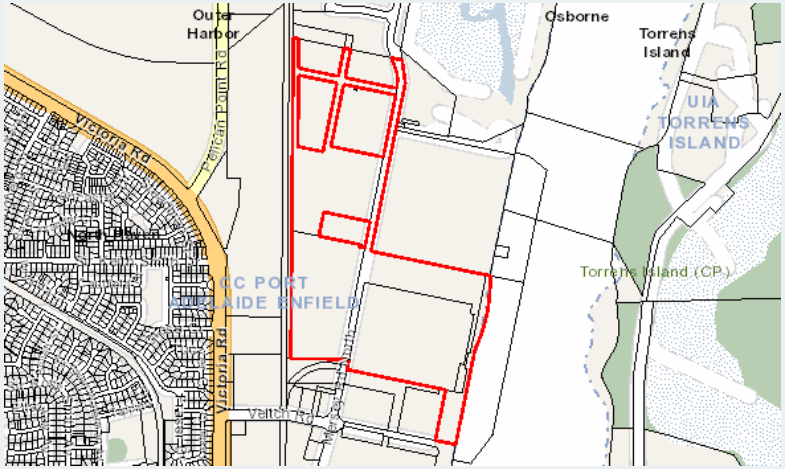
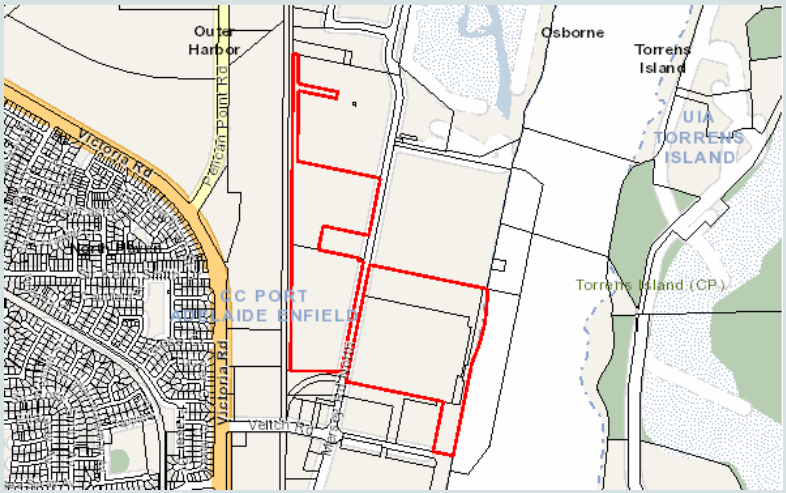
Area 3 is also land formerly held by Renewal SA, ultimately planned for industrial development. It has not yet been subject to ground filling and ground improvement and currently contains dredge ponds used for previous Port River dredging campaigns and minor roads and access tracks. The site is generally vacant, cleared land for future industrial use. No provision for road and services connections have previously been made at the site. Overhead high voltage power lines and a single high pressure gas main are currently within the boundary of the site.

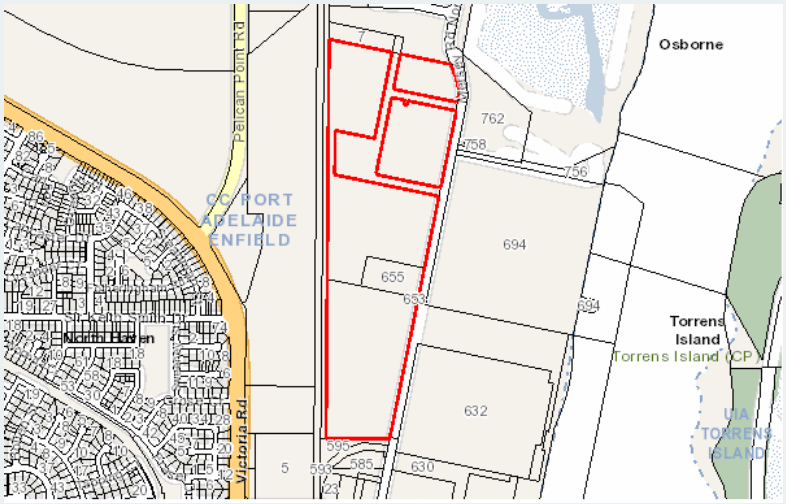
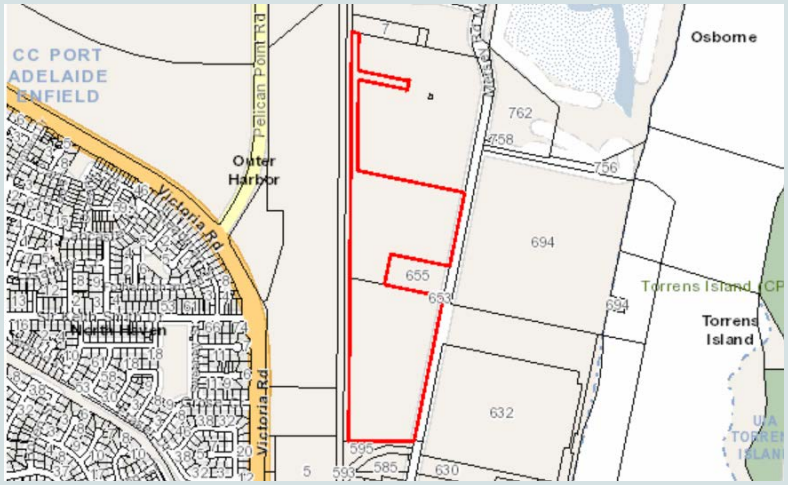
Marine Area

The marine-based portion of the development site is the Port River adjacent to the northeastern extent of Area 3. The Port River supports a variety of uses including port imports, exports and tourism, recreational boating, swimming and fishing. It supports a range of marine flora and fauna and is part of the Adelaide Dolphin Sanctuary.

This section of the Port River has been subject to dredging to maintain the safe access and passage for commercial shipping from the outer to the inner harbor, and maintaining access to docks, wharfs and marine infrastructure shipping infrastructure which has previously been constructed in proximity to Area 3.

Table 4.15: Prior Development Approvals

Application no.	Date lodged	Description	Location
040/L028/17 V2 ID: 5076	21/04/2020	Variation of DA 040/L028/17 for Stage 2 works associated with the South Australian Shipbuilding Infrastructure Upgrade including the construction of a steel assembly & unit fabrication workshop, block assembly hall, block outfitting & erection hall, blast & blast hall, hard stand areas, site infrastructure and temporary car parking arrangements. Variation is for the construction of new buildings Building 25 (High Voltage Switch room); Building 26 (Hazardous Waste Store); Building 27 (Changeroom).	
040/L028/17 V1 ID: 3668	2/11/2018	Variation to 040/L028/17; Construction of Building 19 to be used for a canteen as part of the Stage 2 works associated with the South Australian Shipbuilding Infrastructure Upgrade.	

Application no.	Date lodged	Description	Location
040/L050/18 ID: 3483	15/08/2018	Early works (cut, fill and piling) associated with the preparation of the site for the future construction of assembly and outfitting facilities for the Future Submarine Program.	
040/L019/17 ID: 2053	26/04/2017	Stage 1 of a development for early works, including earthworks and piling, associated with the South Australian Shipbuilding Infrastructure Upgrade project to enable the future build of the Future Frigate Program at Osborne.	

4.13.3 Current Zoning

Land within the study area is covered by five zones, two subzones and a number of overlays that capture a range of technical matters and state interests as described within Section 4.4 of this chapter.

4.13.4 Impact on Crown land and other land tenures

None of the land-based portion of the development site is Crown Land. The Port River which is contained in the marine-based portion of the development site is Crown Land. Mutton Cove, to the south of Area 3, northeast of Area 1 and east of Area 2 of the development site is also Crown Land

Potential impacts on these land uses are covered in the ecology chapters of EIS (see Chapter 12 - Marine flora and fauna and Chapter 13 - Terrestrial flora and fauna).

There are no Native Vegetation Heritage Agreements on the development site.

4.13.5 Impact on areas protected under Special Legislative Schemes

The portion of the Port River included in the development is included in the Adelaide Dolphin Sanctuary, protected by the ADS Act. The Act provides a mechanism to manage and regulate the cumulative effect of the combination of uses to ensure efficient and appropriate planning and the ecological sustainability of the area. Development undertaken within or adjacent the sanctuary needs to be cognisant of and consistent with the objectives of the Act and its Management Plan.

Refer to Chapter 12 - Marine flora and fauna for details about potential impact to the Adelaide Dolphin Sanctuary, and mitigation measures that will be put in place to minimise potential impacts.

4.13.6 High-level energy demand profile

The State Planning Commission Assessment Requirements ask a high-level energy demand profile (including gas and electricity) for the construction and operational phases of the development.

Electricity

Given the initial stage of design development at the time of writing this EIS, an initial Estimated Maximum Demand (EMD) calculation has been undertaken to satisfy this requirement.

Areas with similarities to the former Attack Class program (and where information is available) have been used as a basis to establish demand to apply to the infrastructure layout. Where areas or buildings do not have similarities to the former Attack Class program, infrastructure and equipment loads have been estimated from similar facilities (existing infrastructure at ONS). However, some infrastructure and areas are very unique, and assumed demands have been used based on an understanding of the function and engineering judgement. The Estimated Maximum Demand will be refined in detailed design as more information becomes available.

- Area 1 has an initial EMD of 25.5 Mega Volt Amps (MVA), inclusive of the separate proposed carpark to the west of the rail alignment. The total EMD of the Osborne North Precinct, inclusive of the existing facilities and ASC North is 29 MVA. This load component is proposed to be supplied from existing local substation infrastructure.
- Area 2 has an initial EMD of 23.8 MVA, which is predominantly based on the estimated areas of the new facilities with the pro rata kVA/m² rates from the Attack Class layouts and information.

The large office areas have been estimated based on typical AS/NZS 3000 W/m² figures, with slight uplifts applied for the higher security areas associated with these facilities (similar to that typical for Defence office buildings/areas).

- Area 3 has a preliminary EMD of 21.9 MVA. A portion of this load is anticipated to require a higher level of redundancy in supply relative to Areas 1 and 2. Some of the unique facilities within this area have little design basis information available, and therefore assumed demands have been used in the initial estimate based on high level building function information and engineering judgement.

The site total initial EMD is therefore 71.2 MVA. The maximum demand figures above are inclusive of the spare capacity requirements (i.e. are the Ultimate Design Load for the purposes of infrastructure sizing).

Based on the infrastructure available surrounding the development, it is proposed to utilise the existing local substation to supply Area 1 and provide two 66 kV incoming supplies that will service Areas 2 and 3. The sites for the two 66 KV providing incoming electricity supplies serving Areas 2 and 3 will be confirmed during detailed design.

Gas

Based on the initial design it is currently anticipated that the natural gas demand for the development will not exceed the capacity of the recent new supply provided to immediate proximity of the development area. Gas demand and gas supply will be confirmed during detailed design.

4.14 Soils, landform and geology

The following table sets out the Commission Assessment Requirements and where they are addressed within the EIS.

Assessment requirement No.	Location addressed within EIS
PE2: Standard Requirements	
Provide a description of the soils, landform and geology in the area of the development including the potential for water and wind erosion, soil salinity, acid sulfate soils and soil contamination. The description should: • Characterise soil types and structures in the development area and identify the potential location and disturbance of dispersive, acid sulfate, saline or potentially contaminated soils, or soils of other special characteristics that could affect or be affected by the development. • Identify hydrological, geomorphic or meteorological conditions that may contribute	Chapter 19 – Contamination. Section 4.14 of this chapter and Appendix 1.14 - Physical Environment Report.

Assessment requirement No.	Location addressed within EIS
to susceptibility to erosion (e.g., channels, steep slopes, wind). • Identify any areas of ground instability and any ground conditions that may be susceptible to subsidence from development activities (e.g. tunnelling, deep excavation, dewatering) and direct and indirect changes to vegetative cover. Identify properties, structures and infrastructure that may be susceptible to subsidence. Land subsidence may be a relatively significant contributor to sea flood risk in this location and may occur regionally without being generated from incoming development.	
Describe the development activities with potential to impact on soils and ground stability.	Chapter 19 – Contamination.
Address the implications of seismicity in the area in relation to both the construction and operation of the development.	Section 4.14 of this chapter and Appendix 1.14 - Physical Environment Report.
Identify the risks of contamination of land from spills of fuel (or other toxic substances). Describe measures for the prevention and containment of spills, describe the contingency plans to be implemented in the event of spills, and comment on their expected effectiveness.	Chapter 19 – Contamination.
If acid sulfate soils would be disturbed or unexpectedly encountered during construction, describe measures to avoid oxidation of the sulfides, treat and neutralise the acid if it forms and manage any excavated material.	Chapter 19 - Contamination.
Ensure that appropriate soil contamination investigations have been undertaken and that soil generated from earthworks is managed in accordance with EPA guidelines, including for re-use on site or removal of material off-site for re-use, treatment or disposal.	Chapter 19 - Contamination.

4.14.1 Overview

All aspects of this theme besides seismicity are covered in Chapter 19 - Contamination. Seismicity was considered by JBS&G in their Physical Environment report. The full report is available in Appendix 1.14.

The high level National Seismic Hazard Assessment reported in Appendix 1.14 indicates that the development site is not an area of regionally elevated seismic hazard, noting that at a national scale, seismic hazards in Adelaide are below average. An additional seismic hazard assessment of the site area and region is being undertaken to support the site suitability assessment and future nuclear licensing applications for the development site.

The design of structures in Australia is governed by *AS 1170.4 Structural design actions, Part 4: Earthquake actions in Australia*. Proposed building at the development site will be designed in accordance with the requirements of AS 1170.4 and that of the site licencing requirements to ensure that seismic hazard is appropriately addressed.

Buildings within the SCY that contribute to nuclear safety related activities and functions will be designed to meet the requirements of the Safety Case. These requirements will exceed the seismic design standards specified in the Australian Standards.

The impact pathway and associated mitigation measures for seismic hazard are summarised the table below.

Table 4.16: Seismic Hazard Assessment

Impact factor	Seismic hazard
Impact pathway	Earthquake.
Impact	Damage to built form, and subsequent potential harm to life. Impact to containment of hazardous substances.
Impact Type	Direct
Mitigation measures	Buildings will be designed in accordance with the requirements of AS 1170.4. Buildings within the SCY with a nuclear safety function will be designed to meet the requirements of the Safety Case. These requirements will exceed the seismic design standards specified in the Australian Standards.
Significance of Effect	Not Significant.

4.15 Urban design and placemaking

The following table sets out the Commission Assessment Requirements and where they are addressed within the EIS.

Assessment requirement No.	Location addressed within EIS
DQ1: Standard Requirements	
Provide a contextual analysis and identify site-specific issues including: • existing site conditions • existing built form, heritage context (if applicable), setbacks and land uses within the locality • existing transportation networks and movement patterns (public transport, bicycle paths, pedestrian paths) • existing landscape (Regulated and other trees) • environmental conditions (orientation, outlook and views, noise sources).	Chapter 5 – Receiving Environment and Chapter 7 to 24.
Describe the development principles that are informing the site layout.	Chapter 2 – Description of Development.
Demonstrate the proposal's precinct/site-wide movement strategy with consideration given to the following: • access and parking for worker and service vehicles. • active travel connectivity and public transport • public access to the coast and open space connectivity (specifically how this will be modified or restricted).	Chapter 9 - Transport and traffic.
Demonstrate the proposal's site configuration and built form.	Chapter 2 – Description of Development.
Describe the proposal's landscape design response with consideration given to Water Sensitive Urban Design (WSUD) principles, enhancing biodiversity, proposed vegetation replanting / offsets, reclamation and/or rehabilitation of land not required for the facility, and the urban / coastal / industrial interface including with Mutton Cove and Falie Reserve.	Section 4.15 of this Chapter.
Describe the proposal's Environmentally Sustainable Design (ESD) strategy.	Appendix 1.10 Sustainable Use of Resources. Chapter 14 - Climate Change Adaptation.

Assessment requirement No.	Location addressed within EIS
	Chapter 15 - Greenhouse Gas Emissions. Chapter 16 - Waste Management.
Provide documentation in accordance with clause 5(2)(e) of Practice Direction 17 Impact Assessed Development.	A set of plans, drawn to scale, and prepared by a suitably qualified consultant and provided separately to agencies.

4.15.1 Landscape design

The land-based portion of the development site has historically been cleared. The clearance of the development site initially took place as a result of the importation of fill for land reclamation. In addition, over the last ten years, clearance has taken place as land has been prepared for sale as part of the former Attack Class Submarine program, industrial purposes or retaining its current function as dredge ponds. The land contains little remnant vegetation, and what vegetation that has self-regenerated whilst activities have continued on the land. The majority of vegetation comprises low level shrubs which have been assessed to have low biodiversity or habitat value in their current context. No significant or regulated trees have been recorded on the site.

As part of the development there will be amenity planting prioritising endemic native species and landscaping in appropriate locations (eg car parks/boundary areas) subject to shipyard function and security requirements.

Falie Reserve

Falie Reserve is adjacent to the development site. It is not within the development site for EIS assessment area, and the land is not required specifically for the SCY. Tenure of the reserve was recently transferred to ANI, primarily for the purpose of constructing the grade separated link road. Landscaping, including amenity planting for the balance of the land, both on the reserve west of the rail line, and the stormwater detention basins to the west, will be undertaken as part of the development.

CHAPTER 5

Receiving Environment

URPS

5. Receiving Environment

5.1 Introduction

This chapter provides a description of the development site and its surrounding areas, including key features, designations and key sensitive receptor locations that may be affected by the development. Note that each technical chapter (Chapter 7 to 24) includes a description of the baseline conditions relevant to that technical assessment.

Commission Assessment Requirements

- Chapter 5 Receiving Environment provides information about the locality, including the physical, natural, social and economic environment.

5.2 Physical Environment

5.2.1 Land Use

The development site is located on the north-east tip of the Lefevre Peninsula (Figure 5.1). The primary land use of the Lefevre Peninsula north of Victoria Road is industrial, including both currently utilised and vacant land for future use.

Initially established in 1987, the existing ONS is located to the east of the southern part of the proposed development site and consists of two construction yards, Osborne North and Osborne South. The ONS is the location for the full-cycle docking and maintenance of the Royal Australian Navy's six existing Collins class submarines (CCSM) which is undertaken by ASC Pty Ltd (ASC).

The shipyard at ONS-S comprises a mix of legacy infrastructure and new facilities which were built as part of the Osborne South Development Project (OSDP) and completed in 2020 to support the continuous build of major warships. Infrastructure on the eastern side of the yard are being utilised by the Offshore Patrol Vessel (OPV) program for the build of the first two Arafura class OPVs by Luerssen Australia Pty Ltd (Luerssen).

The remainder of the yard, including all the new facilities, are tenanted by BAE Systems Maritime Australia (BAESMA) for the HCF program. BAESMA will progressively occupy the areas currently used by Luerssen when the OPV program at Osborne is complete, which is anticipated in 2025. Between north and south ANI owns and operates the Common User Facility (CUF) and associated infrastructure at Osborne including the wharf, dry berth, transfer system, shiplift and a fleet of self-propelled modular transporters (SPMTs) and provides services to the shipbuilding programs and other commercial users of the shipyard.

North of the ONS, and adjacent to the northern edge of the development site, is situated two power stations, Pelican Point and Snapper Point.

Other facilities within the northern area of the Lefevre Peninsula include logistic and distribution businesses and terminals, and warehousing for fuel, grains and shipping containers. Further to the north-west of the development site are commercial and local facilities including the Port Adelaide Overseas Passenger Terminal and Royal South Australian Yacht Club.

South of Victoria Road are the residential suburbs of North Haven, Osborne and Taperoo. North Haven is the closest residential suburb, approximately 300m of the south-western boundary of the

development site. North Haven also includes local facilities such as a surf club, golf club, marina, yacht club, primary school and several small parks and playgrounds.

There are several public open spaces at this most northern extent of Lefevre Peninsula. These include Biodiversity Park, Falie Reserve and the Kardi Yarta Playground. These sites have been previously upgraded and landscaped by Renewal SA (Government of South Australia) to improve the open space network within the northern Lefevre Peninsula were completed in 2013. Mutton Cove at Osborne is further to the east on the Port River, and Lady Ruthven Reserve and the Outer Harbour Railway Station Reserve are within the suburb of North Haven.

Figure 5.1 – Lefevre Peninsula map with development and key landmarks shown

5.2.2 Infrastructure

The area is well serviced by a range of infrastructure. Refer to Table 5.1 below. Note existing infrastructure which transects the development site will be relocated through separate development applications as required.

Table 5.1 – Existing infrastructure summary

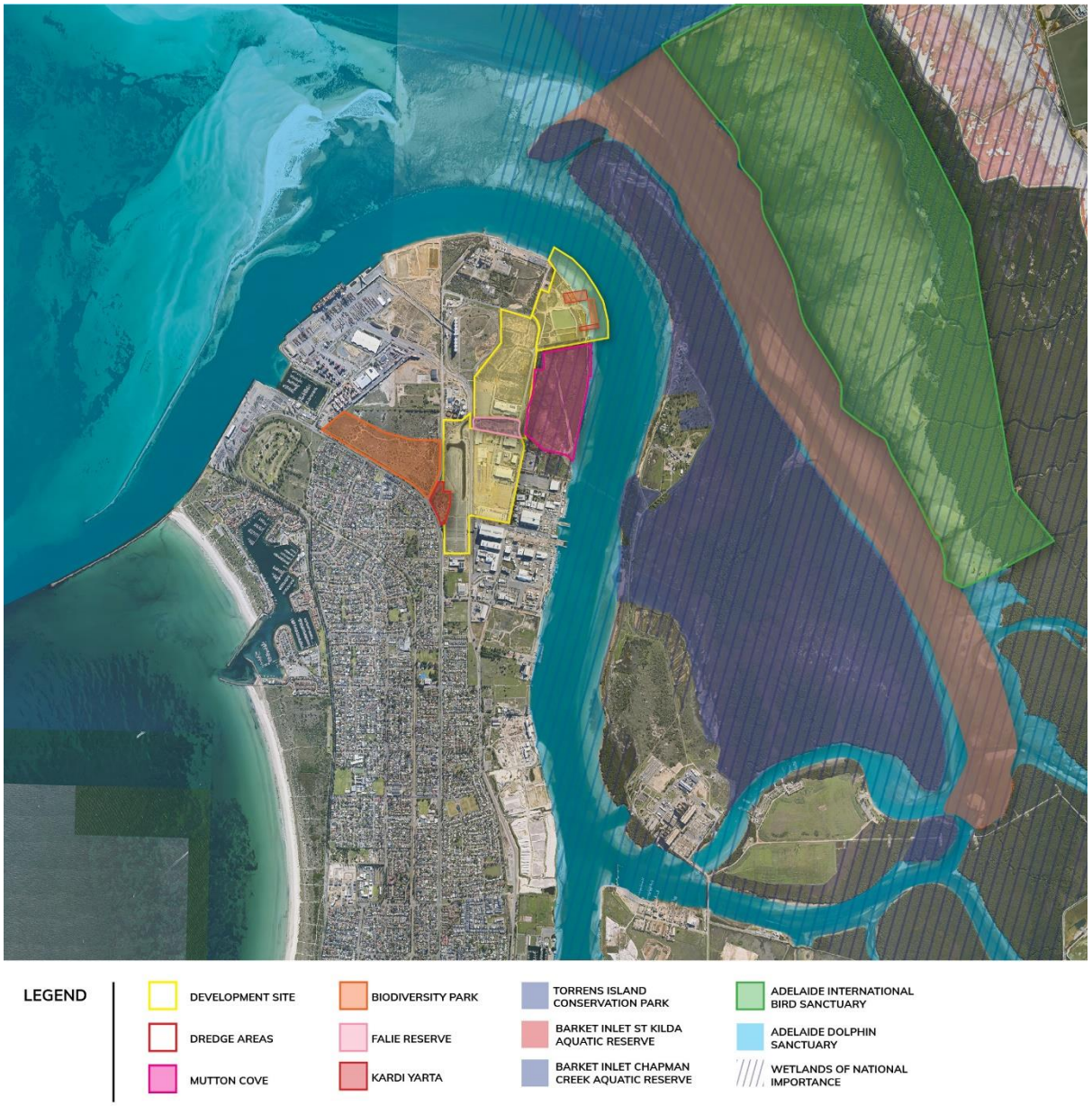
Infrastructure	Activity
Electricity SA Power Networks, Electranet	There are overhead and underground transmission and distribution electricity networks that currently pass through the development site. Lefevre Peninsula is home to three power stations (Pelican Point and Snapper Point at the north and Osborne/LeFevre to the south-east). Pelican Point Power Station is supplied with natural gas from SEAGas and Epic Energy and generates power to approximately 17% of SA. The Snapper Point Power Station also is supplied with natural gas and is used as a power peaking plant. An ElectraNet 275KV overhead transmission line network exits to the east of the Pelican Point and Snapper point power stations, entering the development site where it pivots south and continues through the western edge of Mutton Cove, parallel to Mersey Road North. It then splits, where the main network continues east and crosses Port Adelaide River whilst a feeder enters the Osborne zone (LeFevre) substation that resides in the south-west corner of Mutton Cove. From here electricity is distributed at 66kV and 11kV to the Peninsula to supply industrial sites (such as PMB, ANI South, Flinders Ports etc) and further south with SAPN substation connections at Blackpool and New Osborne substations. These zone substations are connected by a fibre communications network. Electricity then distributed throughout the Lefevre Peninsula from the two zone substations via a hybrid overhead and underground sub transmission cable network.
Gas Ampol, APA Group, Epic Energy, SEA Gas	There are three subsurface, high pressure transmission gas pipelines that cross the Port River and enter Lefevre Peninsula from the east; SEAGas and Epic Energy. The most northern pipeline (Epic Energy) enters the north-east corner of Mutton Cove and proceeds through the development site running parallel to the shoreline, terminating at the power stations. The SEAGas pipeline enters through the south of Mutton Cove until reaching Mersey Road North. It then proceeds north, parallel to the road in the road reserve before crossing through the development site and terminating at the power stations. APA is a low-pressure distribution network supplying natural gas to local customers on the Peninsula.
Sewer SA Water	Sewage in the locality is predominantly serviced by low-pressure and pumped sewerage networks. A low-pressure network starts in the middle

Infrastructure	Activity
	of the Pelican Point Road pavement before continuing east down Mersey Road North through the development site until reaching a gravity network that services the existing ONS and other developments in the surrounding area. Sewage collected in a gravity network to the north of ONS is captured in a pumpstation located in the road reserve of Annie Watt Circuit where it is conveyed to the gravity network in the Shipyard. Pump stations immediately to the north and south of ONS then pump the sewage out of the area south and into a gravity network on Osborne Road.
Stormwater Port Adelaide Enfield Council	The majority of northern Lefevre Peninsula is undeveloped and consists of natural, permeable surfaces including the development site. Rainwater collected from impervious surfaces is distributed underground and discharged to water quality treatment and detention basins before being discharged to the Port River via vegetated open channels. The most significant of these vegetated open channels used for discharging rainwater into Port River is the located in the development site immediately north of Mutton Cove.
Water SA Water	An arterial main in Victoria Road supplies potable water towards the tip of Lefevre Peninsula. A distribution main branches off at Osborne on Veitch Road, heading north in the road reserve of Mersey Road North through the development site, continuing west and then south on Pelican Point Road until branching back into the distribution main on Victoria Road. Developments and facilities on the eastern and northern sides of Lefevre Peninsula are supplied from the Mersey Road North and Pelican Road distribution main. The container yard to the west has a separate potable water supply connection from Victoria Road.
Telecommunications NBN, Telstra, Optus, Nextgen Group, SABRENet, TPG, Telecom	The northern industrial area of Lefevre Peninsula is serviced by multiple telecommunications providers which consist of fibre and copper cable networks in underground conduits. The local network for the area branches off from Victoria Road onto Veitch Road, then continues in the road reserve of Mersey Road North through the development site continuing west and then south on Pelican Point Road until reconnecting into the distribution main on Victoria Road. Each development in the industrial area is serviced from this local network.
Rail Infrastructure **DIT**, Australian Rail Track Corporation	The Outer Harbor railway line is a suburban passenger line in Adelaide. The line runs from Adelaide Station in the city to Port Adelaide and Outer Harbor. The line is operated by Adelaide Metro. There is also a freight railway line running through Adelaide's north-western suburbs. It links Port Adelaide, Pelican Point with the main interstate rail routes which link Adelaide with Melbourne, Perth, Darwin and Sydney.

5.3 Environmental Setting

5.3.1 Terrestrial landscape

Figure 5.2 – Key environmental designations



Landscape

The Lefevre Peninsula is bound by Gulf St Vincent to the west and the Port River to the north and east.

Historically, the northern and eastern Lefevre Peninsula comprised swamps, mangroves and sandy ridges. During the establishment of Port Adelaide, spoil from harbour dredging was used to reclaim this low-lying intertidal land, including the development site. Over the years the area was further filled with various sources including dredge material, waste material from hydraulic fill and industrial dumping, then levelled and developed. The northern Lefevre Peninsula is now characterised by flat terrain with low-lying elevations of 0.5m AHD up 15m AHD in the sand dunes to the west.

Mutton Cove is the only part of the Lefevre Peninsula that has remained at pre-fill levels although it has been subject to alteration in the form of levee banks since European arrival. Mutton Cove is currently surrounded by levee banks on all sides – with a breach to the levee on the eastern side on the Port River frontage.

Soils

The northeastern Lefevre Peninsula is underlain by the St Kilda Formation, which includes light grey shelly stranded beach ridge deposits and shelly silts and sand overlain in places by modern intertidal and swamp deposits. However, over the last 50 to 100 years, mangroves and swamp areas on the Lefevre Peninsula have been reclaimed through the deposition of fill (including spoil dredged from the Port River, and less commonly, industrial by-products such as Penrice grit, ash / cinders and slag)[13].

The Glanville Formation is present beneath the St Kilda Formation. The Glanville Formation consists of coastal sediments including silt, sand and clay, often with shell inclusions.

The presence of contamination soils in the region is possible due to a history of dredge spoil disposal or storage, fill or soil importation, wetlands or detention basins, industry and potential asbestos containing materials.

A search of the Australian National Soil Information System indicates the land-based portion of the development site lies within an area of 'low probability' of acid sulphate soils, noting there is low confidence in this assessment. Historically, acid sulphate soils have however been encountered at depth during construction of existing infrastructure on the northern Lefevre Peninsula.

Land subsidence has been identified as a potential issue in the Port Adelaide region in studies dating back to the 1970s. Key contributing factors are understood to be groundwater withdrawal, land reclamation by draining of wetlands, or by filling. Land subsidence across the Lefevre Peninsula is expected to occur at a rate of 1.5 mm/yr, which is within the 1-2 mm/yr for expected land subsidence along the Adelaide coastline.

Surface water

Surface water on the Lefevre Peninsula currently flows to stormwater basins that drain into the Port River at three main locations, including:

- Northern Mutton Cove outlet, which receives water from Falie Reserve basin and basins further west.
- Southern Mutton Cove outlet.
- Veitch Road outlet.

[13] JBS&G 2024, Physical Environment, accessible via Appendix 1.14 Physical Environment

Groundwater

Hydrogeology in the Lefevre Peninsula comprises five to six Quaternary aquifers and three to four Tertiary aquifers. The first Quaternary aquifer (Q1) is present at depths of approximately 3 mbgl, with an average thickness of 2 m. The Q2 and Q3 aquifers are expected to be present at depths of approximately 16 mbgl and 31 mbgl, respectively. Both the Q2 and Q3 aquifers have an average thickness of 2 m[14].

Groundwater in the locality is known to be impacted by a number of contaminants to varying degrees, including metals, per- and polyfluoroalkyl substances (PFAS) and cyanide.

Noise and vibration

Baseline monitoring within North Haven and Osborne shows that noise in the locality is dominated by industrial and traffic noise of the northern Lefevre Peninsula, with no specific audible noise directly attributed the existing ONS at the residences in these suburbs[15].

Baseline monitoring of the Port River north of Pelican Point identified that background noise was made up of a constant mechanical hum, likely from the nearby power station seawater intake pumps, along with the sound of snapping shrimp. The audio signature of the movements indicated that it was larger vessels, rather than small outboard vessels, passing by.

Air quality

Nearby SA EPA operated air quality monitoring stations show that the primary sources of air emissions in the region surrounding the development site are industrial/ commercial and vehicle generated primarily including PM10 (particles with a diameter of 10 micrometres or less), PM2.5 (particles with a diameter of 2.5 micrometres or less), carbon monoxide, sulphur dioxide and nitrogen dioxide[16].

The Victoria Road Air Quality Monitoring Study published in 2022 by the City of Port Adelaide Enfield and the EPA identified that the concentrations of measured pollutants were similar to those observed in other parts of metropolitan Adelaide. While it was not possible to differentiate between the industrial sources in the region, the levels of air pollutants did not exceed the national standards during the study period.

Open space

The Lefevre Peninsula is home to a number of landscaped recreation parks and biodiversity areas. Mutton Cove protects an area of emerging mangroves and remnant samphire shrublands. Other landscaped areas in the locality include Falie Reserve, Kardi Yarta Playground, Biodiversity Park, Lady Ruthven Reserve, Outer Harbour Railway Station Reserve and the dunes on the western side of the peninsula. Some of these areas contain intact remnant vegetation and revegetation rehabilitation sites which support a range of species including threatened and protected species.

[14] JBS&G 2024, Physical Environment, accessible via Appendix 1.14 Physical Environment
[15] Resonate 2024, Noise and Vibration Technical Report, accessible via Appendix 1.2 Noise and Vibration Technical Report
[16] Vipac 2024, Air Quality Assessment, accessible via Appendix 1.1 Air Quality Assessment

Terrestrial flora and fauna

Much of the Lefevre Peninsula has been cleared and developed, with minimal remnant native vegetation present. Vegetation associations in the locality include low open shrubland including degraded samphire and chenopod shrubland, and planted areas of vegetation. Weeds are prevalent, including nationally declared weeds, as well as non-native fauna including foxes and rabbits.

However, there are a number of sites of higher ecological value in the region which support terrestrial flora and fauna, including Mutton Cove, Torrens Island Conservation Park and the dunes along the western coastline of the Lefevre Peninsula. Bird Island, Biodiversity Park and vegetation regrowth in stormwater drains and ponds also contribute to the ecological value of the areas.

In particular, the region is known to support a number of bird species including species protected under the EPBC Act and NP&W Act due to their migratory or threatened status. Other species of local value in the region include the bitter-bush blue butterfly and yellow sedge skipper butterfly.

5.3.2 Coastal landscape

Coastal features

The Lefevre Peninsula is shaped by the Port River, a tidal inlet from Gulf St Vincent which includes the marine area of the development site. The entrance of the river is established by the Port breakwaters and contains a dredged shipping channel which is regularly maintained to a depth of 14.2 m at the entrance and decreasing to a depth of 9.3 m at the northern bend of the Lefevre Peninsula.

Torrens Island is located to the east. The west of the island is home to the Torrens Island Power Station and other industrial uses. The remainder of the island is a Conservation Park and includes the State heritage listed Quarantine station on the Port River frontage.

Bird Island lies nearby to the north. This island is based on spoil dredged from the harbour in the 1960s and 70s and has subsequently been extended through natural processes.

There have been significant changes to the coastal landscape of the Lefevre Peninsula due to development, tidal flows, and sediment movements influenced by the hydrodynamics of Gulf St Vincent. The Port River and subsequent tidal zones near and on the Lefevre Peninsula, including Mutton Cove, are subject to two complete tidal cycles per day (semidiurnal tides).

Marine flora and fauna

The Port River is characterised by intertidal mud flats and mangroves, with intertidal and subtidal seagrass (*Zostera sp.*) beds present on the along either side of the channel including parts of the marine-based portion of the development site.

The Port River and surrounding Barker Inlet is part of the Adelaide Dolphin Sanctuary which was established to support a small resident group and a larger transient group of the Indo-Pacific

bottlenose dolphins (*Tursiops truncatus*). An estimated 30 dolphins are considered resident, with approximately 400 dolphins which are transient, but visit at different times of the year[17].

Seagrass species (Zostera nigricaulis and Z. muelleri) are sparsely distributed around the edges of the Port River channel, including within the development site[18]. Within the Port River, Zostera distribution is most dense and consistent north towards Bird Island, whereas along the development site and further upstream, the distribution becomes patchy. Zostera species are opportunistic, often resulting in temporal variations. This is consistent with the distribution within the Port River, which has had apparent density fluctuations in the past.

There is one nationally significant declared species observed within the Port River, the European shore crab (Carcinus marnas). The European shore crab has established populations within South Australia, and as an aggressive predator, the species is a threat to native species for food and space. The invasive green seaweed Caulerpa taxifolia and C. cylindracea are also present within the Port River and Barker Inlet and have previously dominated sections of these areas.

Mutton Cove is the last remaining area of remnant vegetation on the Lefevre Peninsula. It has been modified since European arrival with vegetation changing over time from being dominated by mangrove species to saltmarsh species depending on connection to the tidal regime and integrity of the levee bank. The existing levee bank along the boundary of Mutton Cove with the Port River was breached in 2016, and the reserve is now subject to increased tidal inundation volumes that have changed the sites vegetation association over time.

Torrens Island Conservation Park hosts a large area of intact native vegetation including mangroves, saltmarsh and coastal dunes as well as large mature trees including those meeting regulated and significant tree size criteria.

Bird Island, although small, is valued as a bird colony, providing a roosting and feeding site for migratory and non-migratory birds, and a breeding rookery for seabirds.

5.3.3 Protected areas

There are a number of protected areas in the locality.

The Port River and surrounding marine area is encompassed in the Adelaide Dolphin Sanctuary under the ADS Act. The objectives of the Act and Sanctuary are to protect the dolphins in the Port River and Barker Inlet area and to protect the habitat on which they rely.

Torrens Island Conservation Park lies across from river from the development site, which offers high value habitat for flora and fauna. East of Torrens Island is the Barker Inlet – St Kilda and St Kilda – Chapman Creek Aquatic Reserves.

There are two Nationally Important Wetlands to the east and north of the development site including:

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[17] National Parks and Wildlife Services 2024, Adelaide Dolphin Sanctuary Draft Management Plan 2024, accessed via <https://yoursay.sa.gov.au/adsreview-2>

[18] Succession Ecology 2024, Terrestrial and Marine Flora and Fauna Ecological Report, accessible via Appendix 1.6 Terrestrial and Marine Flora and Fauna Ecological Report

- Barker Inlet and St Kilda
- Port Gawler and Buckland Park Lake

The Barker Inlet and St Kilda wetland includes part of the Port River between Torrens Island and Lefevre Peninsula, including within the marine-based portion of the development site. This wetland across it's full extent has been identified as containing the largest mangrove and saltmarsh community in the Gulf of St Vincent.

The Adelaide International Bird Sanctuary extends northwards to the north-east of the development site on the eastern side of Torrens Island to the north of the development site near St Kilda and provides important habitat to migratory birds and resident shorebirds along 60 km of coastline on the eastern side of Gulf St Vincent.

5.4 Social Setting

5.4.1 Traditional Owners

The Lefevre Peninsula is part of the traditional lands of the Kaurna people.

The wider Port Adelaide region was a favoured location for Aboriginal people due to its proximity to the intertidal creek and mangrove resources, which were available year-round. Food sources consisted of fish, shellfish, crabs, birds, reptiles, and small marsupials. Sources of raw material for stone working was available locally, as were reeds for basketry, mats, cloaks, and hunting nets.

The Lefevre Peninsula, as a part of that Port Adelaide region, has intangible heritage values closely tied to the Tjilbruke dreaming, a creation story to the Kaurna people. The story provides a set of rules to live by and a meaning for life showing people how to live with each other and the land. It is believed that the physical attributes of the Port Adelaide region, such as waterholes, the river, the coast, inland watercourses, wetlands, mangroves, and sand dunes were created by this spiritual ancestor. The dreaming continues to explain that an emu hunt occurred, with the birds being driven towards the Lefevre Peninsula where they would be trapped.

While the development site is in the Kaurna People's Native Title Claim Area, contemporary representatives of the Ramindjeri community also place significance on the region.

Figure 5.3 – Map of the Lefevre Peninsula Regional Environmental and Heritage Values

5.4.2 Heritage

There are no World, National or Commonwealth heritage listed places within the development site or within 5km of the development site.

There are no State Heritage Places, State Heritage Areas, Local Heritage Places or Historic Areas located within the development site. There are several Local Heritage Places and State Heritage Places in the vicinity of the development site including:

- State Heritage Place: Torrens Island Quarantine Station Complex
- State Heritage Place: Former Pilot Station, Oliver Rogers Road, Outer Harbor
- Local Heritage Place: Outer Harbor Railway Station, Oliver Rogers Rd, North Haven
- Local Heritage Places: Houses at 11, 12 and 13 Foremost Court, North Haven
- Local Heritage Place: Former Glen Arif House, 537-541 Victoria Road, Osborne

A heritage assessment undertaken by DASH Architects has concluded that direct or indirect impacts are not anticipated to these State and Local Heritage Places given their distances from the development site.

A number of historic shipwrecks are identified in the state shipwrecks database as being present in the Port River. However, most shipwrecks in the locality are considered unlikely to still remain in their plotted locations. The exceptions are Excelsior and Jupiter which are extant in Mutton Cove and Napperby respectively, which are considered likely to be located in the Port River.

5.4.3 Archaeological potential

There are no registered Aboriginal or non-Aboriginal archaeological records identified for the development site.

Regional archaeological investigations and evidence to date indicate a low risk for encountering items of both Aboriginal or non-Aboriginal archaeological significance across the development site.

5.4.4 Community demographics

The current day demographics of the locality differ based on location. Generally, residents living along the western beaches of the peninsula have higher levels of socio-economic advantage. Residents closer to the industrial precinct of the eastern riverfront and the northern suburbs of Adelaide more generally have higher levels of socio-economic disadvantage. Their lower household incomes reflect a population that is less likely than the average South Australian to have tertiary qualifications, and more likely to work in traditionally blue-collar industries like manufacturing, construction, and transport, postal and warehousing.

5.4.5 Local services

The broader Lefevre Peninsula precinct has a well-established residential area which is serviced by a range of community facilities. There are several recreational facilities available to residents and visitors in the area with a marina, golf course and good network of trails, parks and open space. The peninsula's Gulf St Vincent western facing coastline creates an idyllic suburban area in metropolitan Adelaide, whilst the Port River inlet provides opportunity for import, export and industry. Local healthcare, emergency response services, utility, education, childcare and other community support services provide for the local community.

5.4.6 Public Transport

There is one public transport railway line managed by Adelaide Metro connecting Adelaide Railway Station and the Outer Harbour Railway. The line travels along the west side of Victoria Road and stops at each suburb including Outer Harbor, North Haven, Osborne and Taperoo, continuing south to Port Adelaide Railway Station and the line terminates at Adelaide Railway.

There are two public bus service that operate from Port Adelaide. The 150 service terminates at Veitch Road on the southern boundary of the ONS and the 333 service terminates at North Haven.

There is no river public transport within the marine-based portion of the development site.

5.4.7 Light

The industrial areas of the Lefevre Peninsula including power stations, container storage facilities, existing ONS and carparks currently contribute to artificial light shed on the northern Lefevre Peninsula. The northern extents of the development site are currently vacant industrial land and would currently be providing areas limited artificial light.

5.5 Economic Setting

The Lefevre Peninsula is of significant local and state economic importance as an industrial and trade hub in the areas of manufacturing, services, retail, transport and logistics.

The Flinders Ports Holdings Adelaide Container Terminal on the Port River connects South Australia to destinations in most of the world's continents, including north, south and west Asia, the Indian sub-continent, Europe and North America[19]. The peninsula is also serviced by a cruise ship terminal, passenger and freight rail lines, and a network of roads for passenger vehicles and freight trucks including key freight routes.

The City of Port Adelaide Enfield's Economic Development Strategy 2020 identifies that historically, the Council area's economic prosperity has been driven by traditional sectors including manufacturing, logistics and labour led job fields. Whilst traditional manufacturing such as car manufacturing in the State is becoming more challenging, there are opportunities around the introduction of advanced manufacturing and innovation to make traditional fields of manufacturing more sustainable. It also identifies new industries that will contribute to the future economy which include but are not limited to education and training, tourism, retail and services, aged care and disability support and professional services.

The City of Port Adelaide Enfield contains 30% of Adelaide's industrial land. In 2023, the Council's Gross Regional Product was estimated at $11.19 billion, representing 8.33% of the state's Gross State Product[20]. Its largest industry is manufacturing, generating 15,424 local jobs in 2022/23.

The development site itself is nestled in an industrial precinct that fringes the Port River. Surrounding industrial land uses include the Pelican Point and Snapper Point Power Stations, Viterra Grain Silos and conveying infrastructure, Outer Harbour freight railway line, Ampol (Quantem) Pelican Point Fuel Terminal, the Flinders Ports Holdings Adelaide Container Terminal, QUBE Logistics, Pacific Marine Batteries and ANI's existing ONS. The existing ONS is the largest naval shipbuilding hub in Australia and is home to a 213-meter wharf, runway, dry berth, transfer system and the largest shiplift in the southern hemisphere.21

[19] Flinders Port Holdings 2024, Services, accessed via <https://www.flindersadelaidecontainerterminal.com.au/adelaide-container-terminal-services/>
[20] Profile.id 2024, City of Port Adelaide Enfield Economic Profile, accessed via <https://economy.id.com.au/port-adelaide-enfield>
[21] Defence SA 2024, Osborne Naval Shipyard, accessed via <https://defencesa.com/precincts/osborne-naval-shipyard/>

CHAPTER 6

Impact Assessment Methodology

URPS

6. Impact Assessment Methodology

6.1 Purpose of Impact Assessment

This chapter sets out the impact assessment methodology which was adopted in the EIA process. The purpose of the EIA process is to determine whether the development can be undertaken in a way that meets regulatory requirements and stakeholder expectations. It also details what specific measures will need to take to ensure the development is acceptable.

This chapter explains the baseline assumptions, and methods used to assess the impacts and determine effects.

6.2 Overview of the Impact Assessment Process

The process of impact assessment for this development incorporated the following for each project specific environmental, social and economic assessment requirement identified by the State Planning Commission:

- Assessment of the baseline condition and identification of sensitive receptors.
- Identification and determination of potential environmental impacts for construction and operational phases, and cumulative scenarios as appropriate.
- Evaluation of the “effect” of the impacts.
- Consideration of additional mitigation to reduce effects, if appropriate, and confirm residual effects.

These steps are discussed in further detail below.

6.2.1 Identifying Impacts and Effects

The development has the potential to create a range of 'impacts' and 'effects' on the environmental, social and economic environment. The definitions of impact and effect used in this assessment are as follows:

- Impact - a change that is caused by an action. For example, excavation works would lead to a removal of underlying soils (impact).
- Effect - is used to express the consequence of an impact. For example, removal of underlying soils (impact) has the potential to disturb underlying buried heritage receptors (effect).

6.3 Defining the Baseline Conditions

6.3.1 Study Area

The study area for each topic/matter was based on the geographical scope of the potential impacts relevant to the topic/matter or the information required to assess the likely effects, as well as topic specific guidance and consultation with stakeholders. The study area is defined in each technical chapter as the study area varies by topic/matter and between the construction, operation and cumulative scenarios in some cases.

6.3.2 Existing Baseline

In order to predict the potential impacts of the development, it is important to determine the baseline conditions that currently exist within the development site and the identified study area, in the absence of any development. Establishing the existing baseline conditions also informed the embedded mitigation measures to avoid or minimise effects.

Detailed environmental, social and economic baseline information has been collected and the methodology for the collection process is detailed within each technical assessment. Technical assessments are included within Appendix 1.1 to Appendix 1.20 of the EIS. Baseline information has been obtained from various sources including online/digital resources, data searches, desk-based studies, site surveys and stakeholder engagement.

6.3.3 Future Baseline

For some topics/matters it may be necessary for the EIS to include a description of the future baseline. This would describe the likely evolution of the baseline conditions without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort based on the availability of environmental, social and economic information and scientific knowledge. For the majority of topics/matters the future baseline will be similar to the present-day baseline.

6.3.4 Sensitive Receptors

As part of the EIA process, the effects of a given development or scheme are typically assessed in relation to sensitive receptors, including human beings (e.g. existing surrounding residential / future site users), built resources (e.g. buildings) and natural resources (e.g. conservation reserve/ecology). The criteria used for identifying potentially sensitive receptors / resources included:

- Proximity to the development site.
- Number of individual receptors.
- Value - the characteristics / rarity and importance of the receptor in terms of ecological, social, cultural, and/or economic value, including legislative / designated status.
- Presence or absence of impact pathways.
- Extent and duration of potential exposure to environmental impacts.
- Vulnerability and ability to respond to change.
- Recoverability - the ability of a receptor to be able to return to a state close to that which it existed before an activity or event caused damage.

Further details on sensitive receptors / resources, specific to each assessment requirement are provided in the technical chapters of this EIS. The technical chapters considered both existing and future sensitive receptors, on-site and off-site.

Sensitivity was defined within each technical chapter according to the following scale within Table 6.1.

Table 6.1: Descriptors for Receptor / Resource Sensitivity

Sensitivity of Receptor / Resource	Description
Very Low	The receptor / resource is tolerant of change without detriment to its character, or does not make a significant contribution to local character or distinctiveness and is not designated.
Low	The receptor / resource has some tolerance of change without detriment to its character, or only possesses characteristics which are locally significant, not designated or only designated at a district council or local level.
Medium	The receptor / resource has low capacity to absorb change without significantly altering its present character, or contributes significantly to the distinctiveness and character of the site (for example designated features of regional importance).
High	The receptor / resource has very little ability to absorb change without fundamentally altering its present character, or possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the site (for example designated features of international or national importance).

6.4 Identifying and Determining Potential Impacts

6.4.1 Types of impacts

Types of impacts, based upon the definitions in the EPBC Act (with the exception of cumulative impact which is not defined in the EPBC Act) are included in Table 6.2.

Table 6.2: Descriptors for Impact Types

Impact type	Description
Direct impact	An event or circumstance that is caused by the action.
Indirect impact	An event or circumstance that is substantially caused by the action.
Facilitated impact	An event or circumstance that occurs because of a separate and unrelated party (that is, not related to the person that took the original action) undertaking a separate action that is able to occur because the original action occurred.

Impact type	Description
Cumulative impact	The effect of the action in combination with other known development impacts, or other projects or activities to occur concurrently in the region of the development.

6.4.2 Magnitude of Impact

Magnitude of impact was assigned, taking into account the spatial extent, duration, frequency and reversibility of the impact, where relevant. Scales of magnitude of impact were defined in each technical chapter of this EIS where possible, otherwise professional judgement was applied to the following scale in Table 6.3.

Table 6.3: Descriptors for Magnitude of Impact

Magnitude of Impact	Description
Very Low	Very small-scale or barely discernible changes over a small part of the development site and potentially beyond to key characteristics or features of the particular environmental aspect's character, composition or attributes, approximating to a 'no change' situation.
Low	Noticeable but small-scale changes over part of the development site and potentially beyond to key characteristics or features of the particular environmental aspect's character, composition or attributes.
Medium	Medium-scale loss or alteration over the majority of the development site and potentially beyond to key elements.
High	Total loss or large-scale alteration over the whole development site and potentially beyond (such as off-site) to key elements or features of the particular environmental aspect's character, composition or attributes.

6.5 Evaluation of Significant Effects

The assessment of effects was undertaken in accordance with definitive standards and legislation where such material was available. In cases where it was not possible to quantify effects, qualitative assessments were carried out and were based on the available knowledge of the development site and potential effect, alongside professional judgement. Where uncertainty exists, this was detailed in the technical chapters.

It is widely recognised by EIA practitioners that 'significance' reflects the relationship between the magnitude of an impact and the sensitivity (or value) of the affected resource or receptor. Statutory designations and any potential breaches of environmental law take precedence in determining significance because the protection afforded to a particular receptor or resource is already established as a matter of law, rather than requiring a project or site-specific evaluation.

The matrix presented in Table 6.4 was generally applied throughout this EIS to determine the effects of the development. For the avoidance of doubt Negligible/Minor effects are considered to be not significant. Moderate and Major effects are considered to be significant. Where different assessment criteria were used, this is clearly stated within the technical chapter.

Table 6.4: Significance of Effects Matrix

		Magnitude of Impact			
		High	Medium	Low	Very Low
Sensitivity / Value of Receptor	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Very Low	Minor	Negligible	Negligible	Negligible

For consistency, URPS applied following terminology consistently across the EIS chapters to express the nature of the effect:

- Adverse: Detrimental or negative effect to a resource or receptor;
- Negligible: No significant effect to a resource or receptor; and
- Beneficial: Advantageous or positive effect to a resource or receptor.

The duration of temporary construction effects comprise:

- Short-term (a period of up to 2 years);
- Medium-term (a period of between 2 year and up to 5 years); and
- Long-term (a period of more than 5 years).

6.6 Mitigation Measures and Residual Effects

6.6.1 Mitigation Measures

The development of mitigation measures is an integral part of EIA process. Mitigation measures are set out in each technical chapter where effects are identified, with the aim of avoiding, reducing, or offsetting for potential adverse effects and maximising potential beneficial effects.

In each technical chapter, the technical specialists identified appropriate mitigation measures based on their assessment of potential effects and regulatory requirements. There are a range of categories for mitigation measures, including:

- Management Plans.
- Monitoring and Reporting.

- Operating Procedures.
- Agreements.
- Separate Licenses and Approvals.
- Stakeholder Engagement and Agreements.

The following mitigation measures were considered where relevant within the EIA:

- Inherent mitigation measures - those which are modifications to the location or design of the development during the pre-application phase that are 'designed in' or an inherent part of the development and do not require additional action to be taken.
- Additional mitigation measures - those that require further action to be taken to achieve the anticipated outcome or those that require a controlling mechanism or legal undertaking to be implemented, but are under the control of the ANI, the Contractor (during construction), the Shipbuilder (during operation) or statutory agencies, e.g. Monitoring and Reporting; Operating Procedures; Agreements; Separate Licenses and Approvals; and Stakeholder Engagement and Agreements.
- Standard mitigation measures – those that would occur notwithstanding the EIA to meet with legislative requirements or standard practices, e.g. construction mitigation with a high degree of certainty over delivery, e.g. measures to be included in the Construction Environmental Management Plan ('CEMP').

Appendix 2 provides a detailed mitigation schedule outlining the specific measures proposed in the EIS to address potential impacts associated with the development. This schedule offers a comprehensive overview of the mitigation strategies and their implementation timelines, ensuring that all environmental concerns are systematically addressed throughout the development lifecycle. In addition, the Appendix 2 includes a summary list of anticipated additional approvals and licenses required for the development. This list outlines the necessary regulatory approvals and permits that will need to be obtained to ensure compliance with environmental regulations and other statutory requirements before and during the construction phase.

6.6.2 Embedded Mitigation

The basis of the EIA and the assessments within the technical chapters of this EIS is that both inherent and standard mitigation will be delivered, and they are considered to comprise 'Embedded Mitigation' for the EIA.

The Embedded Mitigation was taken into account when determining whether there would be any likely effects. If likely effects were identified after the Embedded Mitigation was taken into account, additional mitigation was considered where necessary, appropriate and feasible. Reassessing the significance of the effect after applying any additional mitigation allows the level of residual effect to be assessed and identified.

6.6.3 Residual Effects

Residual effects are those that remain following the consideration of mitigation within the assessment (i.e., once all Embedded Mitigation and secondary mitigation is taken into account).

6.7 Cumulative Effects

The inter-project effects ('cumulative effects') assessment is important to ensure that the combined effects of the development, together with those of other developments relevant to the development site, are, at a minimum identified, and where information is available fully understood. There is currently no guidance on how to define an appropriate study area for considering cumulative effects. The cumulative effects of the development and cumulative schemes in the local area will be considered on a topic-by-topic basis and the cumulative effects reported in a subsection of each technical chapter, along with mitigation measures where necessary.

A set of screening criteria was developed to identify which cumulative development in the area should be subject to assessment, as follows:

- Impact assessed development expected to be built-out at the same time as the development and with a defined planning and construction programme.
- Spatially linked to the development (within 3km of the development site).
- Other related but separate projects to the development to be developed in the region of the Plan for the Project (but are not impact assessed development).

Other development which meet the above criteria are identified below.

1. Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
2. Development of a Skills and Training Academy to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
3. Development associated with the existing ONS buildings to support the existing shipbuilding and submarine construction program.
4. Development associated with relocation of the single above ground high voltage power line and two underground high pressure gas pipelines.
5. Current development underway by Quantem to increase by 90,000 cubic metres the diesel storage capacity at their Pelican Point Depot.
6. Current development underway by Venice Energy Pty Ltd (040/V136/20) that includes a change of land use to construct a two-berth wharf including operation to convert liquid gas from carriers to gas on Floating Storage and Regasification Units and dredging of the navigational channels.
7. The proposed Lefevre Peninsula Upgrade Project, primarily the re-alignment and upgrade of the Junction of Victoria Road and Pelican Point Roads by the Department for Infrastructure and Transport (DIT).

Of the developments listed above, only developments associated with the Project (i.e., developments listed in point 1 and 2 above) have been considered further with the EIS.

The development associated within the relocation of high voltage powers line and gas pipelines are expected to be completed in advance of any significant construction activities occurring on the development site. There is therefore limited scope for overlap of construction activities to generate cumulative effects with the development. In addition, with the implementation of appropriate mitigation measures, i.e., CEMPs, cumulative effects would not arise. From an operational

standpoint, it is not considered that there would be any potential for cumulative effects with the development. As such, this development is not considered further within the EIS.

The development associated with the Pelican Point Depot (Quantem) and Venice Energy Pty Ltd projects have been granted and construction activities have commenced. Based on information available within the public domain, it is expected that the majority of construction activities for these developments will be completed in advance of works commencing on the development. As such there is limited scope for activities to overlap and create cumulative effects. In addition, both developments are situated further north of sensitive human receptors than the development, and with the implementation of appropriate mitigation measures, i.e., CEMPs, cumulative effects would not arise. Once operational, it is not considered that there would be any potential for cumulative effects with the development, as all developments would require appropriate licenses under the EP Act to address air quality and noise effects. As such, these developments are not considered further within the EIS.

The Lefevre Peninsula Upgrade Project is expected to be completed ahead of the development in early 2026[22]. There is therefore limited scope for overlap of construction activities to generate cumulative effects with the development. Once operational, it is not considered that there would be any potential for cumulative effects with the development. As such, this development is not considered further within the EIS.

6.8 Structure of technical chapters

Each technical chapter follows the same structure for ease of reference, as outlined below within Table 6.5 below.

Table 6.5: Impact assessment approach

Subheading	Included information
Conclusion	A statement in consideration of the assessment that identifies whether the potential effects are acceptable.
Overview	A short overview of the topic and specialist assessment.
Assessment Requirements	The relevant section of the Commission Assessment Requirements.
Guiding legislation and policy	Relevant legislation and policy for the topic/matter.
Scope, Study Area and Assessment Method	Scope of the assessment, study area for the assessment and summary of the investigations undertaken to inform the assessment/assessment of effects method.

[22] Department for Infrastructure and Transport 2024, Lefevre Peninsula Upgrades Project, accessible via <https://www.dit.sa.gov.au/infrastructure/road_projects/LefevreUpgradeProject>

Subheading	Included information
Baseline Conditions and Receptor Sensitivity	High-level overview of the baseline conditions and receptor sensitivity.
Embedded Mitigation Measures	All embedded mitigation measures considered within the assessment of effects.
Assessment of Effects	Assessment of effects for the topic/matter, type of potential impact (direct, indirect, facilitated as described in Table 6.2), how long the potential impact would occur for and the significant of effects for the assessment.
Additional Mitigation Measures and Residual Effect	Summary of an additional mitigation measures required to address significant effects and confirmation of residual effects.
Cumulative Effects	Assessment of cumulative effects for the topic/matter.

CHAPTER 7

Air Quality

URPS

7. Air Quality

Conclusion: No significant air quality effects have been identified. Air quality can be well controlled within acceptable limits for the environment and community through the adoption of standard construction and operation mitigation measures.

7.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to air quality. Vipac Engineers and Scientists (Vipac) has prepared an initial air quality assessment for the construction and operation of the development for the current level of design.

The Vipac Air Quality Assessment (the 'air quality assessment') is included as Appendix 1.1 of this EIS.

7.2 Assessment Requirements

Commission Assessment Requirements: AEQ1 (Detailed Requirements)

- Provide an air quality impact assessment prepared by an appropriately qualified specialist for all potential sources of dust / particles and gaseous pollutants associated with the construction and ongoing operation of the proposed development, to identify any known or potential human health and amenity effects of air emissions (including point source and diffuse sources) on the residential population and local businesses and describe how these would be mitigated, minimised, managed and monitored. Investigations should consider historical investigations and studies, including the EPA/City of Port Adelaide Enfield *Victoria Road Air Quality Study*.
- The impact assessment must include modelling undertaken in accordance with the *Environment Protection (Air Quality) Policy 2016* and the EPA's *Ambient Air Quality Assessment 2016* guidance document. Techniques used to obtain the predictions should be referenced and key assumptions and data sets explained.
- Impact assessment must outline the impacts of dust / particles and gaseous pollutants on existing commercial and industrial operations and any other identified nearby sensitive receivers in the vicinity of the proposed development. The impact assessment should demonstrate how the requirements of the *Environment Protection (Air Quality) Policy 2016* (including ground level concentrations) and the 'General Environmental Duty' (as described in section 25 of the *Environment Protection Act 1993*) will be met, taking into account cumulative impacts and existing background levels of pollutants.

7.3 Guiding legislation and policy

The key legislation and policies that guide air quality assessment in South Australia are summarised in the following Table 7.1.

In South Australia, air quality is monitored and regulated by the South Australian EPA. There are a range of policies under the EP Act that ensure protection of the community against air quality impacts.

Table 7.1 Guiding Legislation, Policies and Guidelines

Name	Description
Legislation	
Environment Protection Act 1993	Section 25 of the EP Act creates a general environmental duty to take all reasonable and practicable measures to prevent or minimise environmental harm.
Local Nuisance and Litter Control Act 2016 (South Australia)	The South Australian legislation that regulates local nuisance and littering. Strengthens local nuisance and litter management services within South Australian communities, supporting and enhancing local amenity values.
Policies and Guidelines	
Environment Protection (Air Quality) Policy 2016 (Air Quality EPP)	Provides a legislative basis for air quality regulation and management in the state, including criteria for developing effective conditions to assist businesses and industries to improve their performance in minimising risk from air emissions through a system of licensing. Specifies air quality criteria used in the air quality assessment.
Evaluation distances for effective air quality and noise management (EPA 2023a)	Provides proposed evaluation distances beyond which the South Australia EPA is unlikely to request specific evaluation of impacts predicated on typical activities, except where there is a potential for ground level concentrations of pollutants to exceed criteria.
Ambient air quality assessment (EPA 2016)	Provides guidance on the approach and methods to facilitate risk-based assessment of air quality impacts including dust generation.
SA EPA Ambient Air Quality Assessment 2016	Supports assessment of ambient air quality under the EP Act. Outlines approaches and methods for obtaining information that best facilitate the South Australia EPA's assessment of a proposal.

Name	Description
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA 2024b)	Describes the impacts of construction activities and the information that should be included in a construction environmental management plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State based requirements for construction environmental management that relates to air quality.

7.4 Scope, Study Area and Assessment Method

7.4.1 Scope

An assessment of potential effects of air emissions during the construction and operational phase of the development has been scoped into this chapter. Impacts on existing sensitive human and ecological receptors have been assessed.

Scoped Out

Operatoin Traffic Emissions

Appendix 1.1 includes an assessment of operational transport emissions for the development. The maximum predicted concentrations of the primary air pollutants associated with vehicles projected to be travelling on Victoria Road and access routes where assessed below relevant criteria at all receptors modelled at 2034. As such, operatoin traffic emissions was not considered further with this EIS.

7.4.2 Study Area

Construction

The study area for the construction assessment extends to human and ecological receptors within 350m and 50m from the site boundary, respectively. In addition, human and ecological receptors within 50m of roads up to 500m from the site boundary along which construction vehicles will travel (i.e. A16 Victoria Road) have been considered.

Operation

The study area for the operational assessment extends to human and ecological receptors up to 500m from the site boundary. This has been based on the SA EPA's '*Evaluation distances for effective air quality and noise management*" document. The document provides proposed evaluation distances beyond which the EPA is unlikely to request specific evaluation of impacts predicated on typical activities.

7.4.3 Assessment Method

Construction

The assessment of potential air quality impacts associated with construction within this chapter has been informed by the air quality assessment, included as Appendix 1.1. In the absence of specific local guidance and policy the air quality assessment includes a risk assessment following the *Guidance on the Assessment of Dust from Demolition and Construction published by the Institute of Air Quality Management in the United Kingdom.*

Air quality impacts may arise from construction and remedial activities, vehicle movements, soiling of public roads, or windblown stockpiles. The main emissions during these works are most likely to be dust and PM_{10} generated during excavation, earth moving (particularly during dry months), or from construction materials. Construction activities have the potential to give rise to temporary or short term elevated windblown dust and/or particulate matter (PM_{10}) concentrations within the vicinity of the development site.

Operation

On-Site Air Emissions

The assessment of potential air quality impacts associated with on-site emissions during operation within this chapter has been informed by the air quality assessment, included as Appendix 1.1. A preliminary assessment of potential air quality impacts from the development by comparison of distances from the nearest sensitive receptors and evaluation in accordance with the SA EPA guidance provided in the *Evaluation distances for effective air quality and noise management* has been undertaken.

The following potential air pollutant/emission sources from activities within the following facilities, which are likely to be included within the development, have been considered:

- Fabrication Workshops;
- Abrasive Blast and Paint Workshop;
- Outfitting Workshop;
- Main Workshop Complex;
- Specialised Manufacturing Facility;
- Boiler House and Room;
- Launch Facility; and
- CEPS (Central Emergency Power Station).

The modelling techniques within the air quality assessment were based on a combination of The Air Pollution Model prognostic meteorological model (developed by CSIRO), and the CALMET model suite used to generate a three-dimensional meteorological dataset for use in the CALPUFF dispersion model. The air quality assessment includes consideration of emissions and odour emitted by the existing and proposed ONS facilities.

Assumptions and Limitations (i.e. Uncertainties)

This air quality assessment was based on an initial concept, which was the level of development design detail available at the time of preparing this EIS. Additional modelling will be undertaken once detailed design progresses, to confirm assumptions, conclusions and mitigation measures required.

Air emission rates required for the modelling assessment within the air quality assessment are derived based upon manufacturer specification data, internationally recognised emissions estimation techniques and/or Vipac's knowledge of similar projects, including the existing ONS.

7.5 Baseline Conditions and Sensitive Receptors

7.5.1 Baseline Conditions

The development is located in an industrial zoned area on the north-east extent of the Lefevre Peninsula. There are a number of industrial/commercial premises currently located in the area, primarily to the south and west of the site.

Nearby South Australian EPA operated air quality monitoring stations show that the primary sources of air emissions in the region surrounding the development site are industrial/ commercial and vehicle generated primarily including PM_{10} (particles with a diameter of 10 micrometres or less), $PM_{2.5}$ (particles with a diameter of 2.5 micrometres or less), carbon monoxide, sulphur dioxide and nitrogen dioxide.

The Victoria Road Air Quality Monitoring Study published in 2022 by the City of Port Adelaide Enfield and EPA identified that the concentrations of measured pollutants were similar to those observed in other parts of metropolitan Adelaide. While it was not possible to differentiate between the industrial sources in the region, the levels of air pollutants did not exceed the national standards during the study period.

A full detailed review of the air quality monitoring is available within Appendix 1.1.

7.5.2 Sensitive Receptors

Sensitive receptors for air quality include human (residential and commercial/industrial) and ecological receptors. The development site and the nearest sensitive receptors (R) are shown in Figure 7.1. Sensitive receptors R1 to R5 are commercial/industrial receptors, R6 to R37 are residential receptors and R38 to R53 are environmental receptors inclusive of the Adelaide Dolphin Sanctuary (R38) and Port River. R54 (not shown for display purposes) is representative of the St Kilda township to the north east of the development site.

Figure 7.1 Location of Receptors in relation to the site

7.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanism for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

7.6.1 Embedded Mitigation Measures

Construction

A Construction Air Quality Management Plan ('CAQMP') will be developed and incorporated into the Construction Environmental Management Plan ('CEMP') for the development. The CAQMP will outline specific strategies and procedures for controlling emissions, primarily dust throughout the construction phase, ensuring that best practices are followed to minimise impacts on air quality and surrounding environments.

Operation

An Air Quality Management Plan ('AQMP') will be developed and incorporated into the Operational Environmental Management Plan ('OEMP') for the development. The AQMP will document specific infrastructure, strategies and procedures embedded during detailed design for controlling air pollutants during operation that need to be maintained and monitored once operational.

Other Approvals/Licensing

A South Australian EPA licence/s will be necessary for the development to ensure compliance with environmental regulations and standards. The licence/s will address any specific environmental conditions and operational requirements to manage and mitigate potential impacts. It is important to note that the South Australian EPA licence/s will be obtained following the granting of planning approval. This sequence ensures that all planning conditions and requirements are integrated into the licence application, allowing for a comprehensive approach to environmental management throughout the development. The CAQMP and AQMP is anticipated to form part of the EPA licence/s application.

7.7 Assessment of Effects

7.7.1 Construction

Potential construction air quality impacts of the development are relatively well known given the construction and development of the existing ONS. All potential construction air quality impacts are considered to be direct, temporary, short-term and reversible in nature. The impacts are determined to be direct as they would occur as a result of activities associated with the development, temporary as they would only potentially occur during the construction works, short-term because these would only arise at particular times when certain activities and meteorological conditions combine, and reversible upon conclusion of construction works.

Given that the closest residential receptors are located more than 250m from the southernmost extent of the development site, the sensitivity of these receptors is considered to be 'Low/Medium' during the construction phase. The sensitivity of commercial and ecological receptors is considered to be 'Medium' during the construction phase as there are commercial and ecological areas adjacent to the development site.

Potential off-site impacts upon air quality (primarily dust) are typically addressed and controlled based upon a CAQMP, as outlined within Section 7.6 above. In practice, construction dust and/or particulate matter levels, and resulting impacts, are likely to vary during the different construction phases of the development depending upon the location of work sites, activities and plant in operation and proximity to sensitive receptors.

Given distances of the sensitive (e.g. residential and ecological) receptors and standard mitigation measures to be implemented (as defined within Section 7.6), the magnitude of impact from construction activities on receptors is considered to result in a Very Low to Low Impact during the construction phase. The construction assessment of effects is provided within Table 7.2, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 7.2: Construction Assessment Effects

Impact factor	Dust
Potential Impact pathway	Annoyance due to dust deposition (dust on surfaces) and visible dust in the air

Impact factor	Dust
Impact Type	Direct
Sensitive Receptors	Human Receptors (Residential) – Low/Medium Human Receptors (Commercial) – Medium Ecological Receptors – Medium
Embedded Mitigation	Prepare a CAQMP, to form part of the CEMP, and implement during construction.
Magnitude of Impact	Very Low to Low Impact
Significance of Effect	Human Receptors (Residential) – Short-term, Negligible/Minor Adverse Effect Human Receptors (Commercial) – Short-term, Negligible/Minor Adverse Effect Ecological Receptors – Short-term, Negligible/Minor Adverse Effect
Impact factor	**Airborne particulate matter less than 10µm (PM10) contained in dust**
Potential Impact pathway	Elevated concentrations of airborne particulate matter due to dust-generating activities
Impact Type	Direct
Sensitive Receptors	Human Receptors (Residential) – Low/Medium Human Receptors (Commercial) – Medium Ecological Receptors – Medium
Embedded Mitigation	Prepare a CAQMP, to form part of the CEMP, and implement during construction.
Magnitude of Impact	Very Low to Low Impact
Significance of Effect	Human Receptors (Residential) – Short-term, Negligible/Minor Adverse Effect Human Receptors (Commercial) – Short-term, Negligible/Minor Adverse Effect Ecological Receptors – Short-term, Negligible/Minor Adverse Effect
Impact factor	**Exhaust emissions**
Potential Impact pathway	Emissions from construction vehicle and plant on development site.
Impact Type	Direct
Sensitive Receptors	Human Receptors (Residential) – Low/Medium Human Receptors (Commercial) – Medium

Impact factor	Dust
	Ecological Receptors – Medium
Embedded Mitigation	Prepare a CCAQMP, to form part of the CEMP, and implement during construction.
Magnitude of Impact	Very Low to Low Impact
Significance of Effect	Human Receptors (Residential) – Long-term, Negligible/Minor Adverse Effect Human Receptors (Commercial) – Long-term, Negligible/Minor Adverse Effect Ecological Receptors – Long-term, Negligible/Minor Adverse Effect

In addition to those effects contained within Table 7.2, the painting of buildings during construction may generate volatile organic compound (VOC) emissions. However, the closest proposed buildings to sensitive receptors that may require painting are at a sufficient distance (e.g. 400m) that potential air quality impacts from these activities are considered to be 'Very Low', resulting is a temporary short-term Negligible effect.

7.7.2 Operation

On-Site Air Emissions

The potential on-site impacts upon air quality from the operation of the development are likely generated by specific processes and activities (like paint and abrasive blasting, manufacturing, fuel combustion sources and vehicle emissions). The main air pollutants with the potential to be generated by these on-site activities include:

- Volatile organic compounds (VOCs)
- Particulate matter (as TSP, dust, PM_{10} an $PM_{2.5}$)
- Combustion gases (e.g. SO_2, CO and NOx)
- Metals
- PAHS
- Odour

Given the potential pollutants from the facilities, the sensitivity of surrounding residential receptors is considered to be 'High' for the purposes of a worse-case assessment if not mitigated, whilst the sensitivity of commercial / industrial and ecological receptors is considered to be 'Medium'.

The modelling assessment of air quality impacts, Appendix 1.1, from the on-site operational sources has predicted no exceedances of the relevant criteria for these pollutants at the sensitive receptors. The magnitude of impact from these operational activities on receptors is therefore considered to result in a 'Very Low' impact.

It is noted, however, that the assessment has been based upon a variety of informed assumptions and the current level of available at the time of preparing this EIS. As detailed design progresses,

and in the event that these assumptions or plan are required to differ from those used, then further modelling will be undertaken.

The operational assessment of effects is provided within Table 7.3, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 7.3: Operation Assessment Effects

Impact factor	Air pollutants from operation activities (VOCs, particulate matter, combustion gases, metals, PAHs and odour)
Potential Impact pathway	• Painting • Manufacturing • Metal surface abrasive blasting activities • Fuel Combustion • Vehicles
Impact Type	Direct
Sensitive Receptors	Human Receptors (Residential) – High Human Receptors (Commercial) – Medium Ecological Receptors – Medium
Embedded Mitigation	Prepare an AQMP, to form part of the OEMP, and implement during operation.
Magnitude of Impact	Very Low Impact
Effect	Human Receptors (Residential) – Permanent, Negligible/Minor Adverse Effect Human Receptors (Commercial) – Permanent, Negligible Adverse Effect Ecological Receptors – Permanent, Negligible Adverse Effect

7.8 Additional Mitigation Measures and Residual Effect

7.8.1 Construction

No additional mitigation or monitoring are required beyond those outlined above in Section 7.6. The likely residual effects for construction effects on human and ecological receptors will remain Short-term and Negligible/Minor Adverse Effect.

7.8.2 Operation

No additional mitigation or monitoring measures are required beyond those outlined above in Section 7.6. The likely residual effects for operation effects on human and ecological receptors will remain permanent and Negligible/Minor Adverse Effect.

7.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6 – Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing ONS buildings to support the existing shipbuilding and submarine construction program.

7.9.1 Construction

Likely significant cumulative effects of construction activities are not expected as each site will be applying good practice site measures and appropriate mitigation techniques and adhering to relevant CEMPs and other management plans.

7.9.2 Operation

Air quality emissions will be controlled during the operation phase at each building, with mitigation measures tailored to its specific function during detailed design, as appropriate. The initial modelling assessment of air quality impacts, Appendix 1.1, based on the on-site operational sources, including the existing ONS facility has predicted no exceedances of the relevant criteria for these pollutants at the sensitive receptors. As such, no likely significant cumulative effects are anticipated for on-site air emissions during operation.

CHAPTER 8

Noise and Vibration

URPS

8. Noise and Vibration

Conclusion: During construction, residential properties, schools and playgrounds could experience short-term noise effects during the daytime period, which may arise from specific activities such as piling. These impacts can be managed through timing of noise generating activities, duration of these activities and other standard measures.

Noise effects of continuous and simultaneous operation of all facilities at the development, and existing ONS, are predicted to comply with the relevant noise criteria.

Traffic noise is expected to increase along the road network in the future as planned growth in the Lefevre Peninsula increases. The Government has commenced the preparation of the Lefevre Master Plan, which will undertake long-term planning to address these issues.

No significant construction vibration effects are predicted and vibration effects can be readily managed through a range of standard industry construction measures.

8.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to noise and vibration. Resonate was engaged to prepare a high-level noise and vibration assessment (the 'noise and vibration assessment') for the construction and operational phases of the development to inform this EIS. The full report is provided in Appendix 1.2.

8.2 Assessment Requirements

Commission Assessment Requirements: *AEQ2: Detailed Requirements*

- Provide an impact assessment of noise / vibration from or on the proposed development, prepared in accordance with the Guidelines for the use of the *Environment Protection (Commercial and Industrial Noise) Policy 2023* by a suitably experienced, professional acoustic engineering consultant. Indicative Noise Levels to be confirmed based on consideration of different zones and subzones.
- The assessment should describe changes to noise and vibration levels as a result of the development (during both the construction and operational phases). Sufficient data should be gathered to provide baseline information for comparison with any future monitoring undertaken during the construction and operational phases. This should include monitoring within the marine environment.
- The noise assessment should include noise contours from a suitable acoustic model for all significant noise generating activities operating under worst case acoustic and meteorological (and/or oceanographic for marine underwater noise) conditions for the transmission of noise from source to marine animals, including the Adelaide Dolphin Sanctuary which is both adjacent to and within the development site, and sensitive receivers, including those residents located on the Lefevre Peninsula and St Kilda township (including transmission of noise sources across water).
- Provide a vibration assessment prepared by a suitably experienced, professional acoustic engineering consultant, assessing the worst case predicted vibration from the development. The report must describe what reasonable and practicable measures will be taken to minimise vibration impacts on sensitive receivers, including marine mammals where relevant, and

adjacent State Heritage Places (including Torrens Island Quarantine Station Complex (State Heritage Place (SHP) 26583 & 13931) and the Former Outer Harbour Pilot Station (SHP 11904)), and the likely effectiveness of these measures, with a view to demonstrating how the 'General Environmental Duty' (as described in section 25 of the *Environment Protection Act 1993*) will be met.

- Underwater noise modelling must be undertaken by suitably experienced specialist. Modelling must include modelling of bed substrates (acoustically reflective or acoustically absorptive) to understand the propagation beyond the proximity of the noise source (whether this be from construction or operational activities). The assessment must identify the distance to which there would be a biological impact to aquatic species.
- Describe how environmental management objectives for noise and vibrations would be achieved, monitored, audited and reported, and how corrective actions would be managed.
- Propose environmental management strategies that will avoid long-term impacts, including behavioural changes, of underwater noise on marine fauna and describe how objectives would be monitored and audited, and how corrective actions would be managed.

8.3 Guiding Legislation and Policy

A number of pieces of legislation, policies and guidelines have informed the noise and vibration assessment as summarised in the table below.

Table 8.1 Summary of Legislation/guidelines

Legislation/guideline	Description / Related Policies
Environmental Protection Act 1993	*Environment Protection (Commercial & Industrial Noise) Policy 2023* (Noise EPP) – environmental noise emissions from the development site should comply with the indicative noise factors identified in the Noise EPP. Compliance with the Noise EPP will also satisfy the requirements of the *Environment Protection Act* in relation to noise pollution.
Planning, Development and Infrastructure Act 2016	The Planning and Design Code (P&D Code) zones land across South Australia. P&D Code zones represent the spatial boundaries that provide guidance for development on 'what' can happen in an area. The noise goals/criteria in the Noise EPP are based on the zoning of the development and the closest noise affected premises.
Local Nuisance and Litter Control Act 2016	Sets requirements for construction noise that causes an adverse impact on amenity.

Legislation/guideline	Description / Related Policies
Work Health and Safety Act 2012 (South Australia)	The South Australian legislation that relates to health, safety and welfare of persons at work, including potential risks associated with vibration.
Policies and Guidelines	
British Standard BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings Assessing Vibration: A technical guideline (NSW Department of Environment and Conservation, 2006)	In lieu of SA based vibration criteria, these standards and guidelines have been adopted for the assessment of vibration from the development on various receptors.
Guideline for the Management of Noise and Vibration: Construction and Maintenance Activities (DIT) German Standard DIN 4150-3 Structural Vibration, Part 3 – Effects of Vibration on Structures	
Technical Guidance for Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Birds (2016 California Department of Transportation)	
Underwater Piling and Dredging Noise Guidelines (DIT 2023)	Developed by the Department for Infrastructure and Transport (DIT) to provide guidance for addressing underwater noise for marine maintenance activities or a marine infrastructure project.
Road Traffic Noise Guidelines EHTM Attachment 7A (2021)	Development by DIT to provides a framework to manage and mitigate road traffic noise in urban planning and infrastructure development. It is primarily aimed at reducing noise impact on communities near major roads or highways.
NSW Roads and Traffic Authority Environmental	Developed by the Roads & Traffic Authority, now Transport for NSW, to provide practical guidance for managing and

Legislation/guideline	Description / Related Policies
Noise Management Manual (2001)	controlling noise and vibration from vehicles. It provides a useful introduction for noise.

8.4 Scope, Study Area and Assessment Method

8.4.1 Scope

The following assessment of potential effects from noise and vibration during the construction and operational phases of the development has been scoped into this chapter:

- Construction - Noise and Vibration Assessment.
- Operation – Traffic Noise Assessment.
- Operation – Noise Assessment.

Scoped Out/Considered in Other Chapters

Construction - Traffic Noise

For an increase in traffic to result in a short-term magnitude of impact that would be noticeable to the human ear, an increase of 3 decibels (dB) on baseline noise levels is required. In real terms, an increase of 3dB traffic noise levels on baseline levels is the equivalent of a 100% increase in road traffic on an individual road link. As outlined within Chapter 9 - Traffic and Transport, the construction phase will extend over a 10-year period, with materials being delivered to the development site on an as-needed basis. As such, it is not anticipated that construction traffic would result in a 100% increase in road traffic on an individual road link over the baseline conditions. Therefore, an assessment of noise generated by construction traffic is scoped out of further assessment, as the development is not considered likely to result in significant noise effects.

In addition, a Construction Traffic Management Plan (CTMP), forming part of the CEMP, which includes measures to minimise impacts due to construction traffic would be prepared and implemented. As part of this, consideration would be given to traffic routing, timing and access points to the development site to minimise noise impacts at existing receptors as detailed construction working methods are developed. Management of heavy goods vehicles within the development site and being let onto the road network will be managed through the CTMP.

Construction – Traffic Vibration

Vibration from vehicle movements on roads and access tracks is generally only noticeable where they are poorly maintained. The construction routes to the development site, being Victoria Road (A16) and Port River Express (A9), are well maintained roads and as a result vehicle movements are unlikely to create vibration. Therefore, vibration from vehicle movements are not considered likely to result in significant effects.

Construction - Vibration Assessment on Heritage Structures

All potential effects from vibration during the construction of the development on sensitive heritage receptors have been considered within Chapter 24 - Heritage Places and Areas.

Operation – Vibration Assessment

There are no significant sources of vibration proposed for the development during the operational phase, nor are there any significant sources of vibration in the area which are likely to affect the operational development. Therefore, vibration from operational activities is not considered likely to result in significant effects.

Construction/Operation - Impacts to Ecological Receptors

Potential effects from noise and vibration during the construction and operational phases of the development on sensitive ecological receptors have been considered within Chapter 12 - Marine Flora and Fauna and Chapter 13 - Terrestrial Flora and Fauna.

8.4.2 Study Area

There are no nationally or state adopted standards or guidance documents that define the study area for the assessment of noise and vibration effects for developments of this type. Therefore, the study area for the development is based on professional judgement by a subject matter expert in noise and vibration.

Construction – Noise and Vibration

The study area that was considered for the construction noise and vibration assessment encompasses the development site and nearby sensitive receptors (detailed in below in Section 8.5.2 -Sensitive Receptors) that may be affected by noise and vibration during the construction activities.

Operation – Traffic Noise Assessment

This assessment includes noise impacts due to changes in road traffic noise as a result the operational development. Consequently, the study area encompasses the study area covered in the Chapter 9 - Traffic and Transport along Victoria Road, Port River Expressway and Semaphore Road.

Operation – Noise Assessment

This assessment includes noise impacts due to introduction of building service plant and manufacturing facilities as a result of the operational development. The study area encompasses potential plant areas and manufacturing facilities (detailed in below in Section 8.5.2 -Sensitive Receptors).

8.4.3 Assessment Method

This assessment follows the EIA methodology provided within Chapter 6 – Impact Assessment Methodology. The tables below provide further details regarding magnitude of impact for this assessment.

Construction – Noise

Table 8.2 describes the magnitude of impact used in the construction noise assessment.

Table 8.2: Descriptors for Magnitude of Impact for Construction Noise

Magnitude of Impact	Description
High	Predicted construction noise level Leq dB(A) is greater than 60dB.
Medium	Predicted construction noise level Leq dB(A) is 55-60dB.
Low	Predicted construction noise level Leq dB(A) is 50-55B.
Very Low	Predicted construction noise level Leq dB(A) between 45dB and 50dB.

Construction – Vibration

Table 8.3 describes the magnitude of impact used in the construction vibration assessment.

Table 8.3: Descriptors for Magnitude of Impact for Construction Vibration

Magnitude of Impact	Description
High	Predicted vibration levels greater than 5 millimetres per second peak particle velocity (mm/s peak particle velocity (PPV)). Vibration is likely to be intolerable for more than a very brief exposure to this level in most building environments.
Medium	Predicted vibration levels (mm/s PPV) between 3 -4.9 mm/s PPV. It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if explanation has been given to residents.
Low	Predicted vibration levels (mm/s PPV) between 1 - 2.9 mm/s PPV. Vibration is likely to be perceptible in residential environments, but unlikely to cause complaint.
Very Low	Predicted vibration levels (mm/s PPV) less than 1 mm/s PPV. Vibration might just be perceptible in residential environments.

Operation – Traffic Noise

The development is not eligible for consideration under the *South Australian DIT Environment and Heritage Technical Manual Attachment 7A: Road Traffic Noise Guidelines*. These guidelines apply specifically to DIT road infrastructure upgrades and do not cover future developments that may increase traffic noise on public roads. Currently, South Australia lacks a noise policy for this situation, necessitating an alternative policy approach to assess under the General Environmental

Duty. As such, an alternative noise policy, the New South Wales EPA Road Noise Policy[23], was used for informing the assessment within this chapter for residential land uses and other non-residential sensitive receptors.

However, it is acknowledged that separate to the development, the Lefevre Peninsula Masterplan (the Plan) is to be prepared by Office for AUKUS that will provide a structured approach to planning on the Lefevre Peninsula. It will provide clear guidance as to the future investment in necessary infrastructure, including housing and transport, to support the new submarine enterprise as well as meeting the needs of other industry in the area and local residents. It is expected that on-going work, to be completed by DIT and authorities, for the Plan will consider appropriate mitigation to reduce any impact on the road network incurred by the development and other growth on the Lefevre Peninsula in the future. As such, it is expected that the *South Australian DIT Environment and Heritage Technical Manual Attachment 7A: Road Traffic Noise Guidelines* will be considered by DIT at the appropriate time.

Table 8.4 describes the magnitude of impact used in the operational traffic noise assessment.

Table 8.4: Descriptors for Magnitude of Impact for Operational Traffic Noise

Magnitude of Impact	Description
High	Total traffic noise increase is greater than 4.1 dB above existing baseline conditions.
Medium	Total traffic noise increase is between 3.1 to 4 dB above existing baseline conditions.
Low	Total traffic noise increase is between 2.1 to 3 dB above existing baseline conditions.
Very Low	Total traffic noise increase is between 0 to 2 dB above existing baseline conditions.

Operation – Noise

Table 8.5 describes the magnitude of impact used in the operational noise assessment.

Table 8.5: Descriptors for Magnitude of Impact for Operational Noise

Magnitude of Impact	Description
High	Change in noise levels greater than 10 dB over the baseline.
Medium	Change in noise levels between 5 – 9.9 dB over the baseline.
Low	Change in noise levels between 3 – 4.9 dB over the baseline.

[23] Road Noise Policy, Department of Environment, Climate Change and Water NSW 2011. Access - https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/2011236nswroadnoisepolicy.pdf

Magnitude of Impact	Description
Very Low	Change in noise levels between 0 – 2.9 dB over the baseline.
No Change	Noise levels at affected receptor are modelled below the relevant Noise EPP criteria.

8.5 Baseline Conditions and Sensitive Receptors

8.5.1 Baseline Conditions

The EPA regulates noise associated with businesses and industries across more than 80 sites on the Lefevre Peninsula, including the Snapper Point and Pelican Point Power Stations. Separately, nine monitoring stations were also deployed throughout the Lefevre Peninsula between 2016, 2017 and 2020 determine the baseline noise and vibration conditions within the area and to assess the cumulative noise impact of the industrial area. The main noise observed was industrial and traffic noise, with no specific audible noise attributed to the existing ONS.

Full details of the noise and vibration baseline monitoring survey for the development including monitoring locations and meteorological conditions are provided within section 3 of the noise and vibration assessment (Appendix 1.2). The average background and instantaneous noise results taken during monitoring in August 2020 are summarised in Table 8.6 below, with the location of monitoring locations shown in Figure 8.1.

Table 8.6: Baseline noise monitoring data

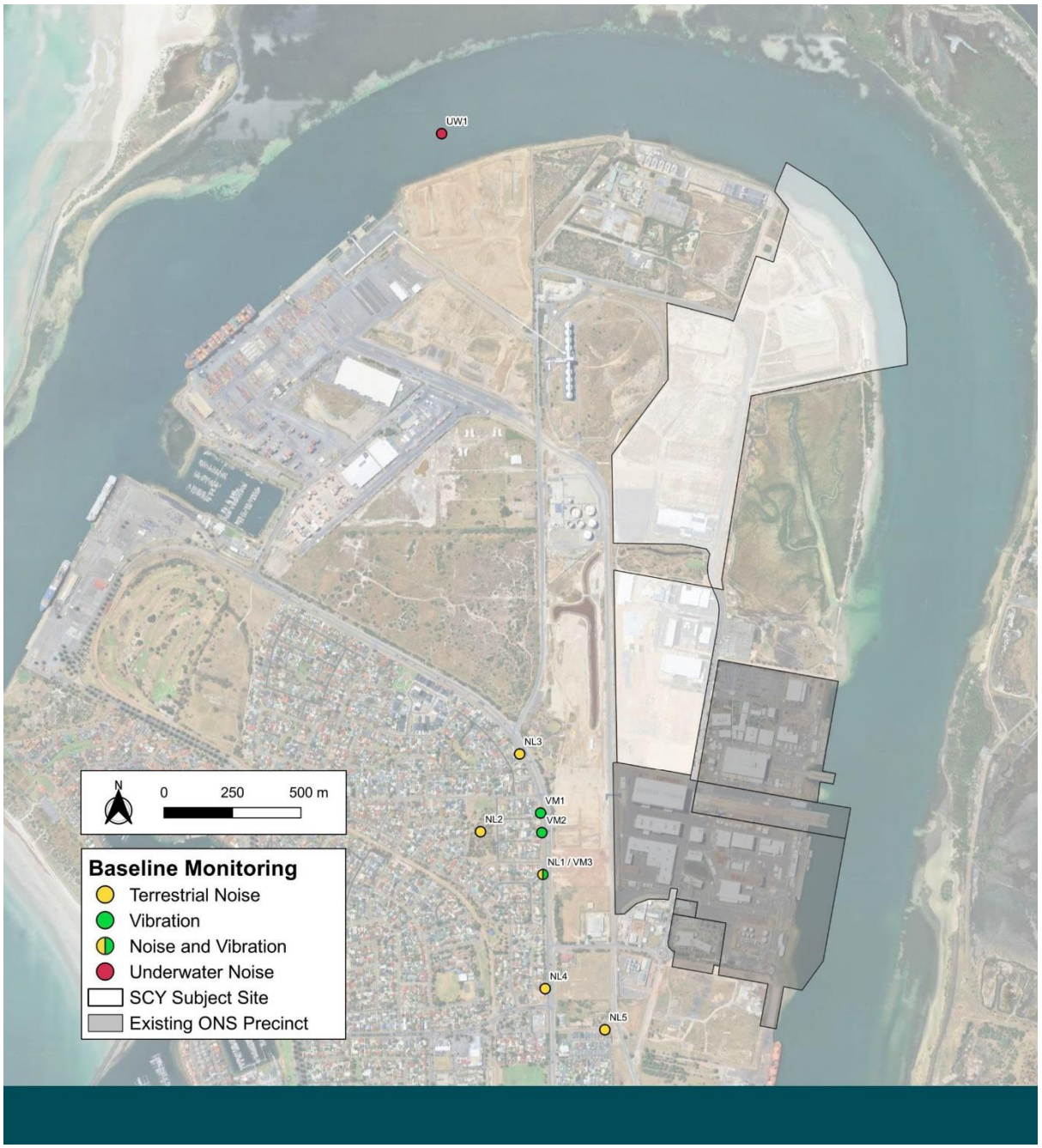
Time of day	Location ID Figure 6.2.1	Average (L_{eq}) background noise (dB) (unattended/attended*)	Maximum (L_{max}) instantaneous noise (dB) (unattended/attended*)
Day	NL1	67/67	88/83
Night		64/58	86/73
Day	NL2	65/45	88/67
Night		57/53	87/73
Day	NL3	67/64	89/81
Night		64/55	89/73
Day	NL4	68/67	90/82
Night		64/65	87/86
Day	NL5	54/47	80/62

Time of day	Location ID Figure 6.2.1	Average (L_{eq}) background noise (dB) (unattended/attended*)	Maximum (L_{max}) instantaneous noise (dB) (unattended/attended*)
Night		48/49	69/58

*Note two rounds of attended monitoring was completed for the daytime period, the numbers include in the table show the lowest measured noise level for each location during attended monitoring for the daytime period.

Baseline vibration levels ranged from 0.1 to 1.5 mm/s PPV at VM1, 0.1 to 0.8 mm/s PPV at VM2, and 0.1 to 0.5 mm/s PPV at VM3.

Figure 8.1 - Baseline monitoring locations



8.5.2 Sensitive Receptors

Key receptors to noise and vibration generally include individual or groups of residential properties, playgrounds, hospitals and schools. Kardi Yarta playground notably is approximately 200m from the development site. Table 8.7 provides examples of the different sensitivities for different receptors which are applicable to this assessment.

The closest sensitive receptors are residential properties (dwellings) located to the west of the development site along Victoria Road, within the suburbs of North Haven and Osborne. The nearest dwellings face away from the development site, with backyards, sheds and boundary fences separating the dwellings from a key freight route of Victoria Road.

There are several adjacent commercial and industrial land uses on the southern boundary of the development site along Veitch Road, including the existing ONS and supporting defence infrastructure and functions, Osborne Terminal fuel depot, Semaphore Container Services and Australian Civil & Mining Training.

Table 8.7: Receptor Sensitivity Descriptors

Sensitivity	Descriptor
High	Residential properties, schools and playgrounds
Medium	Transient residential receptors such as users of hotels
Low	Commercial and industrial premises
Very Low	All other premises that fall outside of the scope described above

8.6 Embedded Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the mechanism for securing mitigation measures (i.e. ensuring they are undertaken by the proponent).

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

8.6.1 Construction

In accordance with EPA requirements, construction activities routinely are to be undertaken during the hours 7 am to 7 pm, Monday to Saturday, unless it can be demonstrated that the noise levels from activities at the nearest residential receivers do not exceed 45 dB(A)Leq or 60 dB(A)Lmax. Construction activity is not routinely permitted to occur outside of these hours or on a Sunday or public holiday without consent from the relevant authority.

Construction Noise and Vibration Management Plan

A Construction Noise and Vibration Management Plan (CNVMP), as part of a broader CEMP, that considers the adopted assessment criteria and sensitive receptors will be prepared and

implemented during construction. The CNVMP will include mitigation measures to minimise noise and vibration including that best practicable means will be applied during construction works to minimise noise and vibration at neighbouring residential properties and other sensitive receptors.

Dredge Management Plan

A Dredge Management Plan (DMP), required for the marine and coastal interface works, will be prepared and will include practicable means to minimise noise and vibration impacts during construction for the ultimate design, construction methodology and equipment chosen for the development. This is required to be provided as part of any EPA dredging license.

8.6.2 Other Approvals/Licensing

South Australian EPA licence/s are anticipated for prescribed activities of environmental importance to ensure compliance with environmental regulations and standards (refer to Chapter 4, section 4.5 of this EIS). The licence/s will address any specific environmental conditions and operational requirements to manage and mitigate potential impacts. South Australian EPA licence/s will be obtained following the granting of planning approval. This sequence ensures that all planning conditions and requirements are integrated into the licence application, allowing for a comprehensive approach to environmental management throughout the development. The CEMP, CNVMP and DMP are expected to form part of the EPA licence/s application.

8.7 Assessment of Effects

8.7.1 Construction Noise and Vibration

The potential effect of construction noise and vibration will principally be influenced by:

- The overall duration of the works.
- The selection of plant, equipment and working methods.
- The siting of plant on the development site (i.e. the distance between work activities and noise sensitive receptors).
- The duration of use of individual plant/equipment.
- The topography of the development site and/or any features that may help reduce noise propagation to adjoining receptors.
- The location of noise sensitive receptors.

Noise

The most notable impacts due to increases in noise during construction would be during construction of site infrastructure and the construction of substructures. Exact details regarding the construction techniques and types of plant can only be estimated at this time (as outlined within section 7 of the noise and vibration assessment).

Section 7 of the noise and vibration assessment includes typical plant and equipment expected for the development and the predicted typical worst-case sound pressure levels at distance from each item of plant. Given construction of substructures, which includes piling activities, are likely to be the worst-case construction noise and vibration activity, this assessment uses piling activities as the basis for the impact assessment for the 7am to 7pm time period.

Noise contours have been calculated to visually identify the extent of noise (and magnitude of impact) within the level range assessed. Figure 8.2 shows the predicted noise levels for piling activities within Area 1 at a location nearest to residential noise sensitive receptors to the development site. Figure 8.3 shows the predicted noise levels for piling activities within Area 3 at a representative location approximately 1.85 kilometres from the nearest residences.

In addition to piling activities, dredging activities are likely to be the worst-case construction noise activity for any out of hour works. This assessment uses dredging activities as the basis for the impact assessment for the potential impact out of hours between 6-7am. Figure 8.4 shows the predicted noise levels for backhoe dredging activities at the shoreline of the Area 3 for the coastal and marine infrastructure.

Figure 8.2 - Indicative worst-case noise contours from impact piling activities within Area 1

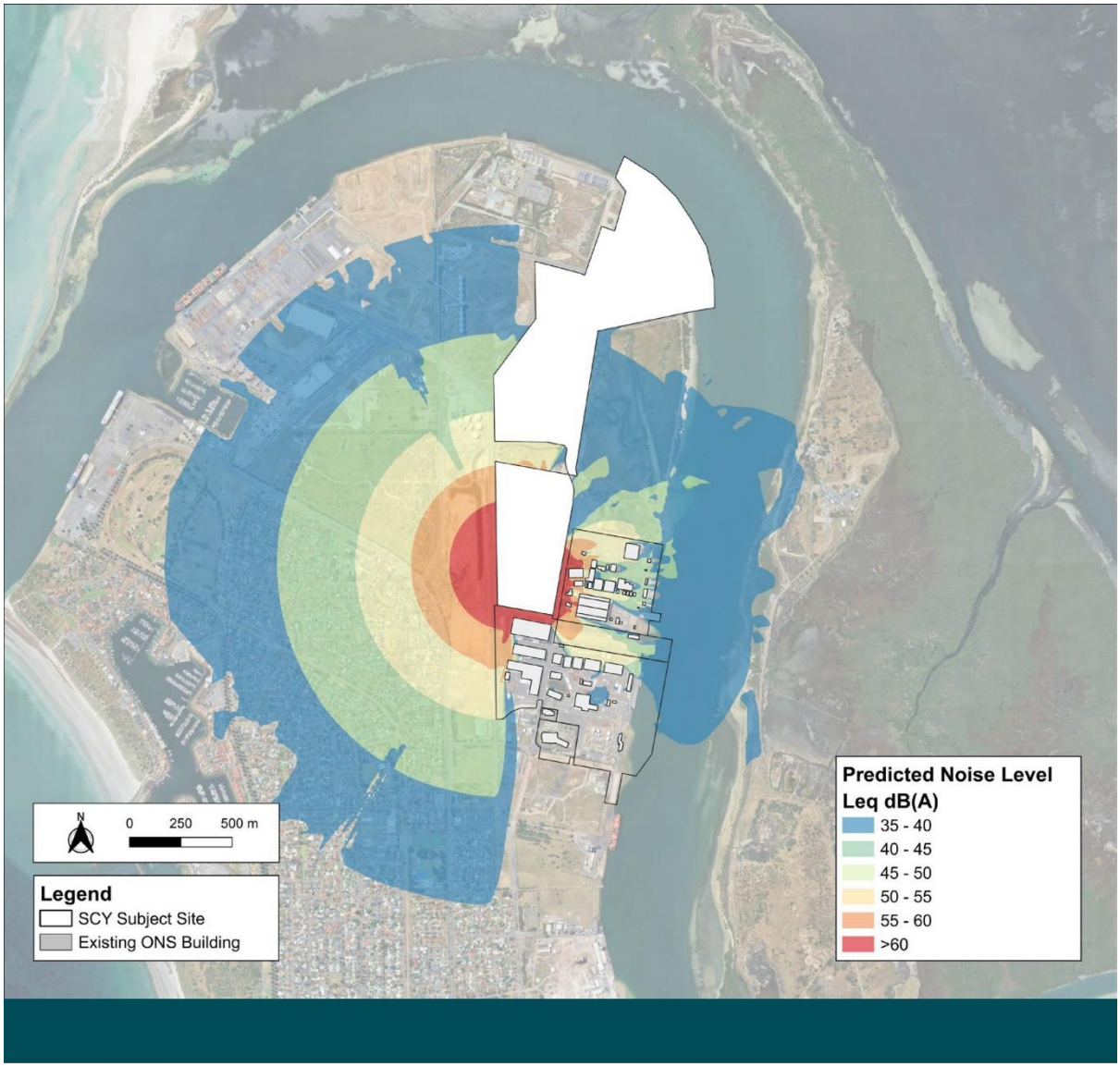


Figure 8.3 - Indicative worst-case noise contours from impact piling at distance within Area 3

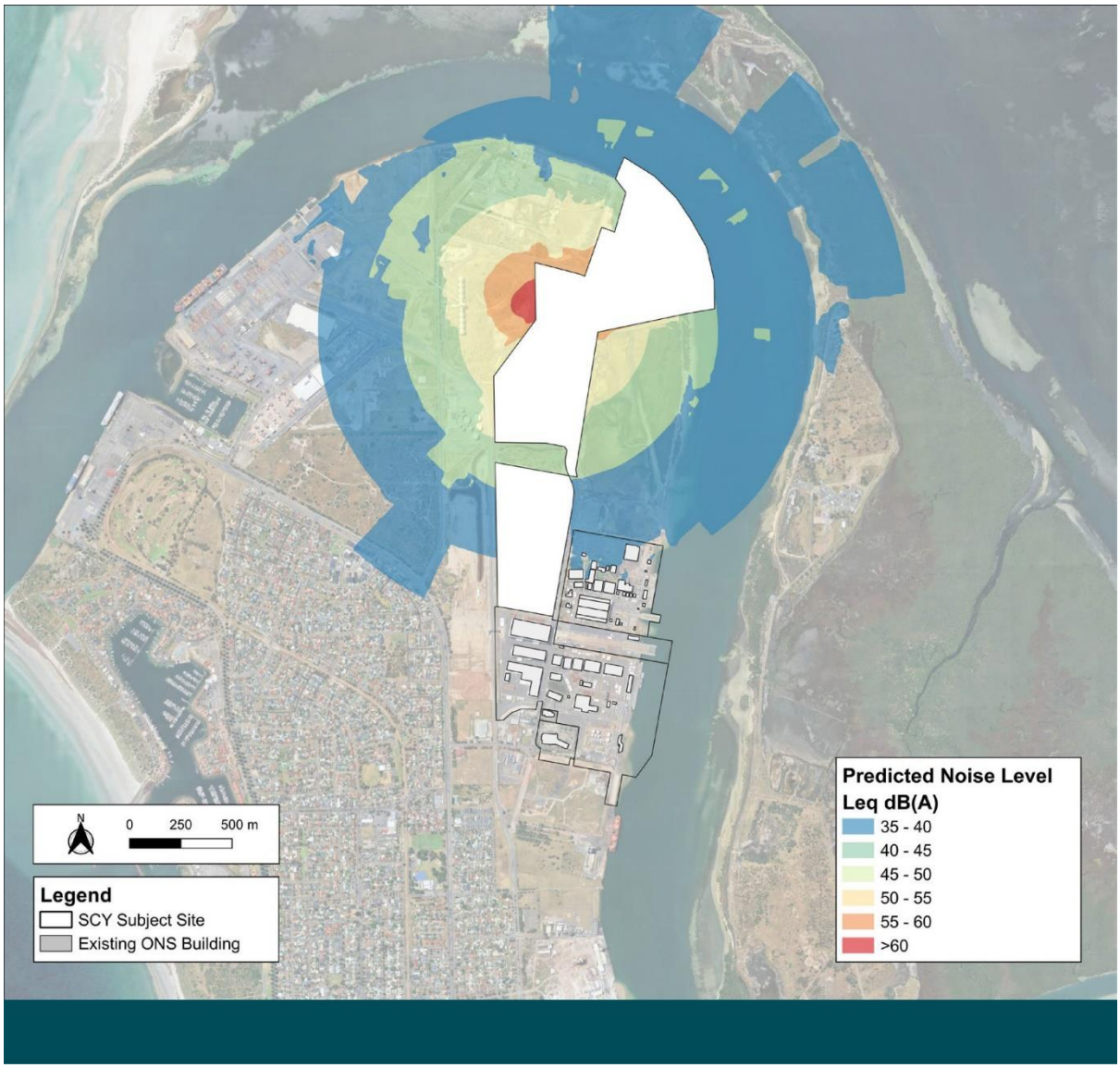
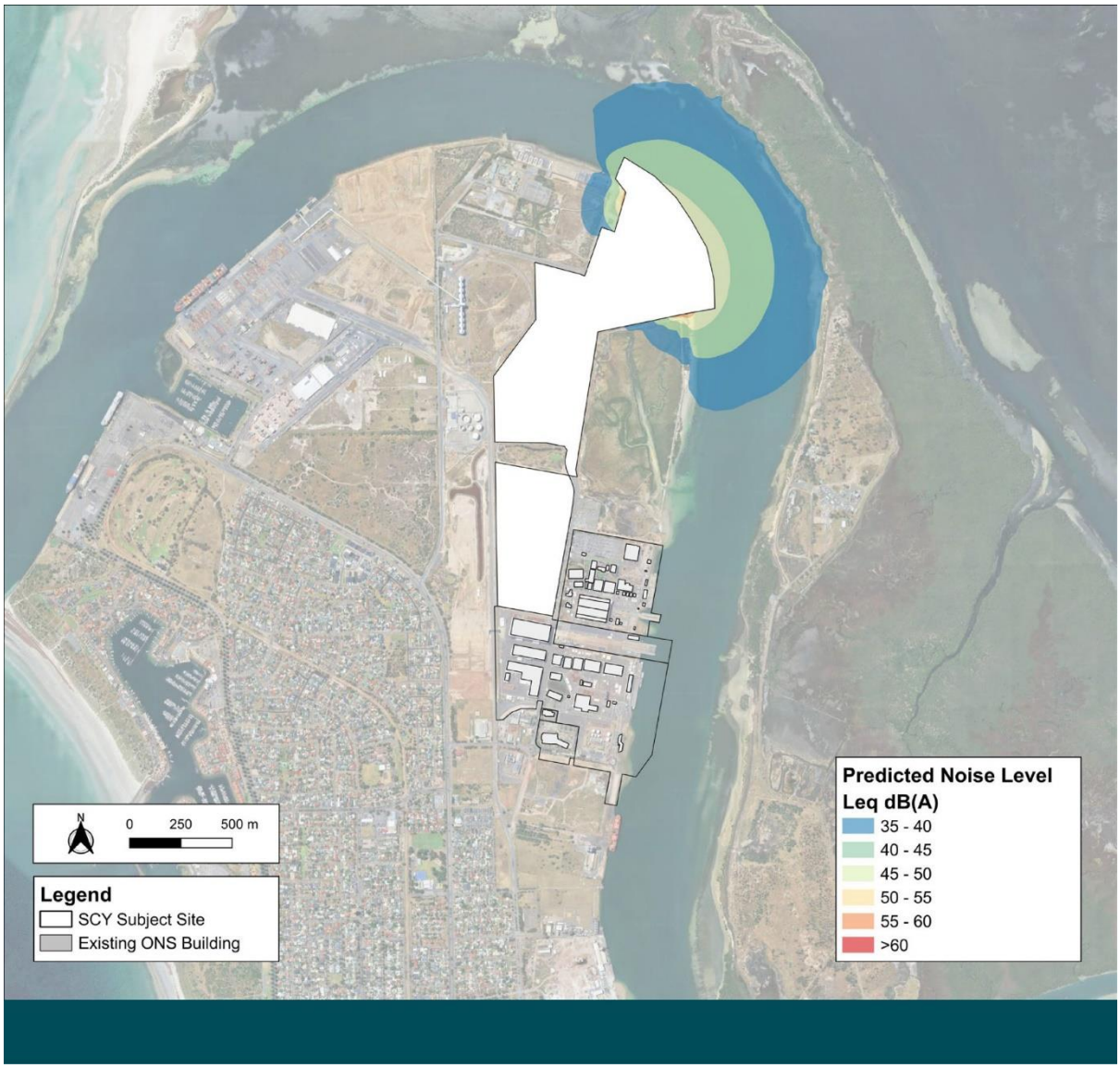


Figure 8.4 - Indicative worst-case noise contours from dredging activities within Area 3



With reference to Table 8.2, the noise contours within Figure 8.2 show that construction noise from on-site activities will have an impact magnitude ranging from High (i.e. predicted construction noise level greater than 60dB) through to Very Low (i.e. predicted construction noise level below than 50dB) as receptors increase in distance from the noise generating activities on the development site or as construction activities move across the development site away from receptors (Figure 8.3).

In practice, construction noise levels and resulting impacts are likely to vary during the different construction phases of the development depending upon the location of work sites, activities and plant in operation and proximity to sensitive receptors as shown in Figure 8.3. As impacts relate to transient activities, they therefore comprise temporary, short term duration impacts.

The construction assessment of effects is provided within Table 8.8.

Table 8.8: Construction Noise Assessment of Effects (Daytime Period)

Potential Impact pathway	Construction noise from activities and plant
Impact Type	Direct
Sensitive Receptors	Residential properties, schools and playgrounds – High Transient residential receptors such as users of hotels – Medium Commercial and industrial premises – Low
Embedded Mitigation	CNVMP prepared as part of a broader CEMP
Magnitude of Impact	High to Very Low depending on receptor/construction activity location
Significance of Effect	Residential properties, schools/playgrounds and hospitals – Short-Term, Major Adverse to Minor Adverse Transient residential receptors such as users of hotels – Short-Term, Major Adverse to Negligible Commercial and industrial premises – Short-Term, Moderate Adverse to Negligible

The noise contours within Figure 8.4 show that construction noise from dredging activities will not result in an adverse impact, with average noise levels significantly below 45 dB(A) at receptors.

The construction assessment of effects is provided within Table 8.9.

Table 8.9: Construction Noise Assessment of Effects (Out of Hours Period)

Potential Impact pathway	Construction noise from dredging activities
Impact Type	Direct
Sensitive Receptors	Residential properties, schools/playgrounds and hospitals – High Transient residential receptors such as users of hotels – Medium Commercial and industrial premises – Low
Embedded Mitigation	Preparation and implementation of a Dredge Management Plan
Magnitude of Impact	No impact
Significance of Effect	Residential properties, schools/playgrounds and hospitals – No Impact Transient residential receptors such as users of hotels – No Impact Commercial and industrial premises – No Impact

Vibration

An initial calculation of vibration levels, provided with section 8 of the noise and vibration assessment (Appendix 1.2), resulting from various plant, equipment and piling techniques that are

likely to be used or comparable to the equipment to be used on the development site was carried out to determine at what distance there could be an impact from construction-phase vibration.

The calculation of vibration levels show that at distances greater than 85m, predicted vibration levels would be less than 0.5 mm/s PPV for plant and equipment. This would result in a Very Low magnitude of impact. For piling activities, the calculation of vibration levels shows that at distances greater than 200m, predicted vibration levels would be less than 1 mm/s PPV for impact and vibratory piling. This would result in a Very Low magnitude of impact.

Given residential receptors range in distance from 300m to 2,000m from the development site, vibration targets for human comfort are unlikely to be exceeded and effects are not expected. As such, no impact is expected.

Vibration may be experienced within the existing ONS and commercial and industrial premises within 100m of the development site. The calculation of vibration levels show vibration levels would result in a Medium to Low magnitude of impact when commercial and industrial receptors are within 20m to 100m from construction activities.

The construction assessment of effects is provided within Table 8.10.

Table 8.10: Construction Vibration Assessment of Effects

Potential Impact pathway	Construction vibration various plant, equipment and piling techniques
Impact Type	Direct
Sensitive Receptors	Residential properties, schools/playgrounds and hospitals – High Commercial and industrial premises – Low
Embedded Mitigation	CNVMP prepared as part of a broader CEMP
Magnitude of Impact	Residential properties, schools/playgrounds and hospitals – No Impact Commercial and industrial premises – Medium to Low
Significance of Effect	Residential properties, schools/playgrounds and hospitals – No Impact Commercial and industrial premises – Short-Term, Minor Adverse to Negligible

8.7.2 Operation – Noise Assessment

A noise model was developed to assess the potential worst-case environmental noise impacts from the existing ONS and proposed operations at the new SCY development.

The noise modelling was undertaken in accordance with the Noise EPP and associated guidelines for a worst-case scenario. The worst-case scenario modelled included all equipment turned on at the same time, with noise intensive activities operating simultaneously 24-hours a day 7-days a week, with worst case meteorological conditions. Refer to the noise and vibration assessment (Appendix 1.2) for further details on the model and scenarios.

The predicted noise level at the closet residential receptor for the Day and Night scenarios are presented in Table 8.11.

Table 8.11: Predicted noise levels during operation

Prediction location	Relevant Criteria Leq dB(A)	Predicted noise level Leq dB(A)	Below Noise EPP criteria
Daytime			
Closest Residential Receptor	52	43	Yes
Nighttime			
Closest Residential Receptor	45	44	Yes

The modelling shows that the noise levels from continuous, simultaneous operation of all facilities at the development site, in combination with the existing ONS, are predicted to comply with the relevant Noise EPP criteria. The magnitude of impact with reference to Table 8.5 would be 'No Change', as such 'No Effects' on residential receptors are considered to occur as a result of the development.

8.7.3 Operation - Road Traffic Noise

SMEC were engaged by ANI to work in partnership with the DIT to undertake an initial transport assessment of the strategic impacts of the potential traffic demand associated with the development and future growth on the Lefevre Peninsula. The SMEC Traffic Assessment Report is included as Appendix 1.3 of the EIS. The information contained within the traffic assessment has been used to inform the road traffic noise modelling.

To assess the road traffic noise impact of the development, the following scenarios have been modelled:

- Existing scenario based on existing road alignments and traffic volumes obtained for 2022. It is conservatively assumed that the traffic growth from 2022 to the year of the development becoming operational is negligible. The purpose of this scenario is to determine existing road traffic noise levels before the development is constructed.
- Future scenario based on existing road alignments (assumed to be unchanged) and future predicted traffic volumes (obtained from the traffic assessment) at year 2041. The future scenario (including the development), comprising the 2041 future baseline which assumes growth across Metropolitan Adelaide, including the Lefevre Peninsula. The purpose of this scenario is to determine the potential increase in road noise on the local network due to planned growth in the Lefevre Peninsula.

The development is expected to generate additional traffic in the surrounding area, particularly on Semaphore Road, Francis Street/Port River Expressway and Victoria Road (noting the Expressway and Victoria Road have been designed for industrial traffic and are key freight routes within the network). For this assessment, only these roads have been modelled for both scenarios. Note that the traffic volumes on these roads are assumed to be the same at all localities without more granular traffic modelling data. Therefore, this noise assessment is considered preliminary and conservative until further detailed information becomes available.

Table 8.12 and 8.13 below provide a summary of the predicted noise level range for the receptors nearest the roads and the expected noise level increase in the future scenario at year 2041 for day and night time. See Appendix 1.2 for full details regarding the modelling.

Table 8.12 Summary of modelled road traffic noise levels in 2041 – daytime

Road	Typical noise level range, dB(A)		Noise increase range, dB(A)	Magnitude of Impact
	Existing Noise Level Range	Future Noise Level Range		
Semaphore Road	58 to 69	61 to 70	1 to 4	Very Low to Medium
Francis St / Port River Expressway	66 to 74	69 to 78	3 to 5	Low to High
Victoria Road	59 to 72	63 to 75	2 to 7	Very Low to High

Table 8.13 Summary of modelled road traffic noise levels in 2041 – nighttime

Road	Typical noise level range, dB(A)		Noise increase range, dB(A)	Magnitude of Impact
	Existing Noise Level Range (2022)	Future Noise Level Range (2041)		
Semaphore Road	53 to 65	57 to 66	1 to 4	Very Low to Medium
Francis St / Port River Expressway	62 to 70	65 to 75	4 to 5	Medium to High
Victoria Road	53 to 67	62 to 71	3 to 9	Low to High

When comparing projected traffic noise levels for the year 2041 to the existing baseline levels from 2022, all receptors within 50 meters of the road network are expected to experience an increase in noise during both daytime and nighttime hours. This increase would occur gradually over time (i.e., over a 15 year plus period), as operational traffic from the development, along with other growth on the Lefevre Peninsula, comes online and contributes to the rise in noise levels on the road network leading up to 2041.

If unmitigated, these impacts will be a direct, adverse and permanent. It should be noted that noise modelling does not take into account the potential impact of vehicle fleet electrification, which is expected to help reduce road noise levels due to quieter engine operations. Additionally, the assessment does not consider other factors that could further influence noise levels, such as advancements in tire technology or changes in traffic patterns (i.e., use of public, or semi-public transport including park and ride facilities).

Based on the modelled daytime and nighttime noise levels within Table 8.12 and 8.13, and assuming no mitigation measures, potential significant effects have been identified for residential

and school/playground receptors, as outlined within Table 8.14 and 8.15, depending on their geographic and spatial location in relation to the road network.

Table 8.14 Summary of significance of effects – daytime

Road	Receptor Sensitivity	Magnitude of Impact	Significance of Effect
Semaphore Road	Residential/school/playground – High	Very Low to Medium	Minor to Moderate
	Commercial and industrial – Very Low		Negligible
Francis St / Port River Expressway	Residential/school/playground – High	Low to High	Moderate to Major
	Commercial and industrial – Very Low		Negligible
Victoria Road	Residential/school/playground – High	Very Low to High	Minor to Major
	Commercial and industrial – Very Low		Negligible

Table 8.15 Summary of significance of effects – nighttime

Road	Receptor Sensitivity	Magnitude of Impact	Significance of Effect
Semaphore Road	Residential/school/playground – High	Very Low to Medium	Minor to Moderate
	Commercial and industrial – Very Low		Negligible
Francis St / Port River Expressway	Residential/school/playground – High	Medium to High	Moderate to Major
	Commercial and industrial – Very Low		Negligible
Victoria Road	Residential/school/playground – High	Low to High	Moderate to Major
	Commercial and industrial – Very Low		Negligible

8.8 Additional Mitigation Measures and Residual Effect

8.8.1 Construction

Noise

No additional mitigation or monitoring are required beyond those outlined above in Section 8.6.

The assessment assumes a worst case, although this also considers the effective implementation of the measures listed within Section 8.6. The likely residual effects for construction effects on receptors will remain Short-term and Major Adverse to Negligible Effect for daytime period. The likely residual effects for construction effects on receptors will remain 'No Impact' for the out of hours period.

South Australian EPA licence/s will be obtained as required to ensure compliance with environmental regulations and standards.

Vibration

No additional mitigation or monitoring are required beyond those outlined above in Section 8.6. The assessment assumes a worst case, although this also considers the effective implementation of the measures listed within Section 8.6.

The likely residual effects for construction effects on high sensitivity receptors will remain 'No Impact'. The likely residual effects for construction effects on low sensitivity receptors will remain Short-Term, Minor Adverse to Negligible.

8.8.2 Operation

Operation – Noise Assessment

No additional mitigation, monitoring or enhancement measures are proposed given that no significant adverse effects have been identified.

South Australian EPA licence/s will be obtained as required to ensure compliance with environmental regulations and standards.

Operation - Road Traffic Noise

Given the significant effects identified, measures will need to be put in place to ensure the transport network can accommodate the additional traffic incurred by the development and other growth on the Lefevre Peninsula in the future.

A range of mitigation measures are currently being explored that include a combination of operational and infrastructure planning responses to reduce and manage traffic volumes (and thus noise impacts). These measures are discussed in detail within Chapter 9 - Transport and Traffic. Given the staged growth of operational traffic over the next 10-15 years, there is sufficient time to ensure the optimal combination of mitigation measures can be adopted in advance of need.

Given the above, it is not possible to quantify with any certainty at this stage how mitigation measures would prevent, reduce or offset the significant adverse effects identified above within Section 8.7.3. As such, it is considered appropriate for the residual effects for the development to remain as reported within Section 8.7.

8.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6 – Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.

- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

8.9.1 Construction Noise and Vibration

If construction activities for cumulative developments overlap with those of the development, it is likely that construction activities will also be controlled through CEMPs, secured by planning conditions, to effectively mitigate noise and vibration impacts on the receptors considered in this chapter. Therefore, it is anticipated that construction noise and vibration from cumulative developments will not result in effects that substantially differ from those already identified in this chapter. As such, significant cumulative effects are not expected.

8.9.2 Operation

Noise Assessment

As outlined within Section 8.6 of the noise and vibration assessment (Appendix 1.2), noise emissions from existing ONS and future development fabrication, consolidation, outfitting, blast and paint, and workshop facilities have been modelled together. As such, the operational noise assessment takes into account the existing ONS and the cumulative effects of the existing ONS are therefore inherent within the assessment of likely significant effects.

In addition, the operational noise emissions from the cumulative schemes listed above do not have plant or facilities that would generate noise emissions that are required to be considered cumulatively with the development.

Traffic Noise Assessment

The traffic data for the operational traffic noise assessment of year 2041 includes future planned growth on the Lefevre Peninsula, this takes into account committed development and growth on the local road network. The future baseline at year 2041 therefore takes into account traffic from the cumulative schemes and the cumulative effects are therefore inherent within the assessment of likely significant effects.

CHAPTER 9

Traffic and Transport

URPS

9. Traffic and Transport

Conclusion: No significant adverse effects have been identified for the transport and traffic network during construction. Traffic generated as a result of the development workforce during the operational phase, in combination with other planned growth on the Lefevre Peninsula, has the potential to exceed the road network design capacity from Port Adelaide, northwards up the Lefevre Peninsula. However, there are a range of operational measures and infrastructure improvements identified to manage capacity and cater for future demand to offset the future planned growth of the Lefevre Peninsula. The State and Commonwealth Government's are committed to work collaboratively to ensure the optimal solution is identified ahead of demand.

9.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to transport and traffic.

SMEC were engaged by ANI to work in partnership with the Department for Infrastructure and Transport (DIT) to undertake an initial assessment of the strategic impacts of the potential traffic demand associated with the development. This included an initial review of options that may optimally manage this demand. The SMEC Traffic Assessment Report (October 2024) (the 'traffic assessment') is included as Appendix 1.3 of this EIS.

9.2 Assessment Requirements

Commission Assessment Requirements: AEQ3: Detailed Requirements

- The scope of a transport and traffic impact assessment requiring detailed assessment will build on the Standard Assessment Requirements and be driven by the scale, nature and location of the development and the anticipated transport and traffic impacts (including reference to and consideration of the Osborne North Car Park and Grade Separated Road project, facility operational requirements (e.g. security measures such as checkpoints)). It is expected that the content of the assessment would be determined in consultation with state and local government and other transport infrastructure owners and operators (including Flinders Ports, Viterra and ARTC).
- The detailed transport and traffic impact assessment report must be prepared by a suitably qualified planner/engineer and will address end-to-end supply chain (input and output) potential impacts to road (local and state maintained), freight and passenger rail (including ongoing access to the Port of Adelaide, Adelaide Container Terminal and Outer Harbor Grain Terminal), maritime and air transport operations (where relevant). The transport and traffic impact assessment must address each proposed project-affected mode (e.g. road, rail, air, port and sea) for each phase of the proposed project and identify potential need for infrastructure improvements and measures to mitigate impacts.

AEQ3: Detailed Requirements (Continued)

- The assessment report must assess the impact on existing and projected shipping, recreational and other maritime/water vessel access to the Port of Adelaide, Torrens Island and Port River (including impacts of security considerations / exclusion zones)
- Detail how active travel modes and public transport, including connections with existing walking and cycling paths will be established, will be supported and the provision of suitable end of trip facilities for workers employed at the facility.

9.3 Guiding Legislation and Policy

The key legislation and policies that guide traffic management in South Australia are summarised in the following Table 9.1.

Table 9.1: Summary of legislation

Name	Description
Highways Act 1926	An Act to provide for the appointment of a Commissioner of Highways, and to make further and better provision for the construction and maintenance of roads and works, and for other purposes.

9.4 Scope, Study Area and Assessment Method

9.4.1 Scope

This chapter considers the effects of the operational phase of the development. In general terms, travel patterns and conditions are considered, 'with' and 'without' the development in order to determine anticipated changes. Those changes between the 'with and 'without' scenarios, such as a forecast change in traffic flow on a link/road, are then assessed in terms of their likely effect on the road receptor.

The 'with' and 'without' development scenarios are defined below.

- 'Without' development – comprising the 2021 existing baseline scenario.
- 'With' development – the 2041 development scenario (including the development), comprising the 2041 future baseline which assumes growth across Metropolitan Adelaide, including the Lefevre Peninsula.

9.4.2 Scoped Out

Construction

The assessment assumes that construction work will occur over a 10-year period, with the peak construction activity likely to occur five years into construction when Areas 1 to 3 are all under construction. However, the construction phase of the development is scoped out of further

assessment within this chapter as the predicted construction traffic demand is projected to be below the modelled design capacity range of the existing road network.

A Construction Traffic Management Plan (CTMP) will be prepared in consultation with statutory agencies prior to the commencement of construction. The CTMP will set out the strategy and approach to traffic routing and management to minimise disruption effects on the local community and environment.

The CTMP would include details of:

- The routing of construction and delivery vehicles to/from the development site.
- Details of parking and turning areas for construction and delivery vehicles and site personnel.
- Timing of deliveries including the avoidance of traditional AM peak hour (07:00-09:00) and PM peak hour (17:00-18:00).
- Management of abnormal (larger or longer) loads.
- Temporary traffic management / signage.

Impacts to freight and passenger rail, maritime and air transport operations, shipping, recreational and other maritime/water vessel access during construction have not been considered further in this assessment.

Given that the construction phase will extend over a 10-year period, with materials being delivered to the development site on an as-needed basis, it is anticipated that there will be no significant adverse effects on these networks/operations. The phased delivery approach of materials is expected to mitigate any substantial strain on transport infrastructure. Consequently, no further detailed assessment of these transport modes is deemed necessary at this time.

Freight and Passenger Rail, Maritime and Air Transport Operations (operation phase)

During the operational phase of the development, no significant impacts on rail, air, or marine transport infrastructure are anticipated. Any increase in transport movements resulting from the development's operations is expected to be within the existing capacity of the infrastructure. Therefore, no further assessment of potential operational impacts on rail, air, and marine transport infrastructure is required at this time.

Shipping, Recreational and Other Maritime/Water Vessel Access (operation phase)

During the operational phase, maritime vessel movements would not be at a frequency that would result in a noticeable impact on shipping, recreational and other maritime/water vessel movements within the Port River.

On occasions that operational maritime vessel movements are required to utilise the Port River, all activities would be coordinated with the Port Operator in advance of the activity occurring, as occurs with the existing ONS operations, ensuring no adverse effects on shipping, recreational and other maritime/water vessel access.

Cumulative effects

Likely significant cumulative effects of construction activities are not expected as each cumulative site will be applying good practice site measures and appropriate mitigation techniques and adhering to relevant CTMPs and other management plans, including the CEMP.

The operational effects of the development are considered against the 2041 'With' development scenario which includes travel demand and interventions from other committed development schemes within the area. As such the 2041 'With' development scenario effectively comprises a cumulative assessment.

No separate cumulative effects assessment is therefore provided within this chapter.

9.4.3 Study Area

The study area for the assessment is shown in Figure 9.1.

Figure 9.1 Traffic Assessment Modelled Area

9.4.4 Modelling

The traffic investigation included within the traffic assessment (Appendix 1.3) modelled the increase in traffic demand as a result of the development (at a strategic level, based on a range of assumptions), and investigated options for supporting traffic movement to manage increased demand.

Model years of 2021 and 2041 were used for the modelling tasks. A combination of traffic counts, traffic signal count data and factored data was used for the validation dataset. The 2041 model year assumes growth across Metropolitan Adelaide. For the ANI precinct (i.e., the existing ONS facility and the development site), job numbers were developed to represent a conservative workforce for the purpose of this exercise. SMEC worked with ANI to inform the DIT of updated assumed 2041 employment totals by the Strategic Modelling (SAM) employment categories.

9.4.5 Assessment Method

This assessment follows the generic EIA methodology provided within Chapter 6 – Impact Assessment Methodology. The tables below provide further details on sensitive receptors and magnitude of impact for this assessment.

The sensitivity of the existing network was determined based on the existing volume of road users against the road design capacity during morning peak periods (which is the busiest time on the network as the majority of commuter and school trips occurs during this period). This is described within Table 9.2 below.

Table 9.2: Descriptors for Receptor Sensitivity

Existing Network Sensitivity	Description
Very Low	Existing traffic is below 25% of the modelled design capacity range of the road.
Low	Existing traffic is between 26% to 50% of the modelled design capacity range of the road.
Medium	Existing traffic is between 51% to 75% of the modelled design capacity range of the road.
High	Existing traffic is greater than 76% of the modelled design capacity range of the road.

Table 9.3 describes the magnitude of impact used in this assessment.

Table 9.3: Descriptors for Magnitude of Impact

Magnitude of Impact	Description
Very Low	Predicted traffic demand is below the modelled design capacity range of the road.

Magnitude of Impact	Description
Low	Predicted traffic demand is within the modelled design capacity range of the road.
Medium	Predicted traffic demand is greater than the modelled design capacity range of the road by less than 10% (i.e., between 100% and 120%).
High	Predicted traffic demand is greater than the modelled design capacity range of the road by more than 20% (i.e., greater than 121%).

The matrix presented in Table 9.4 was applied to determine the significance of effects of the development on the road network.

Table 9.4: Significance of Effects Matrix

		Magnitude of Change			
		High	Medium	Low	Very Low
Sensitivity / Value of Receptor	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Very Low	Minor	Negligible	Negligible	Negligible

Assumptions and Limitations (i.e. Uncertainties)

The following assumptions and limitations have been applied to the traffic assessment within Appendix 1.3:

- It is noted that the hour of 6am-7am is likely to be the highest volume hour in the AM peak period for workers accessing the ANI precinct during the operational phase of the development site. The proposed modelling approach does not include an assessment of 6am to 7am as this is not possible within the current base model capabilities. The models used cover the AM Peak Period of 7am to 9am where the majority of commuter and school trips occurs. This highlights the unique nature of the ANI precinct. Notwithstanding, the modelled outputs for the period from 7am to 9am provide an initial indication of potential performance and were considered suitable for this stage of the planning approvals process. More detailed modelling/analysis will be undertaken in future stage/s as detailed design and planning for the project progresses.
- The proposed approach applied the distribution model currently utilised in SAM which is based on average behaviour across the Adelaide Metro area. It was noted that there is a potential risk that the distribution for the ANI precinct may vary from this. Accordingly, a review of the modelled distribution against Census information was completed to confirm if the SAM distribution was suitable for this level of assessment. Given the unique nature of movements to

the ANI precinct, a more detailed application of the distribution of workers to the precinct may be required for future stage/s of the process.

- Workforce numbers for the ANI precinct are not tightly defined and may vary as detailed design and planning for the development progress. For the purpose of this assessment a conservative demand has been considered.
- An assumption that every worker that uses private vehicles will drive i.e. a vehicle occupancy of 1 for vehicles carrying ANI workers is applied. This again is considered to be a conservative assumption.
- All workers' vehicles travelling to the precinct will have a car park provided on-site.

9.5 Baseline Conditions and Sensitive Receptors

9.5.1 Baseline Conditions

The existing network is characterised by the following:

- Victoria Road is the main arterial road to access the existing ONS facility and fluctuates in movements.
- The peak existing ONS demand occurs for the 6am to 7am period. It is noted that this coincides with the lowest network wide volume.
- Approximately 70% of the traffic wanting to access the existing ONS approaches via the Port River Expressway.
- The Port River Expressway / Victoria Road / Nelson Street intersection is the key access point to the peninsula.
- The Port River Expressway / Perkins Drive / Francis Street intersection is the key transition point between the expressway and arterial network.
- The southern end of the LeFevre Peninsula is the most congested.
- These key intersections are nearing capacity in peak periods due to existing local movements and the current existing ONS demand.
- The Victoria Road design capacity range is 2,500 to 2,800 per hour.
- The Port River Expressway design capacity range is 2,800 to 3,300 per hour.
- The Semaphore Road design capacity range is assumed to be 2,500 to 2,800 per hour.

Figure 9.2 - Existing traffic peak volumes show the current vehicles per hour across a number of example locations during the 6am to 9am period.

EXISTING TRAFFIC PEAK VOLUMES SHOW THE CURRENT VEHICLES PER HOUR ACROSS A NUMBER OF EXAMPLE LOCATIONS DURING THE 6AM TO 9AM PERIOD

9.5.2 Sensitive Receptors

For the purposes of the assessment within this chapter the following existing road receptors have been assessed to provide an assessment of effects for the users of the existing road network.

- Victoria Road (A16) -between Pelican Point Road and Osborne Road (Victoria 1).
- Victoria Road (A16) -between Osborne Road and Seaborne Road (Victoria 2).
- Victoria Road (A16) -between Seaborne Road and Wills Street (Victoria 3).
- Victoria Road (A16) -between Wills Street and Port River Expressway bridge (Victoria 4).
- Port River Expressway (A9) – between Victoria Road (A16) and Perkins Drive (Port River Expressway Bridge).
- Port River Expressway (A9) – between Perkins Drive and Eastern Parade (Port River Expressway 1).
- Semaphore Road (A16) – between Causeway Road and Nelson Street.

Table 9.5 below provides a summary of the existing traffic peak volumes between 7am and 9am for the above receptors as shown within Figure 9.2.

Table 9.5: Summary of existing traffic peak volumes between 7am and 9am

Receptor	Existing traffic movements per hour (North/East)	Existing traffic movements per hour (South/West)
Victoria 1	780/660	320/310
Victoria 2	820/900	730/640
Victoria 3	1240/1200	1240/1130
Victoria 4	1340/1270	1600/1410
Port River Expressway Bridge	1550/1270	1170/1200
Port River Expressway 1	2010/1640	1820/1960
Semaphore Road	360/460	360/500

9.6 Assessment of Effects

9.6.1 Road Network

Table 9.6 below provides the sensitivity of the existing road network receptors based on the highest existing traffic figure provided within Table 9.5 compared against the design capacity range of the road to determine the sensitivity as described within Table 9.2.

Table 9.6: Summary of for Receptor Sensitivity

Receptor	Highest existing traffic movement (North/East/ South/West))	Design Capacity Range	% of the modelled design capacity range used*	Sensitivity
Victoria 1	780	2,500 to 2,800	32%	Low
Victoria 2	900	2,500 to 2,800	36%	Low
Victoria 3	1240	2,500 to 2,800	49%	Low
Victoria 4	1600	2,500 to 2,800	64%	Medium
Port River Exp Bridge	1550	2,800 to 3,300	55%	Medium
Port River Exp 1	2010	2,800 to 3,300	72%	Medium
Semaphore Road	500	2,300 to 2,500	22%	Very Low

*Calculated against lowest number of the design capacity range.

2041 modelling included within the traffic assessment shows that there is potential for development traffic demand to exceed the overall design capacity within the existing road network. This will result in congestion / delays to the existing network and identifies the need to increase capacity to cater for this future demand. The magnitude of impact to receptors based on the modelled demand is provided within Table 9.7.

Table 9.7: Summary of impact magnitude for peak volumes between 7am and 9am

Receptor	*2041 modelled development traffic movement (North/East/ South/West))	Design Capacity Range	Predicted traffic demand as % of the modelled design capacity range**	Impact Magnitude
Victoria 1	4090/3540	2,500 to 2,800	146%	High
Victoria 2	3790/3060	2,500 to 2,800	135%	High
Victoria 3	2910/3060	2,500 to 2,800	109%	Medium
Victoria 4	4210/4420	2,500 to 2,800	158%	High

Receptor	*2041 modelled development traffic movement (North/East/ South/West))	Design Capacity Range	Predicted traffic demand as % of the modelled design capacity range**	Impact Magnitude
Port River Exp Bridge	4180/4420	2,800 to 3,300	134%	High
Port River Exp 1	3720/3850	2,800 to 3,300	117%	Medium
Semaphore Road	590/690	2,300 to 2,500	28%	Very Low

*Highest number used to determine impact magnitude

**Calculated against highest number of the design capacity range.

The significance of effect has been judged to range from Minor Adverse to Major Adverse for the six receptors because the development would result in perceptible changes to the road network and may affect travel behaviour users of the road network to some degree, such as changing route choice. It is noted that the hour of 6am to 7am is likely to be the highest volume hour in the morning peak period for workers accessing the ONS. The proposed approach does not include an assessment of 6am to 7am as this is not possible within the current base model capabilities, and the assessment is thus a conservative assessment of effects.

The significance of effects is provided within Table 9.8.

Table 9.8: Summary of significance of effect

Receptor	Sensitivity	Impact Magnitude	Significance of Effect
Victoria 1	Low	High	Moderate Adverse
Victoria 2	Low	High	Moderate Adverse
Victoria 3	Low	Medium	Minor Adverse
Victoria 4	Medium	High	Major Adverse
Port River Exp Bridge	Medium	High	Minor Adverse
Port River Exp 1	Medium	Medium	Moderate Adverse
Semaphore Road	Very Low	Very Low	Negligible

9.6.2 Road Safety

The increase in traffic volumes will result in an increased potential for interactions between pedestrians, light vehicles and heavy vehicles. However, the local roads in the vicinity of the development site already accommodate regular heavy vehicle movements, associated with the existing ONS and other industrial development on the peninsula.

In addition, any proposed road infrastructure upgrades associated with the development are not expected to result in changes which could significantly affect accidents and safety because it is an explicit requirement of the road authority or road owner that any such works are subject to a road safety audit process prior to implementation and do not unacceptably increase safety risks.

As such, the development is not expected to result in changes which could significantly affect accidents and safety as a result of development traffic and no significant effects are expected.

9.7 Additional Mitigation Measures and Residual Effect

9.7.1 Additional Mitigation Measures

Given the significant effects identified, it is clear that measures will need to be put in place to ensure the transport network can accommodate the additional traffic incurred by the development and other growth on the Lefevre Peninsula in the future.

With the construction of nuclear-powered submarines beginning in the late 2020s when parts of the yard will become operational at this time. It is expected that there will be steady growth in the workforce from mid to late 2020s with peak demand likely to be reached in the mid 2030s. This means that operational traffic demand is expected to grow steadily over the next 10-15 years, providing sufficient time for the optimal mitigation options to be identified.

Mitigation Options

A range of mitigation options were considered within the traffic assessment which could reduce the impacts of the development. Options include:

- Road infrastructure upgrades
  - Upgrade the existing road network to suitably accommodate the demand. Such infrastructure upgrades could include grade separations at key intersections, at-grade road intersection widenings and/or restricted access or restricted movements at various locations.
- Public transport
  - Establish new or enhanced public transport services (rail and/or bus) to the precinct to reduce the private car transport demand.
- Car park and dedicated ANI precinct services
  - Provide dedicated services for ANI precinct staff (bus or train) which could include off-site car parks, to enable simple and effective transfer from car to dedicated public transport service.
- Operations

  - Changes to workforce demand, shift allocations and start and finish times and on-site car parking facilities.
- Combinations
  - A combination of the above approaches is considered likely to provide the optimal solution.

Next steps

Traffic investigations in partnership with DIT will be ongoing to help inform the selection of the final mitigation options as discussed above, and will include:

- Ongoing model development and refinement consistent with that needed for more detailed option assessment and comparison.
- Ongoing refinement of assumptions for the ANI precinct (e.g. workforce demand, shift times etc) as the parallel process of progressing the site operational planning occurs.
- More detailed modelling and assessment of specific options aimed at short-listing to a small number of viable approaches ahead of progression towards a preferred overall network approach.

Lefevre Peninsula Masterplan

Separate to the development, a Lefevre Peninsula Masterplan (the Plan) is to be prepared that will provide a structured approach to planning on the Lefevre Peninsula. It will provide clear guidance as to the future investment in necessary infrastructure, including housing and transport, to support the new submarine enterprise as well as meeting the needs of other industry in the area and local residents. It will also support future local activity and inform broader strategic planning including the development of the Greater Adelaide Regional Plan to make sure that it responds to the needs associated with construction and operation of the development and broader Project.

The Plan is being commissioned by the South Australian Office for AUKUS, (part of the South Australian Department of the Premier and Cabinet), to make sure that future growth of a defined area is sustainable with the aim for liveable, economically supported communities.

The Plan is anticipated to commence in late 2024, with delivery and implementation of the Masterplan in 2026.

Through the involvement of Approval Holders in future planning that provides direct support to the development, coupled with investment and strategic support from various levels of government, it is anticipated that potential impacts to the Lefevre Peninsula Masterplan can be minimised and opportunities maximised.

9.7.2 Residual Effects

Given the current assessment work completed for the development by SMEC in partnership with DIT, and the on-going work that will need to be completed by DIT and authorities for the Lefevre Peninsula Masterplan, and that significant effects will not occurred for 10 to 15 years providing sufficient time for the mitigation options to be identified and implemented, it is considered that suitable mitigation would be able to be implemented to reduce the impact to the road network incurred by the development and other growth on the Lefevre Peninsula in the future thus reducing the overall significance of effects.

However, it is not considered possible to quantify with any certainty at this stage how mitigation measures would prevent, reduce or offset the significant adverse effects identified above within Section 9.7.1. As such, it is considered appropriate for the residual effects for the development to remain as reported within Section 9.6.

CHAPTER 10

Visual Amenity

10. Visual Amenity

Conclusion: There will be some long, medium and short views of the development where it will be visually prominent. However, no significant effects have been identified given the existing industrial character of the development site and surrounding area.

10.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to landscape and visual amenity. URPS prepared a visual amenity assessment for the SCY to inform this EIS. The full report is provided in Appendix 1.4.

Given the maturity of the design, details regarding materials and finishes, nature of landscaping, and photomontages are yet to be confirmed for the development. However, high level illustrative renders of the proposal are provided within Appendix 1.4 and Chapter 2 – Description of Development. Photographs and images of the existing ONS, which will be replicated at the development, have also been provided to assist in understanding the visual impact of the proposal.

10.2 Assessment Requirements

Commission Assessment Requirements AEQ4: Standard Requirements

- Provide a description of the landscape character, features and values of the development area and its environs. This should address (where relevant):
  a) components of the development that may result in impacts to visual amenity,
  b) public and private viewsheds to the development and the visual values of the area,
  c) viewsheds in which the development features, including from nearby public lookouts, tourist attractions, conservation areas, roads and key vantage points in the vicinity,
  d) existing built features within the landscape and their impact on the existing landscape and visual setting.
- Describe the effects of the development on visual amenity and landscape quality, including both near and distant views, such as where public access will be maintained from public reserve and conservation areas, including from the land and sea. This should focus on final built form, but should also address light spill from the development.
- If required, provide a visual analysis of the development from key viewpoints, including photomontages or perspectives showing the proposed and likely future development.
- Describe the rationale for the major design elements of the proposed development and measures to mitigate their visual impact (in the context of an industrial area).
- Describe how the design and construction of all buildings and structures will be controlled to ensure cohesive visual amenity, including details of construction materials, colours and landscaping for all main buildings and structures.
- Describe the use of screening / amenity / landscape plantings and potential broad scale revegetation, including the opportunities for the use of locally endemic species.

10.3 Guiding Legislation and Policy

The key legislation and policies that guides this assessment are summarised in Table 10.1.

Table 10.1: Guiding Legislation and Policy

Name	Description
Legislation	
Planning, Development and Infrastructure *Act 2016*	Section 25 of the EP Act creates a general environmental duty to take all reasonable and practicable measures to prevent or minimise environmental harm.
Standards and guidelines	
AS/NZ 1158.3.2:2020: Lighting for roads and public spaces, Standards Australia and Standards New Zealand 2023	Specifies performance and design requirements for Category P lighting schemes as described in AS/NZS 1158.0. It also specifies the luminaire data and other data that is needed to facilitate the lighting design and the assessment of conformance to the requirements of this Standard.
AS/NZS 4282:2023: Control of the obtrusive effects of outdoor lighting, Standards Australia and Standards New Zealand 2023	Sets out requirements for the control of the obtrusive effects of outdoor lighting. This includes limits for the relevant light technical parameters to control these effects.
National Light Pollution Guidelines for Wildlife, Commonwealth of Australia 2023	These guidelines include a framework for how to assess and manage light pollution impacts on protected wildlife. It provides detailed guidance for how to manage artificial light and specific advice on how to protect marine turtles, seabirds and migratory shorebirds.
Other policies and guidelines that provide more specific guidance for impact assessment	• Guidance Note for Landscape and Visual Assessment (Australian Institute of Landscape Architects Queensland, 2018); and • Guidance for Landscape and Visual Impact Assessment, Third Edition (Landscape Institute and Institute of Environmental Management & Assessment, 2013)

10.4 Scope, Study Area and Assessment Method

There is no formalised standard landscape and visual impact assessment methodology at local or state level in South Australia. Given the absence of available guidance, the assessment undertaken within this chapter has followed a 'best practice' approach using *Guidance for Landscape and Visual Impact Assessment, Third Edition (Landscape Institute and Institute of Environmental Management & Assessment, 2013)* (the 'GLVIA Guidance') as the basis of assessing the significance of effects for the development from publicly accessible locations. There is no current guidance for the assessment of visual impact on views from an individual private property that applies to projects within South Australia, as such this has not been considered within this EIS.

10.4.1 Scope

An assessment of potential effects of landscape and visual amenity during the construction and operational phase of the development has been scoped into this chapter.

10.4.2 Study Area

The study area for the landscape character is the development site and the areas immediately surrounding the development site.

A desktop study was carried out based on an initial study area that extended to approximately 5km from the development site. The study area for the assessment of visual effects was then refined based on the field surveys and extends to 3kms from the development site for this assessment.

It is considered highly unlikely that significant effects will occur on visual receptors beyond the 3km extent.

10.4.3 Assessment Method

Landscape character and visual amenity were assessed to identify the likely impacts arising from the development, considering landscape character and day and night-time visual amenity. This generally follows the approach included within Chapter 6 –Impact Assessment Methodology. The tables below provide further details on sensitive receptors and magnitude of impact for this assessment.

Landscape

The sensitivity of the landscape was determined based on the frequency and volume of users, as well as whether the landscape had any important characteristics such as rarity, tranquillity, scenic amenity or contributed to sense of place. This is described within Table 10.2 below.

Table 10.2: Descriptors for Receptor Sensitivity

Landscape Sensitivity	Description
National	Landscape feature or place that is protected under national legislation or international policy.
State	Landscape feature or place that is heavily used and/or is iconic to the state.
Regional	Landscape feature or place that is heavily used/iconic and valued by residents of a major portion of a city or a non-metropolitan region, and/or places with regionally important scenic value or to landscape features.
Local	Landscape feature that is valued and experienced by concentrations of residents and/or local recreational users, and/or places of local scenic value or local landscape features.
Site	Places without any particular scenic value or local landscape features.

Table 10.3 describes the magnitude of impact to the landscape character used in this assessment.

Table 10.3: Descriptors for Magnitude of Impact

Magnitude of Impact	Description
High	The landscape is altered such that the proposal dominates and/or transforms its character, amenity and/or function.
Medium	The proposal substantially changes and/or is not compatible with the character, amenity, and function of the landscape.
Low	The proposal changes are minor and/or are compatible with the character, amenity, and function of the landscape.
Very Low	The proposal would not change the character, amenity and/ or function of the landscape.

The matrix presented in Table 10.4 was applied to determine the significance of effects of the development on landscape character.

Table 10.4: Significance of Effects Matrix

		Magnitude of Change			
		High	Medium	Low	Very Low
Sensitivity / Value of Receptor	National	Major	Major	Moderate	Minor
	State	Major	Moderate	Minor	Negligible
	Regional	Moderate	Minor	Negligible	Negligible
	Local	Minor	Negligible	Negligible	Negligible
	Site	Negligible	Negligible	Negligible	Negligible

Daytime visual impact assessment method

The visual sensitivity of the receptors considers the nature and duration of views, and distance of view to the development. This is described within Table 10.5 below.

Table 10.5: Descriptors for Receptor Sensitivity

Visual Sensitivity	Description
High	The receptor / resource has very little ability to absorb change without fundamentally altering its present character, or possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the site (i.e., heavily experienced view to a feature or landscape that is iconic to the state.)
Medium	The receptor / resource has low capacity to absorb change without significantly altering its present character, or contributes significantly to the distinctiveness and character of the site (i.e., heavily experienced view to a feature or landscape that is iconic to a major portion of a city or a non-metropolitan region, or an important view from an area of regional open space).
Low	The receptor / resource has some tolerance of change without detriment to its character, or only possesses characteristics which are locally significant, not designated or only designated at a district council or local level. (i.e., local view experienced by concentrations of residents and/or local recreational users, local commercial areas and/or large numbers of road or rail users).
Very Low	The receptor / resource is tolerant of change without detriment to its character, or does not make a significant contribution to local character or distinctiveness and is not designated (i.e, views where visual amenity is appreciated by a small number of residents, not particularly valued by the wider community).

The magnitude of impact on view from the development is described within Table 10.6 below.

Table 10.6: Descriptors for Magnitude of Impact

Magnitude of Change	Description
High	The proposal substantially changes and/or is not compatible with the character of the view/area.
Medium	The proposal is prominent and/or is visually compatible with the character of the view/area.
Low	The proposal is not visually prominent and/or is visually compatible with the character of the view/area.
Very Low	The proposal is not visible, is not visually prominent in the view and/or is compatible with the character of the view.

The matrix presented in Table 10.7 was applied to determine the significance of effects of the development on visual amenity.

Table 10.7: Significance of Effects Matrix

		Magnitude of Impact			
		High	Medium	Low	Very Low
Sensitivity / Value of Receptor	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Very Low	Minor	Negligible	Negligible	Negligible

Night-time visual impact assessment method

An assessment of the potential visual impacts of the proposal at night uses similar methodology to the daytime assessment. However, the assessment also considers the night-time visual sensitivity of receptors based of the existing night-time visual conditions.

10.5 Baseline Conditions and Sensitive Receptors

10.5.1 Baseline Conditions

The development site is located on the northeastern Lefevre Peninsula. It is bound by the Port River and Mutton Cove to the north and east, the existing ONS to the east, industry to the west and south, and residential properties separated by Victoria Road to the west (Figure 10.1).

Figure 10.1 Aerial photograph of development site and surrounding area

The development site currently comprises vacant, cleared, industrial land, laydown areas, car parks, piles and hardstand previously constructed for the former Attack Class Submarine program, stormwater swales and shoreline. The land is relatively flat. It is fenced from the general public and has a very low intensity of use.

The marine-based portion of the development site encompasses a portion of the Port River.

Surrounding Area

The surrounding area includes a range of industrial activities including the largest commercial and tourism port in South Australia, power stations, commercial rail, grain silos, fuel storage and the existing ONS (refer to Figures 10.2.1 to 10.2.6 below).

The locality is characterised by a range of built structures with significant scale and presence that punctuate the skyline and can be viewed locally and from across the Port River.

The built structures include stacks of shipping containers, cranes, large container and cruise ships at the port, large grain silos and fuel tanks at the Viterra site and Ampol fuel terminal respectively, and buildings of significant scale at the existing ONS. The vacant industrial areas, including the development site, in particular are generally in poor condition with past clearing and landfill creating denuded and inhospitable conditions which do not add to the local character.

Figure 10.2.1 Viterra grain silos

Figure 10.2.2 Ampol fuel terminal

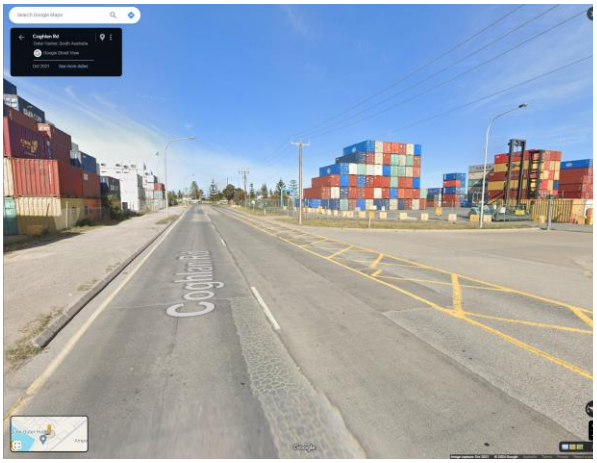


Figure 10.2.3 Flinders Adelaide Container Terminal

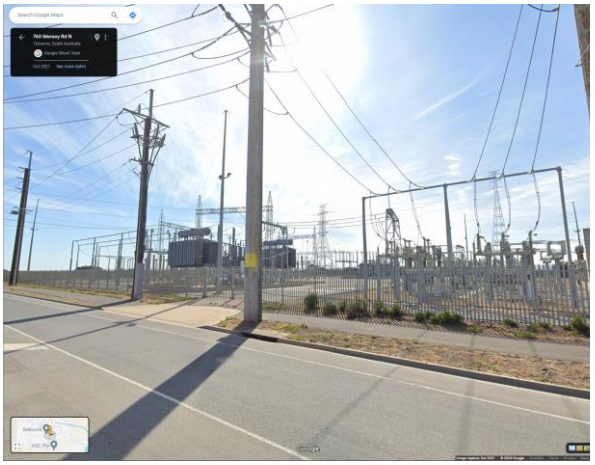


Figure 10.2.4 Osborne Substation

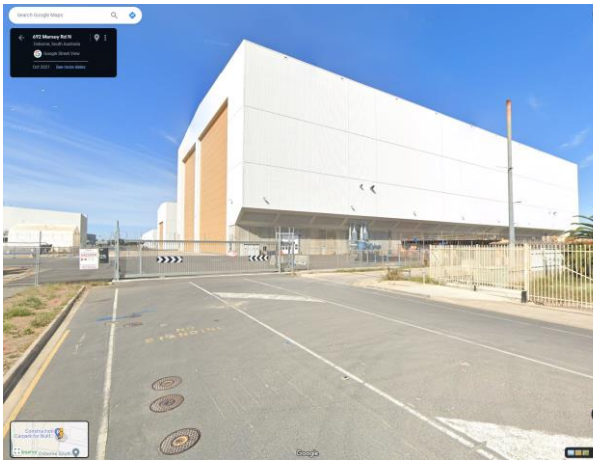


Figure 10.2.5 Osborne Naval Shipyard (ONS)

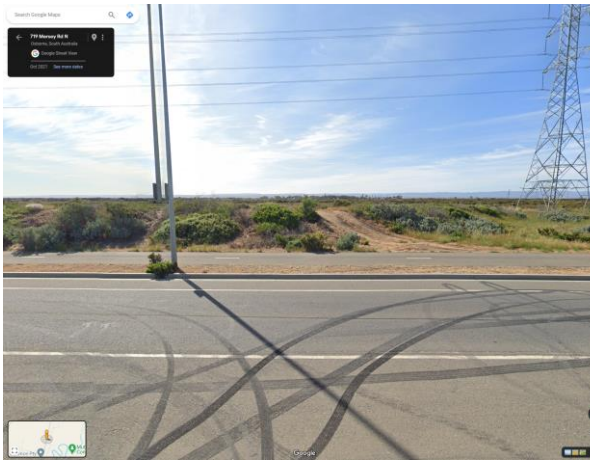


Figure 10.2.6 Mutton Cove

10.5.2 Sensitive Receptors

This section identifies the landscape and visual receptors that have been defined for assessment.

Landscape Character

- Development site and surrounding areas.

Visual

- Surrounding residents - North Haven and Osborne, St Kilda and the northern Lefevre Peninsula.
- People travelling along the local road network.
- People using public reserve and conservation areas, and Port River.

10.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanism for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

10.6.1 Embedded Mitigation Measures

Construction

General

A CEMP will be prepared for the development which will outline specific strategies and procedures for controlling construction impacts, ensuring that best practices are followed to minimise impacts on visual amenity.

Lighting

Measures to avoid or minimise lighting impacts during construction would be documented through the CEMP.

Operation

Lighting

Light spill into sensitive areas such as residential neighbourhoods will be managed through a range of design elements such as building orientation, shielding and lighting standards (to meet Australian Standards and Guidelines).

A sensitive lighting scheme will be developed as the development progresses through detailed design to ensure inward distribution of light and avoiding or minimising light spill onto existing boundary features, and utilised only in the locations required at that time to avoid any impacts to the surrounding area. Lighting for the development is expected to be consistent with the approach that is currently applied to the existing infrastructure at the ONS. Measures to avoid or minimise

lighting impacts during the operational phase of the development will be confirmed through the OEMP.

Design

The major design elements for the development include a series of large volume buildings that can be fitted out for a range of manufacturing and administrative purposes. The design of the buildings is driven by the operational requirements of the yard, including manufacturing, defence security, the support functions required to support workers, and other critical supporting infrastructure design requirements. The design is informed by the learnings taken from functioning shipyards across the world to make it as efficient and effective as possible in meeting submarine construction objectives.

The detail of the materials and finishes for the development as the design is still progressing through detailed design. However, it is anticipated to be similar and complementary to the existing ONS. As illustrated in Figure 10.3, the existing ONS facility uses a similar material palette and colour scheme throughout the precinct, including pavement and landscape design.

Figure 10.3 Aerial view of the existing Osborne Naval Shipyard

10.7 Assessment of Effects

10.7.1 Construction

Landscape effects

Construction activities would involve the temporary mobilisation of plant and workers across the development site to construct the development. The landscape character sensitivity of the Lefevre Peninsula, in particular the development site and surrounding area, is not considered to be particularly sensitive given the vacant land parcels and existing industrial landscape. As such, the development site and surrounding area is considered to be of no more than 'Local' sensitivity. The magnitude of impact during construction is considered to be no more than 'Very Low'. The significant of effects for the landscape character is therefore considered to be Negligible.

Visual effects (daytime)

Construction activities that would impact visual amenity are associated with vegetation removal, excavation and levelling works, the construction of the development's infrastructure, and the presence of plant and equipment. Overall, the construction of the development within short to long range views is considered to result in a 'Medium' magnitude of impact to receptors (i.e., surrounding residents, people travelling along the local road network and people using public reserve and conservation areas, and Port River.) However, all views to the development site are considered to be of no more than 'Very Low' sensitivity. The significant of effects for the daytime visual amenity assessment is therefore considered to be Negligible.

Visual effects (night-time)

Construction activities are currently anticipated to primarily occur from 07:00 to 19:00 Monday to Saturday.

As such, there are only likely to be night-time effects during the evening or early morning during winter when construction occurs during shorter daylight hours. This may result in lighting effects during early mornings or evenings in winter, as artificial lighting will be needed to ensure safe working conditions when natural light is limited. In summer months it is unlikely there will be any appreciable night-time impact, and in the worst-case (i.e. mid to late June) the impacts are only likely to be appreciable for a maximum of 1 to 3 hours per day. Furthermore, the development is located in an area that is strongly influenced by surrounding existing lighting, much of which is permanent, and in a region where the appreciation of the night sky is limited.

Considering the modest, location specific and time-limited nature of lighting potentially associated with the construction phase, the magnitude of the impact is generally considered to be 'Very Low'. All views to the development site are considered to be of no more than 'Very Low' sensitivity. The significant of effects for the nighttime visual amenity assessment is therefore considered to be Negligible.

10.7.2 Operation

Landscape effects

As an industrial zone under the Planning and Design Code, the development site itself is representative of that zoning and is not considered to have any important characteristics such as rarity, tranquillity, scenic amenity or specific contribution to sense of place.

The landscape character sensitivity of the development site and surrounding area is not considered to be particular sensitive. As such, the development site and surrounding area for the most-part, given the surrounding land uses, is considered to be of no more than of 'Local' sensitivity. The magnitude of impact during operation is considered to be 'Very Low'. The significant of effects for the landscape character assessment is therefore considered to be Negligible.

Visual effects (daytime)

Some degree of visual impact is anticipated in a development of this scale and in an area set aside for industrial development. As a shipbuilding precinct, the design and scale of the infrastructure is driven by functional requirements that optimise operations and minimise maintenance requirements once the SCY is operational.

The development will include buildings of a significant scale as occurs today within the existing ONS (Figure 10.4). The view of the largest building in the existing ONS from the nearest residences is shown in the image below.

Just like today at the existing ONS, the development site is anticipated to be visible locally at ground level from the closest residential dwellings (North Haven), the Port River, Mutton Cove, Torrens Island and St Kilda.

Figure 10.4: View of the largest existing ONS building from nearest residential premises

Victoria Road (Figure 10.5) acts as a separation between the industrial aspects and the established neighbourhood of the Lefevre Peninsula. Dwellings along Victoria Road are orientated towards internal local roads with the rear of the allotment towards the development site. This orientation provides a visual separation to the industrial area and reduces some of the impacts associated with views and traffic. It is anticipated that dwellings on the internal street network south of Victoria Road which are oriented towards the development site may view additional built form, most notably from second storey viewpoints.

The local vegetation, mangroves, Barker Inlet, northern extent of Torrens Island and Port River act as a separation for residential properties in St Kilda. The ONS and development site are visible on the horizon from some properties in St Kilda and the foreshore, however the distances involved reduce their visual impact (Figure 10.6). It is anticipated that these dwellings and public spaces will be able to view the new built form, however the small scale of these buildings is important to note given the separation distances involved.

As the built form will be consistent with the existing ONS, just with an increased density and occupation, the operation of the development within short to long range views is considered to result in a 'Medium' magnitude of impact to receptors.

Given the separation between the development and surrounding residential properties/public reserves and the general arrangement of the allotments, surrounding residents and users of the public reserves are considered to be no more than 'Low' sensitivity.

People travelling along the local road network, including drivers and passengers, typically experience environments only briefly while in motion. Their focus is often on the road and safety rather than surrounding scenery, reducing the impact of visual changes. The constantly changing nature of views from vehicles—due to speed, traffic conditions, and landscape variability—means that any visual amenity is often perceived as fleeting, lessening its significance, as such these users are considered to be of 'Very Low' sensitivity.

Many river users, such as boaters or anglers, often have brief interactions with the environment, which minimises the impact of visual changes. Their primary concern is usually the activity they're engaged in, such as fishing or sailing, rather than the specifically observing the surrounding scenery. Views can change rapidly due to movement, limiting the time spent observing any particular visual feature. Frequent river users may become desensitised to visual changes, as they are accustomed to the landscape and its variations. The emphasis on safety and navigation often outweighs concerns about visual aesthetics. As such, Port River users are considered 'Low' sensitivity receptors.

Limitations to the existing land based public road access to Mutton Cove is anticipated once operation of the development commences. As such, visual receptors are likely to be limited and effects to users not considered further. There is potential that Mutton Cove could receive water-based visitors via the Port River. Should this be the case, it is anticipated that these visitors would limit their ingress into Mutton Cove to the shoreline of the Port River and levee/mudflat areas to avoid adversely impacting the Reserve. As such, vegetation within Mutton Cove would help screen the development and depending on the location of the visitor within Mutton Cove, the Reserve itself would provide separation between the development and visitors. In addition, the primary concern of these visitors would likely be the activity of observing the scenery of Mutton Cove and looking for wildlife. As such, the development would form part of the backdrop to these activities, with limited time spent observing any particular visual feature of the development, with the emphasis on the immediate scenery of Mutton Cove and wildlife. As such, visitors to Mutton Cove users are considered 'Low' sensitivity receptors.

Figure 10.5: View of the development site from the nearest dwellings looking across Victoria Road

Figure 10.6: View of the development site and nearby ONS, Viterra grain silos and port infrastructure from St Kilda.

Table 10.8 provides the assessment of daytime visual effects for the development.

Table 10.8: Assessment of effects summary

Receptor	Visual sensitivity	Magnitude of change	Effect
Surrounding residents - Lefevre Peninsula, St Kilda and Port Adelaide	Low	Medium	Minor Adverse
People travelling along the local road network	Very Low	Medium	Negligible
People using public reserve and Port River	Low	Medium	Minor Adverse
People visiting Mutton Cove	Low	Medium	Minor Adverse

Visual effects (nighttime)

The development is located in an area that is currently influenced by existing lighting, much of which is permanent, and in a region where the appreciation of the night sky is limited.

With the implementation of a sensitive lighting scheme during the operational phase, the magnitude of the impact is generally considered to be 'Very Low'. The sensitivity of receptors, as listed in Table 10.8, to nighttime visual impacts are considered to be 'Very Low'. The significant of effects for nighttime visual effects is therefore considered to be Negligible.

10.8 Additional Mitigation Measures and Residual Effect

10.8.1 Additional Mitigation Measures

Landscaping

It is anticipated the final design of the development will include some areas of landscaping. This landscaping, although likely to be limited due to site operations and security considerations, would provide both screening to the development, helping to soften the visual impact, and create additional amenity.

However, due to the comparable elevated scale of the buildings required for the development, this landscaping is unlikely to result in any material change to the assessment of effects as presented within Section 10.7.

10.8.2 Residual Effect

The likely residual effects for construction and operational effects on receptors will remain as discussed within Section 10.8.

10.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

The infrastructure associated with the cumulative schemes is of a smaller scale to that of the development. As such, the cumulative schemes are not considered to contribute significantly to the magnitude of impact experience by receptors such that the residual effects of the development and cumulative schemes together would be greater than that of the development in isolation.

As such, the significant of effects for the cumulative landscape and visual amenity assessment is considered to remain as reported for the development in Section 10.7 for both construction and operation phases.

CHAPTER 11

Biosecurity

URPS

11. Biosecurity

Conclusion: No significant effects have been identified in relation to biosecurity for both the construction and operational phases. Biosecurity effects can be well controlled through the adoption of existing standard mitigation measures.

11.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to biosecurity.

Succession Ecology has prepared a biosecurity assessment for the construction and operational phases of the development. The Succession Ecology Biosecurity Report (the 'biosecurity report') is included as Appendix 1.5 of this EIS.

11.2 Assessment Requirements

Commission Assessment Requirements: BE1 (Detailed Requirements)

- Describe how the proposal is consistent with the South Australia's Biosecurity Policy 2020-2023 and any potential approvals, permits or licenses required prior to conducting marine work during construction and/or operation.
- Detail a monitoring program that would audit the success of biosecurity measures, identify whether objectives have been met, and describe corrective actions to be used if monitoring indicates objectives are not being met.
- Provide information on the proposed management techniques for incoming ship ballast and bilge waters.
- Describe how the introduction and spread of exotic marine organisms or notifiable pathogens (disease) will be avoided or managed.
- Outline strategies to monitor for the early detection of marine exotic organisms (including invasive marine pests) at or near the site, especially on and around marine infrastructure (e.g. wharf, jetty) and how these will be managed.
- Outline measures to ensure consistency with the Australian Ballast Water Management Requirements (and national biofouling management guidelines).
- Outline strategies to monitor and prevent the introduction and spread of vermin and other nuisance species that can be attracted to port facilities, and measures to manage and monitor such species, including the need to restrict the spread of Pacific Oyster Mortality Syndrome (POMS) from the Port River to other areas of state waters / aquaculture areas.
- Outline strategies to monitor, control and manage biofouling of wetted surfaces.

11.3 Guiding legislation and policy

The key legislation and policies that guide biosecurity management in South Australia are summarised in the following Table 11.1

Table 11.1: Summary of Key Legislation and Policies

Legislation	Related Policies / Description
Environmental Protection Act 1993	Environment Protection Agency's (EPA) Code of Practice for vessel and facility management (marine and inland waters) EPA 2019)
	Environment Protection (Water Quality) Policy 2015
	Dredge Guideline (EPA 2020)
Biosecurity Act 2015 (Cwlth)	SA Biosecurity Policy 2020-2023
	National biofouling management guidelines for marinas, slipways, boat maintenance and recreational boating facilities (Australian Government 2021).
	Australian Ballast Water Management Requirements (Department of Agriculture, Water and the Environment 2020) – however, it is noted that Government and defence Vessels are Exempt from Ballast Water Management Plan and Certificate Requirements and the Department of Agriculture, Fisheries and Forestry does not regulate ballast water management for military vessels.
Fisheries Management Act 2007 and *Fisheries Management (General) Regulations 2017*	Permit from Primary Industries and Regions South Australia (PIRSA) under the Act for removal of certain noxious species
Landscape Act South Australia 2019	Related to management of declared animals and plants
Livestock Act 1997	Regulates matters relating to livestock, including fish farms, including controls relating to native or feral animals that carry disease or contamination that may affect livestock.

11.4 Scope, Study Area and Assessment Method

11.4.1 Scope

An assessment of potential effects as a result marine and terrestrial exotic organisms and pathogens and how they may be spread through ballast water (water used to balance the weight of a vessel), bilge water (water that accumulates incidentally in a vessel), biofouling (microorganisms, algae, plants and animals growing on submerged surfaces), dredging, land clearance and other site activities during the construction and operational phase of the development has been scoped into this chapter. Impacts on existing sensitive ecological receptors have been assessed.

The assessment has been informed by the Biosecurity Report, included as Appendix 1.5. The report includes a desktop assessment including database searches, field surveys, and a literature review of existing reports relating to the development.

The assessment within this chapter follows the EIA methodology outlined in Chapter 6 – Impact Assessment Methodology.

11.4.2 Study Area

The study area for both the construction and operational assessment is the extent of the development site and immediate fringe areas.

Assumptions and Limitations (i.e. Uncertainties)

The Biosecurity Report, included as Appendix 1.5, was based on preliminary information about the development. The report was based on all information available at time of preparation.

Details relevant to biosecurity such as the frequency and type of use of the wharf by marine vessels are not yet confirmed.

11.5 Baseline Conditions and Sensitive Receptors

11.5.1 Baseline Conditions

Land-based area

Much of the land-based portion of the development site is dominated by industrial land uses, with limited vegetation throughout. Much of the development site is degraded and contains Declared Plants listed under the *Landscape South Australia Act 2019*. Declared Plants pose a significant threat to primary industries, natural environments, and public safety. A total of 11 species of Declared Plants were identified across the development site. Of these, three are also listed as Weeds of National Significance. Weeds of National Significance are plants that have been identified as national threats due to their invasiveness, economic and environmental impacts.

Six Declared Animals listed under the *Landscape South Australia Act 2019* were identified on the development site during the terrestrial field surveys. This included fox, rabbit, starling, house sparrow, common blackbird and feral pigeon. A desktop search identified an additional seven terrestrial pest fauna species within a 5 km buffer of the development site which may use the development site, of which four are Declared Animals. Although they were not identified in the desktop search or observed during field surveys, a further three pest animals were considered likely to use the development site.

Marine-based area

A desktop search identified a total of 72 introduced species within a 5 km buffer of the development site. Of these, a total of 20 species were recorded within the marine- based portion of the development site, with nine of those listed under the *Fisheries Management Act 2007* (FM Act), as a PIRSA concern, or on the Australian Government National Priority List. These species are listed due to their risk to biosecurity, their ability to compete with native species, and their potential for rapid colonization and spread.

POMS is a disease that affects Pacific Oysters (*Magallana gigas*) and is caused by a virus called OsHV-1 microvariant. POMS causes rapid death and high mortality rates in farmed Pacific Oysters. Feral oyster populations in the Port River are a risk to commercial oyster growing farms. The nearest commercial growing areas is at Port Vincent, approximately 60 km west from the development site. PIRSA states that Pacific Oysters and the virus are now endemic in the Port River. Eradication of feral Pacific Oysters and the virus is considered unachievable in the Port River and estuary, however spread outside of the Port River should be restricted.

11.5.2 Sensitive Receptors

Sensitive receptors for biosecurity include:

- The terrestrial environment, including the land-based portion of the development site and immediate surrounding land.
- The marine environment, including the Port River and the native flora and fauna and fisheries that live in or are supported by this area.

11.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanisms for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

11.6.1 Embedded mitigation measures

Construction

A Biosecurity Management Plan (BMP) will be developed and form part of the CEMP for the development. The BMP will outline specific strategies and procedures for managing and mitigating biosecurity risks throughout the construction phase, ensuring that existing terrestrial and marine biosecurity industry practices are followed.

Site soils and material sourced for fill would be managed in accordance with a Materials Management Plan, part of the CEMP, which will be consistent with industry-standard best practices. These plans will ensure that the necessary management measures for weeds, including Declared Plants, is implemented.

A Dredge Management Plan (DMP) will be prepared to manage and minimise dredging impacts. This plan will include consideration of biosecurity.

The development of the CEMP will be a condition on the development approval and further consultation on the detailed management plan will be undertaken prior to construction commencing.

Operation

A BMP will be developed and incorporated into the OEMP for the development. As with the construction phase, the BMP will outline specific strategies and procedures for managing and mitigating biosecurity impacts throughout the operational phase, ensuring that best practices are followed.

The management of weeds will be included as part of the ongoing operational maintenance activities for the development, similar to the practices already in place at the existing ONS.

11.6.2 Other Approvals/Licensing

All relevant permits and licenses related to biosecurity will be obtained. This includes relevant permits under the FM Act to appropriately manage marine pest species.

11.7 Assessment of Effects

11.7.1 Construction

Terrestrial Environment

Much of the land-based portion of the development site is degraded, in part by the incursion of weeds including Declared Plants. The development presents a long-term positive impact to eradicate all Declared Plants and other weeds at the development site during the construction phase.

There is also the potential for the development to make a long-term positive effect on terrestrial pest fauna distribution, by removing the extent of desirable areas for pest species through clearance, increased human activity, and increased artificial light.

The development could have a potential short-term adverse impact with the introduction, spread or support of pest plants and animals within the development site or surrounding areas. However, this will be managed through a series of standard procedures captured in a BMP as part of the CEMP.

The sensitivity of the terrestrial environment is considered 'Very Low' given its existing level of disturbance.

The removal of Declared Plants and other weeds and the control or removal of terrestrial pest fauna is considered to result in a beneficial 'Low' magnitude of impact during the construction phase. Given the standard management measures to be put in place to minimise the introduction, spread or support of biosecurity risks to the development site, the magnitude of impact is considered to be 'Very Low' during the construction phase.

The assessment of effects is provided within Table 11.2, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 11.2: Construction Assessment Effects for the Terrestrial Environment

Impact factor	Construction activities (terrestrial)
Potential Impact pathway	Positive reduction or whole scale removal of terrestrial pest plants from the development site: vegetation clearance and ongoing weed management. Positive reduction of terrestrial pest animals: control program, vegetation clearance, increased human activity, and increased artificial light. Potential for pest species to be spread, introduced or supported: through waste bins providing food, stockpiles or other materials providing shelter, or soils or other materials brought onto the site containing new weed species.
Impact Type	Direct
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare and implement a BMP
Magnitude of Impact	Reduction/removal of terrestrial pest plants and animals – Low to High Spread, introduced or supported of terrestrial pest plants and animals – Very Low
Significance of Effect	Reduction/removal of terrestrial pest plants and animals – Long-term, Beneficial, Negligible to Minor Effect Spread, introduced or supported of terrestrial pest plants and animals - Short-term, Negligible Effect

Marine Environment

The Port River is a historically disturbed environment and currently contains a number of introduced flora and fauna species, including species listed under the Fisheries Management Act, of PIRSA concern, or on the Australian Government National Priority List.

Eradication of many of the existing species in the Port River is not considered possible as part of development. However, it is important to prevent their spread and avoid introducing new invasive species.

The sensitivity of the marine environment (i.e. the coastal and marine interface within Area 3) is considered 'Low' given the Port River is a historically disturbed environment.

Given the standard management measures to be put in place to minimise biosecurity risk, magnitude of impact is 'Very Low' during the construction phase.

The assessment of effects is provided within Table 11.3, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 11.3: Construction Assessment Effects for the Marine Environment

Impact factor	Construction activities (marine)
Potential Impact pathway	Potential spread and introduction of invasive species via: • Dredging at the edge of the Port River. • Biofouling associated with coastal infrastructure along the edge of the Port River. • Ballast water, bilge water and biofouling associated with vessels.
Impact Type	Direct
Sensitive Receptors	Low
Embedded Mitigation	Prepare and implement a BMP, which includes requirements for operators of marine vessels and equipment used in the construction phase to provide evidence of compliance against the Biosecurity Act and Australian Ballast Water Management Requirements (i.e. Ballast Water Management Plan and Certificate Requirements).
Magnitude of Impact	Low
Significance of Effect	Potential spread and introduction of invasive species - Short-term, Negligible Effect.

11.7.2 Operation

Terrestrial Environment

During the operational phase, the development site will be covered in hardstand (sealed surfaces) and buildings associated with the development, with limited areas of landscaping. Much of the formalised landscaping and green areas within the development site will form part of the surface water drainage system. With the eradication of the Declared Plants and other weeds at the development site during the construction phase, the establishment of hardstand areas and on-going weed management during the operational phase will ensure that Declared Plants and other weeds remain absence from the development site. Areas surrounding the development site will also benefit, as the removal and management of Declared Plants and other weeds will help reduce their spread and proliferation within the surrounding areas.

This will be managed through a series of standard procedures captured in a BMP as part of the OEMP.

There is also the potential for the proposal to make a positive effect on terrestrial pest fauna distribution, by reducing the extent of desirable areas for pest species through building design, increased human activity, and increased artificial light.

The sensitivity of the terrestrial environment during operation is considered 'Very Low' given that the majority of the development site will be covered in hardstand and buildings which provide limited opportunity for Declared Plants, other weeds and pest species to establish and flourish.

With the standard management measures to be put in place to minimise biosecurity risk, magnitude of impact is considered to be 'Very Low' during the operation phase.

The assessment of effects is provided within Table 11.4, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 11.4: Operation Assessment Effects for the Terrestrial Environment

Impact factor	Operational activities (terrestrial)
Potential Impact pathway	Positive reduction of terrestrial pest plants: vegetation clearance and ongoing weed management. Positive reduction of terrestrial pest animals: vegetation clearance, increased human activity, and increased artificial light.
Impact Type	Direct
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare and implement a BMP
Magnitude of Impact	Very Low
Significance of Effect	Reduction/removal of terrestrial pest plants and animals – Long-term, Beneficial, Negligible Effect.

Marine Environment

During the operational phase, the eradication of the existing pest species in the Port River is not considered possible as part of the development. However, it is important to prevent their spread and avoid introducing new invasive species.

Marine biosecurity is regulated through state, national and international legislation, agreements and standards. It is managed through a set of standard measures which are applied to all biosecurity related matters, regardless of the development and the outputs of that development proposed.

The purpose of the development is to construct a fleet of submarines for the Royal Australian Navy. It is considered extremely unlikely that the construction of the submarines would result in any increased risk of spreading or introducing new marine invasive species to the Port River or South Australian, given the submarines will be constructed in South Australian and launched directly into the Port River.

Whilst it is anticipated that some ships will be used to transport goods and materials for the development, ANI nor the shipbuilder will not be the owner or operator of the ships, nor have the primary function of being a receiving port at the development site. The obligations on operators of ships to address these issues under the Biosecurity Act and Australian Ballast Water Management Requirements (i.e. Ballast Water Management Plan and Certificate Requirements) therefore are not specifically the responsibility of the development or the operator of the development.

The sensitivity of the marine environment is considered 'Low' given the Port River is a highly disturbed environment. Given the industry standard management measures to be put in place to minimise biosecurity risk, and the fact that the development is for the construction submarines, the magnitude of impact is considered to be 'Very Low' during the operation phase.

The assessment of effects is provided within Table 11.5, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 11.5: Operational Assessment Effects for the Marine Environment

Impact factor	Operational activities (marine)
Potential Impact pathway	Potential spread and introduction of invasive species via: • Management of biofouling associated with vessels used during operation. • Management of ballast water, bilge water and biofouling associated with vessels.
Impact Type	Direct
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare and implement a BMP, which includes requirements for operators of marine vessels and equipment used in the operational phase to provide evidence of compliance against the Biosecurity Act and Australian Ballast Water Management Requirements (i.e. Ballast Water Management Plan and Certificate Requirements).
Magnitude of Impact	Very Low
Significance of Effect	Potential spread and introduction of invasive species - Short-term, Negligible Effect.

11.8 Additional Mitigation Measures and Residual Effect

11.8.1 Construction

No additional mitigation or monitoring measures are required beyond those outlined above in Section 11.6. The likely residual effects during construction for the reduction/removal of terrestrial pest plants and animals will remain Long-term, Beneficial and Negligible to Minor Effect.

The likely residual effects during construction for the spread, introduction or support of terrestrial and marine invasive species will remain Short-term and Negligible Effect.

11.8.2 Operation

No additional mitigation or monitoring measures are required beyond those outlined above in Section 11.6. The likely residual effects during operational for the reduction/removal of terrestrial pest plants and animals will remain Long-term, Beneficial and Negligible Effect. The likely residual effects during operation for the spread, introduction or support of marine invasive species will remain Short-term and Negligible Effect.

11.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6-Imapct Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

Determination of consent for each cumulative development will have been made in accordance with national, state and local planning policy and guidance, within which biosecurity would be a material consideration and would have included the provision of appropriate mitigation measures.

Therefore, it is considered that cumulative effects will be no greater than those caused by the development in isolation for both the construction and operational phases.

CHAPTER 12

Marine Flora and Fauna

URPS

12. Marine Flora and Fauna

Conclusion: No significant effects have been identified in relation to marine flora and fauna. Potential impacts can be well controlled through the adoption of standard construction and operation mitigation measures.

12.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to marine flora and fauna.

Succession Ecology has prepared a marine flora and fauna assessment for the construction and operational phases of the development. The Terrestrial and Marine Flora and Fauna Ecological Report (the 'ecological report') is included as Appendix 1.6 of this EIS.

12.2 Assessment Requirements

Commission Assessment Requirements: BE2 (Detailed Requirements)

- Describe the nature and extent of the impacts likely to affect listed threatened native marine fauna species and populations during both construction and operation. Describe the ability of communities and individual species to recover, especially threatened or significant species (including those listed under the *National Parks and Wildlife Act 1972*). Detail any residual impacts that cannot be avoided and propose measures to offset the residual loss.
- Assess the potential impacts of the proposed project's activities on the Port River and Adelaide Dolphin Sanctuary more specifically. Model the spread and assess the impacts of any sediment plume to be created by dredging, construction or excavations.
- Assess the potential loss of habitat or diversity that could result from the activity and assess any potential impacts on commercial or recreational fisheries, including impacts that could arise from the loss of nursery habitat (e.g. seagrass beds, reefs, or mangroves) of target species (such as prawns and fish). Assess the potential short-term or long-term impacts of noise on marine fauna, particularly cetaceans.
- Detail the potential impact, including cumulative impacts, (such as any likely increase in vessel numbers, or habitat fragmentation and loss) on marine fauna, including the Port Adelaide bottlenose dolphins (Indo-Pacific bottlenose dolphins) both during construction and operation, including ecologically and economically important species (e.g. fisheries)
- The assessment will also need to take into consideration the outputs of any underwater noise assessment, physical coastal and marine assessment, biosecurity assessment for potential impacts and incorporation of suitable mitigation measures in line with those and other relevant assessments for the development.
- Prepare advice, prepared by a suitably qualified coast and marine expert, which details the existing environment, identifies any coastal hazards (e.g. erosion, sea level rise etc)) and significant coastal or marine features or habitats. The report should also assess the impacts of the proposed operations and documents the environmental protection controls and measures to be implemented and monitored. The report should address impacts on marine organisms from development activities (including noise, vibration, and water quality).

12.3 Guiding Legislation and Policy

The key legislation and policies that guide marine flora and fauna assessment and protection in South Australia are summarised in the following Table 12.1.

Table 12.1: Summary of Legislation and Policy

Name	Description
Environment Protection and Biodiversity Conservation Act 1999	Provides a framework for the protection and management of nationally threatened flora, fauna and ecological communities. Any action that significantly impacts these will require a referral under the EPBC Act.
National Parks and Wildlife Act 1972	Provides for the establishment and management of reserves for public benefit and enjoyment, and for the conservation of wildlife in a natural environment. *National Parks and Wildlife (Protected Animals— Marine Mammals) Regulations 2010* outlines the rules for interacting with marine mammals in the wild, including that of vessels, aircraft, people, and commercial activities.
Landscape South Australia Act 2019 and Landscape South Australia Regulations 2020	Establishes responsibility for land holders to manage Declared pest plants and animals.
Native Vegetation Act 1991	Provides protection for native vegetation in South Australia and sets out a process for applying to clear vegetation.
Adelaide Dolphin Sanctuary Act 2005 (ADS Act) and ADS Draft Management Plan 2024	Establishes a sanctuary to protect the dolphin population of the Port River estuary and Barker Inlet and its natural habitat; and to provide for the protection and enhancement of the Port River estuary and Barker Inlet.
Fisheries Management Act 2007 and Fisheries Management (Aquatic Reserves) Regulations 2016	This Act provides for the conservation and management of the aquatic resource es of SA, the management of fisheries and aquatic reserves, the regulation of fishing and the processing of aquatic resources, the protection of aquatic habitats, aquatic mammals and aquatic resources and the control of exotic aquatic organisms and disease in aquatic resources; and for other purposes.

12.4 Scope, Study Area and Assessment Method

12.4.1 Scope

An assessment of potential effects on marine protected areas, native and/or listed marine threatened flora, fauna and ecological communities, and fisheries during the construction and operation of the development has been scoped into this chapter.

The assessment considers impacts including noise and vibration, removal of habitat, air quality, increased human activity, light pollution, diminished water quality, increased stormwater run-off, increased pollutant concentration, and disturbance of contaminated sediments.

The ecological report, Appendix 1.6, has been used to inform the assessment of the development on marine protected areas, flora and fauna within this chapter. The ecological report included field surveys, a desktop assessment including database searches, and a literature review of existing reports relating to the development.

The assessment within this chapter follows the EIA methodology outlined in Chapter 6 – Impact Assessment Methodology.

Scoped Out

The following assessments have been scoped out of further consideration within this chapter:

Terrestrial Flora and Fauna

Terrestrial flora and fauna (including birds) and open space have been considered within Chapter 13 - Terrestrial Flora and Fauna. Only marine areas, flora and fauna are assessed in this chapter.

Operational Dredging Activities

As outlined within Chapter 1 - Introduction and Need for the Development, operational dredging activities for the Project, including any maintenance dredging for the coastal infrastructure, are excluded from assessment within this EIS. As such, all potential effects on the marine environment from operational dredging activities have not been considered at this time.

Non-Listed Species (Besides Fisheries)

Non-listed flora and fauna species and communities, beside fisheries, have been excluded from the assessment on the basis that populations are of limited ecological importance due to their size, composition or lack of threat / rarity. The loss or impact to these flora and fauna species and communities would have no discernible impact on the overall range and conservation status at any formal administrative scale in the long-term. As such, the development is considered to result in Negligible Effects and not considered further.

Protected Areas

The following protected areas, while identified in the ecological reports, Appendix 1.6, have been excluded from the assessment within this chapter due to geographic separation.

- Bird Island and mudflats (located over 1.5kms north-west of the development site..
- Adelaide International Bird Sanctuary National Park – Winaityinaityi Pangkara (located over 1.5km from the eastern border of the development site).
- Port Gawler & Buckland Park Lake (located over 1km north of the development site).

- Barker Inlet – St Kilda Aquatic Reserve (located over 500m east of the development site).
- Barker Inlet Chapman Creek Aquatic Reserve (located over 1.5kms north of the development site).

No construction impact pathways (noise, light, dust etc.) are likely potential to affect these protected areas at distance. These protected areas are only potentially hydrologically connected to the development site via the Port River/St Vincent Gulf. Given the integrated design criteria needed for the development in its location, potential pollution incidents from the development site would be temporary, short term and significantly diluted and undetectable in the event the source pathway reaches the protected areas. The potential construction effect on the Port River and St Vincent Gulf has therefore been assessed as negligible in Chapter 21 - Surface water and groundwater, and therefore negligible impacts to these protected areas would occur. During operations, site maintenance and management operations will comprise basic maintenance and, if needed, periodic replacement of site infrastructure, and vegetation and habitat management. There are no operational impact pathways (noise, water quality, air quality, light) which could significantly affect these protected areas at distance.

Biosecurity

Marine and terrestrial biosecurity risks have been considered within Chapter 11 – Biosecurity. Only marine protected areas, flora and fauna are assessed in this chapter.

12.4.2 Study Area

The study area for assessment is the extent of the development site and immediate locality (up to 500m from the development site boundary). However, a wider area was considered to assist in determining what marine flora, fauna and ecological communities may use the development site. This included database searches of threatened flora, fauna and ecological communities within 10km of the development site.

Assumptions and Limitations (i.e. Uncertainties)

The ecological report, Appendix 1.6, and this assessment have not included a self-assessment under the EPBC Act given the parallel Strategic Assessment being undertaken for the Project to consider these matters. However, EPBC Act protected species were included as part of these assessments.

The ecological report has been based on all information about the development available at the time of preparation.

12.5 Baseline Conditions and Sensitive Receptors

12.5.1 Baseline Conditions

Approximately 12 hectares of the Port River is included within the marine-based portion of the development site within Area 3. However, the area that will be affected by the development (i.e., where construction activities will occur) will be considerably less.

Port River

- Despite being a highly modified waterway with frequent dredging, active port and industrial activities and historically poor water quality, the Port River provides important habitat for a

resident group of Indo-Pacific bottlenose dolphins (protected as a cetacean under the EPBC Act) and other native marine flora and fauna.

Protected areas (Figure 12.1)

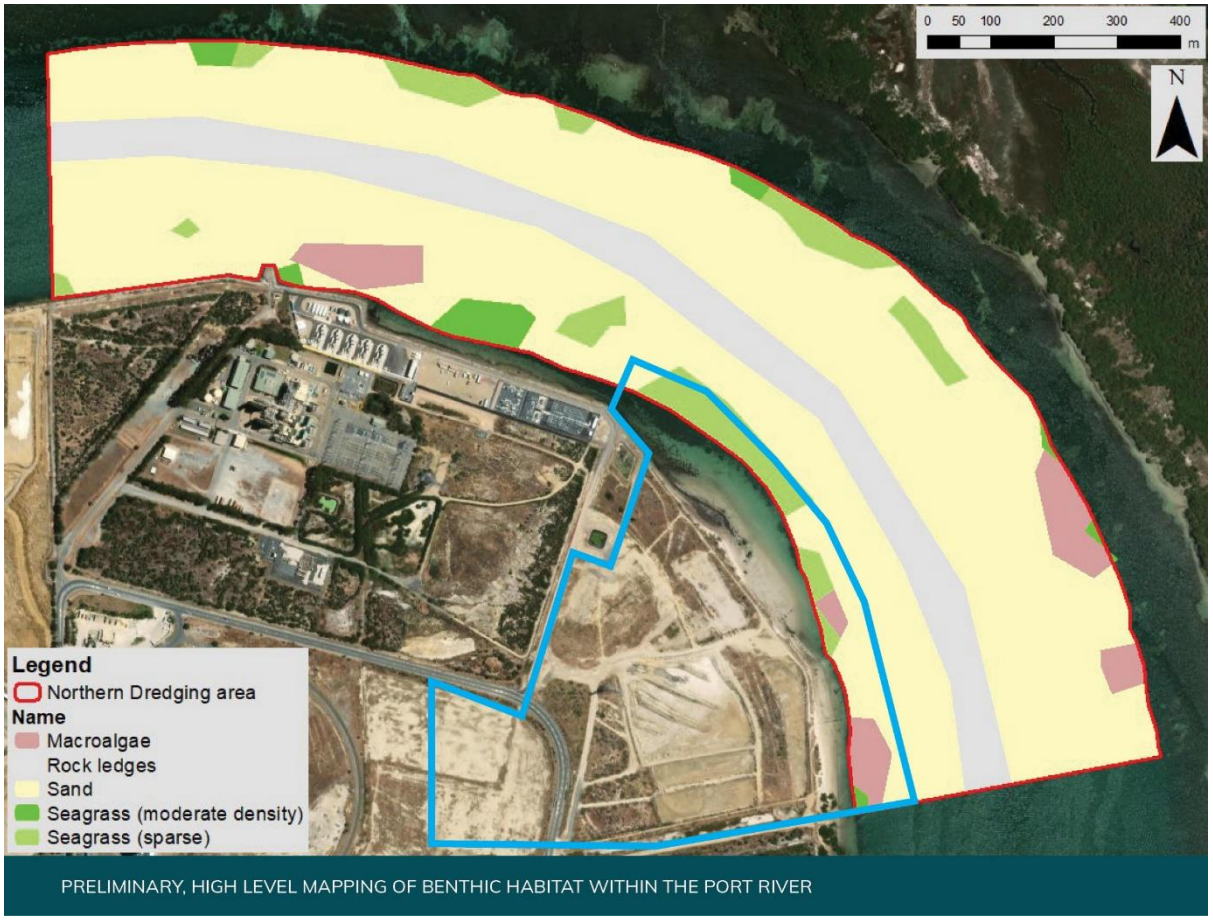
- Approximately 12 hectares of the Port River is included within the marine-based portion of the development site within Area 3. This area of the Port River falls within the ADS protected under the ADS Act. The ADS is home to about 30 resident Indo-Pacific bottlenose dolphins, with hundreds more visiting the area.
- The Barker Inlet and St Kilda Wetland is a Wetland of National Importance that extends through the southern extent of the Port River, Mutton Cove, Torrens Island, Barker Inlet and the eastern leg of Adelaide International Bird Sanctuary.
- Torrens Island Conservation Park is located across the Port River from the development site.
- Mutton Cove is Crown managed land and under the care and control of Department for Environment and Water (DEW). It is included in the ADS.

Native marine vegetation

- The riverbed of the Port River mostly comprises sand, with patches of sparse to moderate density seagrass, microalgae and rock ledges in the dredged shipping channel, as shown in Figure 12.2.
- Intertidal sandy habitat fringes the Port River along the edge of Area 3 of the development site.
- Mangroves and samphire are present outside of the development site such as in Mutton Cove and Torrens Island Conservation Park, including Subtropical and Temperate Coastal Saltmarsh Threatened Ecological Community protected under the EPBC Act.

Figure 12.1 – Location of Protected Areas and Open Spaces

Figure 12.2: Preliminary, high level mapping of benthic habitat within the Port River (approximate position of development site boundary shown in blue)



Listed marine fauna

- A total of 10 threatened or protected marine fauna species under the EPBC Act and/or NPW Act were identified as possible, likely or certain to be impacted by the development. These are identified in the Table 12.2 below.

Table 12.2: Threatened or protected marine fauna species under the EPBC Act and/or NPW Act identified as possible, likely or certain to be impacted by the development

Name	EPBC listing	NPW Listing	Likelihood of occurrence	Likelihood of impact	Likelihood of significant impact
Pinnipeds					
Neophoca cinerea (Australian Sea Lion)	Endangered	Vulnerable	Likely	Possible	Unlikely
Arctocephalus forsteri (Long-nosed Fur Seal)	Listed marine	Not listed	Likely	Possible	Unlikely
Cetaceans					
Delphinus delphis (Short-beaked Common Dolphin)	Listed cetacean	Not listed	Likely	Possible	Unlikely
Tursiops aduncus (Indo-Pacific Bottlenose Dolphin)	Listed cetacean	Not listed	Certain	Certain	Unlikely
Tursiops truncatus (Common Bottle-nose Dolphin)	Listed cetacean	Not listed	Likely	Possible	Unlikely
Fish					
Hippocampus breviceps (Short-head Seahorse)	Listed marine	Not listed	Likely	Likely	Unlikely
Kaupus costatus (Deep-bodied Pipefish)	Listed marine	Not listed	Certain	Certain	Unlikely
Phycodurus eques (Leafy Seadragon)	Listed marine	Not listed	Possible	Possible	Unlikely

Name	EPBC listing	NPW Listing	Likelihood of occurrence	Likelihood of impact	Likelihood of significant impact
Pugnaso curtirostris (Pug-nosed Pipefish)	Listed marine	Not listed	Likely	Likely	Unlikely
Stigmatopora nigra (Wide-bodied Pipefish)	Listed marine	Not listed	Likely	Likely	Unlikely

- *Tursiops aduncus (*Indo-Pacific Bottlenose Dolphin) and *Kaupus costatus* (Deep-bodied Pipefish) were considered the only protected marine fauna species certain to occur and be impacted by the development. Potential impacts to these species were considered unlikely to be significant, less so with the adoption and implementation of a range of mitigation measures primarily during construction.

Commercial and recreational fisheries

- There are no commercial fisheries within the development site. However, there are three main commercial fisheries in Upper Gulf St Vincent. The Port River and Barker Inlet provide recreational fishing opportunities.

12.5.2 Sensitive Receptors

Sensitive marine receptors that are considered potentially impacted by the development include:

- Native marine vegetation - seagrasses.
- Listed marine fauna - Australian Sea Lion; Long-nosed Fur Seal; Indo-Pacific Bottlenose Dolphin; Short-beaked Common Dolphin; Common Bottle-nose Dolphin; Short-head Seahorse; Deep-bodied Pipefish; Leafy Seadragon; Pug-nosed Pipefish; and Wide-bodied Pipefish.
- Protected areas including the ADS, Torrens Island Conservation Park, Mutton Cove (part of the ADS) and Barker Inlet and St Kilda Wetland (part of the ADS and Torrens Island Conservation Park.
- Commercial and recreational fisheries.

12.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanism for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

12.6.1 Embedded mitigation measures

Construction

A Marine and Coastal Environmental Management Plan (MCEMP) (or equivalent) will be developed and incorporated into the CEMP. The MCEMP will outline specific strategies and procedures for managing and mitigating potential impacts to marine flora and fauna throughout the construction phase, ensuring that best practices are followed.

The CEMP will also include:

- A Construction Stormwater Management Plan (SMP) to manage discharge of stormwater and construction wastewater and minimise any potential for impact to the into adjacent protected ADS.
- A Biosecurity Management Plan (BMP) covering management of invasive or harmful marine flora and fauna.
- A Dredge Management Plan (DMP) covering mitigation and management of potential dredging impacts to the marine environment, flora and fauna.
- Measures to manage lighting, and all temporary external lighting will be designed to minimise the risk of light spill outside the area it is desired to illuminate; and particular care will be taken to minimise light spill surrounding habitat.

Operation

A MCEMP will be developed and incorporated into the OEMP for the development. The MCEMP will outline specific strategies and procedures for managing and mitigating potential impacts to marine flora and fauna throughout the operational phase, ensuring required practices are followed. The OEMP will also include a BMP covering management of invasive or harmful marine flora and fauna.

Surface water drainage during operation will be provided during detailed design of the development to assist in managing surface runoff from the land. A Stormwater Management Plan (SMP) will be prepared during detailed design that takes into account climate change and will ensure that peak rates of surface runoff from the development are controlled, that infiltration of runoff is encouraged (where possible and practical) and that any potential pollution from the development are appropriately managed through the use of settlement basins, filtration areas, oil interceptors and / or silt traps etc. The measures identified in the SMP will follow current industry standard guidance and practice and will restrict flows to pre-development discharge rates whilst providing sufficient water quality mitigation.

12.6.2 Other Approvals/Licensing

A Strategic Assessment process is being undertaken in accordance with provisions of the EPBC Act for Matters of National Environmental Significance (MNES). Approval under the EPBC Act will be required before works can commence.

A Native Vegetation Clearance Data Report will be prepared by an Accredited Consultant approved by the Native Vegetation Council as per the *Native Vegetation Act 1991* for any clearance of seagrass or other native vegetation protected under the Act where the NV Act applies.

This will be undertaken once the final design of the development and the quantity of seagrass or other native vegetation impacted by the development has been confirmed.

12.7 Assessment of Effects

12.7.1 Native Marine Vegetation in Development Site

A portion of the Port River Project area was subject to a preliminary tow camera survey in August 2023 by J Diversity Pty Ltd, see Appendix 1.6. The area surveyed included the marine-based portion of the development site within Area 3 (See Figure 12.1). The survey identified a range of habitat types on the riverbed including seagrass (of sparse to moderate density), macroalgae, sand and rock ledges. However, the vast majority of the area surveyed was made up of sand, as shown within Figure 12.1, with only a couple of small areas of sparse seagrass and a very small area of moderate density seagrass being located within the marine-based portion of the development site of Area 3.

More detailed surveys will be undertaken during detailed design when further details regarding infrastructure requirements, piling and dredging is known to inform final mitigation measures and the Native Vegetation Clearance Data Report. It is anticipated that some seagrass, mapped as being sparse in density and protected under the NV Act, will require removal as a result of the development. Other seagrasses and potentially fringing mangroves within the wider Port River could potentially be indirectly impacted as a result of increased water turbidity.

Seagrass is an important vegetation type in the marine environment. They provide habitat, food and nursery grounds for a range of species, and act as substrate stabilisers. However, seagrasses in the Port River do not exist in a pristine environment. They are subject to regular dredging campaigns and stormwater loads from residential, industrial and agricultural areas which often contain pollutants and other particles that reduce water quality. There are substantial areas of higher quality, more abundant seagrasses and mangroves in the wider locality.

As a result, given the sparse extent the sensitivity of potential impact to seagrasses within the marine-based portion of the development site, as well as seagrasses and mangroves in the surrounding locality, is considered to be ‘Very Low’.

The magnitude of impact for the removal of seagrass, as a result of construction dredging and construction of coastal infrastructure, is considered to be ‘High’. The magnitude of indirect impacts on seagrasses and mangroves is considered ‘Very Low’ as these are temporary, short-term and reversible impacts.

The assessment of effects is provided within Table 12.3, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 12.3: Assessment of Effects on Native Marine Vegetation in Development Site

Impact factor	Direct removal of seagrasses
Potential Impact pathway	Construction dredging and construction of coastal infrastructure
Impact Type	Direct
Sensitive Receptors	Very Low

Impact factor	Direct removal of seagrasses
Embedded Mitigation	Prepare a DMP and CEMP
Magnitude of Impact	High
Significance of Effect	Long-term, Minor Adverse Effect
Impact factor	Other construction activities
Potential Impact pathway	Increased water turbidity as a result of dredging, increased stormwater loads, potential for spills from the development site
Impact Type	Indirect
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare a MCEMP, BMP and DMP as part of the CEMP, and implement during construction
Magnitude of Impact	Very Low
Significance of Effect	Short-term, Negligible Effects

12.7.2 Listed Marine Fauna

There are 10 threatened or protected marine fauna species under the EPBC Act and/or NPW Act identified as possible, likely or certain to be impacted by the development. These species are listed in Section 12.5 and include pinniped, cetacean and fish species.

Potential impacts to *Tursiops aduncus (*Indo-Pacific Bottlenose Dolphin) and other dolphins have been considered in Section 12.7.3 and are not considered further here.

Besides the Indo-Pacific Bottlenose Dolphin, the *Kaupus costatus* (Deep-bodied Pipefish) was considered the only other protected marine fauna species certain to occur and be impacted by the development. Four other species of fish and two species of pinniped (Australian Sea Lion and Long-nosed Fur Seal) may be impacted by the development.

These species are protected at a national level. However, besides the Australian Sea Lion which is Endangered under the EPBC Act and Vulnerable under the NPW Act, they are protected only as marine listed species as opposed to threatened species. These species have abundant habitat in the region. The habitat in the immediate proximity of the development makes up an extremely small and highly modified portion of their overall habitat. They are all highly mobile species able to swim away from disturbances to other areas.

The ecology report, Appendix 1.6, contains a high-level assessment as per the EPBC Act Significant Impact Guidelines 1.1 of the potential risk to these marine species as a result of the development. The assessment concluded that all of these species are unlikely to experience significant impact as a result of the development. As a result, despite their national protection (as marine species for all bar one endangered species), the high mobility of these species and ample availability of higher quality habitat in the locality results in the sensitivity of these receptors being considered no greater than 'Medium'.

Impacts to listed marine fauna from construction activities will be a combination of direct (habitat removal) which is permanent and irreversible and indirect effects (turbidity, sedimentation, noise, vibration, water quality etc.) which are temporary, short-term and reversible. Most impacts will be associated with construction dredging and construction of coastal infrastructure within Area 3.

Impacts from operation will be more limited, including a combination of direct (lighting) and indirect (noise, water quality etc.) from site maintenance and management operations.

All impacts to listed marine fauna will be addressed and controlled based upon a MCEMP as part of the CEMP and OEMP, as outlined within Section 12.6 above.

Given the standard mitigation measures that will be implemented and the small area of habitat to be affected, the magnitude of impact is considered to result in a 'Low' impact for construction, and 'Very Low' impact for operational activities.

The assessment of effects is provided within Table 12.4, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 12.4: Assessment of Effects on Listed Marine Fauna

Impact factor	Construction impacts
Potential Impact pathway	Construction dredging and construction of coastal infrastructure
Impact Type	Direct/Indirect
Sensitive Receptors	Medium
Embedded Mitigation	Prepare a MCEMP, BMP and DMP as part of the CEMP, and implement during construction
Magnitude of Impact	Low
Significance of Effect	Short-Term, Minor Adverse Effects
Impact factor	**Operational impacts**
Potential Impact pathway	Vessel movement, light pollution, stormwater run-off and potential spills.
Impact Type	Direct/Indirect
Sensitive Receptors	Medium
Embedded Mitigation	Prepare a MCEMP and BMP as part of the OEMP, and implement during operation
Magnitude of Impact	Very Low
Significance of Effect	Long-Term (lighting) and Short-Term (noise, water quality etc.), Negligible Effects

12.7.3 Areas

The protected areas included in the scope of this chapter are the ADS, Torrens Island Conservation Park, Barker Inlet and St Kilda Wetland and Mutton Cove.

Adelaide Dolphin Sanctuary and Dolphins

ADS

Approximately 12ha of the development site that is in the Port River is within the Adelaide Dolphin Sanctuary (ADS). As outlined above, dredging and and construction of coastal infrastructure will occur in this area for the development. The ADS is protected under the *Adelaide Dolphin Sanctuary Act 2005*. Its management is guided by the *Adelaide Dolphin Sanctuary Draft Management Plan 2024*.

The ADS protects a local population of Indo-Pacific bottlenose dolphins (*Turisops aduncus*) and their habitats within Adelaide's Port River and Barker Inlet. At present, the ADS is home to around 30 resident Indo-Pacific bottlenose dolphins with some 400 more dolphins thought to visit the area. Indo-Pacific bottlenose dolphins are protected as a migratory species under the EPBC Act. They are not listed as threatened under the Act.

The ADS is also an important nursery area for a number of fish and crustacean species and includes haul out sites (Outer Harbor breakwater rock walls) for the nationally endangered (under the EPBC Act) Australian sea lion (*Neophoca cinerea*) and the long-nosed fur seal (*Arctocephalus forsteri*). The ADS is an important part of the local character of the area. For these reasons, the sensitivity of the ADS is considered 'High'.

The impact of the development on the ADS relates to a small area required to facilitate the development, and this is located on the edge of its outermost extent. The area of the ADS impacted by the development is very small in the context of the entire area of the ADS. The ADS is approximately 11,800ha in total, with the 12ha of the development falling within the ADS representing just 0.1% of the total area of the ADS. This spatial scope results in the development having no material impact over the wider ADS and in particular the more pristine, unmodified areas. In addition, the portion of the ADS to be used by the development is already a highly modified habitat as it is currently used as South Australia's main shipping port. The Port River itself has been dredged multiple times and it is fringed by multiple shipbuilding, port and industrial land uses. It has, and is currently, exposed daily to a range of human impacts including marine traffic, noise, light spill and stormwater pollution. Due to historic and current development, stormwater and wastewater are now the primary freshwater inputs to the Port River, and water quality, although better than it has historically been, is still relatively poor as a result. As a result, the magnitude of impact of the development is considered to be 'Very Low' to the ADS.

Dolphins

Dolphins are transient and mobile creatures able to temporarily move themselves away from disturbances such as dredging, noise etc. which further minimises impacts. Modelling of underwater noise and vibration from piling, dredging and vessel movements has been undertaken, see Appendix 1.6, and is not considered likely to cause hearing impact to dolphins due to their high mobility and ability to avoid noisy areas. The habitat in the immediate proximity of the development makes up an extremely small and highly modified portion of their overall habitat. As a result, despite their national protection (as marine species), the high mobility of these species and ample availability of higher quality habitat in the locality results in the sensitivity of these receptors being considered no greater than 'Medium'.

Impacts to the local population of Indo-Pacific bottlenose dolphins (*Turisops aduncus*) and other dolphins from construction activities will be a combination of direct (habitat removal) which is permanent and irreversible and indirect effects (turbidity, sedimentation, noise, vibration, water quality etc.) which are temporary, short-term and reversible. Impacts from operation will be more limited, including a combination of direct (lighting) and indirect (noise, water quality etc.) from site maintenance and management operations.

All impacts to listed marine fauna will be addressed and controlled based upon a MFFMP as part of the CEMP and OEMP, as outlined within Section 12.6 above. Given the standard mitigation measures that will be implemented and the small area of habitat to be affected, the magnitude of impact is considered to result in a 'Low' impact for construction, and 'Very Low' impact for operational activities.

The assessment of effects is provided within Table 12.5, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 12.5: Assessment of Effects on the ADS and Dolphins

Impact factor	ADS land-take required to facilitate the development
Potential Impact pathway	Construction and operation activities
Impact Type	Direct
Sensitive Receptors	High
Embedded Mitigation	N/A
Magnitude of Impact	Very Low
Significance of Effect	Long-Term, Minor Adverse Effect
Impact factor	**Construction impacts on Dolphins**
Potential Impact pathway	Habitat removal, construction dredging and construction of coastal infrastructure
Impact Type	Direct/Indirect
Sensitive Receptors	Medium
Embedded Mitigation	Prepare a MCEMP, BMP and DMP as part of the CEMP, and implement during construction
Magnitude of Impact	Low
Significance of Effect	Long-term (habitat removal)/Short-Term (noise, water quality etc.), Minor Adverse Effects

Impact factor	ADS land-take required to facilitate the development
Impact factor	Operational impacts on Dolphins
Potential Impact pathway	Vessel movement, light pollution, stormwater run-off and potential spills.
Impact Type	Direct/Indirect
Sensitive Receptors	Medium
Embedded Mitigation	Prepare a MCEMP and BMP as part of the OEMP, and implement during operation
Magnitude of Impact	Very Low
Significance of Effect	Long-Term (lighting) and Short-Term (noise, water quality etc.), Negligible Effects

Torrens Island Conservation Park

Construction

Torrens Island Conservation Park is protected under the NPW Act. The island is located within the Adelaide Dolphin Sanctuary and therefore is also protected by the ADS Act. The park supports mangroves, samphire and coastal dunes. These provide important nursery habitat for fish species, supply shelter and nesting sites for birds including 69 bird species of conservation significance, and influence erosion and deposition of sediments along the coast[24]. The Park includes EPBC-listed Temperate and Subtropical Salt Marsh Threatened Ecological Community and habitat for the EPBC Act listed Indo-Pacific Bottlenose Dolphins and birds.

There is no public vehicle access to this Conservation Park. The public can access some parts of the Conservation Park via small watercraft. There are no jetties or mooring facilities for boats.

Adjacent to the Conservation Park are developed areas of the Torrens Island including the Quarantine Power Station, historic Torrens Island Quarantine Station, Barker Inlet Power Station, Torrens Island Power Station and Air Liquide Australia CO_2 plant. A number of these sites generate noise, light and pollution impacts. To the west, over the Port River existing industry on northern Lefevre Peninsula, including the existing ONS also contribute s in ongoing noise, light and pollution impacts.

Dredging for the development is occurring on the opposite side of the Port River to Torrens Island Conservation Park, over 450m at its nearest point.

Given the Conservation Park's protection under state legislation and the flora and fauna it supports which is protected under state and national legislation, the sensitivity of Torrens Island Conservation Park is considered 'Medium'.

[24] https://www.parks.sa.gov.au/parks/torrens-island-conservation-park

No direct construction impacts will affect Torrens Island Conservation Park as it is not within the development site.

Indirect disturbance from construction noise, light, dust deposition, air quality impacts and ground and surface water could occur.

The magnitude of impact is considered 'Very Low' for Torrens Island Conservation Park for indirect construction impacts (given this is not included in the development site or dredge footprint and is a considerable distance from construction activities) with all impacts considered to be temporary, short-term and reversible in nature.

The assessment of effects is provided within Table 12.6, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 12.6: Construction Assessment Effects for Torrens Island Conservation Park

Impact factor	Construction activities
Potential Impact pathway	Construction activities for the marine and coastal infrastructure within Area 3 (including dredging), and wider development site construction impacts from sedimentation, dust, spills, light, noise etc.
Impact Type	Indirect
Sensitive Receptors	Medium
Embedded Mitigation	Prepare a TFFMP, as part of CEMP, and DMP
Magnitude of Impact	Very Low
Significance of Effect	Short-term, Negligible Effect

Operation

The operational phase of the development poses few risks to Torrens Island Conservation Park. Site maintenance and management operations will comprise basic maintenance and, if needed, periodic replacement of specific site infrastructure components. It is not considered that there are any direct impact pathways which could affect these protected areas at distance, with only indirect impacts occurring via potential short term temporary noise, water quality, and air quality impacts.

Given the distance of the Conservation Park from the development site, the sensitivity of Torrens Island Conservation Park is considered 'Very Low'.

The magnitude of impact is considered 'Very Low' for Torrens Island Conservation Park with all impacts considered to be temporary, short-term and reversible in nature.

The assessment of effects is provided within Table 12.7, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 12.7: Operation Assessment Effects for Torrens Island Conservation Park

Impact factor	Operational activities
Potential Impact pathway	Site maintenance and management operations resulting in indirect light, noise, water quality, air quality impacts
Impact Type	Indirect
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare a TFFMP, as part of OEMP
Magnitude of Impact	Very Low
Significance of Effect	Short-term, Negligible Effect

Barker Inlet and St Kilda Wetland

Construction

Barker Inlet and St Kilda Wetland is a Wetland of National Importance. It is located within the Port River, extending through Mutton Cove and Torrens Island. The wetland is contained within the ADS and Torrens Island Conservation Park, therefore indirectly protected under the ADS Act and NPW Act in these locations. It protects a wide range of EPBC-Act listed species.

Dredging and construction activities (including piling) for the marine and coastal infrastructure within Area 3 will occur directly within the Barker Inlet and St Kilda Wetland. Dredging impacts will be managed through a DMP, whilst other construction activities will be managed via a CEMP which includes a TFFMP.

However, the area of Barker Inlet and St Kilda Wetland that intersects the development site and the area where dredging will occur for the construction of the marine and coastal infrastructure for the development is a highly modified habitat. It is exposed daily to a range of human impacts including marine traffic, noise, light spill and stormwater pollution. It has been dredged many times for the Port of Adelaide operations. In addition, the area of the Barker Inlet and St Kilda Wetland impacted by the development is very small in the context of the entire wetland area, and the development will not impact the majority of the Barker Inlet and St Kilda Wetland including the more pristine, unmodified areas. As a result, the sensitivity of area of the Barker Inlet and St Kilda Wetland impact by the development is be considered 'Very Low'.

Indirect disturbance from construction noise, light, dust deposition, air quality impacts and ground and surface water could occur.

Construction activities with the potential to impact the Barker Inlet and St Kilda Wetland entail the removal of habitats to facilitate the development (including dredging) and impacts associated with construction machinery, earthworks, piling and increased on site activity from machinery and workforce. The risk of loss or damage on habitats along with the associated risk of disturbance upon species (potentially causing displacement or reduced breeding success) and risk of mortalities could occur.

The magnitude of impact is considered 'High' for Barker Inlet and St Kilda Wetland for construction activities (given its direct disturbance from dredging and construction activities for the marine and coastal infrastructure within Area 3) with indirect impacts considered to be temporary, short-term and reversible in nature and direct impacts via dredging/installation of marine and coastal infrastructure being permanent, long-term and irreversible.

The assessment of effects is provided within Table 12.8, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 12:8: Construction Assessment Effects for Protected Areas

Impact factor	Construction activities
Potential Impact pathway	Construction activities for the marine and coastal infrastructure within Area 3 (including dredging and piling) resulting in habitat loss, and wider development site construction impacts from sedimentation, dust, spills, light, noise etc.
Impact Type	Direct / Indirect
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare a TFFMP and SMP, as part of CEMP, and DMP
Magnitude of Impact	High
Significance of Effect	Short-term (dredging)/Long-term (habitat loss), Minor Adverse Effect

Operation

The operational phase of the development poses few risks to Barker Inlet and St Kilda Wetland. Site maintenance and management operations will comprise basic maintenance and, if needed, periodic replacement of specific site infrastructure components. It is not considered that there are any direct impact pathways which could affect these protected areas at distance, with only indirect impacts occurring via potential short term temporary noise, water quality, and air quality impacts.

During operation, the Barker Inlet and St Kilda Wetland will be adjacent the development site, as with construction, it is exposed daily to a range of human impacts including marine traffic, noise, light spill and stormwater pollution. The majority of the Barker Inlet and St Kilda Wetland including the more pristine, unmodified areas would not be impacted by operational activities. As a result, the sensitivity of area of the Barker Inlet and St Kilda Wetland impact by the development is considered 'Very Low'.

The magnitude of impact is considered 'Very Low' for the Barker Inlet and St Kilda Wetland with all impacts considered to be temporary, short-term and reversible in nature.

The assessment of effects is provided within Table 12.9, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 12.9: Operation Assessment Effects for Protected Areas

Impact factor	Operational activities
Potential Impact pathway	Site maintenance and management operations resulting in indirect light, noise, water quality, air quality impacts
Impact Type	Indirect
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare a TFFMP, as part of OEMP, and ensure the required outcomes of the SMP are maintained
Magnitude of Impact	Very Low
Significance of Effect	Short-term, Negligible Effect

Mutton Cove

Mutton Cove abuts the land-based portion of the development site. The development site is situated to the north and west of Mutton Cove. Mutton Cove protects the last area of remnant vegetation on the northern Lefevre Peninsula including Beaded Glasswort and Austral Sea-blite low shrubland, Grey Samphire low shrubland and some Grey Mangrove shrubland. These make up a Subtropical and Temperate Coastal Saltmarsh Threatened Ecological Community protected under the EPBC Act. Mutton Cove provides habitat for threatened species of resident and migratory shorebirds.

The area is modified by constructed drainage lines and levee banks and has been significantly degraded since the European period. Given Mutton Cove's location adjacent to the development site and its level of human disturbance, its sensitivity has been determined to be 'Very Low'.

Construction

No direct impacts are expected to occur to Mutton Cove Conservation Reserve. Potential impacts would be indirect and reversible (i.e., temporary and short term) and likely be disturbance from noise, increased workforce presence, dust deposition, and surface water runoff.

Potential indirect impacts will be addressed and controlled through a TFFMP and SMP within a CEMP. The ecological report, Appendix 1.6, determines that development is unlikely to result in a significant impact to the availability or quality of habitat in a way that would cause threatened habitat or species to decline at Mutton Cove. The magnitude of impact on Mutton Cove is considered to result in a 'Low' from construction activities.

The assessment of effects is provided within Table 12.10, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 12:10: Construction Assessment Effects for Mutton Cove

Impact factor	Construction activities
Potential Impact pathway	Construction activities resulting in indirect light, noise, vibration, contamination, water quality, air quality impacts
Impact Type	Indirect
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare a TFFMP and SMP, as part of CEMP
Magnitude of Impact	Low
Significance of Effect	Short-term, Negligible Effect

Operation

During the operation phase, opportunities for public access to Mutton Cove are yet to be confirmed, as any access will be subject to the extent that security requirements for the SCY permit. Site maintenance and management operations will comprise basic maintenance and, if needed, periodic replacement of site infrastructure, and vegetation and habitat management. No direct impacts are expected to occur to Mutton Cove as a result of the development. Potential impacts would be indirect and reversible (i.e., temporary and short term) and likely be disturbance from noise, increased workforce presence and surface water runoff.

Potential indirect impacts will be addressed and controlled through a TFFMP, included as part of the OEMP, and the SMP. The ecological report, Appendix 1.6, determines that development is unlikely to result in a significant impact to the availability or quality of habitat in a way that would cause threatened habitat or species to decline at Mutton Cove. The magnitude of impact on Mutton Cove is considered to result in a 'Low' from operational activities.

The assessment of effects is provided within Table 12.11, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 12:11: Operation Assessment Effects for Mutton Cove

Impact factor	Operational activities
Potential Impact pathway	Site maintenance and management operations resulting in indirect light, noise, water quality, contamination, air quality impacts
Impact Type	Indirect
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare a TFFMP, as part of OEMP, and ensure the required outcomes of the SMP are maintained

Impact factor	Operational activities
Magnitude of Impact	Low
Significance of Effect	Short-term, Negligible Effect

12.7.4 Commercial and recreational fisheries

There are no commercial fisheries within the development site. However, there are three main commercial fisheries in Upper Gulf St Vincent:

- Marine Scalefish Fishery, which operates in all coastal waters of South Australia between the Western Australian and Victorian border.
- Blue Crab Fishery, which covers the Gulf St Vincent and Spencer Gulf. The development occurs in the fishing Block 35. There were no catches within Block 35 or the neighbouring Block 36 in 2020/2021
- Gulf St Vincent Prawn Fishery, which covers the whole Gulf St Vincent. There have been no reported to catches from within 8 km of the Port River.

Given the size of the Gulf St Vincent, the distance of the development from the Gulf St Vincent, and the lack of fishing close by to the development in two of the three fisheries, the sensitivity of commercial fisheries is considered to be 'Very Low'. Impacts to commercial fisheries in the Gulf St Vincent from the development would be limited to those associated with water quality. While modelling has not been undertaken, it is unlikely that these would be of a size and scale to reach the Gulf St Vincent. These impacts would be indirect, short-term, temporary and reversible, with the magnitude of impact considered to be 'Very Low'.

The ADS is considered to be a recreational fishery for purposes of this assessment. The area of the ADS impacted by the development is extremely small in the context of the entire ADS, with the development footprint representing just 0.1% of the ADS. In addition, the portion of the ADS to be used by the development is a highly modified habitat. Under the baseline conditions, it is used by South Australia's main shipping port. It is exposed daily to a range of human impacts including marine traffic, noise, light spill and stormwater pollution. It is fringed by industrial land uses. As a result, the sensitivity of this recreational fishery is considered to be 'Very Low'. As with commercial fisheries, impacts to recreational fisheries from the development would be limited to those associated with water quality, and other indirect construction impacts from turbidity, sedimentation, noise, vibration, water quality etc. which could impact the area immediately adjacent to the development site. These impacts would be indirect, short-term, temporary and reversible, with the magnitude of impact considered to be 'Very Low'.

Impacts to the marine environment will be implemented through standard measures through a MCEMP, DMP, via the CEMP and OEMP.

The assessment of effects is provided within Table 12.12, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 12:12: Assessment of Effects on Commercial and Recreational Fisheries

Impact factor	Construction and operation
Potential Impact pathway	Spills, reduced water quality from dredging (eg turbidity, potential disturbance to contaminated sediments) and stormwater run-off
Impact Type	Indirect
Sensitive Receptors	Very Low
Embedded Mitigation	Standard measures through a CEMP and OEMP.
Magnitude of Impact	Very Low
Significance of Effect	Short-Term, Negligible Effects

12.8 Additional Mitigation Measures and Residual Effect

12.8.1 Construction

No significant effects identified. No additional mitigation or monitoring are required beyond those outlined above in Section 12.6.

12.8.2 Operation

No significant effects identified. No additional mitigation or monitoring are required beyond those outlined above in Section 12.6.

12.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6 – Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

The cumulative schemes listed above do not include any works or activities within the marine environment. As such, these cumulative schemes cannot contribute to direct impacts to listed marine fauna, native marine vegetation, the ADS or commercial and recreational fisheries and direct cumulative effects are not considered to be able to occur.

Impacts from cumulative schemes that could interact with the development on the marine environment would be limited to those associated with water quality.

Determination of consent for each cumulative development will have been made in accordance with national, state and local planning policy and guidance. As such, these cumulative developments are expected to implement CEMPs and OEMPs prepared in consultation with the relevant authorities to address any water quality impacts. As such, no likely significant cumulative effects are expected for marine flora and fauna in combination with the development during either the construction or operation phase.

CHAPTER 13

Terrestrial Flora and Fauna

URPS

13. Terrestrial Flora and Fauna

Conclusion: No significant effects have been identified in relation to terrestrial flora and fauna. Impacts can be controlled through the adoption of standard construction and operation mitigation measures.

13.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to terrestrial flora and fauna.

Succession Ecology has prepared a terrestrial flora and fauna assessment for the construction and operational phases of the development. The Succession Ecology Terrestrial Flora and Fauna Management Plan and Terrestrial and Marine Flora and Fauna Ecological Report (the 'ecological reports') are included as Appendix 1.6 & 1.7 of this EIS.

13.2 Assessment Requirements

Commission Assessment Requirements: BE3 (Detailed Requirements)

- Describe the location of public or private protected areas reserved under the *National Parks and Wildlife Act 1972, Wilderness Protection Act 1992, Crown Land Management Act 2009, Adelaide Dolphin Sanctuary Act 2005* and *Forestry Act 1950*, council reserves and Indigenous Protected Areas which may be impacted by the development. Include reference to areas under Heritage Agreements through the Native Vegetation Act 1991.
- Assess the impacts on public and private protected areas from the development including management of interface issues (e.g. biosecurity, fire management, access) and any implications for Heritage Agreements.
- Describe the location, extent, condition and significance of native vegetation, including listed threatened flora species and ecological communities in the development's environs, and identify those that may need to be cleared or disturbed during construction and / or maintenance.
- Identify and characterise any wetlands or groundwater dependant ecosystems that may be affected by altering surface water or the hydrogeological environment.
- Describe the development activities with the potential to impact on native vegetation and listed threatened flora species and ecological communities, and provide an assessment of how those impacts will be avoided, mitigated or offset.
- For locations to which the *Native Vegetation Act 1991* applies, prepare a Native Vegetation Clearance Data Report prepared by an Accredited Consultant approved by the Native Vegetation Council. The assessment should undertake a survey of the vegetation and fauna (including EPBC Act Listed threatened species and communities), including seagrass in the tidal or subtidal marine environment, detail compliance with the impact mitigation hierarchy and describe how the significant environmental benefit would be achieved.

- Detail potential impacts of fire on native vegetation, and the effects of fire risk management processes during construction, operation and maintenance.
- Outline measures to mitigate effects on native vegetation by addressing the mitigation hierarchy, including any compensatory activities in already degraded areas and use of existing easements. Refer to guidelines produced by the Native Vegetation Council and outline the likely effectiveness of any mitigation measures adopted during both construction and maintenance.
- Describe the location, extent, condition and significance of native fauna populations (including aquatic and subterranean fauna such as stygofauna) and listed threatened and migratory fauna species in the development's environs, and identify those that are likely to be disturbed during construction and / or maintenance.
- Describe the development activities with the potential to impact on native fauna species and listed threatened and migratory fauna species and habitats, and provide an assessment of how those impacts will be avoided or mitigated.
- Identify all potential sources of light pollution from the construction and operation of the proposed development. Describe their impacts on native fauna, including nocturnal species, and how these impacts will be managed.
- Detail appropriate buffer distances that would be required between the proposed development and threatened species, including feeding areas, nesting sites and roosting sites, and Mutton Cove more specifically.

13.3 Guiding Legislation and Policy

The key legislation and policies that guide terrestrial flora and fauna assessment and protection in South Australia are summarised in the following Table 13.1.

Table 13.1: Summary of Legislation and Policy

Name	Description
Environment Protection and Biodiversity Conservation Act 1999	Provides a framework for the protection and management of nationally significant threatened flora, fauna and ecological communities. Any action that may significantly impact these will require a referral under the EPBC Act.
Native Vegetation Act 1991	Provides protection for native vegetation in South Australia and sets out a process for applying to clear vegetation.
National Parks and Wildlife Act 1972	Provides for the establishment and management of reserves for public benefit and enjoyment, and for the conservation of wildlife in a natural environment.
Landscape South Australia Act 2019	Sets a responsibility for land holders to manage Declared pest plants and animals and prevent land degradation.

13.4 Scope, Study Area and Assessment Method

13.4.1 Scope

An assessment of potential effects on terrestrial open space and native and/or listed threatened flora, fauna and ecological communities during the construction and operation of the development has been scoped into this chapter.

The assessment considers impacts including clearance of vegetation and other habitat, noise, light, air quality, contamination events, stormwater runoff, vehicle movements, excavation, restricted access, litter and increased human activity that could occur as a result of the development.

The ecological reports, Appendix 1.6, have been used to inform the assessment of the development on terrestrial flora and fauna within this chapter. The ecological reports included field surveys, a desktop assessment including database searches, and a literature review of existing reports relating to the development.

The assessment within this chapter follows the EIA methodology outlined in Chapter 6 – Impact Assessment Methodology.

Scoped Out

The following matters have been scoped out of the further assessment in this chapter:

Marine Protected Areas, Flora and Fauna

Marine protected areas, flora and fauna are assessed within Chapter 12 - Marine Flora and Fauna. Only terrestrial areas, flora and fauna are assessed in this chapter. This includes native marine vegetation, listed marine flora, fisheries, and protected areas including Torrens Island Conservation Park, Barker Inlet and St Kilda Wetland, Mutton Cove and the Adelaide Dolphin Sanctuary.

Non-Listed Fauna Species

Non-listed fauna species and communities have been excluded from the assessment on the basis that fauna species populations are of limited ecological importance due to their size, composition or lack of threat / rarity. The loss or impact to these species would have no discernible impact on the overall range and conservation status at any formal administrative scale in the long-term. As such, the development is considered to result in Negligible Effects and not considered further.

13.4.2 Study Area

The study area for assessment is the extent of the development site and immediate locality (up to 500m from the development site boundary). However, a wider area was considered to assist in determining what terrestrial flora, fauna and ecological communities may use the development site. This included database searches of threatened flora, fauna and ecological communities within 10km of the development site.

Assumptions and Limitations (i.e. Uncertainties)

The ecological report, Appendix 1.6, and this assessment have not included a self-assessment under the EPBC Act given the parallel Strategic Assessment being undertaken for the Project to address these matters. However, EPBC Act protected species were included as part of these assessments.

The ecological report has been based on information about the development available at the time of preparation.

13.5 Baseline Conditions and Sensitive Receptors

13.5.1 Baseline Conditions

Vegetation including native and listed threatened flora and ecological communities

- Much of the land-based portion of the development site is dominated by industrial land uses. The entire land-based portion of the development site has been subject to clearance and modification, primarily from the importation of fill to enable the site to be fit for industrial land uses.
- Limited natural regeneration of vegetation associations has occurred across the land-based portion of the development site including degraded chenopod shrubland, degraded samphire shrubland, and planted *Melaleuca lanceolata* shrubland.
- The ecological value of the areas of chenopod and samphire shrubland have been degraded by the incursion of Declared Plants and past human activities.
- The land-based portion of the development site is exempt from the NV Act as it does not fall within the NV Act boundaries. The NV Act only applies to the Port River, where there is a presence of native seagrass and mangroves.
- None of the vegetation associations in the development site met the criteria for a Threatened Ecological Community under the EPBC Act. The EPBC-listed Temperate and Subtropical Salt Marsh Threatened Ecological Community occurs nearby, in Mutton Cove and in the Torrens Island Conservation Park.
- No threatened flora under the EPBC Act were observed during the field surveys undertaken by Succession Ecology across the development site in June-July 2023 to inform the EIS.
- One vegetation species, which is listed as Rare under the NPW Act, was observed within Area 2 (*Myoporum parvifolium*). Because the plants were observed in areas that lie outside the jurisdiction of the NV Act, they are not protected under the NV Act. Nevertheless, they are protected under the NPW Act. Flora species listed under the NPW Act do not require approval to be removed, however protection is preferable where possible.
- A total of 11 species of Declared Plants were identified across the land-based portion of the subject site. Of these, three are also listed as Weeds of National Significance.

Native fauna including listed threatened and migratory species

- A total of 61 fauna species were observed within the subject site and surrounds.
- A total of 16 threatened or protected fauna species were observed within the subject site and surrounds. Six of these are listed as threatened under the EPBC Act and/or the NPW Act. The remaining ten species are either listed as Migratory or Marine under the EPBC Act.

- An additional three species, including one listed as threatened under the EPBC Act, were observed during the targeted survey in the wider locality (i.e. at reference sites outside the subject site) and have the potential to occur within the subject site. Three species that have known occurrences in the wider locality but were not observed during the survey are considered to be potentially impacted by the development. Habitat within the subject site for listed threatened and migratory birds include intertidal habitat and coastal swale drains within Area 3.

Open space

- Biodiversity Park lies to the west of the development site.
- Falie Reserve is not part of the development site, but is surrounded by the development site. Note: this site is no longer a public reserve or public open space.

Sensitive Receptors

Sensitive terrestrial flora, fauna and environmental receptors that have the potential to be impacted by the development are identified in the Table 13.2.

Table 13.2 – Summary of Sensitive Receptors

Native vegetation

Name	*Conservation/protection status	Likelihood of occurrence on site
Vegetation associations		
Degraded chenopod shrubland	Not protected	Observed on subject site.
Degraded samphire shrublands	Not protected	Observed on subject site.
Planted Melaleuca lanceolata shrubland	Not protected	Observed on subject site.
Threatened flora		
Creeping Boobialla *(Myoporum parvifolium)*	Rare under the *NPW Act* Not protected under the *NV Act*.	Observed on subject site.

Protected fauna

Scientific name (Common name)	*Conservation status	Likelihood of occurrence on site
Observed within subject site		
Actitis hypoleucos (Common Sandpiper)	EPBC Act: Mi NPW Act: R	Four individuals were observed within the intertidal flat area of the subject site.
Calidris acuminata (Sharp-tailed Sandpiper)	EPBC Act: VU, Mi, Ma	333 observations were made within coastal swale drain/wetlands of the subject site.
Calidris ruficollis (Rednecked Stint)	EPBC Act: Mi, Ma	Four individuals were observed within coastal swale drain / wetland of the subject site.
Haematopus longirostris (Pied Oystercatcher)	NPW Act: R	146 observations were made in the intertidal zone of the subject site.
Haematopus fuliginosa (Sooty Oystercatcher)	NPW Act: R	189 observations were made within the intertidal zone of the subject site.
Hydroprogne (Sterna) caspia (Caspian Tern)	EPBC Act: Mi	26 observations were made in the intertidal zone of the subject site, with 4-8 individuals present at any one time.
Neophema elegans (Elegant Parrot)	NPW Act: R	Observed at three locations across the subject site.
Pelecanus conspicillatus (Australian Pelican)	EPBC Act: Ma This species is not threatened and is common in the region.	Observed on multiple occasions within the subject site.
Threskiornis molucca (Australian White Ibis)	EPBC Act: Ma This species is not threatened and is common in the region.	Observed on multiple occasions within the subject site.

Scientific name (Common name)	*Conservation status	Likelihood of occurrence on site
Tringa glareola (Wood Sandpiper)	EPBC Act: Mi, Ma	One individual was observed utilising the coastal swale drain / wetland of the subject site.
Tringa nebularia (Common Greenshank)	EPBC Act: EN, Mi	Observed both within the intertidal flat (one individual) as well as the coastal swale drain / wetland (seven observations of one or two individuals) of the subject site.
Tringa stagnatilis (Marsh Sandpiper)	EPBC Act: Mi	Four observations were made within the Mutton Cove Mangrove Inlet adjacent to the subject site.
Thalasseus bergii (Greater Crested Tern)	EPBC Act: Mi This species is not threatened and is common in the region.	Observed on multiple occasions within the subject site.
Threskiornis Molucca (Australian White Ibis)	EPBC Act: Ma This species is not threatened and is common in the region.	Observed on multiple occasions within the subject site.
Himantopus himantopus (Blackwinged Stilt)	EPBC Act: Ma This species is not threatened and is common in the region.	Observed on multiple occasions within the subject site.
Anthus australis (Australian Pipit)	EPBC Act: Ma This species is not threatened and is common in the region.	Observed on multiple occasions within the subject site.
Observed at Reference Sites		
Calidris alba (Sanderling)	EPBC Act: Mi	Although it was not identified in the subject site, suitable habitat is present.

Scientific name (Common name)	*Conservation status	Likelihood of occurrence on site
Calidris subminuta (Long-toed Stint)	EPBC Act: Mi	Although it was not identified in the subject site, suitable habitat is present.
Pluvialis squatarola (Grey Plover)	EPBC Act: VU, Mi	Although it was not identified in the subject site, suitable habitat is present.
Species with Known Occurrences and Habitat Preferences		
Acanthiza iredalei rosinae (Samphire Thornbill, Slenderbilled Thornbill (Gulf St Vincent))	EPBC Act: VU NPW Act: V	The subject site contains this species' preferred vegetation only in low densities, thereby providing low-value potential habitat.
Anhinga novaehollandiae Novaehollandiae (Australasian Darter)	NPW Act: R	Suitable habitat is present within the subject site for the species.
Haliaeetus leucogaster (White-bellied Sea Eagle)	NPW Act: E	Suitable foraging habitat is present within the marine-based portion of the subject site..
**EPBC Act: Mi - Migratory, Ma - Marine, CR - Critically Endangered, EN - Endangered, VU - Vulnerable* *NPW Act: E - Endangered, V - Vulnerable, R - Rare.*		

Open space

Name	Legislative Protection status	Location
Falie Reserve	Not protected	Adjacent to subject site.
Biodiversity Park	Not protected	Approximately 40 m west of the subject site.

13.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanisms for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

13.6.1 Embedded mitigation measures

Construction

A Terrestrial Flora and Fauna Management Plan (TFFMP) will be developed and incorporated into the CEMP for the development. The TFFMP will outline specific strategies and procedures for managing and mitigating impacts to terrestrial flora and fauna throughout the construction phase, ensuring that best practices are followed.

The CEMP will also include:

- Measures to manage construction lighting, and all temporary external lighting will be designed to minimise the risk of light spill outside the area it is desired to illuminate; and particular care will be taken to minimise light spill surrounding habitat.
- Construction Stormwater Management Plan (SMP) (or equivalent), measures to manage the discharge of site stormwater and /or surface wastewater, into adjacent areas.
- A Biosecurity Management Plan (BMP) identifying management of terrestrial flora and fauna pests as required.

Operation

A TFFM will be developed and incorporated into the OEMP for the development. The TFFMP will outline specific strategies and procedures for managing and mitigating impacts to terrestrial flora and fauna throughout during operation. Operational lighting will be directed within the development site limits away from sensitive receptors and will include maintaining the designed features to reduce light spill beyond the areas required to be lit.

A BMP will also be incorporated into the OEMP, identifying management of terrestrial flora and fauna pests as required.

Surface water drainage will be provided for the development during detailed design, including measures to assist in managing runoff from the infrastructure and surrounding land. An SMP (or equivalent) documents the design of the development that takes into account climate change and will ensure that peak rates of surface runoff from the development are controlled, that infiltration of runoff is encouraged (where possible and practical) and that low levels of pollution from the development are appropriately managed through the use of settlement basins, filtration areas, pol interceptors and / or silt traps etc. The SMP will address legislative and policy requirements, current industry standard guidance and practice and will restrict flows to pre-development discharge rates whilst providing sufficient water quality mitigation.

13.6.2 Other Approvals/Licensing

Separate to this application, a Strategic Assessment, focusing on Matters of National Environmental Significance, in accordance with provisions of the EPBC Act is being undertaken. Approval from the Commonwealth Government under the EPBC Act will be required before works can commence.

13.7 Assessment of Effects

13.7.1 Terrestrial Vegetation (Including Native and Listed Threatened Flora and Ecological Communities)

Construction

Much of the land-based portion of the development site is industrial land and the entire land-based portion of the development site has been subject to clearance from the importation of fill and clearance of land in preparation for industrial land use over the last 10 years. Self-regenerating vegetation in some parts of the land-based portion of the development site includes limited areas of chenopod shrubland, degraded samphire shrubland, and planted *Melaleuca lanceolata* shrubland. The ecological value of these areas has been compromised by the incursion of Declared Plants and past human activities. The terrestrial remnant vegetation the development site is not subject to provisions of the NV Act.

None of the vegetation associations in the development site met the criteria for a Threatened Ecological Community under the EPBC Act. No threatened flora under the EPBC Act was observed during the field surveys.

One species, which is listed as Rare under the NPW Act, was observed within Area 2 (*Myoporum parvifolium*). Because the plants were observed in areas that lie outside the jurisdiction of the NV Act, they are not protected under the NV Act. Nevertheless, they are protected under the NPW Act. Although flora species listed under the NPW Act do not require approval to be removed, protection is preferable where possible.

For the reasons listed above, the overall sensitivity of the terrestrial vegetation on site is considered to be 'Very Low'.

The entire land-based portion of the development site is anticipated to be cleared of any remaining vegetation. Impacts will be direct, permanent, long-term and irreversible. The magnitude of impact would generally be considered to result in a 'High' impact during the construction phase as a result of total removal of vegetation from a site. However, the development provides a positive opportunity to control and eradicate Declared Plants and other weed species across the development site. As such, it is considered appropriate to reconsider the magnitude of impact to 'Medium' due to the 'Beneficial' impact that the control and eradicate the high prevalence of Declared Plants and other weed species from the development site would provide.

The construction assessment of effects is provided within Table 13.3, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 13.3: Assessment Effects for Terrestrial Vegetation

Impact factor	Clearance of terrestrial vegetation
Potential Impact pathway	Clearance for earthworks and construction of the development
Impact Type	Direct
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare a TFFMP and BMP as part of CEMP
Magnitude of Impact	Medium
Significance of Effect	Long-Term, Negligible Effect

13.7.2 Listed Terrestrial Fauna

A total of 16 threatened or protected terrestrial fauna species were identified within the subject site. Six of these are listed as threatened under the EPBC Act and/or the NPW Act. The remaining ten species are either listed as Migratory or Marine under the EPBC Act.

An additional three species, including one listed as threatened under the EPBC Act, were observed during the targeted survey in the wider locality (i.e. at reference sites outside the subject site) and have the potential to occur within the subject site. Two species that have known occurrences in the wider locality but were not observed during the survey are considered to be potentially impacted by the development.

All of these species are birds. Birds are highly mobile species largely able to avoid impacts and resilient to change. Habitat within the development site, while used often for many of these birds, are of negligible importance to species in wider context of locality. There are abundant higher quality habitats in the nearby and wider locality.

These species were mostly observed within two discrete parts of the subject site: the coastal swale drains (Snapper Point) and the intertidal flat/coastline along the edge of Area 3. These are the only areas on the subject site considered to be significant habitat to listed fauna.

These species will potentially be impacted in a number of ways including:

- Removal of habitat.
- Noise and vibration.
- Light.
- Introduction or spread of pest species.
- Vehicle movements.
- Litter.
- Increased human activity.
- Chemical/oil spill.

Removal of vegetation contributing to viable habitat is likely to be most impactful to listed terrestrial fauna. The entire area of intertidal habitat and all vegetation within the development site will be removed during the construction phase. The coastal swale drains will remain but may be temporarily disrupted.

The most direct impact would be potential for a direct injury or death during construction or operation. This impact pathway is however considered very unlikely.

All other impacts are more temporary and reversible in nature.

A Strategic Assessment of the Project (with a broader scope that than included in the EIS) in accordance with requirements of the EPBC Act is being undertaken. The current findings of the Strategic Assessment are that the Project should be acceptable in relation to listed threatened and migratory species and communities because the Project would be undertaken in a way that would not likely result in a significant residual impact to a Protected Matter.

Despite their national protection, the high mobility of these birds and ample availability of higher quality habitat in the locality results in the sensitivity of these receptors being considered 'Low'.

All impacts to fauna will be addressed and controlled based upon a TFFMP as part of the CEMP and OEMP, as outlined within Section 13.6 above.

The magnitude of impact is considered to result in a 'Medium' impact relating to clearance of habitat during construction, and 'Very Low' impact for all other construction and operational activities. The assessment of effects is provided within Table 13.4, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 13.4: Assessment Effects for Listed Terrestrial Fauna

Impact factor	Clearance of habitat during construction
Potential Impact pathway	Clearance for earthworks and development infrastructure
Impact Type	Direct
Sensitive Receptors	Low
Embedded Mitigation	Prepare a TFFMP as part of CEMP
Magnitude of Impact	Medium
Significance of Effect	Long-term, Minor Adverse Effect
Impact factor	**Construction and operational activities**
Potential Impact pathway	Noise and vibration, light, introduction or spread of pest species, vehicle movements, litter, pits holes and trenches, increased human activity and chemical/oil spill
Impact Type	Direct/Indirect
Sensitive Receptors	Low
Embedded Mitigation	Prepare and implement a TFFMP and BMP as part of CEMP and

Impact factor	Clearance of habitat during construction
	OEMP
Magnitude of Impact	Very Low
Significance of Effect	Long-term (operational lighting), Short-term (all other impacts), Negligible Effect

13.7.3 Open space

Terrestrial open spaces in the locality include Falie Reserve and Biodiversity Park. These open spaces are of local significance.

Falie Reserve was designed for informal recreation, stormwater management and the restoration of local endemic species. It contains planted samphire shrubland and other planted vegetation, including trees, shrubs and ground covers. Falie Reserve is not included within the of the development site, will not be developed through the scope of works included in the development, and is no longer defined as a public reserve or public open space. However, it is subject to a separate Development Application for the grade separated road as part of the wider Project, which has been approved. As such, any impacts from the development to Falie Reserve would only be indirect, as the Development Application for the grade separated road would result in direct, long-term impacts on this receptor. This development has been separately assessed under the EPBC Act.

Biodiversity Park is largely comprised of planted vegetation and naturally regenerating native vegetation. The Biodiversity Park is approximately 40 m west of the development site. The development is expected to have a minimal environmental impact Biodiversity Park. The area is located outside of the development site and no vegetation removal will occur, meaning any impacts from the development would only be indirect (barring operational lighting which would be direct).

Given that these terrestrial open spaces are not incorporated in the development site, and are of local significance only, the sensitivity of these receptors is considered to be 'Very Low'.

Potential indirect impacts will be addressed and controlled through a TFFMP and SWMP, included in the CEMP during construction, and by the TFFMP, within the OEMP, and ensure the required outcomes of the SMP are maintained during operation. The magnitude of impact on open spaces is considered to result in a 'Very Low' impact for both construction and operational activities. The assessment of effects is provided within Table 13.5, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 13.5: Assessment Effects for Open Spaces

Impact factor	Construction and operational activities
Potential Impact pathway	Construction and operational maintenance and management activities resulting in indirect light, noise, water quality, contamination, air quality impacts and decreased amenity values.
Impact Type	Direct (operational lighting) / Indirect (all other impacts).

Impact factor	Construction and operational activities
Sensitive Receptors	Very Low
Embedded Mitigation	Prepare a TFFMP, BMP, and SMP, part of the CEMP during construction. Prepare a TFFMP and BMP, part of the OEMP, and ensure the required outcomes of the SMP are maintained during operation.
Magnitude of Impact	Very Low
Significance of Effect	Long-term (operational lighting), Short-term (all other impacts), Negligible Effect.

13.8 Additional Mitigation Measures and Residual Effect

No additional mitigation or monitoring are required beyond those outlined above in Section 13.6. The likely residual effects for construction and operational effects will remain as stated above within Section 13.7.

13.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6-Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

The Osborne North Car Park and Grade Separated Road and development of a Skills and Training Academy also require clearance of vegetation and will produce impacts including noise, light, dust, traffic, human activity, pollution etc. These areas are not protected under the NV Act or contain threatened flora species. Much of these areas have been subject to degradation by human activities, such as driving and the creation of vehicle tracks, dumping of rubbish and the incursion of introduced flora. These areas do not provide critical habitat for any listed fauna, especially in the context of the high-value habitat available elsewhere in the locality. Approval for each of these cumulative developments will have been made in accordance with national, state and local planning policy and guidance, within which terrestrial flora and fauna would be a material consideration and would have included the provision of appropriate mitigation measures. Therefore, it is anticipated that cumulative effects from the developments listed above will not result in effects that substantially differ from those already identified in this chapter. As such, significant cumulative effects are not expected.

In addition, as outlined above, a Strategic Assessment of the Project (with a broader scope that than included in the EIS and included these cumulative schemes) in accordance with requirements of the EPBC Act is being undertaken. The Strategic Assessment findings suggests that the Project will be acceptable in relation to listed threatened and migratory species and communities because the Project would be undertaken in a way that would not likely result in a significant residual impact to a Protected Matter.

CHAPTER 14

Climate Change Adaptation

URPS

14. Climate Change Adaptation

Conclusion: The climate adaptation and resilience measures identified and adopted by the development seek to minimise climate risks due to future climate change. The assessment has found that the development is resilient to likely climatic changes.

14.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to climate change adaptation.

GHD prepared a climate risk assessment for the construction and operational phases of the development for the EPBC Strategic Assessment. The climate risk assessment is contained within the Climate Review Report (the 'Climate Report') and is included as Appendix 1.8 of this EIS.

14.2 Assessment Requirements

Commission Assessment Requirements: CCRE1 (Standard Requirements)

- Undertake a climate risk assessment of the relevant potential impacts on the development of projected climate change over the lifetime of the development (e.g. increasing temperatures, extreme heat and heat waves, decline in rainfall, increased drought, extreme rainfall events, harsher fire weather, and sea level rise). Include proposed adaptive management strategies.
- For developments with a lifetime to 2050 or before, the risk assessment should be based on climate projections from the RCP 8.5 scenario (high greenhouse gas emissions scenario). For developments with a lifetime beyond 2050, the risk assessment should be based on climate projections under both the RCP 8.5 and RCP 4.5 scenario (moderate greenhouse gas emissions scenario).
- Examine the potential cumulative effects of climate change from a risk management perspective (including adaptive management strategies).
- Where relevant, outline the potential effects of, and identify strategies to protect against, extreme weather events, including a 1% AEP storm event and sea level rise as per Coast Protection Board policy and allowances from a risk management perspective, including adaptive management strategies. Include mitigation strategies should the structure not withstand such an event.

14.3 Guiding Legislation and Agreements

The legislation and agreements relevant to the assessment of climate change adaptation associated with the development are summarised in the Table 14.1 below.

Table 14.1: Summary of Legislation/guidelines

Legislation/guideline	Description
Climate Change Act 2022	Australia is one of 27 nations to have legislated its net zero targets. The Act outlines Australia's greenhouse gas emissions reduction targets of a 43% reduction from 2005 levels by 2030 and net zero by 2050.
Climate Change and Greenhouse Emissions Reduction Act 2007	The Act provides measures to address climate change, through targets to reduce emissions of carbon dioxide and other greenhouse gases, policies and programs to address climate change and ensure that climate change risks are adapted to.
Environment Protection Act 1993	On 1 March 2024, climate change related amendments made to the EP Act came into effect. These amendments define and then add the terms 'climate change adaptation', 'climate change mitigation' and 'greenhouse gas emissions' explicitly into the Objects of the Act. These amendments were made to clarify the role of the Act, in particular the EPA's role in climate change regulation, and also better position the EPA Board to address climate change when administering the Act.
Coast Protection Act 1972	The functions of the Coast Protection Board (as stated in the Act) are to: protect the coast from erosion, damage, deterioration, pollution and misuse. This includes consideration of potential impacts climate change on the coast.
Paris Agreement	Australia is party to the Paris Agreement. The Paris Agreement came into force in 2016. It was a major step forward in international efforts to address climate change. The Paris Agreement aims to strengthen the global response to the threat of climate change by: • Holding the increase in the global average temperature to well below 2°C above pre-industrial levels. • Pursuing efforts to limit temperature increase to 1.5°C. Under the Paris Agreement, Australia must submit emissions reduction commitments known as Nationally Determined Contributions. Australia submitted its first Nationally Determined Contributions to the UNFCCC in 2015. We submitted an updated version of this Nationally Determined Contributions in 2022. The update commits Australia to reducing its emissions to 43% below 2005 levels by 2030.

14.4 Scope, Study Area and Assessment Method

14.4.1 Scope and Study Area

A climate risk assessment has been carried out to establish likely significant effects resulting from climate change on the development.

Geographical Scope

The study area for climate adaptation, unlike other disciplines, focuses on the impact that climate will have on the development (as opposed to the impact of the development on the environment). The study area is therefore the development site of the development.

Temporal Scope

The development has an operational lifespan in excess of 30 years. Representative Concentration Pathways (RCPs) provide plausible descriptions of potential future climate states. Shared Socioeconomic Pathways refine the RCP emission scenarios and refer to scenarios that describe possible future developments in society, economy, and environment. RCP 8.5, often recommended for climate projection assessments to account for a worst-case but plausible scenario, ensures that assessments consider the upper bounds of potential climatic futures. RCPs are defined further within GHD's Climate Review Report.

14.4.2 Assessment Method

Given the lack of available guidance on assessment of climate change adaptation within EIA in South Australia, the assessment undertaken within this chapter has used the *Institute of Environmental Management and Assessment (IEMA), Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation) (2020)*[25] (the 'IEMA Guidance') as the basis of the assessing the significance of effects for the development.

Determining Effect Significance

The climate change adaptation assessment is required to establish any significant effects of climate change on the development. The assessment is focused on the future when it is anticipated that changes from the existing climate will have occurred and these may pose risks in relation to the operational function of the development and its users.

As such, this assessment does not explicitly consider climate risks during the construction period since these works will largely be happening in a period which is not subject to additional climate change to that already experienced and those risks are well established and managed through standard practices.

In terms of resilience to climate change, this is principally a function of the design which needs to anticipate future risks and build in appropriate adaptation measures as required. There is therefore an important focus on embedded measures to address future climate change.

[25] IEMA (2020), Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation. Available at: https://www.iema.net/content/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020/. Accessed: September 2024. 2.amazonaws.com/iema.net/documents/knowledge/policy/impactassessment/

Following IEMA Guidance, the assessment is carried out over five-steps, as follows:

Step 1: Establish Relevant Policy Requirements

This step establishes any relevant policy that informs the assessment of climate risks, and requirement for measures to manage those risks (known as adaptation measures).

Step 2: Identify Receptors

During this stage, relevant receptors in the development which may be affected by climate change are identified.

Step 3: Identify Potential Impacts of Climate Change on Receptors and Confirm Embedded Mitigation

This stage comprises identification of potential impacts of changes in a range of climate variables (e.g. change in average weather conditions and extreme events) on the receptors identified in Step 2. This is undertaken using professional judgement and identifies the design measures to mitigate the impacts taking into account policy requirements identified in Step 1.

Step 4: Assess the Significance of Effects of Climate Change on Receptors

This step assesses the significance of each hazard based on scoring the likely consequence and likelihood of that hazard arising, using a five-point scale described in Table 14.2 and Table 14.3. The assessment of significance and scoring of likelihood and consequence are based on IEMA Guidance.

Table 14.2: Qualitative Description of Consequence

Measure of consequence	Description
Negligible	No damage to the development, minimal adverse effects on health, safety and the environment or financial loss. Little change to service and disruption lasting less than one day.
Minor	Localised disruption or loss of service. No permanent damage, minor restoration work required: disruption lasting less than one day. Small financial losses and/or slight adverse health or environmental effects.
Moderate	Limited damage and loss of service with damage recoverable by maintenance or minor repair. Disruption lasting more than one day but less than one week. Moderate financial losses. Adverse effects on health or the environment.
Large	Extensive damage and severe loss of service. Disruption lasting more than one week. Early renewal of 50-90% of the Project. Major financial loss. Significant effect on the environment, requiring remediation.
Very Large	Permanent damage and complete loss of service. Disruption lasting more than one week. Early renewal of the Project >90%. Extreme financial loss. Very significant loss to the environment requiring remediation and restoration.

Table 14.3: Qualitative Description of Likelihood

Very High	The event occurs multiple times during the lifetime of the development e.g., approximately annually.
High	The event occurs several times during the lifetime of the development e.g., approximately once every five years.
Medium	The event occurs limited times during the lifetime of the development e.g., approximately once every 10 years.
Low	The event occurs occasionally during the lifetime of the development e.g., twice in 40 years.
Very Low	The event may occur once during the lifetime of the development.

These determinants are combined to assess the significance of effects on receptors, as shown in Table 14.4. The assessment is qualitative and based on professional judgment of the assessor based on knowledge of similar schemes, and engagement with the wider project team.

The assessment of significance takes embedded mitigation into account. Embedded mitigation is identified through consultation with the project team and taking into account policy requirements identified through Step 1.

Table 14.4: Assessment of Effects Matrix

		Consequence of Hazard Occurring				
		Negligible	Minor	Moderate	Large	Very Large
Likelihood of hazard occurring	Very High	Not significant	Significant	Significant	Significant	Significant
	High	Not significant	Not significant	Significant	Significant	Significant
	Medium	Not significant	Not significant	Not significant	Significant	Significant
	Low	Not significant	Not significant	Not significant	Not significant	Significant
	Very Low	Not significant	Not significant	Not significant	Not significant	Not significant

Step 5: Establish Further Adaptation Measures and Determine Residual Effects

In the fifth step, further adaptation and mitigation measures for any significant effects are identified and any residual effects of climate change on the receptors are assessed.

Assumptions and Limitations (i.e. Uncertainties)

Future greenhouse gas (GHG) emissions, and the resulting pathway, is uncertain. A precautionary approach, consistent with IEMA Guidance has therefore been adopted by selecting a high emissions scenario (RCP8.5).

The embedded adaptation measures are based on information provided by ANI. The determination of significance has been undertaken under the assumption that industry design standards will be adhered to where detailed design information is unavailable.

14.5 Baseline Conditions and Sensitive Receptors

The assessment of resilience of the development to the impacts of climate change was informed by regional scale information (Adelaide) on historic and the projected change in climate variables to form a future baseline, and other studies undertaken relevant to the development.

14.5.1 Future Baseline

Projected climate change trends for 2050 and 2100 for the Adelaide region under the RCP4.5 and RCP 8.5 scenarios are summarised in Table 14.5 below for climate hazards.

Table 14.5: Future baseline

Climate Hazard	Descriptor
Sea level	Continued increase in sea level is projected for the Adelaide region. Under scenario RCP4.5, the mapping for the indicative sea level rise shows the projected inundation of 0.21 m for the 2050 timeframe, and 0.57 m for the 2100 timeframe. Under scenario RCP8.5, the mapping for the indicative sea level rise shows the projected inundation of 0.23 m for the 2050 timeframe and 0.73 m for the 2100 timeframe.
Extreme temperature	By 2050, the Adelaide region is expected to experience warmer temperatures across all seasons. Spring is projected to experience the greatest warming. Under scenario RCP4.5, by 2050, average temperatures in the region are projected to increase between 0.8 °C and 1.6 °C when compared with to 1986-2005, by 2100 the increase may be between 1.1 °C and 2.2 °C. The increase in average temperatures also translates to an increase in extreme temperatures and more frequent hot days (days of over 35 °C and 40 °C). Average hot days could increase by 25 and 6.5 days by 2050 and increase to 27.5 and 7.5 days by 2100. In the long-term, higher temperatures will tend to prevent frost leading to a decrease in their occurrence. Under scenario RCP8.5, by 2050, average temperatures in the region are projected to increase between 1.2 °C and 2 °C when compared to 1986-2005, by 2100 the increase may be between 2.6 °C and 4.1 °C. The increase in

Climate Hazard	Descriptor
	average temperatures also translates to an increase in extreme temperatures and more frequent hot days (days of over 35 °C and 40 °C), average hot days could increase by 26.8 and 7.4 days by 2050 and increase to 36.2 and 12.9 days by 2100.
Rainfall	Rainfall is projected to decline, especially in spring. This rainfall decline may lead to more prolonged drought periods. Despite a predicted overall decline in rainfall, the intensity of rainfall during extreme weather events is projected to increase. By 2050 the percentage change of extreme rainfall events in projected to increase by an average of 11.8% under RCP4.5 and 7.2% under RCP8.5, when compared with 1986-2005. By 2100 the percentage change of extreme rainfall events in projected to increase by an average of 9.1% under RCP4.5 and 22.9% under RCP8.5.
Drought	The development site and surrounding region is likely to continue to get drier in the future. 2050 projections suggest that rainfall is projected to continue to decline under both RCP4.5 and RCP8.5 scenarios when compared with 1986-2005. Precipitation levels are projected to decrease by an average of 4.2 mm under RCP4.5 and 5.9 mm under RCP8.5. By 2100 precipitation levels are projected to decrease even further, with an average decrease of 6.7 mm under RCP4.5 and 9.3 mm under RCP8.5.
Bushfires	The frequency of hot days (days over 35 °C and 40 °C) and heatwaves is expected to increase. This will increase harsher bushfire risk to the surrounding region. Frosts are projected to decrease over time. By 2050 under RCP4.5 the surrounding region is likely to observe an increase in bushfire days by 1.9 to 3.5 days. Under RCP8.5 bushfire days will increase by 1.9 to 2.3 days, when compared with 1986-2005. By 2100 under RCP4.5 bushfire days are likely to increase by 2.2 to 2.9 days and 2.3 to 5.4 days under RCP8.5 by 2100 under scenario RCP8.5. As noted, the properties at risk of bushfire impacts are likely to increase by 30% and over within the surrounding region of Torrens Island.

14.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanism for mitigation measures.

14.6.1 Embedded Mitigation

Construction

A CEMP would be implemented across the construction phase of the development, which is anticipated to span approximately 10 years. The final version of the CEMP will be subject to approval by the necessary stakeholders and agencies. This document will set out measures to manage climate hazards during the construction phase.

Operation (Design)

General

The development will be built to nuclear licensing requirements, which include protection against extreme weather events.

Flooding

The proposed flooding strategy for the development includes having minimum finished surface levels set above the greater of:

- The 1% annual exceedance probability (AEP) storm tide event, in combination with wave effects and stormwater runoff from the development.
- The 1% AEP overland flow event, with due allowance for the effect of tidal surge.
- A minimum elevation of 3.30 m AHD, as specified in Council's planning requirements (under the Lefevre Peninsula Stormwater Management Plan).

Minimum building floor levels shall be set a further 300 mm above the 1% AEP design flood level or above an elevation of 3.55 m AHD, as specified in the Planning and Design Code.

An evacuation and emergency services route will be maintained that is safe for vehicles in all flood events up to and including the 1% AEP design event, in accordance with the flood hazard assessment criteria outlined in the latest Australian Rainfall and Runoff guidelines. Alternatively, or additionally, a safe shelter-in-place will be provided at an on-site location outside of the 1% AEP design flood extents.

Any off-site impacts will be limited to an acceptable +/- 20 mm afflux in all flood events up to and including the 1% AEP design flood event.

The minimum surface and buildings levels specified above may be raised at a later stage, as the design develops, and the site-specific flood risk assessment is completed. The design flood levels and design flood envelopes used to guide these minimum levels would make an appropriate allowance for increased rainfall, sea level rise, land subsidence or uplift, and coastal erosion.

Critical buildings and infrastructure across the development shall be protected against flood events more extreme than the minimum 1% AEP design flood event. This 'more extreme' design flood event is yet to be determined from the separate site-specific flood risk assessment that is currently underway.

14.7 Assessment of Climate Adaption

14.7.1 Step 1: Establish Relevant Policy Requirements

Flooding and Stormwater

As outlined within Section 5 of the Stormwater Management Plan, prepared by the AECOM AURECON Joint Venture for the development (Attachment/Appendix 1.13), the development meets all current climate related policies. The development will include measures to mitigate against the effects of climate change by reducing vulnerability to flooding, promoting development that minimises natural resource and energy use, reduces pollution and incorporates sustainable construction practices, including water efficiency measures. In addition, the development site would not be at an unacceptable risk of flooding on the development site itself, and there would be no increase to flood risk elsewhere as a result of the development.

Coast Protection Board

As outlined above, the development is being designed in accordance with the standards set out within Appendix 1 of the Coast Protection Board Policy Document by setting finished floor levels above the levels proscribed[26].

14.7.2 Step 2: Identify Receptors

The key receptors on development site identified are:

- Development infrastructure – SCY fabrication facilities and associated infrastructure and services.
- Site access and roads.
- Future workers.

14.7.3 Step 3: Identify Potential Impacts of Climate Change on Receptors and Confirm Embedded Mitigation

This stage comprises identification of potential impacts of changes in a range of climate variables on the receptors and identifies the potential impact and any associated mitigation measures included within the design.

Table 14.6 Potential Impacts of Climate Change on Receptors and Embedded Mitigation

Climate variables	Receptor	Potential impact	Embedded measures to mitigate impacts
Sea level rise	Development infrastructure	• Increase in erosion and flooding of development site.	The development will be built to Nuclear Qualified Facilities standards, which include protection against extreme weather events.
	Site access and roads		

[26] Coast Protection Board 2022, Coast Protection Board Policy Document: Revised October 2022, accessible via <https://cdn.environment.sa.gov.au/environment/docs/CPB-Policy-October-2022.pdf>

Climate variables	Receptor	Potential impact	Embedded measures to mitigate impacts
	Future workers	• Increase in damage costs to infrastructure. • Increased health and safety risks for workers.	Minimum finished surface levels shall be set above the greater of: • The 1% AEP storm tide event, in combination with wave effects and stormwater runoff from the development. • The 1% AEP overland flow event, with due allowance for the effect of tidal surge. • An elevation of 3.30 mAHD. Minimum building floor levels shall be set a further 300 mm above the 1% AEP design flood level or above an elevation of 3.55 mAHD. A safe evacuation and emergency services route will be maintained that is safe for vehicles in all flood events up to and including the 1% AEP design event, in accordance with the flood hazard assessment criteria outlined in the latest Australian Rainfall and Runoff guidelines. Alternatively, or additionally, a safe shelter-in-place will be provided at an on-site location outside of the 1% AEP design flood extents. Any off-site impacts will be limited to an acceptable +/- 20 mm afflux in all flood events up to and including the 1% AEP design flood event.
Extreme temperature	Development infrastructure	• Overheating of infrastructure • Increasing temperatures leading to increased health risks for workers, including heat stress and other	• Equipment rated to withstand higher temperatures; cooling capacity rated to accommodate higher cooling demand. • OEMPs to consider measures to address site access and health risks related to future climate change.
	Site access and roads		
	Future workers		

Climate variables	Receptor	Potential impact	Embedded measures to mitigate impacts
		heat-related illnesses.	
Extreme rainfall/ flooding	Development infrastructure Site access and roads Future workers	• Increase in damage costs to infrastructure. • Health and safety risks for workers.	A suitable SMP would be implemented during both the construction and operation phases of the development. The operational SMP would include the following measures: • Stormwater runoff is captured by the major and minor drainage network, which then conveys flow towards a series of detention systems. The drainage network would be designed to provide the following minimum levels of service: – Minor (underground) network: 10% AEP. – Major (overland) network: 1% AEP. • Flows entering the detention systems are to be temporarily contained within the basin extents while discharge is restricted by the basin outlet pipe, pump-out rates or water levels in the Port River. These detention systems are typically in the form of above-ground, earthen basins, but there are also opportunities for other forms, such as underground tanks. The detention systems would be designed to contain all inflows with a suitable allowance for freeboard in a 1% AEP design storm event, and taking into consideration the interaction of basin outlet pipes with the water levels in Port River. • Outflows from the detention systems are discharged to outfalls

Climate variables	Receptor	Potential impact	Embedded measures to mitigate impacts
			along the Port River in a manner that does not allow for the entry of tidal waters or erode / scour the downstream earth. Emergency Flood Response Plans would be secured for all stages of the development through the CEMP and OEMP. The Emergency Flood Response Plans will ensure that safe access and egress is available for site workers at all times
Drought	Development infrastructure	• Potential water restrictions	The OEMPs will include measures to address potential water restrictions through standard management procedures.
	Site access and roads		
	Future workers		
Bushfire	Development infrastructure	• Decrease in air quality for workers	The development site and its surrounds is not within an area that is deemed to be high risk for bushfires, as such no measures are required for the development site in relation to site access etc. The OEMP/s will include standard measures to address potential health risks related to a decrease in air quality from bushfires beyond the Adelaide metropolitan areas.
	Site access and roads		
	Future workers		

14.7.4 Step 4: Assess the Significance of Effects of Climate Change on Receptors

Table 14.7 details the assessment of climate risks identified in Step 3 above, taking into account design measures to mitigate risks.

Table 14.7 assessment for significance of effects

Impact factor	Receptor	Impact	Likelihood	Consequence	Significance
Sea level rise	Development infrastructure Site access and roads Future workers	• Increase in erosion and flooding of developme nt site. • Increase in damage costs to infrastructu re. • Increased health risks for workers.	High	Minor	Not Significant
Extreme temperature	Development infrastructure Site access and roads Future workers	• Overheatin g of infrastructu re. • Increasing temperatur es lead to increased health risks for workers, including heat stress and other heat-related illnesses.	High	Minor	Not Significant
Extreme rainfall/ flooding	Development infrastructure Site access and roads Future workers	• Increase in damage costs to infrastructu re. • Health risks for workers.	High	Minor	Not Significant

Impact factor	Receptor	Impact	Likelihood	Consequence	Significance
Drought	Development infrastructure	• Potential water restrictions	Medium	Minor	Not Significant
	Site access and roads				
	Future workers				
Bushfire	Development infrastructure	• Decrease in air quality for workers	High	Minor	Not Significant
	Site access and roads				
	Future workers				

14.7.5 Step 5: Establish Further Adaptation Measures and Determine Residual Effects

Table 14.7 shows that there are no significant effects on the development due to future climate change.

14.7.6 Residual Effects

The residual effects are in line with those described in Table 14.7 and are not significant.

14.8 Cumulative Resilience Effects

All cumulative developments have been considered in the identification of cumulative effects from climate change. The climate change adaptation assessment considers the impacts of climate change on the development and as such, the receptors for the assessment are the development and its users.

Effects associated with flooding and surface water runoff as a result of higher rainfall and extreme rainfall events may be exacerbated by cumulative developments which increase the impermeable area in the vicinity of the development. However, the Stormwater Management Plan, Appendix 1.13, takes into account climate change and cumulative effects so this is not further assessed here.

Effects associated with higher temperatures and more extreme temperature events could be exacerbated by cumulative developments if they result in a large increase in hard surface in the vicinity of the development (urban heat island effect). However, it is expected that all cumulative developments would include climate resilience measures. Given the location the development site next to the Port River and Gulf St Vincent, it is considered that any additional urban heat effect by cumulative developments will be minimal.

Cumulative effects with respect to climate resilience are therefore not significant.

CHAPTER 15

Greenhouse Gas Emissions

URPS

15. Greenhouse Gas Emissions

Conclusion: No significant greenhouse gas emissions effects have been identified. The development's greenhouse gas emissions are a small component of national carbon budgets over the development's lifecycle.

The development will adopt good practice measures to avoid and minimise greenhouse gas emissions during the construction and operation phases and will support South Australia's transition to net zero by or before 2050.

15.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to greenhouse gas (GHG) emissions.

Colby Phillips Advisory has prepared a preliminary GHG assessment for the construction and operational phases of the development to inform this EIS. The full report is provided in Appendix 1.9.

15.2 Assessment Requirements

Commission Assessment Requirements: CCRE2 (Standard Requirements)

- Undertake a preliminary greenhouse gas assessment that:
  - identifies potential sources of GHG emissions that would be generated
  - provides an estimated annual GHG emissions for the construction and operating phases
  - provides an estimate of yearly net GHG emissions and emissions intensity, including an uncertainty assessment
  - provide an inventory of projected annual Scope 1 emissions.
- Describe how the project will contribute to meeting South Australia's emissions targets i.e. 100% renewable energy target by 2030, 50% emissions reduction below 2005 level by 2030 and zero net emissions by 2050.
- Describe measures that have been incorporated in the design to minimise, reduce and ameliorate greenhouse gas emissions, particularly the use of alternative or renewable energy sources and off-sets, energy efficiency and energy conservation measures, and if it incorporates integrated passive design principles and climate-responsive techniques and features and identify barriers to implementation.

15.3 Guiding Legislation and Agreements

The legislation and agreements relevant to the assessment of GHG emissions associated with the development are summarised in 15.1 below.

Table 15.1 Guiding legislation and agreements

Legislation/guideline	Description
Climate Change Act 2022	Australia is one of 27 nations to have legislated its net zero targets. The Act outlines Australia's greenhouse gas emissions reduction targets of a 43% reduction from 2005 levels by 2030 and net zero by 2050.
Climate Change and Greenhouse Emissions Reduction Act 2007 (the 'Act')	The South Australia Government is currently amending the *Climate Change and Greenhouse Emissions Reduction Act 2007*. The updates to the Act will seek to update the existing targets outlined in the Act to reflect South Australia's commitments to reach net zero greenhouse gas emissions by 2050, at least 50% net emissions reduction on 2005 levels by 2030, and 100% renewable energy in electricity generated in South Australia and supplied to the state's grid electricity supply by 2030.
Environment Protection Act 1993	On 1 March 2024, climate change related amendments made to the EP Act came into effect. These amendments define and then add the terms 'climate change adaptation', 'climate change mitigation' and 'greenhouse gas emissions' explicitly into the Objects of the Act. These amendments were made to clarify the role of the Act, in particular the EPA's role in climate change regulation, and also to better position the EPA Board to address climate change when administering the Act.
Paris Agreement	Australia is party to the Paris Agreement. The Paris Agreement came into force in 2016. It was a major step forward in international efforts to address climate change. The Paris Agreement aims to strengthen the global response to the threat of climate change by: • holding the increase in the global average temperature to well below 2°C above pre-industrial levels • pursuing efforts to limit temperature increase to 1.5°C. Under the Paris Agreement, Australia must submit emissions reduction commitments known as Nationally Determined Contributions. Australia submitted its first Nationally Determined Contributions to the UNFCCC in 2015. An updated version of this Nationally Determined Contributions was submitted in 2022. The update commits Australia to reducing its emissions to 43% below 2005 levels by 2030.

15.4 Scope, Study Area and Assessment Method

15.4.1 Scope and Study Area

GHGs are gaseous compounds that have been identified as contributing to a warming effect in the earth's atmosphere. The primary GHG relevant to the development is carbon dioxide (CO_2) which is emitted from combustion sources such as energy for plant, services and equipment at the site and vehicular transport.

The scope of the GHG assessment within this chapter is defined through its:

- Geographic scope - GHGs contribute to climate change, which is a global environmental effect and as such the geographic area for the assessment is not limited by any specific geographical scope or defined by specific sensitive receptors.
- Temporal scope - The temporal scope was consistent with assessing the whole lifecycle GHG emissions from the development (i.e., construction and operation).

15.4.2 Assessment Method

In the absence of specific guidance on assessment of GHG emissions with EIA within South Australia, the assessment undertaken within this chapter has used the *Institute of Environmental Management and Assessment (IEMA), Guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022)* (the 'IEMA Guidance') as the basis of the assessing the significance of effects for the development[27].

Determining Effect Significance

The approach to classifying and defining likely significant effects therefore relies on IEMA Guidance and applying professional judgment on the significance of the development's lifecycle GHG emissions considering their context, compliance with policy, and mitigation measures.

IEMA established three underlying principles, which informed its approach to significance, as follows:

- The GHG emissions from all developments will contribute to climate change, the largest interrelated cumulative environmental effect.
- The consequences of a changing climate have the potential to lead to significant environmental effects on all environmental topics/matters, e.g., population, fauna and soil.
- GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a development might be considered to be significant.

[27] IEMA (2022), Assessing Greenhouse Gas Emissions and Evaluating their Significance. 2nd Edition. Available at: https://s3.eu-west-2.amazonaws.com/iema.net/documents/knowledge/policy/impactassessment/J35958_IEMA_Greenhouse_Gas_Guidance-1.pdf. Accessed: September 2024.

Based on these principles, IEMA conclude that:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some developments will replace existing development or baseline activity that has a higher GHG profile. The significance of a development's emissions should therefore be based on its net impact over its lifetime, which may be beneficial, adverse or negligible.
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the development's residual emissions at all stages.
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the development's remaining emissions should be considered.

It follows that the significance of any net change of GHG resulting from a development is not so much whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions consistent with a trajectory towards net zero by 2050.

Therefore, the assessment of significance is established over two steps as follows:

Step 1: Establish Context of GHG Emissions

Context for decision making is provided by comparing the net change in the whole of life GHG emissions resulting from the development with state GHG emissions totals.

Step 2: Determine Significance of Effects

Significance of effects is established through applying the criteria detailed in Table 15.2 based on professional judgement that considers:

- Step 2a: The consistency of the development with national and state designed polices to limit GHG emissions and meet the Australia's net zero target.
- Step 2b: The robustness, timeliness and efficacy of mitigation measures proposed to avoid, reduce and compensate GHG emissions.

Examining each of these dimensions allows the assessment to make professional judgement on the likely significance of effects based on a set of significance criteria established in the IEMA Guidance, summarised below in Table 15.2. Major adverse, moderate adverse and beneficial effects should be considered significant in the context of EIA. Negligible and minor adverse are considered not significant.

Table 15.2: Significance of effects criteria (Source: IEMA Guidance)

Significance of Effect	Description
Major adverse	The development's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing state and national policy for developments of this type. A development with major adverse effects is locking in emissions and does not make a meaningful contribution to the Australia's trajectory towards net zero.
Moderate adverse	The development's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with state and national policy goals for developments of this type. A development with moderate adverse effects falls short of fully contributing to the Australia's trajectory towards net zero.
Minor adverse	The development's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A development with minor adverse effects is fully in line with measures necessary to achieve the Australia's trajectory towards net zero.
Negligible	The development's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for developments of this type, such that radical decarbonisation or net zero is achieved well before 2050. A development with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Beneficial	The development's net GHG impacts are below zero and cause a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A development with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

Mitigation

In terms of mitigation, IEMA recommends that mitigation should in the first instance seek to avoid GHG emissions. Where GHG emissions cannot be avoided, the development should aim to reduce the residual significance (within the context of EIA) of its emissions at all stages. Where additional GHG emissions remain but cannot be further reduced at source, approaches should be considered that compensate for the development's remaining emissions, for example through offsetting.

Assumptions and Limitations (i.e. Uncertainties)

Given the initial stage of design development at the time of writing this EIS, the GHG assessment is based on a range of assumptions and specific quantities for expected materials or energy usage during project construction and operating phases and/or activities were not available.

Once greater design detail is determined, an updated GHG emissions assessment will be prepared to confirm assumptions and refine findings and form part of a future Greenhouse Gas Emissions Reduction Strategy (GGERS), see section 15.6 below.

15.5 Baseline Conditions and Sensitive Receptors

15.5.1 Baseline Conditions

The development site is presently a brownfield site and there are no material activities that result in GHG emissions. Baseline emissions are therefore assumed to be zero.

15.5.2 Sensitive Receptors

The assessment of climate change does not include identification of sensitive receptors, as GHG emissions do not directly affect specific locations, but lead to indirect effects by contributing to climate change.

15.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanism for mitigation measures.

15.6.1 Embedded Mitigation

Construction

A CEMP would be implemented across the construction phase of the development. The final version of the CEMP will be subject to approval by the necessary stakeholders and agencies. This document will set out measures to reduce environmental impacts and minimise the creation of waste and the use of energy and other resources.

Operation

Once more design detail is confirmed, a GGERS will be prepared to identify exactly how the development will minimise its operational GHG emissions. The GGERS will be prepared through the following steps:

- Using the early assessment / framework developed by the GHG assessment, prepare a fully developed project baseline GHG emissions assessment once more project information is available.
- Compare the trajectory of the baseline emissions assessment with state emissions targets and identify any contribution gap between the project baseline and state targets.
- Identify & select emission reduction measures to align with state targets.

- Set targets & implement selected emission reduction measures.
- Monitor & report performance.
- Adjust approach if needed.

The development's GGERS will be focused on reducing emissions at their source. However, some emissions cannot be avoided due to lack of available technology, development consumption total energy consumption need, procurement requirements, or prohibitive costs. As such, purchasing or creating offsets could be considered to reduce residual emissions.

15.7 Assessment of Effects

15.7.1 GHG Emission Assessment Findings

The scope of the GHG emission assessment for construction and operation covers:

- Scope 1 - Direct GHG Emissions (those generated on the development site).
- Scope 2 - Indirect GHG Emissions (resulting from electricity imported and used on the development site).
- Scope 3 - Embodied GHG emissions (GHG emissions happening outside of the development site, in the supply chain).

GHG emissions from the treatment and disposal of waste are a small component of the GHG emissions of the development and will be minimised through standard best practice including the implementation of construction and operational waste management plans. As such, they are not considered further within this assessment, this is consistent with the IEMA Guidance.

Table 15.3 identifies likely main sources of GHG emissions for the development during its construction and operational phases. This inventory should be considered a starting point, may not be exhaustive, and should be reviewed and expanded as necessary when the design is further progressed.

Table 15.3: Main emissions sources at each phase

Emissions scope	Potential major sources	Construction phase	Operational phase
Scope 1 - Direct GHG Emissions (i.e., on-site emissions resulting from)	– Gaseous fuels (e.g., liquefied petroleum gas, natural gas)	•	•
	– Liquid fuels (e.g., petrol, diesel)	•	•
	– Welding gasses (e.g., acetylene)	•	•
	– Refrigerant leakages (e.g., HVAC)	•	•
Scope 2 - Indirect GHG Emissions (i.e., imported emissions resulting from)	– Grid electricity	•	•
Scope 3 - Embodied GHG emissions (i.e., external site embodied emissions caused by)	– Infrastructure construction materials (e.g., concrete, steel, aluminium, aggregate, timber, glass, bitumen, building fit-out, etc.)	•	
	– Submarine construction materials & equipment (e.g., steel, batteries, plastics, communications / guidance / navigation systems, weapon systems, etc.)		•
	– Energy supply - Upstream emissions (e.g., electricity transmission & generation)	•	•

Emissions scope	Potential major sources	Construction phase	Operational phase
	– Embodied emissions - Other Scope 1 Consumables (e.g., welding gasses, refrigerants)	•	•
	– Water - Supplied & used	•	•
	– Wastewater - Treatment & disposal	•	•
	– Waste management - Collection and resource recovery or landfill disposal	•	•
	– Site maintenance activities		•
	– Other supply chain embodied emissions – For other material & resource use (e.g., paper, food, printer cartridges, other submarine manufacturing and testing equipment or activities, etc.)	•	•
	– Project travel (e.g., vehicular, air)	•	•
	– Workforce (e.g., private and/or public transport to and from work, external site offices, etc.)	•	•

Findings of the Colby Phillips Advisory GHG assessment, Appendix 1.9, include:

Construction

- Based on the preliminary assessment and with the limited design detail currently available, approximately 557,310 tonnes CO_2e could potentially be emitted across the entire 10-year construction phase of the development. This could potentially equate to an average of 55,730 tonnes CO_2e per year.
  - This is dominated (>90%) by scope 3 emissions from embodied emissions in building materials. Major contributors (e.g., >50%) to these building material Scope 3 emissions would be concrete and steel.
  - Construction phases GHG emissions could peak between 2028 and 2030 when main civil works for most major buildings and/or other infrastructure (i.e., foundations, structures, facades, services) could be completed.

Operation

- Based on the preliminary assessment and with the limited detailed information currently available, approximately 67,250 tonnes CO_2e could potentially be emitted per year during the operation of the development. This could potentially equate to an average of 920,000 tonnes CO_2e over the projected operation period.
  - Scope 3 emissions are the largest contributor to operational emissions of the development (73%), dominated by submarine construction materials and components (24%), workforce e.g. project-related flights and travel, private and public travel to and from work etc. (17%), and other potential resource usage for operations at the site e.g., office paper, cardboard from deliveries, plastics in PPE, etc. (17%). Scope 2 emissions from grid electricity usage is likely to account for 22% of annual operational emissions.

Whole Life GHG Emission Footprint

- The whole life GHG emissions footprint for the development, based on the preliminary assessment and with the limited design detail currently available is estimated to be approximately 1,477,310 tonnes CO_2e (557,310 tonnes CO_2e + 920,000 tonnes CO_2e).

15.7.2 Assessment of Significance of Effects

Step 1: Establish Context

The GHG emissions from the development are compared to state CO_2e totals to establish context. The updates to the Act will seek to update the existing targets outlined in the Act to reflect South Australia's commitments to reach net zero greenhouse gas emissions by 2050, at least 50% net emissions reduction on 2005 levels by 2030, and 100% renewable energy in electricity generated in South Australia and supplied to the state's grid electricity supply by 2030.

The summary of annual GHG emissions provided within the State and Territory Greenhouse Gas Inventories 2022 data, provided by the Department of Climate Change, Energy, the Environment and Water, shows South Australia emissions for the 2022 year were estimated to be 15.8 million tonnes (MT) $CO2_e$.[28] To assess a worse-case assessment, 15.8 MT CO_2e has been used as the baseline for both the construction and operational phases over the life of the development.

The construction phase GHG emissions (55,730 tonnes per year) as a percentage of the Australia's annual GHG emissions (15.8 MT CO2e) is approximately 0.35% and therefore considered small. The operational phase GHG emissions (67,250 tonnes per year) as a percentage of the Australia's annual GHG emissions (15.8 MT CO2e) is approximately 0.43% and therefore considered small.

Step 2: Determine Significance

Step 2a: Consistency of the Development with State Policies

The development is judged to accord with all relevant state policies relating to GHG emissions in the following ways:

- The gross GHG emissions associated with the construction and operational phase of the development are small in the context of wider GHG emissions.
- The development will be designed to minimise embodied carbon and maximise lifecycle benefits, where appropriate.
- A whole of life GHG emissions assessment to support the application (Appendix 1.9).

Overall, the development is considered consistent with relevant state policies relating to GHG emissions as outlined within Section 4.2 of the GHG assessment attached as Appendix 1.9.

[28] Department of Climate Change, Energy, the Environment and Water 2022, State and territory greenhouse gas inventories: annual emissions https://www.dcceew.gov.au/climate-change/publications/national-greenhouse-accounts-2022/state-and-territory-greenhouse-gas-inventories-annual-emissions Access: September 2024

Step 2b: Robustness, timeliness and efficacy of mitigation

The principles of the IEMA Guidance are that where GHG emissions cannot be avoided, that mitigation should be provided to minimise GHG emissions.

Mitigation measures adopted by the development to minimise GHG emissions from the construction and operation phase that are considered inherent in the design and described in 'Mitigation Measures' of this Chapter.

As outlined within Section 15.6, purchasing or creating offsets could be considered to contribute to emission reduction if required. Section 4.3.3 Offsets of the GHG Assessment, attached as Appendix 1.9, outlines a range of potential offset mechanisms or measures that could be considered to reduce and minimise future GHG emissions of the development if required and to further contribute towards meeting South Australia's emission targets.

Summary of GHG Assessment

The assessment of significance has followed a two-step process consistent with IEMA Guidance and is summarised below in Table 15.4.

Table 15.4 Summary of GHG Assessment

Step	Assessment	Applicable IEMA rating
Step 1- Context	The development's GHG emissions are a very small component of state carbon budgets over the development's lifecycle.	Minor adverse
Step 2a: Consistency with policy	The development is consistent with applicable existing and emerging policy requirements.	
Step 2b: Robustness, timeliness and efficacy of mitigation	The development will adopt good practice measures to avoid and minimise GHG emissions during the construction and operation phases and will support the transition to net zero by or before 2050.	

Residual Effects

No additional measures are proposed and therefore the residual effects remain as Minor adverse.

15.8 Cumulative Effects

The IEMA Guidance makes clear that climate change is "the largest interrelated cumulative environmental effect" and therefore the assessment of GHG emissions which contribute to climate is intrinsically cumulative.

In terms of this assessment the following are therefore relevant:

- The assessment has considered the effects of the development in the context of state cumulative totals. Since the state totals assume that other developments will contribute GHGs, the assessment has inherently considered their implications in determining significance; and
- The geographical location of emissions has no relevance to the assessment. Therefore, the effects of the development are independent of any local cumulative emissions.

Taking this into account, an assessment of the GHG emissions associated with cumulative developments was not undertaken and the cumulative GHG effects are considered to be the same as those for the completed development.

This is consistent with IEMA Guidance which states that,

> *"Effects of GHG emissions from specific cumulative Projects therefore in general should not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative Project that has GHG emissions for assessment over any other".*

CHAPTER 16

Waste Management

URPS

16. Waste Management

Conclusion: No significant waste management effects have been identified. The development will adopt good practice measures to avoid and minimise waste and will follow the waste hierarchy (avoiding, reducing, reusing, recycling and recovering waste as a priority over treating and disposing waste).

16.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development for waste. Colby Phillips Advisory has prepared a waste management report (the 'Waste Management Report') for the construction and operational phases of the development to inform this EIS. The full report is provided in Appendix 1.11.

16.2 Assessment Requirements

Commission Assessment Requirements: CCRE4: Detailed Requirements

- Identify, quantify and classify all the expected waste streams to be generated from the proposed project activities during the construction, operation, rehabilitation and decommissioning phases of the development.
- Assess and describe the proposed management measures for each waste stream against the waste management hierarchy, namely: avoid and reduce waste generation, reuse, recycle, recover energy and other resources, treatment and disposal. This includes the generation, storage and transport of waste.
- Provide a required framework and content for a future waste management and minimisation plan (for demolition, construction and operation where relevant), detailing the sources of waste, the location of waste storage (including separation of waste streams, such as recyclables, hard waste and e-waste) and disposal facilities on the site or development - related sites (e.g. laydowns) and provide details of how these facilities will be serviced, including the need for licensing, permits or approvals to support proposed offsite or onsite waste management practices
- To support planning of logistics and industry capability, identify potential waste service providers, including any potential requirement for waste streams to be managed by licensed service providers interstate.
- Describe the method of storage of the radioactive waste from all relevant components of the proposal during ongoing operations, including transport and handling, storage and disposal of radioactive waste.
- Describe the method of disposal of radioactive waste from all relevant components of the proposal after operations are completed.

16.3 Guiding legislation and policy

The legislation and policies relevant to the waste assessment for the SCY are summarised in the Table 16.1 below.

Table 16.1: Summary of Legislation/guidelines

Legislation/guidelines	Description
Waste Strategy 2020-2025	South Australia's Waste Strategy 2020-2025 outlines actions that can contribute to the development of a circular economy. It sets targets including zero avoidable waste to landfill by 2030.
Environment Protection Act 1993 - Environment Protection (Waste to Resources) Policy (Waste EPP) 2010	The Waste EPP provides regulatory underpinning for South Australia's Waste Strategy.
Waste management hierarchy	The waste management hierarchy is recognised internationally as a set of priorities for the efficient use of resources.

16.4 Scope, Study Area and Assessment Method

16.4.1 Scope and Study Area

Multiple waste streams will be produced through the construction and operation of the development. Anticipated waste categories are identified in Table 16.2, and these have been assessed within this chapter.

The study area for the development is the Greater Adelaide region as all waste produced is expected to be managed within this area.

Table 16.2: Categories of waste expected to be produced

Waste category	Description
Standard waste & recycling	Does not contain hazardous and/or radioactive waste.
Hazardous waste	Is dangerous to environment and human health.
Contaminated solid waste	Has hazardous waste contamination but still suitable for landfill disposal.
Waste soils	From excavation that is not contaminated and can be safe for reuse as a construction fill.
Radioactive waste	Low level waste as outlined within Table 4.12.

16.4.2 Assessment Method

Given the absence of specific guidance on the assessment of waste within EIA in South Australia, the assessment undertaken within this chapter has used the *Institute of Environmental Management and Assessment (IEMA) guide to: Materials and Waste in Environmental Impact Assessment, Guidance for a proportionate approach* (the 'IEMA Guidance') as the basis of the assessing the significance of effects for the development. Specifically, the 'Landfill Diversion' method has been selected to determine effect significance[29].

This method was selected as the management of waste is highly regulated in South Australia, and this approach aligns with the State's goals for reducing landfill reliance and enhancing resource recovery.

Determining Effect Significance

Determining effect significance generally follows the approach included within Chapter 6 – Impact Assessment Methodology (i.e., relationship between the magnitude of an impact and the sensitivity (or value) of the affected resource or receptor.)

Table 16.3 describes the magnitude of impact used in this assessment.

Table 16.3: Magnitude of Impact criteria

Magnitude of Impact	Description
Very Low	In construction and/or operation, a development is expected to achieve 90-99% landfill diversion.
Low	In construction and/or operation, a development is expected to achieve 60-89% landfill diversion.
Medium	In construction and/or operation, a development is expected to achieve 30-59% landfill diversion.
High	In construction and/or operation, a development is expected to achieve 0-29% landfill diversion.

The matrix presented in Table 16.4 was applied to determine the significance of effects of the development.

Table 16.4 Significance of Effects Matrix

	Magnitude of Impact			
	High	Medium	Low	Very Low

[29] IEMA (2020), IEMA guide to: Materials and Waste in Environmental Impact Assessment. Guidance for a proportionate approach. Available at: https://www.iema.net/content/materials-and-waste-in-environmental-impact-assessment-march-2020/. Accessed: September 2024.

		Magnitude of Impact			
Sensitivity / Value of Receptor	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Very Low	Minor	Negligible	Negligible	Negligible

Assumptions and Limitations (i.e. Uncertainties)

The waste types and quantities of waste detailed in this EIS are indicative and have been identified for the purpose of determining potential waste effects and waste management options. Although the quantities of waste actually generated by the development may differ from the estimates made, the identified waste management options are variable and are considered to be appropriate for anticipated final waste quantities.

Typical management measures, in accordance with State regulatory frameworks, have also been proposed to appropriately manage potential waste and resource use impacts.

16.5 Baseline Conditions and Sensitive Receptors

16.5.1 Baseline Conditions

The development site is presently brownfield site and there are no existing activities that result in waste. Baseline waste quantities are therefore assumed to be zero.

16.5.2 Sensitive Receptors

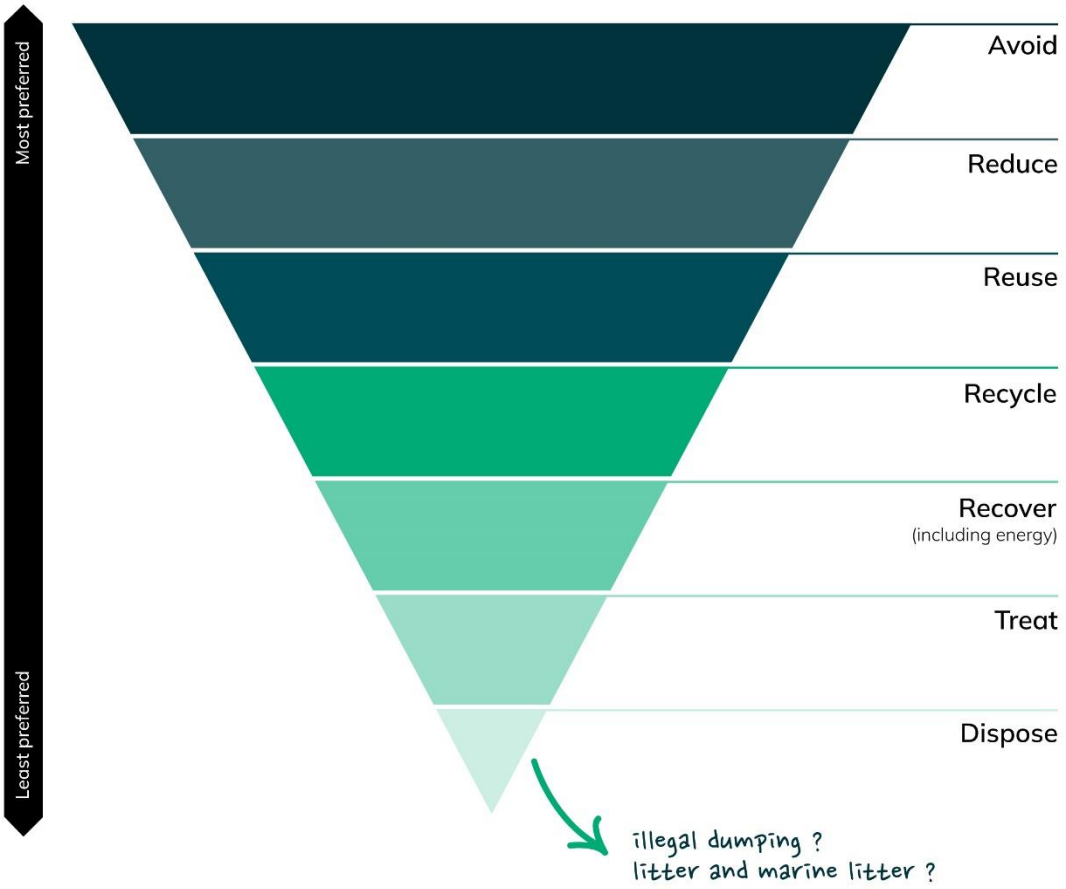
Landfills are considered the sensitive receptors in this assessment due to their vulnerability to waste management practices. Landfills are considered to be a 'High' sensitive receptor.

16.6 Mitigation Measures

16.6.1 Existing Waste Management Requirements

Management of waste is highly regulated in South Australia. Waste must be managed appropriately to avoid impacts including waste of resources including materials, energy, water, emissions etc., and harm to the environment and community. Disposal of this waste will follow the waste hierarchy (Figure 16.1), with avoiding, reducing, reusing, recycling and recovering waste as a priority over treating and disposing waste.

Figure 16.1: Waste hierarchy



The development will comply with all relevant requirements to ensure management of waste promotes sustainability and avoids negative impacts. The storage, transport, disposal and licensing requirements for each key waste type produced through the development have been outlined below. These will be further detailed in a Waste Management and Minimisation Plans ('WMMP') included within the CEMP and OEMP for the development once further development details are known.

- General wastes: General wastes generated by ancillary activities including office, amenities, packaging, scrap metal, warehousing, and organic matter would be sorted and disposed according to South Australian waste management and disposal procedures under the EP Act.
- Hazardous waste: Hazardous wastes may be generated by manufacturing and fabrication activities within the development and would likely include materials such as paint, cleaners, solvents, degreasers and batteries. Hazardous wastes would be disposed of in accordance with the requirements of the EP Act.
- Radioactive wastes: The testing and commissioning of the SSN-AUKUS are anticipated to generate low level radioactive waste. The Australian Radioactive Waste Management Framework (Commonwealth of Australia 2018) describes low level waste as including laboratory wastes, equipment and bulk material, with minor levels of contamination from contact with radioactive materials. It is material that contains radioactive materials with activities or activity concentrations at levels where regulatory oversight is needed to ensure safety.

This radioactive waste will be managed in accordance with the South Australian EP Act and the Australian *Radiation Protection and Nuclear Safety Act 1998*.

Table 16.5 Storage, transport, disposal and licencing, permits and approvals requirements for each waste type

Impact pathway (waste type)	Mitigation and management measures			
	Storage	Transport	Disposal	Licencing, permits and approvals
Standard waste & recycling	Source separation of waste for resource recovery with multiple types of recycling bins to be provided on site.	Licensed Category A transport providers.	Licensed disposal facilities that can receive and process these waste streams to maximise resource recovery and landfill diversion. Where possible, onsite re-use and processing.	Approvals and/or licensing by the SA EPA under the *EPA Act*.
Hazardous waste including soils	Bins and storage designed and built for safe containment of hazardous wastes. These facilities would be designed, managed, and used in line with relevant requirements and standards for the dangerous goods or	Licensed Category B waste transporters.	SA EPA licensed hazardous disposal facilities, including reprocessors.	SA EPA requirements as above, as well as adherence to the following requirements Work health and safety requirements: • *South Australia Work Health and Safety Act 2012.* • *South Australia Work Health.*

Impact pathway (waste type)	Mitigation and management measures			
	Storage	Transport	Disposal	Licencing, permits and approvals
	hazardous substances present in the waste.			*and Safety Regulations 2012.* • *South Australia Approved Codes of Practice in South Australia.* • *Australian Code for the Transport of Dangerous Goods by Road & Rail.* Dangerous goods requirements: • *South Australia Dangerous Substances Act 1979.* • *South Australia Dangerous Substances (General) Regulations 2017.* • *South Australia Dangerous Substances (Dangerous Goods Transport) Regulations 2023.* • *National Environment Protection Measure*
Contaminated solid waste	Actual or suspected contaminated solid waste would be handled and stored in the same way as for hazardous waste until its level of contamination can be tested and classification confirmed.	Where meeting the SA EPA criteria for landfill disposal: Category A licensed waste transporters Where exceeding the SA EPA criteria for landfill disposal: Category B licensed waste transporters.	Where meeting the SA EPA criteria for landfill disposal: refer standard waste & recycling Where exceeding the SA EPA criteria for landfill disposal: refer hazardous wastes.	

Impact pathway (waste type)	Mitigation and management measures			
	Storage	Transport	Disposal	Licencing, permits and approvals
				(Movement of Controlled Waste between States and Territories) Measure 1998. • *Commonwealth Transport Regulations 2002.*
Waste soils	Temporary on-site storage as outlined within a Soil, Erosion and Contamination Management Plan, which will form part of the CEMP, until reuse on site or disposal off site.	Where meeting the SA EPA criteria for disposal: Category A Licensed waste transporters. Where not meeting SA EPA criteria for waste soils: refer contaminated wastes.	Where meeting the SA EPA criteria for waste soils: suitable construction sites. Where not meeting SA EPA criteria for waste soils: refer contaminated wastes.	• *SA EPA Standard for the production and use of Waste Derived Fill.*
Radioactive waste The limited volumes of radioactive waste produced during the development will be classified as exempt, very short-lived, very low level waste, and low level waste (LLW). **No intermediate or high-level radioactive waste will be produced, nor will storage be required at the development site**.				Separate approval and/or licensing by the SA EPA under the *SA Radiation Protection and Control Act 2021.* Preparation of radiation waste management plan that complies with the SA EPA's *Code*
Exempt	Some waste may be suitable for landfill disposal if it meets the 'Exempt' classification per ARPANSA Codes of practice for radioactive waste	Category A licensed waste transporters	Refer disposal facilities for general waste, subject to	

Impact pathway (waste type)	Mitigation and management measures			
	Storage	Transport	Disposal	Licencing, permits and approvals
	management (2020). Exempt waste would be stored in a suitable designed and secure area and comply with the with, if required, until disposal: • *SA EPA Code of Compliance for facility design and shielding 2022.* • *ARPANSA Codes and standards.*		confirmation and approval by the SA EPA under the *South Australia Radiation Protection and Control Regulations 2022* following SA EPA *Guidelines for waste management application/ plan to dispose of unsealed radioactive material.*	*of Compliance for radiation management plans 2022.* SA EPA approved facility under the *SA Radiation Protection and Control Act 2021.* ARPANSA approval(s) for transport and/or disposal would be additionally required under the *Australia Radiation Protection and Nuclear Safety Act 1998.* *South Australia Radioactive Protection & Control Regulations 2022.* *ARPANSA Code for the Safe Transport of Radioactive Material (2019).* *Australian Naval Nuclear Power Safety Bill 2024 requirements set by the Australian Naval Nuclear Power Safety Regulator (ANNPSR).*
Very short-lived waste	Specialised and secure storages, which would need to be classified and comply with: • *SA EPA Code of Compliance for facility design and shielding 2022* • *ARPANSA Codes and standards*	Category A licensed waste transporters.	Store on site until meets Exempt levels, refer above for disposal requirements for exempt waste.	
Very low level waste		If Exempt, see above. If not Exempt, SA EPA licensed carrier &/or ARPANSA	Store on site until meets Exempt levels or National Disposal Facility is available.	

Impact pathway (waste type)	Mitigation and management measures			
	Storage	Transport	Disposal	Licencing, permits and approvals
		transport approval.		
Low level waste	Can only be held and stored in a suitable and secure facility (at the development site or elsewhere) until suitable disposal facility becomes available in Australia.	SA EPA licensed carrier &/or ARPANSA transport approval.	Store on site until a low-level radioactive waste disposal facility is available.	

16.6.2 Summary of management plans

A Waste Minimisation and Management Plan (WMMP) for the development will be prepared once further project details are known. This will include a Construction Waste Management Plan as part of the CEMP, an Operational Waste Management Plan, and a Radiation Management Plan ('RMP'). A proposed framework for these plans is provided in the full Waste Management Report available in Appendix 1.11.

16.7 Assessment of Effects

16.7.1 Construction

Potentially, subject to the outcome of detailed design, up to 170,000 tonnes of waste material could be generated by the construction phase of development as outlined within Table 16.6 below. More than 90% of this material should be diverted away from landfill disposal through:

- Reuse on-site of demolished masonry, concrete, and waste soils.
- Recycling, mainly by construction and demolition industry re-processors.
- Recovery of dry and non-hazardous waste material as a refuse derived fuel (to provide an energy source).

As such, the construction phase of the development is considered to result in a 'Very Low' magnitude of impact, as the development should achieve a landfill diversion percentage of more than 90%. The significant of effect to landfills during the construction phase of the development is therefore considered to be Minor Adverse.

Table 16.6 Preliminary assessment of waste including high-level indicative volume estimates

Category	Waste material	Indicative volume (tonnes)*	Potential disposal fate (primary)				
			Reuse	Recycle	Recover	Treat	Landfill
1. Standard waste & recycling	Masonry	79,000	64%	32%			4%
	Metals	5,000		90%	8%		3%
	Organics	3,400		20%	65%		15%
	Cardboard & Paper	700		20%	65%		15%
	Plastics	1,300		20%	65%		15%
	Glass	340			60%		40%
	Other Material	110		45%	45%		10%
	Sub-total	89,850	50,560	30,910	4,140		4,240
2. Hazardous waste including soils	Soil / Masonry (demolition)	800				100%	
	Other (construction activity)	430				100%	
	Sub-total	1,230				1,230	
3. Contaminated waste	Low level contaminated	1,680					100%
	Intermediate-level contaminated	1,120					100%
	Sub-total	2,800					2,800
4. Waste soils	Waste derived fill (clean)	71,200	100%				
	Intermediate waste soil (some contamination)	3,700			100%		
	Sub-total	74,900	71,200		3,700		
TOTALS	**By volume**	**168,350**	**121,760**	**30,910**	**7,840**	**1,230**	**7,040**

Category	Waste material	Indicative volume (tonnes)*	Potential disposal fate (primary)				
			Reuse	Recycle	Recover	Treat	Landfill
	By %	100%	72%	18%	5%	1%	4%

* Should only be considered ±50%, to be confirmed once more project information becomes available. Developed based on other assessments by Colby Phillips Advisory on project material inventories for greenhouse gas emission assessment (Appendix 1.9) and dangerous substances (Appendix 1.15) to support EIS of the SCY project.

16.7.2 Operation

Up to 2,000 tonnes of waste material per year (on average) could be generated in the operational phase of this development. Potentially more than 70% of this material should be diverted away from landfill disposal, as outlined within Table 16.7 below, mainly by source separating these materials and sending them to local recyclers.

Radioactive waste will be produced during the operational phase, which will be managed in accordance with strict state, national and international requirements to ensure utmost safety.

As such, the operational phase of the development is considered to result in a 'Low' magnitude of impact, as the development should achieve a landfill diversion percentage between 60% and 89%. The significant of effect to landfills during the operation phase of the development would be Moderate Adverse.

A conservative approach has been taken for the potential disposal fate of the standard waste & recycling during the operation phase, as approximately 410 tons (20% of total operational waste) has been allocated for landfill. With appropriate management using the measures outlined within Section 16.6, it is expected that the majority of standard waste and recycling would be able to be reused, recycle or recovered. Assuming that even half of the 410 tons is able to be reused, recycled or recovered, the magnitude of impact of the development would reduce to 'Very Low', as the development should achieve a landfill diversion percentage of more than 90%. The significance of effect would reduce to Minor Adverse in this case.

Based on professional judgement, the overall significance of effect is Minor Adverse for the operational phase.

Table 16.7: Preliminary assessment of potential waste streams including high level indicate volume estimates

Category	Waste material	Indicative volume (tonnes) *	Potential disposal fate (primary)					Radioactive waste fate (primary)		
			Reuse	Recycle	Recover	Treat	Landfill	Store	National Radioactive Waste Disposal Facility	Temporary storage & repatriation
1. Standard waste & recycling	Standard office / industrial /site activities									
	Paper & Cardboard	670		80%		1%	19%			
	Garden Waste (inc. some soil / mulch)	380		80%	10%		10%			
	Food Waste	210		50%			50%			
	Glass	30		50%			50%			
	Plastic	80		50%			50%			
	Other wastes (e.g., hard waste, e-waste, etc.)	110			40%		60%			
	Submarine manufacturing activity materials									
	Steel / ferrous	300	11 %	80%	4%	2.5%	2.5%			
	Copper	10	10 %	80%	4%	3%	3%			
	Brass	3	10 %	80%	4%	3%	3%			

Category	Waste material	Indicative volume (tonnes) *	Potential disposal fate (primary)					Radioactive waste fate (primary)		
			Reuse	Recycle	Recover	Treat	Landfill	Store	National Radioactive Waste Disposal Facility	Temporary storage & repatriation
	Aluminium	20	10 %	80%	4%	3%	3%			
	Glass	7	5%	30%	40%	5%	20%			
	Plastic	10	2%	60%	30%	3%	5%			
	Other materials (non-ferrous metals, ceramics, e-waste, explosives, etc.)	30	1%	30%	40%	5%	24%			
	Sub-total	**1,860**	**40**	**1,280**	**110**	**20**	**410**			
2. Hazardous waste including soils	**Sub-total**	**80**				**100 %**				
3. Contaminated waste	Low level contaminated	35					100%			
	Intermediate-level contaminated	15					100%			
	Sub-total	**50**					**50**			

Category	Waste material	Indicative volume (tonnes) *	Potential disposal fate (primary)					Radioactive waste fate (primary)		
			Reuse	Recycle	Recover	Treat	Landfill	Store	National Radioactive Waste Disposal Facility	Temporary storage & repatriation
5. Radioactive waste ^	Exempt	The assessment of radioactive waste is outside the scope of this EIS and will be addressed through the nuclear license for the development site. The potential for low level radioactive waste generated during commissioning of the nuclear-powered propulsion system at the final stage of the submarine build process, will be assessed through the Radiation Protection and Nuclear Safety Agency and ultimately the Australian Naval Nuclear Power Safety Regulator. Given the lead time in bringing the nuclear-powered propulsion system to the development site, there will be detailed work undertaken to quantify this prior to a nuclear license being granted.								
	Very short-lived waste									
	Very low level waste									
	Low level waste									
	Sub-total	N/A								
TOTALS	**By volume**	**2,020**	**40**	**1,280**	**110**	**100**	**470**	**5**	**13**	N/A
	By %	**100%**	**2%**	**63.4 %**	**5.4 %**	**5%**	**23.3%**	**0.3 %**	**0.6 %**	N/A

^ Classifications per ARPANSA Guide for Classification of Radioactive Waste (2020). * Should only be considered ±50%, to be confirmed once more project information becomes available.

16.8 Additional Mitigation Measures and Residual Effect

No additional mitigation or monitoring are required beyond those outlined above in Section 16.6. The likely residual effects for construction and operation will remain Minor Adverse.

16.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6-Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

No cumulative effects during either the construction or operational phase with these cumulative schemes are expected. This conclusion assumes that these developments will also implement effective waste management strategies as required by legislation and policy (i.e., Construction Waste Management Plan as part of a broader CEMP, and an Operational Waste Management Plan, similar to those outlined in Section 16.6. By adhering to best practices for waste management, it is expected that any potential effects will be mitigated, thereby preventing significant cumulative effects.

CHAPTER 17

Local, Regional and State Economies

URPS

17. Local, Regional and State Economies

Conclusion: Our key finding is that there are significant benefits to the South Australian economy at all levels through construction and operation of the development. However, the South Australian Government and Australian Government will need to give consideration and manage competition for skilled labour and land requirements.

17.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to economics.

TSA Management has prepared an Economic Analysis for the construction and operational phases of the development. The Economic Analysis Report is included as Appendix 1.12 of this EIS.

17.2 Assessment Requirements

Commission Assessment Requirements:

LSRE1: Detailed Requirements

- Provide a full economic analysis of the development including the long-term economic viability and efficiency of the operational aspects of the development, incorporating a regional impact analysis (RIA) and cost-benefit (risk return) analysis (CBA).
- The RIA should focus on the direct impact of the project on the local, regional and state economies. The identification of economic impacts should include the prediction of spending on goods, services, taxes etc. during construction and operation of the project and the distribution of income generated by the project.
- The CBA should assess the impact of the project on the economic welfare of the economies of interest by estimating a dollar value for as many economic, social and environmental benefits and costs as can reasonably be predicted.
- Consideration of regional economic impacts should include:
    - An outline of the skill level requirements of any new workforce, the component of the workforce that is expected to be hired locally, and the type of employment this would entail (e.g. full time, permanent, sub-contractors, casual, skilled labour, truck drivers etc) and identify if this employment would be continuous/year round.
    - Description of the existing significant economic activities and facilities in the areas (e.g. industrial, commercial, primary production (e.g. mining, agriculture, horticulture, viticulture, aquaculture, fishery), tourism) in the project area.
    - Identification of the impacts of the development will have on existing users of distribution networks for gas, electricity, waste, potable water, sewerage, and communication systems.

LSRE1: Detailed Requirements (continued)

- Describe any potential economic effects locally and regionally and the potential to attract value add development and commercial ventures including:
    - potential employment opportunities and the expected impacts on the local workforce during construction and operational stages and flow-on impacts on local business
    - information on local and indigenous employment and training opportunities associated with the proposal.
    - the economic effect of the construction and on-going workforce regionally. Include consideration of impact of development on existing industries and local businesses if workers change employment e.g. mining taking skilled workers from trades and agriculture due to higher wages.
    - effects on accommodation supply and demand
    - an analysis of existing supply chain and prospective suppliers, as well as any gaps in the supply chain
    - consideration of any additional land requirements to support the development (i.e. third-party supplier, logistics, transport, warehousing, manufacturing, office etc) to support the project and need to be co-locate or within close proximity.
    - secondary economic effects, including property and land values, potential to attract new industries and commercial ventures. Describe the positive and negative effects on existing businesses / industries (e.g. displacement, competition or opportunities)
    - the proposal's anticipated effect on State and local investment, research and development, educational effects, employment generation and flow-on impacts on business.
    - the proposal's anticipated effect on State and local investment and the region as a whole Identifying employment and investment opportunities, including the 'multiplier effect' for the local area, the broader regional economy and community and South Australia.
    - any economic implications for the State and the region if the development does not proceed.

17.3 Guiding Legislation and Policy

Legislation, policies and guidelines of importance to this assessment are summarised in the table below.

Table 17.1 Summary of Legislation/guidelines

Legislation/guideline	Description / Related Policies
Planning, Development and Infrastructure Act 2016	In South Australia, economic analysis is integrated within the broader environmental impact assessment requirements under the PDI Act. Although the Act does not prescribe economic analysis as a standalone legislative requirement, it does mandate economic considerations for projects classified as Impact Assessed Development.

17.4 Scope, Study Area and Assessment Methodology

The EIA methodology is detailed in Chapter 6 - Impact Assessment Methodology. This section provides specific details of the methodology applied to the assessment of economic effects resulting from the construction and operation of the development.

17.4.1 Scope

Likely economic impacts for the state, regional and local economies considered include the following:

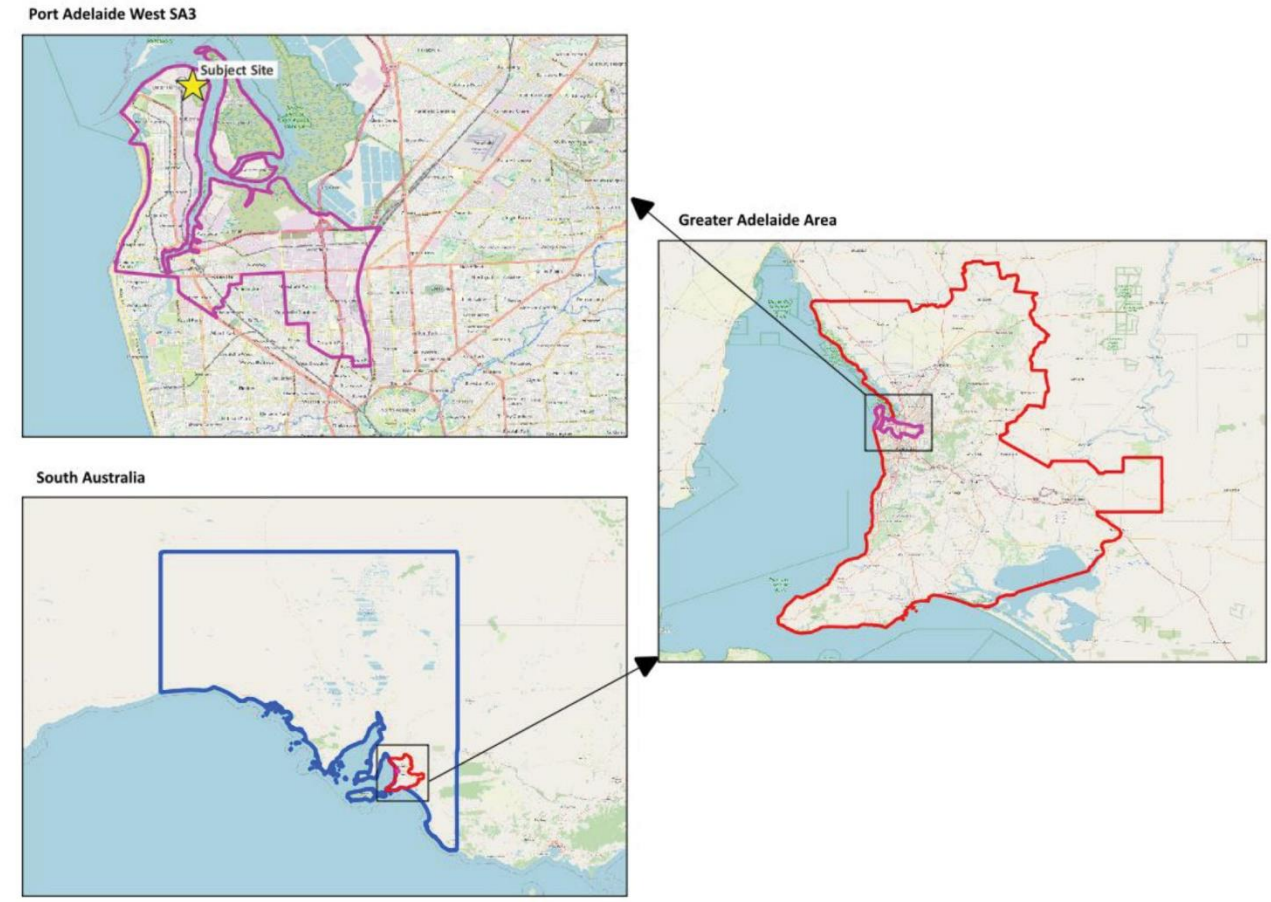
- Construction employment.
- Construction workforce spending.
- Contribution to construction output.
- Operational employment.
- Operational workforce spending.
- Contribution to operational outpu.t
- Other effects:
  - Employment and labour force impacts and risks.
  - Effects on accommodation supply and demand.
  - Supply chain opportunities.
  - Land requirements and potential effects.
  - Implications of not proceeding with the development.

17.4.2 Study Area

There are no nationally or state adopted standards or guidance documents that define the study area to be adopted for the assessment of economic effects for developments of this type. Therefore, the assessment uses the study area as contained within the Economic Analysis Report. The Economic Analysis Report splits the study area into three areas, as discussed below, as some effects will have very localised effects, whilst others will be experienced across Greater Adelaide and the State. The boundaries of these locations are shown in Figure 17.1.

- The local economy (defined as the Port Adelaide-West SA3).
- The regional economy (defined as the Greater Adelaide region).
- The state economy (defined as the South Australia state).

Figure: 17.1 - Local, Regional and State Economies



LOCAL, REGIONAL AND STATE ECONOMIES

17.4.3 Assessment methodology

The Economic Analysis Report, Appendix 1.12, is consistent with the State Planning Commission's Assessment Requirements. There is no specific guidance available within South Australia which establishes a methodology for undertaking an assessment of the various potential likely significant economic effects of a proposed development. In addition, different spatial scales will be relevant to the assessment of different potential economic effects. Accordingly, the approach adopted for this assessment was based on professional judgment and in consideration of the policy and baseline context of each type of effect and characteristics of each receptor.

The assessment of potential economic effects does however cover a number of different aspects of the development on different sensitive receptors including the labour market and local, regional and State economy.

The sensitivity of the economic receptors takes account of the importance attached to each receptor in policy terms and the characteristic of the baseline environment and ability of the receptor to absorb or respond to change, and where practicable draws on measurable indicators such as the scale of these receptors identified in the baseline, to gauge the receptor's sensitivity. Table 17.2 details the sensitivity criteria that were applied to this economic assessment for effects related to economic effects.

Table 17.2 - Receptor Sensitivity Descriptors

Value (Sensitivity)	Descriptor
High	The economic receptor has limited capacity to absorb or respond to change without noticeable economic loss or gain.
Medium	The economic receptor has some capacity to absorb or respond to change and may result in some perceptible economic loss or gain.
Low	The economic receptor has the capacity to absorb or respond to change with no or hardly perceptible economic loss or gain.

The magnitude of change upon each receptor was determined by considering the change experienced from the baseline conditions, subject to the consideration of embedded mitigation. The criteria used for the assessment of magnitude of change, which can either be positive (beneficial) or negative (adverse) is detailed in Table 17.3.

Table 17.3 – Magnitude of Impact Descriptors

Value (Sensitivity)	Descriptor
High	Substantial change to the economic receptor in terms of employment levels, output or productivity.
Medium	Noticeable change to the economic receptor in terms of employment levels, output or productivity.
Low	Hardly perceptible change to the economic receptor in terms of employment levels, output or productivity.
Very Low	No perceptible change to the economic receptor in terms of employment levels, output or productivity.

Assessing Significance

The significance of effect attributed to each socio-economic receptor was assessed based on the magnitude of change due to the Project and the evaluation of the sensitivity of the affected receptor as shown in Table 17.4.

Table 17.4: Significance of Effects Matrix

		Magnitude of Impact			
		High	Medium	Low	Very Low
Sensitivity / Value of Receptor	High	Major	Major/ Moderate	Moderate / Minor	Minor / Negligible
	Medium	Major/ Moderate	Moderate / Minor	Minor / Negligible	Negligible
	Low	Moderate / Minor	Minor / Negligible	Negligible	Negligible

Determining the scale of economic effects requires professional judgement; therefore, the matrix above includes a degree of flexibility when considering the magnitude of an impact in the context of the sensitivity of the receptor. The reasoning behind the professional judgement, and where this flexibility applies, is clearly explained in the assessment section.

17.4.4 Assumptions and Limitations (i.e. Uncertainties)

As with any dataset, baseline data will always change over time. The most recent published data sources were used in the Economic Analysis Report; however, it should be noted that in some instances this data may be older than the true baseline. This is an unavoidable limitation that is not considered to adversely impact the validity of the assessment undertaken to identify the likely significant economic effects.

17.5 Baseline Conditions and Sensitive Receptors

17.5.1 Baseline Conditions

Demographic overview

The demographic analysis within the Economic Analysis Report, Appendix 1.12, finds that a large extent of the local study area (i.e., Port Adelaide West-SA3) are relatively socioeconomically disadvantaged, with low household incomes reflecting a local worker population that is less likely than the average South Australian to have tertiary qualifications, and far more likely to work in traditionally blue-collar industries, like manufacturing, construction, and transport, postal and warehousing. Parts of the local region have traditionally experienced very high levels of unemployment, particularly regions to the south and east of the Port Adelaide centre.

The regional economy has been shaped by its access to key freight corridors (Port River Expressway, and North South Corridor), intermodal terminals, and trade gateways. These factors make the region an important location for businesses that benefit from access to global markets, typically those involved in the manufacture of goods, and the transportation, storage and distribution of goods (imports and exports).

17.5.2 Sensitive Receptors

Sensitive receptors have been identified based on their potential to interact with the development. The following economic receptors have the potential to experience an effect:

- Construction/operation labour market.
- Local, Regional and State economies.
- Accommodation Market.
- Residential land and Employment land.

17.6 Embedded Mitigation Measures

None identified.

17.7 Assessment of Effects

17.7.1 Construction

Construction Employment

The receptor for construction employment effects is the construction labour market at a regional and state level. The construction phase will generate demand for employment directly associated with the construction of the development, and indirectly via the supply chain. For each $1 billion invested, an estimated 619 jobs will be created annually across the South Australian economy, including just under 200 jobs directly associated with construction.

The sensitivity of the receptor is considered to be medium at the regional level and low at a state level, noting that the technicians and trades workers, machinery operators and drivers, and labourers accounts for high percentage of labour force at a regional level and given the mobility within the construction sector and availability of skills across the State. The magnitude of impact is medium at the regional level and low at a State level.

Therefore, there is likely to be a temporary, Moderate / Minor Beneficial effects on job creation at the regional level, and Minor / Negligible Beneficial effects at a state level during the construction phase. At a regional level this is considered to be significant, decreasing to not significant at a State level.

Construction Workforce Spending

The receptor for construction workforce spending effects is the local and regional economy. As the number of construction workers on site would likely fluctuate over the course of the construction programme, and there may be on site welfare and food/drink facilities, and there may be on site welfare and food/drink facilities, it is not possible to accurately quantify the level of this spending that would be captured locally.

If all spending occurs within the local economy, the spending impact of construction employees (medium magnitude impact) on the local economy (low sensitivity receptor) would be indirect, temporary, and Negligible / Minor Beneficial (not significant), with a Negligible Beneficial effect (not significant) at regional economy level. Individual local receptors within the local economy may experience a more substantial

effect given the benefit of accessibility to the construction site however it is not possible to accurately estimate the level of spend at that scale.

Contribution to Construction Output

The receptor for construction output effects is the construction economy at a regional level. Effects were assessed at a regional level to reflect the likely distribution of resident location of construction workers. The direct impact of construction phase expenditures would generate around $255 million output within the regional economy, taking into account production-induced and consumption-induced expenditures.

A substantial proportion of this is likely to be retained in the region economy. The sensitivity of the receptor is therefore considered to be low at the regional scale. The magnitude of change is low at the regional scale. Therefore, there is likely to be a temporary, Negligible Beneficial effect on the contribution to construction output the at the regional level during the construction phase which is not significant.

17.7.2 Operation

Operational Employment

The receptor for operational employment effects is the labour market at a regional and state level. The operational phase will generate demand for employment directly associated with the construction of the submarines, and indirectly via the supply chain. For each $10 billion invested, an estimated 6,010 jobs will be created directly as a result of the operating phase. A further 11,099 jobs will potentially be created within supply chains, and through the spending of workers wages and salaries.

The sensitivity of the receptor is medium at the regional level and low at a state level, noting that the technicians and trades workers, machinery operators and drivers, and labourers accounts for high percentage of labour force at a regional level and given the mobility within the sector and availability of skills across the state. The magnitude of impact is medium at the regional level and low at a State level.

Therefore, there is likely to be a temporary, Moderate / Minor Beneficial effects on job creation at the regional level, and Minor / Negligible Beneficial effects at a state level during the operational phase. At a regional level this is considered to be significant, decreasing to not significant at a State level.

Operational Workforce Spending

The receptor for operational workforce spending effects is the regional and State economy. $1.3 billion in wages and salaries is expected to be generated for every $10 billion in annual activity. It is not possible to accurately quantify the level of this spending that would be captured regional. If all spending occurs within the regional economy, the spending impact of employees (medium magnitude impact) on the regional economy (medium sensitivity receptor) would be indirect, and Moderate Beneficial (significant). This would decrease to a Minor Beneficial effect (not significant) at State economy level due to the State being a low sensitivity receptor.

Contribution to Operational Output

The receptor for operation output effects is the regional and State economy. Effects were assessed at a regional and State level to reflect the likely distribution of resident location of workers. The direct employment supported during the operational phase would generate around $9.42 billion output would be generated within the regional and State economies for every $10 billion in economic activity.

The sensitivity of the receptor is therefore considered to be medium at the regional and low at State level. The magnitude of change is considered to be medium at the regional and low at State level. Therefore, there is likely to be a temporary, Moderate Beneficial effect on the contribution to operation output at the regional level, which is considered to be significant, decreasing to a Minor Beneficial effect at State level, which is considered to be not significant.

17.7.3 Other Effects:

Employment and labour force impacts and risks (Construction)

The ASA estimates that a peak of around 4,000 workers will be required to design and build the infrastructure for the development. South Australia is already facing persistent skill shortages with 351 occupations currently experiencing shortages, up from 149 in 2021 – including those skills required for the design and construction of the development. Skills shortages are particularly severe for general construction labourers, project management professionals, concreters, and structural and civil engineers.

The evidence suggests that the design and building of the development would compete for the same workers with a range of other major infrastructure projects. This, combined with the fact that initiatives aimed at addressing skills shortages will take some time to produce dividends, it is reasonable to expect that the vast majority of the local workforce required for the design and building of the development will 'crowd out' jobs elsewhere in the State economy.

Another important consequence of a development such as this during a construction worker shortage is that the cost of labour contracts is likely to be pushed up, further reducing the viability of private investments across the region. The inability to mobilise construction sector resources as needed also has the potential to result in construction delays.

These risks could be minimised through ongoing active management of the public infrastructure works pipeline by the South Australian Government and Australian Government to smooth labour and material demands. In addition, concerted efforts to attract construction workers from interstate and overseas will reduce risks to the development and the economy overall. Investment of resources to contract and train disengaged working aged First Nation residents should also be considered to ensure benefits to First Nation communities are maximised.

The sensitivity of the receptor is therefore considered to be high at the regional level and medium at the State level. The magnitude of impact is medium at the regional and State level. Therefore, there is likely to be a temporary, Moderate Adverse effect at the regional level, which is significant, increasing to Minor Adverse effect at the State level, which is considered to be not significant.

Employment and labour force impacts and risks (Operation)

South Australia already possesses an established world-class maritime industry base and highly skilled workforce. Building on this established base, the ASA estimates that between 4,000 and 5,500 direct jobs must be filled to build nuclear-powered submarines when the development reaches peak activity in 20-30 years' time. The manufacturing phase of the development requires both manufacturing and knowledge-intensive workers, requiring a mix of vocationally and tertiary-training employees. By the time the development reaches peak activity, there is a strong prospect that the entire 4,000 to 5,500 direct jobs required will represent net additional employment (i.e. no displacement of other jobs in the economy).

The Jobs and Skills Australia 2023 Skills Priority List suggests that manufacturing is not presently facing a worker shortage in South Australia. That said, there are recognised worker shortages in New South Wales, Queensland, and Western Australia, suggesting that nationwide the market is relatively precarious. Further, given the need for manufacturing workers from around 2028, there is a possibility that worker shortages will be experienced in the sector, potentially impacting project timing and cost.

There is therefore a pressing need to support training and worker attraction programs to ensure that an adequately sized- and skilled workforce is able to be attracted to the development site, without displacing significant amounts of activity from other similar and related businesses across the Greater Adelaide region.

The sensitivity of the receptor is therefore considered to be low at the regional level and very low at a State level. The magnitude of change is high at the regional and State level. Therefore, there is likely to be a permanent, Moderate Beneficial effect at the regional level, which is significant, Minor Beneficial effect at the State level, which is not significant.

Effects on accommodation supply and demand

The Lefevre Peninsula is not traditionally a location that supports significant levels of tourist or business-related visitation. As a result, the region's accommodation offer is relatively under-developed. To accommodate temporary spikes in workforce requirements, and other business-related travel, an adequate supply of hotel rooms and serviced apartments will be important.

Adelaide hotels were operating at an average of 71% occupancy in calendar year 2023, in line with 2022 occupancy rates. This is a relatively healthy occupancy rate and compares favourably to national figures of 70.9% in 2019, and 66.5% in 2023. During 2023, supply increased by 600 room nights (0.8% increase). Looking ahead, there exists a strong pipeline of new hotel supply driven by growth in events and conference attraction and the State's focus on major events and tourist attraction (e.g., LIV Golf, Gather Round). Whilst broadly the Adelaide accommodation market appears capable of absorbing the accommodation needs of the temporary workforce requirements for the development, it is important to note that the development site is over 20 kilometres by road and a more than 30-minute commute from the Adelaide CBD.

The Port Adelaide Enfield Council possesses limited accommodation options. Around 110 serviced apartments (predominantly comprising Quest Apartments in Port Adelaide) are available, and the nearest hotel supplies 24 suites (5 minutes to the development site). Local liaison activities have revealed that available serviced apartments and hotel rooms particularly on the Lefevre Peninsula are frequently heavily booked as a consequence of existing shipbuilding activities.

Data sourced from Localis[30] for the Semaphore, Port Adelaide & Outer Harbor Wards area suggests the local accommodation market throughout 2023 was experiencing occupancy rates above the Adelaide average, peaking at over 90% on multiple occasions. There exist several major approved hotel developments locally that will assist in relieving existing market pressures and in partially accommodating future demand associated with the development. Without additional supply of accommodation and serviced apartments beyond the developments listed above, many temporary workers will endure long

[30] https://www.localis.co/

commutes from available accommodation elsewhere in Adelaide. In turn, this demand could crowd out growing tourism and events/conference accommodation demands in the city more broadly.

The sensitivity of the receptor (accommodation) is therefore considered to be medium at the local level and medium at a regional level. The magnitude of change (increase occupancy rate) is medium at a local and regional level. Therefore, there is likely to be a Moderate Beneficial effects at the local level, which is significant, and Minor Beneficial effects at the regional level, which is not significant.

Supply chain opportunities

The construction of submarines has benefits not just for the submarine building industry but also for the broader economy. The supplies and services from other industries that support the submarine construction contribute to economic activity in those sectors, and the flow on of employees spending their income further supports the local and regional economy (the 'consumption effect').

The receptor for consumption effect is the regional and State economy. The sensitivity of the receptor is therefore considered to be medium at the regional and low at State level. The magnitude of change is medium at the regional and low at State level. Therefore, there is likely to be Moderate Beneficial effect at the regional level, which is significant, decreasing to a Minor Beneficial effect at State level, which is not significant.

Land requirements and potential effects

Residential

Of the new workers at the development, not all will choose to live locally, as evidenced by journey to work data for the existing ONS workforce. As a general principle, however, a high degree of self-containment would be considered a desirable outcome, with shorter drive times supporting broader economic efficiency and liveability outcomes.

The development will enhance existing risks of ongoing localised excess housing demand and housing cost increases. Further, pressures to accommodate new housing in a region with large quantities of strategically important industrial land and existing businesses raises the prospects of land use conflict and highlights the need for good planning.

The sensitivity of the receptor is therefore considered to be low at the regional level. The magnitude of change is high at the regional level. Therefore, there is likely to be a Moderate effect for residential land requirements at the regional level which is significant.

Industrial Land

Modelling of regional industrial land recently undertaken by TSA for Planning and Land Use Services reveals that the supply of industrial land across the Adelaide West and Inner North regions will shortly become exhausted, with future growth likely to be accommodated in the Outer North region, where there is a significant pipeline of future employment land in the vicinity of the Northern Connector (part of the North-South Motorway). This has potentially significant implications for the development, with the possibility that businesses supplying to activities at the development are unable to locate in the vicinity of the development site, potentially building inefficiencies into the regional economy.

Given this level of additional local demand, upward pressure on employment land values is likely and some displacement of existing tenants in and near to the Lefevre Peninsula is possible to make way for new tenants that highly value or require good proximity to shipbuilding is likely to occur.

The sensitivity of the receptor is therefore considered to be high and the local level and medium at the regional level. The magnitude of change is high at the local and regional level. Therefore, there is likely to be a Major Effects at the local level and Moderate effects at the regional level, which are considered to be significant.

Implications of not proceeding with the development.

Failure to proceed with the development could potentially communicate a message to prospective investors that investment in South Australia carries risk. This would result in a situation in which future investors avoid the State in favour of alternate locations or build in a risk premium to South Australian investments, which would have a detrimental impact on the State's productivity.

For every $10 billion in manufacturing phase expenditures foregone, up to $1.332 billion in economic surpluses may be lost from South Australian community.

Manufacturing is in a long-term state of decline in South Australia, though in recent decades, the State has been successful supporting knowledge-intensive, advance manufacturing businesses. Firms in this sector have been able to leverage the State's existing skills base and cheap and well-located employment lands. In the absence of the development, a significant amount of knowledge intensive manufacturing, and (as shown in the Economic Analysis Report) a sizeable quantity of business linked to the provision of intermediate inputs would not be undertaken in the State, and along with it, the opportunity to build a sustainable and transferrable skills base within the South Australian workforce.

Besides those directly employed, a significant number of jobs and economic output will be linked to businesses working to provide intermediate inputs to activities at the development. Failure to proceed with the development would therefore result not only in the loss of jobs and activity directly associated with nuclear-powered submarine construction at the development, but also the activity linked to industries and businesses that will grow and evolve to service the sector.

South Australia has real and enduring strengths in defence, as set out in the South Australian Economic Statement, which highlights the importance of South Australia maintaining its strong reputation in this sector through pursuit of AUKUS opportunities, and expansion of the defence, space and cybersecurity industries. Projects such as AUKUS will be critical to the future of the defence sector in South Australia, with activities on the Lefevre Peninsula deepening the local talent pool and providing important benefits to private sector businesses with an existing Adelaide presence.

Failure to progress the development therefore represents a significant threat to the ongoing viability of this sector in South Australia.

A failure to provide well-paying and sustainable manufacturing and knowledge-intensive jobs in Adelaide's northwestern suburbs is likely to have detrimental long-term implications on communities across the region. A failure to deliver sustainable manufacturing jobs is likely to result in workers becoming either unemployed, or employed in less knowledge-intensive, lower paid manufacturing. In either case,

there would be a negative impact on the quantity of wages earned and circulated within regional retail and service businesses.

Overall, it is considered that if the development were not to proceed, the significance of effects to the State would be 'Significant' adverse.

17.8 Additional Mitigation Measures and Residual Effect

No additional mitigation or monitoring are required for effects deemed to be Beneficial. As such, likely residual effects will remain as reported above in Section 17.7.1 and 17.7.2 in relation to Employment, Workforce Spending and Output for both construction and operation phases.

No additional mitigation or monitoring are required beyond those outlined above for effects deemed to be Minor, Negligible or Beneficial within Section 17.7.3. This section addresses those effects identified as being potentially significant (Moderate or Major) in relation to other effects as outlined within Section 17.7.3.

No additional mitigation or monitoring is required in relation to the implications of not proceeding with the development. As such, likely residual effects will remain as reported above in Section 17.7.3.

17.8.1 Additional Mitigation Measures

South Australian Government Commitments – Skills and Training

- The Commonwealth Government has already announced $33.5 million over six years from 2024–25 for initiatives to enhance domestic industry and workforce capacity. Another $17.2 million has been committed for 2024–25 to expand Australian industry participation in the nuclear-powered submarine supply chain.
- The South Australian and Australian governments have committed to ongoing and active management of the public infrastructure works pipeline to smooth labour and material demands.
- There are various policies and government investments in local workforce management and recruitment measures that are being pursued, including:
  - The establishment of the Skills and Training Academy on the Lefevre Peninsula will develop the workforce to build and sustain nuclear-powered submarines.
  - The establishment of the Shipbuilding Employment Pathways initiative.
  - The expansion of the Defence Industry Pathways Program to include pathways into the nuclear-powered submarine program.
  - Launch of an ASA Nuclear Graduate Program aimed at attracting high-performing graduates from STEM or nuclear-related disciplines.
  - Extension of the School Pathways Program, promoting career pathways and opportunities within the defence industry.
  - 3,000 scholarships for students studying undergraduate STEM courses relevant to the nuclear-powered submarine program.
- Notwithstanding these measures, there will be a need to recruit workers from interstate and overseas.

Whilst the development is not capable of the implementation the above, it is considered that if the above is implemented this would help to mitigate those effects relating to employment and labour force impacts and risks during both the construction and operation stages.

Land requirements and potential effects

Residential

Response to land affordability and supply is a broader challenge than just the scope of the development. The Malinauskas Government has released a suite of integrated solutions in the Housing Roadmap released in June 2024. Initiatives include fast tracking of the largest release of residential land in the State's history along with planning reforms and skills programs to facilitate quicker approvals and construction. For households who may be impacted by affordability, there are a range of new initiates including:

- Recent changes to prevent rent bidding will contribute stabilising rent prices.
- Changed eligibility criteria for Private Rental Assistance will allow more households to access financial support.
- Investment in building, modernising and upgrading thousands of public homes, to unlock more opportunities for people who need housing security.

Whilst the development is not capable of the implementation the above, it is considered that if the above is implemented this would help to mitigate effects during both the construction and operation stages.

Industrial Land

To minimise displacement, excessive land value increases and to support the timely and productive servicing of the development, it is recommended that:

- Interventions be considered that facilitate earlier development of employment lands in the Gillman/Dry Creek precinct:
  - This land is not development ready and will require significant site works and investment in infrastructure connections.
  - Whilst rising land values may assist in triggering land investment by land developers, the extent of upfront works required may still necessitate government intervention to de-risk investment and stimulate timely land supply, including for example through funding of catalytic infrastructure.
- Strategic well-located employment land in the adjoining Inner North region to be protected from rezoning for alternative uses and continue to well separated from residential development:
  - The western half of the Inner North region has a number of precincts with comparative advantages in traditional employment uses as well as freight and logistics. Technology Park and Edinburgh Park are important precincts and home to defence and aerospace industries and the Burton / Direk precinct has one of the highest concentrations of employment in freight and logistics activities in Greater Adelaide.
  - Over 25% of total zoned employment land within Greater Adelaide is located in the Inner North and the region is well serviced by a range of distribution and freight networks and is well connected to the Lefevre Peninsula.

  - In 2020, 486 hectares of vacant land was identified, located predominantly in Edinburgh Parks (247ha) and Burton/Direk (122ha). There is also 90ha of future employment land identified at Waterloo Corner. In the decade to 2020, the region lost more employment land to rezoning than it had gained.

- Increases in land value are likely to result in some land hungry and low value generating businesses (e.g., freight and logistics, materials recycling) seeking relocation elsewhere, potentially to the Outer North region. In anticipation of this, there is potential for governments to work closely with these types of businesses to facilitate relocations and free up land for higher value generating uses more closely aligned with activities at the development site.

Whilst the development is not capable of the implementation the above, it is considered that if the above is implemented with the help of the South Australian Government and Australian Government this would help to mitigate effects.

17.8.2 Residual Effects

Employment and labour force impacts and risks (Construction)

Assuming the effective implementation of the measures included within Section 17.8.1, it is considered the magnitude of impact can be reduced to low at the regional and State level. This would reduce the overall significance of effect to temporary, Minor Adverse effect at the regional level, which is not significant.

Land Requirements and Potential Effects

Residential

Assuming the effective implementation of the measures included within Section 17.8.1, it is considered the magnitude of impact can be reduced to medium at the regional and State level. This would reduce the overall significance of effect to temporary, Minor Adverse effect at the regional level, which is not significant.

Industrial Land

Assuming the effective implementation of the measures included within Section 17.8.1, it is considered the magnitude of impact can be reduced to at the medium at local level and low at regional level. This would reduce the overall significance of effect to Moderate/Minor Adverse effect at local and regional levels, which is not significant.

CHAPTER 18

Flooding

URPS

18. Flooding

Conclusion: No significant effects have been identified in relation to flooding for both the construction and operational phases.

18.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to flooding.

The AECOM Aurecon Joint Venture (AAJV) has coordinated and prepared a Stormwater Management Plan (the 'SMP') for the development site. The SMP is included as Appendix 1.13 of this EIS. The SMP presents the basis of stormwater management at the development site, which will later guide the design for proposed stormwater management measures. The SMP also considered the existing stormwater management conditions at the development site, proposed changes as a result of the development, including impacts from flooding, and presents an initial preliminary overarching stormwater management strategy for the development.

18.2 Assessment Requirements

Commission Assessment Requirements:

HR2: Detailed Requirements

- Describe the history of flooding onsite and in proximity to the development site.
- Describe current flood risk for a range of annual exceedance probabilities up to the probable maximum flood for the proposed project site, including consideration of flooding associated with interactions between surface water flows and coastal inundation under climate change scenarios (i.e. sea level rise, storm events).
- Use flood modelling to assess how the proposed project may potentially change flooding and run-off characteristics on-site and both upstream and downstream of the site, including changes associated with the dynamics between surface water flows and coastal inundation risks.
- The assessment must consider all infrastructure associated with the proposed project including levees, roads, and linear infrastructure, and all proposed measures to avoid or minimise impacts.
- Identify the potential impacts on people, property, infrastructure and the environment from potential flood risk (where relevant).
- Evidence must be provided to demonstrate that the securing of storage containers of hazardous contaminants during flood events meets relevant requirements of the Environment Protection Act 1993.

18.3 Guiding Legislation and Policy

The key legislation and policies that guide the flooding assessment in South Australia are summarised in the following Table 18.1.

Table 18.1 - Summary of legislation and policy

Name	Description
Planning, Development and Infrastructure Act 2016	The Act has specific provisions for floodplain management, including land-use controls to mitigate flood risks.
Emergency Management Act 2004	This Act defines responsibilities for local councils and State agencies in flood disaster response and preparedness.
Natural Resources Management Act 2004	Empowers DEW and local authorities to manage water resources and floodplains, assisting in flood prevention and risk reduction.
Water Resources Act 1997	Defines the roles of State agencies, councils, and community groups in flood risk management, preparedness, and resilience.
Stormwater Management Authority Policies	The supports local governments in creating flood-resistant infrastructure, especially in urban areas.
Australian Rainfall and Runoff Guidelines	The Australian Rainfall and Runoff Guidelines are a set of national standards and methodologies used for flood risk assessment, water resources planning, and infrastructure design in Australia.

18.4 Scope, Study Area and Assessment Method

18.4.1 Scope

An assessment of potential effects of from surface water and tidal flooding during the construction and operation of the development has been scoped into this chapter. Impacts on sensitive human and ecological receptors have also been assessed.

18.4.2 Study Area

The area assessed includes the entire development site area and a 500m buffer from the development site boundary.

18.4.3 Assessment Method

There are no published guidelines or criteria for assessing and evaluating effects of flooding within the context of an EIA within South Australia. As such, the general approach to EIA methodology, as detailed in Chapter 6 - Impact Assessment Methodology, has been used.

Assumptions and Limitations (i.e. Uncertainties)

Stormwater modelling completed as part of the SMP was high-level and only intended to support the principles for stormwater management at the development site. The modelling was based on current available information and numerous assumptions as outlined with the SMP. Any recommendations informed by the modelling within the SMP should be treated as indicative only.

Additional detailed modelling will be required during subsequent design to confirm the conclusions of the SMP remain correct and confirm the detailed design of the development.

18.5 Baseline Conditions and Sensitive Receptors

18.5.1 Baseline Conditions

The development is located in an industrial zoned area on the north-eastern tip of the Lefevre Peninsula (Figure 18.1). There are a number of industrial/commercial premises located primarily to the south of the development site.

For the purpose of the flooding assessment, the development site is divided into three key areas:

- Area 1 – separated by the Australian Rail Track Corporation railway line:
  - Area 1a – on the eastern side of the railway line and bounded by Mersey Road to its east, Falie Reserve to its north, and the existing surface shipyard and common use infrastructure to its south. It is proposed that this area will contain shipyard manufacturing facilities and other supporting infrastructure.
  - Area 1b – on vacant land immediately west of the railway line. This area is bounded by the railway line to its east, Pelican Point Road to its west, and the Quantem Fuel Terminal to its north. This area will house a carpark across the large area that sits outside the extents of existing detention basins.
- Area 2 – north of Area 1 and Falie Reserve, between the railway line and Mersey Road North. This area will contain a large carpark, traditional manufacturing facilities, amenities, programme and engineering management facilities.
- Area 3 – vacant parcels of land on the eastern side of Mersey Road North and north of Mutton Cove. The eastern side of this area runs along the western bank of the Port River. The area will contain traditional manufacturing facilities, amenities, programme and engineering management facilities.

Topography

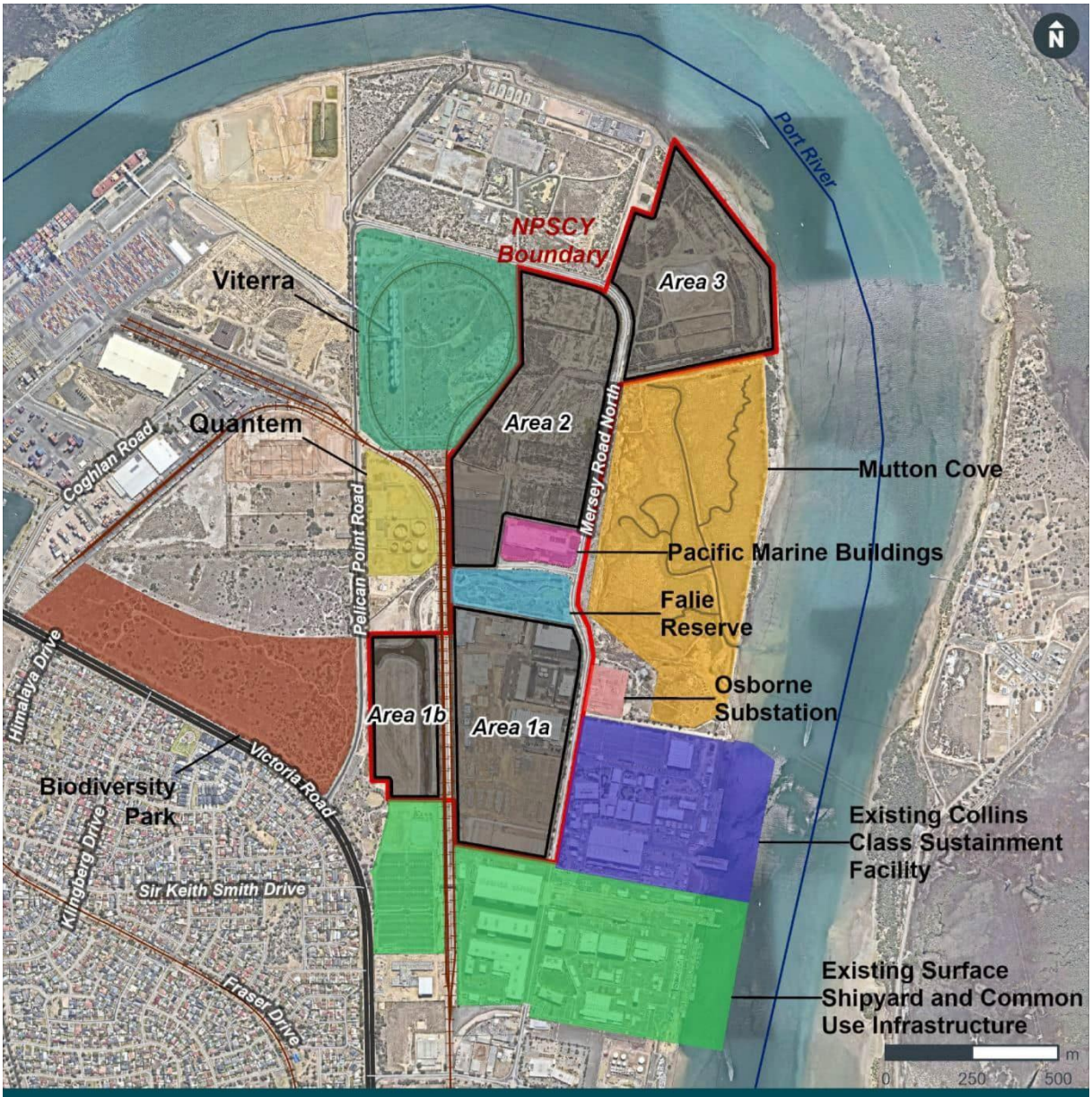
Existing topography across the development site is relatively flat, with only a very subtle grade that falls from west to east, towards the Port River. Most existing surface levels sit around 2.0 to 3.0 mAHD. The lowest elevations occur at Areas 1b and 3, as surface levels across these areas have not been subject to full preparation for industrial development. The other areas (1a and 2) have been filled as part of previous industrial development and are consequently elevated at or above 3.0 mAHD.

Civil works are currently underway across Area 1b as part of an early works package to raise a portion of the area for the construction of an at-grade carpark. Finished surface levels across this carpark would be set above 3.3 mAHD. The carpark will be temporary until the development works commence, during which this carpark would be replaced with the proposed carpark in Area 1b.

There are several existing stormwater basins across the development site, with most invert levels ranging between 0.5-0.8 mAHD. There are also four large dredging ponds within Area 3, that have invert levels ranging between 1.0-1.5 mAHD. These invert levels are similar to natural surface levels across Mutton Cove, which is significantly lower than the partially developed, adjacent Area 2.

There are a number of earth bunds across all development site areas. Most notably, adjacent to Area 2 there is bunding along the western edge of Mutton Cove, with levels above 3.3 mAHD to prevent urban stormwater runoff from entering the environmentally protected area. There is another 0.5-metre-high bund along the western boundary of Area 2, providing a barrier against surface flows entering the railway corridor. There is also some bunding along the eastern boundary of Area 3, to prevent high tidal waters from entering the area.

Figure 18.1: Development site plan



DEVELOPMENT SITE PLAN FOR THE STORMWATER MANAGEMENT PLAN

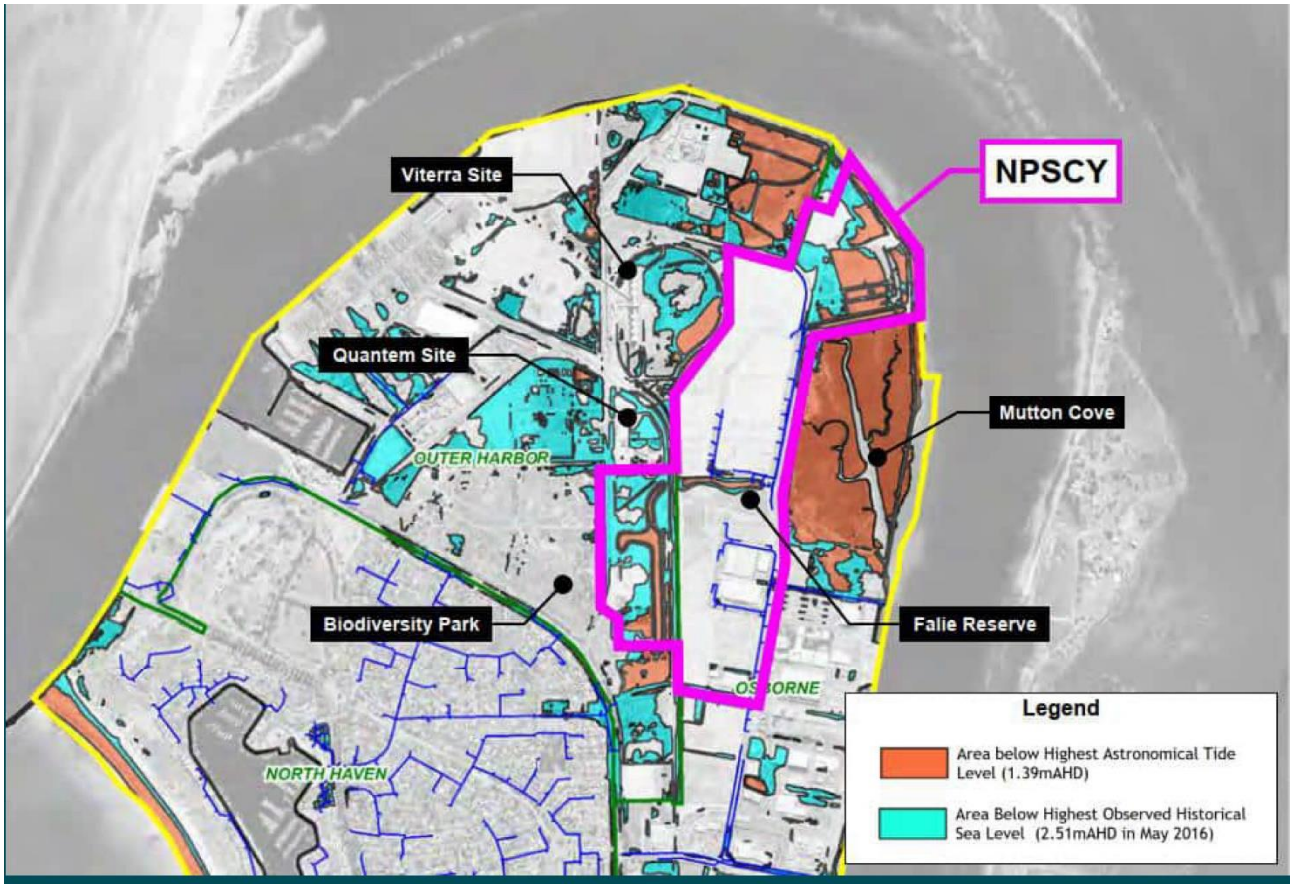
Tidal interactions

The Lefevre Peninsula has many low-lying areas that sit below recorded high tide levels. Areas 1a and 3 are both low-lying and would be inundated by high tides or storm surges should there be no protection measures in place. Areas of the development that are below recorded high tide levels, under existing conditions, are shown in Figure 18.2. The two areas shown correspond to:

- Red area – the Highest Astronomical Tide level for the Outer Harbor: 1.39 mAHD.
- Cyan area – the highest observed sea level that occurred in May 2016: 2.51 mAHD.

The Port Adelaide Seawater Stormwater Flooding Study reported that there is no reliable correlation between rainfall event probability and storm tide probability. This suggests that the statistical likelihood of a 1% AEP rainfall event occurring together with a 1% AEP storm tide event would be extremely rare (i.e., with an AEP smaller than 1%).

Figure 18.2: Area below historical tide levels



AREAS BELOW HISTORICAL HIGH TIDE LEVELS

Flooding

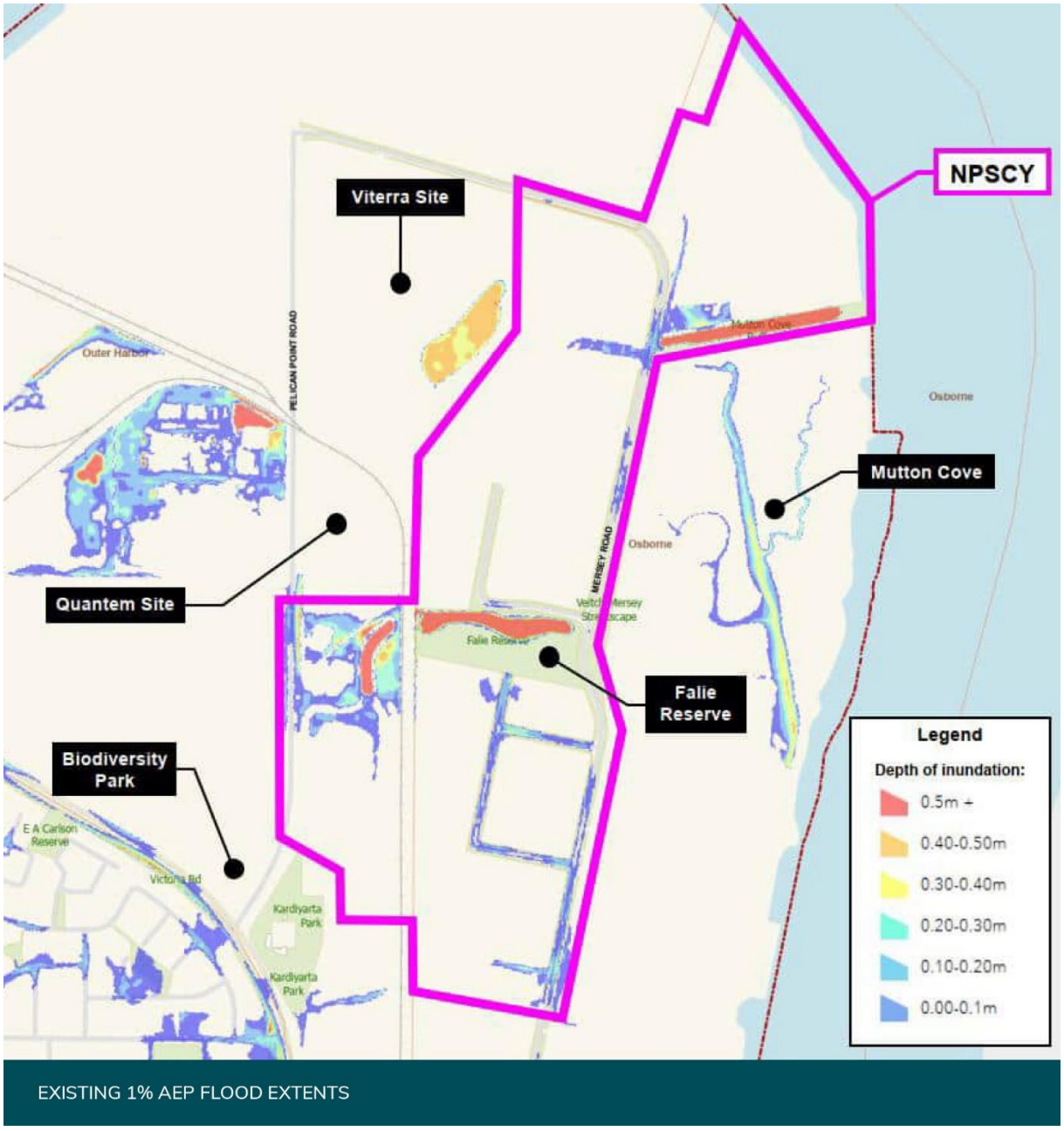
The flood extents for the 1% AEP design storm event for the development site are shown in Figure18.3, obtained from Council's online Flood Awareness Map.

The flood modelling results show that floodwaters across the development site are generally contained to the existing road reserves and detention basins in a 1% AEP storm event. Floodwaters generally do not breach the road reserves or basins and enter private allotments. This is likely due to developed surface levels across Areas 1a and 2 being raised above 3.30 mAHD, and building floor levels set even higher, above 3.55 mAHD to protect against flooding.

There is some minor flooding across Area 1b, surrounding the Western Basins, with flood depths generally remaining below 300 mm deep in the 1% AEP storm event. It appears that this flooding arises from flows spilling out of the lowest sag point on Pelican Point Road and/or from flows exceeding the capacity of the existing detention basins.

There does however appear to be an anomaly with the modelling, as both Western Basins (i.e., the main and link basins) are not fully engaged. The results indicate that the Western Basins catchment flows were only applied to the link basin and culverts connecting the two basins were not modelled. This would explain why flows within the link basin are not balanced between the two basins. The flood mapping in this area would vary from what has been shown in Figure 18.3 if these basins were modelled accurately.

Figure 18.3: Existing 1% AEP flood extents



18.5.2 Sensitive Receptors

Sensitive receptors for flooding include human (residential and commercial/industrial) and ecological receptors sited within 500m of the development site. Based on the baseline conditions described above, Table 18.2 sets out a summary of the existing and future receptors, respectively, and their sensitivity.

Table 18.2: Summary of Receptor Sensitivity to Flooding

Receptor	Sensitivity (Value)
Development Workers (construction) – on site.	High
Development Workers (Operation) – on site.	High
The development – on site.	High
Residents of residential properties – along Victoria Road.	High
Residential Buildings – along Victoria Road.	High
Adjacent roads – Victoria Road, Pelican Point Road, Veitech Road.	Medium
Commercial buildings and properties – Viterra, Quantem.	Medium
Playgrounds - Kardi Yarta Playground.	Medium
Ecological Features – Port River, Mutton Cover, Biodiversity Park, Adelaide Dolphin Sanctuary.	Low

18.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the schedule provided. The following section outlines the securing mechanism for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

18.6.1 Embedded Mitigation Measures

Construction

Construction of the development will take place in accordance with a CEMP. The CEMP will include good practice methods with these measures designed to prevent adverse impacts in relation to flood risk, surface water drainage and pollution control of oils, sediment, cements and other polluting sources which may be hazardous to the water environment. The CEMP will include a Soil, Erosion and Contamination Management Plan.

The construction SMP will also ensure the development does not impede existing flood flow paths or result in increased flood levels on adjoining private properties, including on Viterra, Quantem, and the existing ONS facilities south of the development site. Such impacts would be mitigated by designing diversion

routes for impeded flow paths or by introducing new culverts / additional flood storage to minimise any flood impacts on adjoining private properties. This would be set out within the CEMP. The SMP will also ensure that the effect of flooding on staff and people at the development site will be Negligible and not significant.

Operation

Flood protection measures

At a very minimum, surface and building levels across the development site would be set above the 1% AEP design flood envelope, with an appropriate allowance for increased rainfall, sea level rise, land subsidence or uplift, and coastal erosion. To achieve this, finished surface levels would be set above a minimum level of 3.30 mAHD and building floor levels set above a minimum level of 3.55 mAHD. This is consistent with Council's recommendations for coastal developments.

Review of the flood mapping, Figure 18.3, indicates that the development is likely be protected against overland flooding in the 1% AEP design storm event by adopting the above minimum surface and building levels as outlined above.

Critical buildings and infrastructure may be raised to higher elevations to protect against more extreme flood events. The required levels of flood protection for this critical infrastructure are yet to be determined and are subject to future detailed design. In addition to raised surface and building levels, the development will include a sea wall along the eastern boundary of Area 3 to protect the development site from extreme storm surges or tidal interactions. The design requirements and height of this sea wall are subject to further detailed design.

Flood safety measures

The development would need to develop and implement safe flood management plans and procedures to ensure the safety of critical infrastructure and on-site personnel. These plans and procedures would capture flood warning methods, management practices in the event of a flood, safe access and egress routes and/or safe havens on-site (i.e., shelter-in-place).

The safe evacuation route for the development would need to provide access to and from the development site in all events up to and including the 1% AEP design flood event. The access route should remain safe for vehicles during this design event, in accordance with the flood hazard assessment criteria outlined in the latest Australian Rainfall and Runoff guidelines, to ensure the development site is not isolated during rare flood events. This would allow on-site personnel to evacuate the development site and for emergency services to access the development site during such flood events, if required.

Operational Stormwater Management Plan

The operational Stormwater Management Plan would be implemented for the development as part of the OEMP, which would include:

- Stormwater runoff is captured by the major and minor drainage network, which then conveys flow towards a series of detention systems. The drainage network would be designed to provide the following minimum levels of service:
  - Minor (underground) network: 10% AEP.

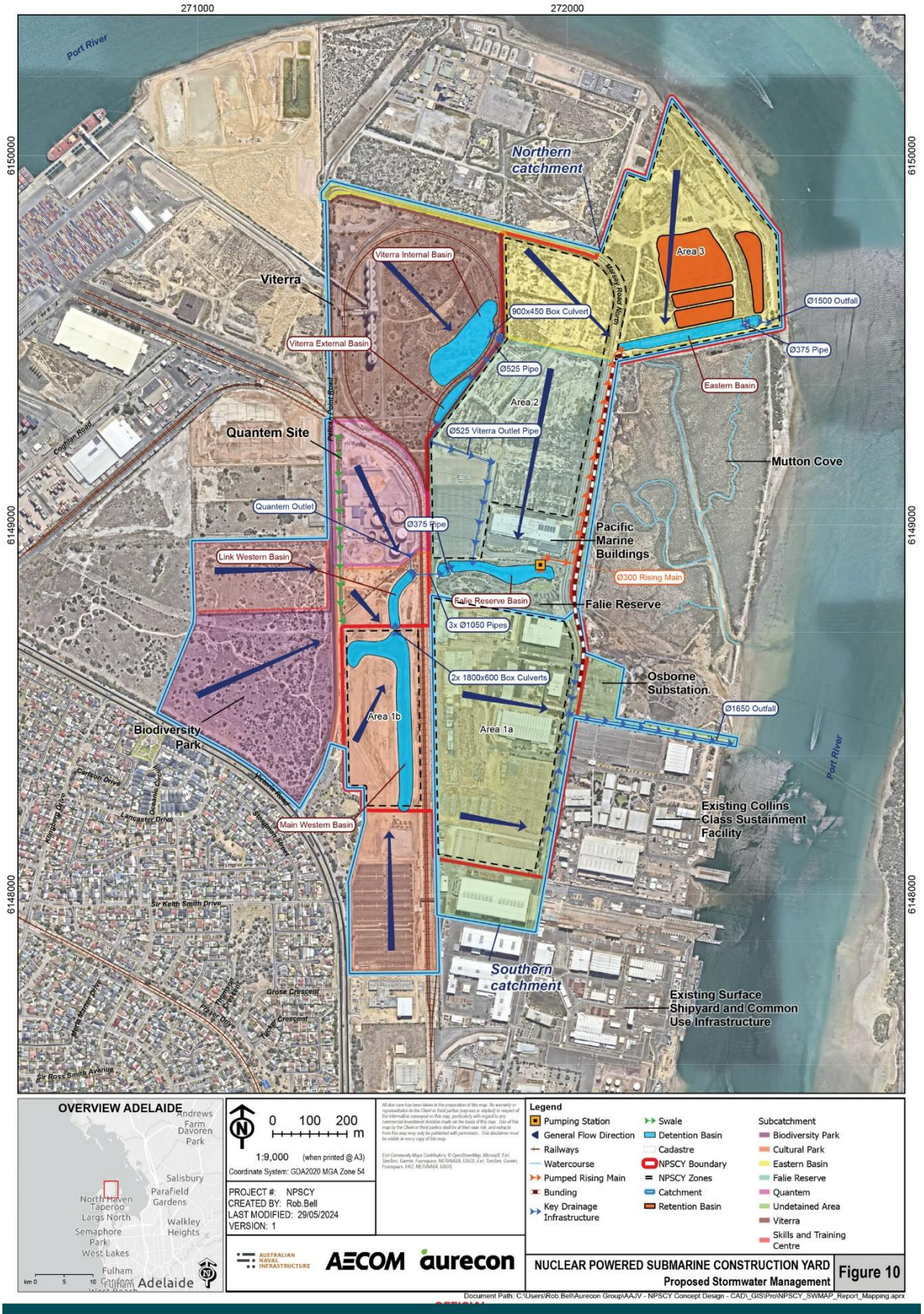
  - Major (overland) network: 1% AEP.

- Flows entering the detention systems would be temporarily contained within the basin extents while discharge is restricted by the basin outlet pipe, pump-out rates or water levels in the Port River. These detention systems would typically be in the form of above-ground, earthen basins, but there are also opportunities for other forms, such as underground tanks. The detention systems would be designed to contain all inflows with a suitable allowance for freeboard in a 1% AEP design storm event, and taking into consideration the interaction of basin outlet pipes with the water levels in Port River.
- Outflows from the detention systems would discharge to outfalls along the Port River in a manner that does not allow for the entry of tidal waters or erode / scour the downstream earth.

Design of the drainage system would account for tidal interactions, and it is recommended that the drainage system is designed to climate conditions for the year 2130. This accounts for a 100-year asset life from the estimated completion date of the development by the year 2030.

The proposed sub catchments and drainage paths across the development for stormwater management are shown in Figure 18.4 below.

Figure 18.4 - Proposed sub catchments and drainage paths for the development



PROPOSED SUB CATCHMENTS AND DRAINAGE PATHS FOR THE DEVELOPMENT

18.7 Assessment of Effects

18.7.1 Construction

As noted in Section 18.5, both Areas 1a and 3 are low-lying and would naturally be subject to inundation by high tides if left unprotected. The development does not alter this condition; i.e., it does not increase the risk or frequency of tidal flooding to either the development itself or surrounding areas. Consequently, any potential water from tidal flooding is incorporated into the overall assessment of surface water flooding, outlined below for the construction phase.

From a flood risk perspective, therefore, the primary concern during the construction phase is managing surface water runoff, including any tidal influences, to minimize impact from surface water flooding on the development and to surrounding receptors. The construction works could divert or displace overland flow paths that could exacerbate flooding to downslope locations, and/or make flooding within the development site worse. This represents a loss of flood storage due to the presence of stored fill material and access roads etc., the introduction of items that could be washed away during a flood and cause blockages to structures downstream and presents a risk to surrounding areas, including residents, surrounding commercial units and adjacent roads. This would be considered a high magnitude impact.

However, the CEMP would set out measures for the management of surface water runoff during the construction of the development. Were an extreme rainfall event to occur, there could be some potential for unmanaged discharge of storm water from the development site. However, this would be no different to the existing baseline conditions and the temporary surface water management measures during the construction works would provide some benefit in terms of on-site attenuation and water quality treatment which is not present within the pre-development site.

The magnitude of impact to offsite receptors is therefore considered to result in a 'Very Low' impact. Therefore, the significance effect of construction works on surface water flood risk is therefore assessed as Temporary, Minor Adverse / Negligible (and not significant) with the CEMP in place to mitigate any risks to surrounding residential units, their residents, surrounding commercial units, adjacent roads and ecological features.

The risk posed to staff on the site, and also infrastructure, will be managed through a construction SMP which will ensure that no people are in high risk areas of the development site during periods when flooding is likely and that mobile unsecured construction equipment and infrastructure is moved to higher areas of the site where flood risk is low. The magnitude of impact to onsite receptors is therefore considered to result in a 'Very Low' impact. The effect on construction staff and people at the development site will be Negligible and not significant.

18.7.2 Operation

Onsite Receptors (development buildings and workers)

Because the development will increase ground levels across much of the existing development site and harden the edge of Area 3 with a sea wall, the lower-lying areas associated with higher tidal interactions and surface water flooding risk will no longer exist. As outlined above within Section 18.6, surface and building levels across the development site would be set above the 1% AEP design flood envelope, with an appropriate allowance for increased rainfall, sea level rise, extreme storm surges, land subsidence or

uplift, and coastal erosion. Furthermore, the operational SMP will ensure flow is directed away from buildings and towards less vulnerable receptors i.e., detention systems, amenity, and car parking. Therefore, the proposed buildings, and hence their work force, of the development would be unlikely to experience surface water flooding during a 1% AEP event. On this basis, the magnitude of impact is considered to be Very Low for the development. As such, the significance of effects from surface water flood risk for on-site receptors will be Minor Adverse and not significant.

Offsite Receptors (Residents, resident properties, ecological features and roads)

Off-site receptors, such as the existing ONS facility to the south of the development site and the adjacent roadways, will not suffer any significant effects following completion of the development. The SMP, through detailed design for the development, will mitigate off-site discharge up to and including a 1% AEP event and limit any off-site impacts to existing flood behaviour (acceptable +/- 20 mm afflux). The implementation of the SMP, including identified mitigation measures, will mean surface water flood risk will not increase off-site as a result of the development, and the magnitude of impact is considered to be Very Low. As such, the significance of effects from surface water flood risk for off-site receptors will be Minor Adverse / Negligible and not significant.

18.8 Additional Mitigation Measures and Residual Effect

No additional mitigation or monitoring are required beyond those outlined above in Section 18.6. The likely residual effects for construction and operational effects will remain as stated above within Section 18.7.

18.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6 – Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

18.9.1 Construction

Likely significant cumulative effects of construction activities are not expected as each site will be applying good site practice measures and appropriate mitigation techniques and adhering to relevant CEMPs and other management plans for control of surface water and flood risk.

18.9.2 Operation

As outlined in Section 3 of the SMP, the developments listed above may interact with or discharge into the same stormwater system that will serve the development. Recognizing the potential cumulative effects of multiple projects, these cumulative developments were comprehensively evaluated within the SMP to ensure a holistic approach to stormwater management and flood risk. Each development will be required

to contribute to coordinated, site-wide drainage designed to effectively manage the total stormwater volume and prevent any adverse off-site flooding impacts.

The final detailed SMP for the development site and the Project will ensure that the establishment of integrated, resilient drainage that safeguards the development site and surrounding areas from flood risks. As such, the significance of any cumulative effects from surface water flood risk for onsite and off-site receptors is expected to be the same as the development in isolation, i.e., Minor Adverse / Negligible and not significant.

CHAPTER 19

Contamination

URPS

19. Contamination

Conclusion: Extensive site and groundwater investigations have been undertaken to date across the development site. Sampling, testing and reporting has to date has confirmed that potential soil and groundwater contamination impacts during the construction and operational phases can be effectively and appropriately managed such that no significant effects are expected.

Further investigations are scheduled to confirm existing data. These investigations will be undertaken during detailed design and results confirmed prior to construction commencing.

19.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to contamination on the development site.

JBS&G has prepared a Site Contamination Assessment and Physical Environment Report for the construction and operational phases of the development. The JBS&G Physical Environment Report, with the Site Contamination Assessment included as an appendix, is included as Appendix 1.14 of this EIS.

19.2 Assessment Requirements

Commission Assessment Requirements: HR3 (Detailed Requirements)

- Describe the historical land use and potential for contamination of soils and sediments and describe any known or suspected soil contamination that could be re-suspended, released or otherwise disturbed as a result of past or future development. This investigation would also consider any previous use of waste fill or similar materials, including the deposition of dredge spoil from the Port River.
- Detail any known or potential sources of contaminated groundwater that could be impacted by the development.
- Detail procedures to be adopted to confirm whether site contamination exists (such as site history, site audit, and site contamination reporting) and any remedial measures proposed.
- Detail management measures that will be required during construction and operation to prevent site contamination.
- Demonstrate compliance with the assessment methodology and site acceptability requirements for the intended use(s) of the development sought by Practice Direction 14 Site Contamination Assessment 2021, Plan SA.
- Describe how site and groundwater contamination assessment will be undertaken in accordance with the National Environment Protection (Assessment of Site Contamination) Measure, the EPA Guidelines for the assessment and remediation of site contamination (2019), the PFAS National Environmental Management Plan 2.0, and other relevant guidance issued or referred to by the EPA.

19.3 Guiding legislation and policy

The key legislation and policies that guide site and groundwater contamination assessment in South Australia are summarised in the following Table 19.1.

Table 19.1: Summary of legislation and policy

Legislation/guideline	Description and related policies/guidelines
Environment Protection Act 1993	Creates a general environmental duty to take all reasonable and practical steps to prevent or minimise any resulting environmental harm. The *Environment Protection (Water Quality) Policy 2015* (Water Quality EPP) provides the structure for managing and regulating surface and groundwater quality within SA.
Landscape South Australia Act 2019	Provides for the protection and management of the State's natural resources, including provisions relating to land management, water resources management and pest plant and animal control. Regional landscape plans and control policies are in force under the Act to guide management of water, soil and biological assets and define water affecting activities which require a permit and the regulation framework for surface and groundwater quantity in prescribed areas.
Coast Protection Act 1972	Formed to protect, restore and manage the coast to prevent erosion, damage, deterioration, pollution and misuse.
National Environment Protection (Assessment of Site Contamination) Measure 1999	Provides nationally consistent guidance on assessment and management of soil contamination.

A number of other guidelines and standards are related to this assessment. Refer to the full JBS&G Physical Environment Report Appendix 1.14, for a full description.

19.4 Scope, Study Area and Assessment Method

19.4.1 Scope

An assessment of potential effects of land-based site and groundwater contamination during the construction and operational phase of the development is within the scope of this chapter.

Impacts on existing sensitive human, controlled waters (groundwater and surface water) and ecological (flora and fauna of statutory and non-statutory conservation designations) receptors have been assessed. The following impact are considered within this chapter:

Construction

- Disturbance to contaminated soil through excavation.
- Potential disturbance of coastal acid sulphate soils.
- Potential contamination of soils / groundwater from spills.
- Potential contamination incidents during the management of soil generated from earthworks / additional soil required to achieve the derived site levels.
- Disturbance of hazardous ground gas.
- Potential contamination incidents as a result of erosion and sedimentation.
- Potential contamination incidents as a result soil compaction.
- Potential contamination incidents from dewatering of excavations.

Operation

- Potential contamination of soils/groundwater from spills.
- Potential impacts from hazardous ground gas.
- Potential contamination incidents as a result of erosion and sedimentation.
- Potential contamination incidents from dewatering.

Scoped Out

Marine sediments

Marine sediments within the marine based portion of the development site are not assessed in this chapter. The investigations completed by JBS&G relate only to the land-based portion of the development site. Additional information about dredging for the project can be found Chapter 20 - Coastal and marine.

Operational phase

The following potential operational phase impacts were identified in the Physical Environment Report but have been scoped out of this chapter for the following reasons:

- Seawater inundation – this is covered in Chapter 14 - Climate change adaptation and hence is not included within this chapter. Please refer to Chapter 14 for further information.

19.4.2 Study Area

The study area for assessment is the extent of the land-based portion of the development site, and adjacent sensitive receptors within 250m of the development site.

19.4.3 Assessment Method

The Physical Environment Report including appendices are consistent with the State Planning Commission's Assessment Requirements. It reports on the existing levels of site and groundwater contamination at the development site and assess the potential for the development to disturb this existing contamination or further contaminate the site as a result of construction and operational activities for the development, and measures to manage these risks.

The Physical Environment Report includes a desktop review of the site setting, historical land ownership, historical use of the site, historical aerial photographs, SA EPA information and existing soil and groundwater contamination data for the development site and surrounds. It also includes a site inspection including collection and analysis of soil and groundwater samples and comparison to relevant criteria for commercial/industrial land use.

There are no published guidelines or criteria for assessing and evaluating effects of site and groundwater contamination within the context of an EIA within South Australia. As such, the general approach to EIA methodology, as detailed in Chapter 6 - Impact Assessment Methodology, has been used. The magnitude of the potential effects during the construction and operational phase have been determined based on the criteria defined in Table 19.2. Classification of magnitude has been assigned assuming design and mitigation measures are implemented.

Table 19.2 - Classification of magnitude of impact

Classification of magnitude	Description
High	Total loss of major alterations to one of more of the key elements, features or characteristics of the baseline. The post-development situation will be fundamentally different.
Medium	Partial loss or alteration to one of more of the key elements or characteristics of the baseline. The post-development situation will be partially changed.
Low	Minor loss or alteration to one or more of the key elements, features or characteristics of the baseline. Post-development, the change will be discernible but the underlying situation will remain similar to the baseline.
Very Low	Very minor loss or alteration to one of more of the key elements, features or characteristics of the baseline, such that post-development, the change will be barely discernible, approximating to the "no change" situation.

The classification of significance of effect are described in Table 19.3.

Table 19.3: Classification of significance effect

Classification of magnitude	Description
Major adverse	An increase in contamination risk from the existing baseline conditions e.g. land that has a very low contamination risk in the baseline becomes a high or very high risk.
Moderate adverse	An increase in contamination risk from the existing baseline conditions e.g. land that has a low contamination risk in the baseline becomes a moderate or high risk.
Minor adverse	An increase in contamination risk from the existing baseline conditions, e.g. land that has a low contamination risk in the baseline becomes a moderate/low risk.
Negligible	Negligible change in contamination risks.
Minor beneficial	A reduction in contamination risk from the existing baseline conditions e.g. land that has a moderate/low contamination risk in the baseline becomes a low risk.
Moderate beneficial	A reduction in contamination risk from the existing baseline conditions, e.g. land that has a high contamination risk in the baseline becomes a moderate/low or low risk.
Major beneficial	A reduction in contamination risk from the existing baseline conditions e.g. land that has a very high contamination risk in the baseline becomes a low or very low risk.

19.4.4 Assumptions and Limitations (i.e. Uncertainties)

Additional site and groundwater contamination assessment has been identified in certain locations, and for certain types of infrastructure, to confirm initial preliminary data. This is explained further in Section 19.5.2. This assessment has been based on the information available to date, and will be updated if required should additional data collected alter the results of the assessment.

19.5 Baseline Conditions and Sensitive Receptors

19.5.1 Baseline Conditions

The Physical Environment Report, Appendix 1.14, provide a detailed assessment of the baseline conditions across the development site. Key features of existing site and groundwater contamination on the development site are summarised below.

Past potentially contaminating activities

- Several potentially contaminating activities (PCAs) were identified as having previously occurred onsite, including:
  - Dredge spoil disposal or storage (moderate risk).
  - Fill or soil importation (moderate risk).
  - Wetlands or detention basins (low to moderate risk).
  - Potential burial and asbestos containing materials (ACM) (low to moderate risk).
- Several offsite PCAs were also identified, these PCAs were considered unlikely to impact the contamination status of the development site.

Soils encountered at the development site

- Summary of the soils encountered across the development site are included within Table 19.4.

Table 19.4: Summary of soils found on site

Soil Type	Description	Thickness
Fill	Most commonly, grey silty / gravelly / clayey sands / sand with shell grit and shells at some locations (commonly in the northern half of Area A, and Area B and C) (likely to be dredged material / locally sourced material). Surface / near surface (overlying the above) yellow brown / orange brown sandy gravel / gravelly sand, often with inclusions of brick – limited to Area A east of the railway line (likely to be building rubble; imported fill). Sandy silt / silt, sandy gravels and sandy clay were also reported frequently, often in near surface soils (likely imported fill).	Variable – absent to 3 mbgl (typically 1 m to 1.5 m).
Silty Sand/Sand	Typically grey with shellgrit and shells. Consistent with the St Kilda Formation.	Encountered to the extent of drilling (3 mbgl), where present.

Soil contamination sampling results

- All soil samples collected returned results below the adopted criteria for commercial / industrial land use with the exception of copper in one sample from Area 1 which exceeded ecological criteria only (noting that this was not considered to be significant in the context of the development), and lead in one sample from Area 2 which exceeded both ecological and human health criteria. This elevated lead concentration appeared to be isolated, however, further investigation will be undertaken to assess the extent of lead in this area.
- Acid sulfate soils (ASS) and potential acid sulfate soils (PASS) were not encountered, noting the testing to date has been focused to the upper 3 m fill layer of the site. Further investigation will be undertaken

in the specific areas of the development site where deeper excavation and dewatering is likely to be required (Area 3) to allow assessment of deeper soils where acid sulfate soils (ASS) and potential acid sulfate soils (PASS) are more likely to be realised.

- The soil investigation completed targeted the PCAs identified onsite, and did not identify significant contamination.

Groundwater contamination sampling results

- Contamination of groundwater exists across the development site, with a number of contaminants reported at concentrations above the adopted Tier 1 groundwater screening levels for relevant environmental values of groundwater. However, with the potential exception of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS), a complex group of synthetic chemicals that have been used in consumer products around the world since the 1950s, the site contamination is unlikely to be site derived, given the site history and reported soil concentrations.
- Whilst contamination of groundwater exists across the site, it is unlikely to be associated with a risk to onsite receptors (workers) following completion of construction. Construction workers may be exposed to groundwater during the construction stage of the development, and this exposure requires management.
- Methane was reported in a number of wells (mainly Area 1 and 2). This is likely to be naturally occurring rather than a result of potentially contaminating activities at the site. Whilst there are no screening levels provided by the adopted sources for assessment of methane and it is unlikely to present a risk via the direct contact pathway, methane is a volatile chemical and has the potential to impact the development (both construction and operation) via the vapour pathway. Further investigation are being undertaken to assess any potential risks from methane via the vapour pathway.
- It is likely that dewatering construction water will require treatment prior to disposal to marine or freshwater, due to elevated concentrations of a number of contaminants which exceed the criteria provided by EPA 1093/21.

Further investigations

As mentioned above, time and site access constraints have meant that a number of further investigations are still required prior to commencement of construction works.

Two Sampling Analysis and Quality Plans (SAQPs) have been prepared to outline these works (available in Appendix 1.14). Results will be provided to relevant authorities once finalised.

- SAQP for Additional Targeted Site Contamination Assessment:
  - Soil investigation of the former Ferrocut site (Area 1).
  - Extent of elevated lead concentration (Area 2).
  - Assessment of potential acid sulfate soil and actual acid sulfate soil in deeper soils (i.e. at depths greater than 3 mbgl) in specific locations like Area 3 where dewatering is likely to be required.
  - Assessment of deeper Q2 aquifer in areas where dewatering is likely to be required.
- SAQP for Hazardous Ground Gas Assessment:

  - Assessment of methane in the vapour phase for groundwater across the site.
- Riverbed sediment contamination in dredging footprint.

19.5.2 Sensitive Receptors

As per the current and future site land use classification as commercial/industrial, sensitive receptors for site and groundwater contamination include human and ecological receptors.

The following human receptors were identified:

- Construction workers (during the construction).
- On site workers (site operation).
- Sub-surface maintenance workers (site operation).
- Human occupants of surrounding residential and commercial properties (offsite).

The following controlled waters receptors were identified:

- Port River.
- Groundwater.

The following ecological receptors were identified:

- ADS and Mutton Cover (including flora and fauna).

19.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanisms for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

19.6.1 Embedded mitigation measures

Construction

The following management plans will be prepared and implemented to ensure best practises for contamination are followed during the construction phase:

- A Soil, Erosion and Contamination Management Plan (SECMP), which will form part of the CEMP, will include unexpected finds protocols should soils encountered during construction works be inconsistent with those encountered during the site investigations. It will include procedures for the assessment and management of unexpected finds. It will include management strategies for hazardous materials use, storage and handling, spill response and risks of inhalation, ingestion, and dermal contact of potentially contaminated materials and ground gas during construction.

- An Acid Sulfate Soil Management Plan (ASSMP), which will form part of the CEMP, will be prepared in accordance with EPA SA (2007) for areas where soil disturbance in areas where sulfate soils are anticipated to be encountered at depth - specifically Area 3. The ASSMP would outline measures to avoid / minimise oxidisation of sulfides, measures to contain and treat / neutralise acid drainage, and management measures required for any excavated stockpiled material (minimise surface area, minimise storage duration, cover to minimise infiltration, etc).
- A Dewatering Management Plan (DMP), which will form part of the CEMP, will be prepared for the dewatering activities in accordance with EPA SA (2021) by a suitably qualified professional. The DMP will include any requirements to treat dewatering wastewater prior to discharge, ongoing monitoring requirements during the dewatering program, while also considering potential changes to local hydrology due to the dewatering which could impact on registered users of groundwater or any known groundwater contamination in the vicinity of the dewatering (onsite or offsite).
- A Stormwater Management Plan (SMP), which will form part of the CEMP, will include good practice methods with these measures designed to prevent adverse impacts in relation to flood risk, surface water drainage and pollution control of oils, sediment, cements and other polluting sources which may be hazardous to the water environment.

Operation

The following management plans will be prepared and implemented to ensure best practises for contamination are followed during the operational phase:

- An OEMP.
- A DMP, which will form part of the OEMP.

19.6.2 Other Approvals/Licensing

Large earthworks activities that involve dewatering may require an authorisation in the form of a licence. The threshold for an 'earthworks drainage' licence is stated in Schedule 1 of the EP Act: the conduct of earthworks operations in the course of which more than 100 kL of wastewater containing suspended solids in a concentration exceeding 25 mg/L is discharged directly or indirectly to marine waters or inland waters.

19.7 Assessment of Effects

Onsite human receptors during construction and operation are limited to workers. The sensitivity of onsite human receptors is considered to be 'Medium'.

Offsite human receptors during construction and operation are limited to human occupants of surrounding residential and commercial properties. Given the separation of these receptors from the development site, the sensitivity of onsite human receptors is considered to be 'Medium'.

Ecological receptors include the ADS, Mutton Cove and associated flora and fauna, whilst controlled waters receptors include the Port River and onsite groundwater.

While a heavily modified environment, the Port River adjacent to the development site supports a range of native flora and fauna including protected species. The adjacent Mutton Cove is less modified that the Port River and also supports a range of wildlife. Due to human development, stormwater and wastewater are now the only freshwater inputs to these environments, and water quality is poor as a result. The Port River is dredged regularly. Given their existing level of disturbance and exposure to pollutants, the sensitivity of these ecological and controlled water receptors is 'Medium'.

19.8 Construction

All potential construction site and groundwater contamination impacts are temporary and reversible in nature.

19.8.1 Disturbance to contaminated soil through excavation

The Physical Environment Report, Appendix 1.14, completed to date did not identify soil contamination when considering the proposed land use (commercial / industrial), with all soil samples returning results below both human health and ecological criteria, with the exception of one result for lead in Area B and one result for copper from Area 1 which exceeded ecological criteria only. Based on the results to date, it is unlikely that construction activities will result in large scale disturbance to contaminated soil through excavation or construction activities.

Onsite construction workers will be implementing best practise processes as per the CEMP and wearing appropriate PPE. Given the very low likelihood of disturbance to contaminated soil and embedded mitigation measures, the magnitude of impact is 'Very Low'. Therefore, the significance of effect to onsite construction workers is Negligible (not significant).

The inclusion of the mitigation measures within the CEMP will reduce the exposure levels to adjacent site users (moderate sensitivity receptors) from the risks of inhalation, and ingestion of potentially air-borne contaminated materials, coupled with the very low likelihood of disturbance to contaminated soil, the magnitude of impact is 'Very Low'. Therefore, the significance of effect is Negligible (not significant) to adjacent site users.

Construction activities are unlikely to result large scale disturbance to contaminated soil or change the existing baseline conditions material across the development. As such, ecological and controlled waters receptors will experience a magnitude of impact no greater than 'Very Low'. Therefore, the significance of effect to ecological and controlled waters receptors is Negligible (not significant).

19.8.2 Potential disturbance of coastal acid sulphate soils

The development site is mapped as low probability (low confidence) for ASS and investigations completed to date did not identify potential or actual ASS, noting these investigations were limited to the upper 3 m of the development site. As these soils have been encountered at certain depths and locations with previous infrastructure construction for the existing ONS, further investigation of Area 3 in particular is to be completed to assess the likelihood for potential ASS to be present in the area where deeper excavation and dewatering is likely to be required.

Should ASS be identified in the further investigation of Area 3, or unexpectedly encountered during construction works, this will be managed with standard procedures through an ASSMP for areas where disturbance cannot be avoided.

Onsite construction workers will be implementing best practise processes as per the CEMP and wearing appropriate PPE. Given the low likelihood of disturbance to ASS and embedded mitigation measures, the magnitude of impact is 'Very Low'. Therefore, the significance of effect to onsite construction workers is Negligible (not significant).

The inclusion of the mitigation measures within the CEMP will reduce the exposure levels to adjacent site users (moderate sensitivity receptors) from the risks of inhalation, and ingestion of potentially air-borne contaminated materials and thereby reduce the magnitude of impact to 'Very Low'. Therefore, the significance of effect is Negligible (not significant).

Assuming the effectively implementation of the CEMP and ASSMP, the magnitude of impact from the potential disturbance of ASS is 'Low' for ecological and controlled waters receptors. Therefore, the significance of effect to ecological and controlled waters receptors will be Minor Adverse (not significant).

19.8.3 Potential contamination of soils / groundwater from spills during construction

The inclusion of mitigation measures within the CEMP, such as leak and spill prevention from vehicles / storage, and the safe working procedures for the proposed piling, will reduce the likelihood of the migration and / or discharge of leached and mobile contaminants from leakages or spills to the onsite construction workers, adjacent site users, ecological and controlled waters receptors (moderate sensitivity receptors). The magnitude of impact is 'Very Low'.

Therefore, the significance of effect is Negligible (Not Significant) to all receptors.

Management of soil generated from earthworks / additional soil required to achieve the derived site levels

Additional soils will be required to achieve the required site levels for the development. Any imported soils will be virgin quarry material, or waste derived fill (WDF) suitable for commercial / industrial land use. As such, this will not increase the contamination risk over the existing baseline conditions, or further contaminate the development site.

Any surplus soils from the development site will be classified in accordance with the EPA WDF standard, with these materials then potentially able to be re-used in a different area of the development site or offsite as WDF, or disposed to a licensed landfill. As such, this will not increase the contamination risk at the development site over the existing baseline conditions.

These standard processes will be managed through the CEMP and WDF standard. The magnitude of impact is 'Very Low' for onsite construction workers, adjacent site users, ecological and controlled waters receptors (moderate sensitivity receptors). Therefore, the significance of effect is Negligible (Not Significant) to all receptors.

Hazardous ground gas

The investigation completed to date identified concentrations of methane in groundwater across the development site. Methane is a volatile chemical and has the potential to impact on human health via the

vapour pathway if accumulated in enclosed spaces, as such on human receptors have been considered. Further investigation of hazardous ground gas is to be undertaken – the scope of these proposed works are detailed in the SAQP included as Appendix 1.14, with these additional works to be implemented prior to the commencement of site works.

The vast majority of construction activities will take place in the open-air with no confined spaces for the potential accumulation of gases. This therefore removes the pathway for ground gas migration and accumulation. In addition, should the Hazardous Ground Gas Assessment identify the requirement for gas protection measures to be included within the final design of buildings to protect future occupiers and construction workers, these measures would be implemented during the construction phase and thus remove the pathway for ground gas migration and accumulation at this time.

Given the above, and that onsite construction workers will be implementing best practise processes as per the CEMP and wearing appropriate PPE. The magnitude of impact is 'Very Low'. Therefore, the significance of effect to onsite construction workers is Negligible (not significant).

Given the separation of the receptors from the development site and the inclusion of the mitigation measures within the CEMP will reduce the exposure levels to adjacent site users (moderate sensitivity receptors) from the risks of inhalation, and ingestion of potentially air-borne contaminated materials and thereby reduce the magnitude of impact to 'Very Low'. Therefore, the significance of effect is Negligible (not significant).

Erosion and sedimentation

During rainfall events, areas disturbed by construction activities may be subject to erosion resulting in transportation and deposition of soil and sediment in surface water. During the summer months, where rainfall is less frequent, wind erosion is more likely to occur. The CEMP will include erosion and sedimentation and control measures which will be implemented during site earthworks. Controls will include installation of berms or drains where appropriate (e.g. on slopes leading to the Port River), silt fences and / or hay bales for interim onsite erosion control, appropriate stockpile management and erosion controls for excavations. Contingency plans for expected storm or flood warnings will be developed.

Ongoing monitoring of the effectiveness of implemented controls (to be outlined in the CEMP) will be undertaken. Any identified sodic or dispersive soils will be managed in accordance with the CEMP and EPA guidance on stockpile management (EPA, 2020), noting field indictors of sodic and dispersive soils will be included in the CEMP.

As a result, the magnitude of impact is 'Very Low' to onsite construction workers, adjacent site users, ecological and controlled waters receptors (moderate sensitivity receptors) from contamination risk as a result of erosion and sedimentation. Therefore, the significance of effect is Negligible (Not Significant) to all receptors.

Soil compaction

Construction activities could result in soil compaction in areas used for vehicle access and laydown areas and can change local drainage. Compaction from heavy vehicle traffic may also increase land subsidence, changing local drainage patterns and increasing erosion potential. The CEMP will include measures which will be implemented to address soil compaction. As a result, the magnitude of impact is 'Very Low' to

onsite construction workers, adjacent site users, ecological and controlled waters receptors (moderate sensitivity receptors) from soil compaction increasing the risk of contamination incidents occurring. Therefore, the significance of effect is Negligible (Not Significant) to all receptors.

Dewatering of excavations

Across the majority of the development site, the potential for intersection with shallow groundwater during construction activities is expected to be low, as the development is to be built up and used mainly for large slab on grade industrial buildings with no basements. However, groundwater is likely to be intersected as part of the construction of the non-tidal wet basin, caisson and potentially the launch facility, and it is likely that wastewater will be required to be discharged (rather than reused). It is noted that investigations are to be completed to assess deeper soil and groundwater within Area 3, with this data to inform disposal options for both soil and wastewater from dewatering, as well as assessing for potential indicators of acid sulphate soils in this area.

A DMP, which forms part of the CEMP, will be prepared for the dewatering activities in accordance with EPA requirements by a suitably qualified professional. As a result, the magnitude of impact is 'Very Low' to onsite construction workers, adjacent site users, ecological and controlled waters receptors (moderate sensitivity receptors) from dewatering of excavations as this activity will not change the characteristics of the existing baseline. Therefore, the significance of effect is Negligible (Not Significant) to all receptors.

19.8.4 Operation

All potential operation site and groundwater contamination impacts are identified as permanent and irreversible in nature.

Potential contamination of soils/groundwater from spills

The potential for contamination to soils, surface water and shallow groundwater at the site during operations as a result of a spill of fuel / chemicals is expected to be very low.

Storage and handling of fuel and other chemicals will be in accordance with Standards Australia and EPA SA, and procedures for the management of spills will be outlined in OEMP. The presence of hardstand across the development site will further decrease the potential for any spill to impact soil and groundwater. Any requirements for hazardous waste stored onsite would be done under an EPA licence, with any hazardous waste generated disposed to a licenced facility under tracking documentation.

The magnitude of impact is 'Very Low' for leakages or spills to the onsite workers, adjacent site users, ecological and controlled waters receptors (moderate sensitivity receptors). Therefore, the significance of effect is Negligible (Not Significant) to all receptors.

Hazardous ground gas

Should the Hazardous Ground Gas Assessment identify the requirement for gas protection measures to be included within the final design of buildings to protect future occupiers and workers, these measures would remove the impact pathway for ground gas migration and accumulation. The presence of hardstand across the development site will further decrease the potential pathway for ground gas migration.

Given the above, the magnitude of impact is Very Low for onsite workers, adjacent site users, ecological and controlled waters receptors (moderate sensitivity receptors). Therefore, the significance of effect is Negligible (Not Significant) to all receptors.

Erosion and sedimentation

Following completion of construction activities, the majority of the development site will be sealed with bitumen, concrete or paving. There will be minimal non-sealed areas. The largest unsealed area will be the area associated with the drainage strategy of the development. Throughout the operational life of the development, maintenance and repair of any non-paved surfaces will be continually undertaken as appropriate, as directed via the OEMP, in order to mitigate the potential for erosion and sedimentation from occurring as a result.

As a result, the magnitude of impact is considered to be 'Very Low' to onsite workers, adjacent site users, ecological and controlled waters receptors (moderate sensitivity receptors)) from contamination risk as a result of erosion and sedimentation. Therefore, the significance of effect is Negligible (Not Significant) to all receptors.

Dewatering

There is potential that ongoing dewatering may be required following construction of the non-tidal wet basin, caisson and potentially the launch facility. Should this be required, the DMP will include assessment and requirements for the ongoing dewatering proposed to be undertaken, noting that the DMP will need to provide evidence demonstrating no potential for environmental harm as a result of the ongoing dewatering to receptors can occur. This DMP would be presented to EPA for approval.

As a result, the magnitude of impact is 'Very Low' to onsite workers, adjacent site users, ecological and controlled waters receptors (moderate sensitivity receptors) from dewatering during the operation phase. Therefore, the significance of effect is Negligible (Not Significant) to all receptors.

19.9 Additional Mitigation Measures and Residual Effect

No additional mitigation or monitoring are required beyond those outlined above in Section 19.6. The likely residual effects for construction and operational effects will remain as stated above within Section 19.7.

19.10 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6 – Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

19.10.1 Construction and operation

Appropriate pollution prevention measures are expected to be detailed in all the cumulative scheme's CEMPs and OEMPs which would reduce any potential significant effects to not significant. These measures and use of best industry practice during the construction phase, as implemented via the CEMPs/OEMPs, are expected to prevent pollution originating from the schemes and entering the land and water environments preventing the wide-spread migration of any contamination as well as minimising the risk posed to sensitive receptors. The mitigation measures within the CEMP and OEMP for the development will ensure a similar level of protection to identified sensitive receptors and prevent the potential for off-site migration of contamination. It is considered that there is very low likelihood of interaction between the cumulative schemes and the development in relation to potential land contamination and therefore no significant cumulative effects are anticipated.

CHAPTER 20

Coastal and Marine

URPS

20. Coastal and Marine

Conclusion: No significant effects have been identified in relation to the placement of dredged material within the Gulf St Vincent, nor from changes to coastal processes during operation.

20.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to the coastal and marine interface works.

The AECOM Aurecon Design Joint Venture (AAJV) has contributed information for the EIS in relation to the coastal and marine interface works and provided indicative preliminary dredging volumes for the construction of the development.

As outlined within Chapter 1 – Introduction and Need for the Development, the EIS excludes assessment of dredging activities associated with the operation of the development (i.e., deepening of the existing channel and creation of swing basins).

20.2 Assessment Requirements

Commission Assessment Requirements PE1: Detailed Requirements

- Describe existing coastal environmental values including estuarine, littoral and marine environmental values (e.g. water quality, benthos, aquatic flora and fauna, mangrove areas, salt marsh, and amenity) that could be impacted by construction or operation of the development.
- Describe current processes and recently historical estuarine, littoral and marine morphology with a description of the processes shaping the coastal system (e.g. tides, rivers, floods, coastal currents, sediment transport, major storms, rocky headlands, or islands)
- Describe the legislative, regulatory and planning contexts for coastal systems that apply to the development.
- Describe existing residential, commercial or recreational uses of the coastal system that could be impacted by construction or operation of the development.
- Provide details of proposed works with potential to affect coastal processes including buildings and infrastructure to be built on the shore or on land close to the shore and excavations on or near the shore.
- Provide detail of any required dredging (area and volume) within the Port River both immediate (capital) and likely ongoing (maintenance). Identify spoil de-watering and storage site/s and how the spoil storage sites will be protected from potential sea flood risk.
- Identify the flooding and erosion risks to the site (including flooding and erosion exacerbated by sea level rise and extreme weather events) and measures to reduce the risks.
- Provide details of the pre- and post-development stormwater flow regime, including detail of runoff generated under a 1 EY, 50 year ARI and 100 year ARI events

- Provide details of how natural processes and the protective function of landforms and vegetation will be maintained in sea erosion and storm tide inundation areas.
- Identify any potential for Coastal Acid Sulfate Soils (CASS) to be encountered on the site and how this might be mitigated (refer to the Coast Protection Board policy on CASS).
- Assess the potential impacts to the coastal system and existing uses from the development and propose mitigation measures to avoid or minimise those impacts during construction and operation.
- Map existing vegetation communities and describe the effect of the proposed development on coastal features and associated vegetation communities and outline management and rehabilitation measures for these areas.
- Identify the impact of coastal erosion due to expected sea level rise of 0.3 metre to 2050 and 1.0 metre to 2100.
- Describe the effect on the conservation values of the nearby conservation areas (including conservation parks, national parks, land with heritage agreements, Adelaide Dolphin Sanctuary etc)
- Describe historical marine uses and the potential for contamination of sediments or contaminated groundwater entering the marine environment and describe any known or suspected sediment or groundwater contamination within the study area that could be re-suspended released or otherwise disturbed as a result of the project.
- Provide details of proposed works with potential to affect marine waters and current uses. The description should include the following matters (where relevant):
  - potential impact of vessel movements on the marine environment
  - any jetties, bunds, harbour walls, groynes, channel markers, or other infrastructure, to be built in the Port River
  - any proposals to undertake transhipping of material in state waters or the Commonwealth marine area
  - describe the underlying geology and the nature of the soils with special reference to coastal landforms
  - identify geological, seabed and substrate impacts that may occur as a result of any dredging activity that will be undertaken during the construction phase. Detail measures for managing these impacts.
  - identify the total 'in water' footprint of the proposed development (including all areas to be dredged and/or altered).
- Model the sediment plume produced by any dredging including an assessment of likely risk to marine vegetation and fauna. Modelling should be developed using at least 12 continuous months of turbidity data collected from the site.
- Describe the potential for pollution (e.g. sediment plumes, discharges or spills to land and water, discharge of stormwater and wastewater) of marine waters during construction and

operation. Identify locations where discharge to marine waters or land may occur during construction, operation or decommissioning of the development.

- Assess the potential impacts of the proposed project's activities in marine waters including, but not limited to, any potential impacts on the Adelaide Dolphin Sanctuary and Port River, commercial or recreational fisheries effects of the development on nursery habitat. Include spills of fuels and chemicals from water and land-based activities, run-off / discharge from land-based activities and propose mitigation or offset measures to avoid or minimise those impacts during construction and operation.

20.3 Guiding Legislation and Policy

The key legislation and policies that guide this coastal and marine assessment in South Australia are summarised in the following Table 20.1.

Table 20.1: Summary of legislation and policy

Name	Description
Environment Protection Act 1993	South Australia regulates activities within its coastal waters through the EP Act, including dredging and disposal activities.
Fisheries Management Act 2007	The Act is a key piece of legislation in South Australia for protecting marine biodiversity, particularly fish habitats and ecosystems that support commercial and recreational fisheries. The Act protects seafloor ecosystems by regulating activities that could disturb benthic habitats.
Marine Parks Act 2007	The Act aims to protect and manage South Australia's marine parks, which are designated areas of high ecological, cultural, or recreational value.
SA EPA Dredge Guideline (2020)	The purpose of the document is to help proponents and licensees in meeting their general environmental duty under the *Environment Protection Act 1993*, by demonstrating that all reasonable and practicable measures have been undertaken to minimise the potential for environmental harm.

20.4 Scope, Study Area and Assessment Method

20.4.1 Scope

The potential environmental effects considered within this chapter for the coastal and marine interface works are predominantly associated with the construction phase of the development, and primary relate to the disposal of dredged material generating turbidity in the marine environment at the designated dredge material placement area ('DMPA') given many of the impacts of dredging in the Port River are covered in other chapters as identified in the Scoped Out section below. The following impacts are considered within this chapter:

- Construction - potential effects from mobilisation of contaminants at the DMPA.
- Construction - potential effects from placement of dredged material at the DMPA, including smothering of benthic flora and fauna.
- Operation - altered morphology and changes to coastal processes within Port River as a result of the hardening of the coastal edge within Area 3.

The disposal location for dredged materials has not been confirmed. Dredge ponds used for comparatively smaller previous ANI dredging campaigns that have had smaller volumes of dredged material are within the subject site and will be developed as part of the development, meaning they are no longer able to be used for this purpose.

For the purposes of this assessment, due to the likely quantity of material, and the absence of a suitable land-based site currently identified, it has been assumed that all dredged material for the construction phase of the development would be disposed of within the Gulf St Vincent. The Gulf St Vincent site would be the same deposition site as was used for the previous dredging programmes of the Port River undertaken by Flinders Ports Holdings in 2005 and 2018[31].

Previous testing of material dredged from the Port River, as reported within the Flinders Ports 2017 Development Application[31], has indicated it is not suitable for beach regeneration or engineered fill. Land based disposal would also require large areas of land and lengthy drying periods, as investigated by Flinders Ports Holdings for the 2005 Outer Harbor Channel Deepening[31], and was discounted as an alternative.

Scoped Out

Operational Dredging Activities

As outlined within Chapter 1 - Introduction and Need for the Development, operational dredging activities for the Project, including any maintenance dredging for the coastal infrastructure, are excluded from assessment within this EIS. As such, all potential effects from operational dredging activities have not been considered.

[31] Environment Protection Authority South Australia (EPA SA) 2024a. Outer harbour dredging (Flinders Ports). Available at: https://www.epa.sa.gov.au/community/stay-informed/flinders-ports

Direct and Indirect Effects from Construction Activities

The following impacts associated with the construction of the coastal and marine interface works and dredging activities to construct the development have not been included within this chapter, as the impacts and effects have been comprehensively assessed within their respective technical chapter that deals with the sensitive receptor that is potential affected by the activity.

- Air Quality – Chapter 7 - includes an assessment of air quality impacts to surrounding human receptors from all construction activities.
- Noise and Vibration – Chapter 8 – includes an assessment of noise and vibration impacts to surrounding human receptors from all construction activities.
- Biosecurity - Chapter 11 - includes an assessment for the spread of marine pests during construction.
- Marine Flora and Fauna – Chapter 12 – includes assessments to native marine vegetation, listed marine fauna, the Adelaide Dolphin Sanctuary and commercial and recreational fisheries from construction activities. The assessments include consideration of the following impacts within the Port River and surrounds only (i.e., did not consider the DMPA):
  - Direct disturbance/removal of the seabed and seagrasses.
  - Release of contaminants, including spills from refuelling, waste disposal etc.
  - Disturbance to marine fauna from noise and vibration.
  - Loss of fisheries values.
- Heritage Places and Areas - Chapter 24 - includes an assessment of disturbance of shipwrecks.

20.4.2 Study Area

Construction

The study area consists of the Gulf St Vincent, as this is the likely location of the DMPA and the area where it could be anticipated that indirect impacts from placement activities could occur.

Operation

The study area includes the coastal shoreline adjacent to Area 3 of the development.

20.4.3 Assessment Method

The general approach to EIA methodology, as detailed in Chapter 6 - Impact Assessment Methodology, has been used. However, the assessment of effects within this chapter are based on a qualitative assessment of the development against the findings of the previous Flinders Ports Holdings dredging development applications for the 2005 Outer Harbor Channel Deepening (OHCD) project and the 2017 Outer Harbor Channel Widening (OHCW) project. As such, professional judgement has been used in determining the significance of effects of the development.

The assessments undertaken for the Flinders Ports Holdings dredging activities in 2005 and 2017 concluded that there were no long-term significant environmental effects on ecological receptors with the Gulf St Vincent. Both projects received approval and were implemented.

Assumptions and Limitations (i.e. Uncertainties)

This assessment uses publicly available information from the OHCD and OHCW projects, as no specific surveys or assessments have been conducted directly by the project team in relation to the disposal of dredged material within the Gulf St Vincent to date. The data and insights presented here rely on the findings from Flinders Ports Holding's 2017 Development Application[31] and other accessible resources , including those from the SA EPA available publicly.

As the disposal location for dredge material has not yet been confirmed, further assessment and approval will be undertaken and provided to the EPA as part of the dredging and disposal licence applied for under the *Environment Protection Act 1993*.

In addition, it is acknowledged that the changes to coastal processes from the development is uncertain as changes could lead to greater erosion or accretion depending on the final design of the coastal and marine infrastructure within Area 3.

20.5 Baseline Conditions and Sensitive Receptors

20.5.1 Baseline Conditions

As outlined within the Flinders Ports Holdings 2017 Development Application[31], water circulation in the Gulf St. Vincent follows a generally clockwise pattern with sediment moving and accumulating towards the north. However, seasonal currents affect this flow and influence water quality, as outlined below:

- Summer: Residual currents and dominant southerly/southeasterly winds push waters northward along both sides of the gulf. When these waters reach the gulf's northern head, they turn and move southward down the centre, creating a south-to-southeast sediment drift.
- Winter: This pattern largely reverses, with nearshore waters flowing southward while the central gulf experiences a northward return flow. These seasonal changes contribute to variable turbidity levels across the gulf.

The gulf generally has low turbidity and sediment levels, with higher concentrations in the northern waters. Sampling[31] conducted in summer indicates increased turbidity near the seabed, likely due to the southward movement of denser, saline water.

Water quality in the Gulf St. Vincent is influenced by various factors, including urban runoff, wastewater discharge, and agricultural runoff. These activities contribute to nutrient and sediment loads, particularly in nearshore areas. High levels of nutrients, such as nitrogen and phosphorus, are common in urbanized zones due to stormwater and treated wastewater discharges. These nutrient loads lead to occasional algal blooms and increased turbidity, which can degrade water clarity and affect marine life. Seagrass meadows, which are extensive in the Gulf St. Vincent, are critical to the region's marine ecosystem, providing habitat, stabilising sediments, and supporting biodiversity[32].

[32] Environment Protection Authority South Australia (2013), Gulf St Vincent Bioregional Assessment Report 2010-2011, EPA, Government of South Australia Accessed - https://www.epa.sa.gov.au/files/477489_marine_gsv2010_11.pdf

20.5.2 Sensitive Receptors

Based on the baseline conditions described above, Table 20.2 sets out a summary of the receptors and their sensitivity.

Table 20.2: Summary of Receptor Sensitivity

Receptor	Sensitivity (Value)
Ecological receptors with the Gulf St Vincent – including seagrass and other benthic habitats, marine biodiversity, particularly fish habitats and ecosystems that support commercial and recreational fisheries.	Medium
Morphology within the Port River.	Low

20.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanism for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

20.6.1 Embedded Mitigation Measures

Construction

A Marine and Coastal Environmental Management Plan (MCEMP) will be developed and incorporated into the CEMP. The MCEMP will outline specific strategies and procedures for managing and mitigating impacts to marine flora and fauna throughout the construction phase, ensuring that best practices are followed.

The CEMP will also include:

- A Biosecurity Management Plan (BMP) covering management of invasive or harmful marine flora and fauna.
- A Dredge Management Plan (DMP) covering mitigation and management of dredging impacts to the marine environment, flora and fauna.

The DMP will set out the proposed dredging methodology based on final design and the season in which the works will be undertaken within The DMP will include monitoring requirements with triggers for changes in methodology in order to reduce plume and sedimentation impacts. The DMP is expected to:

- Outline legal, environmental, and compliance requirements and how they will be met.
- Describe the environmental standards, procedures, and practices for the dredging program.
- Define roles and responsibilities for environmental management.
- Promote best environmental practices.
- Set performance goals for the contractor during the dredging program.
- Provide procedures for incident management, monitoring, and reporting during the dredging program.
- Manage and monitor water quality impacts from dredging activities.
- Implement best practices for:
  - Safe handling and storage of waste on dredge vessels.
  - Fuel and wastewater transfer operations.
  - Minimising noise impacts on nearby areas.
  - Reducing air emissions from dredging operations.
- Reduce the risk of environmental incidents, such as marine wildlife strikes, oil spills, or vessel collisions.
- Protect cultural heritage sites during dredging activities.

Operation

Relevant and ongoing aspects from the construction MCEMP will be incorporated into the OEMP for the development. The relevant ongoing aspects from the construction MCEMP will outline specific strategies and procedures for managing and mitigating impacts to marine flora and fauna throughout the operational phase, ensuring that best practices are followed.

20.6.2 Other Approvals/Licensing

A parallel Strategic Assessment process is being undertaken under the EPBC Act. Approval in accordance with provisions of the EPBC Act for Matters of National Environmental Significance (MNES) will be required before works can commence.

A Native Vegetation Clearance Data Report will be prepared by an Accredited Consultant approved by the Native Vegetation Council as per the NV Act for any clearance of seagrass or other native vegetation protected under the Act once the final design of the development and the quantity of seagrass or other native vegetation to be removed has been confirmed.

20.7 Assessment of Effects

20.7.1 Construction

The construction of the development is expected to require between 636,000m^3 and 891,000m^3 of material to be dredged, with a breakdown provided within Table 20.3 below.

Table 20.3: Quantity of materials to be dredged

Area	Approx. m^3 of materials to be removed
Launch Facility	190,000 – 266,000
Main Wharf Berth	139,000 – 195,000
Wet Basin	307,000 – 430,000
Total	**636,000 – 891,000**

The 2005 OHCD project involved the dredging of approximately 2.7 million m^3 of material, and the 2017 OHCW project involved the dredging of approximately 1.55 million m^3 of material. The quantity of material to be removed and to be placed within the DMPA for the development is between 24% and 33% of the material removed for the 2005 OHCD project, and between 41% to 57% the material removed for the 2017 OHCW project.

Potential effects of from placement of dredged material at the DMPA

The proposed dredging campaign for the construction of the development will have both a lower dredging volume and shorter duration than either the 2005 OHCD and 2017 OHCW projects. Based on the current volumes of materials anticipated, as outline above, any impacts to ecological receptors are expected to be in the region of 50% smaller than the 2017 OHCW project, and 75% smaller than the 2005 OHCD project.

Seagrass surveys at the DMPA undertaken after the 2005 OHCD project, as outlined the Flinders Ports Holdings 2017 Development Application[31], showed that the seagrass in the gulf made a recovery from those impacts. This indicates that permanent or long-term impacts on seagrass habitat, and other benthic habitats and marine biodiversity, due to turbid plumes from the placement of dredged material is unlikely. Whilst acknowledging the placement of dredge material within the Gulf St Vincent will cause impacts to benthic flora and fauna, it will not be permanent, with flora and fauna species able to recolonise the DMPA in time.

As such, the development is not expected to result in changes which could significantly affect ecological receptors with the Gulf St Vincent as a result of the placement of dredged material at the DMPA and no significant effects are expected.

Potential effects of mobilisation of contaminants

Sediment sampling included within the Flinders Ports Holdings 2017 Development Application[31] concluded that material within the Port River that was removed was suitable for marine placement, due to the no indication of contamination being identified. It is reasonable to conclude that the material to be removed for the development will be similar in composition to that removed for the 2005 OHCD and 2017 OHCW projects. However, sediment sampling will be conducted to confirm the material to be dredged is appropriate for placement at the DMPA within the Gulf St Vincent.

There is potential for ASS to be presented within areas to be dredged. Mild levels of ASS were identified along the existing channel during the assessment for the Flinders Ports Holdings 2017 Development

Application[31]. Testing showed that the ASS was only weakly acidic and had sufficient neutralising capacity within the soils that further treatment was not necessary. In addition, further ASS testing undertaken for the swing basin area in 2016 for the 2017 OHCW did not identify any ASS. It is reasonable to conclude that the material to be removed for the development will be similar in makeup to those removed for the 2005 OHCD and 2017 OHCW projects. However, further sampling will be conducted as part of the EPA dredging licence. In addition, as all material will be kept within water and disposed at sea (i.e. not exposed to oxygen), it is not expected that any ASS material would not require further treatment.

As such, the development is not expected to result in changes which could significantly affect ecological receptors with the Gulf St Vincent as a result of the mobilisation of contaminants/ASS at the DMPA and no significant effects are expected.

20.7.2 Operation

Morphology and changes to coastal processes within the Port River

The construction of the coastal and marine infrastructure within Area 3 and the hardening of the coastal edge will cause changes in channel morphology and hydrodynamics (e.g. flow of water, deposition of sediment) in the Port River. The spatial area of this impact is still uncertain as changes could lead to greater erosion or accretion depending on the final design of the coastal and marine infrastructure within Area 3. Given the final design has not been landed, this modelling is yet to be undertaken.

Indicative scopes of work for additional assessment work that may be undertaken to inform design of the marine infrastructure for the development, and thus confirm the detail assessment of morphology and changes to coastal processes within the Port River, are summarised as follows:

- Detailed met-ocean study: Develop design parameters for the site including extreme water levels, waves, and currents, and ambient conditions.
- Hydrodynamic study: Assess the impact of the development on waves, currents, and sediment transport.
- Sedimentation study: Evaluate the potential for sedimentation using combinations of historical suspended sediment concentrations and simulations of the flushing regime under the modified layout. Confirm sedimentation rates and dredge depths.

However, the construction of approximately 700m of coastal and marine infrastructure is unlikely to significantly alter the baseline coastal processes or channel morphology within the Port River.

Given the scale of the change, which represents a relatively small portion of the broader marine environment within the Port River, any effects on sediment movement or water flow patterns are expected to be minimal. Localised modifications to the shoreline and channel may occur, but these will likely be limited in scope and duration, with natural coastal processes quickly adjusting.

As such, the development is not expected to result in changes which could significantly affect morphology and changes to coastal processes within the Port River and no significant effects are expected.

20.8 Additional Mitigation Measures and Residual Effect

No additional mitigation or monitoring are required beyond those outlined above in Section 20.6. The likely residual effects for construction and operational effects will remain as stated above within Section 20.7.

20.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6 – Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

No dredging activities are required for the cumulative schemes listed above. As such, no cumulative effects can occur.

20.9.1 Operational Dredging

As outlined within Chapter 1 – Introduction and Need for the Development, the EIS excludes assessment of dredging activities associated with the operation of the development (i.e., deepening of the existing channel and creation of swing basins). It is acknowledged that there could be cumulative effects on ecological receptors with the Gulf St Vincent from placement of additional dredged material. The dredging activities associated with the operation of the development will be subject to detailed assessment, as part of its planning application process once detailed design is complete. This detailed assessment will include a cumulative assessment of the development, thereby providing confirmation on the final impacts and associated effects of the Project in relation to dredging activities.

CHAPTER 21

Surface Water and Groundwater Quality

URPS

21. Surface Water and Groundwater Quality

Conclusion: No significant effects have been identified in relation to surface water and groundwater quality during the construction and operational phases.

21.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development on water quality (surface and ground).

AECOM Aurecon Joint Venture (AAJV) has coordinated and prepared Stormwater Management Plan (the 'SMP') for the development site. The SMP is included as Appendix 1.13 of this EIS. JBS&G has prepared a Site Contamination Assessment and Physical Environment Report for the construction and operational phases of the development, including assessment of groundwater. The JBS&G reports are included as Appendix 1.14 of this EIS.

The SMP presents the basis of stormwater management at the development site. It also considers the existing stormwater management conditions at the development site, proposed changes as a result of the development, including water quality improvement measures, and presents an overarching stormwater management strategy for the development.

21.2 Assessment Requirements

Commission Assessment Requirements: PE3 (Detailed Requirements)

- Describe existing surface water environmental conditions upstream and downstream of the site (including seasonal variations and variations with flow) of waterbodies, watercourses, drainage channels, wetlands and floodplains. Water quality, any existing site contamination and potential sources of surface water pollution should be addressed.
- Describe the legislative, regulatory and planning contexts for surface water that apply to the development.
- Describe the potential for pollution (e.g. sediment plumes, spills to land and water, discharge of stormwater and wastewater, dewatering) of water bodies, watercourses, drainage channels and wetlands during construction and operation. Identify locations where discharge to surface waters or land may occur during construction, operation or decommissioning of the development.
- Describe potential alteration to surface water flows as a result of the development (including to waterbodies, watercourses, wetlands, floodplains, beds and banks) and include details of the nature of the works.
- Identify the risks of contamination of land from spills of fuel (or other toxic substances). Describe measures for the prevention and containment of spills, describe the contingency plans to be implemented in the event of spills, and comment on their expected effectiveness.

- Describe the proposed mitigation measures to protect the environmental values for surface water quality, how the relevant standards and indicators may be achieved, to protect surface water during construction and operation. Provide details of proposed stormwater management, both installation and ongoing maintenance requirements, as well as any water sensitive design features as part of the development. If required, revisit project design and construction methodologies to reduce impacts surface water quality to demonstrate that the Water Quality EPP will be met.
- Prepare a Soil Erosion and Drainage framework which describes the site characteristics, including the existing topography and runoff characteristics and outline measures to prevent soil erosion and contaminated runoff from leaving the site during construction and operations (including any opportunities for water sensitive design). Include inspection, maintenance and monitoring of effectiveness of soil erosion measures. If applicable, include details of how management measures may alter in accordance with staging of the development.
- Describe measures for storage and management of stockpiled topsoil and subsoils to minimise potential adverse effects on local hydrology and water quality, restoring soil profiles and drainage Include sediment and erosion controls where required (e.g. temporary berms, controlling water movement into and around the site, stockpile management and stabilisation of non-paved operational areas).
- Describe the known groundwater related environmental conditions including quality and significance of groundwater in the area of the development and any surrounding area potentially affected by the proposed development's activities
  - describe the nature, type, geology / stratigraphy and depth to and thickness of the aquifers, and hydraulic properties.
  - any existing site contamination, and any identified potential sources of groundwater pollution
  - characterise the quality and volume of the groundwater including seasonal variations of groundwater levels
  - describe existing groundwater supply infrastructure (e.g. bores, wells, or excavations).
- Describe the legislative, regulatory and planning contexts for groundwater that apply to the development (if applicable).
- Describe present and potential users and uses of groundwater water in areas potentially affected by the development, including residential, municipal, agricultural, industrial, recreational and environmental uses of water including groundwater dependent ecosystems (GDE).
- Describe the potential changes to hydrology (including water quality), as a result of the proposal, and the implications of these changes. Water quality impacts should consider any parameters (e.g. metals, non-metal inorganics) considered important for existing groundwater users / uses in the vicinity of the projected area of impact.
- Where groundwater would be taken by the development, quantify the volume of water that would be taken, the timeframe over which the take would occur and the potential impact on groundwater users (if applicable), noting that as the subject land is in the Central Adelaide

Prescribed Wells Area, a water licence will be required for the taking of any groundwater for industrial uses. Include details as to how any dewatered water would be managed and used or disposed of, taking into consideration the waste management hierarchy and any nearby known site contamination.

- Describe stormwater and wastewater management and the potential impact on groundwater resources in particular with regard to fuel and chemicals used in construction and / or operation of the development. Describe measures proposed for management of stormwater and wastewater during construction and operation to avoid impacts to groundwater.

21.3 Guiding Legislation and Policy

The key legislation and policies that guide water quality in South Australia are summarised in Table 21.1.

Table 21.1: Summary of legislation and policy

Name	Description
Planning, Development and Infrastructure Act 2016	The Act integrates water quality considerations through policies.
Natural Resources Management Act 2004	This act focuses on sustainable resource use and management. The EPA and local Natural Resources Management (NRM) Boards use this legislation to guide regional strategies on water quality, especially in agricultural areas. It mandates water allocation plans to manage resource use sustainably and protect against over-extraction, which could degrade water quality.
Environment Protection Act 1993	This act sets out the regulatory framework for protecting the environment, including water resources. It empowers the EPA to regulate activities that could impact water quality, including issuing licenses, enforcing compliance, and overseeing pollution controls.
Environment Protection (Water Quality) Policy 2015	Established under the EP Act, this policy provides detailed guidelines on protecting water quality from pollutants and contaminants. It sets discharge limits and classifications for pollutants, aiming to protect the environmental values of water bodies from point source (e.g., industrial outflows) and diffuse pollution (e.g., agricultural runoff).
Port Waterways Water Quality Improvement Plan	Details targets to protect environmental values for water quality improvement, primarily with respect to nutrients in the Port waterways. While it focuses on the monitoring and

Name	Description
	management of two main point sources for nutrient discharge into the Port Waterways, it also provides nutrient trigger values along the waterway.
Australian and New Zealand guidelines (ANZG) for fresh and marine water quality	Provides authoritative guidance on the management of water quality for natural and semi-natural water resources in Australia and New Zealand.

21.4 Scope, Study Area and Assessment Method

21.4.1 Scope

An assessment of potential effects on water quality (surface and ground) during the construction and operation of the development has been scoped into this chapter.

Impacts on sensitive controlled water and ecological receptors have been assessed. Common pollutants found in stormwater runoff that can impact water quality from construction sites and industrial areas include suspended solids, nutrients, litter, heavy metals, oils and grease.

These pollutants can have the following potential risks on the receiving environment:

- Increased suspended sediments could potentially increase water turbidity and cause siltation on seagrass leaves. This would limit the light to seagrass, which can reduce their growth productivity and over time contribute to an overall loss of seagrass.
- Elevated nutrient levels support the natural eutrophication process which promotes the growth of algae. This can eventually lead to a loss of above ground seagrass biomass, as high nutrient levels favour the growth of toxic / invasive algal species over that of seagrasses.
- Litter and gross pollutants such as plastic waste have been widely known to cause environmental harm (or even death) to shorebirds, turtles, and other mammals. Organic waste may also cause oxygen depletion in waters through the microbial breakdown process.
- Metals such as copper, lead and zinc are commonly found in roof runoff and road dust. They can have acute and chronic toxic effects on seagrass species.
- Hydrocarbons (oils and greases) are of concern due to their potential for acute toxicity and ability to bioaccumulate.
- Freshwater can alter the salinity levels on which marine organisms rely on. It also carries higher nutrient levels and sediment loads than seawater, which could be harmful to the saltmarshes in Mutton Cove, as there is not sufficient flushing. Freshwater ingress into Mutton Cove could also interact with coastal acid sulfate soil and facilitate soil subsidence.

21.4.2 Study Area

The area assessed includes the entire development site area and adjacent water environment.

21.4.3 Assessment Method

There are no published guidelines or criteria for assessing and evaluating effects of water quality within the context of an EIA within South Australia. As such, the general approach to EIA methodology, as detailed in Chapter 6 - Impact Assessment Methodology, has been used.

Assumptions and Limitations (i.e. Uncertainties)

Stormwater modelling completed as part of the SMP was high-level and only intended to support the principles for stormwater management at the development site. The modelling was based on limited available information and numerous assumptions as outlined with the SMP. Any recommendations informed by the modelling within the SMP should be treated as indicative only. More detailed modelling will be required during subsequent design stages to confirm the conclusions of the SMP remain correct and confirm the detailed design of the development.

Additional groundwater contamination assessment has been identified in certain locations, and for certain types of infrastructure, to confirm initial preliminary data. This assessment has been based on the information available to date, and will be updated if required should additional data collected alter the results of the assessment.

21.5 Baseline Conditions and Sensitive Receptors

21.5.1 Baseline Conditions

Surface Water Quality

There is limited available information on existing water quality improvement measures across the development site. Knowledge of existing water quality measures is solely based on a desktop review of aerial imagery, Google Streetview, and information included in previous studies.

All drainage outlets discharging to Falie Reserve and the Eastern Basin (runs between the southern boundary of Area 3 and northern boundary of Mutton Cove) have trash nets installed to capture gross pollutants conveyed by the underground drainage network. It is assumed that these trash nets are owned and maintained by Council.

Most of the existing development site, except for a small area within Area 1, drains to a detention basin. While these detention basins are not designated water quality improvement measures, they would provide some treatment. Some sedimentation would occur as water is stored in the basins, and this would reduce the amount of sediment (and with sorbed nutrients) entering downstream waters. Vegetation within these basins – particularly within the Falie Reserve and Eastern basins – would also assist with reducing nutrient loads via uptake (or assimilation).

Review of aerial imagery indicated that there is also an existing stormwater pond at the north-eastern corner of the former Ferrocut Workshop property, located north of the Mersey Road North and Annie Watt Circuit intersection. This pond appears to be heavily vegetated, which would also assist in removing pollutants from property inflows.

A large portion of the existing surfaces across the development site are unsealed and allow for the infiltration of rainfall and stormwater runoff during the more frequent storm events. This would also reduce pollutant loads discharging to the Port River in the existing conditions.

Groundwater Quality

Existing groundwater levels across the development site generally vary between 0.4-1.4 mAHD. These groundwater levels are less than 2 metres below existing surface levels. They are also within the same range as existing basin invert levels, which range between 0.5-0.95 mAHD.

Review of aerial imagery over the past decade showed that the existing Falie Reserve, Western Basins (situated within Area 1) and Eastern Basin remain wet all year round. The water level varies between wetter periods, where the entire base of the basin is covered by pooled waters, to drier periods, where there are only small patches of pooled waters at localised depressions within the basins. This indicates that these basins could potentially be impacted by groundwater fluctuations.

The Port Waterways Water Quality Improvement Plan states that groundwater is a known source of pollutants to the Port River. This indicates that the existing groundwater quality on the Lefevre Peninsula exceeds the acceptable trigger values for various pollutant indicators. The poor groundwater quality flowing to the Port River has historically been largely attributed to operational activities at a few point sources, including major industrial and wastewater treatment sites. Significant diffuse sources also contributing to the poor groundwater quality include industrial waste, overflowing septic systems and saline seepage beneath salt crystallisation ponds. These sources are generally of most concern to the salinity, nutrient levels, and heavy metal concentrations present in groundwater.

Groundwater quality data from the JBS&G Site Contamination Assessment Contamination, Appendix 1.14, shows a number of contaminants reported at concentrations above the adopted Tier 1 groundwater screening levels for relevant environmental values of groundwater. However, with the potential exception of perfluoroalkyl and polyfluoroalkyl substances (PFAS) (a complex group of synthetic chemicals that have been used in consumer products around the world since the 1950), the contamination is unlikely to be site derived, given the site history and historic reported soil concentrations.

It is likely that dewatering during construction will require treatment prior to disposal to marine or freshwater, due to elevated concentrations of a number of contaminants which exceed the criteria provided by EPA 1093/21.

21.5.2 Sensitive Receptors

As per the current and future site land use classification as commercial/industrial, sensitive receptors for water quality include controlled water and ecological receptors.

The following controlled water receptors were identified:

- Port River.
- On site Groundwater.

The following ecological receptors were identified:

- ADS and Mutton Cove (including flora and fauna).

21.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanism for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

21.6.1 Embedded Mitigation Measures

Construction

Construction of the development will take place in accordance with a CEMP. The CEMP will include good practice methods with these measures designed to prevent adverse impacts in relation to water quality, surface water drainage and pollution control of oils, sediment, cements and other polluting sources which may be hazardous to the water environment. Sediment and erosion controls would be implemented during construction phases to maintain an acceptable water quality standard. This is typically achieved by developing a Soil, Erosion and Contamination Management Plan included within the CEMP.

A Dewatering Management Plan (DMP), which will form part of the CEMP, and will be prepared for the dewatering activities in accordance with EPA SA (2021). The DMP will include any requirements to treat dewatering wastewater prior to discharge, ongoing monitoring requirements during the dewatering program, while also considering potential changes to local hydrology due to the dewatering which could impact on registered users of groundwater or any known groundwater contamination in the vicinity of the dewatering (onsite or offsite).

A construction drainage strategy would be designed to ensure the development does not impede existing water flow paths or result in increased flood levels on adjoining private properties, including on Viterra, Quantem, and the existing ONS facilities south of the development site. This would be set out within the CEMP.

Operation

The following management plans will be prepared and implemented to ensure best practises for water quality are followed during the operational phase:

- An OEMP.
- A DMP, which will form part of the OEMP.
- A Stormwater Management Plan for the development.

Careful management of water quality is crucial to protecting the receiving environment. The development would incorporate a range of water quality improvement measures along the proposed drainage system to reduce pollutant loads discharging off-site and entering the Port River.

These water quality improvement measures could include:

- Protection of Mutton Cove - drainage networks to direct all stormwater runoff around Mutton Cove and towards the two existing Port River outfalls – one located north and another south of the Mutton Cove. The levee wall along the eastern edge of Mutton Cove could be retained, or re-established, to prevent overland flows from spilling to the Mutton Cove in all events up to and including the 1% AEP design storm event.
- Treatment solutions - Treatment of stormwater runoff from the development site would be achieved by incorporating a variety of both natural and mechanical water quality improvement measures along the proposed drainage system. Natural water sensitive urban design (WSUD) measures could include above-ground solutions such as bioretention systems, grassed swales, and wetlands. Proposed detention basins and the base of any infiltration systems, such as bioretention swales, would be lined (e.g., with clay) to assist with keeping stormwater separate from groundwater. Mechanical devices are typically located underground and include proprietary products such as filtration systems, oil / water separators, and gross pollutant traps.
- Stormwater reuse - Stormwater runoff from roof areas can be captured and reused for onsite purposes wherever possible (e.g., for toilets, irrigation, and operational activities). This can be achieved by connecting the roof drainage to plumbed rainwater tanks. Stormwater reuse would reduce the amount of stormwater runoff entering the downstream Port River, which would in turn reduce pollutant loads discharging to the Port River.
- Spill prevention measures - It is proposed that independent oil / water separators are also installed downstream of high-risk spill areas such as carparks. These systems are capable of separating oil from contaminated stormwater runoff and have a shutoff valve to store and prevent spills from entering downstream waterbodies.

21.6.2 Monitoring

Regular monitoring of stormwater quality discharging off-site during both construction and operational phases may be required to ensure the proposed treatment measures are performing as intended.

21.7 Assessment of Effects

Ecological receptors include the ADS, Mutton Cove and associated flora and fauna. Controlled waters receptors include the Port River and onsite groundwater. Although a heavily modified environment, the Port River adjacent to the development site supports a range of native flora and fauna including protected species. The adjacent Mutton Cove is less modified that the Port River and also supports a range of wildlife.

Due to human activities and development, stormwater and wastewater are now the only freshwater inputs to these environments, and water quality is considered poor as a result. The Port River is also

dredged relatively regularly to maintain shipping access and function. Given their existing level of disturbance and exposure to pollutants, the sensitivity of these ecological and controlled water receptors is considered to be 'Medium'.

21.7.1 Construction

During the construction phase, there is the potential for a pollution event or events to affect surface and groundwater water quality. If this occurred this would have a negative impact on the receptor, potentially resulting in degradation of the water quality which would impact on any aquatic life and designated sites with hydrological connectivity to the surface water runoff and groundwater.

Activities that may generate impacts include demolition of existing structures, earth stripping, stock piling, excavation, construction plant movements and hauls, refuelling, equipment maintenance, storage of materials and chemicals and the generation, storage and disposal of waste materials. Impacts are generally from sediment (soil particles) suspended in runoff, particularly from rainfall during storm events, which can impact water quality, or from pollution by construction materials or fuels.

Pollution from mobilised sediment is a historically common on construction sites and can result in increased sedimentation and smothering of habitat as well as morphological impacts. The pollution control measures to be included within the CEMP for earthworks, vehicle movements, the timing of works, the management of spoil heaps and the implementation of the Soil, Erosion and Contamination Management Plan will control the majority of pollution risks during the construction phase.

Procedures to be set out in the Soil, Erosion and Contamination Management Plan would be specifically developed in order to reduce the likelihood of such uncontrolled discharge, pillage or pollution incident. If such an occurrence were to occur due to unforeseen incident, actions would be undertaken to limit the spread of any spillage and to clear the spillage prior to discharge to surface water receptors. Such actions would be detailed an emergency response plan which would be prepared in accordance with the CEMP.

Dewatering during construction could contain contaminants would need to be treated prior to discharge to the Port River or sewer system (under appropriate licence) or removal via tanker. A DMP, which forms part of the CEMP, will be prepared for the dewatering activities such that there would be no impact anticipated on groundwater quality or the Port River.

Any other waters generated on-site, such as through vehicle washing or dust suppression, would also be collected and treated on-site prior to discharge to the foul sewer system (under appropriate licence) or removal via tanker, with procedures to be set out in the CEMP.

As is the case for potential surface water pollution, a spillage or pollution incident could impact on groundwater quality. Procedures to be set out in the CEMP would be specifically developed in order to reduce the likelihood of such uncontrolled discharge, pillage or pollution incident. If such an occurrence were to occur due to unforeseen incident, actions would be undertaken to limit the spread of any spillage and to clear the spillage prior to discharge to ground.

Given the above, the magnitude of impact of construction works on surface water and groundwater quality is assessed as temporary 'Very Low' with the CEMP in place to all receptors (moderate sensitivity). Therefore, the significance effect is therefore assessed as Negligible (and not significant) to all receptors.

21.7.2 Operation

Following completion of construction activities, the majority of the development site will be sealed with bitumen, concrete or paving and buildings. Reduction in infiltration will occur across the development site through the introduction of these impermeable surfaces. There will be minimal non-sealed areas. The largest unsealed area will be the area associated with the drainage strategy of the development. Throughout the operational life of the development, maintenance and repair of any non-paved surfaces will be continually undertaken as appropriate, as identified in the OEMP.

If not controlled the introduction of new impermeable surfaces can impact the water quality of surface water runoff. The SMP sets out how runoff from the development site will be managed and discharge via WSUDs and mechanical devices that will filter and clean water prior to discharge into the Port River. As such, the potential for adverse impacts in water quality of surface water runoff associated with the development is 'Very Low'.

The potential effect of pollution on the receptors during the operational phase is short term as it would be limited to the occurrence of the incident itself (i.e., following a spill etc). This may result in an adverse impact on water which is shed from developed areas of the development. However, this runoff will be filtered by WSUDs features or oil interceptors having only indirect impacts on the water environment. The magnitude of impact is therefore considered to be 'Very Low' for all receptors.

The magnitude of impact associated surface water runoff is 'Very Low' as there will be no discernible change in the quality of surface water runoff to controlled waters and ecological receptors. This is a Negligible (not significant) effect on all receptors during the operational phase.

21.7.3 Additional Mitigation Measures and Residual Effect

No additional mitigation or monitoring are required beyond those outlined above in Section 21.6. The likely residual effects for construction and operational effects will remain as stated above within Section 21.7.

21.8 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6 – Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

21.8.1 Construction

Likely significant cumulative effects of construction activities are not expected as each site will be applying good site practice measures and appropriate mitigation techniques and adhering to relevant CEMPs and other management plans for control of water quality.

21.8.2 Operation

As outlined in Section 3 of the SMP, the developments listed above may interact with or discharge into the same drainage system that will serve the development. Recognizing the potential cumulative effects of multiple projects, these cumulative developments were comprehensively evaluated within the SMP to ensure a holistic approach to water management, including water quality. Each development will be required to contribute to a coordinated, site-wide drainage strategy designed to effectively manage the total stormwater volume and water quality. The final detailed SMP for the development site and the Project will ensure that the establishment of an integrated, resilient drainage strategy that safeguards the development site and surrounding areas from adverse water quality issues. As such, the significance of any cumulative effects from water quality for receptors is expected to be the same as the development in isolation, i.e., Negligible and not significant.

CHAPTER 22

Aboriginal Cultural Heritage

URPS

22. Aboriginal Cultural Heritage

Conclusion: There are no known Aboriginal heritage sites within the development site. The development site has been assessed as having a low risk of works impacting unknown Aboriginal heritage sites. Risk of encountering unknown Aboriginal heritage sites can be managed through routine measures. Overall, no significant effects have been identified to Aboriginal heritage sites.

22.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to Aboriginal heritage. Independent Heritage Consultants (IHC) has undertaken an Aboriginal heritage desktop assessment for the development. The IHC Aboriginal Heritage Desktop Assessment (IHC 2024), Appendix 1.18, is not able to be made publicly accessible as it contains sensitive information relating to Aboriginal cultural heritage. This report will be provided directly to the relevant authorities for review.

22.2 Assessment Requirements

Commission Assessment Requirements: SC1 (Standard Requirements)

- Describe any consultation with the RARB or any relevant Traditional Owner representatives relevant to the project area. Details of Aboriginal heritage provided by Traditional Owners during consultation or discussed in the EIS must remain confidential and are not to be disclosed or published by the proponent.
- Describe the outcomes of AAR's central archives search for the project area, including consideration of any restricted Aboriginal sites and instances where approval from Traditional Owners may be required to access further information about the nature and/or location of the heritage.
- Describe any Aboriginal heritage surveys or assessments relevant to the project area, including historic reports where relevant and accessible. These may include desktop-based heritage assessments, heritage survey/inspection reports, Work Area Clearance reports or other risk assessments. Where an Aboriginal heritage assessment is undertaken, it must be done by an appropriately qualified heritage expert.
- Where there is a high risk of discovery of Aboriginal heritage within the project area, it is recommended that the proponent engage Traditional Owners and a qualified heritage expert (archaeologist and/or anthropologist) to carry out an on-ground heritage survey/inspection of the project area.
- Identify any potential impacts to recorded or unrecorded Aboriginal heritage in the project area (noting that the specific location of any heritage must not be identified in the EIS).
- Outline measures to avoid or minimise impacts to recorded and unrecorded Aboriginal sites, objects and remains in the project area during construction and operations phases. Where

impacts to Aboriginal heritage are proposed, the proponent must hold valid authorisations under the *Aboriginal Heritage Act 1988* (SA).

- Preparation of an Aboriginal heritage discovery plan or Cultural Heritage Management Plan (if required) to protect and appropriately manage Aboriginal heritage during all phases of the project.
- Preparation of an Aboriginal Engagement Plan that sets out steps taken to facilitate early, ongoing, meaningful and effective consultation with identified Aboriginal stakeholders throughout project design delivery and operations.

22.3 Guiding Legislation and Policy

In South Australia, Aboriginal cultural heritage is regulated by the Aboriginal Affairs and Reconciliation. Sites of significance are protected by the *Aboriginal Heritage Act 1988*.

The key legislation and policies that guide management of Aboriginal heritage in South Australia are summarised in the following Table 22.1.

Table 22.1 : Summary of Legislation/guidelines

Name	Description
Legislation	
Native Title Act 1993 (Cth)	Provides a process through which Aboriginal and Torres Strait Islander Australians can lodge an application to seek a determination of native title.
Native Title (South Australia) Act 1994	Provides for the registration of native title rights, investigations on native title rights, claims and determinations of native title rights and compensation for acts affecting native title rights in South Australia.
Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cth)	The *Aboriginal and Torres Strait Islander Heritage Protection Act* provides a mechanism for the Minister for Environment to make declarations regarding the protection of an Aboriginal area when the Minister is not satisfied that under state or territory law there is effective protection of the area from a threat of injury or desecration. Declarations made under this Act involve restricting activities and/or access to an Aboriginal site.
Aboriginal Heritage Act 1988 (amended 2016) (SA)	Provides for the protection and preservation of Aboriginal heritage. Under section 23 of the *Aboriginal Heritage Act* it is an offence to damage, or interfere with an Aboriginal site, objects or remains unless written authorisation from the Minister for Aboriginal Affairs and Reconciliation has been obtained.

Name	Description
Guidelines	
Aboriginal Sites, Objects and Ancestral Remains Discovery Procedure, Department for Infrastructure and Transport.	Outlines the procedure when Aboriginal sites, artefacts or remains are discovered during project work in South Australia.
Discovery of Aboriginal sites and objects fact sheet, Government of South Australia	Provides advice regarding the discovery of Aboriginal sites and objects in South Australia.
Managing Aboriginal Heritage in South Australia, Government of South Australia.	Provides an overview of managing Aboriginal heritage in South Australia.

22.4 Scope, Study Area and Assessment Method

The IHC Aboriginal Heritage Desktop Assessment was consistent with the State Planning Commission's Assessment Requirements. Impacts on native title, known and unknown heritage sites were considered.

The assessment included a review of relevant Aboriginal background information (previous survey reports, consultation records, relevant heritage register searches, archival sources), alongside an environmental landform analysis, aimed at developing an understanding of the heritage context for the development site to consider in the context of the proposed work.

22.4.1 Scope

The IHC Aboriginal Heritage Desktop Assessment has been used to inform the significance of effects of the development on Aboriginal heritage within this chapter. The assessment within this chapter follows the EIA methodology outlined in Chapter 6 – Impact Assessment Methodology.

Scoped In

The following potential effects are considered within this chapter:

- Potential effects to unknown heritage sites during construction.

Scoped Out

The following assessments have been scoped out of further consideration within this EIA:

- Native title: The development site is within the native title claim area of the Kaurna People (Tribunal file no. SCD2018/001/Federal Court Number SAD6001/2000). The Federal Court has determined that native title does not exist in the current development site. Therefore, there are no direct or indirect impacts on native title as a result of the development and it has been excluded from further assessment.

- Known Aboriginal heritage sites: there are no known registered Aboriginal heritage sites within the development site. Therefore, there can be no direct or indirect impacts to known sites as a result of the development and they have been excluded from further assessment.
- The operational phase has excluded from the scope of assessment as all direct physical effects on below ground assets would occur during construction phase of the development.

22.4.2 Study Area

The study area for the assessment is the extent of the development site.

22.4.3 Assumptions and Limitations (i.e. Uncertainties)

The IHC Aboriginal Heritage Desktop Assessment was based on desktop assessment only. This was primarily because it was considered that there was sufficient existing information about the development site and heritage in the general locality from previous site surveys and monitoring undertaken on the northern Lefevre Peninsula area, within and in proximity to the subject area, since the early 2000s.

22.5 Baseline Conditions and Sensitive Receptors

22.5.1 Baseline Conditions

The northern and eastern sections of the Lefevre Peninsula, including the development site, have been subjected to a significant amount of geotechnical investigations, archaeological surveys, Aboriginal consultation and Kaurna/Ramindjeri earthworks monitoring. These studies, undertaken since the early 2000s, have confirmed a generalised cultural significance for the peninsula and surrounding waters. They highlight the presence of burial sites on the southern end of the peninsula, such as at Birkenhead Reserve and Persic Street, and the absence of Aboriginal sites on the northern and eastern extents, including the development site. Those reports documenting the results of Kaurna/Ramindjeri monitoring of earthworks along the reclaimed northern and eastern peninsula margins state that no cultural materials were identified.

There is a general consensus among the previous studies that there is a low heritage risk in the pre-European intertidal zone, which is now reclaimed land that has been levelled with hydraulic fill and industrial waste. There is only one location at the southern end of the development site where archival maps and photographs show low lying cheniers. This location would have been frequented opportunistically at most by Aboriginal people pre-European arrival as it was located away from more favoured occupation locations (fresh water and dunes such as those present in Birkenhead to the south). This, coupled with the historic landscape modification, including bulldozing of the cheniers prior to reclaiming of land has further reduced the potential for intact archaeological deposits.

22.5.2 Sensitive Receptors

Sensitive receptors for Aboriginal heritage on the development site include unknown Aboriginal sites, objects and ancestral remains.

22.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanism for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

22.6.1 Embedded Mitigation Measures

The CEMP for the development will outline specific strategies and procedures for ensuring construction personnel are aware of the possibility of encountering unknown Aboriginal heritage sites and that all required processes are undertaken should a site be encountered and documented in a site discovery procedure.

22.7 Assessment of Effects

The IHC Aboriginal Heritage Desktop Assessment has assessed the development site as being at low risk of encountering unknown Aboriginal heritage sites.

There have been extensive geotechnical investigations, archaeological survey, Aboriginal consultation and Kaurna/Ramindjeri earthworks monitoring since the early 2000's across the northern and eastern sections of the Lefevre Peninsula including the development site. There is a general consensus among these studies of the area that there is a low heritage risk in the pre-European intertidal zone.

Considering that the development site was largely under water until the period following European arrival, with the exception of a small number of geologically recent, low lying cheniers, it is unlikely that there was anything other than potential opportunistic use of this area by Aboriginal people during low tide. The cheniers would have been frequented at most opportunistically by Aboriginal people pre-European arrival as it was located away from more favoured occupation locations (fresh water and dunes such as those present in Birkenhead to the south). The low energy movement of water and subsequent accumulation of sediments in this area, in addition to the mangrove environment, are likely to have removed any evidence of pre-European occupation and/or use. Subsequent landscape modification including levelling of cheniers and land reclamation, wetland drainage, extractive industries, urbanisation including transport, industrial and residential construction and installation of surface and in-ground services has further reduced the potential for archaeological deposits to survive.

The entire development site has been extensively filled and levelled with hydraulic fill and industrial waste. Since then, the site has been further modified including through earthworks, piling and construction. As such, the sensitivity of unknown Aboriginal heritage receptors, if present, within the development site is 'Very Low'.

Majority of the development site during construction will require fill to elevate levels, rather than cut. Minimal excavation in Areas 1 and 2 are anticipated to be required given that ground improvement works for future infrastructure have already been undertaken. Excavation will be largely limited to Area 3 for the

wet basin and shiplift. Piling will also be undertaken across the site. Nonetheless, there is still a chance of encountering unexpected finds. Should an unknown Aboriginal site, objects or remains be affected by construction activities this impact would be direct, permanent, long-term and irreversible. However, any impacts from the development should be seen in the context of the likely continuing truncation of archaeological deposits over time, given the existing baseline. For these reasons, the magnitude of impact for construction activities is 'High'.

Should an unknown Aboriginal heritage sites be found, standard procedures would be put in place as per the CEMP as outlined within Section 22.6 above to minimise impact and ensure responsible management. The CEMP will also set in place protocols for staff inductions to ensure staff are aware of the possibility of encountering Aboriginal heritage sites.

The construction assessment of effects is provided within Table 22.2, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 22.2: Construction Assessment Effects on Unknown Aboriginal Heritage Sites

Impact factor	Accidental disturbance of unknown Aboriginal heritage sites, objects or remains
Potential Impact pathway	Groundbreaking construction activities (e.g. earthworks, excavations and foundations).
Impact Type	Direct.
Sensitive Receptors	Unknown Aboriginal heritage sites – Very Low.
Embedded Mitigation	Staff inductions and unexpected finds procedures incorporated into the CEMP.
Magnitude of Impact	High.
Significance of Effect	Unknown Aboriginal heritage sites – Permanent, Long-Term, Minor Adverse.

22.8 Additional Mitigation Measures and Residual Effect

No additional mitigation or monitoring are required beyond those outlined above in Section 22.6. The likely residual effects for construction effects on unknown Aboriginal cultural heritage sites, objects or remains will remain Minor Adverse.

An Engagement Plan guides general engagement and consultation for the development. Within the plan, ongoing consultation by ANI in partnership with ASA has commenced with Kaurna for the project focussing on project design and delivery, in addition to broader opportunities and outcomes for Aboriginal people which fall outside of the requirements of the AH Act.

22.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6 – Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

Although unknown Aboriginal cultural heritage sites, objects or remains may be present within the development site and may extend beyond the boundary of the development site, it is reasonably understood that the determination of consent for each cumulative development will have been made in accordance with national, state and local planning policy and guidance, within which Aboriginal cultural heritage sites, objects or remains would be a material consideration and would have included the provision of appropriate archaeological mitigation measures.

In addition, any Aboriginal cultural heritage sites, objects or remains affected within each site would be discrete features or remains of archaeological interest, where no potential cumulative effect has been identified; i.e. no archaeological asset has been identified which is sufficiently extensive that it would be affected by both the development and any of those schemes being considered cumulatively.

Therefore, it is considered that cumulative effects will not substantially differ from those already identified in this chapter for the development in isolation. As such, significant cumulative effects are not expected.

CHAPTER 23

Community Wellbeing/Social Impact Assessment

URPS

23. Community Wellbeing/Social Impact Assessment

Conclusion: No significant effects have been identified. The development will generate social and community benefits and impacts, with most of these being beyond the area under the control of the development and ANI.

ANI, in partnership with the shipbuilder will work with Local, State and Commonwealth Government to support the community through this change, to ensure locals and broader South Australians enjoy the benefits of the development, and negative impacts are minimised. For this reason, the Commonwealth, State and Local Government are working together to prepare plans and policies to minimise social impact and maximise social opportunities.

23.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to community wellbeing and social impact.

URPS undertook a Social Impact Assessment (the 'SIA') for the construction and operational phases of the development. The SIA is included as Appendix 1.19 of this EIS.

23.2 Assessment Requirements

Commission Assessment Requirements SC2: Detailed Requirements

- Provide a social impact assessment (SIA) of the development which addresses:
  - the existing social environment of communities potentially impacted by the project
  - the potential social impacts (both positive and negative) of the project, and how they will be managed and monitored.
- The SIA should include social baseline information:
  - a demographic profile of potentially affected communities
  - an analysis of community characteristics (e.g. community history and culture, land / property ownership)
  - an overview of land use, key industries in the region, and relevant local and state government plans
  - an overview of the capacity and accessibility of infrastructure, facilities and services, including education, health and emergency services
  - an analysis of the existing housing and accommodation market, including availability, capacity and affordability
  - a profile of the local and regional labour market, including likely availability of personnel with skills relevant to the project [economic report]
  - details of other resource, infrastructure and major projects in the area (planned and currently operating).

- Key matters to be addressed by the SIA (for both construction and operation) are:
  - Workforce Management incorporating (where relevant)-
    - A summary workforce profile.
    - An analysis of the local and metropolitan labour market, and an assessment of potential social impacts, including employment opportunities, training and development opportunities
    - An assessment of opportunities for local workers to commute to and from work, including the use of public transport and active travel modes.
    - Workforce management measures which [may] include:
      (1) Measures to enhance potential employment opportunities for local communities, and to mitigate potential negative social impacts.
      (2) Provisions to prioritise recruitment of workers from local communities
      (3) Proposed training and development initiatives to improve local and regional skills and capacity including, where relevant, initiatives for traditionally under-represented groups.
  - Housing and Accommodation incorporating (where relevant):
    - Clarification of any temporary workforce accommodation provision (i.e. location, quantity, type etc)
    - Analysis of potential social impacts from additional housing demand for the temporary and permanent workforce, including:
      (1) Potential impacts to availability and affordability of housing (open market and rental) and other forms of accommodation
      (2) Consequences of project induced housing market changes for local residents
      (3) Potential opportunities for local accommodation providers
    - Workforce housing and accommodation management measures which [may] include:
      (1) Measures to enhance potential benefits for project workers and the community, and to mitigate potential negative social impacts
      (2) Policies regarding housing and accommodation support to be provided to project workers and their families who wish to live locally.
  - Health and Community Well-being incorporating (where relevant):
    - An analysis of the availability, accessibility and capacity of, and an assessment of potential project impacts on, existing social services, facilities and infrastructure such as healthcare and emergency response, transport and utilities, education and childcare, and community support services

- An analysis of the health and well-being of potentially impacted communities (in particular relevant disadvantaged groups e.g. Aboriginal people, disability, elderly), and an assessment of potential social impacts, including:
  - (1) Community health, safety and security
  - (2) Livelihoods, economic well-being and access to resources
  - (3) Community lifestyles and cultural practices, amenity value, social character, and community cohesion
  - (4) Potential temporary or permanent effects on community recreational facilities, affecting the use of open space and the enjoyment of passive and active recreational opportunities.
- Health and community wellbeing management measures which [may] include:
  - (1) Measures to ensure that the level of service provided to the local community by existing social services, facilities and infrastructure is not reduced
  - (2) Measures to mitigate potential health and well-being impacts on local communities, and enhance potential benefits
  - (3) The level of on-site health services to be provided for workers
  - (4) Details of any workforce code of conduct to govern worker interactions with local communities
  - (5) Emergency response arrangements and management measures agreed with emergency service providers, for incidents both on and off the project site
  - (6) Details of any community development programs to be implemented, and the outcomes to be achieved.

23.3 Guiding Legislation and Policy

Legislation, policies and guidelines of importance to this assessment are summarised in the table below.

Table 23.1: Summary of Legislation/guidelines

Legislation/guideline	Description / Related Policies
Planning, Development and Infrastructure Act 2016	In South Australia, SIA is integrated within the broader environmental impact assessment requirements under the PDI Act. Although the Act does not prescribe a SIA as a standalone legislative requirement, it does mandate social impact considerations for projects classified as Impact Assessed Development.

23.4 Scope, Study Area and Assessment Methodology

23.4.1 Scope

The assessment within this chapter assesses the following potential impacts of the development:

- Increased scale of land use.
- Light spill and light impact.
- Danger to people and property.
- Temporary storage of low level radioactive waste and/or a nuclear power propulsion system on site.
- Availability of information about use of nuclear-powered propulsion system on site.
- Changes to local property market.
- Increased demand on infrastructure/utilities.
- Opposition to defence activity.
- Changes to access..
- Changing community composition
- Complexity and availability of information provided about the assessment and approvals process.
- Genuine, regular and transparent engagement and barriers to participation.

Scoped Out

Any community wellbeing or social impact that is comprehensively assessed within a technical chapter, as outlined below, has been scoped out of further assessment within this chapter.

- Air Quality – Chapter 7
- Noise and Vibration – Chapter 8
- Transport and Traffic – Chapter 9
- Visual Impact – Chapter 10
- Biosecurity - Chapter 11
- Marine Flora and Fauna – Chapter 12
- Terrestrial Flora and Fauna – Chapter 13
- Climate Change (including energy use) – Chapter 14
- Greenhouse Gas Emissions - Chapter 15
- Waste – Chapter 16
- Local, Regional and State Economies – Chapter 17
- Flood Risk – Chapter 18
- Surface Water Run-off – Chapter 21
- Aboriginal Heritage – Chapter 24.

Cumulative effects

A separate cumulative effects assessment is not included in this chapter because the impacts of this development on community wellbeing and social factors are not anticipated to differ substantially in combination with other cumulative development.

Generally, any major development introduced into a community brings a predictable range of positive and negative effects. These effects are largely consistent across projects of similar scope and are perceived by stakeholders in a similar manner. Importantly, the addition of this development alongside any other cumulative development in the area is not expected to exacerbate or amplify the magnitude of impact in a way that would require a distinct cumulative analysis or increase the resulting significant of effects.

Consequently, a separate cumulative effects assessment has not been deemed necessary for this chapter.

23.4.2 Study Area

There are no nationally or state adopted standards or guidance documents that define the study area to be adopted for the assessment of social effects for developments of this type. Therefore, the assessment uses the study area as contained within the SIA which has been based on professional judgement.

The SIA splits the study area into three areas as discussed below:

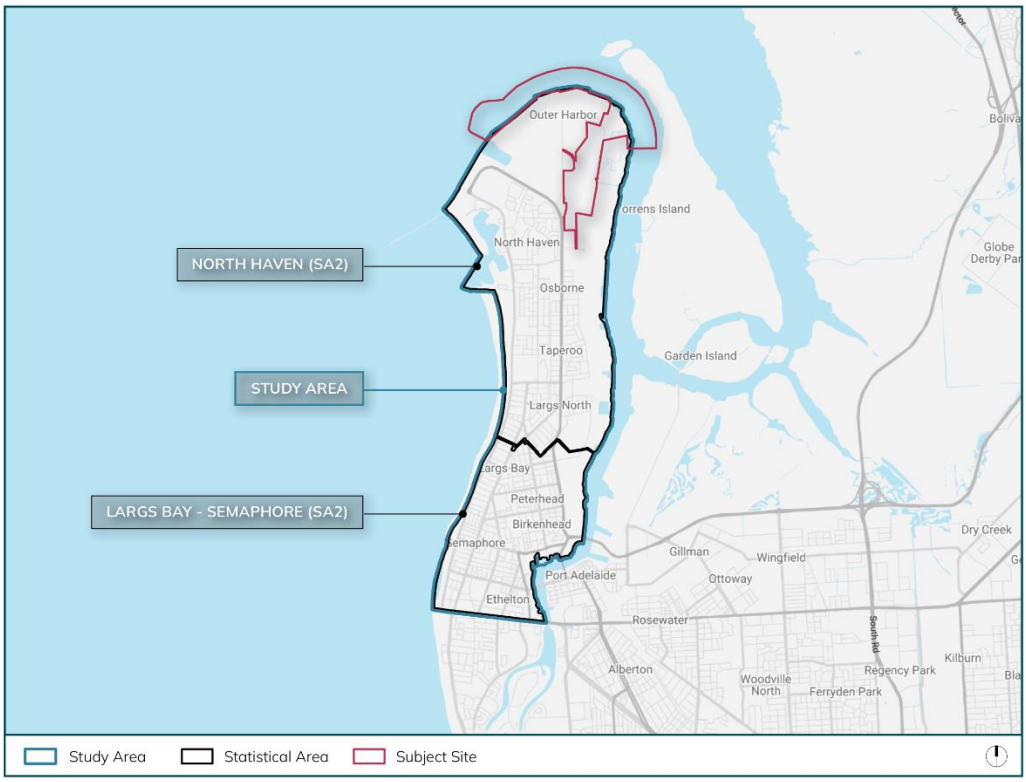
Study Area 1

The 'immediately impacted community', representing those that live or work in proximity to development site. This was defined as those within the following Australian Bureau of Statistics (ABS) data groups:

- Statistical Area Level 2 (SA2) North Haven.
- SA2 Largs Bay – Semaphore.

These two areas are shown Figure 23.1

Figure 23.1: Directly impacted community data group (North Haven SA2 and Largs Bay - Semaphore SA2)



Study Area 2

The 'wider community' who will not experience the direct impacts of those in the immediately impacted community but may feel some of the real or perceived broader impacts. This wider community is defined as those within Greater Adelaide. This is defined by the ABS as the Greater Adelaide Greater Capital City Statistical Area.

Study Area 3

This study area was considered to be 'other interested and affected people'. These comprise community members beyond Greater Adelaide that have an interest in the development.

23.4.3 Assessment methodology

The SIA, Appendix 1.19, is consistent with the State Planning Commission's Assessment Requirements.

All real or perceived, positive and negative impacts were considered. Impacts identified were wide ranging and include impacts to services, infrastructure, residential areas, employment, community cohesion, public safety (including perceptions), recreation, public space amenity and other values.

The SIA was prepared through analysis of ABS Census data, Geographical Information Systems (GIS) spatial data, feedback received through previous and concurrent engagement for ONS projects being undertaken by ANI, targeted engagement with key stakeholders, technical reports submitted as part of the EIS, and other publicly available resources.

The SIA establishes an assessment methodology for the likely impacts of the development. The residual impact level determined in the SIA has been adopted as the magnitude of impact, as shown within Table 23.2, as per the EIA methodology outlined in Chapter 6 – Impact assessment Methodology.

Table 23.2: SIA and EIS terminology conversion for determining magnitude of impact

SIA Report – Residual impact level		This EIS chapter – Magnitude of Impact Rating
High residual impact	No mitigation measure in place. Impacts daily life of local community members. Potential to cause significant or unreasonable distress in many cases. There are greater negative impacts than positive impacts.	High
Medium residual impact	Partial mitigation measure in place. Impacts weekly life of local community members. Potential to cause some distress in some cases. Negative and positive impacts are somewhat similar.	Medium
Low residual impact	Some mitigation measure in place. Impacts occasional life of local community members. Unlikely to cause distress in most cases. There are greater positive impacts than negative impacts.	Low
No residual impact	No residual impact is likely to be experienced at any time.	Very Low
Net positive impact	Significant beneficial impacts likely to be experienced*	Beneficial

*Note the SIA does not have criteria for residual impact assessment for this level. The EIS has included this criteria to help inform the reader.

The sensitivity of the receptors was determined based on the location of the receptors in relation to the development site, as dictated by the three study areas described within Section 23.4.2. Those receptors in closer proximity to the development site are awarded a higher sensitivity rating. This is described within Table 23.3 below.

Table 23.3: Descriptors for Receptor Sensitivity

Descriptor	Sensitivity
Study Area 1 - North Haven: immediately impacted community	High
Study Area 1 - Largs Bay – Semaphore: immediately impacted community	Medium
Study Area 2: wider community	Low
Study Area 3: other interested and affected people	Very Low

Assessing Significance

Assessing SIA impacts within the EIA regime is challenging because perceptions are inherently subjective, varying widely across individuals based on personal values, experiences, and expectations. Unlike measurable environmental or physical impacts, perceived impacts depend on personal interpretation, which cannot be consistently quantified or standardised. Additionally, perceived impacts evolve over time and may be influenced by social dynamics, media, or individual beliefs, making it difficult to accurately predict or assess their effect within a standardised framework.

As such, determining the scale of effects requires professional judgement as a degree of flexibility is required when considering the magnitude of an impact in the context of the sensitivity of the receptor. The reasoning behind the professional judgement, and where this flexibility applies, is clearly explained within the residual effects section of the assessment.

23.4.4 Assumptions and Limitations (i.e. Uncertainties)

This SIA has been undertaken based on very preliminary data and information about the development. Therefore, while the breadth of potential social impacts has likely been captured, the exact magnitude of impact has had to be determined based on available information and professional judgement.

23.5 Baseline Conditions and Sensitive Receptors

23.5.1 Baseline Conditions

The SIA establishes a comprehensive baseline of the affected community including who it comprises and how they live, work, play, move and interact. Key attributes of the affected community are summarised below:

- The dominant use of the development site and immediate surrounds since the late 1900s has been industrial for infrastructure and for ship building.
- A large residential area has grown to the south of the development site as a low to medium density suburb home to a somewhat diverse community with differing levels of advantage and access to services.

- Overall, the study area has a similar Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Disadvantage score to Greater Adelaide. This indicates that the local community is likely to have the social and economic ability to be resilient to change and impacts. However, it is important to consider that those on the western, beach fronting side of the peninsula are likely to have much higher levels of socio-economic advantage as compared to those living on the eastern side of the peninsula, closer to the existing industrial precincts. Therefore, the eastern population of the peninsula who are more likely to be impacted by the development are already likely have higher level of socio-economic disadvantage and may be less resilient to change. The broader Northern Adelaide suburbs are also generally considered to experience higher levels of socio-economic disadvantage than Greater Adelaide.
- Port Adelaide functions as an important regional centre for the wider area with most social, health, and community services available from here. There are a wide range of adequate services and infrastructure scattered throughout the local area which the existing community are already well connected to.
- Challenges around access to attainable housing is not unique to this part of Adelaide and is being felt across Greater Adelaide and the nation more broadly.
- The area is relatively well serviced currently by the local road network and public and active travel alternatives, making getting to and from work relatively straight forward. The majority of employed residents use their car to drive to work.
- The prevalence of health conditions in the City of Port Adelaide Enfield is similar to the average for Greater Adelaide.
- The area has traditionally been dominated by 'blue collar' workers although a decline in manufacturing generally has seen a lower participation in males in the workforce.
- A range of key developments in the locality support the ongoing revitalisation of the area, which is likely to continue the repositioning of the northern Port Adelaide region as an attractive place to live and work.
- A review of relevant Government Plans confirms a long-term vision for ongoing support for this proposal, with all parts of social support and economy being poised to see this growth occur.

23.5.2 Sensitive Receptors

Sensitive receptors for the development are human receptors, including the immediately impacted community, wider community and other interested and affected people as described in Section 23.4.2 - Study Area.

23.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the specific measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section addresses key mitigation measures only.

23.6.1 Embedded mitigation measures

Construction

The CEMP for the development will include a range of discipline-specific sub-management plans that will manage and mitigate construction impacts that may affect community sensitive receivers, for topics such as amenity, noise, air quality etc.

Operation

The OEMP for the development will include a range of discipline-specific sub-management plans that will manage and mitigate operational impacts that may affect community sensitive receivers, for topics such as amenity, noise, air quality, operational hazards etc.

23.6.2 Stakeholder Engagement

ANI and its development partners will undertake regular, ongoing, quality engagement with community and stakeholders. This will ensure the community continues to be well informed about the development and are able to have their questions and concerns heard.

23.7 Assessment of Effects

23.7.1 Direct

The immediately impacted community are a somewhat diverse community with differing levels of advantage. Those along the western beach front of the Lefevre Peninsula are generally of higher socio-economic advantage, whilst those living in the eastern side of the Lefevre Peninsula closer to the industrial areas are of lower socio-economic disadvantage. Therefore, the eastern population may be less resilient to impacts of the development.

As a whole, key demographic statistics of the immediately impacted community as compared to Greater Adelaide are summarised below:

- Higher median age.
- Lower proportion of cultural and linguistic diversity.
- Higher proportion of Aboriginal and Torres Strait Islander peoples.
- Higher proportion of lone households.
- A greater diversity of housing, with a higher proportion of semidetached, row or terrace houses, townhouses, flats and apartments.
- Similar levels of those who own outright, own with a mortgage or rent their house.
- Slightly lower median household income in the north and slightly higher in the south.
- Slightly lower median rent in the north and the same in the south.
- Slightly higher median mortgage repayments, especially in the south.
- Similar participation in the labour force.

- Higher proportion of full-time workers, smaller proportion of part-time workers, and similar proportion of those away from work or unemployed.
- Top industries of employment include healthcare and social assistance, public administration and safety and retail trade.
- Smaller proportion of professionals, and a larger proportion of technicians and trade workers.
- Higher proportion of those who drive or train to work.
- Significantly lower proportion of people with a Bachelor Degree level and above.
- Higher Socio-Economic Indexes for Areas (SEIFA) score in the south (ie less disadvantaged) and lower in the north (ie more disadvantaged).
- Slightly higher proportion of those who need assistance with core activities.
- Similar rate of health conditions.
- Significantly lower availability of healthcare professionals.

It is important to consider that the wider community of Greater Adelaide will also feel some of the broader social impacts of the development, whilst other interested and affected people may be interested in the more political aspects of the development.

There are a wide range of actual and perceived direct impacts on these community groups during the construction and operational phases of the development. These impacts vary in their significance from negligible to moderate.

Table 23.4 below identifies each of the potential direct impacts of the construction and operation of the development on the community, including their impact pathway, embedded mitigation measures and significance of effect. The table also identifies where to refer to for further information should additional be covered within another chapter of the EIS.

Table 23.4: Assessment of Direct Effects for Social Impact

Impact factor	Increased scale of land use
Potential Impact Pathway	New and changed land uses with increased activity
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	Zoning and land use will be managed through the approvals process
Magnitude of Impact	Low
Significance of Effect	Immediately impacted community – Moderate/Minor Effect Wider community – Negligible Effect Other interested and affected people - Negligible Effect

Impact factor	Increased scale of land use
Further Information	Refer Chapter 4 – EIS Requirements for further information on Land Use
Impact factor	**Light spill and light impact (construction and operation)**
Potential Impact Pathway	Lighting during construction and operational lighting
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	Specific strategies and procedures for ensuring that best practices are followed relating to lighting during construction will be captured in a CEMP. A sensitive lighting scheme will be developed during detailed design of the development, to be implemented during construction to minimise light spill, in balance with Australian Standards, design, work health and safety and security requirements.
Magnitude of Impact	Low
Significance of Effect	Immediately impacted community – Moderate/Minor Effect Wider community – Negligible Effect Other interested and affected people - Negligible Effect
Impact factor	**Danger to people and property**
Potential Impact Pathway	Use of hazardous materials on site
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	Hazardous materials will be managed through a range of standard State regulated requirements incorporated within the development's CEMP and OEMP
Magnitude of Impact	Low
Significance of Effect	Immediately impacted community – Moderate/Minor Effect Wider community – Negligible Effect Other interested and affected people - Negligible Effect
Further Information	Refer to the following Chapters for further information: Chapter 16 - Waste Management Chapter 19 - Contamination Chapter 21 - Surface water and groundwater

23.7.2 Indirect

There will also a range of actual and perceived indirect effects on the community during the construction and operational phases of the development. These impacts vary in their significance from negligible to major.

Table 23.5 identifies each of the potential indirect impacts of the development on the community, including their impact pathway, embedded mitigation measures and significance of effect. Each table also identifies where to refer to for further information given majority of these impacts are covered in detail in another chapter of the EIS.

Table 23.5: Assessment of Indirect Effects for Social Impact

Impact factor	Changes to local property market
Potential Impact Pathway	New and changed land uses with increased activity
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	None identified. ANI and the shipbuilder will work in partnership with Local, State and Commonwealth Government to address potential emerging housing impacts and opportunities should they occur
Magnitude of Impact	Medium
Significance of Effect	Immediately impacted community – Major/Moderate Effect Wider community – Minor Effect Other interested and affected people - Negligible Effect
Further Information	Refer to Chapter 17 - Local, Regional and State Economies for further information
Impact factor	**Increased demand on infrastructure/utilities**
Potential Impact Pathway	New and changed land uses with increased activity
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	ANI, in partnership with the shipbuilder, will work with relevant site services and utilities to ensure that the development site is adequately serviced and that this will not disrupt the surrounding locality beyond acceptable levels
Magnitude of Impact	Very Low
Significance of Effect	Immediately impacted community – Minor/Negligible Effect Wider community – Negligible Effect

Impact factor	Changes to local property market
	Other interested and affected people - Negligible Effect
Further Information	Refer to Chapter 4 – General EIS Requirements for further information
Impact factor	Opposition to defence activity
Potential Impact Pathway	New and changed land uses with increased activity
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	None identified. The development is critical to Australia's long-term defence strategy. Not developing a modern future submarine capability could impact upon national security and diminish the contribution of Australia to security in the Indo-Pacific region.
Magnitude of Impact	Medium
Significance of Effect	Immediately impacted community – Major/Moderate Effect Wider community – Minor Effect Other interested and affected people - Negligible Effect
Impact factor	Changes to access
Potential Impact Pathway	Introduction of new/larger restricted access/security zones
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	None identified. Changes to the current public access to the development site should be anticipated as it is routinely required to ensure national security, protect sensitive technologies, and maintain site safety.
Magnitude of Impact	Medium
Significance of Effect	Immediately impacted community – Major/Moderate Effect Wider community – Minor Effect Other interested and affected people – Negligible Effect
Further Information	Refer to Chapter 4 - General EIS Requirements for further information
Impact factor	Danger to people and property
Potential Impact Pathway	Temporary storage of low level radioactive waste and/or a nuclear power propulsion system

Impact factor	Changes to local property market
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	Radioactive waste will be managed through a rigorous licensing and compliance process. Australia will work with its AUKUS partners, the UK and the US, to implement the highest international standards of nuclear safety and security during construction of the submarines.
Magnitude of Impact	Low
Significance of Effect	Immediately impacted community – Moderate/Minor Effect Wider community – Negligible Effect Other interested and affected people - Negligible Effect
Further Information	Refer to Chapter 4 – General EIS Requirements for further information
Impact factor	**Availability of information about use of nuclear-powered propulsion system on site**
Potential Impact Pathway	Limited public access to information about the nuclear-powered propulsion system
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	There is a commitment to sharing all information to the extent that it can be disclosed. ANI in partnership with the ASA and the shipbuilder include in communication materials information about the process and rigour regarding the assessment undertaken by the nuclear Regulator, to provide levels of assurances to the community.
Magnitude of Impact	Low
Significance of Effect	Immediately impacted community – Moderate/Minor Effect Wider community – Negligible Effect Other interested and affected people - Negligible Effect
Further Information	Refer to Chapter 4 – General EIS Requirements for further information
Impact factor	**Changing community composition**
Potential Impact Pathway	Increased economic activity
Sensitive	Immediately impacted community – High/Medium

Impact factor	Changes to local property market
Receptors	Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	ANI, in partnership with the shipbuilder, will work with Local, State and Commonwealth Government to support the community through this change, to ensure South Australians and/or locals enjoy the benefits, and negative impacts are minimised
Magnitude of Impact	Beneficial
Significance of Effect	Immediately impacted community – Beneficial Effect Wider community – Beneficial Effect Other interested and affected people - Beneficial Effect
Impact factor	**Complexity and availability of information provided about the assessment and approvals process**
Potential Impact Pathway	Assessment and approvals process
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	ANI appreciates the complexity of the delivery of this project and is working with partners and approval agencies to communicate this as clearly and transparently as possible
Magnitude of Impact	Low
Significance of Effect	Immediately impacted community – Moderate/Minor Effect Wider community – Negligible Effect Other interested and affected people - Negligible Effect
Impact factor	**Genuine, regular and transparent engagement and barriers to participation**
Potential Impact Pathway	Communications and Engagement
Sensitive Receptors	Immediately impacted community – High/Medium Wider community - Low Other interested and affected people - Very Low
Embedded Mitigation	ANI has already established a record of regular engagement with the community. Consideration will be provided to the literacy needs of the local community.
Magnitude of Impact	Low

Impact factor	Changes to local property market
Significance of Effect	Immediately impacted community – Moderate/Minor Effect Wider community – Negligible Effect Other interested and affected people - Negligible Effect

23.8 Additional Mitigation Measures and Residual Effect

No additional mitigation or monitoring are required beyond those outlined above for effects deemed to be Minor, Negligible or Beneficial. As such, likely residual effects for all wider community and other interested and affected people will remain as reported above in Section 23.7 and remain 'not significant'.

This section addresses those real or perceived, positive and negative effects identified as being potentially significant (Moderate or Major). Only the immediately impacted community has been assessed as having the potential to experience significant effects.

23.8.1 Additional Mitigation Measures

Changes to local property market

Response to housing affordability and supply is a broader challenge than just the scope of the development. The South Australian Government has released a suite of integrated solutions in the Housing Roadmap released in June 2024. Initiatives include fast tracking of the largest release of residential land in the State's history along with planning reforms and skills programs to facilitate quicker approvals and construction. For households who may be impacted by affordability, there are a range of new initiates including:

- Recent changes to prevent rent bidding will contribute stabilising rent prices.
- Changed eligibility criteria for Private Rental Assistance will allow more households to access financial support.
- Investment in building, modernising and upgrading thousands of public homes, to unlock more opportunities for people who need housing security.
- Fast-tracking of the Greater Adelaide Regional Plan to identify additional housing and growth opportunities.

Whilst the development is not capable of the implementation the above, it is considered that if the above is implemented this would help to mitigate those real or perceived effects across the Lefevre Peninsula.

23.8.2 Residual Effect

Increased scale of land use

The development site is located on the north-east tip of the Lefevre Peninsula, with the primary land use of the northern Lefevre Peninsula being industrial. The development site consists of both utilised and vacant allotments.

Residents within the directly immediately community are living next to an area that is already designated for industrial use under the Planning and Design Code. As a result, it is reasonable to anticipate that local

residents are aware that future development within this area would result in an increased scale of land use associated with industrial uses. This zoning information is freely accessible to the public.

As such, whilst the immediately impacted community has been allocated a 'High/Medium' sensitivity within this chapter, for the potential impacts from increased scale of land use as a result of the development it is considered to be more appropriate to allocate receptors as 'Medium' sensitivity. This change in sensitive would result in effects no greater than Minor, which are not significant. The residual effect is therefore considered to be Minor and not significant.

Light spill and light impact

The nearest human receptors, within the immediately impacted community, to the development site are more than 250m away. As such, whilst the SIA identifies a 'Low residual impact' it is considered that there is 'No residual impact' from light spill and light impact due to distance of receptors from the development site. In addition, the development will implement a CEMP and sensitive lighting scheme. The magnitude of impact is therefore considered to be 'Very Low' and the residual effect of the development 'Minor' and not significant.

Danger to people and property and temporary storage of low level radioactive waste and/or a nuclear power propulsion system

The nearest residential human receptors, within the immediately impacted community, to the closest extent (the carpark) of the development site is approximately 250m. Hazardous materials (including up to low level radioactive material) will be stored at greater separation distances to residents. Hazardous materials such as fuels, paints and corrosive materials are routinely used for shipbuilding currently at the ONS. It is anticipated that Area 3 will be the focus of the nuclear license for the development site, as the nuclear-powered propulsion system is expected to be stored and fitted to the submarines within this Area. As such design of the development site itself maximizes the geographic separation containing these activities from existing human receptors.

As such, whilst the SIA identifies a 'Low residual impact' it is considered that there is 'No residual impact' from the use of hazardous materials or temporary storage of low level radioactive waste and/or a nuclear power propulsion system on site due to distance of receptors from the closest extent to the development site. In addition, the development will implement a CEMP and OEMP containing standard and highly regulated measures to mitigate and manage potential impacts from the use of hazardous materials. The nuclear power propulsion system will be stored inside a safe and secure area, purposely constructed to house the system, and all low level waste will be collected, sorted and categorised before being taken off-site for disposal (once a suitable facility becomes available) in accordance with relevant legislation and Regulatory guidance. The magnitude of impact is therefore considered to be 'Very Low' and the residual effect of the development is 'Minor' and not significant.

Availability of information about use of nuclear materials on site

Given the nature of this Project as a defence security precinct, not all information is publicly available. ANI in partnership with the ASA has conveyed all the information that can be disclosed to date. Information within Chapter 4 – General EIS Requirements includes information on the use of nuclear materials on site which is considered sufficient for informing the EIS and immediately impacted community. Whilst the immediately impacted community has been allocated a 'High/Medium' sensitivity within this chapter, it is considered to be more appropriate to allocate human receptors as 'Medium' sensitivity in relation to

availability of information. This change in sensitive would result in residual effects no greater than Minor, which are not significant.

Changes to local property market

As outlined above, the response to housing affordability and supply is a broader challenge than just the scope of the development. It is considered that any real or perceived indirect effects of the development contributing to changes to local property market must be seen in the context of the wider economic benefits and opportunities that the development will bring to the region and state, as well as the development being only one of numerous factors that are contributing to changes in the property market. It is also not possible for the development to mitigate, reduce or offset these real or perceived indirect effects. As such, whilst 'Major/Moderate' effects have been identified, it is not considered that this effect should be classed as 'Significant' due to the wider beneficial impacts provided by the development. The residual effect is therefore considered to be Major/Moderate and not significant.

Opposition to defence activity

The acquisition of conventionally-armed, nuclear-powered submarines is the single biggest leap in Australia's defence capability. It will strengthen our capacity to defend Australia and its national interests. It will significantly enhance Australia's contribution to the security and stability of the region. Not proceeding with this project could contribute to Australia's sovereign risk and damage our international reputation.

The Defence State Sector Strategy 2030 identifies that South Australia is home to a critical mass of world-class industry delivering many of Defence's largest and most complex projects, playing a critical role in South Australia's economy. South Australia also has a strong history of delivering a highly skilled workforce to meet the needs of major Defence projects. The Lefevre Peninsula has been identified as a strategically important locality for employment and defence with the future development to deliver the objectives within the 2030 Strategy.

In light of the above, whilst 'Moderate/Minor' effects have been identified for a very small number of receptors who are strongly opposed to defence activity, it is not considered that this effect should be classed as 'Significant' given the importance of the Project to Australia. The residual effect is therefore considered to be Moderate/Minor and not significant.

Changes to access

Restricting public access to the development site is essential to ensure national security, protect sensitive technologies, and maintain the safety of both personnel and the public. Public access to the development site itself is currently restricted with fencing under the baseline conditions, so it is considered that there can be 'no effect' to receptors with respect access to the development site itself.

It is acknowledged that current public access to locations immediately adjacent to the development site via land (road) will be subject to change as a result of the development. Changes to public access via water (river) to Mutton Cove are not currently anticipated. Any changes to access via land will affect individuals or groups who are regular visitors or contributors to the public space adjacent to the development site. However, the 'Major/Moderate' significant effect identified is considered to extend to only those individuals or groups specifically visiting Mutton Cove, who form a very small percentage of the receptor group. As such, significant effects are possible to a very small percentage of the receptor group,

with the majority of the receptor group experiencing no significant effects. The residual effect is therefore considered to be Moderate/Minor and not significant.

Complexity and availability of information provided about the assessment and approvals process

As this Project as a defence security precinct, not all information is, nor will be made, publicly available. The complexity of the Project necessitates a complex approval process to ensure that the effects of the development are fully understood and assessed. As such, the development is following the Impact Assessed Development process which is the highest level of assessment under the PDI Act and enables the holistic consideration of projects that are of economic, social or environmental importance to South Australia.

The Impact Assessed process provides a comprehensive assessment of a development and the expected effects on the receiving environment and broader context of its setting, which could relate to a local area, region, state or nation. The Impact Assessed process is highly transparent, providing extensive opportunities for community engagement by openly sharing development details, inviting public submissions, and holding consultations to ensure community voices shape development outcomes. Wherever possible, efforts have been made to simplify and streamline this approvals pathway. It is acknowledged that complete availability of information for all elements of the development may not be feasible, but there is a commitment to sharing all information that can be disclosed.

Relevant government agencies have also been provided information to aid in their assessment of the development. Whilst the immediately impacted community has been allocated a 'High/Medium' sensitivity within this chapter, it is more appropriate to allocated human receptors as 'Medium' sensitivity. This change in sensitivity would result in residual effects no greater than Minor, which are not significant.

Genuine, regular and transparent engagement and barriers to participation

The complexity of the Project necessitates a complex approval process to ensure that the effects of the development are fully understood and assessed. As such, the development is following the Impact Assessed Development process which is the highest level of assessment under the PDI Act and enables the holistic consideration of projects that are of economic, social or environmental importance to South Australia.

The Impact Assessed process provides a comprehensive assessment of a development and the expected effects on the receiving environment and broader context of its setting, which could relate to a local area, region, state or nation. The Impact Assessed process is highly transparent, providing extensive opportunities for community engagement by openly sharing development details, inviting public submissions, and holding consultations to ensure community voices shape development outcomes. Wherever possible, efforts have been made to simplify and streamline this approvals pathway. It is acknowledged that complete availability of information for all elements of the development may not be feasible, but there is a commitment to sharing all information that can be disclosed.

Whilst 'Moderate/Minor' effects have been identified, it is not considered that this effect should be classed as 'Significant'. The residual effect is therefore considered to be Moderate/Minor and not significant.

CHAPTER 24

Heritage Places and Areas

URPS

24. Heritage Places and Areas

Conclusion: No significant effects have been identified in relation to Heritage places and areas.

There are no state heritage places, state heritage areas, local heritage places and historic areas affected by this development.

There are historic shipwrecks in the locality that could be affected by construction activities. Mitigation measures for construction activities in close proximity to extant historic shipwrecks will be put in place to manage potential impacts.

There is no reasonable cause to suspect that excavation of the development site will result in an archaeological artefact of significance being discovered.

24.1 Overview

This chapter of the EIS presents an assessment of the likely significant effects of the development with respect to non-Aboriginal heritage places and areas.

DASH Architects has prepared a heritage places and areas assessment for the construction and operational phases of the SCY. The DASH Architects Heritage Places and Areas Report is included as Appendix 1.20 of this EIS.

24.2 Assessment Requirements

Commission Assessment Requirements: SC3 (Standard Requirements)

- Provide details of the location, nature and known potential heritage values of all historic heritage potentially affected by the development particularly State and Commonwealth-listed places and areas (including shipwrecks).
- Provide an assessment of potential impacts from the development on all State heritage and other listed historic heritage places and areas (including shipwrecks). If applicable, this study should be undertaken.
- If Commonwealth, National and World Heritage places have been identified, undertake an assessment of potential impacts to heritage values.
- Provide design, management and site protection strategies (prepared by an appropriately qualified heritage consultant in accordance with the PDI Code if relevant) to avoid, mitigate or manage negative impacts on heritage values and enhance any positive impacts.

24.3 Guiding Legislation and Policy

The key legislation and policies that guide heritage assessment and protection in South Australia are summarised in the following Table 24.1.

Table 24.1: Summary of Legislation/guidelines

Name	Description
Legislation	
Heritage Places Act 1993	Identifies, protects and manages State Heritage Places and objects (along with the *Heritage Places Regulations 2020 (SA))* and archaeological artefacts of heritage significance, irrespective of whether a site is subject to a heritage designation.
Planning, Development and Infrastructure Act 2016	Identifies, protects and manages State Heritage Areas, Local Heritage List, and Historic Areas, along with the *Planning, Development and Infrastructure (General) Regulations 2017 (SA).*
Planning & Design Code	Includes various Overlays that provide policy guidance for development that affects a State or Local Heritage Place or their context, State Heritage Areas, Historic Areas and Historic Shipwrecks.
Historic Shipwrecks Act 1981	Protects historic shipwrecks in South Australia, including through setting compliance and permitting requirements for developments in the vicinity of historic shipwrecks.

24.4 Scope, Study Area and Assessment Method

The DASH Architect's Heritage Places and Areas Report, Appendix 1.20, was consistent with the State Planning Commission's Assessment Requirements. Impacts on Commonwealth and State heritage places, local heritage places and areas, historic areas, historic shipwrecks and historical archaeology were considered.

This report included a review of relevant desktop information and legislation, policy and guidelines. It drew upon analysis, hydrographic surveys and diving surveys undertaken previously for the purpose of investigating the historic shipwrecks potentially impacted by the development.

24.4.1 Scope

The DASH Architect's Heritage Places and Areas Report has been used to inform the significance of effect of the development on non-Aboriginal heritage within this chapter. The assessment within this chapter follows the EIA methodology outlined in Chapter 6 – Impact Assessment Methodology.

Scoped In

The following potential effects are considered within this chapter:

- Potential effects to the Excelsior shipwreck, unexpected historic shipwreck finds and unknown historical archaeology during the construction phase.

Scoped Out

The following assessments have been scoped out of further consideration within this EIA:

Direct Impacts (Construction)

State Heritage Places, State Heritage Areas, Local Heritage Places, Historic Areas and Known Sites of Historical Archaeology

There are no state heritage places, state heritage areas, local heritage places, historic areas or known sites of historical archaeology located within the development site. As such direct impacts on state heritage places, local heritage places, state heritage areas, historic areas and known sites of historical archaeology within the development site have been scoped out of further assessment within this chapter as no receptors can be impacted by the development.

Historic Shipwrecks (Besides Excelsior and Unexpected Finds)

The Corsair, Sigrid, Wildflower, Enchantress and Napperby are the five shipwrecks mapped as located within the marine-based portion of the subject site as shown in Figure 24.1. The Jupiter is located in the nearby Mutton Cove. Figure 24.2 shows the extent of the development site and the proposed dredging area for the development.

Figure 24.1: Mapped Shipwrecks and Heritage Places

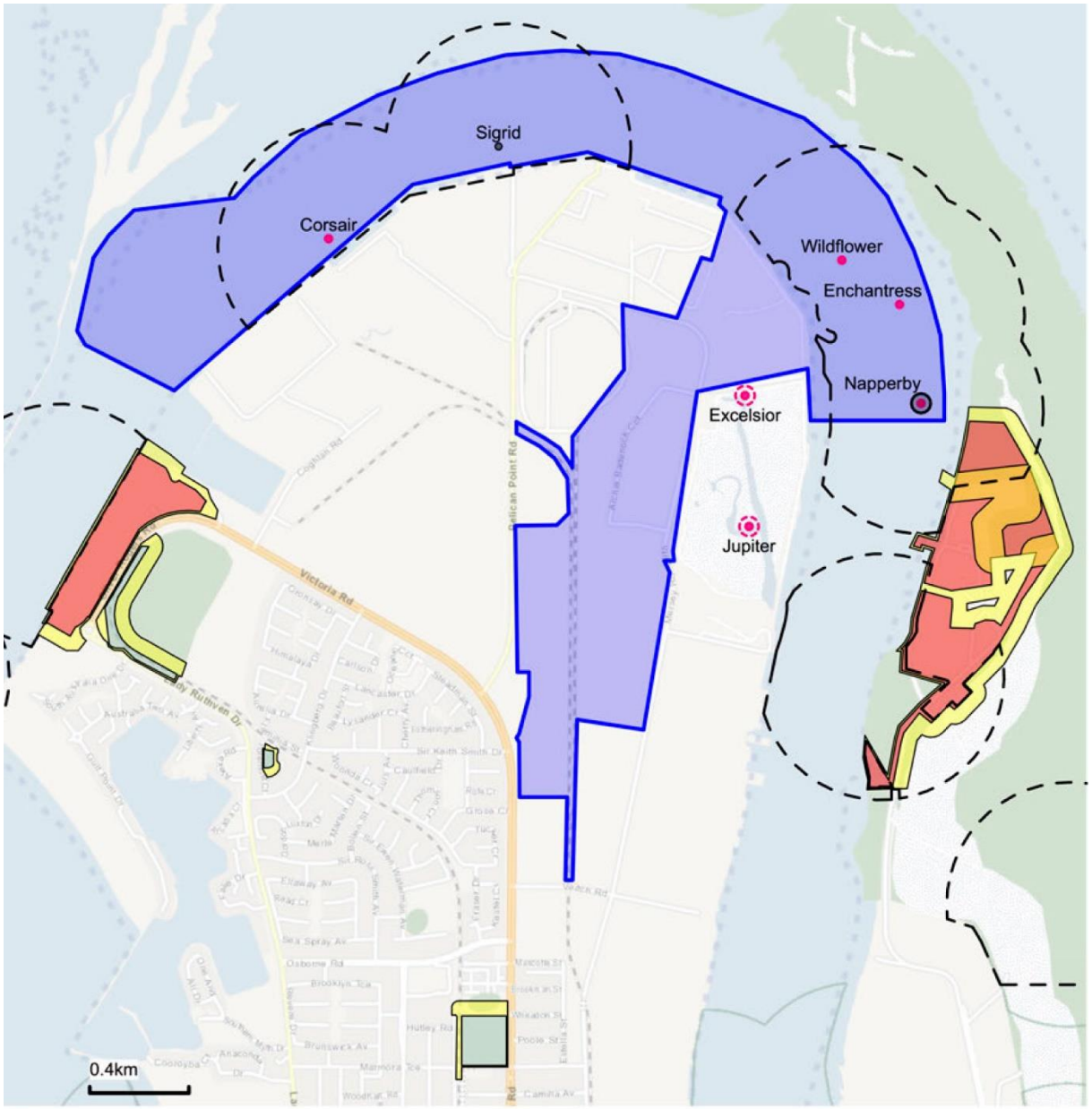


Figure 24.2: Extent of the development site and the proposed dredging

Online research, hydrographic surveys and dive investigations has indicated that these six shipwrecks are unlikely to be affected by the development for the following reasons and hence have been scoped out of further assessment:

- **Corsair** is mapped over 1.5 kilometres from the proposed dredge footprint (as shown in Figure 24.1). Additionally, it is unlikely that remains of the Corsair shipwreck, its articles and/or relics would be uncovered by the development, as this area has been impacted by dredging on multiple occasions, channel widening, land reclamation and coastal development. The shipwreck is mapped directly within the dredged Berth 8 alongside the active Flinders Ports Holdings Adelaide Container Terminal. It is an area that has been dredged and surveyed many times since the widening and deepening of Outer Harbor and the creation of Berth 8 in 2006. No evidence of a shipwreck was found when the berth was dredged and it is unlikely any evidence of that shipwreck will be found.
- **Sigrid** is mapped approximately 940 metres from the proposed dredge footprint (as shown in Figure 24.1). Additionally, Sigrid is less than 75 years old and is not classified as a 'historic shipwrecks' or protected under state legislation.

- Wildflower is mapped approximately 85 metres from the proposed dredge footprint (as shown in Figure 24.1). It is unlikely that remains of the Wildflower shipwreck, its articles and/or relics would be uncovered by the development, as historical research has indicated that the location for this wreck is likely to be further north along the coast (not within the marine-based portion of the development site). It is believed that vessel instead sank north of the Section Bank between Port Gawler and St Kilda beach. Should the shipwreck be located in its plotted location, this is within the dredged shipping channel in the middle of the Port River and remains would be unlikely to be recovered due to previous disturbance.
- Enchantress is mapped approximately 245 metres from the proposed dredge footprint (as shown in Figure 24.1). It is unlikely that remains of the Enchantress shipwreck, its articles and/or relics would be uncovered by the development, as this area has been impacted by dredging on multiple occasions and channel widening. Its plotted location is along the edge of the existing dredged shipping channel in the middle of the Port River and would have been previously disturbed. Historic reports show it was smashed up and debris from that wreck was found floating in multiple locations around St Vincent Gulf. It is unlikely any evidence of that shipwreck will be found.
- Napperby is mapped approximately 345 metres from the proposed dredge footprint (as shown in Figure 24.1). It is likely that the Napperby shipwreck, its articles and/or relics may be extant in the Port River, however may be further south than its plotted location (not within development site) and likely buried in sand or silt. The mapped and anticipated locations are both located well outside the proposed dredge footprint for the coastal works associated with the development. Dredging is not considered to affect the Napperby.
- Jupiter: The Jupiter shipwreck is located approximately 260 metres to the east of the development site's land-based area. No piling works are proposed in this area. The *Jupiter* shipwreck is covered in silt, and was last visible in 2017. When visible, it was in poor condition with heavily corroded steelwork and was partially collapsed. Noting the distance of predicted vibration levels over 100 metres are unlikely to exceed the DIN 4150 guideline, and that this vessel is currently completely covered in silt, the development is not considered to affect the Jupiter.

The following conclusions are supported by extensive historic background research, hydrographic surveys, diving surveys and consideration of recent river activities.

The Port River is an active shipping channel and has been regularly dredged over many years. For at least the last five decades, surveys of the shipping channel have been carried out on a regular basis almost annually and additionally wherever any dredging has occurred. Generally these surveys have been carried out only to the extents of the channel batters. Each new survey is compared with the previous survey for differences in the seabed that may result from sediment buildup or unexplained foreign objects. All objects that may affect shipping safety are investigated and removed as a matter of course. No evidence can be found that shows anything like these shipwrecks have been discovered from any previous hydrographic survey carried out in the Port River area.

Historical analysis was undertaken to determine if any areas outside the shipping channel would warrant further survey to look for historic shipwreck remains. Two survey locations were identified and surveyed through hydrographic survey and visual dive survey. These surveys did not identify any objects related to shipwreck material.

Indirect Impacts (Operation)

There are several Local and State Heritage Places in the vicinity of the subject site including:

- Torrens Island Quarantine Station Complex (State Heritage Place # 13931 and 26583) – 780m south-west of the development site's land-based area.
- Former Pilot Station, Oliver Rogers Road, Outer Harbor (State Heritage Place # 11904) - 1km south of the development site's water-based area and 1.8km t west of the development site's land-based area.
- Outer Harbor Railway Station, Oliver Rogers Rd, North Haven (Local Heritage Place # 3030) - 1.6km west of the development site's land-based area.
- Houses at 11, 12 and 13 Foremost Court, North Haven (Local Heritage Place # 1822, 1823 and 1824) - 980m west of the development site's land-based area.
- Former Glen Arif House, 537-541 Victoria Road, Osborne (Local Heritage Place # 3029) - 660m south-west of the development site's land-based area.

These are shown in the Figure 24.1 above.

Due to the distance of each of these receptors from the development site and intervening built and natural form, there is not considered to be any potential for indirect impacts to occur to these state and local heritage places as a result of impacts to view/vistas or vibration etc. as a result of the development. These heritage assets have scoped out of further assessment within this chapter.

24.4.2 Study Area

The study area for the assessment within this chapter comprises the following:

- The development site and Mutton Cove for historic shipwrecks.
- The land-based portion of the development site for historical archaeology.

24.4.3 Assumptions and Limitations (i.e. Uncertainties)

The DASH Architects Heritage Places and Areas Report, Appendix 1.20, was prepared with no detailed project plans, based on project footprints and high-level details about construction and operations only.

The assessment excludes Aboriginal cultural heritage, which is covered in Chapter 22 – Aboriginal Cultural Heritage.

24.5 Baseline Conditions and Sensitive Receptors

24.5.1 Baseline Conditions

Historic Shipwrecks – Excelsior and Unexpected Finds

There are five shipwrecks mapped as located within the marine-based portion of the subject site and two shipwrecks in the vicinity (Mutton Cove) as shown in Figure 24.1.

Of these seven shipwrecks, all but Excelsior have been excluded from the scope of assessment as described above. The Excelsior shipwreck is located within Mutton Cove. It is visually extant (present) and

in poor condition with heavily corroded steelwork and is partially collapsed. It is protected as a 'historic shipwreck' under state legislation.

The Port River is an active shipping channel and has been regularly dredged and surveyed over many years. It is therefore unlikely that unmapped shipwrecks would be encountered, however this may be a possibility given its maritime history.

Historical archaeology

There are no archaeological designations affecting the development site. The development site was originally marshy low-lying land (intertidal swamp, mudflats, dunes and sub-tidal seabed) until it was reclaimed with extensive fill and developed throughout the late 20th century. Potential archaeological artefacts that may be uncovered are unlikely to be of such significance to warrant further investigation (i.e. low archaeological potential). DASH Architect's archaeological assessment, Appendix 1.20, concludes that there is no reasonable cause to suspect that excavation of the development site will result in an archaeological artefact of significance being discovered.

24.5.2 Sensitive Receptors

Sensitive receptors for heritage include historic shipwrecks and unknown historical archaeology as described above.

24.6 Mitigation Measures

Appendix 2 contains a mitigation schedule that elaborates on the mitigation measures proposed in the EIS to address potential impacts of the development. For further details on each mitigation measure and its implementation, please refer to the comprehensive schedule provided. The following section outlines the securing mechanism for mitigation measures.

Embedded mitigation measures, as outlined below, are well-established within industry design and construction practices and have been effectively demonstrated in the development of the surrounding area, including during the construction and operation of the existing ONS facility.

24.6.1 Embedded Mitigation Measures

The CEMP for the development will outline specific strategies and procedures for ensuring construction personnel are aware of the possibility of encountering unknown historic shipwrecks and historical archaeology and that all required processes are undertaken should a site be encountered.

A Construction Noise and Vibration Management Plan ('CNVMP') will be developed and incorporated into the Construction Environmental Management Plan ('CEMP') for the development. The CNVMP will outline specific strategies and procedures for controlling vibration throughout the construction phase, ensuring that best practices are followed to minimise impacts on the surrounding environments including heritage.

24.7 Assessment of Effects

24.7.1 Historic shipwrecks

Excelsior

The Excelsior is a historic shipwreck (over 75 years old) in SA waters and is protected under the *Historic Shipwrecks Act 1981.* The Excelsior shipwreck is approximately 27m from the southern edge of the road boundary to the north of Mutton Cove and approximately 72m from the northern edge of the road boundary. The Excelsior is currently available for land based viewing to the public from this location.

Shipwrecks are an important part of the history of the area as Adelaide's main shipping port. However, it is important to recognize that this shipwreck is already in poor condition. Other external impacts such as heavy storms and sustained tidal inundation could contribute to damaging the shipwreck.

Once the development site is developed, changes to road access to the existing public access to Mutton Cove and the Excelsior within it should be anticipated. Opportunities for further public access once the development is fully operational is yet to be confirmed, as any access will be subject to security requirements. Should land based public viewing of the Excelsior reduce, there is a possibility that this will reduce its ongoing historic and recreational value to the public.

For the reasons listed above, the sensitivity of the Excelsior receptor is considered to be 'Medium', specifically during the period in which piling along the closest site boundary is being undertaken.

It is understood that piling will be required along this road boundary on the southern edge of the development site directly north of Mutton Cove. The exact nature of the piling, vibratory or impact, is also not known at this stage.

Potential impacts to the Excelsior are limited to vibratory impacts from construction activities for the development, however the types of construction works for the development and their exact distance to the wreck are unknown at this stage. Potential impacts to the Excelsior will be addressed and controlled through a range of measures identified in a CVMP as part of the CEMP for the development as outlined within Section 24.6 above. Potential impacts would be direct, short-term and reversible.

Given the above, the magnitude of impact from construction activities on the Excelsior is considered to range from 'Very Low' to 'Medium' during the construction phase.

The construction assessment of effects is provided within Table 24.2, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 24.2: Excelsior Shipwreck Assessment Effects

Impact factor	Vibration
Potential Impact pathway	Construction activities, including vibratory and impact piling activities and possibly the use of large vibratory rollers.
Impact Type	Direct

Impact factor	Vibration
Sensitive Receptors	Historic shipwreck Excelsior – Medium
Embedded Mitigation	Range of measures embedded in the CEMP as described in Section 24.6
Magnitude of Impact	Very Low to Medium
Significance of Effect	Negligible to Moderate Adverse

Unexpected Finds

There are no shipwrecks mapped or known within the proposed dredge footprint.

The Port River is an active shipping channel and has been regularly dredged over many years. For at least the last five decades, surveys of the shipping channel have been carried out on a regular basis almost annually and additionally wherever any dredging has occurred. No evidence can be found that shows anything related to shipwrecks have been discovered from any previous hydrographic survey carried out in the Port River area. All objects that may affect shipping safety are investigated and removed as a matter of course.

Given historic shipwrecks in South Australia are protected under the state-based *Historic Shipwrecks Act 1981*, the sensitivity would generally be considered Medium. However, given the low likelihood of encountering any shipwreck, the sensitivity within the development site is 'Very Low'.

Nonetheless, there is still a chance of encountering unexpected finds. Impacts are likely to occur through direct disturbance only, through dredging of the Port River or excavation of the land-based area. Should an unknown shipwreck or associated relics or articles be impacted this impact would be direct, permanent, long-term and irreversible. However, any impacts from the development should be seen in the context of the likely continuing truncation of archaeological deposits over time, given the existing baseline. For these reasons, the magnitude of impact for construction activities is 'High'.

Should an unknown shipwreck or associated relics or articles be found, standard procedures would be put in place as per the CEMP as outlined within Section 24.6 above to minimise impact and ensure appropriate management. The CEMP will also set in place protocols for staff inductions to ensure staff are aware of the possibility of encountering unknown shipwrecks or associated relics or articles.

The construction assessment of effects is provided within Table 24.3, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 24.3: Other Historic Shipwrecks Assessment Effects

Impact factor	Direct disturbance to shipwrecks
Potential Impact pathway	Groundbreaking works including dredging and excavation

Impact factor	Direct disturbance to shipwrecks
Impact Type	Direct
Sensitive Receptors	Shipwrecks in the Port River – Very Low
Embedded Mitigation	Staff inductions and unexpected finds procedures incorporated into the CEMP
Magnitude of Impact	High
Significance of Effect	Minor Adverse

Historical Archaeology

There is no reasonable cause to anticipate that excavation of the development site will result in an archaeological artefact of significance being discovered. There are no archaeological records on the development site.

DASH Architect's archaeological assessment, Appendix 1.20, concludes that there is no reasonable cause to anticipate that excavation of the development site will result in an archaeological artefact of significance being discovered. In addition, archaeological artefacts that may be uncovered are unlikely to be of such significance to warrant further investigation.

As a result of the low likelihood of uncovering an archaeological artefact of significance, the sensitivity of the development site is 'Very Low'.

Majority of the site during construction will require fill rather than cut. Excavation will be largely limited to Area 3 for the wet basin and shiplift. Piling will also be undertaken across the site. Nonetheless, there is still a chance of encountering unexpected finds. Should an unknown heritage asset be affected by construction activities this impact would be direct, permanent, long-term and irreversible. The magnitude of impact for construction activities is 'High'.

Unexpected finds will be managed through standard procedures captured in the CEMP for the development (as defined within Section 24.6).

The construction assessment of effects is provided within Table 24.4, with the level of significance of each effect being determined by combining the magnitude of impact with the sensitivity of the receptor as defined within Table 6.4 of Chapter 6 – Impact Assessment Methodology.

Table 24.4: Historical Archaeology Assessment Effects

Impact factor	Direct disturbance to historical archaeology
Potential Impact pathway	Groundbreaking works including excavation and piling
Impact Type	Direct

Impact factor	Direct disturbance to historical archaeology
Sensitive Receptors	Unknown historical archaeology – Very Low
Embedded Mitigation	Staff inductions and unexpected finds procedures incorporated into the CEMP
Magnitude of Impact	High
Effect	Minor Adverse

24.8 Additional Mitigation Measures and Residual Effect

As outlined in the previous sections, the piling methods, whether vibratory or impact, need to be finalised as the development progresses through detailed design. Without this information on the construction techniques and design, the final approach to mitigation measures cannot be established. However, the following additional measures could be implemented depending on the final construction methods and design, and these will be confirmed at the detailed design stage.

24.8.1 Historic Shipwrecks – Excelsior

- Photographic Record: the *Excelsior* shipwreck should be inspected to assess the risk of further damage to vibration, including the preparation of a detailed dilapidation record/report prior to any construction works occurring within 200m of the shipwreck.
- Condition monitoring of *Excelsior*; undertake regular visual monitoring where construction activities occur within 100m of the shipwreck.
- Use of 'spotters' at the shipwreck for any unavoidable activities to provide 'live' condition monitoring during exceedance events.
- For piling that is planned to be conducted within 100m of the Excelsior shipwreck, alternative piling methodologies to impact piling should be investigated, for example: CFA (Continuous flight auger) piling.
- Where impact piling (or dynamic pile testing) is to be undertaken for engineering reasons, vibration measurements during a trial pile that is located further than 100m from the *Excelsior* shipwreck should be undertaken to assess the vibration propagation characteristics of the site soil conditions. These vibration measurements may then inform a risk assessment and vibration management approach that considers the potential vibration levels received at the *Excelsior* shipwreck for comparison to DIN 4150.
- Where major soil compaction works are required to be undertaken on the development site boundary within approximately 100 m of the Excelsior, the machine size and method of compaction should be considered with the intent to reduce the risk of potential vibration damage.
- Vibration measurements should be continuously recorded at the *Excelsior* shipwreck for the duration of construction activities that occur within 200m of the shipwreck to provide a record.
- Establishment of protocols for events that have potential for causing damage to the shipwreck.

Unexpected Finds and Historical Archaeology

No additional mitigations are required beyond those outlined above in Section 24.6.

24.8.2 Residual Effects

Historic Shipwrecks – Excelsior

With the implementation of the additional mitigation measures outlined above, the magnitude of impact can be effectively reduced from 'Very Low to Medium' to 'Very Low to Low', which would reduce the significance effects from 'Negligible to Moderate Adverse' to 'Negligible to Minor Adverse'. As such, the likely residual effects for construction on the Excelsior historic shipwreck is considered to be 'Negligible to Minor Averse'.

Unexpected Finds and Historical Archaeology

The likely residual effects for construction on unexpected finds and historical archaeology receptors will remain Minor Adverse Effect.

24.9 Cumulative Effects

The assessment of cumulative effects considers the potential likely significant effects that will arise from the development in combination with cumulative schemes which are related but separate to the development, as set out in Chapter 6 – Impact Assessment Methodology, and outlined below.

- Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road.
- Development of a Skills and Training Facility to support pathways into and within the submarine and naval shipbuilding workforce including developing skills required for the construction of the SSN-AUKUS nuclear powered submarines.
- Development associated with the existing Osborne Naval Shipyard buildings to support the existing shipbuilding and submarine construction program.

Although unknown heritage sites, objects or remains may be present within the development site and may extend beyond the boundary of the development site, it is reasonably assumed that the determination of consent for each cumulative development will have been made in accordance with national, state and local planning policy and guidance, within which heritage sites, objects or remains would be a material consideration and would have included the provision of appropriate archaeological mitigation measures.

In addition, any heritage sites, objects or remains affected within each site would be discrete features or remains of archaeological interest, where no potential cumulative effect has been identified; i.e. no archaeological asset has been identified which is sufficiently extensive that it would be affected by both the development and any of those schemes being considered cumulatively.

Therefore, it is considered that cumulative effects will not substantially differ from those already identified in this chapter for the development in isolation. As such, significant cumulative effects are not expected.

CHAPTER 25

Summary of Significant Effects

URPS

25. Summary of Significant Effects

25.1 Introduction

This chapter of the EIS summarises the conclusions from the assessment of the significant effects of the development. Residual effects are defined as those effects that remain following the implementation of mitigation measures. Residual effects and mitigation measures are discussed in full in the relevant technical chapters of this EIS.

Each technical chapter contains detailed consideration of both the beneficial and adverse residual effects identified as likely to arise from the development. The criteria applied to define the significance of residual effects are set out within Chapter 6 - Impact Assessment Methodology, with further detail provided within the individual technical chapters. Where technical chapters have deviated from this standard methodology, this is explained in the respective chapters and justification for the reason provided.

A Mitigation Schedule, Appendix 2, has been produced. The Mitigation Schedule outlines the Embedded Mitigation that has been included as part of the development.

25.2 Summary of Significant Effects

A summary of the identified significant effects for each topic is presented in Table 25.1 for the construction phase, Table 25.2 for the operational phase. Negligible and minor effects (adverse and beneficial) are not included in the following tables and are more numerous.

Table 25.1: Summary of significant residual effects - Construction Phase

Effect	Potential effect significance	Additional mitigation	Likely Residual Effect
7 Air Quality			
No significant effects identified			
8 Noise and Vibration			
Construction noise from activities and plant	*Short-Term, Major Adverse to Negligible Effect during the daytime*	None	*Short-Term, Major Adverse to Negligible Effect during the daytime*
No significant effects identified for Vibration			
9 Traffic and Transport			
No significant effects identified			
10 Visual Amenity			
No significant effects identified			
11 Biosecurity			
No significant effects identified			

Effect	Potential effect significance	Additional mitigation	Likely Residual Effect
12 Marine Flora and Fauna			
No significant effects identified			
13 Terrestrial Flora and Fauna			
No significant effects identified			
14 Climate Change Adaption			
No significant effects identified			
15 Greenhouse Gas Emissions			
No significant effects identified			
16 Water Management			
No significant effects identified			
17 Local, Regional and State Economies			
Construction Employment	*Short-Term, Moderate / Minor Beneficial effects on job creation at the regional level*	None	*Short-Term, Moderate / Minor Beneficial effects on job creation at the regional level*
Employment and labour force impacts and risks	*Short-Term, Moderate Adverse effect at the regional level*	South Australian Government Commitments – Skills and Training	*Short-Term, Minor Adverse effect at the regional level*
18 Flooding			
No significant effects identified			
19 Contamination			
No significant effects identified			
20 Coastal and Marine			
No significant effects identified			
21 Surface Water and Groundwater Quality			
No significant effects identified			
22 Aboriginal Cultural Heritage			
No significant effects identified			
23 Community Wellbeing/Social Impact Assessment			
No significant effects identified			
24 Heritage Places and Areas			
Vibration Effects to the Historic shipwreck Excelsior	*Long-Term, Negligible to Moderate Adverse*	Implement measures included within Section 24.8 Additional	Long-Term, Negligible to Minor Adverse

Effect	Potential effect significance	Additional mitigation	Likely Residual Effect
		Mitigation Measures of Chapter 24.	

Table 25.2: Summary of significant residual effects – Operational Phase

Effect	Potential effect significance	Additional mitigation	Likely Residual Effect
7 Air Quality			
No significant effects identified			
8 Noise and Vibration			
Road traffic noise (Year 2041)	*Long-term, Minor Adverse to Major Adverse*	Significant effects will not occur for 10 to 15 years, providing sufficient time for the mitigation options to be identified and implemented. Suitable mitigation can be implemented to reduce the impact of road traffic noise as a result of the development and other growth on the Lefevre Peninsula through the Lefevre Peninsula Masterplan planning process.	*Long-term, Minor Adverse to Major Adverse*
9 Traffic and Transport			
Effects to the exiting road network (Year 2041)	*Long-term, Minor Adverse to Major Adverse*	Significant effects will not occur for 10 to 15 years, providing sufficient time for the mitigation options to be identified and implemented. Suitable mitigation would be able to be implemented to reduce the impact on the road network as a result of the	*Long-term, Minor Adverse to Major Adverse*

Effect	Potential effect significance	Additional mitigation	Likely Residual Effect
		development and other growth on the Lefevre Peninsula through the Lefevre Peninsula Masterplan planning process.	
10 Visual Amenity			
No significant effects identified			
11 Biosecurity			
No significant effects identified			
12 Marine Flora and Fauna			
No significant effects identified			
13 Terrestrial Flora and Fauna			
No significant effects identified			
14 Climate Change Adaption			
No significant effects identified			
15 Greenhouse Gas Emissions			
No significant effects identified			
16 Water Management			
No significant effects identified			
17 Local, Regional and State Economies			
Operational Employment	*Long-Term, Moderate / Minor Beneficial effects on job creation at the regional level*	None	*Long-Term, Moderate / Minor Beneficial effects on job creation at the regional level*
Operational Workforce Spending	*Long-Term, Moderate Beneficial effects on the regional economy*	None	*Long-Term, Moderate Beneficial effects on the regional economy*
Contribution to Operational Output	*Long-Term, Moderate Beneficial effects on the regional economy*	None	*Long-Term, Moderate Beneficial effects on the regional economy*
Employment and labour force impacts and risks	*Long-Term, Moderate Beneficial effects on the regional economy*	None	*Long-Term, Moderate Beneficial effects on the regional economy*
Effects on accommodation supply and demand	*Long-Term, Moderate Beneficial effects at the local level*	None	*Long-Term, Moderate Beneficial effects at the local level*

Effect	Potential effect significance	Additional mitigation	Likely Residual Effect
Supply chain opportunities	*Long-Term, Moderate Beneficial effects on the regional economy*	None	*Long-Term, Moderate Beneficial effects on the regional economy*
Land requirements and potential effects (Residential)	*Long-Term, Moderate effect for residential land requirements at the regional level*	Implement measures included within Section 17.8.1 Additional Mitigation Measures of Chapter 17.	*Minor Adverse effect at the regional level*
Land requirements and potential effects (Industrial)	*Long-Term, Major effects at the local level and Moderate effects at the regional level*	Implement measures included within Section 17.8.1 Additional Mitigation Measures of Chapter 17.	*Moderate/Minor Adverse effect at local and regional levels*
Implications of not proceeding with the development	*Significant Adverse*	None	*Significant Adverse*
18 Flooding			
No significant effects identified			
19 Contamination			
No significant effects identified			
20 Coastal and Marine			
No significant effects identified			
21 Surface Water and Groundwater Quality			
No significant effects identified			
22 Aboriginal Cultural Heritage			
No significant effects identified			
23 Community Wellbeing/Social Impact Assessment			
No significant effects identified			
24 Heritage Places and Areas			
No significant effects identified			

Adelaide

27 Halifax Street
Enter via Symonds Place
Adelaide SA 5000

(08) 8333 7999

Melbourne

Level 3 107 Elizabeth Street
Melbourne VIC 3001

(03) 8593 9650

Perth

Level 17 1 Spring Street
Perth WA 6000

(08) 6285 3177

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