

OFFICIAL



Osborne Submarine Construction Yard (SCY) EIS

CCRE3: Sustainable Use of Resources

Prepared for:

Australian Naval Infrastructure (ANI) & URPS

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Executive Summary

This report presents information and advice to support the Environmental Impact Statement (EIS) for planning approval of the proposed nuclear powered submarine construction yard (SCY) project at Osborne, Adelaide:

- ***To ensure opportunities to procure and use resources efficiently and sustainably are maximized, supporting South Australia's transition to the circular economy.***

It includes (but is not limited to):

1. A suggested approach to developing the sustainability strategy(ies) for construction and operational phases of the SCY project – which is summarised in the figure overleaf.
2. This proposed sustainability strategy includes guidance and advice on:
 - a. Approach and methodology to fulfill the strategy(ies), including utilising already established and well-articulated Defence requirements for developing sustainable infrastructure.
 - b. Design guidelines that can be used to maximise sustainable resource use, including (among other areas) for construction methods, materials, and equipment to reduce energy use (including for transport and vehicle emissions), disposal of waste, water use efficiency during construction and operation over the life of the project.
 - c. How sustainability for development of the SCY should be monitored and reviewed.
3. Recommended ways in which power use can be minimised or supplemented, especially using alternative energy sources, energy efficient measures and energy conservation.

The suggested approach for SCY project sustainability aligns with aims and priorities in the recently released Defence Net Zero Strategy (Department of Defence, 2024a).

An overview of the key advice provided in this report is illustrated in Figure E-1 overleaf:

- Proposed sustainability objectives and key principles for the SCY project.
- Summary of the proposed approach for achieving sustainable outcomes in resource usage during each phase (construction or operational) through best practice in:
 - Environmental management,
 - Procurement, and
 - Design and/or operating requirements, standards and/or other methods that should be met or considered.

Objective

Deliver “a strategically aligned, affordable, safe and sustainable estate that enables Defence capability and operations” that aligns with Australian Government sustainability aims and targets.

Key Principles

- Identify and assess ESD risks and initiatives in whole-of-life (WOL) cost analysis for infrastructure planning, design, and construction.
- Set minimum standards and requirements for: Climate adaptation, energy, water, and waste minimisation and management, and pollution prevention.
- Align sustainability targets and outcomes to aims, priorities and implementation plan in Defence Net Zero Strategy.

Approach Summary		
	Construction phase	Operational phase
Environmental Management	<ul style="list-style-type: none"> • Construction-phase Environmental Management System(s) • SA EPA Compliant construction Environmental Management Plan(s) 	<ul style="list-style-type: none"> • Operational Environmental Management system(s)
Procurement	<ul style="list-style-type: none"> • Follow Australian Government Environmentally Sustainable Procurement Policy(ies) • Follow South Australian Government Sustainable Procurement Policy(ies) 	
Guidance / Requirements	<ul style="list-style-type: none"> • Defence Net Zero Strategy aims, priorities and implementation plan (considering Defence Future Energy Strategy). • Defence Smart Infrastructure Handbook requirements • Defence's Smart Building Energy Performance Guide • National Building Code energy and water efficiency requirements • Green Star ratings or design alignment to relevant sustainable design credits including LCA adoption to minimise embodied emissions (where adopted) • Contemporary best practice NABERS rating targets (energy, water & waste): Consider (if above existing Defence requirements) • Adopt SA 100% Renewable Energy (electricity) target • Relevant SA Government Climate Actions (align to support where feasible) • Design to SA Waste Management Better Practice Guide • National Electric Vehicle Strategy (align to support where feasible) • Australian Government APS Net Zero in Government Operations strategy (align design to support where feasible) 	<ul style="list-style-type: none"> • Defence Net Zero Strategy aims, priorities and implementation plan (considering Defence Future Energy Strategy). • NABERS ratings: Maintain and continuously improve (where feasible) • Green Star rating credit performance (where adopted): Maintain • SA 100% Renewable Energy (electricity) target: Continue to align with (as feasible) • SA Government Climate Actions: Continue to align with (as feasible) • National Electric Vehicle Strategy: Continue to support (where feasible) • Australian Government APS Net Zero in Government Operations strategy: Adopt and follow • Continuously review and improve (as required) to comply with: <ul style="list-style-type: none"> ○ Current and future regulatory requirements for sustainable operational practices, and/or ○ Current and future Australian Government or Defence sustainability policies and/or programs

Figure E-1 – Summary overview of sustainability strategy suggested for the SCY project: Objective, key principles and approach including guidance that should be followed and specific requirements or expectations that should be met or considered.



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1 Introduction

1.1 Context

Australian Naval Infrastructure (ANI) is planning a nuclear-powered submarine construction yard (or SCY) at Osborne, Adelaide, for the Australian Government's SSN-AUKUS submarine project.

The Minister for Planning has declared the SCY at Osborne as an impact assessed development under section 108 (1)(c) of the *Planning, Development, and Infrastructure Act 2016* (PDI Act), which requires the preparation of an Environmental Impact Statement (EIS).

To support the EIS, information has been sought on how the development could procure and use resources efficiently to maximise sustainably and support South Australia's transition to the circular economy.

This report provides this information based on the project data available at current time. *Note: In providing this advice, it is recognised that the sustainability approach to the SCY project hasn't been confirmed yet and still needs to be reviewed and considered by ANI.*

1.2 Scope of assessment

Table 1-1 overleaf gives the information requested to support the project EIS. In summary, this information sought includes (but is not limited to) the following.

- A proposed sustainable resource use objective for the SCY.
- A proposed approach including design guidelines that could be adopted to achieve this objective during construction and operation phases of the project.
- A potential framework for ANI to monitor and review sustainable resource use performance during each project phase.
- Guidance on how each project phase can achieve sustainable use of resources in line with Circular Economy principles for energy, materials, and water and to minimise emissions and waste.

1.3 Presentation

This report is presented as follows.

Section 2 – Available project information	Summarises available project information to support this advice.
Section 3 – Sustainability context	Introduces relevant context for to develop a strategy or approach for sustainable resource use by the SCY project.
Section 4 – Sustainability strategy	Outlines a potential strategy and opportunities for sustainable resource use in the SCY project including proposed project objective, approach, design guidelines (including for transport), and management of this strategy including performance measurement and auditing.
Section 5 – Power use	Identifies ways in which power use could be minimised and/or supplemented by alternative energy sources for the SCY project.

Table 1-1 – Scope of Assessment requested to support the EIS

<p>CCRE3</p>	<p>Sustainable Use of Resources</p>	<p>To ensure opportunities to procure and use resources efficiently and sustainably are maximized, supporting South Australia’s transition to the circular economy</p>	<ul style="list-style-type: none"> - Describe the sustainability objectives of the development and the approach and methodology used to achieve these objectives. - Describe design guidelines for aspects of the development (including transport options) that would be adopted to ensure sustainability - Describe how sustainability of the development will be audited - Identify ways in which power use can be minimised or supplemented, especially using alternative energy sources, energy efficient measures and energy conservation. - Describe the proposed approach to matters such as design, construction methods, materials, and equipment to reduce energy use (including vehicle emissions), disposal of waste, water use efficiency during construction and operation over the life of the project.
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2 Available project information

2.1 Project status

Design development for the SCY project has commenced but is still at initial stages. For this this advice:

- There was not yet a full description available of activities that will be undertaken during the project.
- Consequently, it was necessary to review available project information, consider what these project activities would or might be, to identify what sustainable resource use opportunities could apply during construction and/or operational phases.
- This high-level and preliminary information is presented in following sections and was used to consider sustainable resource use during the project and advise on how it can be achieved in line with the circular economy principles.

2.2 Project overview

Based on currently available information, the following gives an overview of the SCY project at Osborne.

- The project would cover a substantial site area on the Northeastern corner of the Lefevre Peninsula.
- There would be multiple buildings or structures across this site, not including other proposed road and transport infrastructure.
- At high level, these buildings and structures would or could be expected to include (but may not be limited to):
 - Single or multi-level office buildings,
 - On-site accommodation facilities (including leisure and catering),
 - Manufacturing buildings and workshops,
 - Storage Warehouses,
 - Docks,
 - Covered submarine assembly area including launch area,
 - Car park areas – External open and/or multi-level covered structures (for personnel parking and fleet vehicles),
 - Utility buildings – For plant including back-up generators, communication, and data systems.
 - Ancillary facilities (e.g., health)
 - Fuel storage tanks,
 - External yards for storage (including materials and waste),
 - Specialised buildings, yards and storage areas for nuclear related materials and activities,
 - Security fencing and gates,
 - Landscaped and recreational areas for personnel, and
 - Roads and transport infrastructure (including for public transport access).
- There would be tens of thousands of square metres of built area constructed and then operated and maintained after.
- Some of these structures would or could have specialised design needs or house activities to meet specific defence, security, and submarine construction requirements.
- The expected site construction program would commence in 2025 and complete within 10 years.

{Next section starts overleaf}

2.3 Expected or potential project activities

2.3.1 Construction Phase

The construction phase of the SCY project is anticipated to include the following activities at the site. It should be noted that these activities would not happen across the entire site at once and may occur progressively in different parts of the site over a multi-year construction program.

<p>Demolition</p>	<p>Clear site ready so construction can safely commence, which may include (but not be limited to):</p> <ul style="list-style-type: none"> • Clear vegetation, • Remove existing structures and previous utility infrastructure and dispose of any materials still located or stored on site from past activities, • Identify, excavate, and dispose of any previously contaminated soils, and • Reprocess above suitable demolished materials at site or third party external reprocessor(s) for reuse in future construction at site or other construction project(s).
<p>Preliminary works (or site preparation)</p>	<p>Prepare the site for access and construction of buildings and other facilities and structures, which may include (but not be limited to):</p> <ul style="list-style-type: none"> • Site grading to main levels, • Services installation including trenching, poles, laying conduits or pipes, • Road base construction and construction phase paving, • Cut and fill (with soil, rock and/or aggregate) to prepare final levels for buildings and/or (above or below ground) structures, and • Excavations for footings / piers and foundation installation for buildings and other structures.
<p>Construction</p>	<p>Of buildings and other facilities and structures including (but not limited to):</p> <ul style="list-style-type: none"> • Final site service excavations and conduits or pipework installed for supply into buildings and other facilities and structures (electricity, water, gas, sewer, comms), • Footings / piers and foundations laid / installed, • Building and other structure frames erected (steel frame / concrete slab, steel frame concrete tilt-up, timber) • Roofing, internal structural, and internal services installed (e.g., switchboards, conduits, piping &/or connections for electricity, water, gas, sewer, comms), • Utility and/or service plant and equipment &/or storages installed (e.g., HVAC, ventilation ducting, boilers, hot water, gas storage, water pumping & storage, etc.) • External windows, walls, facades installed, • Internal insulation, walls, ceilings, doors, glass, and other partitions, and electrical and comms and access points installed, • Base fit-out (cabinetry, kitchens, toilets), • Surface treatments / finishes (water proofing, painting, tiling, wood panelling, other), • Floors / coverings (e.g., timber, laminate, tiling, carpets, etc.), • Final fit-out (furniture, curtains, drapes, other furnishings), • Specialised workshop &/or laboratory fit outs (if industrial), • Manufacturing, laboratory, R&D plant, equipment & storages delivered and installed (if industrial) • Disposal of waste and recycling generated by the above.

2.3.2 Operational phase

The operational phase of the AUKUS SCY project is expected include the following activities at the site.

Note: These are potential activities based on hypothecation by Colby Phillips Advisory based on preliminary project information available, and there may be some differences once the final submarine manufacturing activity scope for the SCY site is confirmed (e.g., some manufacturing operations may happen off-site and elsewhere, etc.).

<p>Submarine manufacturing</p>	<p>Would involve a range of on-site manufacturing activities, much of general industrial nature, but other specialised for submarine manufacturing and associated defence work and could include areas for (but not limited to) the following. The presence of these activities could vary from building to building across the site and include (but not be limited) to the following.</p> <ul style="list-style-type: none"> • Offices – Which would be similar those in office-only buildings. • Warehousing and storage - High level security and low-level security. • Metal shop – For forming / pressing, cutting, welding, of metals. • Electroplating – For metal coatings. • Other Surface coatings – Including other specialised methods like powder coating, vapor deposition and /or thermal spraying. • Paint shop – For painting of materials and/or components. • Plastics production / moulding area – For specialised production of plastic polymers and/or their casting, extrusion and/or 3D printing into components. • Electrical equipment manufacturing / assembly & testing. • Communications, sonar & radar systems manufacturing / assembly & testing. • Submarine battery storage & testing. • Other specialised manufacturing areas. • Specialised R&D areas & testing / analytical laboratories. • General workshop operations areas – which may include lathes, CNC, cutting, grinding machines and pre-assembly areas. • Secure area for storing, preparation and/or testing the submarine nuclear reactor before installation in the submarine. • Main submarine assembly & fit out area – where manufactured and/or prefabricated components would finally be assembled to form the submarine and fit it out. • Main submarine launch area – From where the submarine would be launched. • Vehicle, plant & equipment maintenance workshops – For maintaining and servicing vehicles and mobile plant. • Staff support areas – which could include Refectory(ies) and/or lunchrooms, Toilets & changerooms, on-site first-aid, Training / simulation facilities / areas, and Human resources support and/or guidance areas. • Waste and recycling disposal and storage areas • Utility areas and operations – for electricity supply, information (IT), HVAC, hot water, steam production, water supply, vehicle fuel supply and/or charging stations, etc.
<p>Offices</p>	<p>Which would largely be like those occurring in standard commercial or government offices elsewhere, including (but not limited to):</p> <ul style="list-style-type: none"> • Computer and other electrical and electronic equipment, • Use of paper and stationery and digital media, • Staff facilities including kitchens, lunch / tea rooms, toilets, and End-of-Trip areas, • First-aid or medical treatment areas, • Cleaner rooms, • Waste and recycling disposal areas

	<ul style="list-style-type: none"> Utility areas and operations – for electricity supply, information (IT), HVAC, hot water, water supply, etc.
Accommodation (on-site)	<p>For workers and/or defence personnel, including (but not limited to):</p> <ul style="list-style-type: none"> Serviced and unserviced accommodation – some of which may include kitchens, Utilities (to support this accommodation) – which may be like those needed by offices and outlined above, Cleaning – which would may include chemical storage, waste, and recycling disposal areas, and even laundry facilities, and Shared areas – which may include gyms, common eating and/or other recreational areas, landscaped gardens, etc.
Retail / commercial	<p>To support the workforce and SCY operations, which may include (but not be limited to):</p> <ul style="list-style-type: none"> Hospitality (i.e., café), Childcare centre, Medical care, and Leisure (e.g., gym).
Car parking	<p>For workforce and /or SCY, security and/or defence fleet vehicles, which would include (but not be limited to):</p> <ul style="list-style-type: none"> Car parking in paved ground-level areas, basements and/or multi-storey buildings, and Fuel supply and/or charging stations (for security, SCY fleet and defence vehicles).
Security	<p>Which would or could include (but not be limited to):</p> <ul style="list-style-type: none"> Specialized offices in buildings across the site or stand-alone buildings at key access points or for main security administration, Fencing and other structures or barriers to control site and/or secure building access, and Electronic active and passive monitoring and/or surveillance systems for the above.
Gardens & Landscaping	<p>Across the site, which would or could include (but not be limited to):</p> <ul style="list-style-type: none"> Lawns and gardens, Outside recreational / leisure areas for sport, playgrounds and / or BBQs / eating, Maintenance sheds and storage, and Garden material and waste areas.

2.4 Other relevant advice or assessments

Colby Phillips Advisory has prepared other following separate advice to support the EIS process for the AUKUS SCY project. The information in these other assessments has been used to inform this report.

- **CCRE2: Greenhouse Gas Emissions** (Colby Phillips Advisory, 2024a)
- **CCRE4: Waste Management** (Colby Phillips Advisory, 2024c)
- **HR4: Dangerous Substances** (Colby Phillips Advisory, 2024b)

3 Sustainability context

3.1 Introduction

The SCY project should align its sustainable resource use practices resource with relevant:

- South Australian requirements and / or community expectations,
- National requirements and /or community expectations, and
- Australian Government procurement and defence project policy and /requirements.

This context is concisely reviewed in the following sections. It informs the proposed sustainability strategy outlined for the SCY in Section 4.

3.2 South Australian requirements &/or expectations

South Australian requirements and /or expectations for sustainable development and resource use are embedded across a range of State Government planning and environmental legislation and policies which are summarised below.

3.2.1 Planning development & Building Rules

The *State Planning, Development, and Infrastructure Act 2016* (South Australian Government, 2024a) controls planning, use, development and management of land and buildings.

- Its primary object is to support and enhance the State's liveability and prosperity in ways that are ecologically sustainable, including:
 - Sustainable resource use in line with relevant building standards such as the National Building Code, and
 - A focus on achieving energy efficient environments that address the implications of climate change.
- To support the object of the Act, policies, standards, and codes have been established, including (but not limited to):
 - State Planning Policies – including those listed in Table 3-1 overleaf that support sustainable resource use outcomes,
 - Planning & Design Code – which can include specific design objectives and requirements for sustainable design of developments, and
 - Design Standards – of which there are presently none (in final form)
- *Note: An Environmental Impact Statement (EIS) for planning approval should include a statement on how a development would be consistent with relevant objectives of the Act, State Planning Policies, Planning & Design Code, and any Design Standards.*

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Table 3-1 – South Australian State planning policies (SPPs) relevant to Sustainable Resource Use. For a complete list of these SPPs, see: [State planning policies | PlanSA](#)

State Planning Policy	Policy examples potentially relevant to Sustainable Resource Use by the SCY project
No. 5: Climate Change	<p>5.1 Create carbon-efficient living environments through a more compact urban form that supports active travel, walkability, and the use of public transport.</p> <p>5.3 Facilitate climate-smart buildings to reduce our demand for water and energy</p> <p>5.4 Mitigate the impacts of rising temperatures by encouraging water sensitive urban design, green infrastructure, and other design responses.</p> <p>5.6 Facilitate green technologies and industries that reduce reliance on carbon-based energy supplies and directly or indirectly reduce our greenhouse gas emissions.</p>
No. 11: Strategic Transport Infrastructure	<p>11.5 Encourage development that supports the increased use of a wider variety of transport modes, including public transport, walking, and cycling, to facilitate a reduced reliance on private vehicle travel and promote beneficial community health outcomes</p> <p>11.8 Development that takes advantage of emerging technologies that contribute to liveability, sustainability, and economic productivity, including electric and alternative fuel vehicles, autonomous vehicles, and on-demand transport opportunities.</p>
No. 12: Energy	<p>12.2 Facilitate renewable sources of energy supply, such as solar and wind, at the local level.</p> <p>12.5 Enable industries to reduce carbon emissions by supporting energy efficient urban and building designs.</p>
No. 14: Water Security and Quality	<p>14.5 Development should incorporate water sensitive urban design principles that contribute to the management of risks to water quality and other risks (including flooding) to help protect people, property and the environment and enhance urban amenity and liveability.</p>
No. 16: Emissions and Hazardous Activities	<p>16.1 Protect communities and the environment from risks associated with industrial emissions and hazards (including radiation) while ensuring that industrial and infrastructure development remains strong through:</p> <ul style="list-style-type: none"> a) supporting a compatible land use mix through appropriate zoning controls b) appropriate separation distances between industrial sites that are incompatible with sensitive land uses c) controlling or minimising emissions at the source, or where emissions or impacts are unavoidable, at the receiver. <p>16.2 Assess and manage risks posed by known or potential site contamination to enable the safe development and use of land</p>

Table 3-2 – Select examples of Building Code provisions relevant to Sustainable Resource use. The Building Code can be inspected at: [National Construction Code | NCC \(abcb.gov.au\)](#)

Volume 1 - Class 2 to 9 (multi-residential, commercial, industrial, and public) buildings and structures.	
Section J - Energy efficiency performance requirements	<p>Thermal performance requirements for building fabric, energy efficiency of key equipment and the features a building must have to facilitate the future installation of distributed energy resources, including reference to verification methods and/or design standards that can be used for different building types, e.g.,</p> <ul style="list-style-type: none"> • National Australian Built Environment Rating System (NABERS) Energy rating requirements for the office and accommodation building • Complying with certain requirements of Green Star building sustainability rating scheme • Following American National Standards Institute (ANSI) methods for building energy analysis or simulation • Obtaining a Building Sustainability Index (BASIX) certificate
Volume 2 - Class 1 (residential) and 10 (non-habitable) buildings and structures	
Section H9 – Energy efficiency	<p>Energy efficiency building requirements to improve the thermal performance and efficient use of energy, including use of house energy rating software.</p>
Section H10 – Water efficiency	<p>Water efficiency building requirements.</p>

- The Act mandates the National Building Construction Code, or Building Code, as building rules.
 - It includes provisions (e.g., see Table 3-2 overleaf) that support:
 - Energy efficiency, water conservation, and reducing emissions,
 - Using sustainable building materials, and
 - Construction practices that minimise environmental impacts.
 - It refers to design standards and sustainability ratings that can be used to verify that these provisions are being met, including:
 - National Australian Built Environment Rating System (NABERS) Energy rating requirements for office and accommodation buildings, and
 - Certain requirements of the Green Building Council of Australia’s Green Star building sustainability rating scheme.

3.2.2 Environmental management

The *Environment Protection Act 1993* (South Australian Government, 2024) aims to promote sustainable development through:

- Sustaining natural and physical resources to meet the reasonably foreseeable needs of future generations, and
- Having regard to climate change adaptation and climate change mitigation.

There are a variety of regulations and environmental protection policies under this Act along with other policies, industry codes of practice, and guidelines that have a bearing on sustainable resource use, including (but not limited to):

- Handling site contamination,
- Disposal and resource recovery of waste materials, including construction and demolition waste and operational waste materials,
- Management of hazardous and radioactive waste, and
- Protection of air and water quality.

3.2.3 Climate change mitigation

The *Climate Change and Greenhouse Emissions Reduction Act 2007* (South Australian Government, 2007) has provided a framework for South Australia to set targets and develop policies for:

- Greenhouse gas emission reduction,
- Renewable electricity adoption, and
- To other encourage sustainability outcomes.

It has seen the State commit to the following targets:

- Become a 100% net renewable electricity generator by 2030,
- Set greenhouse gas emission reduction targets of:
 - 2030: Reducing net greenhouse gas emissions by at least 50% (from 2005 levels), and
 - 2050: Achieve net zero greenhouse gas emissions by 2050.

In 2022, the South Australian Government released its Climate Change Actions statement (2022), which includes sustainable resource use actions to help tackle climate change. A number of these relevant actions are listed in Table 3-3 overleaf.

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Table 3-3 – Examples of actions in South Australian Government Climate Change Actions statement (South Australian Government, 2022) that are relevant to sustainable resource usage

Action	Description
1.4. Implement energy demand management and productivity programs	The government will implement a range of policies and projects to manage electricity demand and improve energy efficiency.
2.8 Support business and communities to adopt circular economy practices	Encourage businesses to implement circular economy opportunities and boost sustainable growth and address resource security.
2.9 Implement South Australia’s Waste Strategy 2020–2025	South Australia’s Waste Strategy 2020–2025 outlines a range of actions that will help reduce emissions by increasing recycling and resource reuse and reducing methane from landfills.
2.11 Deliver a stronger regulatory framework to reduce waste and encourage greater reuse of materials to support a circular economy	Encourage business and industries to reduce waste, improve resource recovery and keep materials in use longer.
3.8 Develop a framework to deliver integrated urban water management and inform investment decisions	Consider urban greening needs, and stormwater management to minimise flood risk.
4.1 Drive the transition to electric vehicles	The government is supporting initiatives to increase the uptake of hydrogen and battery electric vehicles by motorists in South Australia.
4.2 Plan to transition the public transport system aligned with net zero emissions targets	The government will plan for a staged transition of the public transport fleet and operations to align with the government’s net zero emissions targets.
4.5 Align transport planning with net zero emissions outcomes	State and government emission reduction goals will be embedded in transport and infrastructure planning and investment frameworks.
4.6 Drive increased patronage of public transport through delivery of services that are more efficient, integrated and customer-focused	The government will deliver a modern and customer focused public transport network to encourage greater uptake and thereby reduce private car use and associated greenhouse gas emissions.
5.3 Support development and implementation of stronger climate smart standards in the National Construction Code	The South Australian government will contribute to improvements in standards in energy efficiency, emissions and climate resilience in the National Construction Code and relevant South Australian standards.
5.4 Encourage the private and public sector to go ‘beyond compliance’ in climate smart design	Encourage consumers, designers, developers, builders, and assessors to understand and apply climate smart design that goes ‘beyond compliance’ with relevant standards.
5.6 Deliver low-emission infrastructure and operations	Encourage the use of low and zero emissions technology and materials, and support recycling and reuse as part of a more circular economy.

3.2.4 Circular economy practices & waste management

The *Green Industries SA Act 2004 Act* (South Australian Government, 2017a) has objectives to:

- Eliminate waste disposal to landfill,
- Promote innovation and government and business activity that adopts Circular Economy, and principles for sustainable development in South Australia and enables development of a waste strategy to achieve this goal.

Under the *Green Industries SA Act 2004 Act*, South Australia has developed a Waste Strategy 2020-2025 for the State (Green Industries SA, 2020).

- This Waste Strategy adopts the following guiding principles for sustainable resource use.
 - o *Waste management hierarchy* – see Figure 3-1(a) below – which is a conceptual framework designed to guide and rank waste management decisions.
 - o *The circular economy* – see Figure 3-1(b) – which advances a conceptual economic model for production and consumption that involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products for as long as possible (to “maximise their technical utility).
 - o *Ecologically sustainable development* – which ensures that developments are designed to not only meets the needs of present generations but future generations too.
- The South Australian Waste Strategy 2020-2025 includes resource management targets:
 - o Achieve zero avoidable waste to landfill by 2030,
 - o 5% per capita waste reduction by 2025 (from 2020 baseline), and
 - o 2025 landfill diversion targets for:
 - Municipal waste – 75%
 - Commercial and industrial waste – 90%
 - Construction and demolition waste – 95%

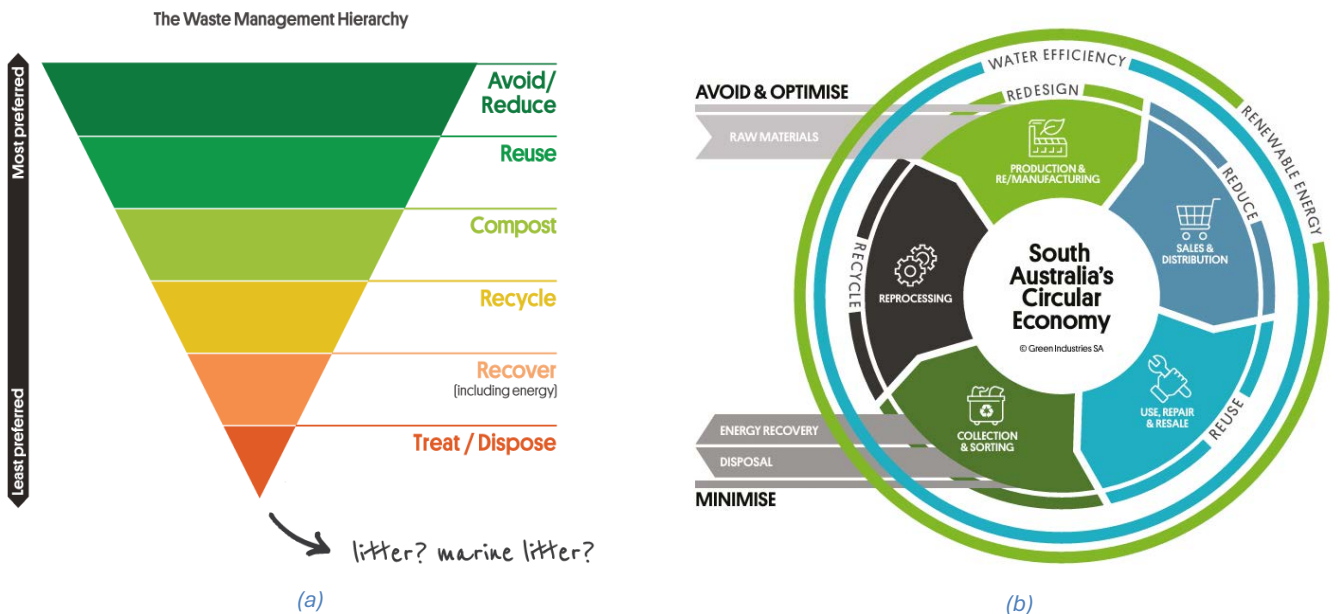


Figure 3-1 – (a) The Waste Hierarchy, (b) The Circular Economy. Image sources: South Australia’s Waste Strategy 2020-2025 (Green Industries SA, 2020)

3.2.5 Water management

Water resources within South Australia are managed under the *Landscape South Australia Act 2019* (South Australian Government, 2023), which aims to promote sustainable development and use of water resources and under which sustainable limits on how much water from existing natural resource can be used are set.

In practice though, water would be supplied to the SCY by SA Water. Its key commitments include:

- Using water efficiently, and
- Reducing greenhouse gas emissions.

Because of South Australia's reliance on limited water supplies from River Murray, water recycling for sustainable water use has been long-been practiced and encouraged in the State. Examples include:

- Recycled water schemes supplied from SA Water's wastewater treatment plants to Adelaide City's parklands and for agricultural irrigation north and south of Adelaide, and
- Stormwater recycling in Metropolitan Adelaide, including (groundwater) aquifer storage and recovery (ASR).

3.2.6 Infrastructure development & procurement

The South Australian Government has developed its own:

- Sustainable Procurement Policy (South Australian Government, 2023) – which encourages and/or can specify that suppliers use recycled content in materials or goods, renewable energy, electric vehicles, lower emission good and services.
- Green Procurement Guideline (Procurement Services SA, 2023) – which seeks to promote green procurement outcomes, including (among others):
 - Lower levels of energy, resources, or water,
 - Promoting renewable energy practices,
 - Encouraging reusability and/or recyclability of materials and goods,
 - Reducing operational (Scope 1 and 2) and /or supply chain or embedded (Scope 3) emissions.

3.3 National requirements &/or expectations

3.3.1 Australian Government legislation & policies or programs

At the national level, there is an array of legislation and policies and/or programs that intersect with sustainable use of resources.

- A summary list of these with examples of how they contain relevant requirements and/or expectations for sustainable resource use are summarised in Table 3-4 overleaf (for legislation) and Table 3-5 (for policies / programs) two pages overleaf.
- As can be observed, there are many potential sustainable resource requirements and/or expectations from Australian Government legislation, policies or programs that could apply to Australian Government projects.
- Collectively, they establish a range of potential sustainable resource requirements and/or expectations for procurement, design, construction and/or operation of infrastructure, buildings, tenancies and/or project management, including (but not limited to):
 - Energy and water efficiency,
 - Emissions reduction and/or net zero outcomes,
 - Outcome-based targets or sustainability ratings to demonstrate the above are being achieved, including (among others):
 - Green Star ratings for design and construction of buildings,
 - NABERS ratings for operation of buildings,
 - Up to 75% target for low emission vehicles for fleets,
 - Circular economy practices in managing waste and materials,
 - Considering offsets or low emission travel options and accommodation providers with 6-star NABERS Energy ratings

{Cont. three pages over}

Table 3-4 – Examples of Australian Government legislation relevant to sustainable resource usage.

Australian Government legislation	Potential relevance
<i>Building Energy Efficiency Disclosure Act 2010</i>	Requires most sellers or lessors of office spaces to obtain and disclose energy efficiency information in a building energy efficiency certificate (BEEC): <ul style="list-style-type: none"> • National Australian Built Environment Rating System (NABERS) Energy for Offices rating for the building, • Commercial Building Disclosure (CBD) lighting assessment, and • Other general energy efficiency guidance.
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Which establishes a legal framework for the Australian Government to review referred projects for how they protect and manage certain matters that are related to nationally significant (protected) plants, animals, habitats, and places.
<i>Greenhouse and Energy Minimum Standards Act 2012</i>	Created a national framework for appliance and equipment energy efficiency to promote adoption of appliances and equipment that use less energy and produce less greenhouse gases.
<i>Industrial Chemicals Environmental Management (Register) Act 2021</i>	Established a national framework to manage the ongoing use, handling, and disposal of industrial chemicals
<i>National Environment Protection Council Act 1994</i>	Which enables the Australian, State & Territory Governments to establish National Environment Protection Measures (NEPMs), including for managing site contamination and recycling of used packaging.
<i>National Greenhouse and Energy Reporting Act 2007</i>	Which provides the framework for reporting by companies of their emissions, energy production and consumption that exceed specific energy and greenhouse thresholds.
<i>Ozone Protection and Synthetic Greenhouse Gas (Import Levy) Act 1995</i>	Controls the manufacture, import, export, use and disposal of ozone depleting substances and synthetic greenhouse gases and products containing these gases.
<i>Product Stewardship (Oil) Act 2000</i>	Encourages management and re-refining of used and recycled oil.
<i>Recycling and Waste Reduction Act 2020</i>	Provides a national framework for industries to take greater responsibility for the environmental impacts of their products throughout the entire product lifecycle, including supporting product stewardship and controlling export of waste glass, plastic, tyres, and paper.
<i>Renewable Energy (Electricity) Act 2000</i>	An Australian Government scheme to increase the proportion of electricity generated in Australia from renewable sources, to reduce the emissions of greenhouse gases from electricity generation and to promote the development of a renewable energy industry in Australia
<i>Water Efficiency Labelling and Standards Act 2005</i>	Establishes the Water Efficiency Labelling and Standards (WELS) to encourage purchase of water efficient products.

Table 3-5 – Examples of Australian Government policies and programs relevant to sustainable resource usage

Policy / initiative	Potential relevance
Renewable electricity	<ul style="list-style-type: none"> The Australian Government’s Powering Australia Plan sets an 82% target for renewable electricity by 2030
The National Electric Vehicle Strategy	<ul style="list-style-type: none"> Aims to increase the uptake of EVs to reduce our emissions and improve the wellbeing of Australians
Emissions reduction	<ul style="list-style-type: none"> Net 2030 emissions target of 43% reduction below 2005 levels to meet Paris Agreement commitments. Net Zero 2050 plan towards a future legislated target of net zero greenhouse gas emissions by 2050, with emissions reduction plans for different sectors of the economy including for electricity, transport, industry and built environment¹ that will look to transform energy use towards renewable energy and expand use of lightweight and low carbon materials
APS Net Zero in Government Operations strategy	<ul style="list-style-type: none"> Contains rules, guidance, policies and/or targets for government entities on practices and procurement to achieve Net Zero for <ul style="list-style-type: none"> Energy – Including by improving energy efficiency, adopting renewables, and replacing gas with electricity Buildings – By considering Green Star ratings for building construction and/or requiring minimum 5.5-star NABERS Energy rated building for leasing Procurement – by developing and implementing an Environmentally Sustainable Procurement policy Fleet – Targets of up to 75% for purchase or lease of low emission vehicles by 2025 Travel – Considering offsets or low emission travel options and accommodation providers with 6-star NABERS Energy ratings
National Waste Policy 2018 (& 2019 National Waste Action Plan)	<ul style="list-style-type: none"> The National Waste Policy provides a national framework for waste and resource recovery, including in a circular economy, to (among other things): <ul style="list-style-type: none"> Establish a National Waste Action Plan. Avoid waste & improve resource recovery. Increase use of recycled material and build demand and markets for recycled products. Set targets to reduce total waste generated to 10% by 2030 and recover 80% of all waste by 2030. Significantly increase the use of recycled content by governments and industry. Encourage product stewardship in Australia.
Environmentally Sustainable Procurement Policy and Reporting Framework	<ul style="list-style-type: none"> Designed to reduce the environmental impact of Australian Government procurement by applying climate, environment, and circularity principles to four (4) high-impact procurement categories: <ul style="list-style-type: none"> Construction services Furniture, fittings, and equipment Information and communication technology (ICT) goods Textiles.
Trajectory for Low Energy Buildings	<ul style="list-style-type: none"> National plan that aims to achieve zero energy and carbon-ready commercial and residential buildings in Australia
National Australian Built Environment Rating System (NABERS)	<ul style="list-style-type: none"> A voluntary rating system with design standards to measure a commercial building’s energy efficiency, run by the NSW Government on behalf of all Australian Governments. NABERS will soon release an Embodied Carbon rating tool for new buildings and major refurbishments.

¹ For more information, see [Net Zero - DCCEEW](#)

3.3.2 Green Star rating scheme

The Green Star rating scheme was first developed in 2003 by Green Building Council of Australia (GCBA).

- Since this time, it has become a nationally recognised sustainability rating system and certified thousands of fitouts, buildings, homes, and communities right across Australia.
- It presently includes different rating tools for:
 - *Green Star Buildings* – covering all building types, including offices and industrial premises,
 - *Green Star Interiors* - for interior fitouts including offices, hotels, schools, and shops,
 - *Green Star Performance* – for improving the operational efficiency of buildings, and
 - *Green Star Communities* – for projects at the precinct or a community scale.
- The Green Star rating scale is from 0 to 6 stars – see Figure 3-2 below – with stars obtained by earning credits by following Green Star specified sustainable design methods or standards and sustainability their performance targets or outcomes.
- Green star rating credits, design methods or standards, and/or performance outcomes support sustainable resource usage in new building projects through (but not limited to):
 - Lower upfront carbon emissions from material usage (during construction including managing construction and demolition waste),
 - Lower energy use and emissions through energy efficient operation,
 - More renewable energy,
 - Lowering water use and/or using recycled water,
 - Minimising building life cycle impacts,
 - Responsible resource management through product stewardship and source separating and recycling of operational waste materials, and
 - Eliminating high global warming potential (GWP) refrigerants.
- A Green Star rating for buildings or a precinct such as the SCY can therefore provide a comprehensive strategy towards managing sustainable resource use including design methods or standards that can be used to achieve this outcome.
- For more information on Green Star ratings, see: [Home - Green Building Council of Australia \(gbca.au\)](http://gbca.au)



Figure 3-2 – How Green Star ratings translate to sustainability performance outcomes for a project. Image source: [What does a new 4, 5 and 6 Star Green Star building look like? | Green Building Council of Australia \(gbca.org.au\)](http://gbca.org.au)

3.3.3 Australian Government Environmentally Sustainable Procurement Policy (2024)

Already mentioned above in national requirements &/or expectations, this Australian Government Environmentally Sustainable Procurement (ESP) Policy (Australian Government, July 2024) is explained in more detail below.

- This Policy commenced on 1 July 2024 and already applies to procurement by the Australian Government of Construction Services ≥ \$7.5M
 - o In July 2025, it will be extended to Furniture, Fittings and Equipment, ICT Goods, and Textiles ≥ \$1M.
- This Policy aims to improve environmental sustainability across three focus areas – climate, the environment and circularity – as summarised in Figure 3-3 below.
- For Construction Services, procuring officials may determine whether to set a sustainability rating for the project that a supplier must achieve, which the supplier will be required to report against.

Focus Areas	Climate	Environment	Circularity
Principles	<ul style="list-style-type: none"> • minimise greenhouse gas emissions • optimise energy efficiency • use low emissions materials 	<ul style="list-style-type: none"> • optimise water efficiency • use safe and renewable inputs • safely use and dispose of chemicals • actively minimise the creation of waste and the amount that is sent to landfill 	<ul style="list-style-type: none"> • buildings and fit-outs use less materials, minimise waste, can be deconstructed and reused, are designed for adaptability and flexibility • goods are durable, repairable, reusable and/or recyclable • goods have been refurbished or existing goods are reused • goods contain recycled content /recycled materials are used • goods are recycled at the end of useful life • goods are returned for resource recovery through a take-back or end of life scheme • goods are available for lease, rent or product-as-a-service as an alternative to buying outright

Figure 3-3 – Australian Government ESP Policy sustainability focus areas and principles. Image source: Australian Government Environmentally Sustainable Procurement (ESP) Policy (Australian Government, July 2024)

3.4 Defence requirements / expectations

3.4.1 Defence Environmental Strategy (2016)

The Australian Government Defence department has its own Defence Environmental Strategy 2016-2036 (Australian Government, 2016).

- The aims of this Strategy include:
 - o Delivering a sustainable estate across Defence maritime, land and aerospace areas, activities, and operations.
 - o Improving the efficiency of resource consumption.
- These aims include (among other things) the following priorities.
 - o Minimise operational costs by using less energy and water,
 - o Transition toward cleaner energy and integrated water management (with greater use of fit-for purpose water), and
 - o Improve waste disposal options and product stewardship

3.4.2 *Defence's Smart Infrastructure Handbook (2019)*

This Smart Infrastructure Handbook (Department of Defence, 2019) includes guidance for ecologically sustainable development (ESD) in Department of Defence infrastructure projects. This guidance:

- Sets objectives for achieving ESD in Defence infrastructure projects, including:
 - o to delivering “a strategically aligned, affordable, safe and sustainable estate that enables Defence capability and operations.”
- Requires projects to consider ESD risks and initiatives and undertake WOL cost analysis as part of infrastructure planning, design, and construction.
- Sets out a range of design and operating minimum sustainability requirements and considerations across ESD areas.
 - o Some examples of these requirements and considerations are given in Table 3-6 overleaf.
 - o These examples are by no means exhaustive and there is many more detailed ESD requirements and considerations in this document.
 - o Many of these ESD requirements and considerations reference relevant building and ESD performance-rated standards and other Australian government policies that must or should be followed of considered.
 - o For energy ESD requirements, it references the Defence's Smart Building Energy Performance Guide – see next section below.
- Requires that measurement and performance monitoring of ESD in these projects is undertaken, including installation of metering equipment to enable this to happen.

3.4.3 *Defence's Smart Building Energy Performance Guide (2022)*

The Smart Building Energy Performance Guide (Department of Defence, 2022) was originally issued in 2011 and most recently updated in 2022.

- It sets out the Defence policy and requirements for energy and resource efficiency which reduce greenhouse gas emissions for Defence buildings, including objectives to:
 1. Energy efficient energy usage,
 2. Reduced water usage,
 3. Reducing materials and embodies energy used for construction,
 4. Selecting environmental responsible products and services, and
 5. Efficiently using external resources such as public utilities to minimise use of non-renewable resources, minimise process emissions and minimise waste creation.
- In providing guidance it cites and refers to a range of documents, including but not limited to:
 - o The above Smart Infrastructure Handbook.
 - o National Building Code required energy efficiency provisions and related publications.
 - o Australian Government’s Energy Efficiency in Government Operations (EEGO) policy.
 - o Other Defence strategies, policies and guidelines for Energy, Green Procurement and Climate Change, including (but not limited to):
 - Defence Mechanical Engineering Policy.
 - Defence National Submeter Program
 - Defence Estate Energy Policy (2014)
 - Defence Estate Water Policy (2014)
 - o National Australian Built Environment Rating System
 - o Australian Standards that must be complied with.

Table 3-6 – Examples of sustainable resource use ESD requirements and/or consideration in Defence Smart Infrastructure Handbook (Department of Defence, 2019) by ESD area. This list is not exhaustive, refer to Handbook for others and more detail.

ESD area	Requirement or approach relevant to sustainable resource use
Climate adaptation	<ul style="list-style-type: none"> Perform a climate risk assessment and adaptation strategy in accordance with Australian Standard AS 5334-2013 climate change adaptation for settlements and infrastructure (additional consideration).
Energy	<ul style="list-style-type: none"> All facility and infrastructure designs shall promote energy efficiency and aim to transition to cleaner (low emissions), more sustainable and secure energy supply (Design & Construction requirement). All buildings shall comply with the Australian Government’s Energy Efficiency in Government Operations (EEGO) policy or updated equivalent document (Design & Construction requirement). All office spaces (including those within non-office buildings) with a net lettable area (NLA) ≥2,000m2 must achieve or exceed the minimum energy performance standards in accordance with the EEGO policy (or updated equivalent document). Where office space within a building is <2,000 m2, the design shall endeavour to achieve 4.5 stars National Australian Built Environment Rating (NABERS) in accordance with the Defence Building Energy Performance Manual (Department of Defence, 2022) The design shall assess and report on the potential for mainstream alternative and renewable energy sources to supplement supply (Design & Construction requirement). Passive design features shall be considered early in the design stage (Design & Construction requirement). HVAC systems shall meet or exceed the minimum energy efficiency provisions described in the applicable sections of the National Construction Code (Design & Construction requirement). Ensure that electrical redevelopment works allow for a base to be renewables ready in the future (minimum general requirement) Consider the zoning/formal allocation of an appropriate area for future large scale solar PV, or other renewable energy source (additional general consideration).
Water	<ul style="list-style-type: none"> Domestic appliances and fixtures use will need to achieve specified minimum Water Efficiency Labelling and Standards Scheme (WELS) ratings (as outlined the Smart Infrastructure Handbook). Consider the sustainable, efficient use and reuse of water from a range of sources, incorporating potable water, wastewater recycling, stormwater harvesting and groundwater management. Consider urban design benefits and environmental protection (minimum general requirement). Inclusion of dual reticulation (third pipe) infrastructure incorporated into base hydraulic network to support non-potable end uses such as irrigation, toilet flushing, laundry, vehicle washing, firefighting, and cooling towers (additional general consideration). Water used for irrigation to be supplied by non-potable sources (additional general consideration). Consider environmental uses of water e.g. ponds / streams / irrigation / urban greening to help cool areas sources (additional general consideration).
Waste minimisation and management	<ul style="list-style-type: none"> Consider strategies to minimise materials consumption, minimise demolition waste and avoid stockpiling through staged planning, adaptive reuse of buildings, infrastructure or assets, and reuse of materials (minimum general requirement). Allocate sufficient area to store waste and segregated recyclables to enhance ease of use, amenity (consider quarantine and hazardous wastes as appropriate), collection and handling of waste via collection vehicles (minimum general requirement). Consider allocating land for waste facilities or materials storage, including on-site waste treatment in consultation with Service Delivery Division (additional general consideration).
Materials	<ul style="list-style-type: none"> Preference should be given to materials that have a significant recycled, recyclable, or recovered content (minimum material requirement). Maximise (at least 95% of total cost) the use of timber sourced either from post-consumer reused timber or from forest certification schemes (minimum material requirement).
Other	<ul style="list-style-type: none"> Projects must develop a Construction Environmental Management Plan (CEMP) (minimum general requirement). Projects must prepare an ESD report including assumptions and logic behind decisions relevant to Smart Infrastructure considerations (minimum general requirement).

3.4.4 Defence Net Zero Strategy (2024)

During preparation of this report, Department of Defence released its Net Zero Strategy (Department of Defence, 2024a).

- This new Defence Net Zero Strategy outlines the actions Defence will take to reduce its emissions and minimise its contribution to climate change, which are designed to support Australian Government emission reduction targets:
 - An interim 43% reduction on 2005 emission levels by 2030, and
 - Net zero emissions by 2050.
- It includes four strategic aims along with matching priorities – see Table 3-7 below – and references the recently released Defence Future Energy Strategy (Department of Defence, 2024b).
- This Net Zero Strategy is aligned with current South Australian and National targets, requirements and/or expectations to improve sustainability through reducing Defence GHG emissions.

Table 3-7 – Defence Net Zero Strategy aim and priorities

Net Zero Defence Strategic Aims	Priorities
<p>1. Accelerate emissions reductions with renewable electricity</p>	<ul style="list-style-type: none"> • Retail electricity contracting to provide 100% renewable electricity by 2030 • Fixed renewable energy generation and energy storage on bases where energy security is paramount • Mobile renewable energy generation and energy storage in support of regional Australia energy security, • base surge, humanitarian aid and disaster relief, and Defence assistance to civil community
<p>2. Transition current fuels to low emissions alternatives</p>	<ul style="list-style-type: none"> • Orderly transition to low-carbon and sustainable energy options through the Defence Future Energy Strategy (DFES) • Electrify Defence white fleet, contractor fleet and support vehicles • Engage with industry for the development of low emissions energy types and alternative propulsion systems
<p>3. Increase energy efficiency and investigate carbon sequestration on the Estate to reduce emissions and costs</p>	<ul style="list-style-type: none"> • Energy efficient and resilient owned, operated or leased facilities • Reduce the use of gas across the Estate • Understand carbon sequestration opportunities
<p>4. Embed a unified and integrated approach to achieving net zero with enabling functions and resources</p>	<ul style="list-style-type: none"> • Governance, performance management, funding and reporting • Develop a workforce to manage the transition to a net zero Defence • Ongoing monitoring of industry advancements in climate change mitigation • Understand all emissions sources and their relative contribution

4 Sustainability strategy

4.1 Objective(s)

For the SCY project, ANI should consider Defence's Smart Infrastructure Handbook (Department of Defence, 2019) objective for sustainable development (ESD) in Department of Defence infrastructure projects along with aim and priorities in recently Defence Net Zero Strategy (Department of Defence, 2024a):

- ***Deliver “a strategically aligned, affordable, safe and sustainable estate that enables Defence capability and operations” that aligns with Australian Government sustainability aims and targets.***

4.2 Key principles

Similarly, ANI should consider the following principles aligned to guidance (per Item 1.5) provided in Defence's Smart Infrastructure Handbook (Department of Defence, 2019) and Defence Net Zero Strategy (Department of Defence, 2024a) to support ESD in the SCY project.

- ***ESD risks and initiatives should be identified and considered in whole-of-life (WOL) cost analysis as part of infrastructure planning, design, and construction.***
- ***The project should set the minimum sustainability standards and requirement considerations for infrastructure planning, design, and construction, as it relates to:***
 - o ***Climate adaptation,***
 - o ***Energy,***
 - o ***Water,***
 - o ***Waste minimisation and management, and***
 - o ***Pollution prevention.***
- ***The SCY project sustainability strategy(ies) (across both project phases) should support the aims and priorities in the Defence Net Zero Strategy.***

4.3 Approach

4.3.1 Overview

Figure 4-1 overleaf gives an overview of the suggested approach for ANI to fulfill the above objectives and principles.

- The suggested approach is summarised by following key project activities for each project phase.
 - o ***Environmental management –***
 - Environmental management systems (EMSs) in both project phases can be developed to ensure sustainability objectives and outcomes for the project are identified, monitored, and achieved. *These EMSs should be aligned with and may be certified to AS/NZS ISO 14001: 2016 standards.*
 - For the construction phase, construction environmental management plans must be developed to meet relevant SA EPA requirements.
 - o ***Procurement –***
 - In both project phases should seek to follow principles and guidance in:
 - Australian Government Sustainable Procurement Policy(ies)
 - South Australian Government Sustainable Procurement Policy(ies)

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Objective

Deliver “a strategically aligned, affordable, safe and sustainable estate that enables Defence capability and operations” that aligns with Australian Government sustainability aims and targets.

Key Principles

- Identify and assess ESD risks and initiatives in whole-of-life (WOL) cost analysis for infrastructure planning, design, and construction.
- Set minimum standards and requirements for: Climate adaptation, energy, water, and waste minimisation and management, and pollution prevention.
- Align sustainability targets and outcomes to aims, priorities and implementation plan in Defence Net Zero Strategy.

Approach Summary		
	Construction phase	Operational phase
Environmental Management	<ul style="list-style-type: none"> Construction-phase Environmental Management System(s) SA EPA Compliant construction Environmental Management Plan(s) 	<ul style="list-style-type: none"> Operational Environmental Management system(s)
Procurement	<ul style="list-style-type: none"> Follow Australian Government Environmentally Sustainable Procurement Policy(ies) Follow South Australian Government Sustainable Procurement Policy(ies) 	
Guidance / Requirements	<ul style="list-style-type: none"> Defence Net Zero Strategy aims, priorities and implementation plan (considering Defence Future Energy Strategy). Defence Smart Infrastructure Handbook requirements Defence's Smart Building Energy Performance Guide National Building Code energy and water efficiency requirements Green Star ratings or design alignment to relevant sustainable design credits including LCA adoption to minimise embodied emissions (where adopted) Contemporary best practice NABERS rating targets (energy, water & waste): Consider (if above existing Defence requirements) Adopt SA 100% Renewable Energy (electricity) target Relevant SA Government Climate Actions (align to support where feasible) Design to SA Waste Management Better Practice Guide National Electric Vehicle Strategy (align to support where feasible) Australian Government APS Net Zero in Government Operations strategy (align design to support where feasible) 	<ul style="list-style-type: none"> Defence Net Zero Strategy aims, priorities and implementation plan (considering Defence Future Energy Strategy). NABERS ratings: Maintain and continuously improve (where feasible) Green Star rating credit performance (where adopted): Maintain SA 100% Renewable Energy (electricity) target: Continue to align with (as feasible) SA Government Climate Actions: Continue to align with (as feasible) National Electric Vehicle Strategy: Continue to support (where feasible) Australian Government APS Net Zero in Government Operations strategy: Adopt and follow Continuously review and improve (as required) to comply with: <ul style="list-style-type: none"> Current and future regulatory requirements for sustainable operational practices, and/or Current and future Australian Government or Defence sustainability policies and/or programs

Figure 4-1 – Summary overview of sustainability strategy that ANI could consider for SCY project: Objective, key principles and approach including guidance that should be followed and specific requirements or expectations that should be met or considered.

- **Guidance / Requirements –**
 - In the construction phase, the SCY project should look to comply with sustainability requirements and / guidance in the following order of precedence.
 - Defence infrastructure requirements in its existing:
 - Defence Net Zero Strategy (Department of Defence, 2024a)
 - Smart Building Energy Performance Guide (Department of Defence, 2022)
 - Smart Infrastructure Handbook (Department of Defence, 2019)
 - National Building code energy and water efficiency requirements
 - Consider whether higher NABERS ratings for water, energy and waste than specified in the above documents should be adopted, if aligned with contemporary best practice.
 - Consider whether adopting Green Star ratings can support the sustainability objective for the project.
 - Consider how to align project and infrastructure design to support other important sustainability expectations:
 - SA 100% Renewable Energy (electricity) target
 - Relevant SA Government Climate Actions (e.g., see Table 3-3)
 - National Electric Vehicle Strategy
 - Australian Government APS Net Zero in Government Operations strategy
 - For the operational phase, the SCY project should align with the following sustainability requirements and / expectations.
 - Defence Net Zero Strategy (Department of Defence, 2024a)
 - NABERS ratings: Maintain and improve them (where feasible).
 - Green Star rating credit performance (where these were adopted): Maintain these.
 - Continue to support and/or align with other important sustainability expectations where feasible:
 - SA 100% Renewable Energy (electricity) target
 - Relevant SA Government Climate Actions
 - National Electric Vehicle Strategy
 - Australian Government APS Net Zero in Government Operations strategy
 - Continuously review and improve (as required) sustainability practices to comply with:
 - Current and future regulatory requirements for sustainable operational practices, and/or
 - Current and future Australian Government or Defence sustainability policies and/or programs

It is important to note that sustainability requirements and / expectations in Australia are rapidly evolving and changing and the sustainability strategy may need to evolve over the life of the SCY project too.

4.3.2 Additional guidance

Table 4-1 overleaf provides more detailed guidance by:

- *Each project phase* (construction and operational).
- *Scope – By:*
 - o Sustainability scope:
 - Project – Where the scope of approach applies to managing or achieving a sustainability resource usage across the project as a whole,
 - Energy – Approaches specific to ensuring sustainable use of energy
 - Water – Approaches to maximise sustainable use of water
 - Materials & circularity – Approaches to achieve sustainable use of material resources in line with circularity principles.
 - o Site scope:
 - Precinct (or SCY site-wide)
 - Individual buildings (which may be individually designed and built and /or then managed by separate parties)
- *Performance objective* – which outlines the performance objective of a proposed specific approach to achieving sustainable resource use during the project.
- *Recommended method &/or outcome* – which details a:
 - o Proposed design standard, scheme &/or guideline, and
 - o Performance outcomes (under this standard or scheme) that should be sought.

It should be noted that some of the potential methods in the Table 4-1 may overlap and sometimes even recommend different performance outcomes.

- An important step at commencement of the project would be review and summarise each of these and develop a comparison matrix.
- It would enable any overlaps to be identified and curated into the optimal best practice method(s) and/or performance outcome(s) that can be adopted.
- As part of this exercise, relevant subordinate regulatory requirements, policies, standards, and other design guidance and/or methods can be identified (some of which are already identified in Section 3 of this report).
- The following sections provide some additional discussion by project phase (as outlined in Table 4-1).

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Table 4-1 – More detailed suggestions that can be considered to achieve proposed sustainability objective during each SCY project phase

Project phase	Scope	Performance objective	Potential method &/or outcome that can be considered		
			Design Standard / Scheme / Guidance / Principle(s)	Potential outcome	
Construction	Project	Building & Precinct construction phase	Defence ESD requirements	Defence Net Zero Strategy & Defence Smart Infrastructure Handbook	Develop project delivery during construction phase to align with ESD targets, priorities and/or requirements in these documents.
			Best practice environmental management	AS/NZS ISO 14001: 2016	Project environmental management system (EMS) - to embed performance objectives and recommended approaches, including review and continuous improvement during project phase
			Best practice construction environmental management planning	SA EPA Guideline 1095/24	Develop an SA EPA approved Construction environmental management plan (CEMP) to responsibly manage site contamination and waste from construction activities.
			Sustainable procurement practices	Australian Government Environmentally Sustainable Procurement Policy	Adopt principles and recommended practices from this Policy to construction phase procurement where practical and affordable
				South Australian Government Sustainable Procurement Policy	Consider sustainable procurement practices recommended by this Policy in procurement decisions
			Minimise greenhouse gas emissions	CCRE2 –GHG Emissions recommendations	Review and consider design and operating measures for construction phase in this report
			Minimise waste	CCRE4 – Waste Management recommendations	Review and consider waste and recycling management for construction phase in this report
			Other Australian Government requirements	Australian Government policies and programs	Identify and review relevant to sustainable resource usage policies and programs (e.g., see Table 3-5) and align with these.
			Building projects	Best practice building sustainability	Green Star Buildings
	Precinct project	Best practice precinct sustainability	Green Star Communities	Consider 5-star (Excellent) rating, aim for 6 stars (World-leading)	
	Energy	Building & Precinct design & construction	Defence ESD requirements	Defence Net Zero Strategy & Defence Smart Infrastructure Handbook	Confirm project aligns to renewable energy or energy efficiency aims, priorities and other ESD requirements and considerations for Defence infrastructure design.
				Defence's Smart Building Energy Performance Guide	Confirm project aligns to minimum energy efficiency requirements and considerations for Defence building design and performance.
			Other Australian Government requirements	Australian Government policies and programs	Identify and review other relevant energy-related sustainable resource usage policies and programs (e.g., see Table 3-5) and align with these where feasible.
		Building Design	Maximise energy efficiency / minimise usage	Building Code	Achieve minimum energy efficiency performance requirement (for that building class), including specified minimum NABERS Energy ratings (e.g., 5.5 for offices)
				Green Star Buildings	If Green Star rating sought, consider achieving Greenhouse Gas Emissions credit, e.g., Target 5 star: GHG emissions 30% less than referenced building, limited GHG emissions from direct fossil fuel sources to 10%, complete Building Energy Consumption and Greenhouse Gas Emissions Calculator.
NABERS				Achieve minimum Building Code requirements for energy efficiency	

Project phase	Scope		Performance objective	Potential method &/or outcome that can be considered	
				Design Standard / Scheme / Guidance / Principle(s)	Potential outcome
		Precinct Design	Maximise renewable electricity	Green Star Communities	If Green Star rating sought, consider achieving Peak Electricity Demand credit, e.g., On-site Generation: At least 30% of the annual electrical energy needs of the project are met through on-site power generation systems, and Energy Storage: At least 25% of the peak electricity demand is shifted to non-peak times through energy storage systems.
				South Australia renewable electricity target	Consider adopting State target for 100% net renewable electricity supply by 2030
			Minimise Scope 1 & 2 emissions	Green Star Communities rating	If Green Star rating sought, consider achieving Greenhouse Gas Strategy credit, e.g., Claim at least 5 points (out of 6)
		Building Design	Provide sustainable transport	Green Star Buildings	If Green Star rating sought, consider achieving Sustainable Transport credit, e.g., Proposed transport solutions on site decreases carbon emissions from transport and encourages the uptake of active transport options: At least 7 points (out of 10)
				Green Star Communities	If Green Star rating sought, consider achieving Sustainable Transport & Movement credit: Improve sustainable transport infrastructure, e.g., Claim all 3 points
		Precinct Design		The National Electric Vehicle Strategy	Design the precinct to support future transition to electric vehicles in line with this Strategy (e.g., electric charging stations, biofuels mandate)
	Water	Building & Precinct design & construction	Defence ESD requirements	Defence Smart Infrastructure Handbook	Achieve minimum water ESD requirements and considerations for Defence infrastructure design.
				Defence's Smart Building Energy Performance Guide	Confirm project aligns to minimum water reduction requirements and considerations for Defence building design and performance.
			Other Australian Government requirements	Australian Government policies and programs	Identify and consider relevant to water-related sustainable resource usage policies and programs (e.g., see Table 3-5) and align with these where feasible.
		Building Design	Maximise water efficiency / minimise usage	Building Code	Meet minimum Water efficiency requirements (for that building class)
				Green Star Buildings	If Green Star rating sought, consider achieving Potable Water credit, e.g., 65% reduction (compared to Standard Practice benchmark) plus Satisfy 3 pts (out of 5) from best practice water saving design features.
				NABERS	Consider designing to 5-star NABERS water rating for that building activity type
		Precinct Design		Green Star Communities rating	If Green Star rating sought, consider achieving Integrated Water Cycle credit: Water Sensitive Urban Design – Performance Pathway, e.g., 5 points from reducing potable water usage
		Materials & Circularity	Building & Precinct design & construction	Defence ESD requirements	Defence Smart Infrastructure Handbook
Defence's Smart Building Energy Performance Guide	Confirm project aligns to minimum waste management and embodied energy reduction requirements and considerations for Defence building design and performance.				
Other Australian Government requirements	Australian Government policies and programs			Identify and review relevant to materials, circularity and waste management-related sustainable resource usage policies and programs (e.g., see Table 3-5) and align with these where feasible.	
Building Design	Low emissions infrastructure		Green Star Buildings	If Green Star rating sought, consider Embodied Carbon Emissions credit, e.g., 10% reduction in upfront carbon emissions plus minimum 9 points (out of 11) from upfront carbon reduction calculator, comparative Life Cycle assessment &/or long-term carbon storage	
	Low GWP Refrigerants used			If Green Star rating sought, consider meet requirements for Green Star Design & As Built Refrigerant Impacts credit	

Project phase	Scope	Performance objective	Potential method &/or outcome that can be considered			
			Design Standard / Scheme / Guidance / Principle(s)	Potential outcome		
		Low emissions and maximise recycled &/or reused materials		If Green Star rating sought, consider Responsible Building Materials credit, e.g., At least 2 points (out of 3) including 60% (by mass) of all reinforcing bar and mesh is produced using energy-reducing processes in its manufacture		
				If Green Star rating sought, consider Sustainable Products credit, e.g., At least 2 points (out of 3)		
				If Green Star rating sought, consider Construction & Demolition Waste credit, e.g., All 2 points available including 90% of waste diverted from landfill		
		Maximise construction waste recycling or landfill diversion		Maximise operational waste recycling or landfill diversion can happen	NABERS	If Green Star rating sought, consider Operational Waste credit
						Consider designing for at least a 4.5-star whole building NABERS Waste Rating (or 60% recycling rate)
						Follow design principles on this Guide to maximise waste diversion from landfill
		SA Waste Management Better Practice Guide for Residential and Mixed-Use Developments.	SA Environment Protection (Waste to Resources) Policy 2010	Ensure that design can comply with requirements for source separation before any landfill disposal		
					Green Star Communities	If Green Star rating sought, consider Greenhouse Gas Strategy credit, e.g., Claim at least 5 points (out of 6)
Precinct Design	Minimise embodied Life Cycle emissions	Green Star Communities	Green Star Communities	If Green Star rating sought, consider Waste Management Credit, e.g., Claim up 2 points for construction and demolition waste (waste management plan + minimum 60% waste recycled or reused) and operational waste (public place recycling, composting or green waste scheme, hazardous waste collection and disposal)		
				Maximise construction & Operational waste recycling or landfill diversion		
Operational	Project	Building, Management Area &/or Precinct levels	Defence ESD requirements	Defence Net Zero Strategy	Evolve operation of project to align with relevant aims and/or priorities.	
				Best practice environmental management	AS/NZS ISO 14001: 2016	Project environmental management system (EMS) or systems for precinct and separate buildings or management areas - to embed performance objectives and recommended approaches, including review and continuous improvement during project phase
				Sustainable procurement practices	Australian Government Environmentally Sustainable Procurement Policy	Consider in all future operational-phase procurement, principles, and recommended practices from this Policy.
					South Australian Government Sustainable Procurement Policy	Consider in all future operational-phase procurement, sustainable procurement practices recommended by this Policy.
				Minimise greenhouse gas emissions	CCRE2 – GHG Emissions recommendations	Review and consider the (post-construction) operating and management measures in this report to minimise future greenhouse gas emissions
				Minimise waste	CCRE4 – Waste Management recommendations	Review and consider the (post-construction) operating and management measures in this report for waste and recycling management.
	Energy	Building operation	Defence ESD requirements	Defence Net Zero Strategy	Develop energy use of project during operational phase to align with relevant aims and/or priorities.	

Project phase	Scope		Performance objective	Potential method &/or outcome that can be considered	
				Design Standard / Scheme / Guidance / Principle(s)	Potential outcome
			Maximise energy efficiency / minimise usage	NABERS	Maintain Building Code specified or other adopted minimum NABERS Energy ratings (e.g., 5.5 for offices) for that building class
				Australian Government policies and programs	Continue to align with and follow relevant energy-related sustainable resource usage policies and programs (e.g., see Table 3-5).
		Precinct management	Maximise renewable electricity	South Australia renewable electricity target	If adopted, achieve State 100% net renewable electricity supply by 2030
				Sustainable transport	South Australian Government Climate Change Actions
			The National Electric Vehicle Strategy		Continue to expand and encourage public transport access options
			Towards nett zero	APS Net Zero in Government Operations strategy	Transition to electric vehicles in line with this Strategy
		Follow rules, guidance and/or targets in this strategy for practices and procurement to achieve Nett Zero and encourage all tenants to do the same			
	Water	Building operation	Maximise water efficiency / minimise usage	NABERS	Maintain 5-star or other adopted NABERS water rating for that building activity type
				Australian Government policies and programs	Continue to align with and follow relevant water-related sustainable resource usage policies and programs (e.g., see Table 3-5).
		Precinct management		Green Star Communities	If Green Star rating was obtained, consider Maintain Integrated Water Cycle credit potable water reduction performance.
		South Australian Government Climate Change Actions		Where feasible, improve water management and expand urban greening and stormwater reuse	
	Materials & Circularity	Building operation	Reduce waste generation and maximise operational waste recycling or landfill diversion can happen	NABERS	Maintain 4.5-star whole or other adopted building NABERS Waste Rating (or 60% recycling rate) and improve to 5-star rating if feasible (if this NABERS rating is adopted)
				Australian Government policies and programs	Continue to align with and follow relevant sustainable resource usage policies and programs for materials, circularity, and waste management (e.g., see Table 3-5).
		Precinct management		Green Star Communities	If Green Star rating was obtained, maintain Waste Management Credit operational waste schemes for precinct
South Australian Government Climate Change Actions		Where feasible, continuously improve waste reduction and diversion towards State Waste Strategy targets for Commercial and Industrial sector activities			
		Encourage use of low and zero emissions technology and materials and circular economy actions through procurement and continuous project improvement			
SA Environment Protection (Waste to Resources) Policy 2010		Comply with current & future requirements for source separation before any landfill disposal.			

4.3.3 Construction phase

4.3.3.1 Overview

The proposed approach would aim to achieve the following for the project construction phase.

- It would as a minimum align the SCY project with design and construction ESD requirements and considerations in the:
 - Defence Net Zero Strategy (Department of Defence, 2024a)
 - Smart Building Energy Performance Guide (Department of Defence, 2022)
 - Smart Infrastructure Handbook (Department of Defence, 2019)
- The above include designing to meet minimum renewable energy adoption and emission reduction outcomes and NABERS ratings for energy and water in Defence infrastructure but there may be merit of considering whether higher levels should be adopted to reflect contemporary best practice and a NABERS waste rating should be adopted too.
- These requirements can be supplemented by Green Star ratings for buildings and the site (or precinct) as the best-practice (and default) method to ensuring sustainable resource use.
- In event that a project Green Star ratings is not sought, individual Green Star rating credits (within these ratings) could be adopted for achieving best practice sustainable resource use outcomes for energy, water, materials, and emissions.
- The SCY project should then additionally consider alignment where practical and feasible to other Australian and South Australian Government policies and programs for sustainable resource usage.

The following sections provide more specific guidance that could be implemented for the SCY project.

Note:

- *Green Star ratings and / or credits are suggested above because 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 SCY project.*
- *It is feasible to instead not use Green Star ratings and / or credits and separately identify relevant design standards, methods and/or guidance and independently develop sustainable resource use performance objectives and targets and/or undertake assessments for this purpose.*

4.3.3.2 At the precinct level and for individual building projects

- Align the SCY project with design and construction ESD requirements and considerations in the Defence Net Zero Strategy (2024a), Defence Smart Infrastructure Handbook (2019), Smart Building Energy Performance Guide (2022) and National Building Code, including for performance monitoring and reporting.
- Establish an AS/NZS ISO 14001: 2016 aligned Environmental Management System (EMS)
 - An EMS would embed into construction phase activities the adopted performance objectives and approaches for sustainability, including mechanisms for data collection, performance review and continuous improvement.
 - It may include an overarching EMS for the SCY precinct along with separate EMSs (and subordinate) for individual construction projects at the site undertaken by different parties.
- Consider adopting industry accepted best practice sustainability ratings for design and construction: Green Star Buildings and Communities – e.g., at a 5-star (Excellent) rating but with aim to achieve 6 stars (World-leading) where feasible.

- This approach can ensure design and construction of individual buildings and the SCY precinct at high levels of sustainable resource use.
- It would support the Australian Government's Environmentally Sustainable Procurement (ESP) Policy (July 2024), which may seek to apply a sustainability rating to Construction Services projects (≥ \$7.5M).
- All construction activities should develop a construction environmental management plan (CEMP) *per* South Australia EPA Guideline (2024) to responsibly manage site contamination and construction wastes.
- Consider and adopt (where feasible) best-practice sustainability procurement principles and practices recommended by:
 - Australian Government Environmentally Sustainable Procurement Policy (Australian Government, July 2024).
 - South Australian Government Sustainable Procurement Policy (South Australian Government, 2023).
- Review and consider (where feasible) recommended sustainability measures for construction phase activities in CCRE3 and CCRE4 reports for:
 - Minimising Greenhouse Gas emissions (Colby Phillips Advisory, 2024a), and
 - Managing construction phase waste (Colby Phillips Advisory, 2024c).

4.3.3.3 Energy resources (& Scope 1 and 2 emission)

- Align the SCY project with energy ESD requirements and considerations in the Defence Net Zero Strategy (2024a), Defence Smart Infrastructure Handbook (2019) and Smart Building Energy Performance Guide (2022).
- For building design:
 - Meet Building Code energy efficiency requirements, including minimum best practice NABERS Energy ratings.
 - If adopting the Green Star Building rating or its individual credits, consider:
 - Greenhouse Gas Emissions credit (to 5-Star rating level) – to ensure buildings can operate with low greenhouse gas emissions.
 - Green Star Buildings Sustainable Transport credit – to design future low emission and active transport solutions for the SCY.
- At precinct level design:
 - If adopting the Green Star Communities rating or its individual credits, consider:
 - Peak Electricity Demand credit – to target a minimum level (e.g., 30%) of on-site renewable electricity generation and battery storage (to shift peak electricity demand).
 - Greenhouse Gas Strategy credit – to ensure low greenhouse gas emissions across the site.
 - Look to align future renewable energy procurement to support South Australia's renewable electricity target of 100% by 2030.
 - For transport:
 - Consider the Green Star Communities Transport & Movement credit – to ensure future low emission and active transport solutions for the SCY.
 - Design the SCY to support future transition to electric vehicles in line with The National Electric Vehicle Strategy (Australian Government, 2023) (e.g., electric charging stations, biofuels mandate).

- Review and consider alignment to relevant Australian Government energy and (Scope 1 and 2) emissions-related policies and programs for sustainable resource usage in built infrastructure, e.g., see select examples in Table 3-5 presented earlier.

4.3.3.4 Water resources

- Align the SCY project with water ESD requirements and considerations in the Defence Smart Infrastructure Handbook (2019) and Smart Building Energy Performance Guide (2022).
- For building design:
 - Meet Building Code water efficiency and NABERS requirements.
 - If adopting the Green Star Building rating or its individual credits, consider:
 - Potable Water credit to achieve best practice potable water reduction outcomes.
- At precinct level design:
 - If adopting the Green Star Communities rating or its individual credits, consider:
 - Integrated Water Cycle credit for Water Sensitive Urban Design performance – to ensure best practice water management for the SCY.
- Review and consider alignment to other relevant Australian and South Australian Government water-related policies and programs for sustainable resource usage in built infrastructure.

4.3.3.5 Materials & Circularity (& Scope 3 emissions)

- Align the SCY project with ESD requirements and considerations in the Defence Smart Infrastructure Handbook (2019) and Smart Building Energy Performance Guide (2022):
 - Waste minimisation and management, and
 - Materials and embodied energy / emissions.
- For building design:
 - If adopting the Green Star Building rating or its individual credits, consider:
 - Embodied Carbon Emissions credit – to minimise embodied energy and emissions in building materials.
 - Refrigerant Impacts credit – to minimise Global Warming Potential (GWP) of refrigerants to be used.
 - Responsible Building Materials credit – to minimise the energy and /or ensure renewable sourcing of building materials.
 - Sustainable Products credit – to maximise the reused and recycled content and future product stewardship (for disposal) of building materials.
 - Construction & Demolition Waste credit – to minimise waste generation and maximise the construction and demolitions waste diverted from landfill.
 - Operational Waste credit – to minimise future operational waste generation and maximise its diversion from landfill (to recycling).
 - Design waste and recycling management to meet:
 - South Australian better practice guide for waste management in new developments (Zero Waste SA, 2014), and
 - Requirements in South Australia’s Environment Protection (Waste to Resources) Policy 2010.
- At precinct level:
 - If adopting the Green Star Communities rating or its individual credits, consider:

- Greenhouse Gas Strategy credit – to ensure future low greenhouse gas emissions by the SCY.
- Communities Waste Management Credit – to:
 - Minimise waste generation and maximise the construction and demolitions waste diverted from landfill, and
 - Minimise future operational waste generation and maximise its diversion from landfill (to recycling).
- Review and consider alignment to relevant other Australian and South Australian Government policies and programs for sustainable resource usage in materials, circularity, and waste management in built infrastructure, e.g., see select examples in Table 3-5 presented earlier.

4.3.4 Operating phase

For the project operating phase, the proposed approach would achieve the following.

4.3.4.1 Precinct level, sub-site area and/or individual buildings

- Establish an AS/NZS ISO 14001: 2016 aligned Environmental Management System (EMS) to provide mechanisms for on-going data collection, performance review and continuous improvement for sustainable resource usage (including ensuring that the following operating phase targets for sustainable resource usage are achieved).
 - Again, this may include an overarching EMS for the SCY precinct along with separate (and subordinate) EMSs covering different site management areas or individual buildings.
 - Performance review and continuous improvement may include (over 30+ year life of project) regular updates to performance targets (where feasible to achieve with new technology, practices and/or services).
- For all future procurement, the SCY and its tenants should be look to (embed into their EMSs and) adopt best-practice sustainability principles and practices recommended in:
 - Australian Government Environmentally Sustainable Procurement Policy (Australian Government, July 2024).
 - APS Net Zero in Government Operations strategy.
 - South Australian Government Sustainable Procurement Policy (South Australian Government, 2023).

4.3.4.2 Energy resources (& Scope 1 & 2 emissions)

- For building management and operation:
 - Building managers would maintain Building Code specified minimum NABERS Energy ratings (e.g., 5.5 for offices) for that building class.
 - Continue to follow relevant Australian Government energy and (Scope 1 and 2) emissions-related policies and programs for sustainable resource usage in built infrastructure.
 - Develop renewable energy adoption and energy usage for project operation in line with the aims and priorities in the Defence Net Zero Strategy (2024a).
- For the SCY precinct, it would:
 - Seek to align with 100% net renewable electricity supply by 2030 in line with South Australia renewable electricity target of 100% by 2030 and same priority in the Defence Net Zero Strategy (2024a) to accelerate emissions reductions with renewable electricity.

- In line with other priorities in the Defence Net Zero Strategy (2024a), consider opportunities to:
 - Electrify and/or transition vehicles to renewable fuels or other low emission alternatives, and
 - Transition away from (fossil fuel) gas usage.
- Support South Australian Government Climate Change Actions to:
 - Transition to low emission transport
 - Expand and encourage public transport access options
- Encourage and /or require building managers to support the above precinct outcomes.

4.3.4.3 Water resources

- For building management and operation:
 - Building managers would maintain a 5-star NABERS water rating for that building activity type.
 - Continue to follow relevant Australian Government water-related policies and programs for sustainable resource usage in built infrastructure.
- For the SCY precinct:
 - If adopted, maintain Green Star Communities Integrated Water Cycle credit potable water reduction performance.
 - Where feasible, support South Australian Government Climate Change Actions to improve water management and expand urban greening and stormwater reuse (*viz.* Table 3-3.).
 - Encourage and /or require building managers to support the above precinct outcomes.

4.3.4.4 Materials & Circularity

- For building management and operation:
 - Building manager would obtain an at least a 4.5-star whole building NABERS Waste Rating (or 60% recycling rate) and improve to 5-star rating if feasible.
 - Continue to follow relevant Australian and South Australian Government policies and programs for materials, circularity, and waste management in built infrastructure.
- For the SCY precinct:
 - If adopted, maintain Green Star Communities Waste Management credit for operational waste performance.
 - Comply with current and future requirements of South Australia's Environment Protection (Waste to Resources) Policy 2010
 - Support South Australian Government Climate Change Actions by:
 - Encouraging site waste reduction and diversion (at precinct level and by tenants) towards State Waste Strategy targets for all Commercial and Industrial sector activities.
 - Encouraging on-going use of low and zero emissions technology and materials and circular economy actions (at precinct level and by tenants) through procurement and continuous project improvement
 - Encourage and /or require building managers to support the above precinct outcomes.

4.4 Design guidelines & methods

The approach detailed in Table 4-1 for the project would automatically embed nationally accepted best practice industry design guidance to ensure sustainable design and operational outcomes for resource usage during both phases of the SCY project, i.e.,

- **Environmental Management Systems (EMSs)** – Should align with AS/NZS ISO 14001: 2016, an international standard already widely used in Australia that sets out globally accepted requirements and international best practice for developing and certifying these systems².
- **Defence infrastructure sustainability best practice** – Meet these already well articulated requirements and expectations in existing guidance documents.
- **National Building Construction Code**³ – Meet mandated national rules and requirements for energy and water efficiency in building design, including relevant design and sustainable resource standards that must be followed and assessment tools to be used.
- **Green Star ratings and credits**⁴ – Which if adopted are built around and reference relevant best practice international and national design and sustainability standards, guidelines, and codes, and include assessment tools and calculators that ensure future construction and/or operational sustainable resource use performance can be successfully predicted and / or achieved.
- **NABERS**⁵ – Like Green Star ratings, this operational sustainability rating scheme includes comprehensive guidelines and assessment tools to ensure future sustainable resource use design and/or operating outcomes are realised.
- **Australian and South Australian Government Sustainable procurement policies** – which together would provide best practice principles and guidance on sustainable procurement of resources in projects.

² For more information, see: [AS/NZS ISO 14001:2016 Environmental management systems — Requirements with guidance for use | Standards Australia Store](#)

³ For more information, see: [National Construction Code | NCC \(abcb.gov.au\)](#)

⁴ For more information, see: [Green Star Rating System | Green Building Council of Australia \(gbca.org.au\)](#)

⁵ For more information, see: [Home | NABERS](#)

4.5 Management & auditing

As proposed in Table 4-1, management of the SCY project during each phase would be achieved by establishing and/or requiring AS/NZS ISO 14001 aligned Environmental Management Systems (EMSs) as reiterated and expanded upon below.

- *Construction phase* –
 - o SCY Project & Precinct – ANI to establish EMS.
 - o Individual building projects – Subordinate EMSs for that project required by the party(ies) contracted to undertake the design and/or construction of the assets or infrastructure, reviewed and approved by ANI.
- *Operational phase* –
 - o SCY Project & Precinct – ANI (or future SCY site manager) to establish operational phase EMS.
 - o Sub-site area &/or individual buildings – Subordinate EMSs for operation of that area or building to be established by that site or building manager to manage and operate those assets, reviewed, and approved by ANI (or SCY site manager).

These AS/NZS ISO 14001 aligned EMSs would automatically incorporate (among other) requirements and a framework for:

- Engaging with relevant authorities, agencies, and stakeholders to develop the EMS scope and requirements,
- Include relevant regulatory compliance requirements,
- Assigning (at ANI, contracted party, area management body, and/or tenant level) responsibilities for implementation of the EMS and ensuring that proposed sustainable resource use actions are being properly undertaken,
- Monitoring and reporting of sustainable resource use actions and their performance are planned and happen,
- Regular audits and reviews of sustainable resource use actions and their performance are conducted, and
- Requirements and a process exists to identify opportunities to improve sustainable resource use actions and/or performance, including in line with future changes in regulatory requirements and/or other government and/or community expectations.

They would ensure that construction and operating phases of the SCY project are managed to:

- Deliver the project's:
 - o Sustainable resource use objective, and
 - o Sustainable resource use design and operational performance approach actions (as outlined in Table 4-1).
- Regularly audit and measure, review and/or report on the sustainable resource use performance outcomes being achieved, and
- Continuously improve sustainable resource use initiatives and performance for the SCY project and site (in response to any future change to regulatory requirements and/or other government and/or community expectations).

5 Power use minimisation & supplementation

5.1 Overview

The project sustainability strategy in Section 4 and approach outlined in Table 4-1 for the SCY includes specific actions that would achieve:

- **Power minimisation and supplementation, especially using alternative energy sources, energy efficient measures and energy conservation.**

Note: It is assumed that this intended outcome includes not only power and energy use that can produce Scope 1 and 2 emissions from the SCY project during both project phases, but also Scope 3 related (or supply chain) power and energy use too.

These actions already recommended are re-iterated and briefly expanded on in sections below.

5.2 Construction phase

- **Building & Precinct Construction** –
 - Review and consider recommended design and operating measures for construction phase in report for CCRE2 – GHG Emissions recommendations (Colby Phillips Advisory, 2024a).
 - Table A1-1 in Appendix 1 (to this report) reproduces the table from this other report identifying these specific measures.
 - Align with principles and practices in Australian and South Australian Government Environmentally Sustainable Procurement Policies and relevant Defence project and infrastructure sustainability guidance documents – which would ensure that low energy and emission materials and services are procured, and infrastructure is designed to be enable sustainability requirements during future SCY operation.
- **Building design** –
 - Implement Building Code energy efficiency performance requirements (for that building class), including specified minimum NABERS Energy ratings (e.g., 5.5 for offices).
 - Consider a 5-star rating outcome for Green Star Buildings Greenhouse Gas Emissions credit, i.e.,
 - GHG emissions from energy usage to be 30% less than referenced building, and
 - Limit GHG emissions from direct fossil fuel sources to 10%.
 - Consider a 5-star rating outcome for Green Star Buildings Embodied Carbon Emissions, Responsible Building Materials, and Sustainable Products credits – which should minimise power consumption and/or energy usage in building materials that produce Scope 3 emissions.
 - Adopt Defence Net Zero Strategy (2024a) aim and priorities to support:
 - Future 100% net renewable electricity supply by 2030
 - Future operation of the SCY buildings in line with Australian Government emission reduction targets:
 - 43% reduction from 2005 levels by 2030, and
 - Net Zero by 2050.
 - Future vehicle electrification and/or transition to lower emission fuels.
- **Precinct Design** –

- Consider a 5-star rating outcome for Green Star Communities Peak Electricity Demand credit, i.e.,
 - At least 30% of the annual electrical energy needs of the project are met through on-site power generation systems, and
 - Energy Storage: At least 25% of the peak electricity demand is shifted to non-peak times through energy storage systems.
- Aim for 100% net renewable electricity supply by 2030 in line with South Australia renewable electricity target of 100% (generation) by 2030
- Consider a 5-star rating outcome for Green Star Communities Greenhouse Gas Strategy credit, which would minimise Scope 1 and 2 emissions from site power energy usage.
- Again, support Defence Net Zero Strategy (2024a) aim and priorities:
 - Future 100% net renewable electricity supply by 2030
 - Future operation of the SCY site in line with Australian Government emission reduction targets:
 - 43% reduction from 2005 levels by 2030, and
 - Net Zero by 2050.
 - Future vehicle electrification and/or transition to lower emission fuels.

5.3 Operational phase

- *Precinct, Sub-area &/or Building Management –*
 - Review and adopt recommended design and operating measures for operating phase in report for CCRE2 – GHG Emissions recommendations (Colby Phillips Advisory, 2024a).
 - Table A1-2 in Appendix 1 (to this report) reproduces the table from this other report identifying these specific measures.
 - Aim to achieve 100% net renewable electricity supply by 2030 in line with South Australia renewable electricity target of 100% (generation) by 2030.
 - Follow principles and practices in Australian and South Australian Government Environmentally Sustainable Procurement Policies – which would ensure that low energy and emission goods and services are procured.
 - The above procurement practice would include encouraging use of low and zero emissions technology and materials in line with South Australian Government Climate Change Actions (*viz.* Action 5.6 per Table 3-3)
 - Through the relevant EMS, regularly audit and review power and energy usage and consider opportunities for continuous improvement (to reduce these).
 - Evolve (as needed) operation of the project to implement Defence Net Zero Strategy (2024a) aim and priorities:
 - 100% net renewable electricity supply by 2030
 - Operation of the SCY site in line with Australian Government emission reduction targets:
 - 43% reduction from 2005 levels by 2030, and
 - Net Zero by 2050.
 - Vehicle electrification and/or transition to lower emission fuels
- *Building operation –*
 - Maintain Building Code energy efficiency performance requirements (for that building class), including specified minimum NABERS Energy ratings (e.g., 5.5 for offices)
 - Maintain Green star rating outcomes where adopted.

- Once more, evolve (as needed) operation of buildings to support Defence Net Zero Strategy (2024a) aim and priorities:
 - 100% net renewable electricity supply by 2030
 - Operation of the SCY site in line with Australian Government emission reduction targets:
 - 43% reduction from 2005 levels by 2030, and
 - Net Zero by 2050.
 - Vehicle electrification and/or transition to lower emission fuels.

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Appendix 1 – CCRE2 – GHG Emissions recommendations

Reproduced from other report (Colby Phillips Advisory, 2024a), refer following pages for:

- *Table A1-1 – Construction phase*
- *Table A1-2 – Operational phase*

Table A1-1 – CCRE2 –GHG Emissions report (Colby Phillips Advisory, 2024a) construction-phase recommended design and operating measures to reduce, minimise or ameliorate GHG emissions.

Emissions scope	Design or operational Measure
1	– Electrification of diesel construction plant & equipment (excavators, bulldozers, loaders, graders, where possible (to leverage of State’s high renewable energy in Grid supply)
	– Select / procure / mandate highest efficiency and ‘clean emission’ construction plant & equipment diesel engines
	– Select / procure / mandate Hybrid or EV vehicle mandate for site vehicles (where appropriate)
	– Select / procure / mandate Biodiesel substitution option (e.g., 20% Biodiesel used) for diesel plant, equipment, and site vehicles
	– For HVAC and other refrigeration, specify high COP systems with low GWP refrigerants and low leakage rates (e.g., <5% pa or even less).
	– Use Green Gas (e.g., H ₂ /b-CH ₄ /E-CH ₄) instead of natural gas and LPG
	– Consider on-site H ₂ generation from renewable electricity to replace on-site fossil fuel gas usage
2	– Select / procure / mandate highest electrical efficiency construction plant (screens, equipment (e.g., drills, water heating) & lighting (e.g., LED)
	– Buy 100% renewable electricity for (part or all) site supply (to reduce Scope 2 emission factor)
	– Where opportunity permits, consider on-site Solar PV or wind (which can continue into operational phase) to boost renewables percentage (above Grid electricity supply).
3	– Adopt project sustainability rating, e.g., Green Star, including relevant low emission design frameworks & tools for buildings & other infrastructure that automatically incorporate / embed low energy / emission integrated passive design principles, climate-responsive techniques, and energy efficiency through select high efficiency HVAC and lighting systems.
	– Design team to institute a low emission review process into the design process to identify and assess opportunities for decarbonization and regularly report on review outcomes
	– Implement a Green Circular procurement strategy (for all project materials and equipment) including: <ul style="list-style-type: none"> o Joint committee with ANI / ASA / Defense, design team, relevant government agencies (e.g., DCCEEW, GISA, DTI, DIT), and standard setting bodies to ‘pro-actively’ review and overcome potential blockages caused by procurement requirements, specifications, and standards. o Development of ‘smart’ and flexible supply chain pull through procurement strategies and work with suppliers to minimise cost increments from sourcing low emission materials or components. o Partner with Australian and South Australian Government agencies to support suppliers and develop complementary programs to unlock separate support for them to partner / collaborate on ‘green’ or ‘lower’ emission manufacturing &/or supply strategies or processes for the project.
	– Buy low emission cement for concrete (e.g., energy efficient cement manufacturers that use renewable energy sources) and consider use of recycled fly ash or other materials to reduce cement usage
	– Procure ‘Green’ or low emission steel (e.g., manufacturers that use Hydrogen instead of carbon)
	– Procure (or mandate supply chain procurement of) low emission glass and aluminum and other prefabricated materials
	– Recycle soil and aggregate recovered from site demolition or procure recycled soil and aggregate from construction and demolition (C&D) re-processors
	– Set up on-site recycling systems to maximize diversion from landfill and recycling or resource recovery (e.g., alternative fuels) of C&D waste generated at the site (including engaging with GISA for advice)
	– Digital-first work practices and meeting strategy (to minimise domestic and international travel and maximize working from home for office / design workers).
	– Encourage public transport and engage with local transport departments to facilitate convenient public transport options for site construction workers.
	– Fleet or private vehicle subsidies for workforce to buy fuel efficient vehicles, hybrids, or even electric vehicles.
	– Book domestic or international flights with airlines that use Sustainable Aviation Fuel.
	– Require major project offices to meet National Built Environment Rating System (NABER) energy rating of at least 5 stars.
– Supply Chain Renewable Gas or Electricity Procurement (i.e., buy renewable energy for supply chain partners so they can directly reduce their Scope 1 and 2 emission factors).	
All	– Adopt project sustainability ratings, e.g., Green Star, NABERS, where this can contribute to reduced energy use and emissions during the construction and future operational phase.
	– Develop GHG emissions reduction strategy for construction phase.
	– Implement ISO 14000 Environmental Management System to embed processes to review and drive down GHG emissions during design and construction activities (and for future operational phase)

Table A1-2 – CCRE2 –GHG Emissions report (Colby Phillips Advisory, 2024a) proposed operational phase measures to reduce or offset GHG emissions. Note: This list is not necessarily exhaustive

Emissions scope	Design or operational measure
1	<ul style="list-style-type: none"> - Select / procure / mandate highest efficiency office and submarine manufacturing plant and equipment - Select / procure / mandate Hybrid or EV vehicles for AUKUS SCY fleet vehicles (where appropriate) - Replace LPG fueled forklifts with electric or H₂-fueled alternatives. - Electrify other equipment that otherwise use diesel or fossil fuels, e.g., heat pumps for water heating, electrical space heating, electrical steam production (if small generation capacity, e.g., < 50kW) - Where not possible (to electrify), procure highest efficiency or lowest emission diesel and gas plant, equipment, and site vehicles. - Replace or reduce residual natural gas usage wherever possible, e.g., H₂/b-CH₄/E-CH₄/Natural Gas blends for space heating, industrial burners, or boilers. - For HVAC and other refrigeration, use low GWP refrigerants and maintain regularly to ensure low leakage rates (e.g., <2% pa or even less). - Consider Biodiesel substitution / mandate option (e.g., use 20% Biodiesel) for all diesel engines and site vehicles, including on-site storage or partnering with nearby fuel stations. - Consider on-site H₂ generation from renewable electricity to replace on-site fossil fuel gas usage - For welding activities, collaborate with suppliers to procuring 'green' welding gases or consumables.
2	<ul style="list-style-type: none"> - Select / procure / mandate highest electrical efficiency operating plant, equipment, and lighting (HVAC, refrigeration plant, cranes, lathes, CNC machines, water heaters, lighting, kitchen). - Develop 'cool' microclimate landscaping/infrastructure greening, shading, and cooling, to reduce site cooling demands during summer - Buy 100% renewable electricity for (part or all) site supply (to further reduce Scope 2 emission factor) - Install on-site Solar PV or wind with batteries to boost renewables percentage (above Grid supply).
3	<ul style="list-style-type: none"> - Adopt project sustainability rating target for ratable land uses, e.g., NABERS, for energy, water and waste and apply same operational / management principles to other buildings & infrastructure - AUKUS submarine design team to institute a low emission review process into the design process to identify and assess opportunities for decarbonization and regularly report on review outcomes - Implement a Green Circular procurement strategy for the AUKUS SCY operational activities including AUKUS submarine procurement: <ul style="list-style-type: none"> o Joint committee with ANI / ASA / Defense, management team and submarine designers, relevant government agencies (e.g., DCCEEW, GISA, DTI, DIT), and standard setting bodies to 'pro-actively' review and overcome potential blockages caused by procurement requirements, specifications, and standards. o Develop 'smart' and flexible supply chain pull through procurement strategies and work with suppliers to minimise cost increments from sourcing low emission resources, goods &/or services. o Partner with Australian and South Australian Government agencies to support suppliers and develop complementary programs to unlock separate support for them to partner / collaborate on 'green' or 'lower' emission manufacturing &/or supply strategies or processes for the operational resources needed. - Procure 'Green' or low emission steel for the AUKUS submarine (e.g., manufacturers that use Hydrogen instead of carbon) if possible - Procure (or mandate supply chain procurement of) low emission resources, other submarine construction materials or components and other site operational resources. - Manage and operate on-site recycling systems to maximize diversion of waste from landfill and recycling or resource recovery (e.g., alternative fuels) – for both Submarine construction and office and other operational ancillary activities (including engaging with Green Industries SA for advice) - Digital-first work practices and meeting strategy (to minimise domestic and international travel and maximize working from home for office / design workers) - Encourage public transport and engage with local transport departments to facilitate convenient public transport options for site staff and workers - Fleet or private vehicle subsidies for workforce to buy fuel efficient vehicles, hybrids, or even electric vehicles. - Book domestic or international flights with airlines that use Sustainable Aviation Fuel
All	<ul style="list-style-type: none"> - Adopt project sustainability ratings, e.g., NABERS, where this can contribute to reduced energy, water use, waste generation and emissions during the operational phase. - Develop GHG emissions reduction strategy for operational phase. - Implement certified ISO 14000 Environmental Management system to review and drive down GHG emissions during operational activities.