AMC Strategic Infrastructure & Land Use Plan

Final Strategic Infrastructure & Land Use Plan

Department of Jobs, Tourism, Science and Innovation

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PROJECT 301012-02724 - 301012-02724-MP-REP-0003: AMC Strategic Infrastructure & Land Use Plan - Final Strategic Infrastructure & Land Use Plan

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Executive summary

The Australian Marine Complex (AMC) is located in Henderson, approximately 23km south of the Perth city centre. It is a world-class centre of excellence for manufacturing, fabrication, assembly, technology, repair and maintenance activities for the marine, defence and resource industries.

The AMC consists of the following key precincts shown in Figure 0-1:

- Shipbuilding Precinct
- Technology Precinct
- Support Industry Precinct
- Fabrication Precinct (including the CUF)
- Recreational Boat Precinct.

At the heart of the complex is the Western Australian Government owned Common User Facility (CUF), which commenced operations in 2003. Its business model is the provision of facilities for multiple users, including laydown areas, a fabrication hall, workshops, offices, off-load and load-out wharves and vessel berths.

Vessel construction and maintenance has always played a key role in the AMC. However, for the past 15 years supporting large scale resource projects (oil and gas as well as mining) has been a key focus. Looking to the future, shipbuilding and sustainment (in particular driven by the defence sector) is seen as a key to the AMC's continuing growth.

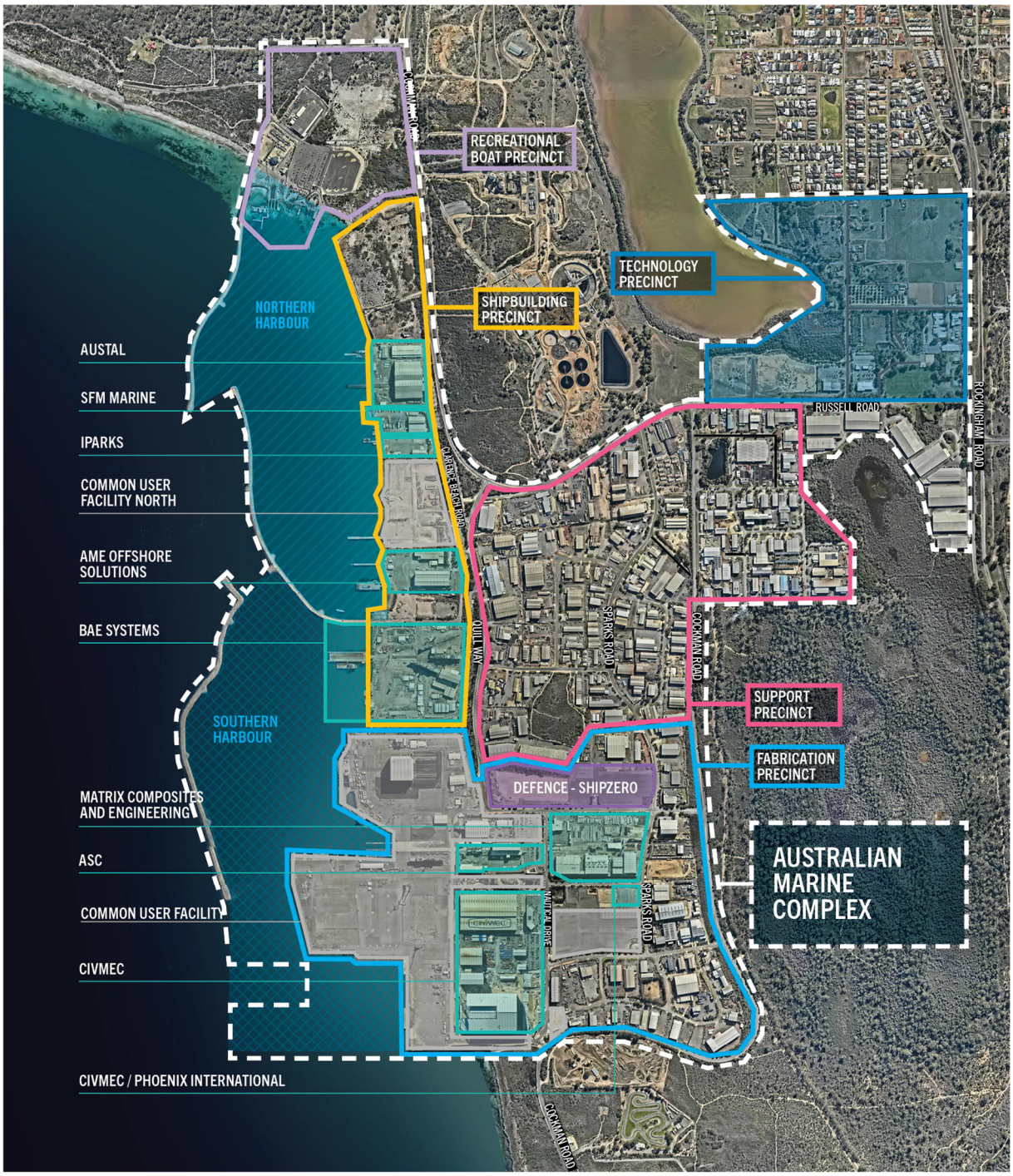
As one of just two locations identified for naval shipbuilding in Australia, the AMC is of strategic national importance. The AMC will support the continuous build of naval vessels and the future maintenance and sustainment of submarines and surface vessels. The AMC will also be critical to attracting suitable export opportunities and international sustainment work.

To ensure Western Australia is ready to support this future naval work and provide ongoing support for resource and other major projects, it is critical that infrastructure in the AMC is matched to the current and emerging requirements of these sectors. It is also critical for the surrounding areas, both land and waterways, to be equipped with the necessary infrastructure, services and utilities to support this effort.

Purpose

The purpose of the Strategic Infrastructure and Land Use Plan (SILUP) is to provide a comprehensive land and infrastructure response to both the current and future requirements of the defence, resources and marine industries at the AMC including their associated manufacturing, fabrication and assembly needs.

Figure 0-1 AMC context



Objectives

- Establish the AMC as the principal location for all maintenance, upgrades and sustainment of Australia's submarines and frigates[1]
- Ensure the AMC is positioned to support the construction of new naval vessels
- Enable the national and international expansion of Western Australia's defence, marine and resource industry capabilities
- Facilitate and enhance economic development and diversification opportunities created by the clustering of defence, marine, and resources industries
- Provide common user infrastructure and land to meet the needs of defence, marine, and resource industries
- Enable the co-location of businesses across the marine, defence and resource industries supply chains
- Enable research and development activities that promote cross sector collaboration and innovation.

Land Use

Currently land within the AMC is structured around five precincts, each with a focus on different activities. This precinct structure has informed the AMC's development to date and major changes to this approach are not proposed. It is critical that the unique nature of the AMC is preserved in the future, and that land use provides for a range of industrial activities associated with the defence, resource and marine industries. With the development of the Latitude 32 Industrial Area adjacent to the AMC there is the potential for new support businesses to be located here.

AMC Waterfront

The AMC waterfront is structured around two sheltered harbours: a northern and southern. The SILUP identifies the infrastructure and land upgrades aligned to each harbour's role and function. The SILUP has considered the roles and functions of each harbour in alignment with the objectives for the future of the AMC.

AMC Northern Harbour

The primary focus of the Northern Harbour will be to continue to support the build of naval vessels, commercial shipbuilding and maintenance activities. Key elements proposed for the Northern Harbour include:

- Extension of Clarence Beach Road and utilities north to support development of Lots 15, 16 and 17
- A land backed wharf and potential new ship transfer system within the existing CUF North
- New fabrication buildings within CUF North
- Extension of the vessel transfer path from the Southern Harbour to Austal and including CUF North, providing access to the BAE and CUF shiplift facilities.

[1] As and when required by Defence and the Commonwealth Government.

AMC Southern Harbour

The primary focus of the Southern Harbour will be to support the construction and sustainment of Defence vessels and the ongoing support of resource sector and major projects. Two concept options have been developed for the future development of land and infrastructure within the Southern Harbour. Both options provide the same capacity with regard to the number of berths, vessel lift and transfer, vessel transfer paths, hardstand positions and breakwaters.

Southern Harbour Concept Option 1

Key elements of Concept Option 1 (Figure 0-2) include:

- Consolidation of Defence activities and creation of a single Defence Priority Zone in the central portion of the Southern Harbour
- Multiple new berths to accommodate future Defence vessel requirements
- A new covered work area and two outdoor hardstand positions to accommodate vessel sustainment and disposal activities
- Upgraded lift and transfer capability
- New transfer paths to the Northern Harbour and within the CUF
- New breakwaters to shelter berths in the southern portion of the harbour
- A new large vessel dry berth to support out of water activities on vessels too large for the upgraded lift and transfer system.

Southern Harbour Concept Option 2

The key differences with Concept Option 2 (Figure 0-3) include:

- Creation of two Defence Priority Zones aligned with the location of berth infrastructure within the harbour
- New lift and transfer capability in the southern portion of the harbour
- New breakwaters in the southern portion of the harbour would be required earlier than in Concept Option 1 due to the location of new lift and transfer capability in the southern portion of the harbour.

Infrastructure

The SILUP considers the need for future upgrades to precinct wide infrastructure to support the AMC and improve the amenity of the complex. In particular upgrades to the local and regional road networks are required to support efficient and safe access to the AMC in the future. Upgrades to the public transport, pedestrian and cyclist networks must also be considered to help promote a more balanced network in the future.

Figure 0-2 AMC Strategic Infrastructure and Land Use Plan Option 1

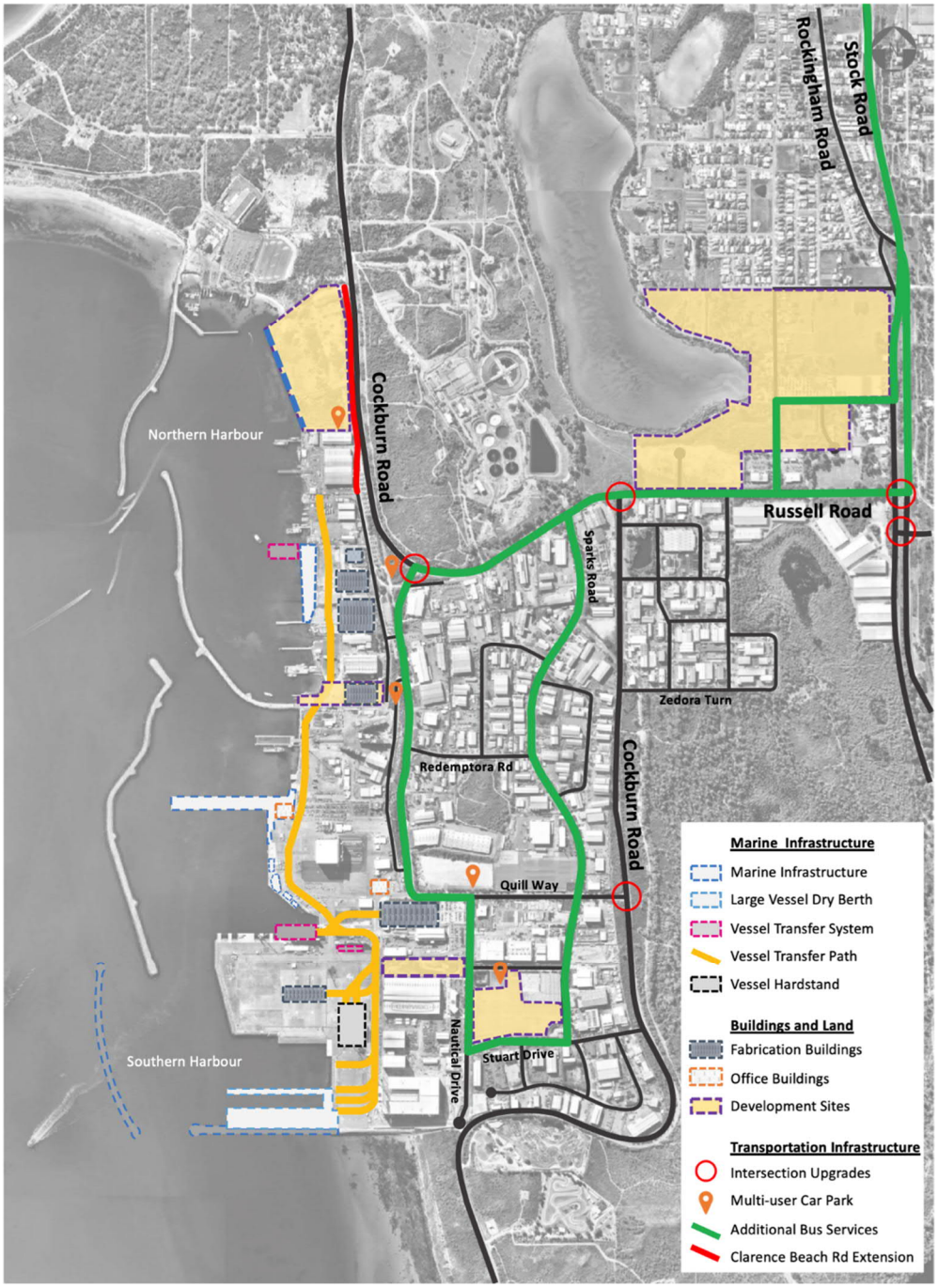
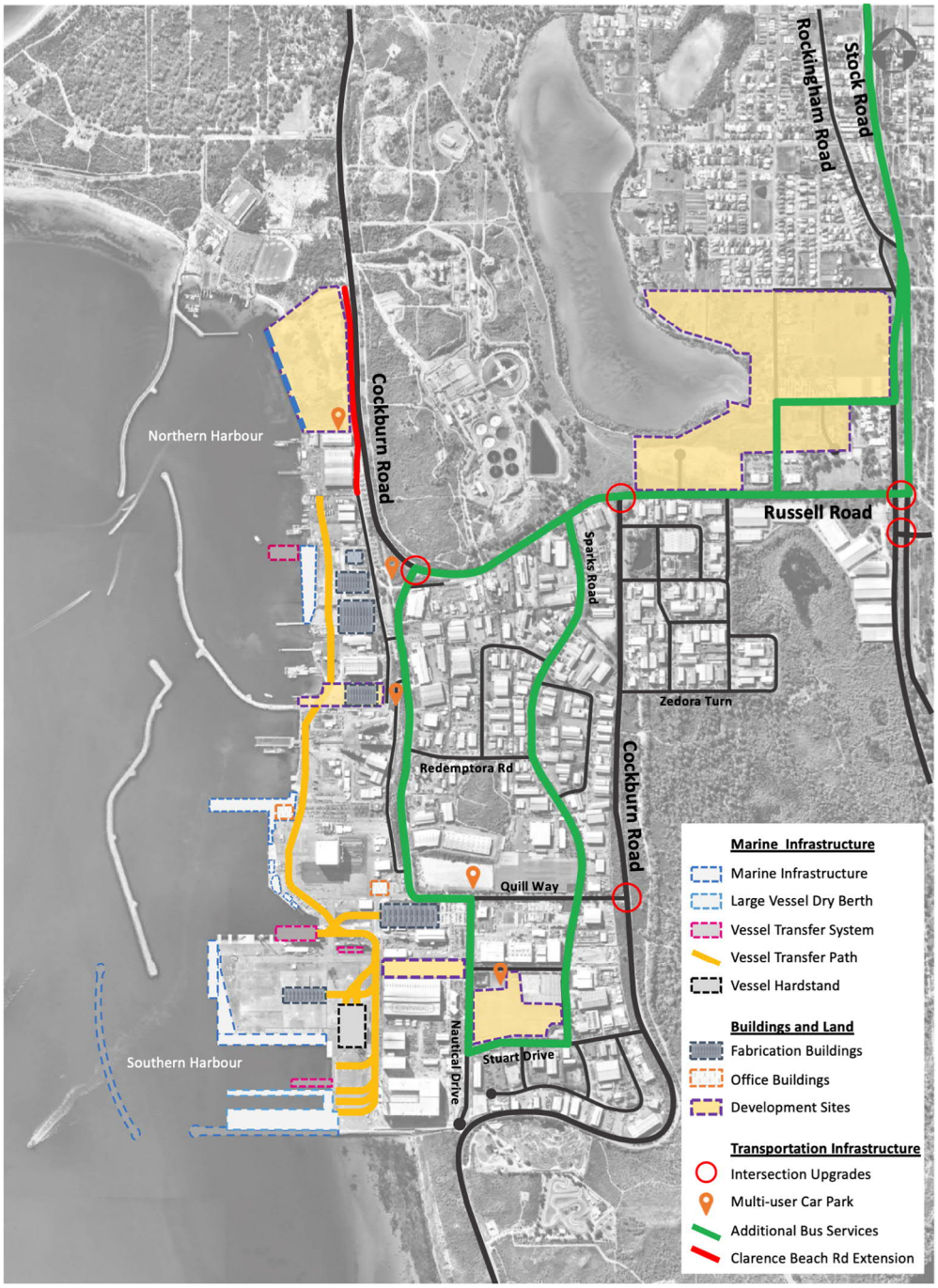


Figure 0-3 AMC Strategic Infrastructure and Land Use Plan Option 2



Acronyms and abbreviations

Acronym/abbreviation	Definition
ACSM	Attack Class Submarine
ADV	Australian Defence Vessel
AMC	Australian Marine Complex
AMCM	AMC Management Pty Ltd
AMCAP	Anzac Midlife Capability Assurance Program
AOR	Auxiliary Oiler Replenishment
CASG	Capability Acquisition and Sustainment Group
CD	Chart Datum
CUF	Common User Facility
CCSM	Collins Class Submarine
Defence	Department of Defence
DMSS	Defence Marine Support Systems
DoT	Department of Transport
DSRA	Selected Restricted Availability with Docking
EPA	Environmental Protection Authority
FBE	Fleet Base East
FBW	Fleet Base West
FCD	Full Cycle Docking
FRCAH	Fremantle Rockingham Controlled Access Highway
FTTN	Fibre To The Node
HMAS	Her Majesty's Australian Ship
HWL	High Wide Loads
IMAV	Intermediate Maintenance Availability Period
JTSI	Department of Jobs, Tourism, Science and Innovation
LHD	Landing Helicopter Dock
LOTE	Life of Type Extension
MCD	Mid Cycle Docking
MTOFSA	Maritime Transport and Offshore Facility Security Act

Acronym/abbreviation	Definition
MV	Merchant Vessel
MW	Mine Warfare vessel
NBN	National Broadband Network
OPV	Offshore Patrol Vessel
RAN	Royal Australian Navy
RAV	Restricted Access Vehicles
SILUP	Strategic Infrastructure and Land Use Plan
SMSC	Strategic Military Survey Capability
SPMT	Self-propelled Modular Transporters
SRA	Selected Restricted Availability
STW	Set To Work
WA	Western Australia

1 Introduction

On 30 October 2018, the Premier launched the Western Australian Defence and Defence Industries Strategic Plan (Government of Western Australia, 2018) to ensure Western Australia (WA) can fully contribute to the national and international defence industry. The Strategic Plan's vision is for the defence sector to continue to grow and become a key pillar of the Western Australian economy, with the annual Gross State Product contribution to double by 2030 to $6 billion.

The Strategic Plan outlines six key strategies to achieve this vision, one of which is 'developing strategic infrastructure'. This involves strategic planning for, and management of the Henderson Precinct and the Australian Marine Complex (AMC) to ensure they meet current and future Defence requirements, and to optimise and coordinate infrastructure to continue to meet the needs of the resources and other industry sectors. The Henderson Precinct is the terminology used by Defence when referring to the AMC.

As one of just two locations identified by the Commonwealth Government for naval shipbuilding in Australia, the AMC is of strategic national importance. The AMC will support the continuous build of naval vessels and future maintenance and sustainment of the Royal Australian Navy (RAN) fleet including submarines, patrol boats and frigates. The AMC will also be critical to attracting suitable export opportunities and international sustainment work. Additionally, the AMC has and will continue to play, a pivotal role in the development of the resource sector and major projects throughout Western Australia as a base for manufacturing and fabrication prior to deployment on site.

To ensure Western Australia is ready to support future Defence and major projects, it is critical that infrastructure in the AMC is matched to the current and future requirements of these sectors. It is also critical for the surrounding areas, both land and waterways, to be equipped with the necessary infrastructure, services and utilities to support this effort.

1.1 Purpose

The purpose of the Strategic Infrastructure and Land Use Plan (SILUP) is to provide a comprehensive land and infrastructure response to both the current and future requirements of the defence, resources and marine industries at the AMC including their associated manufacturing, fabrication and assembly needs.

This is a high level plan only and there will be the need to complete further, more detailed studies on a number of the recommendations prior to their implementation.

1.2 History of the AMC

The AMC was established in 2003 following development of the Common User Facility (CUF). Since its establishment, the AMC has become home to hundreds of businesses focussed on the complex key areas of manufacturing, fabrication, assembly, technology, repair and maintenance for the marine, defence and resources sectors.

Between 2002 and 2005, investment from both Commonwealth and State Governments of $200 million assisted in developing strategic infrastructure to capitalise on the growing potential in the marine, defence, mining, oil and gas industries by enabling the delivery of major engineering projects within the State.

The State Government further invested $170 million between 2006 and 2008, to enhance capability including the floating dock, Self-Propelled Modular Transporters (SPMT) and extensions to wharves. During 2009 to 2010 a partnership with Chevron saw the development of their quarantine base and a $35 million service and supply base.

Growth continued from 2011 to 2013 through the establishment of businesses in the Support Precinct, with benefits arising from the strategic location to facilitate commercial success. Since 2014 the overall markets slowed in both the mining, and oil and gas sectors however the AMC has retained a key role in the support of these sectors as well as marine and defence.

1.3 AMC vision

At the heart of AMC's success is a clearly articulated vision:

'*A world-class centre of excellence for manufacturing, fabrication, assembly, technology, repair and maintenance servicing activities in the marine, defence and resources industries. Which also incorporates state of the art recreational boating launching, storage and servicing facilities for the WA community.'* (AMC Land Use and Infrastructure Plan, 2008)

1.3.1 Objectives

During the process of this study, objectives have been developed, as follows:

- Establish the AMC as the principal location for all maintenance, upgrades and sustainment of Australia's submarines and frigates[2]
- Ensure the AMC is positioned to support the construction of new naval vessels
- Enable the national and international expansion of Western Australia's defence, marine and resource industry capabilities
- Facilitate and enhance economic development and diversification opportunities created by the clustering of defence, marine, and resources industries
- Provide common user infrastructure and land to meet the needs of defence, marine, and resource industries
- Enable the co-location of businesses across the marine, defence and resource industries supply chains
- Enable research and development activities that promote cross sector collaboration and innovation.

[2] As and when required by Defence and the Commonwealth Government.

A number of sector specific objectives have also been developed:

Defence

- Ensure the AMC can support sustainment and maintenance activities of all RAN vessels based at Fleet Base West (FBW), as well as a number of vessels based at Fleet Base East (FBE)
- Position the AMC to support sustainment activities of Allies, including the United States Navy and Royal Navy, and regional partners subject to harbour and infrastructure capabilities/availabilities
- Provide a competitive environment for defence sustainment work through the availability of common user infrastructure
- Establish the AMC as a secure and resilient support location for Defence
- Develop the AMC as a location that attracts and sustains a distinguished Defence and defence industry workforce.

Resource Sector and Major Projects

- Ensure that sufficient land and suitable infrastructure is available to support the resource sector on a project basis
- Provide a competitive environment for resource sector project work through the availability of common user infrastructure
- Develop the AMC as a flexible environment with the opportunity for expanded laydown areas that are appropriately connected to the CUF.

Commercial Shipbuilding and Maintenance

- Ensure the AMC has capacity to support commercial shipbuilding and maintenance activities
- Provide a competitive environment for project work through the availability of common user infrastructure
- Develop the CUF in the Northern Harbour as a hub for commercial shipbuilding and maintenance activities, and support smaller Defence vessels.

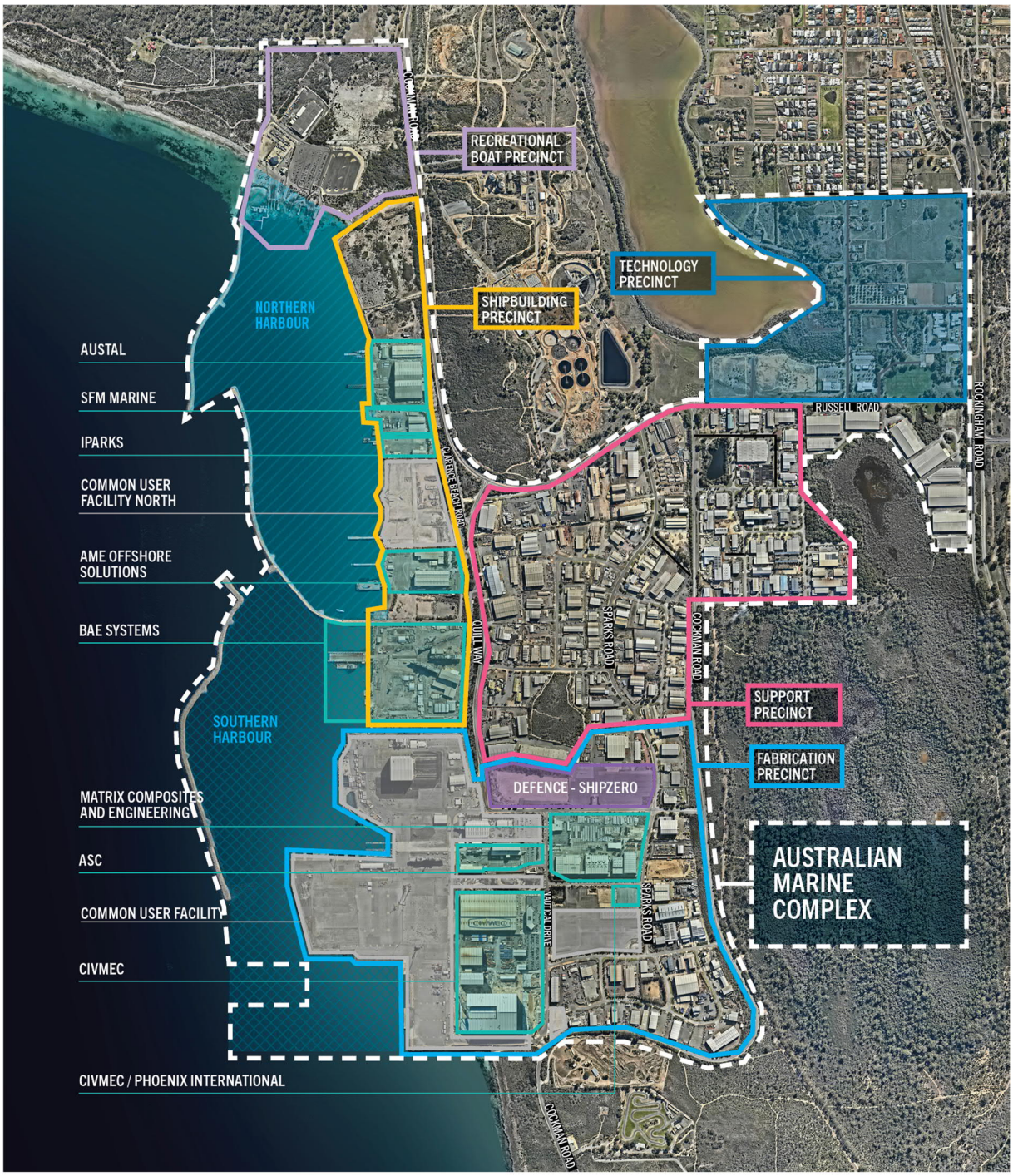
1.4 Project site

The AMC, located approximately 23km south of Perth in the suburb of Henderson, consists of the following key precincts and shown in Figure 1-1:

- Shipbuilding Precinct
- Technology Precinct
- Support Industry Precinct
- Fabrication Precinct (including the CUF)
- Recreational Boat Precinct.

Section 3.1 provides an overview of the purpose and core functions of each precinct.

Figure 1-1 AMC context



2 Planning context

The following section provides an overview of agencies currently responsible for the planning and operation of the AMC and current policy/strategy positions that will drive the future development of the AMC.

2.1 Governance

Governance within the AMC involves several agencies/authorities for various elements of the AMC. Table 2-1 identifies existing agencies and their role within the AMC at present.

Table 2-1 Existing governance structure

Agency	Responsibilities
Department of Jobs, Tourism, Science and Innovation	WA Government department responsible for strategic planning of the State's Strategic Industrial Areas, which includes the AMC
Department of Planning, Lands and Heritage	WA Government department responsible for planning and managing land and heritage
DevelopmentWA	WA Government agency responsible for the management of strategic government land holdings within the AMC and infrastructure within the CUF. The Industrial Lands Authority is the responsible business unit within DevelopmentWA
City of Cockburn	WA Local Government responsible for local planning and economic development, the administration of local planning regulations and infrastructure such as roads, drainage and footpaths within the City of Cockburn including AMC
AMC Management (AMCM)	Contracted facility manager and responsible for the day to day operations of the CUF
Department of Transport (DoT)	WA Government department responsible for operation of the Northern Harbour, including seabed leases and the Woodman Point Recreational Boating Facility
Main Roads WA	WA Government department responsible for planning, maintenance and operation of Western Australia's road network.
Fremantle Ports Authority	WA Government agency responsible for operation of the Southern Harbour including seabed leases
Department of Defence (Defence)	Commonwealth Government department responsible for control of Naval Waters

2.2 Planning context

2.2.1 Western Trade Coast

The AMC is one of four industrial areas that makes up an area known as the Western Trade Coast. The other industrial areas being the Kwinana Industrial Area, Rockingham Industry Zone and Latitude 32.

The four industrial areas are home to State and nationally significant industrial operations and their associated supply chains. These operations include heavy engineering, fuel refining, mineral processing, chemical manufacturing, energy generation and others. The synergies offered by these existing operations together with established industrial land, waterways, infrastructure and services, can continue to support the defence, resources and marine industries in the AMC and vice-versa.

In August 2020, the Government announced its endorsement for a land-backed future container port to be located adjacent to the Kwinana Industrial Area. The next stages of planning will be progressed by a Westport Office within DoT. This will take into consideration broader transport connectivity within the Western Trade Coast and may include land and marine connectivity with the AMC.

2.2.2 Fleet Base West

The RAN has a permanent presence on Garden Island, in the form of Her Majesty's Australian Ship (HMAS) Stirling. This is the location of FBW, the home port to the RAN's west coast fleet, including ships, submarines, support vessels, support staff, logistics and repair facilities and Australian Clearance Diving Team Four. HMAS Stirling continues to provide a base for the RAN in its response to regional security in the Indian Ocean.

The AMC provides a critical sustainment hub supporting all FBW vessels and the greater RAN. At present in water sustainment activities are undertaken at both FBW and the AMC whilst out of water activities are undertaken solely at the AMC. Development of the Ship Zero facility in the AMC is a significant investment by Defence and signals the importance of the AMC in the long term as a sustainment hub. The facility will form a Navy capability centre in Western Australia, consolidating system program offices for naval vessel construction, sustainment and support programs. Ship Zero will also provide a base for Navy personnel while vessels are undergoing maintenance in the AMC.

2.2.3 Environment

The AMC waterways are in the Moderate Protection Area of the Cockburn Sound. The AMC has a history of environmental approvals through the Environmental Protection Authority (EPA) which have supported the staged development of marine infrastructure in the Northern and Southern Harbours by the State. These include:

- Ministerial Statement 443, Breakwater Extension, Northern Harbour Precinct, Jervoise Bay (1997)
- Ministerial Statement 490, Industrial Infrastructure and Harbour Development, Jervoise Bay (1998).

Future development of infrastructure will require up to date consideration of the environment to support requests to the EPA for variations to these existing ministerial statements. This will likely include an updated baseline for the current state of key environmental factors such as water circulation, quality and sediments.

2.3 Strategic context

In July 2020, the Western Australian Government launched the WA Recovery Plan with the intent to restore business and consumer confidence, create jobs and rebuild the economy in response to the COVID-19 pandemic. The Plan is set around 21 priority streams, with clear and direct commitment from government to create more WA jobs. This includes a focus on driving industry development, boosting local manufacturing, building infrastructure and unlocking barriers to investment. The AMC will directly benefit from the WA Government's commitment to accelerating infrastructure delivery to expand WA's defence industry capability, increasing the level of marine repair, maintenance and construction activity in WA. The AMC CUF will continue to support local businesses to benefit from an increased focus on manufacturing and fabrication work being undertaken in WA.

2.3.1 Defence

There are a number of existing and background strategy and policy documents that have direct relevance to planning for the AMC. The following Commonwealth and State strategies outline the significant role AMC will play in the future:

- 2020 Defence Strategic Update (Department of Defence, 2020)
- 2020 Force Structure Plan (Department of Defence, 2020)
- Maritime Sustainment 2025 - Plan Galileo (Department of Defence, 2020)
- Defence Industry Capability Plan (Department of Defence , 2018)
- Western Australian Defence and Defence Industries Strategic Plan (Government of Western Australia, 2018)
- Naval Shipbuilding Plan (Department of Defence, 2017)
- Defence White Paper (Department of Defence, 2016)
- Defence Integrated Investment Program (Department of Defence, 2016)
- The Defence of Australia (Defence White Paper) (Department of Defence, 1987)

The Defence White Paper (2016), and the recently released Defence Strategic Update (2020), are the drivers of the actions being taken by Defence to have a more capable and reliable RAN fleet at the disposal of the Commonwealth. In relation to shipbuilding, the AMC is currently the minor naval vessel hub, however further development at the AMC will enable the construction of a wider range of vessels including those presented in the Force Structure Plan (2020), with the major surface combatants and submarines being built in South Australia.

The Western Australian Defence and Defence Industries Plan and Plan Galileo by Defence provide a strong framework for the Future Maritime Sustainment Model and give direction on the future requirements of Defence that must be accommodated through the AMC. This includes the importance and long term commitment to the AMC as the Regional Maintenance Centre West for naval vessel sustainment, which requires greater capability and flexibility to service a larger range of vessels.

Plan Galileo describes the intention of the future sustainment model to provide "Platform Agnostic" capability, enabling Defence to achieve a nationally consistent approach to sustainment through the application of uniform processes around the country.

These plans provide certainty that shipbuilding and maintenance will be ongoing activities within the AMC into the future. This will require the AMC to move to a "program" approach to its engagement with Defence, and provides a strong platform for future public and private sector investment in infrastructure that can be leveraged across industries.

2.3.2 Resources and major projects sector

Western Australia's resources sector has long been of strategic and economic importance and a comparative advantage to the State and Australia. The AMC has been instrumental to the manufacturing, fabrication and assembly needs of some of Western Australia's and Australia's largest mining, oil and gas projects. This includes:

- The assembly and load out location for 13 prefabricated, customised control rooms and substations by Schneider Electric for the $30 billion Chevron operated Wheatstone Project. This required 40,000sqm of laydown over a 24 months period, and use of the SPMT to transport the buildings which were in excess of 70m long, 28m wide and 590 tonnes.
- The pre-dressing and pre-assembly works by CB&I Kentz Joint Venture for the Chevron operated $60 billion Gorgon Project. This required up to 14 hectares of laydown, use of the SPMT and load out wharves from October 2011 to November 2015.
- The fit out and load out by Thyssenkrupp of stackers and reclaimers for the $3.6 billion BHP South Flank Project. These machines each have a capacity of 20,000t/h making them the largest rail mounted stackers and reclaimer in the world.

The AMC will continue to play a key role in supporting resources and major projects in the future with an increased emphasis on project sustainment and support in addition to construction support. To achieve this a range of infrastructure will continue to be required (laydowns, fabrication buildings and berths) in addition to supporting infrastructure extending into the greater metropolitan region and beyond (High Wide Load (HWL) and Restricted Access Vehicles (RAV) networks).

2.3.3 Commercial shipbuilding and marine industries

The AMC has long supported the docking and berthing of a range of commercial vessels, along with the build and maintenance of superyachts, ferries, tugs, rescue, patrol and offshore supply vessels.

The largest superyacht 'White Rabbit' to be built in Australia was completed by Echo Yachts in the AMC and launched in September 2018. The 3,000 gross tonne, 84m long vessel is the largest aluminum tri-hulled superyacht in the world.

There is significant opportunity for the AMC to continue to support the growth of the shipbuilding and marine industry, through the availability of infrastructure including fit for purpose lift and transfer systems, fabrication and maintenance halls and transfer paths connecting existing and future waterfront operations in the Northern Harbour with the Southern Harbour.

2.4 Planning assumptions

As part of the planning process a number of assumptions were made where information or firm commitments were not available to support development of the SILUP. These include:

- AMC will continue to be Western Australia's sole shipbuilding and maintenance precinct
- Full Cycle Docking (FCD) for Collins class Submarines (CCSM) will be transitioned to AMC in the future with the first of these activities scheduled to commence in 2024/2026. Flexibility in the timing of this transition is possible. [3] For the purposes of developing the SILUP it is assumed to take place at an expanded ASC facility
- Mid Cycle Docking (MCD) activities will continue at ASC's present facilities
- AMC should, as far as practical, be able to accommodate the sustainment activities of all RAN vessels based at FBW, and the major upgrades of the broader RAN fleet
- The AMC must remain capable of supporting the current and emerging needs of the major projects and resources sectors
- Commercial shipbuilding will continue to be an important activity within the AMC. The AMC should have common user infrastructure (shiplift and transfer, vessel hardstand) available to support the commercial shipbuilding
- A number of specific assumptions have been made regarding future Defence requirements within the AMC. These are addressed later in Section 4.1
- Emerging technology trends such as the digital shipyard concept, additive manufacturing, augmented reality and increased use of autonomous systems for maintenance, fabrication, assembly and construction must be considered in future planning for the AMC.

2.5 Committed projects

The following are currently committed vessel build and sustainment, defence and defence industry projects within the AMC:

- Civmec undercover modularisation and maintenance facility
- 'Ship Zero' to be established by Defence at Lot 103 Quill Way in the near future
- Build of ten new Offshore Patrol Vessels (OPV) at the Civmec maintenance facility, with final fit-out, testing, in-water harbour and sea trials at the CUF
- Anzac class frigate sustainment and upgrades under the Warship Asset Management Agreement. These works are being completed at BAE and AMC CUF
- Collins class submarine sustainment and upgrades at the ASC facility
- Build of six Cape class patrol boats by Austal
- Build of remaining Guardian class patrol boats by Austal
- Development of the submarine escape and rescue facility at the corner of Welding Pass and Sparks Road by Civmec and Phoenix International.

[3] At present no commitment to this transition has been made by Defence or the Commonwealth Government.

3 Existing land use and infrastructure

3.1 Existing land use precincts

The AMC is divided into five precincts (refer to Figure 1-1) each with a defined purpose/objective:

1. Fabrication Precinct

The Fabrication Precinct is intended to provide land for industry directly associated with marine and resources projects in close proximity to the waterfront. This precinct has a total area of 142ha and is currently occupied by over 150 businesses. There is limited vacant land available within this precinct at present.

The CUF is located within the Fabrication Precinct and provides a range of multi-user infrastructure to support shipbuilding, maintenance and large scale resource projects. This includes laydown area, assembly and fabrication halls (including cranage) and six wharves including a heavy load out facility. Additionally, the CUF also includes a floating dock facility capable of lifting vessels up to 12,000 tonnes and supported by on shore transfer infrastructure including SPMT's, for transfer of vessels up to 4,500 tonnes.

The CUF offers infrastructure and services on a project by project basis, for a range of different industry users. It has an open access policy and can cater for a number of projects at any one time.

The CUF has a Section 15 Customs gazettal which allows customs clearance at the facility and operates under a CUF Port Security Plan in compliance with the Maritime Transport and Offshore Facility Security Act (MTOFSA).

2. Shipbuilding Precinct

The focus of this precinct is the construction and maintenance of commercial and smaller Defence vessels and associated manufacturing, engineering, repair and refurbishment activities. This precinct also provides support services to resource industries. It enables a waterfront location for individual operators to establish their own marine infrastructure, along with the development opportunity of CUF North addressing the needs of the commercial shipbuilding industry.

There are currently several vacant sites available for future development on a leasehold basis within this precinct.

3. Technology Precinct

This precinct is allocated to support innovation and entrepreneurship within the marine, defence, oil and gas, and resources sectors. This precinct includes offices, conference and training facilities to support businesses within the AMC.

There are significant future development opportunities within this precinct.

4. Support Industry Precinct

This precinct occupies a total area of approximately 113ha providing land for specialist businesses delivering goods and services to the AMC and beyond. There is limited vacant land available within this precinct at present, though there are several sites on the market that could be redeveloped.

5. Recreational Boat Precinct

The Recreational Boat Precinct (Woodman Point Recreational Boating Facility) is located at the northern end of the AMC. The DoT manages the facility in addition to the Northern Harbour. Public facilities currently include eight boat ramps with finger jetties, a floating universal access pontoon, parking facilities for 400 car/boat trailer bays and two leasehold sites occupied by Cockburn Power Boat Club and Cockburn Pleasure Boat Storage operations, both of which sell fuel and a limited range of convenience goods. A small breakwater currently shelters the precinct, opening into the Northern Harbour with vessels sharing the same entrance to Cockburn Sound.

As the vested authority of the facility and 29ha of vacant land behind it, DoT's vision is to cater for expansion of leasehold development within a Maritime Business Park, attracting businesses that service the recreational boating community. Typical uses would include boat building, repairs and maintenance, maritime retailing and chandlery, boat showrooms, and boat storage sites.

Data collected by the DoT between October 2010 and December 2016 indicated an annual average of 44,000 movements to/from the site, or 845 weekly movements. Activities are typically concentrated over weekends and Mondays/Fridays between December and March.

Based on predicted increases in recreational boat registrations, a further 8 ramp lanes (plus associated car and trailer parking) and 350 moorings will be required by 2036 to meet future demand.

3.2 Existing infrastructure

3.2.1 Marine infrastructure

The AMC is located in Jervoise Bay. It is within the declared Port waters of the Outer Harbour of the Port of Fremantle. There are two defined harbours; Northern and Southern. The seabed in the Northern Harbour is the responsibility of the DoT. The seabed in the Southern Harbour is the responsibility of the Fremantle Port Authority.

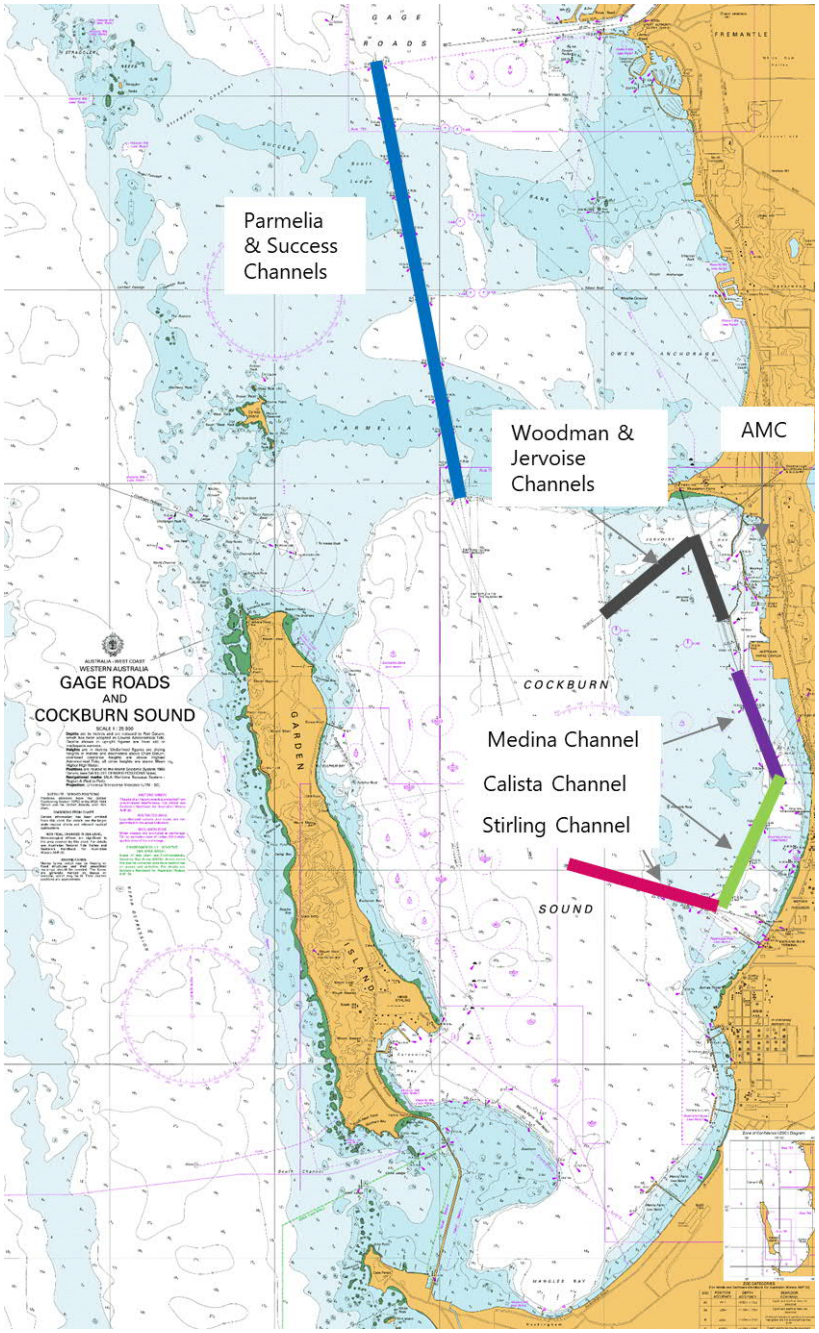
3.2.1.1 Vessel approach channels and harbour depths

The AMC is accessible from sea via Gage Roads, and the Success and Parmelia Channels (Figure 3-1). Both these channels are in line with each other, and have a width of 154m and a design dredged depth of -14.7mCD. This is the only vessel access and it is recognised there is a risk should the channels get blocked by other port users. This risk could be reduced by the establishment of a second channel.

Woodman and Jervoise Channels provide access to the AMC with a minimum seabed depth of approximately 10m. These two channels are not dredged.

The Southern Harbour is accessible via the Stirling, Calista and Medina Channels with maintained dredge depths of -11.6mCD, -11.5mCD and -9.9mCD respectively.

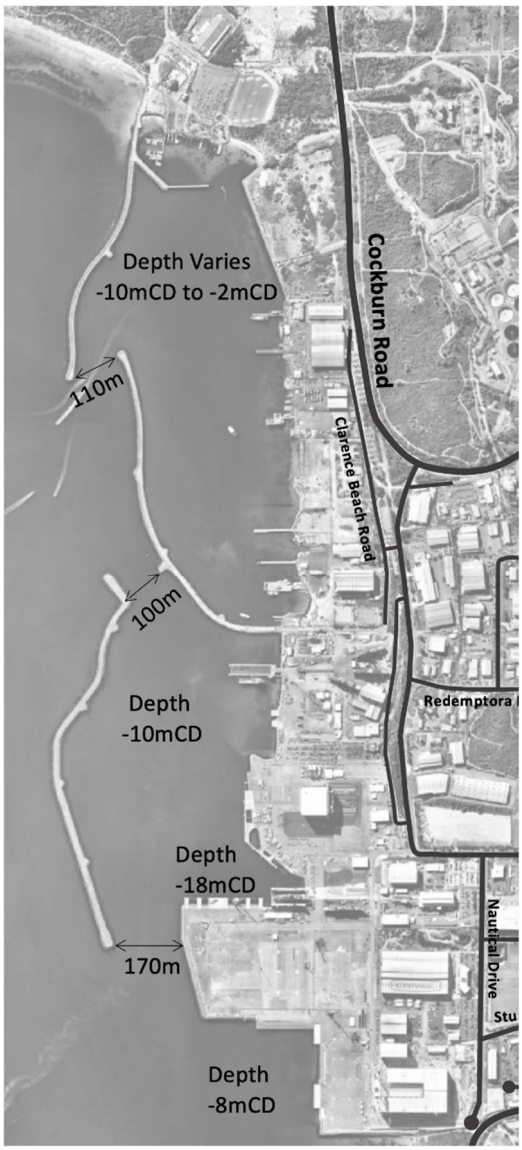
Figure 3-1 Approach shipping channels to AMC



All shipping is managed by the Fremantle Port Authority and vessels of length greater than 35m require a pilot to be on board for all movements within the Outer Harbour area.

The seabed depths within the Northern and Southern Harbours are shown in Figure 3-2. The central CUF harbour is currently dredged to a minimum of -10mCD, the deep sink pocket for the floating dock to -18mCD, and the southern CUF portion to -8mCD.

Figure 3-2 AMC harbour dredge depths



3.2.1.2 Berths

Northern Harbour

There are a number of privately owned berths in the Northern Harbour. These are small jetty structures perpendicular to the land. There is one finger jetty in the AMC CUF North site. This has a berth face of 88m, and fendering on both sides. The jetty can accommodate vessels of around 1300t, and lengths in the order of 70m.

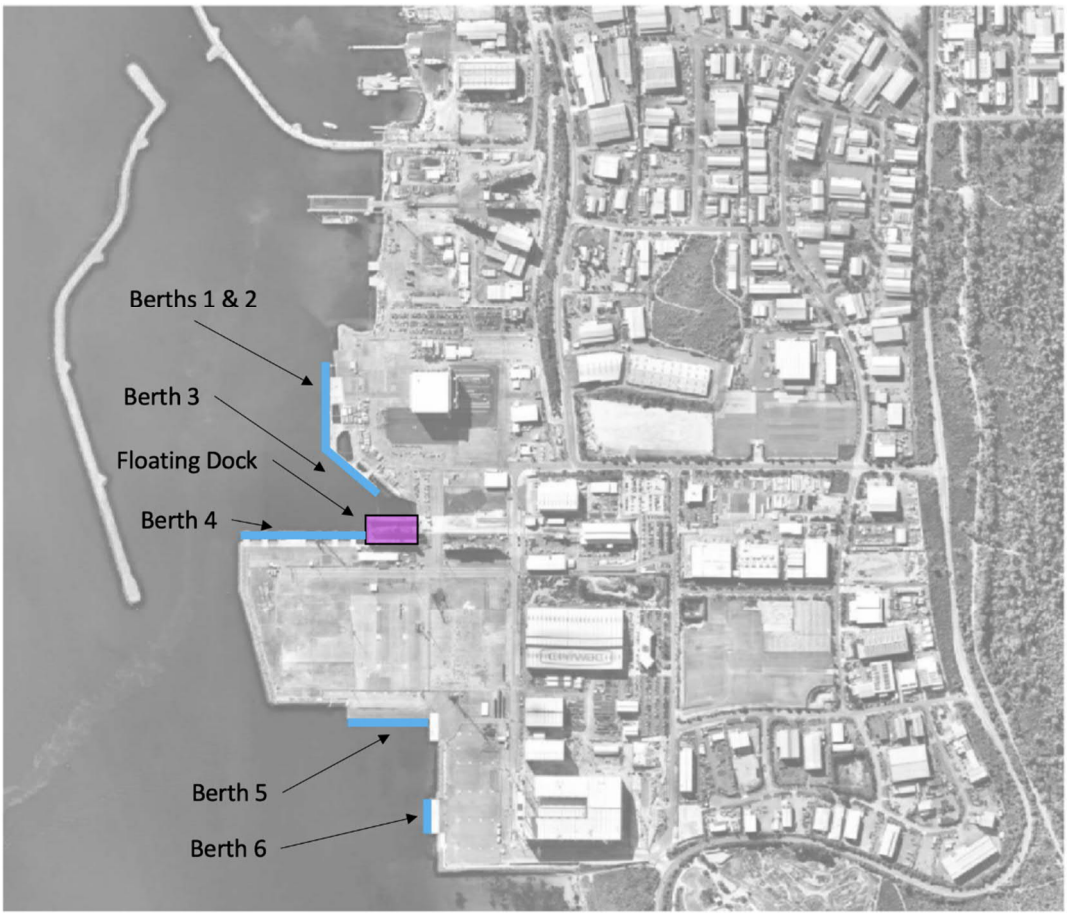
Southern Harbour

The existing berths at the CUF are listed in Table 3-1 and shown in Figure 3-3.

Table 3-1 AMC CUF berths

Berth No	Designated Use	Depth (m)	Length (m)
AMC 1	RAN Maintenance / Load out	10m	115m
AMC 2	RAN Maintenance	10m	69m
AMC 3	RAN Maintenance	9.3m	132m
AMC 4	Maintenance / Heavy lift / Construction Support / Supply Vessel and Major Logistics Staging	12.7m	254m
AMC 5	Heavy lift Roll On Roll Off (for loading modules using SPMT / wheeled vehicles)	8m	177m
AMC 6	Roll On Roll Off	8m	75m

Figure 3-3 Existing berth locations at the CUF

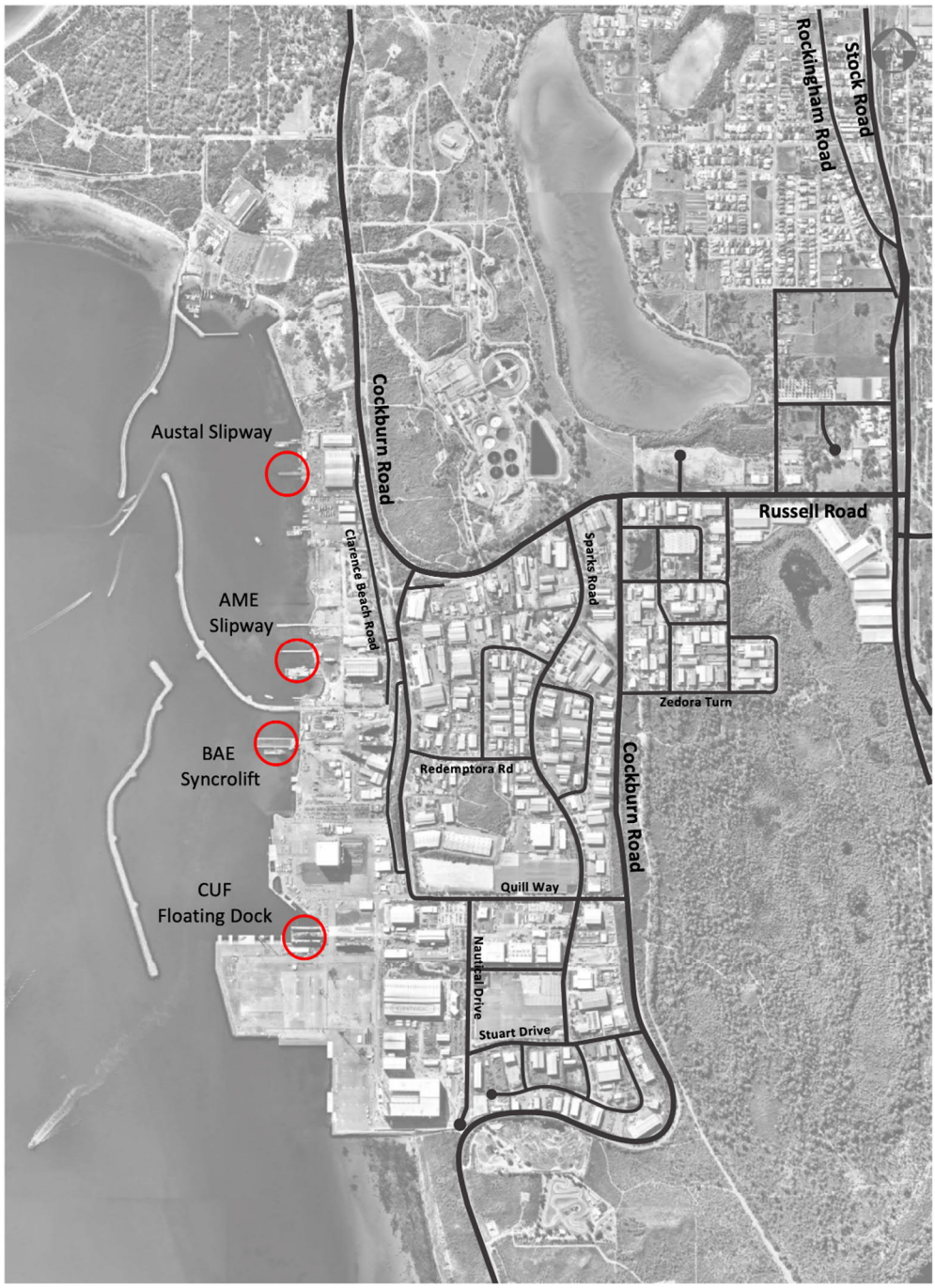


Berths 5 and 6 are exposed to the wave environment from inside the Cockburn Sound, as there are no breakwaters to create a sheltered harbour.

3.2.1.3 *Lift and transfer*

At the AMC there are currently four options for the lift and transfer of vessels as noted and shown in Figure 3-4.

Figure 3-4 AMC lift and transfer capabilities



Northern Harbour

Within the AMC Northern Harbour there are two existing privately owned facilities to enable vessel launching and retrieval:

- 2,000t slipway at the Austal facility
- 2,000t slipway at the AME facility[4]

They both use rail transfer to move vessels around on land and into and out of sheds.

Southern Harbour

Within the AMC Southern Harbour there are two existing facilities to enable vessel launching and retrieval:

- 8,000t syncrolift at the BAE facility
- 12,000t lift capacity floating dock with 4,500t transfer capacity at the CUF

The BAE syncrolift is privately owned, and connected to a turntable and rail system which enables the movement of vessels on land. The syncrolift is capable of lifting up to the weight of an in service Hobart class air warfare destroyer, but the vessel is too long to traverse the turntable. The BAE syncrolift has been used by other AMC tenants previously including ASC, Austal and Echo Yachts.

At the CUF, the floating dock is common use infrastructure operated by AMCM and once vessels are lifted, they can be transported on dedicated transfer paths using SPMT. There is one dedicated transfer path from the floating dock to the ASC facility.

The current floating dock has a transfer capacity with a maximum pay load of 4,500t including the SPMT. The system can currently transfer the Collins class submarines and Anzac class frigates. It can lift vessels up to 12,000t but was not designed to act as a maintenance floating dock, as there are requirements to ensure its availability for submarine transfer on limited notice. The floating dock has been in operation since 2009 and has a design life of 25 years.

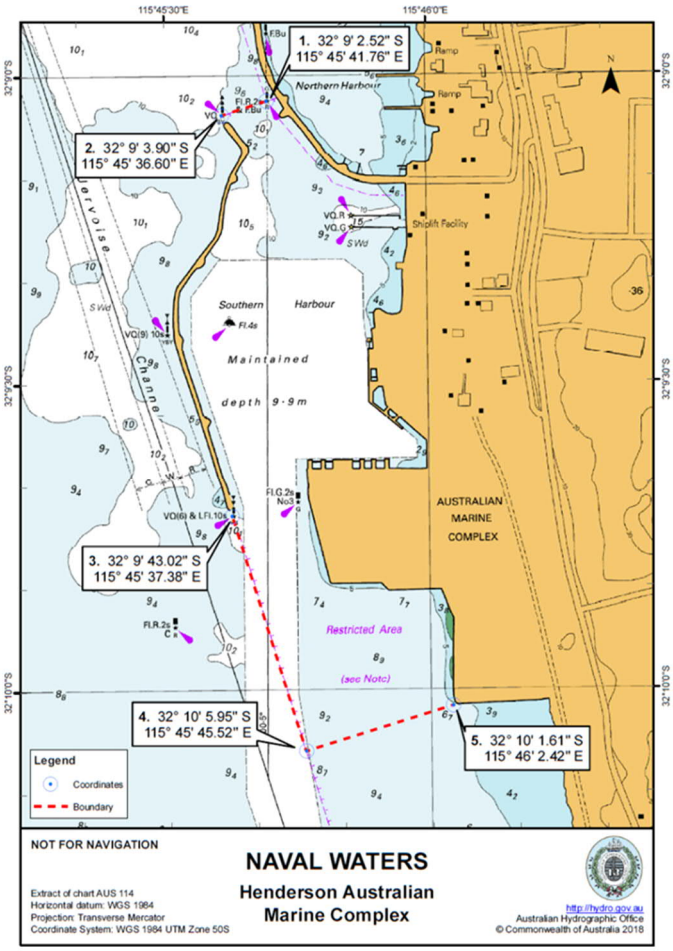
It is noted that there is the potential to upgrade all of these facilities in the future to accommodate larger vessel types.

3.2.1.4 Naval Waters

In February 2019, Naval Waters were declared over the Southern Harbour of the AMC. The term 'Naval Waters' means those waters declared by Proclamation, pursuant to Section 3B of the Control of Naval Waters Act 1918 (Cth) (Commonwealth of Australia, 2016) ('Act'), in respect of the Henderson AMC. The limits of Naval Waters at the Henderson AMC are shown in *Figure 3-5*. The Act, in conjunction with the Control of Naval Waters Regulation 2015 (Cth) (Commonwealth of Australia, 2015) ('Regulation'), provides the legal framework to regulate non-Defence presence and activity in the prescribed Naval Waters around facilities owned or used by Defence.

[4] As per AME's website

Figure 3-5 Naval Waters at AMC (Commonwealth of Australia, 2019)



The operation of Naval Waters will be overseen by the Superintendent of Naval Waters Perth (the Commanding Officer of HMAS Stirling). A guidance note (Royal Australian Navy, 2019) has been prepared by the Superintendent outlining the operation of Naval Waters and the roles and responsibilities of the RAN and other parties in their implementation and ongoing operations.

The establishment of Naval Waters at the AMC does not replace or remove the roles and responsibilities required under the MTOFSA. The intent is that they will augment the security arrangements of Defence facilities and assets co-located at the AMC, thereby providing users with more flexibility on responding to various matters or threats within Naval Waters which are specific to Defence in a timely and effective manner.

With regard to security the guidance note includes the following:

"Security considerations (such as heightened threat levels or force protection) and/or public safety considerations (such as naval activities involving ship handling and manoeuvring) may necessitate restrictions on access to Naval Waters, as well as the exercise of other powers under the Act and the Regulation. Defence's intention is to use the powers conferred under the Naval Waters legislation only to the extent necessary and appropriate to ensure security and public safety. Noting the commercial nature of the Henderson AMC, these powers are not intended to, and will not be used to, unnecessarily deter or

impede the passage of commercial shipping, disrupt non-Defence activities, or interfere with the functions and responsibilities of ports and industry. The Conditions do not supplant the security arrangements of the Henderson AMC based entities or the respective security plans associated with the MTOFSA".

Ongoing close engagement will be required between the State, AMCM, Superintendent of Naval Waters (Commanding Officer HMAS Stirling) and the Henderson Security and Facilities Manager of Capability Acquisition and Sustainment Group (CASG) to ensure the practical implementation does not impact commercial operations at the AMC. The Henderson Precinct Security Working Group provides an ongoing forum for this to occur.

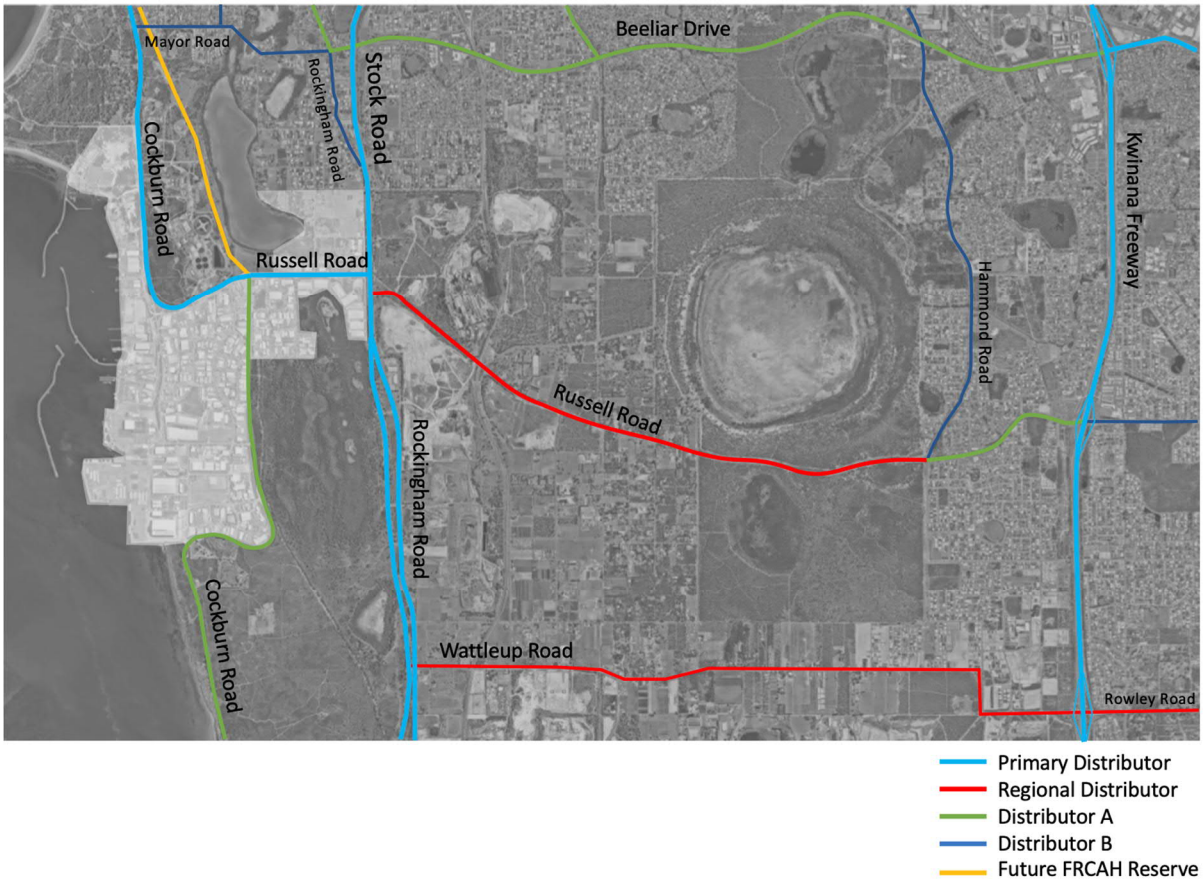
3.2.2 Transport

A high-level review of existing transport infrastructure has been undertaken as part of this study by Flyt (AMC Transport and Traffic Report (Flyt, 2019)). This section provides a high level overview of the current transport network supporting the AMC.

3.2.2.1 Road network

The AMC precinct is well connected to the wider regional road network and the greater metropolitan region. Cockburn Road provides a north-south spine through the AMC. To the east Rockingham Road provides further north-south access with Russell Road providing access eastward towards the Kwinana Freeway. Figure 3-6 illustrates the surrounding regional road network.

Figure 3-6 AMC road network



Traffic congestion is a known issue within the AMC and several studies have been undertaken in the past to identify potential upgrades to the network to improve congestion and safety. Additional high level traffic modelling was undertaken as part of this study to determine potential network upgrades required to support the relocation of FCD to the AMC[5].

In particular, congestion during the morning and afternoon peak periods at key intersections providing access to the AMC, has been identified as an issue. These intersections include:

- Cockburn Road/Russell Road
- Cockburn Road/Quill Way (West)
- Quill Way/Cockburn Road (West)

During peak periods, certain movements (into or out of the AMC) become severely congested resulting in significant delays for users.

Additionally, the intersection of Russell Road and Rockingham Road on the external regional road network is also significantly congested during peak times.

The Fremantle Rockingham Controlled Access Highway (FRCAH) is proposed to pass through the study area as shown in Figure 3-6. This project includes a realignment of Cockburn Road and upgrades to

[5] At present no commitment to this transition has been made by Defence or the Commonwealth Government.

Russell Road/Rockingham Road to create a controlled access highway, however, no commitment has been made with regard to the timing of its construction.

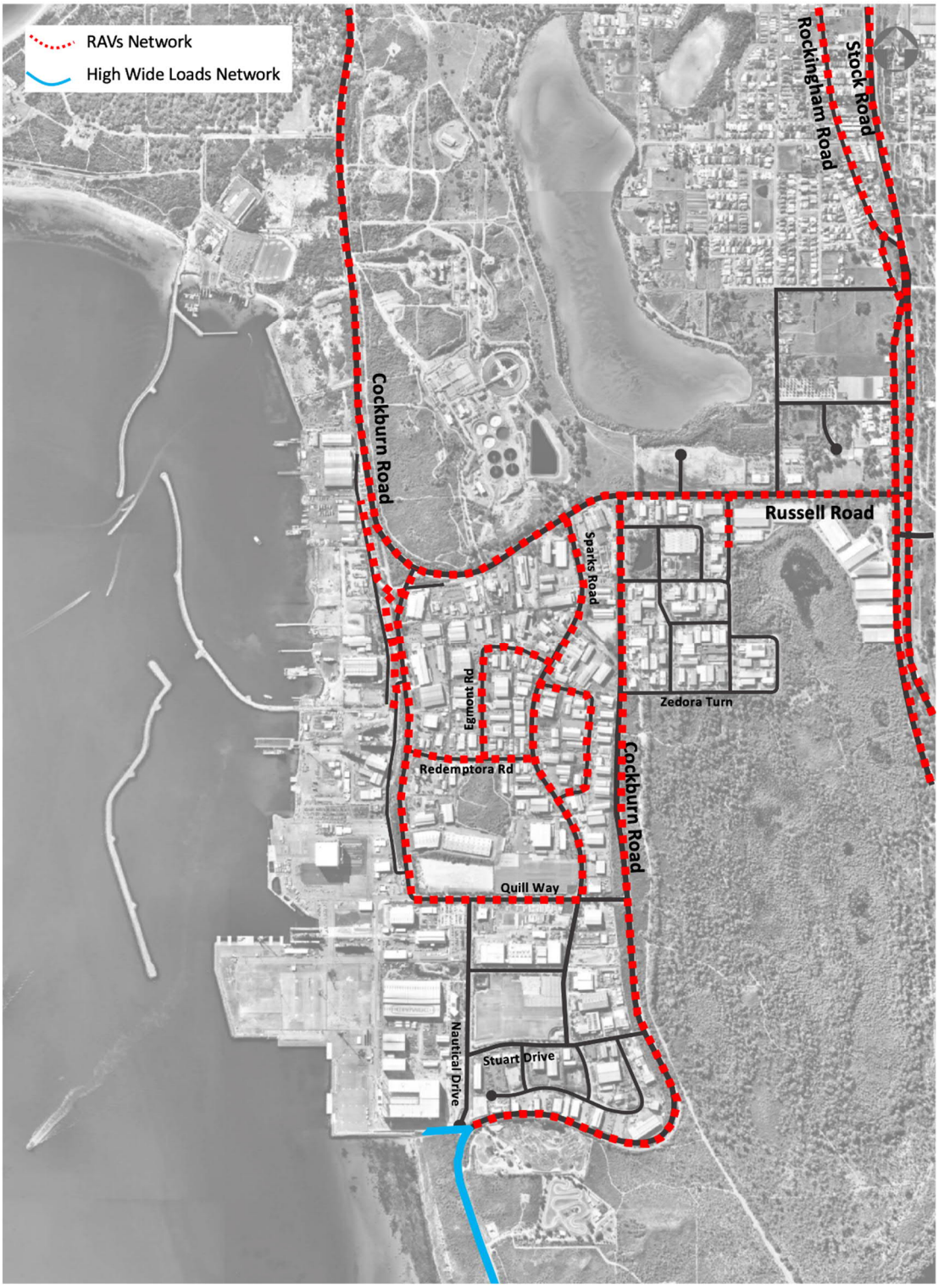
3.2.2.2 High Wide Loads network

HWL are over-dimensional loads up to 8m high, 8m wide and 24m long with a maximum of 270t net mass. HWL corridors are built to standards which accommodate large indivisible loads linking key heavy fabrication centres and the AMC in the Perth metropolitan area with mine sites, refineries and other industrial factories that require large machinery and plant equipment.

Access by RAV and HWL is critical for many of the businesses operating within the AMC. These networks provide access to the AMC for materials, components and vessels that have been constructed elsewhere within the region.

The majority of roads within the AMC are part of the Perth RAV network. The existing RAV network in the vicinity of the AMC permits RAV categories 2-4 (pocket road train, B-Double, and other vehicles with a maximum length of either 25.0m or 27.5m) to use these routes. The RAV network is set out in Figure 3-7.

Figure 3-7 Existing RAV and High Wide Load networks



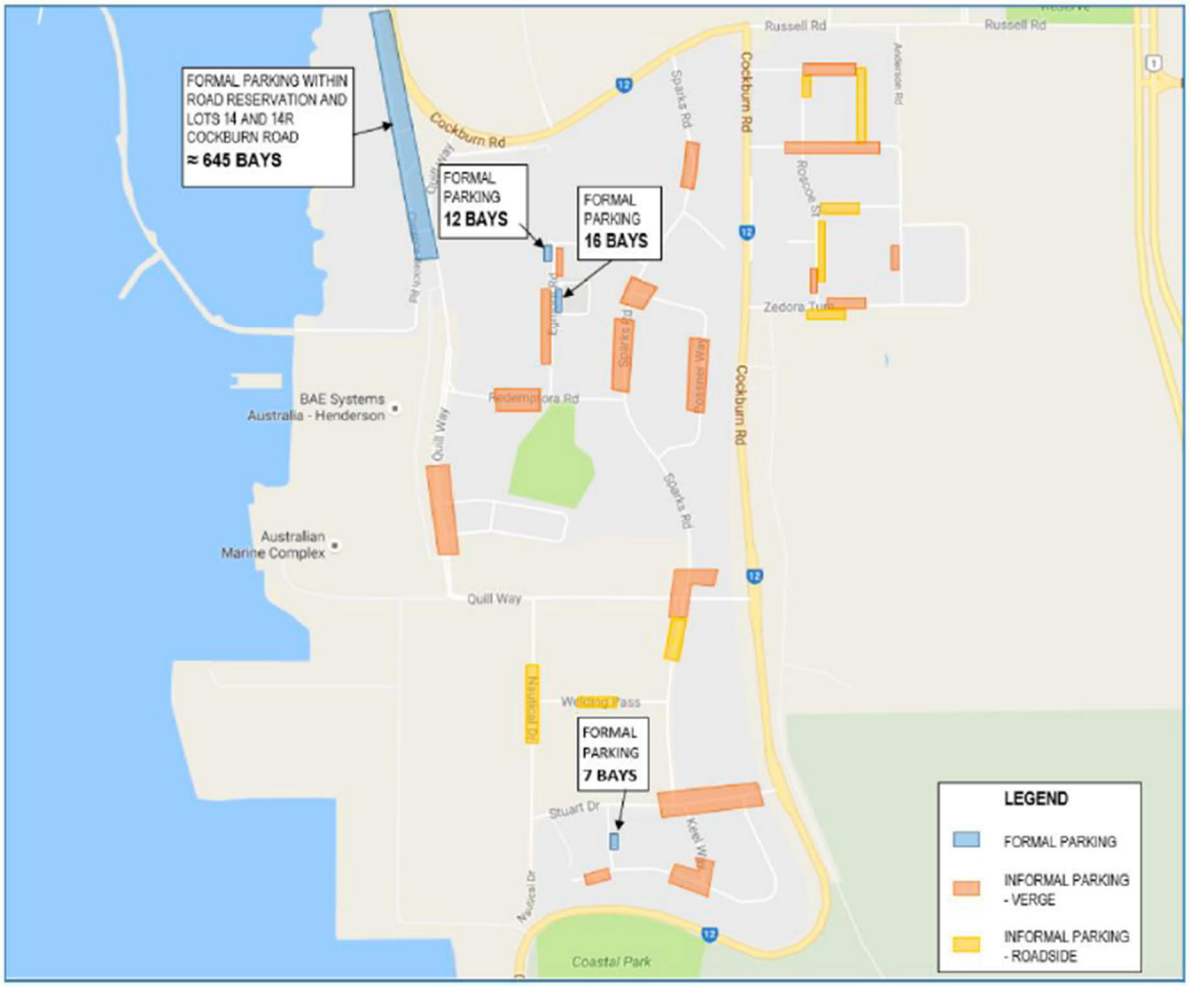
All other roads within the study area not identified on the RAV network are constructed to an industrial standard to accommodate “as of right” vehicles (vehicles that do not require a permit to utilise the

public road network). Specific turn areas, such as the large turning area at the top of Egmont Road, have been constructed to facilitate truck movements.

3.2.2.3 *Car parking*

An extremely limited volume of public car parking is provided within the AMC. Each business is responsible for managing its own car parking on site. Over time however, the public road network (on street and within the road reserve) has been utilised for car parking which has the potential to adversely impact road safety and the ability of the road network to cater for RAV. Figure 3-8 illustrates the location of existing formal and informal on street parking within the AMC.

Figure 3-8 Existing on street car parking (source: (City of Cockburn, 2016))



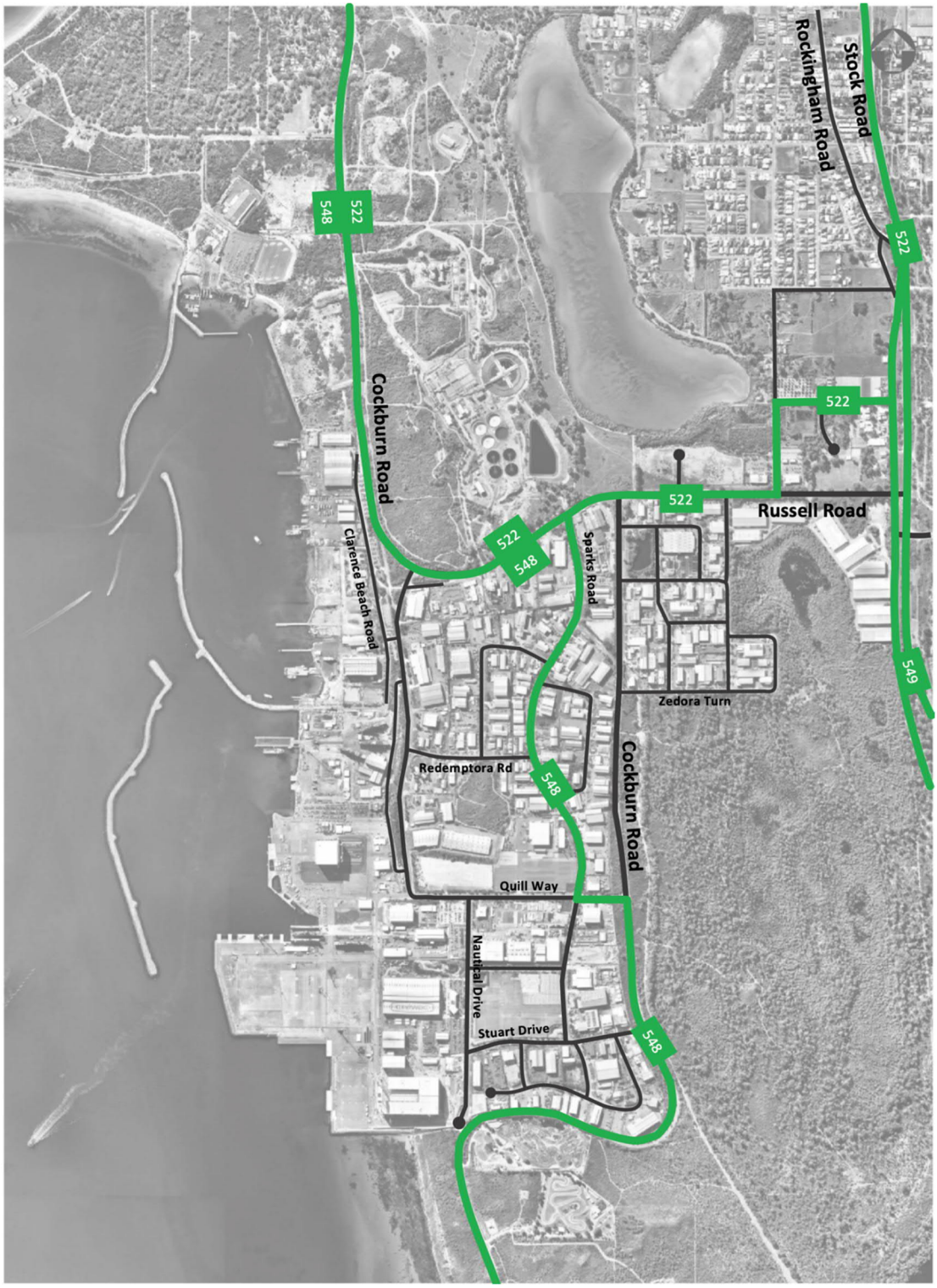
3.2.2.4 *Public transport*

Public transport services within the AMC are limited at present. Industrial areas are typically difficult to serve effectively with public transport due to their low density nature and operating hours. At present only two bus services provide direct access to the AMC as shown in Figure 3-9.

Route 548 currently services the AMC traveling between Rockingham Station (~25mins) and Fremantle Station (~25mins) and operates throughout the day. Route 522 provides access to Spearwood and

Cockburn Central Station (~20 mins travel time), however only three services per day operate on this route. Additionally, the 549 (also travelling between Rockingham Station and Fremantle Stations) passes the precinct on Rockingham Road.

Figure 3-9 Existing public transport services



The limited frequency and number of routes serving the AMC limits the ability of people working within AMC to use public transport as a viable mode of transport. Limited frequencies impact the ability of people to time their travel to coincide with their start and finish times. It also impacts on their flexibility to travel when required.

Current services also provide a limited catchment for public transport users. The Rockingham to Fremantle corridor is relatively well serviced, however access to the wider metropolitan region is difficult. The 522 service provides a connection to Cockburn Central Station providing the opportunity to use a connecting train service or park and ride at Cockburn Central. The extremely limited frequency of this service impacts on its ability to be used by the AMC workforce however.

The majority of the AMC's workforce therefore travel each day by car as it is more convenient and efficient. The impacts of this include:

- Congestion on roads providing access to AMC
- Difficulty for apprentices, or those who cannot drive, accessing the AMC
- Limited demand for public transport, which in turn results in reduced provision.

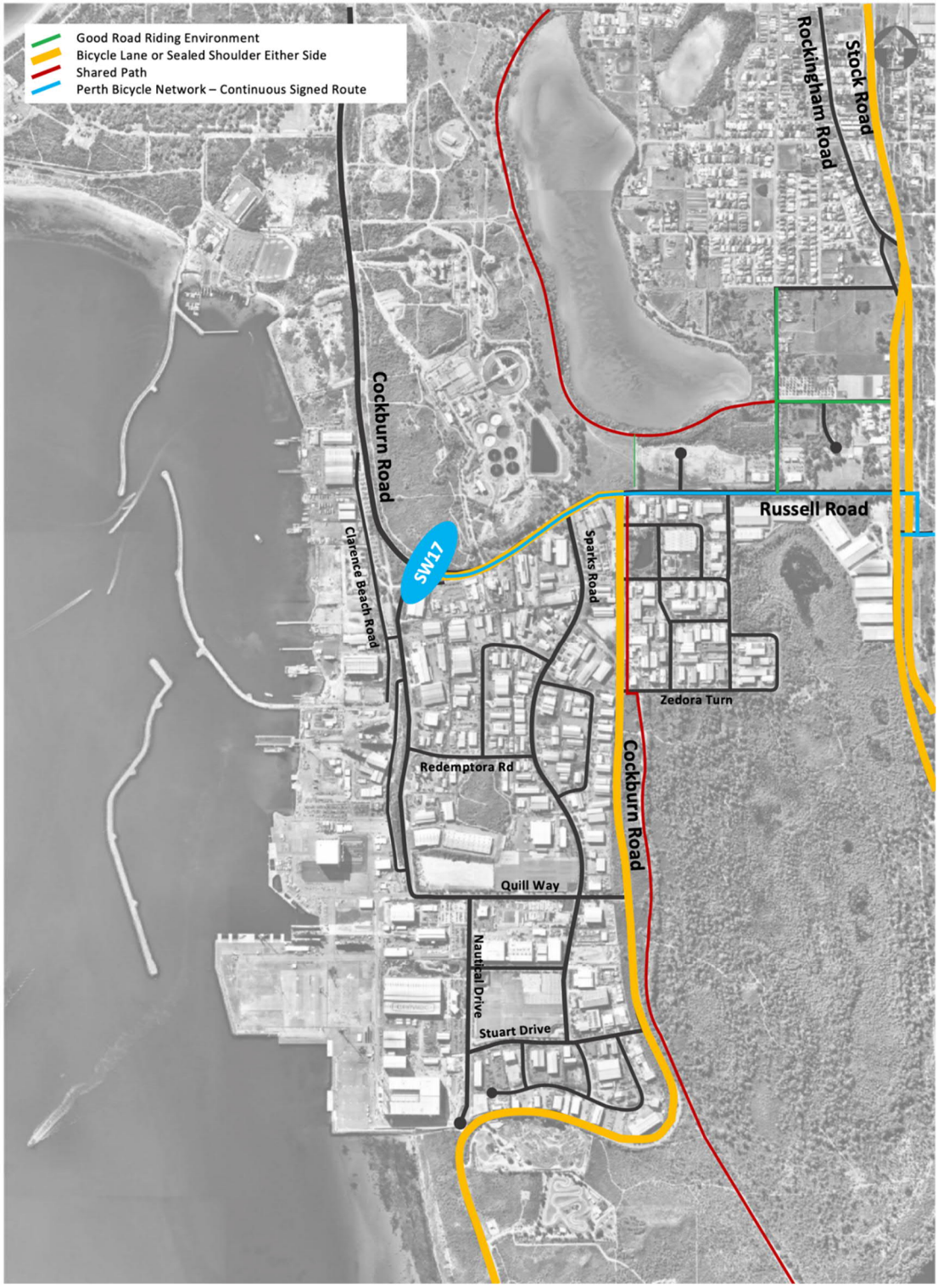
3.2.2.5 Pedestrians and cyclists

Pedestrian infrastructure is extremely limited within the AMC, only the east-west extension of Quill Way, Redemptora Road and one section of Sparks Road provide footpaths. Quill Way is the only road to have footpaths on both sides. The paths are narrow and adjacent to the road carriageway with no buffer from vehicles. The footpath is regularly broken for crossovers, stops abruptly or is not provided in key locations (such as connecting to existing bus stops).

There is no shade or limited protection from weather and there are currently very few destinations within the overall area that would generate pedestrian trips in their own right (i.e. cafes, lunch bars or other businesses that people may access on foot from their work site).

Cycling infrastructure is also available within the precinct however it is limited in nature and the volume, speed and composition of traffic is not conducive to a friendly cycling environment. The AMC is currently served by a regional network of on and off road cycling infrastructure as noted in Figure 3-10. Regional connections are provided by on road lanes, whilst a limited network of off road paths also exists in the surrounding area.

Figure 3-10 Existing cycling infrastructure



3.2.3 Utilities

The AMC is served by a range of utilities including:

- Power
- Gas
- Water (Potable/Sewer)
- Telecommunications
- Stormwater Drainage.

3.2.3.1 Power

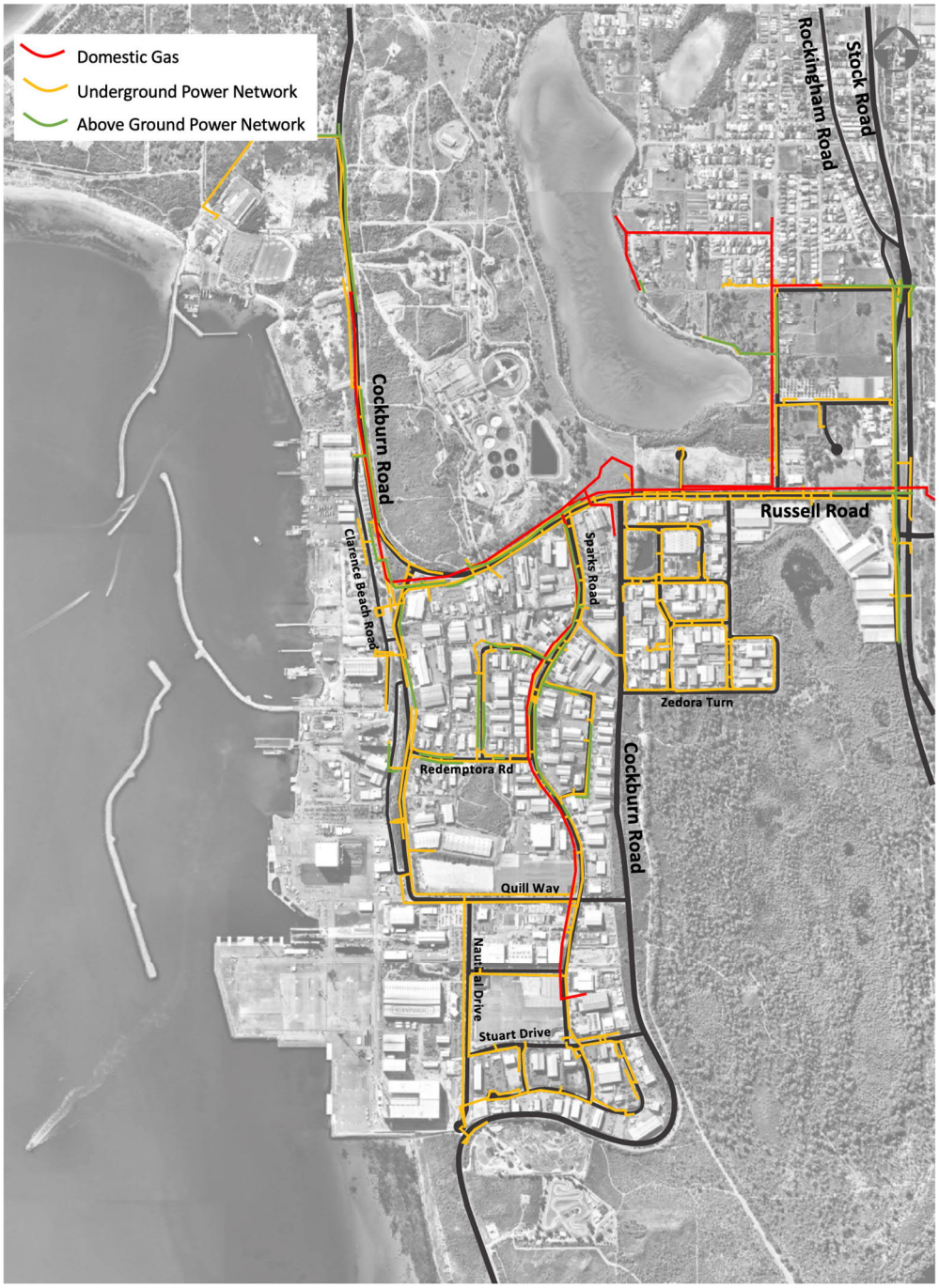
Electrical power is currently supplied to the AMC from the Cockburn Cement substation located on Russell Road. The AMC is serviced by three 22kV feeders from this substation. Within the AMC, power is delivered to premises via a predominantly underground network, although above ground power lines are present in some locations.

Figure 3-11 illustrates the location of the existing electrical power distribution network within the AMC.

3.2.3.2 Natural gas

Natural gas is available in some locations within the AMC as illustrated in Figure 3-11. The existing network extends along Russell Road and Clarence Beach Road within the industrial portion of the site. It also extends through the Technology Precinct along McGrath Road.

Figure 3-11 Existing power and domestic gas distribution networks

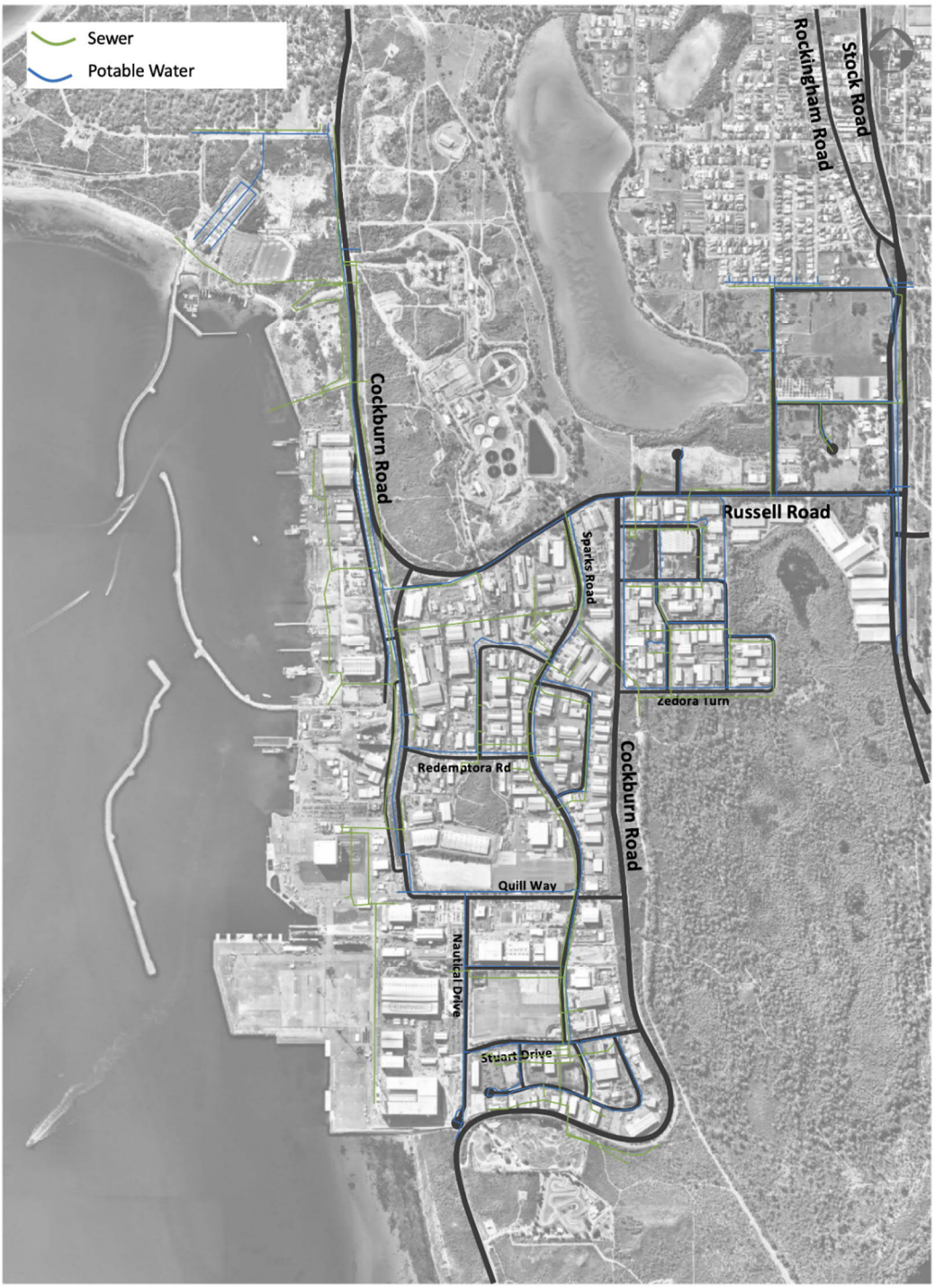


3.2.3.3 *Water*

All existing premises within the AMC have access to potable water and sewer networks. The Water Corporation operate a waste water treatment plant to the north east of the AMC on Cockburn Road. An outfall from this plant passes through Lot 15 on Clarence Beach Road before discharging into the Northern Harbour.

Future development of land and infrastructure in the vicinity of the outfall will need to consider its easement and impacts on marine infrastructure. Figure 3-12 illustrates the location of the existing potable water and sewer networks.

Figure 3-12 Existing potable water and sewer networks



3.2.3.4 *Telecommunications*

Access to telecommunications infrastructure within the AMC is provided via retail providers. The National Broadband Network (NBN) has been installed within the AMC and predominantly uses 'Fibre to the Node' (FTTN) technology to connect to premises. A FTTN connection is where existing copper phone and internet network are utilized from a nearby fibre node (street cabinet) into the individual property, as the final connection to the NBN access network. Nodes are then connected to a local exchange (located on the corner of Quill Way and Nautical Drive) by optic fibre.

The FTTN network will support asymmetrical consumer broadband up to 100/40Mbps and symmetrical service up to 10/10Mbps or possibly 20/20Mbps at some premises. The NBN can also provide data and communications services tailored to the specific requirements of business where their standard offering is insufficient.

The AMC is currently covered by Telstra's existing 4G and 5G networks. A small portion of Zedora Turn is currently not serviced by the 5G network.

3.2.3.5 *Stormwater drainage*

Stormwater drainage is provided throughout the AMC via a piped system feeding into a number of sumps for collection and natural infiltration. When flows exceed a certain volume there is a series of overflow paths, into larger sumps. Stormwater is discharged into Cockburn Sound through gross pollutant traps.

The City of Cockburn is responsible for the stormwater drainage network within the AMC. Within the CUF the AMCM is responsible for stormwater drainage.

3.2.3.6 *CUF utilities*

Utilities are supplied to the CUF by external providers, however distribution within the CUF is the responsibility of AMCM. The services provided inside the CUF include 24 hour manned security and closed-circuit television surveillance, lighting towers and underground reticulated services for power, potable water, firewater, communications (both public and Defence Restricted Networks) and sewerage. These services feed through to the berths, the fabrication buildings and laydown areas.

For current vessel sustainment activities at the CUF, the RAN follow a series of procedures for use of equipment. The CUF shore power cannot support this process and portable power in the form of generators is used as backup. There is a need to upgrade the power supply system to the wharves, to support RAN set processes and procedures (Oropesa Port Management Pty Ltd, 2018).

3.3 Latitude 32 Industrial Area – DA6A

The development area 6A within the Latitude 32 Industrial Area is about to be developed as a new industrial estate by DevelopmentWA. The development area will encompass 100 hectares of land, and is located immediately east of Stock Road/Rockingham Road adjacent to the AMC. Development area 6A will provide the opportunity to meet any demand for additional transport, storage and laydown areas outside of the AMC, and provide industrial lots for businesses seeking to improve supply chain efficiencies by locating in close proximity to the infrastructure in the AMC.

Efficient access to this precinct in the future will be critical. The ability to move large modules and equipment between the AMC CUF and Latitude 32 will help reinforce the relationship between these two precincts and create further opportunities in the future.

4 Demand drivers

The following section outlines key demand drivers for the AMC in the future. These drivers are focussed on projects/activities that are of sufficient size/volume they will have a significant influence on the AMC as a whole. Typically, these projects/activities are focussed on the waterfront and/or the CUF, however their influence will extend throughout the AMC and beyond.

4.1 Defence activities

To support future planning for infrastructure within the AMC, in particular within the waterfront precinct, it is necessary to understand planned shipbuilding, sustainment and vessel disposal activities.

A high-level sustainment schedule for all existing and future RAN vessels based at FBW was developed. A schedule for planned future shipbuilding activities was also identified. Together these schedules were then used to identify demand for AMC infrastructure in the future. The schedule was developed on a per quarter basis from 2020 to the end of 2035, and subsequently extended to examine additional demand up to 2044.

Key steps in the sustainment schedule's development included identification of:

- All vessels (existing and potential future) based at FBW including the following information:
  - Defence maintenance schedule for Anzac class vessels through to 2029 (received 22 May 2020)[6]
  - SEA1180 OPV launch schedule (dated 20 February 2020)
- Maintenance upgrades of the FBE frigate vessels
- Commissioning dates for new vessels
- Likely sustainment activities for future vessels
- Key characteristics of each vessel type to be accommodated in AMC (draft, beam, length, displacement)
- Identification of in-water and out of water activity requirements.

A number of key assumptions support the development of the sustainment schedule as follows:

- In conjunction with infrastructure at FBW, the AMC should be able to support all FBW vessel sustainment requirements
- AMC should be able to support the sustainment activities of some FBE vessels including Hobart class destroyers
- A dedicated precinct for Defence activities within the AMC would be preferable
- Ideally the AMC should include facilities to enable maintenance activities (including paint removal and application) for RAN vessels in all weather conditions
- Common user infrastructure within the AMC should create a competitive environment for future sustainment activities

[6] Confidential information supplied by the Department of Defence

- A level of redundancy of infrastructure will be required to ensure support of future sustainment activities
- Ability to lift and transfer up to Hunter class sized vessels, and move within AMC
- Ship Zero infrastructure construction will commence in 2020
- The Anzac – Hunter class transition plan is not yet defined. Life of Type Extension (LOTE) activities for four Anzac class as part of the transition plan is assumed starting in 2034
- The Collins – Attack submarine transition plan is not yet defined, but decommissioning of the Collins class submarines could be considered at the AMC
- In the future, FBW will still be utilised for all post production activities. The current practice is for ships to transit to FBW at the end of the production period to undertake RADHAZ surveys, System STW, defect rectification, harbour acceptance trials, whole ship evolutions and other predominantly Navy preparedness activities.

4.1.1 Vessel characteristics

Table 4-1 shows the key characteristics of each type of vessel class home ported at FBW and other naval vessels that are currently or could be supported at the AMC in the future. These characteristics determine the type of infrastructure required to support future Defence activities within the AMC, for the purposes of the SILUP.

Table 4-1 Vessel key characteristics

Vessel Type / Class	Length	Beam	Draft	Full Load Displacement
Anzac class frigate	118m	14.8m	4.5m	3,800t (with upgrades planned to achieve 4,000t)
Hobart class air warfare destroyer	146.7m	18.6m	7.2m	7,000t
Hunter class frigate	149.9m	20.8m	5.7m	9,000t to 12,000t
Collins class submarine	77.8m	7.8m	7m	3,100t
Attack class submarine	100m	10m	unknown	5,300t
Arafura class Offshore Patrol Vessel	80m	13m	4m	1,640t
Armidale class patrol boat	56.8m	9.7m	2.7m	300t
Pacific patrol boat	39.5m	8m	4.2m	240t
Cape class patrol boat	58.1m	10.6m	3.1m	700t
HMAS Sirius (support ship)	191.3m	32m	7.2m	25,106t
Supply Class Auxiliary Oiler Replenishment	173.9m	23m	8m	19,500t

Vessel Type / Class	Length	Beam	Draft	Full Load Displacement
(AOR) ship (HMAS Stalwart and HMAS Supply II)				
Canberra class Landing Helicopter Dock (LHD)	230.8m	32m	7.2m	27,831t
Australian Defence Vessel (ADV) Ocean Protector	105.9m	21m	6.6m	8,500t
Merchant Vessel (MV) Stoker (rescue gear ship)	93.2m	16m	4.1m	3,690t
MV Besant (submarine intervention gear ship)	83m	16m	4.3m	3,231t

4.1.2 New vessel builds

Defence is currently embarking on a program of continuous shipbuilding. Vessels committed for construction at the AMC include:

Offshore Patrol Vessels

Ten of the new OPV will be constructed at the Civmec facility in the AMC. The schedule allows for a vessel build of 27 months in total. This timeframe is broken down to being 21 months within the Civmec facility, one transfer and lift, and 6 months in the water alongside a berth.

Pacific patrol vessels

The Pacific patrol vessels are currently being constructed by Austal at their facility in Naval Base. They are transported via the HWL road network, launched via the floating dock and the set to work activities are completed alongside the berth at the Austal facility in the Northern Harbour.

Cape class patrol vessels

Austal have been awarded a contract to build six evolved Cape class patrol boats for the RAN to replace the existing Armidale class, ensuring there is no capacity gap before the introduction of the OPVs. Construction commenced at Austal's Northern Harbour facility in mid-2020 with the first vessel to be delivered in late 2021 and the sixth to be delivered in mid-2023.

SEA 1905 and SEA 2400

SEA 1905 is the Maritime Mine Countermeasures Program which includes Mine Warfare (MW) vessels. Program SEA 2400 is the Hydrographic Data Collection Capability Program which includes the introduction of a Strategic Military Survey Capability (SMSC) to replace Navy's two Hydrographic Survey Ships (HMAS Melville and HMAS Leeuwin).

The 2020 Force Structure Plan (Department of Defence, 2020) announced the intention for up to eight vessels to be constructed, likely based on the OPV platform, to provide MW and SMSC capabilities. More information regarding these programs is expected to be provided in the updated Naval Shipbuilding Plan, to be issued in late 2020.

Large-hulled naval vessels

The 2020 Force Structure Plan announces the build of a number of large hulled naval vessels for a range of purposes. These vessels include two multi-role sealift and replenishment vessels to replace HMAS Choules, a replacement for the ADV Ocean Protector, a salvage and repair vessel to support large ships at sea, and a large-hulled vessel to support the Pacific Step-Up. It is likely these vessels will be constructed in Australia, and potentially at the AMC.

Border Force vessels

The Naval Shipbuilding Plan (Department of Defence, 2017) identifies a need for up to sixteen Border Force vessels to be replaced in the future. Whilst the construction of these vessels has not yet been committed, there is a significant opportunity for the replacement vessels to be constructed in the AMC.

Land combat and amphibious warfare vessels

The AMC also has the potential to support the construction of the Riverine patrol craft, replacement LHD Landing craft, future Army watercraft as well as large Army landing craft, which were introduced in the 2020 Force Structure Plan.

4.1.3 Vessel maintenance requirements

For each type of vessel further assumptions are noted in the sections below.

Anzac class frigates

In the future the following maintenance activities are assumed to be undertaken at the AMC:

- Intermediate Maintenance Availability (IMAV) period with a duration of 9 weeks. This is represented by a 3-month duration in the sustainment schedule. This activity is undertaken in the water alongside a berth
- Selected Restricted Availability (SRA) period with a duration of 14 weeks. This is represented by a 3-month duration in the sustainment schedule, with the works being completed in water alongside a berth
- Selected Restricted Availability with Docking (DSRA) period, with a duration of 14 weeks (indicated as 3 months in the sustainment schedule). This activity includes a lift and transfer, with the vessel located on a vessel hardstand position, and a second transfer and lift to return the vessel to the water. An additional 3 months is allowed in a DSRA for extended post-production activities such

as a Fleet Technical Assessment, trials, defect rectification and a Unit Readiness Assessment. It is assumed these activities will be undertaken with the ship based at FBW, not AMC

- Anzac Midlife Capacity Assurance Program (AMCAP) with a duration of 24 months overall. 18 months allows for a lift and transfer, with the vessel located on a vessel hardstand position, and a second transfer and lift to return the vessel to the water, and onto a berth. There is a further 6 months of in water maintenance, with this activity being completed at FBW
- Life of Type Extension with a duration of up to 24 months and the same breakdown as AMCAP.

Hobart class destroyers

A major upgrade of the three Hobart class air warfare destroyers, focussed on their Combat Management Systems, will be conducted in the mid-late 2020s under Project SEA 4000 Phase 6. There is significant potential for this activity to be conducted at the AMC.

Future Hunter class frigates

It is assumed the first Hunter class frigate will be undergoing trials and testing from 2027 and commence operations in 2030. There is no available information on the sustainment of the future Hunter class frigates. For the purposes of the schedule the following maintenance activities are assumed:

- In water maintenance undertaken annually, with a duration of 3 months
- Out of water maintenance undertaken every 5 years, with a duration of 9 months. This activity allows for a lift and transfer of the vessel to the hardstand location, and a transfer and lift to return the vessel back into the water.

Collins class submarines

The current sustainment activities for the Collins class submarines are split between Osborne in South Australia and at the AMC. It is assumed FCD will be completed at the AMC in 2024/2026. Flexibility in the timing of this transition is possible[7]. The following maintenance activities are assumed to be completed at the ASC facility in the AMC:

- MCD for an overall duration of 12 months. This comprises a lift and transfer and around 9 months on the hardstand within the ASC facility. The submarine is then transferred back into the water for a 3-month Set to Work (STW) period in water
- FCD for an overall duration of 24 months. This comprises a lift and transfer and around 21 months on the hardstand within the ASC facility. The submarine is then transferred back into the water for a 3-month STW period in water. It is assumed LOTE activities require the same timeframe and replace FCD when required
- The Collins – Attack submarine transition plan is not yet defined, however decommissioning of the Collins class submarine could be considered at the AMC.

It is acknowledged that the location of FCD if transitioned to the AMC is yet to be determined. For the purpose of developing the SILUP it is assumed to take place at an expanded ASC facility[7].

[7] At present no commitment to this transition has been made by Defence or the Commonwealth Government.

Future Attack class submarines

The first Attack class submarine (ACSM) is scheduled for completion in 2032. The sustainment activities for the ACSM will be able to be undertaken at the AMC. It is assumed a similar schedule and activities/durations to the current Collins class will be undertaken at the AMC.

Provision to accommodate unscheduled dockings will be required at the AMC from 2032 onwards.

Offshore Patrol Vessels

Two of the OPVs will be based at FBW. For the purposes of the schedule the following maintenance activities are assumed for these two vessels:

- In water maintenance undertaken annually, with a duration of 3 months
- Out of water maintenance undertaken every 5 years, with a duration of 6 months. This activity allows for a lift and transfer of the vessel to the hardstand location, and a transfer and lift to return the vessel back into the water.

Support vessels

HMAS Sirius will be decommissioned at the end of 2021 and will be replaced by the AOR HMAS Stalwart. Both these vessels are too large to dock using the current facilities at the AMC and any major maintenance is required to be conducted in the Captain Cook Graving Dock (a large vessel dry berth) in Sydney. The schedule identifies an in water extended maintenance period once a year for 3 months alongside a berth and it is assumed this will be undertaken at the AMC in the future. For major maintenance a large vessel dry berth would be required.

The ADV Ocean Protector vessel can be lifted by the existing floating dock at the AMC, but not transferred. It has a five year docking cycle, hence it could be maintained on the floating dock. This would prevent any other lift and transfer activities during this maintenance period. Alternatively, the Graving Dock in Sydney can be used for this activity.

For MV Stoker and MV Besant regular in water maintenance is currently completed at FBW. This arrangement will continue in the future, hence our schedule does not allow for this to occur within the AMC. Out of water maintenance is undertaken every 5 years, with a duration of 3 months and is assumed to be at the AMC. This activity allows for a lift and transfer of the vessel to a hardstand location and a transfer and lift to return the vessel back into the water.

The Defence Marine Support Systems (DMSS) water craft including tugs and Self-Propelled Water Fuel Lighter undertake regular maintenance at FBW. Dockings are normally completed every three to four years. These vessels are not included in this schedule as given their size there are opportunities for maintenance in the Northern Harbour.

4.2 Resources and major project activities

The future activities of the resources sector (oil and gas, and mining) does not follow a structured program like Defence. Workload for the resources sector is on a project by project basis and preparing a similar schedule to identify demand is not possible.

The unprecedented growth of the resources sector from 2008 to 2016 enabled expansion of the AMC to its existing state. Whilst it is unlikely there will be the same level of growth in the future there are

major projects in the pipeline over the next five years, with the AMC positioned to provide support. This includes key projects as listed in Table 4-2. Specific to this sector, the future planning of the AMC needs to ensure:

- Adequate laydown area
- Covered workspace for fabrication
- Availability of wharf space
- Facilities to support washdown, blast and paint activities.

Table 4-2 Resource project opportunities

Sector	Company	Project
Mining Resources	FMG	Iron Bridge
Oil & Gas	Woodside	Scarborough
Oil & Gas	Woodside	Pluto Train 2
Oil & Gas	Woodside	Browse
Oil & Gas	ConocoPhillips	Barossa
Oil & Gas	SANTOS	Dorado
Oil & Gas	Chevron	Gorgon Stage 2
Oil & Gas	Carnarvon Petroleum	Buffalo
Oil & Gas	Chevron	Janz Io
Oil & Gas	INPEX	Ichthys Phase 2a
Oil & Gas	Neptune Energies	Petrel/Tern/Frigate
Oil & Gas	SANTOS	Spartan subsea tieback
Oil & Gas	SANTOS	Van Gogh infill Phase 2
Oil & Gas	BHP	Pyrenees Infill Phase 4
Oil & Gas	Western Gas	Equus
Oil & Gas	Woodside	NWS brownfield tiebacks - Pyxis
Oil & Gas	Woodside	Pluto expansion onshore (source gas Scarborough)
Oil & Gas	Woodside	NWS brownfield tiebacks - Lambert Deep / GWF3
Oil & Gas	Decommissioning	Woodside, Chevron, Vermillion, SANTOS

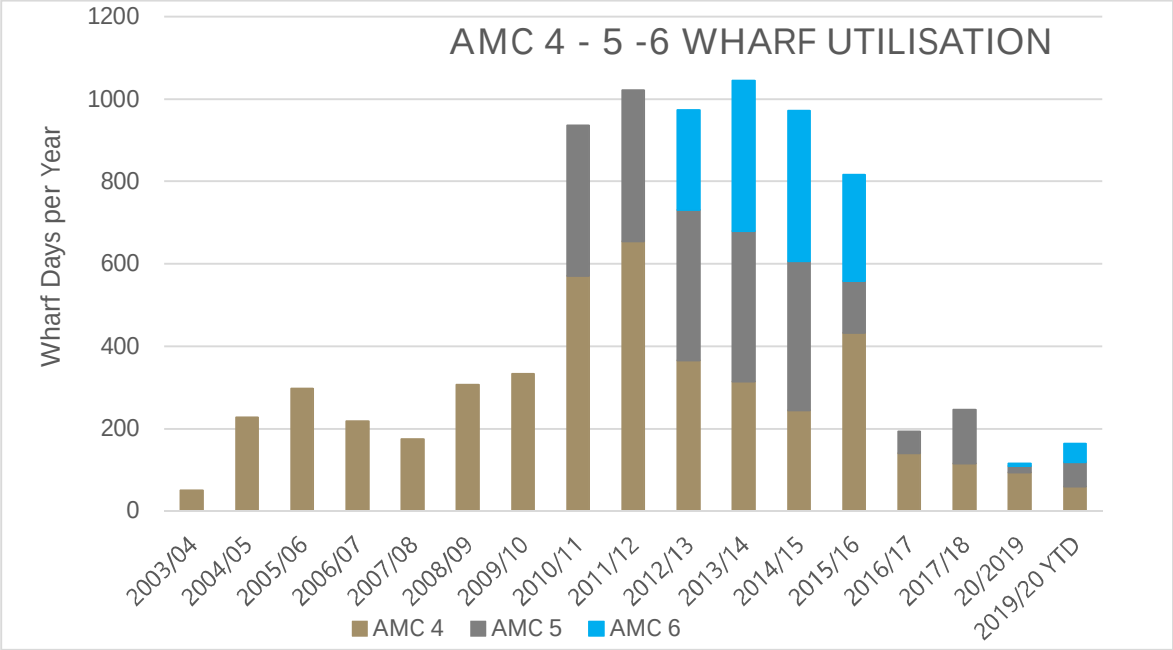
Utilisation of local facilities for fabrication is likely to be the main drawcard in the use of the AMC. This includes piles, jackets and topsides, shiploaders, reclaimers and conveyors. A near future example of the oil and gas sector's use of the AMC is an upcoming Pipe Spool project. This will utilise 80,000m^2 of laydown area from October 2020 to October 2021 and load out over AMC 4 wharf. Pipe spool

fabrication is a niche market in the AMC, given the close proximity of the fabrication location to the offshore fields in the State's North West.

It is not possible to directly relate these projects with anticipated usage of businesses in the AMC, however the need to cater for the future is essential. Ensuring adequate laydown area and covered work space for fabrication and availability of wharf space at the CUF is critical.

Figure 4-1 notes the utilization of the AMC 4, 5 and 6 wharves since the opening of the CUF. These three wharves can accommodate at least up to 900 days per year of usage. In a downturn of the market, (2016-2019) berth usage was around 200 wharf days per year for all three berths.

Figure 4-1 AMC 4, 5 and 6 wharf utilisation



4.3 Commercial shipbuilding and maintenance activities

There are around 2,500 commercial vessels registered in WA. These include fishing boats, charter boats, supply vessels, ferries, shipping and port related service vessels.

Taylored Consulting completed a market outlook for the AMC over the next 10 years (Taylored Consulting, 2019). In relation to shipbuilding it recognised opportunities in the commercial and small vessel sectors exist. This includes the Defence sector but also high end superyachts, ferries and vessels for small-scale tourism activities.

Large cruise operators are likely to schedule maintenance in countries such as Singapore, Malaysia, Vietnam and China. The ability of local AMC businesses to compete in the global shipbuilding industry, is based on their capability to deliver technology and innovative bespoke requirements, as opposed to low cost labour resources. Infrastructure such as a large vessel dry berth can also play a significant role in attracting maintenance of large cruise operators.

Similar to the resources sector, future activities for commercial shipbuilding and maintenance are not clearly defined but there is demand. It is recognized that the Northern Harbour area is an ideal

location to further concentrate this sector's activities. Specific to this sector the future planning of the Northern Harbour needs to ensure:

- Availability of common user infrastructure in the form of a lift and transfer system, and transfer paths
- Sheds and buildings for shipbuilding and maintenance activities
- A transfer path linking the Northern Harbour with the Southern Harbour.

4.4 Planning and design principles for the AMC waterfront

The output from the sustainment schedule for Defence activities is a series of graphs, (presented later in this document), showing demand over a 24 year timeframe for the following:

- In-water activities (berths)
- Vessel lift and transfer
- Vessel hardstands.

These demand over time graphs have enabled the ability to map out the future infrastructure requirements and explore the possible configurations.

4.4.1 Berth characteristics and planning assumptions

Northern Harbour

There are a number of privately owned berths in the Northern Harbour, and one located at CUF North. Any new berths would need to be designed to cater for a range of steel and aluminum hulled vessels with typical sizes noted in Table 4-3.

Table 4-3 Typical vessel sizes

Type	Length (m)	Beam (m)	Draft (m)	Displacement Tonnage (t)
Cape class patrol boat	58	10.6	3.1	300
Pacific patrol boat	39.5	8	2.5	240
Superyachts – monohull	75	10	4.5	600
Superyachts – trimaran	84	20	4.2	2940 (Gross tonnage)
Vehicle & passenger ferries	118	29	4.2	
Passenger ferries	56	14	1.8	

Southern Harbour

All new berths in the Southern Harbour would be designed to cater for RAN vessels. New berths can either be orientated along the edge of existing land or as a finger jetty, extending into the harbour basin. If there is sufficient space, a finger jetty enable creation of berths on both sides of the jetty and a greater opportunity to cater for potential demand. Their design should ensure that there is sufficient space available for the multiple contractors to work independently on both sides of the jetty simultaneously. The wharf design also needs to cater for the ability to respond to oil spills both in terms of the attachment of floating booms, and prevention of any spills from the wharf into the ocean.

The location of new berths needs to consider:

- Protection from wind and waves
- Vessel turning circles
- Impacts on existing berths, operations and services
- Access to support land uses
- Ability to cater for different vessel types
- Defence priority zone and security implications.

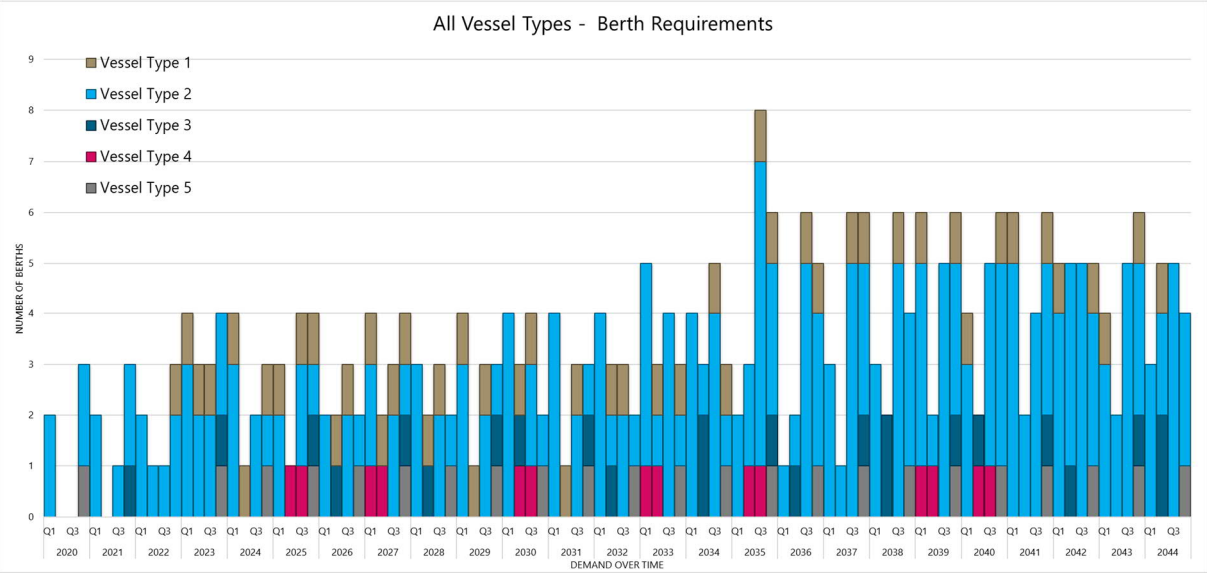
The design of all future Defence berths require the following:

- Shore power at the front and rear for each ship – 1600 Amp, 450V, 60 Hz and 50 Hz
- Water, both for potable and for fire fighting
- Sewage, either reticulated pipeline or a vacuum tanker service
- Telephone, information and communication services (including access to Defence Restricted Networks)
- Pneumatic Yokohama fendered berths
- Refrigerated storage for ship cold food supplies
- Hazchem/dangerous goods store
- Quarantine waste facilities
- Gangway supply (to alleviate the need to truck them to/from FBW)
- Cranage and wharf load capacity
- Wharf side showers and toilets for use by ship staff and industry
- Galley crew break rooms, if existing CUF building 2 lease is discontinued
- A range of different contractor shore power connection points
- Cathodic protection earth bonding on wharf for ship cathodic protection systems
- Shore side laundry facility for ship and possibly industry use if required

4.4.2 Future demand for berth facilities

Figure 4-2 shows the demand over time graph for Defence berth usage. There will be demand for resource projects to access berths over time. Although the timing and extent of these activities is not clear, the planning for berths has considered continued access for this sector.

Figure 4-2 Defence berth demand over time[8]



There is a need to increase the number of berths to cater for four vessels from 2023 onwards, increasing in the early 2030s to five vessels, followed by a consistent demand for six vessels by the mid-2030s. All new berths will need to be designed to cater for RAN vessels with the services and requirements as noted in Section 4.4.1. To cater for the submarines, a dedicated berth with panelling to support the hydropneumatic fenders will be required.

To ensure maximum flexibility, each new berth will be 200m in length to cater for Hunter class vessels. It is recognized that the support vessels require longer berths and hence the berths should be positioned to accommodate this in at least one location in the AMC.

4.4.3 Vessel lift and transfer characteristics and planning assumptions

Infrastructure to support the lift and transfer of vessels is key to the development of both the Northern and Southern Harbours. In the Northern Harbour it is recognised there is a need for a lift capability up to 1,250t / 1,500t. In the Southern Harbour there is a need for capability to lift and transfer up to the Hunter class vessels, in the order of 9,000t to 12,000t. The options for lift and transfer, including the role of existing infrastructure, must be considered holistically for both Harbours to determine the best solution for all AMC users. Critical in these considerations is access to this infrastructure by all those seeking to lift and transfer vessels within the AMC.

There are a number of options for the lift and transfer of vessels as described in Table 4-4.

[8] This graph assumes transition of FCD to the AMC. At present no commitment to this transition has been made by Defence or the Commonwealth Government.

Table 4-4 Lift and transfer options

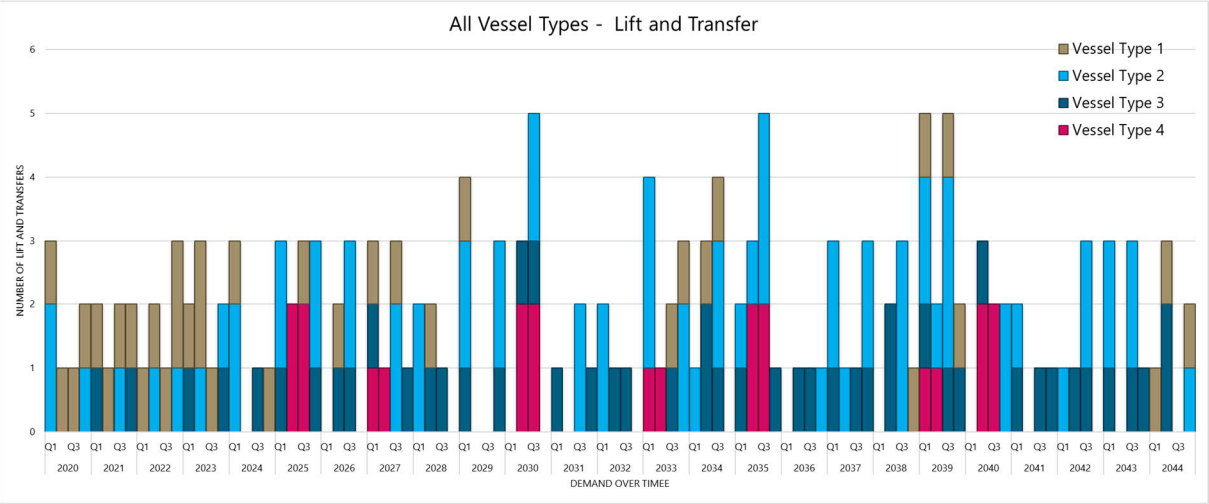
Option	Description	Benefits	
Slipway	• Twin rails and cradle system for vessel launch and retrieval • Move vessel onshore using rail system	• Limited benefits – considered as an 'old fashioned' transfer method	
Shiplift / syncrolift	• Structural platform lifted and lowered vertically for vessel launch or retrieval • Can connect to rails and trailers on land or utilize SPMT	• Common technology to cater for a range of vessels • Longevity	
Floating dock	• System includes a floating dock, a deep sink dredged pocket, a wharf to berth against for vessel transfer • Ability to move the vessel using SPMT when on land • Could have cranes built onto the sides for lifting capability and use as a maintenance dock	• Increased flexibility in relation to transporting on SPMT • Can operate as a dry dock with access for cranes and other vehicles	
Marine travel lift	• Travel crane for lifting and moving vessels • Requires two finger jetties to support travel lift • Limited to lifting vessels up to 1500 tonnes	• Flexible means of lifting vessels and transporting to hardstand or shed • Could be an option in the Northern Harbour due to smaller anticipated vessel sizes	
Pallet barge	• Flat top barge designed to cater for a defined tonnage • Requires a wharf with suitable mooring arrangement to berth against, to roll on the vessels using the SPMT	• Cheaper option for vessel transfer that could be adopted in Northern Harbour • Significant risks as involves 'double handing' of a vessel	

Option	Description	Benefits	
	• Would transport vessel to floating dock, and utilize to lower the barge and vessel into the water, before sailing away		
Large vessel dry berth	• Basin that is flooded to allow vessel access, and then drained so that the vessel rests on cradles or supports in a dry environment • Not possible to transfer a vessel from a dry berth • All cranage is located on the sides, for vessel maintenance • Identified as desirable in the 2020 Force Structure Plan (Department of Defence, 2020)	• Suitable for large vessels, where the cost of transfer and associated infrastructure become prohibitive due to their weight • Provides the ability to construct and maintain large Defence and commercial vessels	
Transfer Path	• Utilise SPMT to move vessel to existing floating dock or shiplift • Path needs to be designed to cater for the maximum weight of the vessel and minimal change in gradients	• Could enable vessel transfer from Northern Harbour to Southern	

4.4.4 Future demand for lift and transfer facilities

Figure 4-3 shows the demand over time graph for Defence vessel lift and transfer. The demand for lift and transfer of commercial vessels will still occur in the future but it is not defined, compared to the Defence requirements.

Figure 4-3 Defence lift and transfer demand over time[9]



The maximum number of lift and transfers over a three month period that may take place within the AMC is five, commencing in the 2030s. Typically, a lift and transfer utilising the existing AMC floating dock, takes around three days to prepare for and complete the manoeuvre. Based on this duration there is adequate capacity to cater for the projected number of lift and transfer movements predicted in the future. Additionally, it is assumed that privately owned lift and transfer facilities (Austal, AME and BAE) will continue to be available in the future, thus ensuring that sufficient lift and transfer capacity is available.

Although the floating dock can lift vessels up to 12,000 tonnes, the transfer of vessels from the floating dock to the CUF is restricted to 4,500 tonnes. It is not currently possible to transfer the Hobart class destroyers, or Hunter class frigates. Assessments would need to be completed to determine if the existing floating dock can lift the Attack class submarines when the final characteristics of the vessel is known.

To transfer these vessels an upgraded or new vessel lift and transfer facility will be required. Any new facility would need to enable operation independent of tidal state and in all weather conditions. The transfer system would need to be designed to cater for lightship displacement tonnage of the vessels. The pros and cons of the various options will need to be considered in a separate Vessel Lift and Transfer Technology Study as they are complex and must be considered in the context of other infrastructure investments in the AMC.

[9] This graph assumes transition of FCD to the AMC. At present no commitment to this transition has been made by Defence or the Commonwealth Government

Option1 upgrade existing floating dock

To accommodate larger vessels in the future, upgrades to the existing floating dock could include:

- Replacement with a larger floating dock, to cater for vessels up to 150m in length and full load displacement weights of between 9,000t to 12,000t to accommodate future growth of the Hunter class fleet
- Extension of the existing floating dock by 50m and an increase in lift and transfer capacity to 9,000t, (or even 12,000t if feasible)
- Acquisition of additional SPMT.

Option 2 alternative lift and transfer options

- A shiplift could be purposely designed to cater for a future Hunter class vessel, with SPMT used to transport vessels on land
- A large vessel dry berth could provide an alternative means for vessel maintenance that does not need transfer onto land
- Provision of a transfer path to the BAE syncrolift on the assumption that this facility is upgraded to cater for the future vessels.

For the Northern Harbour, given it involves smaller vessels the following lift and transfer facilities could be considered:

- Marine travel lift for vessels up to 1,250 /1,500 tonnes
- Shiplift / new floating dock for vessels greater than 1,500 tonnes, such as OPVs
- Relocate the existing floating dock, if an alternative solution is considered for the Southern Harbour
- Pallet barge system.

Options for the Northern Harbour and their pros and cons should be considered in conjunction with those in the Southern Harbour, in a separate Vessel Lift and Transfer Technology Study.

4.4.5 Vessel hardstand characteristics and planning assumptions

Northern Harbour

There are no defined outdoor hardstand positions in the Northern Harbour area, but there are a number of sheds where vessels can be constructed, sustained and upgraded.

Southern Harbour

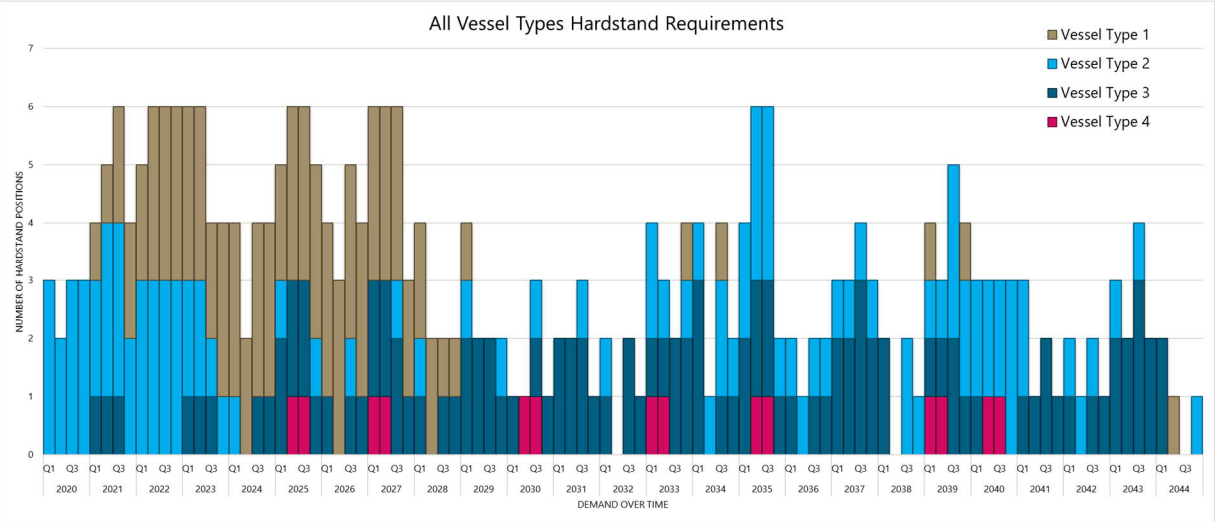
Within the Southern Harbour there are the following hardstand positions:

- BAE facility - three outdoor locations
- CUF – one outdoor location for Anzac class frigates
- ASC facility – one outdoor and one indoor position for submarines
- Civmec – a vessel maintenance facility, catering for two frigate vessels (up to Hunter class size) and eight OPVs indoors.

4.4.6 Future demand for vessel hardstand

Figure 4-4 shows the demand over time graph for Defence hardstand requirements. Although the demand for hardstand from other users is unclear, this has been considered to ensure these activities can have new or continued access.

Figure 4-4 Hardstand demand over time[10]



In the future up to six hardstand positions will be required. These could be catered for with existing facilities within the AMC (CUF and others).

A key requirement of Defence is the provision of facilities to enable maintenance activities (including paint removal and application) for future RAN vessels in all weather conditions. Currently the only location in the Southern Harbour where this is feasible is the Civmec maintenance facility. Provision for additional covered facilities in the CUF to meet this key requirement will be considered.

The above demand over time graph does not account for disposal of RAN vessels. To account for this, additional hardstand positions with utilities and suitable bunding complying with all relevant environmental standards will be accommodated in the CUF. The design for hardstand positions also needs to cater for management of invasive marine species, wash down and blasting activities.

The OPV construction is driving demand in the early part of the schedule. Demand will also eventuate from the SEA1905 and SEA2400 programs. Future vessel construction beyond the 15 year horizon is unknown, and other demand may eventuate in the future. The hardstand area could also be utilised by resources or other major projects if not required for vessels.

[10] This graph assumes transition of FCD to the AMC. At present no commitment to this transition has been made by Defence or the Commonwealth Government

5 Opportunities and constraints

The following section provides a summary of the opportunities and constraints identified through the stakeholder consultation and gap analysis process. The opportunities and constraints have been grouped according to project types or infrastructure types within the AMC to help guide subsequent planning for infrastructure and land uses within the AMC.

5.1 Defence

ID	Opportunities / Constraints
D1	ASC currently undertakes in water activities at FBW rather than within the AMC as they believe the infrastructure currently available in the AMC does not meet their requirements.
D2	Suitable utilities (power, water, telecommunications) with sufficient working space is required at each berth to support Defence activities (existing and new vessels). Offices and support buildings are also required within close proximity to the wharves to support in water maintenance activities. (Oropesa Port Management Pty Ltd, 2018)
D3	There are currently no amenities within AMC for Navy personnel while vessels are being maintained. Personnel therefore move between FBW and the AMC as required.
D4	There is no dedicated location/infrastructure for vessel disposal within the AMC at present. Additional hardstand positions will be required in the future to accommodate sustainment and disposal activities. The location of transfer paths to the south and north of the floating dock will impact on the potential to provide hardstand positions.
D5	Current common user vessel lifting capacity will not support future known Defence vessel types. Limitation on the existing capacity to lift (maximum lift = 12,000 tonnes) and transfer vessels (maximum transfer = 4,500 tonnes).
D6	There is currently no infrastructure to cater for larger vessels than those currently based at FBW within AMC and therefore no redundancy of infrastructure within Australia. This is only available through the Captain Cook Graving Dock in Sydney.
D7	Connectivity with the Ship Zero site is required from the CUF.
D8	Non-Defence activities are located and operate in close proximity to current Defence activities.
D9	There is a need for warehousing to support Defence sustainment activities to be located inside or in close proximity to the AMC.
D10	In the future, if new commercial port facilities are developed in Cockburn Sound, shipping volumes using the Gage Roads, Success and Parmelia Channels will increase significantly. If a second access channel is not constructed and the current one becomes blocked for any reason, this may adversely impact vessel access to the AMC.

5.2 Commercial shipbuilding

ID	Opportunities / Constraints
C1	There is no common user ship lift and transfer capability within the Northern Harbour at present, however, access to privately owned infrastructure occurs to support commercial shipbuilding and maintenance activities.
C2	There is no defined transfer path for vessels between the Northern Harbour and Southern Harbour to provide access to shiplift and transfer capabilities at both BAE and the floating dock.
C3	Activities undertaken outdoors in some locations (within and adjacent to the AMC) may impact other users within the AMC (outdoor sandblasting/painting).
C4	Condition of the breakwater in the Northern Harbour is poor in places and will require significant maintenance in the future.
C5	Varying dredge depths in the Northern Harbour restrict vessel access/movement.
C6	Common user infrastructure including fabrication sheds and hardstand need to be available to provide flexibility for project based commercial shipbuilding.
C7	The Recreation Boating Precinct brings the public into the Northern Harbour and in close proximity to existing private landholdings. There is the potential for conflict for vessel movement and public accessing private jetties and groynes. There are also possible conflicts at the harbour entrance, which is reduced to only 110m.

5.3 Resources sector and major projects

ID	Opportunities / Constraints
RP1	Access to the CUF for HWL from the surrounding road network is constrained in some areas, which makes the transport of HWL from some locations expensive due to permitting/removal of street furniture/raising of powerlines.
RP2	Additional buildings to provide covered work space inside the CUF to support fabrication.
RP3	Maintain availability of appropriately sized laydown areas for future resource projects, and access to heavy load out wharves (such as AMC 4 and 5) at the CUF.
RP4	A flexible approach is required for co-habitation of oil and gas, resources and Defence related activities within the CUF, ensuring availability of common use infrastructure. This includes access to the AMC 1 wharf for the load-out of large modules from the fabrication hall.
RP5	Ability for laydown area overflow into other waterfront lots or adjacent ones directly behind.

5.4 Support industry/activities

ID	Opportunities / Constraints
SIP1	There is limited vacant land available for future development within the support/fabrication precincts at present.
SIP2	Within the Shipbuilding Precinct there are three vacant lots (15,16 and 17) to the north of Austal which are not accessible by road at present and therefore cannot easily be developed.
SIP3	The Technology Precinct is currently under utilised.
SPI4	The City of Cockburn is progressing an amendment to its local planning scheme (Scheme Amendment No.144) to relax zoning requirements for land within the AMC through the inclusion of additional uses.
SIP5	The Latitude 32 Industrial Area is located immediately to the east of the AMC and has the potential to accommodate related land uses and activities in the future. There is no direct transfer path to transport large modules between the Latitude 32 Industrial Area and the AMC at present.

5.5 Common User Facility

ID	Opportunities / Constraints
CUF1	There is limited working area behind AMC 1/AMC 2 and AMC 3 berths due to their current design.
CUF2	Berths AMC 5 and AMC 6 are exposed to open water which reduces their operability.
CUF3	Vessel sizes able to be accommodated within the AMC is limited by berth lengths/dredged depth (refer Figure 3-2 and Figure 3-3).
CUF4	New transfer paths will be required to establish redundancy in lift and transfer capability and connect with locations for vessel construction, maintenance, sustainment and decommissioning activities. This will reduce land available for laydown purposes.
CUF5	Future use and development of the southern portion of the CUF will need to ensure a competitive environment for all users.
CUF6	The design life of floating dock is 25 years with a recertification at that stage for an additional 25 years. This is due in 2034.
CUF7	Aging buildings in a hostile environment (salt, wind).

5.6 Transportation

ID	Opportunities / Constraints
T1	Traffic congestion at key intersections along Cockburn Road, Russell Road and Rockingham Road makes access to the AMC difficult. Congestion and existing road safety issues will continue to worsen in the future due to increased development in the AMC and surrounding areas.
T2	The Metropolitan Region Scheme includes provision for the Fremantle Rockingham Controlled Access Highway. There is also the potential to upgrade other regional roads where additional road reserve is available.
T3	Some businesses have converted their on site car parking to other uses forcing staff to park off site. On street car parking has the potential to impact on the movement of RAV within the AMC. Car parking is not the 'highest and best use' of land within the CUF or other areas within AMC. Demand for car parking will likely increase in the future.
T4	There is limited public transport infrastructure and services within AMC making it difficult to access the AMC by transport modes other than car. Existing services will require upgrade in the future to provide greater travel options for the AMC workforce.
T5	There is limited pedestrian infrastructure within the AMC which makes moving around on foot very difficult. There are limited footpaths and no marked pedestrian crossings within the AMC.
T6	There is limited infrastructure for cyclists. Traffic volumes and composition contribute to a hostile road environment for cyclists. It is also likely that there are limited end of trip facilities available for cyclists.
T7	The vertical and horizontal geometry of the HWL entrance to the Southern CUF from Cockburn Road could be improved.

5.7 Utilities

ID	Opportunities / Constraints
U1	Sump D is located on the western side of Nautical Drive on valuable waterfront land, between ASC and Civmec. Sump D forms part of the overall AMC stormwater drainage network. This land could potentially be used for other purposes if not required for drainage.
U2	Upgrade to the power supply and distribution network within the CUF may be required to support new fabrication facilities and the potential large vessel dry berth.
U3	Utility services will require extension to Lots 15,16 and 17 Clarence Beach Road to support development of these sites in the future.

5.8 Governance

ID	Opportunities / Constraints
G1	Declaration of Naval Waters over the Southern Harbour will require close engagement with Superintendent of Navel Waters (Commanding Officer HMAS Stirling) and the Henderson Security and Facilities Manager (CASG) to ensure the practical implementation does not impact commercial operations.
G2	Several Government agencies have roles and responsibilities in the AMC that may be difficult for owners / businesses to understand and navigate if not communicated.
G3	There is currently some inconsistency between government charges (seabed leases). The Northern Harbour is administered by the DoT and the Southern Harbour is administered by the Fremantle Port Authority.
G4	Compliance with the existing planning scheme requirements (car parking and permitted uses) has been an issue within the AMC in the past. The City of Cockburn has recently completed a compliance audit of DA15 and DA17 within the AMC to help address this issue.
G5	The City of Cockburn has progressed Scheme Amendment No.144 to address zoning and land use permissibility within the AMC.

5.9 Environment

ID	Opportunities / Constraints
E1	Circulation of water within the Northern Harbour.
E2	Existing constraints within the AMC including, contaminated sites, ship wrecks and WaterCorp outfalls.
E3	Existing constraints outside the AMC including seagrass and Henderson Cliffs.
E4	Improved facilities to manage emergency events i.e. ability to block drains that discharge into the ocean.

5.10 Amenities

ID	Opportunities / Constraints
A1	Amenities should be significantly improved in the future to help businesses compete for the best workforce and to support increased numbers of Navy personnel based in the AMC during training and sustainment activities.

5.11 Emergency Services

ID	Opportunities / Constraints
ES1	As the AMC further develops, emergency response assessments will need to be undertaken.

6 Infrastructure and land use solutions

The following section outlines a range of infrastructure and land use proposals intended to address the opportunities and constraints identified earlier in Section 5. It should be noted that these are high level concepts only and will require further study in the future to determine the final engineering solutions. The plan indicates a number of opportunities for new infrastructure or land uses that could potentially be developed in the future, should identified demand develop. The exact form and mechanism for their implementation will be determined by State Government in the future.

It is recognised there is a difference in nature and activities in the Northern and Southern Harbours at the AMC. The Southern Harbour is dominated with the CUF and RAN vessel sustainment, whereas the Northern Harbour, with the exception of Austal, focuses on commercial vessel build and sustainment. Future planning is focused on reinforcing the strengths of each location and ensuring that activities in each are supported by appropriate land use planning and infrastructure in the future.

Two concept options have been developed for the Southern Harbour and one for the North, each with accompanying zoning plans. It should be noted the zones identified in these plans are strategic and not statutory zones. In developing options, it is important to ensure that existing operations at the CUF and those of other waterfront operators are not impacted.

Land uses and infrastructure have also been considered throughout the broader AMC and a number of proposals have been developed support future growth.

6.1 Waterfront land uses

To help ensure that sufficient land and infrastructure is available for all AMC users a number Activity Zones are proposed within the current waterfront precinct (including the CUF). The intention of each zone is outlined in *Table 6-1*. These zones have no statutory powers and are intended as a guide for future development only.

It is acknowledged that the CUF Defence Priority Zone will require further specialised planning in collaboration with Defence to ensure the zone meets the security and access requirements of Defence from both a personnel and facility perspective. Sections 6.3.4 and 6.4.4 detail the initial concept layout options for establishing a Defence Priority Zone within the CUF. This zone will require specialised physical systems to meet the needs of Defence. This should be planned to complement the sustainment activities undertaken within Defence contractor sites working on Navy platforms. The formulation of separate zones at the AMC and the physical systems required on their boundaries will be determined as part of a ‘whole of complex’ comprehensive security strategy.

Table 6-1 Waterfront activity zones

Zone	Function
Defence Contractors	These sites are identified as existing and future Defence contractors who require direct access to the CUF or their own waterfront infrastructure, for shipbuilding or sustainment activities.
CUF Defence Priority Zone	Within this zone Defence activities are prioritised. Infrastructure will be designed primarily to suit Defence requirements and access for Defence activities will be prioritised over other uses. Non-Defence activities can be undertaken in this zone if land/infrastructure is not required for Defence purposes.
CUF Common Use Zone	This zone is prioritised for use by major/resources projects. Infrastructure and land within this zone is designed to accommodate these uses. This zone can be used for other purposes provided that it is not required for projects.
Commercial Vessels Zone	The intention of this zone is to ensure that commercial shipbuilding and maintenance activities have a prioritised precinct. Smaller Defence vessels could also be constructed and maintained within this zone.

Depending on use, physical and operational restrictions would be applied within these zones, given the CUF is a working port facility (under MTOSFA) and there are designated custom controlled areas.

6.2 Northern Harbour – concept

The focus for the Northern Harbour is to support commercial and small Defence vessel build and maintenance. This concept does not have a staged approach as per the Southern Harbour as development will be driven by project and industry demand. Demand for infrastructure and land within this precinct will therefore need to be monitored closely to ensure that infrastructure is provided in a timely manner.

This concept considers the following infrastructure development, as shown in Figure 6-1.

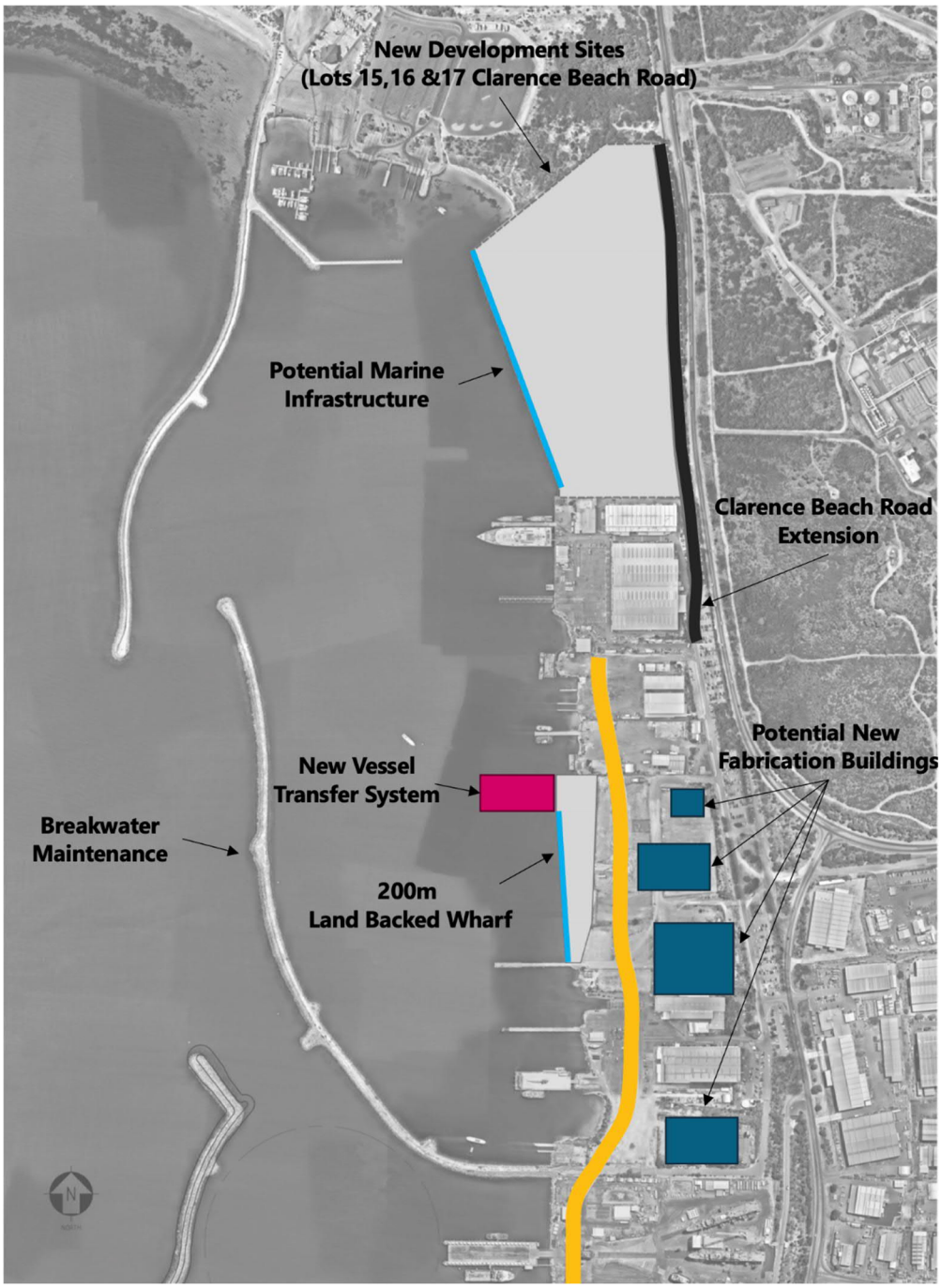
6.2.1 CUF North

The Northern Harbour includes approximately 7.5ha of currently underutilised land allocated to the CUF. Future development of this land will require the following infrastructure:

- Dredging, reclamation and the construction of a land backed wharf. Dredge depth to be determined depending on the vessel requirements, possibly in the order of -6mCD to -8mCD
- Development of a vessel transfer facility. This could range from a large marine travel lift (capable of lifting between 1,250t and 1,500t displacement), to using the existing floating dock or some form of pallet barge
- Construction of hardstand and laydown for vessel movement
- Sheds and offices for vessel build and maintenance

- Ablution facilities for common use
- Improved access from Clarence Beach Road, including the RAV corridor
- Utilising the existing jetty as a facility for the Fremantle Port Authority Kwinana tugs
- Development of a transfer path from the Southern Harbour CUF to Austal through CUF North, for any vessels larger than the current vessel transfer system can cater for. It is noted that the proposed alignment of the transfer path within the Northern Harbour traverses privately held land and would require negotiation with existing land owners to achieve access. The transfer path would need to be designed to cater for the types of vessels that can be accommodated at the facilities from Austal down to AME.

Figure 6-1 Northern Harbour concept



6.2.2 Initial development

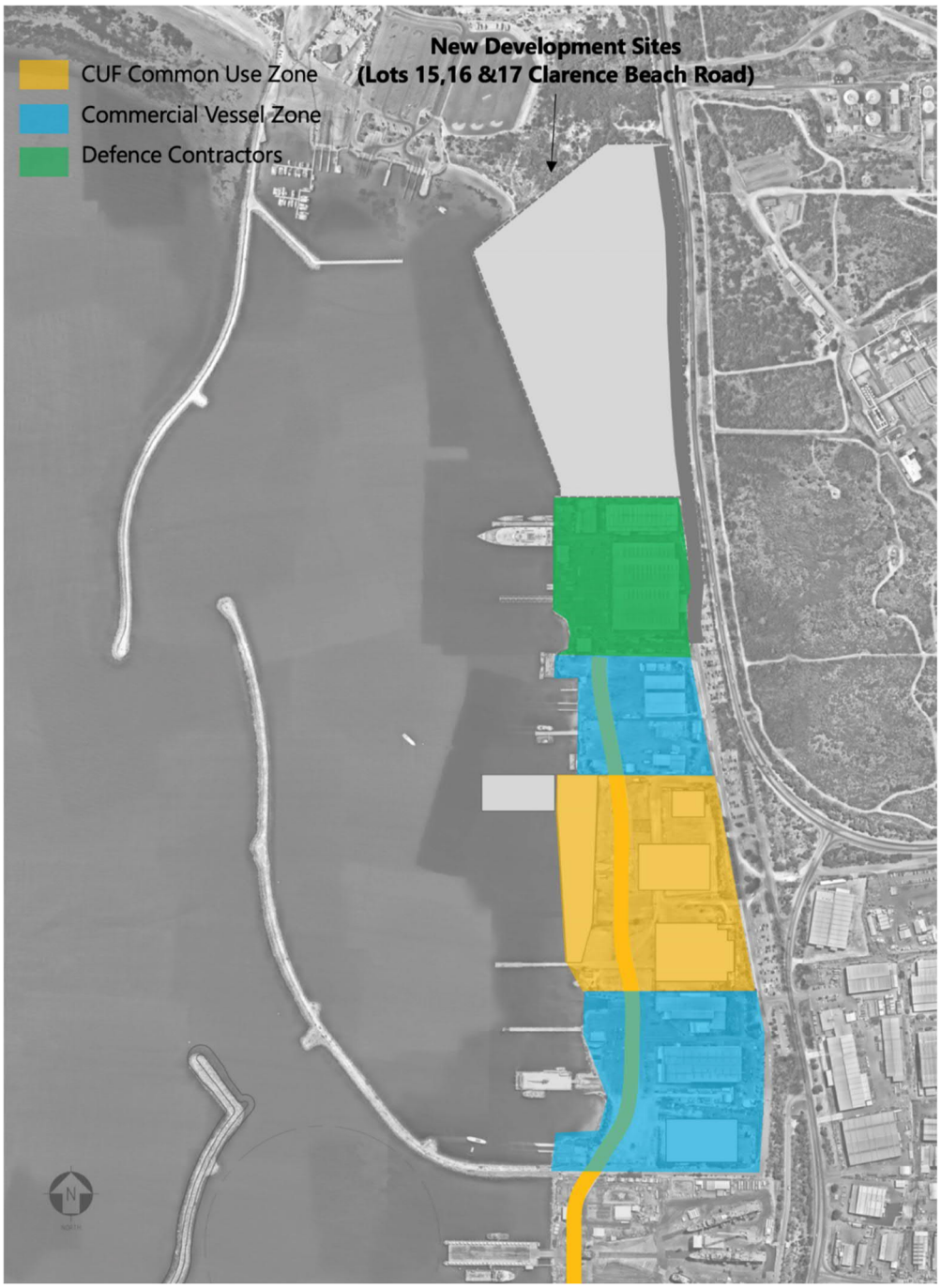
The key known infrastructure development in 0 to 5 years are:

- CUF North Development – vessel fabrication hall to support commercial shipbuilding and sustainment
- Extension of Clarence Beach Road through Lots 15, 16 and 17
- Major maintenance of the Southern Jervoise Bay breakwater, to ensure the harbour is protected for years to come
- A vessel transfer path from CUF North to BAE to support the new vessel fabrication hall.

6.2.3 Waterfront activity zones

Figure 6-2 illustrates the proposed structure of activity zones within the Northern Harbour. These zones have been structured to promote this area's focus on shipbuilding and maintenance, whilst providing a significant area for the CUF.

Figure 6-2 Waterfront activity zones



6.3 Southern Harbour – concept 1

This concept focuses Defence activity within the central area of the Southern Harbour. It provides for staged expansion of the berths to cater for demand, without impacting on existing CUF operations and creates the opportunity for a consolidated Defence precinct.

The staging of berth construction will need to be coordinated with Defence, given other wharf upgrades and works at both FBW and FBE.

Figure 6-3 to Figure 6-5 show the proposed staged development for this concept.

6.3.1 Stage 1: 0 to 5 years

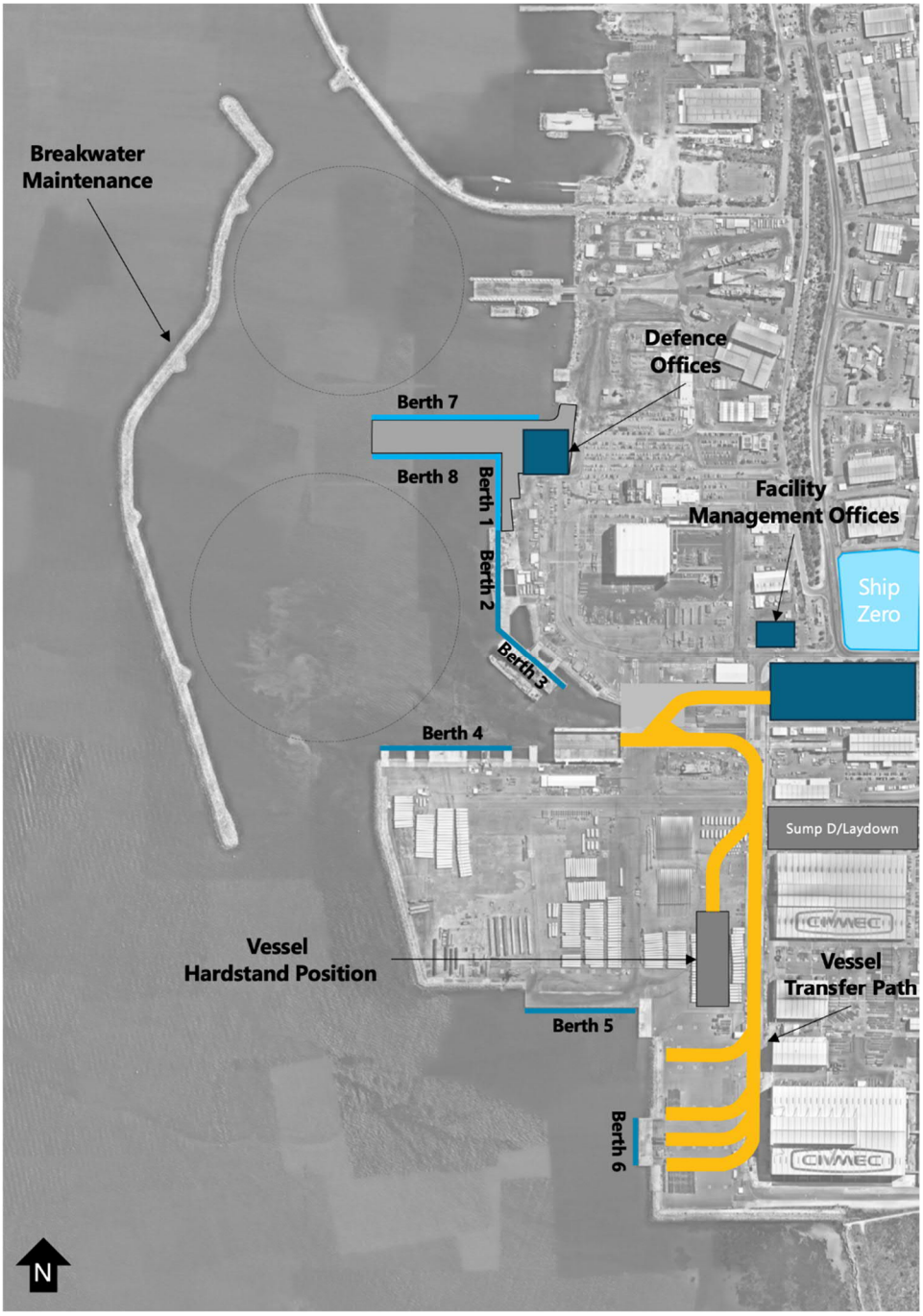
The following infrastructure is included in Stage 1:

- Three priority berths for Defence. This will be an extension of the existing AMC 1 wharf, in a northerly direction to provide for a berth (AMC 1 and 2) length around 280m. A finger jetty running perpendicular to the extended AMC 1 berth, providing a further two new berths, of 200m in length. One of these berths could be a dedicated submarine berth. The width of the finger jetty would need to be able to cater for the possibility of two different contractors undertaking sustainment activities. To cater for a berth depth of -10mCD, localised dredging adjacent to the existing land will be required
- A reclamation behind the two new berths provides land to develop secure offices for Defence and Defence contractors. These offices would also have secure IT and cater for all of Defence's requirements
- Upgrades to the existing services (power, water, secure communications) that currently feed to AMC 2 and 3 wharves. Extensions of the services to feed to the new berths with a staged design approach to cater for the future expansion
- A defined transfer path from the Civmec facility to the floating dock to cater for the movement of the OPVs, and Anzac class and Hunter class frigates
- Expansion of the ASC facility to the north and construction of a new shed and facilities to cater for FCD maintenance activities[11]
- An additional set of cradles to support the submarine whilst in the shed
- A dedicated transfer path from the new ASC FCD maintenance shed to the floating dock[11]
- Possible relocation of Building 9 to another location in the CUF to provide covered work space areas, and the optionality for a vessel to be transferred into the building
- Once the transfer path is constructed to the ASC facility, the existing vessel hardstand position at the CUF will need to be relocated. This new vessel hardstand will be designed with suitable bunding to cater for wash down, management of invasive marine species, blasting, refurbishment and disposal activities
- It is essential to ensure there are berths available for common use, with AMC berths 4, 5 and 6, able to support resource based activities
- Upgrades to the facility management offices, to provide for additional office space, café, gym and other facilities for all workers and Defence personnel based in the area. The specific amenity improvements made to the CUF facility management offices will be considered in conjunction with the provision of services at the Ship Zero site for Defence personnel.

[11] At present no commitment to this transition has been made by Defence or the Commonwealth Government.

It is acknowledged that the location and timing of FCD, if transitioned to the AMC, is yet to be determined. For the purpose of developing the SILUP it is assumed it will take place at an expanded ASC facility[12].

Figure 6-3 Southern Harbour concept 1 - stage 1, 0 to 5 years



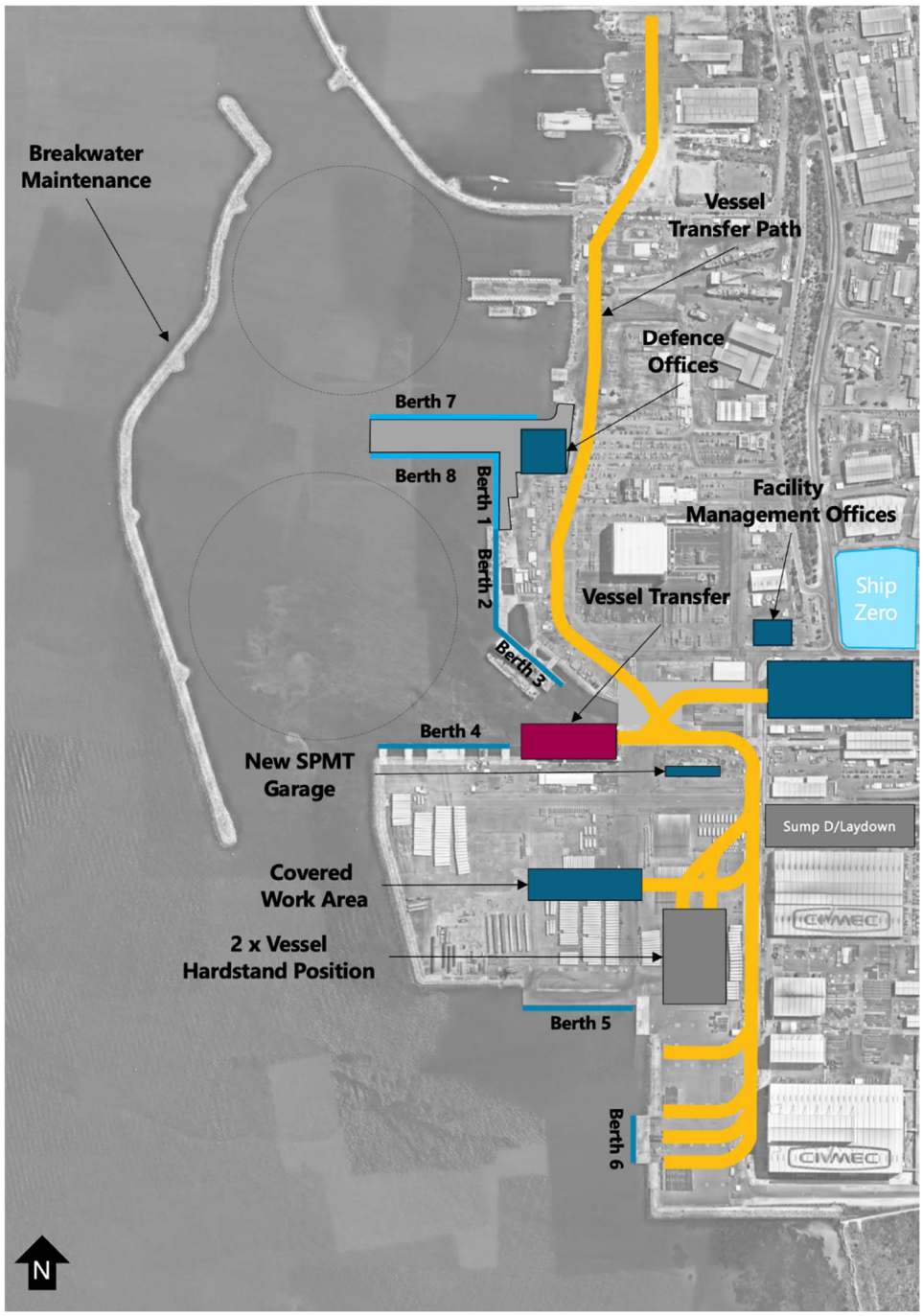
[12] At present no commitment to this transition has been made by Defence or the Commonwealth Government.

6.3.2 Stage 2: 5 to 10 years

The following infrastructure is included in Stage 2:

- Upgrade to the existing floating dock, by either adding on an additional section or building a new one, to enable the lift and transfer of the Hunter class frigate vessels
- To cater for the expanded floating dock the easternmost dolphin on the AMC 4 berth would need to be demolished, hence reducing the overall length of this berth to 200m
- Purchase of additional SPMT for Hunter class vessel transfer
- Construction of new garage facilities for the SPMT units
- Development of a transfer path from BAE to the CUF floating dock on the assumption that BAE upgrade their shiplift to cater for the Hunter class frigates
- Expansion of the vessel hardstand to cater for a second vessel, and an additional set of vessel cradles
- Construction of a covered work area within the CUF to cater for vessels up to the Hunter class frigate size. The position as shown in Figure 6-4 is one possible option, but there could be other feasible locations depending on how infrastructure is developed. Additional laydown and storage areas may also be required to support the functions of the building
- Three existing berths remain available for common use, AMC berths 4, 5 and 6.

Figure 6-4 Southern Harbour concept 1 - stage 2, 5 to 10 years

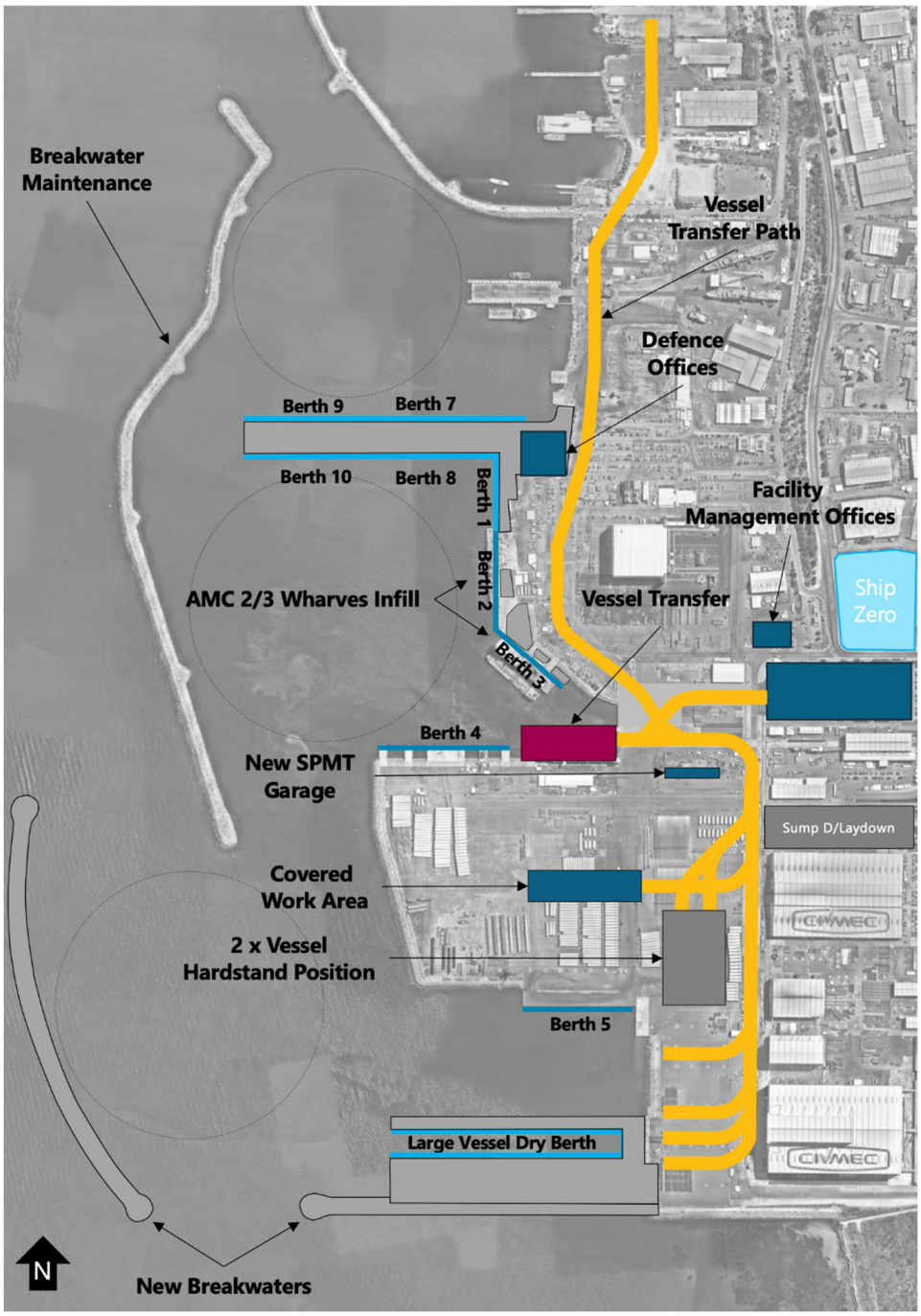


6.3.3 Stage 3: 10+ years

The following infrastructure is proposed in stage 3:

- Two additional priority berths for Defence providing an overall total of seven berths. It is intended to extend the finger jetty by an additional 200m. This wharf structure effectively separates the existing harbour in two parts. To the north there is an allowance for a vessel turning circle of 360m, and to the south 420m. This larger turning circle can cater for vessels of lengths up to 230m. Given the overall 400m length of the finger jetty, ablution and other facilities may be required on the jetty, along with space to turn around any vehicles
- Improvement upgrades to AMC 2 and 3 wharves to fill in the areas behind the berths, with a piled deck structure. This will provide more working space for cranage and laydown
- Construction of additional breakwaters to create a southern sheltered harbour. The position of these are dependent on further studies to understand the impacts on existing Medina / Jervoise approach channels, and the local wave environment. There is an allowance for a 420m turning circle, catering for a vessel of maximum length 230m
- Localised dredging to create a channel to a new large vessel dry berth
- Development of a large vessel dry berth, with supporting facilities, and cranage. The northern side of this dry berth could also be designed as a wharf, for vessel layby requirements or to meet demand beyond the timeframe of this strategic plan
- Two existing berths remain available for common use, AMC berths 4 and 5. The operability of AMC 5 would be improved with the construction of breakwaters.

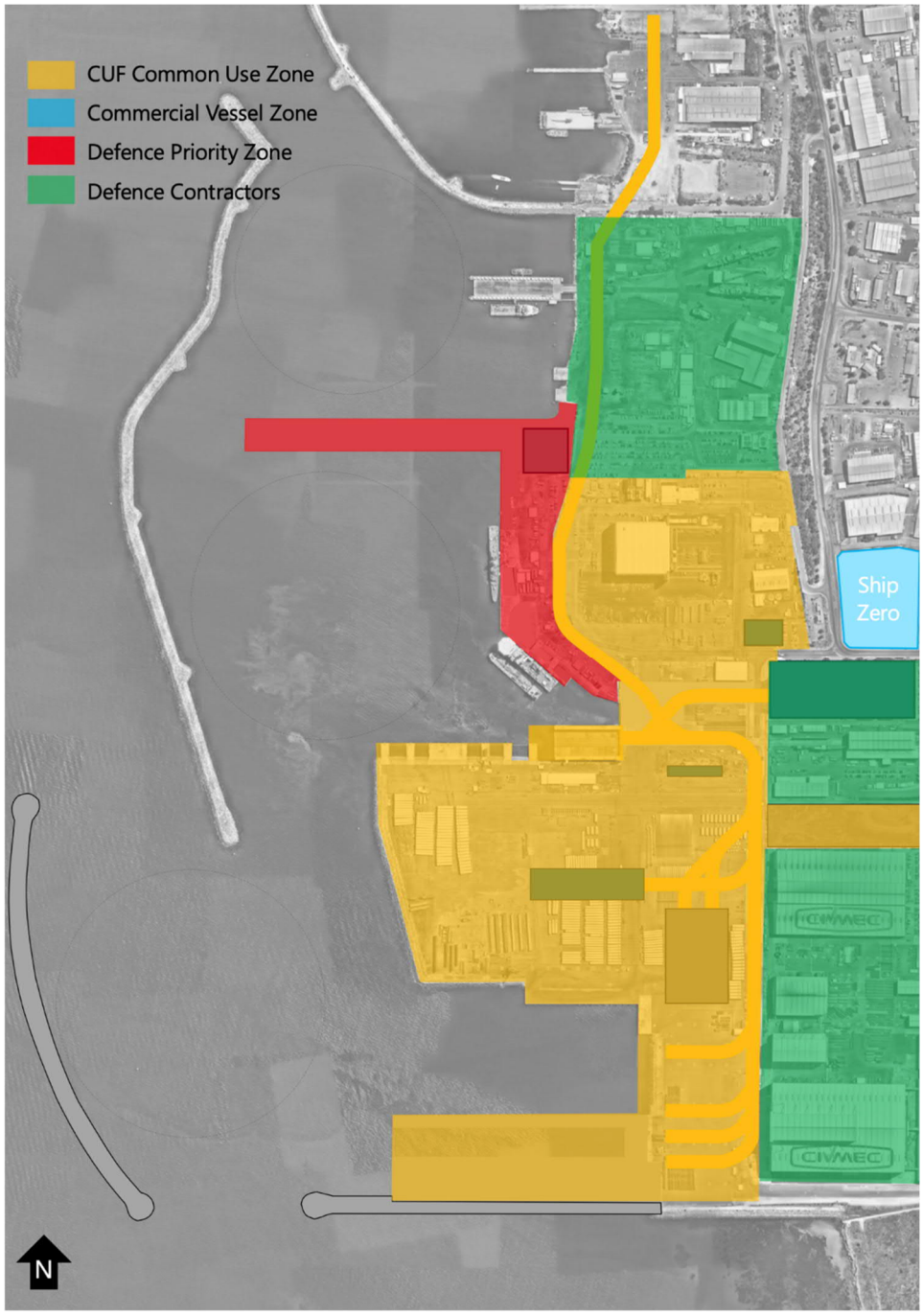
Figure 6-5 Southern Harbour concept 1 - stage 3, 10+ years



6.3.4 Waterfront activity zones

This option creates a consolidated Defence Priority zone in the centre of the Southern Harbour as shown in Figure 6-6. The majority of land and infrastructure in the Southern Harbour remains common user preserving the ability to support resource and major projects in the future.

Figure 6-6 Southern Harbour concept 1 – activity zones



6.4 Southern Harbour – concept 2

This concept concentrates development in the southern portion of the Southern Harbour creating the opportunity for new shiplift infrastructure. This option adopts the same proposed infrastructure developments as Concept 1 for the first five years. Figure 6-7 to Figure 6-9 shows the proposed staged development for this concept.

6.4.1 Stage 1: 0 to 5 years

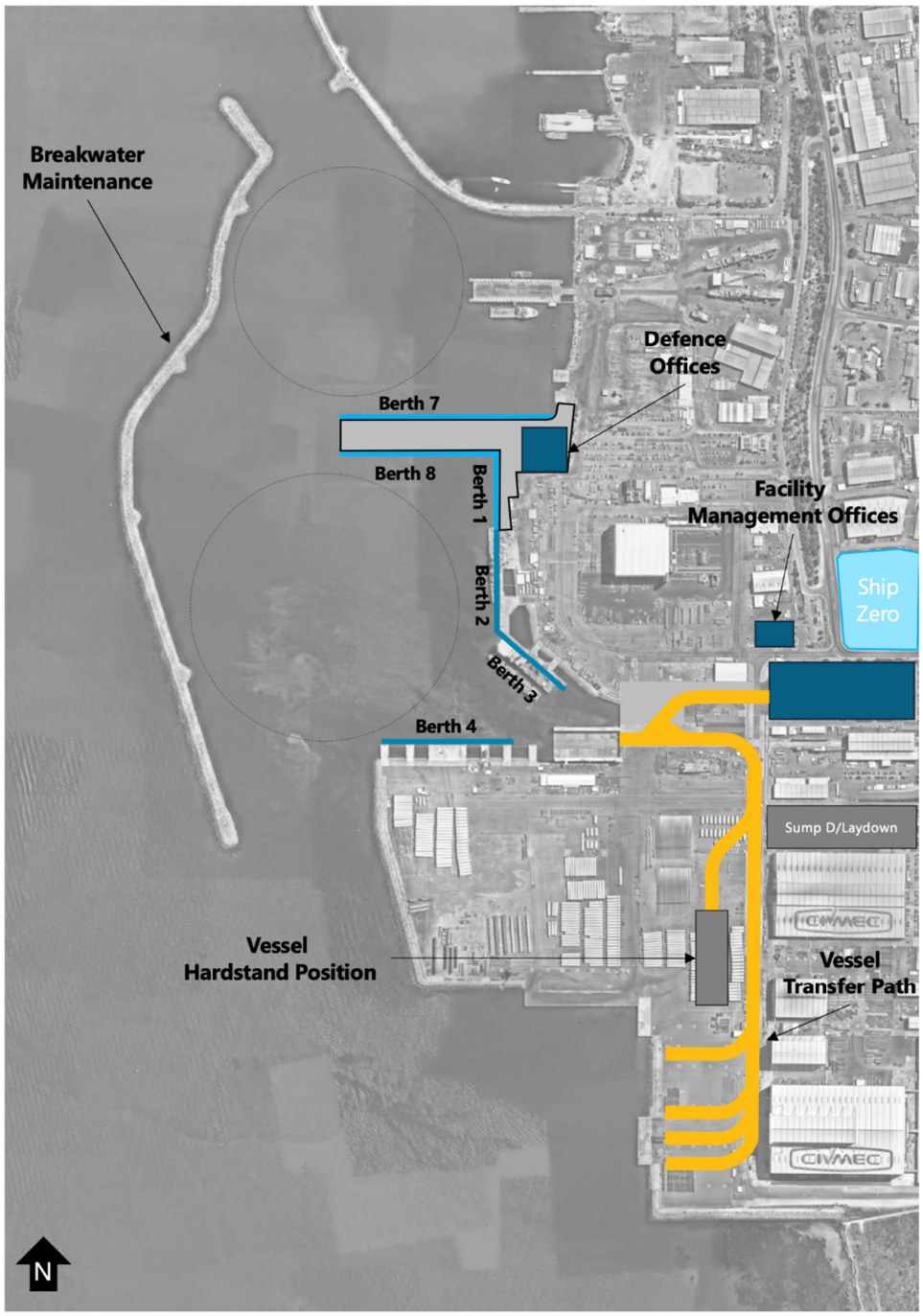
The following infrastructure is proposed in Stage 1:

- Three priority berths for Defence. This will be an extension of the existing AMC 1 wharf, in a northerly direction to provide for a total berth length of approximately 280m (AMC 1 and 2). A finger jetty running perpendicular to the extended AMC 1 berth, providing a further two new berths, each of 200m in length. One of these berths could be a dedicated submarine berth. The width of the finger jetty would need to be able to cater for the possibility of two different contractors undertaking sustainment activities. To cater for a berth depth of -10mCD, localised dredging adjacent to the existing land will be required
- A reclamation behind the two new berths provides land to develop secure offices for Defence and Defence contractors. These offices would also have secure IT and cater for all of Defence's requirements
- Upgrades to the existing services (power, water, secure communications) that currently feed to AMC 2 and 3 wharves. Extensions of the services to feed to the new berths with a staged design approach to cater for the future expansion
- A defined transfer path from the Civmec facility to the floating dock to cater for the movement of the OPVs, Anzac class and Hunter class frigates
- Expansion of the ASC facility to the north and construction of a new shed and facilities to cater for FCD maintenance activities[13]
- An additional set of cradles to support the submarine whilst in the shed
- A dedicated transfer path from the new ASC FCD maintenance shed to the floating dock[13]
- Possible relocation of Building 9 to another location in the CUF to provide covered work space areas and the optionality for a vessel to be transferred into the building
- Once the transfer path is constructed to the ASC facility, the existing vessel hardstand position at the CUF will need to be relocated. This new vessel hardstand will be designed with suitable bunding to cater for washdown, management of invasive marine species, blasting, refurbishment and disposal activities
- AMC berths 4, 5 and 6 will remain available to support resource sector/major project activities
- Upgrades to the facility management offices, to provide for additional office space, café, gym and other facilities for all workers and Defence personnel based in the area.

It is acknowledged that the location of FCD, if transitioned to the AMC, is yet to be determined. For the purpose of developing the SILUP it is assumed to take place at an expanded ASC facility.

[13] At present no commitment to this transition has been made by Defence or the Commonwealth Government

Figure 6-7 Southern Harbour concept 2 - stage 1, 0 to 5 years



6.4.2 Stage 2: 5 to 10 years

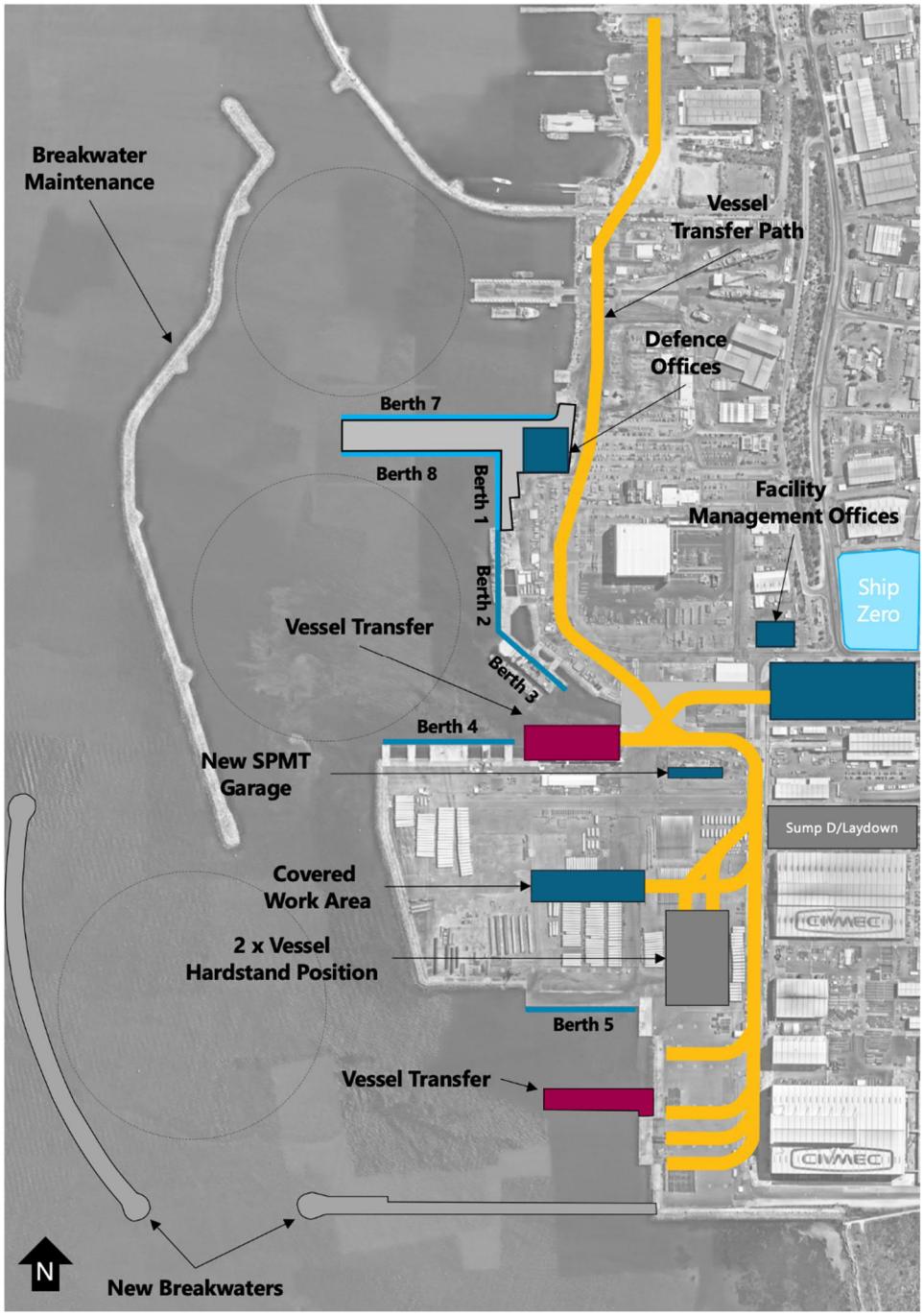
The following infrastructure is proposed in Stage 2:

- Construction of additional breakwaters to create a southern sheltered harbour
- Expansion of the vessel hardstand to cater for a second vessel, and an additional set of vessel cradles
- Construction of a covered work area within the CUF to cater for vessels up to the Hunter class frigate size. The position as shown in Figure 6-8 is one possible option, but there could be other feasible locations depending on how infrastructure is developed. Additional laydown and storage areas may also be required to support the functions of the building.

There are options to consider for lift and transfer of the Hunter class vessels during this time frame:

- Upgrade to the existing floating dock, by either adding on an additional section or building a new one, to enable the lift and transfer of the Hunter class vessels, along with modifications to AMC 4, additional SPMT and garage storage as per concept 1. The transfer path to Civmec would need to be upgraded to cater for loads up to and including Hunter class vessels. Other transfer paths within the CUF would also need to be upgraded to cater for loads up to and including the Hunter class vessels
- The alternate to upgrading the floating dock is the construction of a new shiplift facility in a southern sheltered harbour. This would be designed to lift the Hunter class vessels, and SPMTs used to transport the vessel on defined paths to the hardstand location. This could minimise the distance vessels are moved on land and assist in reducing associated risks. Localised dredging to create an access channel to the shiplift will be required
- Development of a defined transfer path from the floating dock to BAE, to cater for the future Hunter class vessels. This could provide another lift option on the assumption that BAE upgrade their shiplift capacity.

Figure 6-8 Southern Harbour concept 2 - stage 2, 5 to 10 years

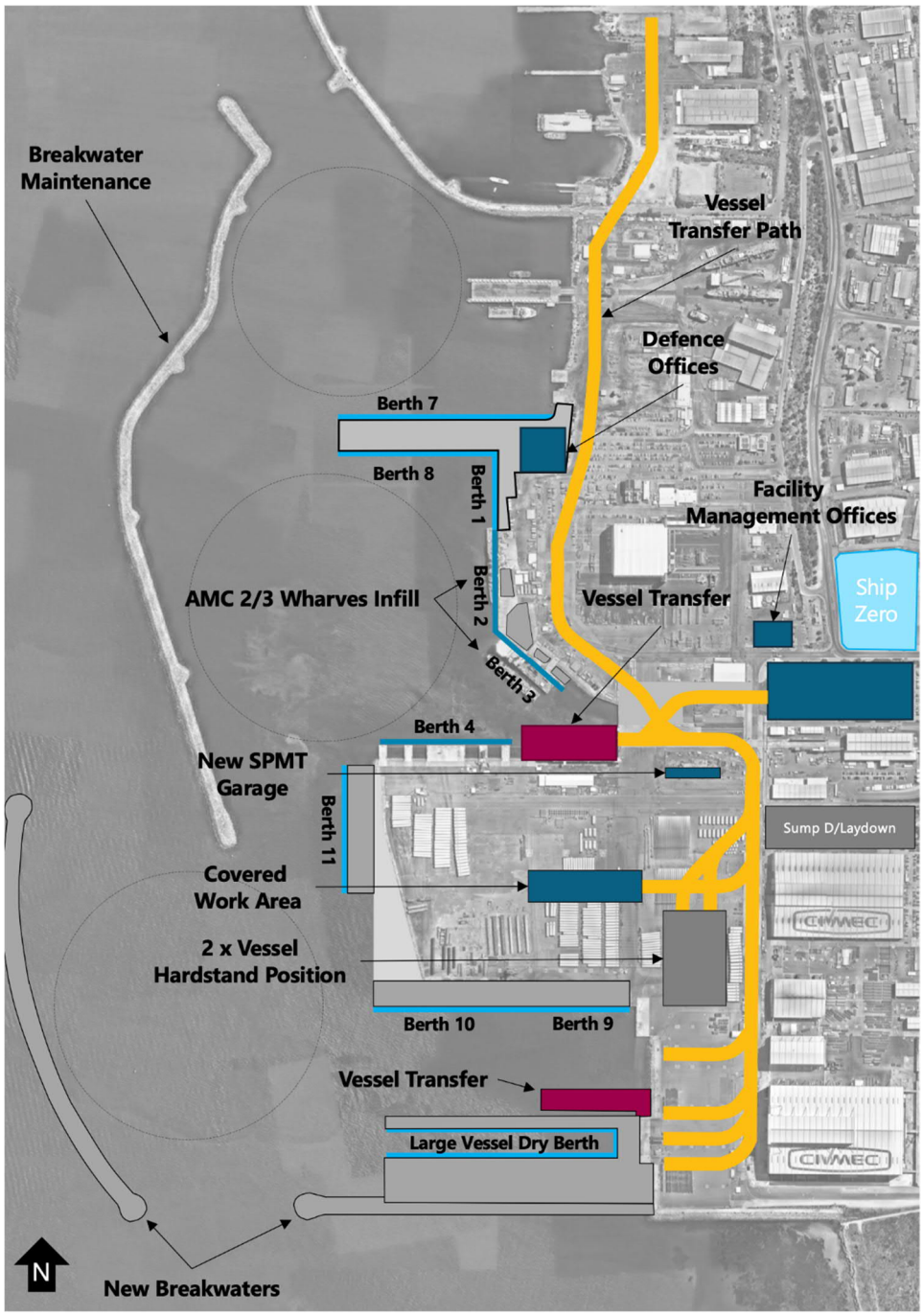


6.4.3 Stage 3: 10+ years

The following infrastructure is proposed in Stage 3:

- Two additional priority berths for Defence. The present AMC 5 berth can be converted with upgrades to the fendering system and new services. The two western dolphins would be decommissioned and new mooring facilities incorporated into a new berth with the berthing line remaining consistent with the AMC 5 wharf
- Dredging of the southern harbour area to achieve a minimum depth of -10 mCD
- One additional berth for common use, given the conversion of AMC 5 berth
- Improvement upgrades to AMC 2 and 3 wharves to fill in the areas behind the berths, with a piled deck structure. This will provide more working space for cranage and laydown
- Localised dredging to create a channel to a new large vessel dry berth
- Development of a large vessel dry berth, with supporting facilities and cranage. The north side of this dry berth could also be designed as a wharf, for vessel layby requirements or to meet demand beyond the timeframe of this strategic plan.

Figure 6-9 Southern Harbour concept 2 – stage 3, 10+ years

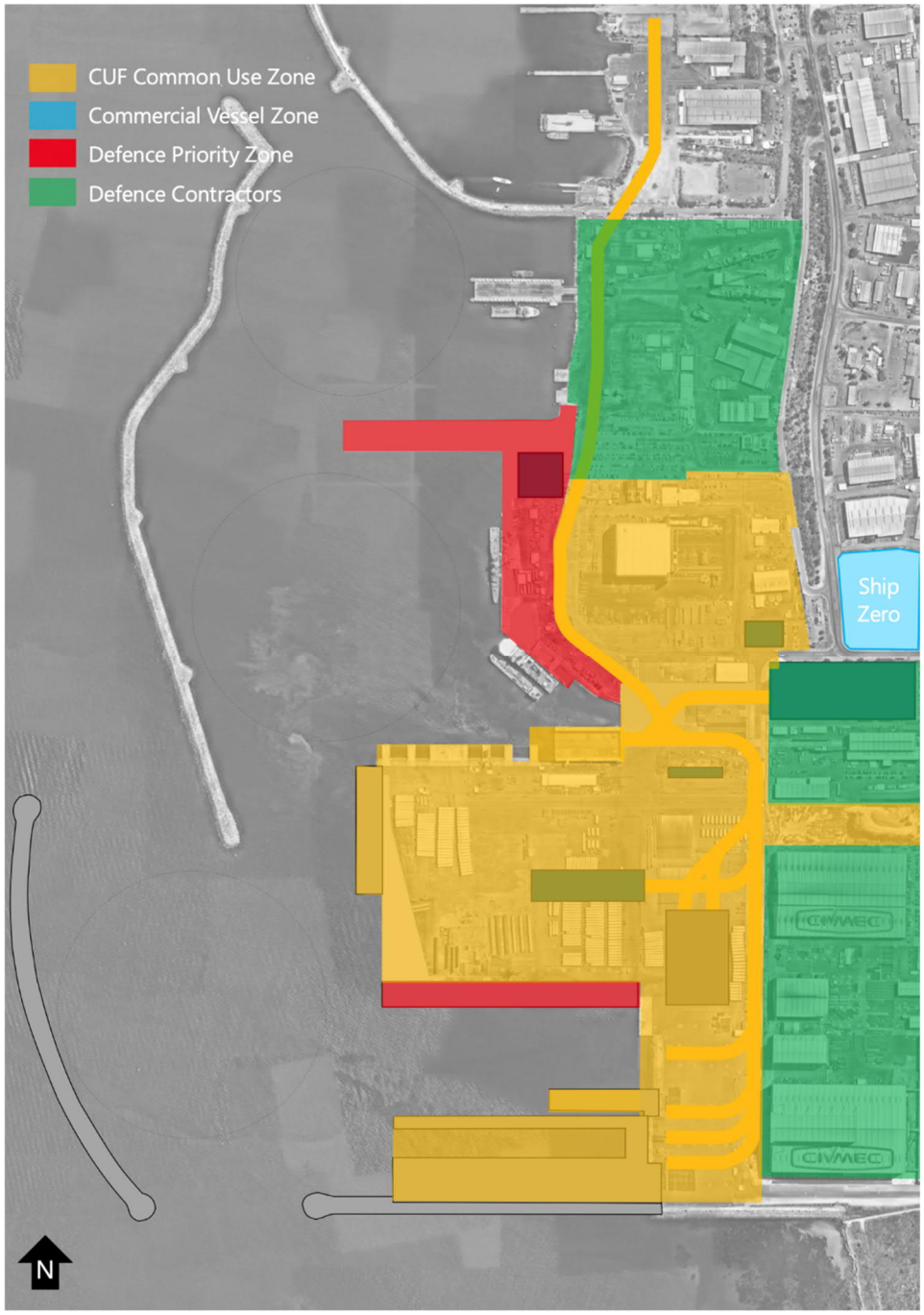


6.4.4 Waterfront activity zones

In this concept the CUF Common Use Zone is largely the same as concept 1. The Defence Priority Zone however is now spread across two locations due to the positioning of new berths further south within the harbour, as shown in Figure 6-10.

Given the staging of this option, there may be a time frame when only one berth (AMC 4) is available for common use. Usage of at least one of the Defence priority berths would need to be managed to ensure ongoing availability to the resource and major projects sector, unless Berth 11 is constructed in advance of Berths 9 and 10.

Figure 6-10 Southern Harbour concept 2 activity zones



6.4.5 CUF Laydown Area

AMCM currently manages the allocation of laydown and assembly areas within the CUF. At present there are six areas as identified in Figure 6-11 providing a total area of 29ha.

Figure 6-11 Existing CUF laydown and assembly areas

The construction of transfer paths and vessel hardstand areas will result in areas of land that may be available on a temporary basis for use as a laydown/assembly area whilst the construction of new buildings will reduce the total area available. To help determine the total future area available for laydown/assembly areas it is necessary to categorise areas as follows:

- Permanent laydown – land within the CUF available 24 hours a day 7 days a week for users to rent
- Temporary laydown – land inside the boundary of a transfer path. For transfer paths with a low number of scheduled vessel movements the land could be leased on a short term basis. To ensure the path is clear for vessel transfer, this land can only be occupied by uses that can be easily moved when the path was required for vessel transfer.

Vessel transfer paths that may be required on very short notice for emergency dockings (such as the transfer path from the Floating Dock to the ASC facility) are not considered suitable for allocation as laydown/assembly areas.

Based on the ultimate development of concept 1 the area of permanent laydown is 19.4ha and the temporary laydown area is 5.2ha, giving a total area of 24.6ha. This is shown in Figure 6-12.

Figure 6-12 Concept 1 future laydown areas

Based on the ultimate development of concept 2 the area of permanent laydown is 19.4ha and temporary laydown area is 5.2ha, giving a total area of 24.6ha. This is the same total area as concept 1. This is shown in Figure 6-13.

Figure 6-13 Concept 2 future laydown areas

6.5 AMC land use precincts

The structure of the AMC land use precincts has proven to be robust over time. By limiting the types of industry that can develop within the AMC, the precincts have ensured that the original intent and purpose of the complex as a whole has remained consistent over time and focussed on target industry/activities.

In the future it will be critical to maintain this precinct structure and ensure that activities within the AMC remain focussed on the core objectives of the complex. Without this continued focus, it is possible that other land uses will seek to locate within the AMC, diluting the core activities and occupying land that may one day be required for core industry.

Development of the Latitude 32 Industrial Area immediately to the east of the AMC should be viewed as an opportunity to develop complementary and general industry. This negates the need to relax existing zoning restrictions to allow the development of general industry within the AMC and will allow it to remain focussed on its current target industry.

The ongoing administration of the AMC could however be simplified through the creation of a Strategic Industry zone of the entirety of the AMC through the City of Cockburn Town Planning Scheme in recognition of its State and National significance as one of only two shipbuilding hubs in Australia. Land use permissibility should be consistent with the zone's objectives.

The existing precinct definitions are generally considered suitable for the future, however the following update to the fabrication precinct is considered necessary given the proposed change in nature of activities:

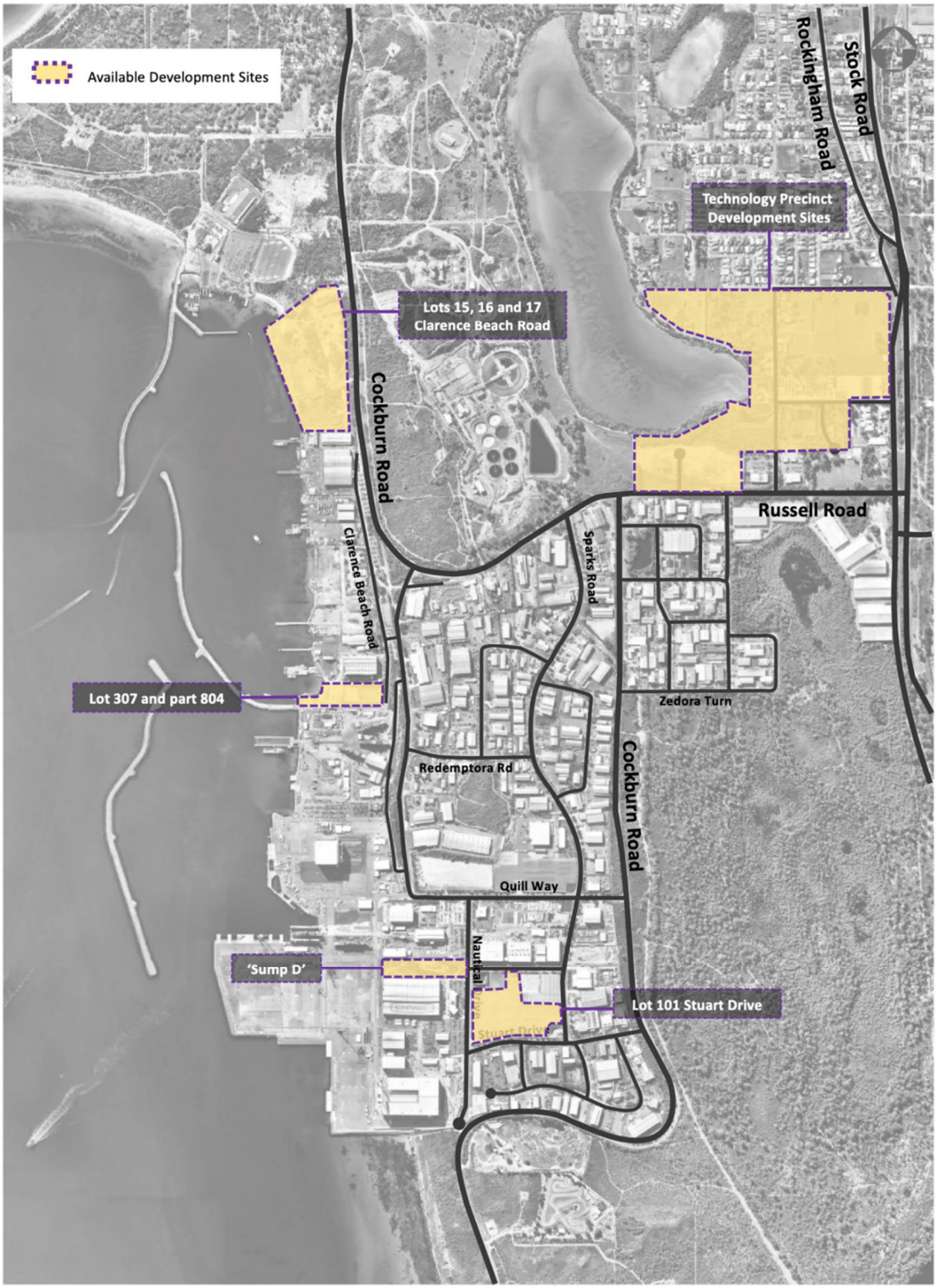
Fabrication Precinct

The Fabrication Precinct incorporates the CUF and is intended to provide land for industry directly associated with Defence, marine, oil and gas and major projects in close proximity to the waterfront.

6.6 Available development sites

Although there is limited land available at present within the AMC, several large parcels of land still exist for future development. Figure 6-14 illustrates the location of potential future development sites within the AMC.

Figure 6-14 Available development sites



6.6.1 Lots 15, 16 and 17 Clarence Beach Road

These three lots at the northern end of the harbour, adjacent to Austal and the recreational boating facility, are currently vacant. The lots have a combined size of approximately 14 hectares and are sized as noted in Table 6-2.

Table 6-2 Lot sizes

Lot No	Area (Hectares)
15	6.80
16	3.53
17	3.64
Total Area	13.97

This land should be prioritised for the development of strategic projects, including activities related to commercial shipbuilding and maintenance or major projects that require direct access to the waterfront for development of marine/berth infrastructure.

To realise the development potential of this land it will be necessary to extend Clarence Beach Road from its current end point at Austal north into Lots 15, 16 and 17. Utilities will also need to be extended to these sites.

Development of infrastructure along the waterfront could be achieved through public investment based on the anticipated future requirements of businesses. This infrastructure could then be retained as part of a new CUF in the Northern Harbour. Alternatively, the private sector could be relied upon to develop any required infrastructure along the waterfront. Third party access could potentially be achieved through lease agreements with new businesses.

6.6.2 Lot 307 and part Lot 804

This is small block of land could accommodate a fabrication shed and offices for vessel build and maintenance or future multi-user car parking.

The combination of all of Lot 307 Clarence Beach Rd and a smaller area of Lot 804 Quill Way creates this 3.3ha development site. Approximately half this area could accommodate built form such as fabrication sheds, enclosed painting work areas and offices. This site has direct access to the BAE syncrolift and has accommodated land transfer of vessels to this launch facility in the past. For this reason, the western portion of the site should remain undeveloped (except for laydown and temporary storage) to enable continued land-based transfer of vessels to the BAE syncrolift and the CUF's Floating Dock.

6.6.3 Sump 'D'

The 'Sump D' site, located between ASC facilities and Civmec has been used for a variety of purposes over time. Originally designed as part of the stormwater drainage network, over time the area allocated for the sump has been reduced with the western portion of the site filled in and now used for laydown purposes.

Potential uses of the site are dependent on its future role as part of the stormwater network. To this end, further studies are required to determine if the area of sump can be further reduced, replaced with tanks or gross pollutant traps creating a large area of land for development.

Due the strategic location of the site, potential future activities may include:

- Vessel disposal (requires the implementation of bunding and site specific drainage)
- General outdoor laydown
- Fabrication building.

6.6.4 Lot 101 Stuart Drive

This site is currently held by DevelopmentWA and has been used for a variety of purposes in the past. Part of the Lot is allocated as a temporary car park for the ASC facility for the next few years. In the future this site could potentially be utilized as an extension of the CUF for laydown and fabrication activities.

The retention of this site as a flexible location for short term projects/overflow from the CUF would ensure ongoing flexibility within the AMC to accommodate fluctuations in demand. The potential to connect this site directly to the CUF using stormwater drainage Sump 'D' on Quill Road should be explored in the future to increase the potential to use this site as an overflow for the CUF. This would potentially allow the fabrication of large modules or other components within Lot 101 prior to direct transport into the CUF. The potential to use the existing road network for the transport of these modules should also be considered.

6.6.5 Technology precinct

The Technology Precinct currently has a large area of land available for development in the future. The precinct definition currently in place for the Technology Precinct is still considered relevant. In the near future a review will be undertaken of the size and use of the precinct to determine the optimum size for the precinct.

It is likely that the precinct will continue to be developed with offices, training, research and development facilities to support the core activities of the AMC. Light industrial activities associated with research and development, training or other low impact activities could potentially be considered for this precinct.

Businesses looking for a location within the AMC could be encouraged to locate some components of their operations (engineering/administration offices) within this precinct rather than occupying more valuable land within the core precincts.

Additional amenities could also be permitted to locate here including gymnasiums, childcare facilities or other services that might support and increase the amenity of the AMC for its workforce. It should however be noted, that there is land zoned as 'local centre' within the AMC on Quill Way at present. This area could also accommodate activities intended to improve the amenity of the AMC.

6.7 Transport infrastructure

The AMC precinct is well connected to the wider regional road network and the greater metropolitan region. Cockburn Road provides a north-south spine through the site dividing the technology precinct

and dissecting the support industry precinct. To the east Rockingham Road provides further north-south access with Russell Road providing access eastward towards the Kwinana Freeway.

The designated HWL network provides direct access to the southern end of the CUF whilst Cockburn Road, Russell Road and many of the AMC's internal roads form part of the RAV Network.

Proposed infrastructure and service upgrades within this section should be considered as part of a package of measures that should be implemented together in order to achieve their full benefits.

6.7.1 Car parking

Car parking is an important issue within the AMC. Minimum requirements for on site car parking provision are dictated by the City of Cockburn through their Town Planning Scheme. Some businesses have reduced on site car parking numbers and reallocated this space to their core activities. This has resulted in a large number of vehicles being parked on streets and verges within the AMC.

On street parking within the AMC has a number of adverse impacts including:

- Road safety - increased potential conflicts between informally parked vehicles and moving traffic
- Pedestrian safety - as pedestrians need to travel between parked vehicles and businesses with limited footpath infrastructure
- RAV network function – on street parking may impede the movement of RAV within the AMC.

In the waterfront precincts car parking occupies land that could be used for more productive purposes related to AMC's core activities.

6.7.2 Proposed public car parks

A potential solution to the issue of car parking within the AMC would be the implementation of multi-user car parks in key locations. This approach would include the development of multi-story car parks positioned within the AMC to serve multiple businesses.

The size, capacity and exact location of each car park requires further analysis based on demand within each car park catchment. Proposed car park capacities shown here are broad estimates only. Detailed parking surveys and feasibility studies will be required to support each car park. Consideration should be given to funding mechanisms, potential impacts for existing businesses that have their own car parks, operational models and benefits to the AMC through improved land use efficiency.

Figure 6-15 illustrates the potential location of public car parks within the AMC. In each case, it is intended that car park users would be able to walk to/from their workplace with no need for an internal shuttle bus service. Upgrades to pedestrian infrastructure, including footpaths and safe road crossings will also be required.

Proposed locations and functions include:

Site 1 - Serves Austal and new development sites to the north (Lots 15, 16 and 17 – where the car park would be located) and existing sites to the south of Austal. A car park accommodating 1,000-2,000 vehicles in this location would allow current parking on Clarence Beach Road to be removed whilst minimising the requirement to provide car parking within the Austal and northern development sites (a more efficient use of valuable waterfront land).

Site 2 - Serves BAE and existing commercial operations at the southern end of the Northern Harbour, located on Lot 307 and part Lot 804 which are currently vacant. In locating a car park on this site, it is acknowledged that a potential waterfront development site is being allocated to car parking as opposed to the commercial shipbuilding industry. The intention of this car park would be to consolidate the parking of several businesses in this precinct making more land available for productive uses along the waterfront. The size of this car park requires further study and consultation with potential users but could be in the vicinity of 1,000-1,500 bays.

Alternatively, this precinct could also potentially be served by a car park located within the Local Centre located at 81 Quill Way.

Site 3 - Serves the ASC facility, Ship Zero, CUF. This site is currently owned by Defence and will require further engagement with them to explore the potential for a multi-user car park. In addition to car parking required for the Ship Zero (550 bays), an additional 780 bays would be required to support the ASC facility (as part of their expansion to accommodate FCD[14]) and a further 1000 bays to accommodate potential CUF users (resources and major projects) for a total of 2330 bays.

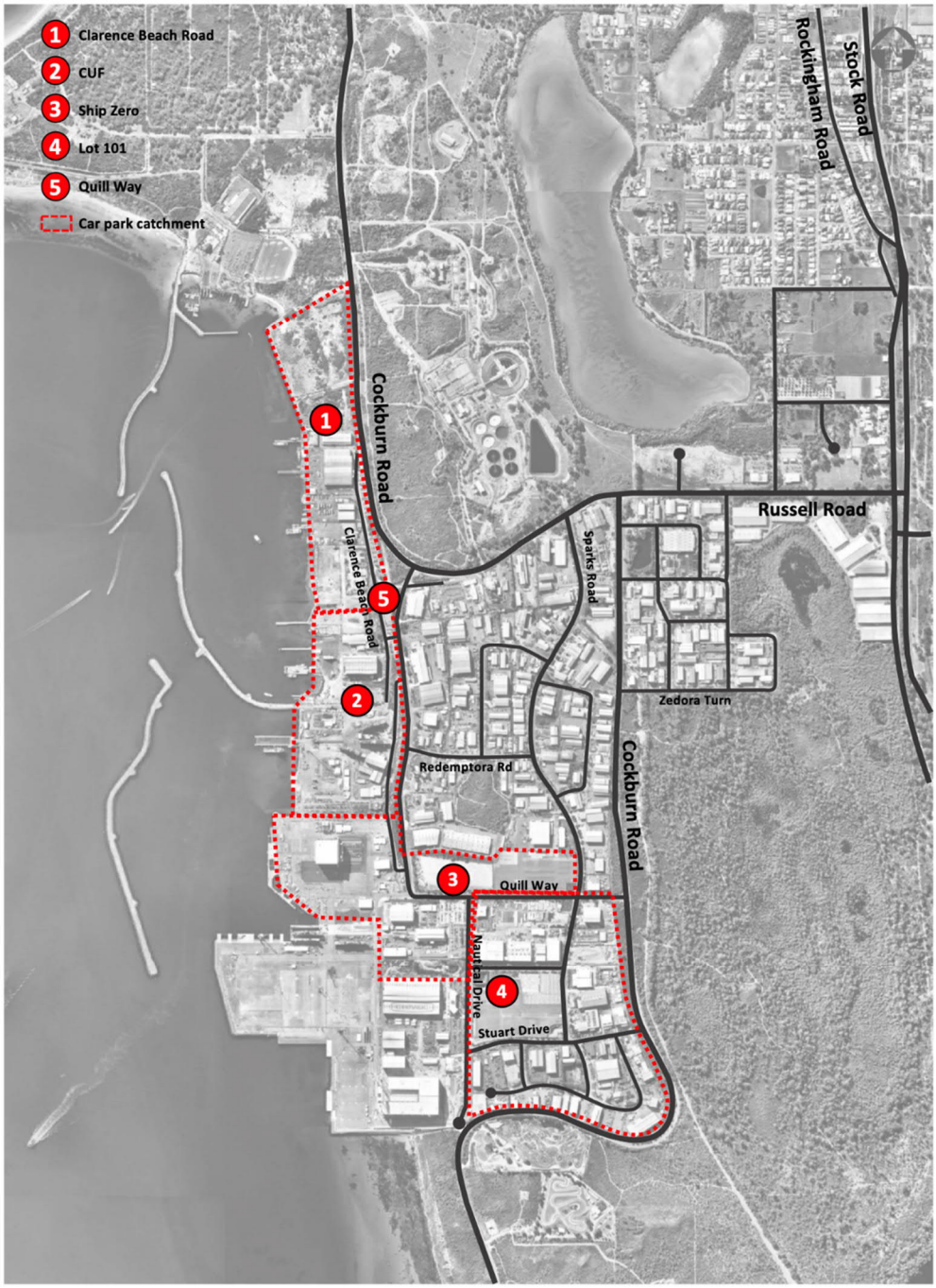
An alternative to this location could be to utilise land in the northern portion of the CUF. This facility could potentially be shared with BAE allowing them to develop land currently utilised for car parking for more productive uses.

Site 4 - Serves the southern AMC fabrication precinct and potentially the ASC facility using Lot 101 Stuart Drive, currently held by DevelopmentWA. This car park will accommodate overflow parking from businesses within the fabrication precinct and could also accommodate ASC facility parking if this cannot be located within Site 3. It is not possible to determine the number of parking bays required in this location as a detailed survey of existing on-street and off-street car parking would be required.

Site 5 - Serves Austal and CUF North utilising road reserve at the intersection of Quill Way and Cockburn Road. This car park will need to be sized based on potential demand generated by CUF North users. The potential to implement a car park here will also be impacted by the final design of Clarence Beach Road.

[14] At present no commitment to this transition has been made by Defence or the Commonwealth Government.

Figure 6-15 Proposed multi-user car park locations



There are several options available to support the implementation of multi-user car parks within the AMC. The mechanism for their construction and operation will depend on their intended use and the need to recover capital/operational costs. These can be broadly defined as follows:

1. Government – Either State or Local Government could construct and operate the car parks. Car park users could either be charged directly (as they use the facility) or businesses charged based on the number of their staff using the facility.

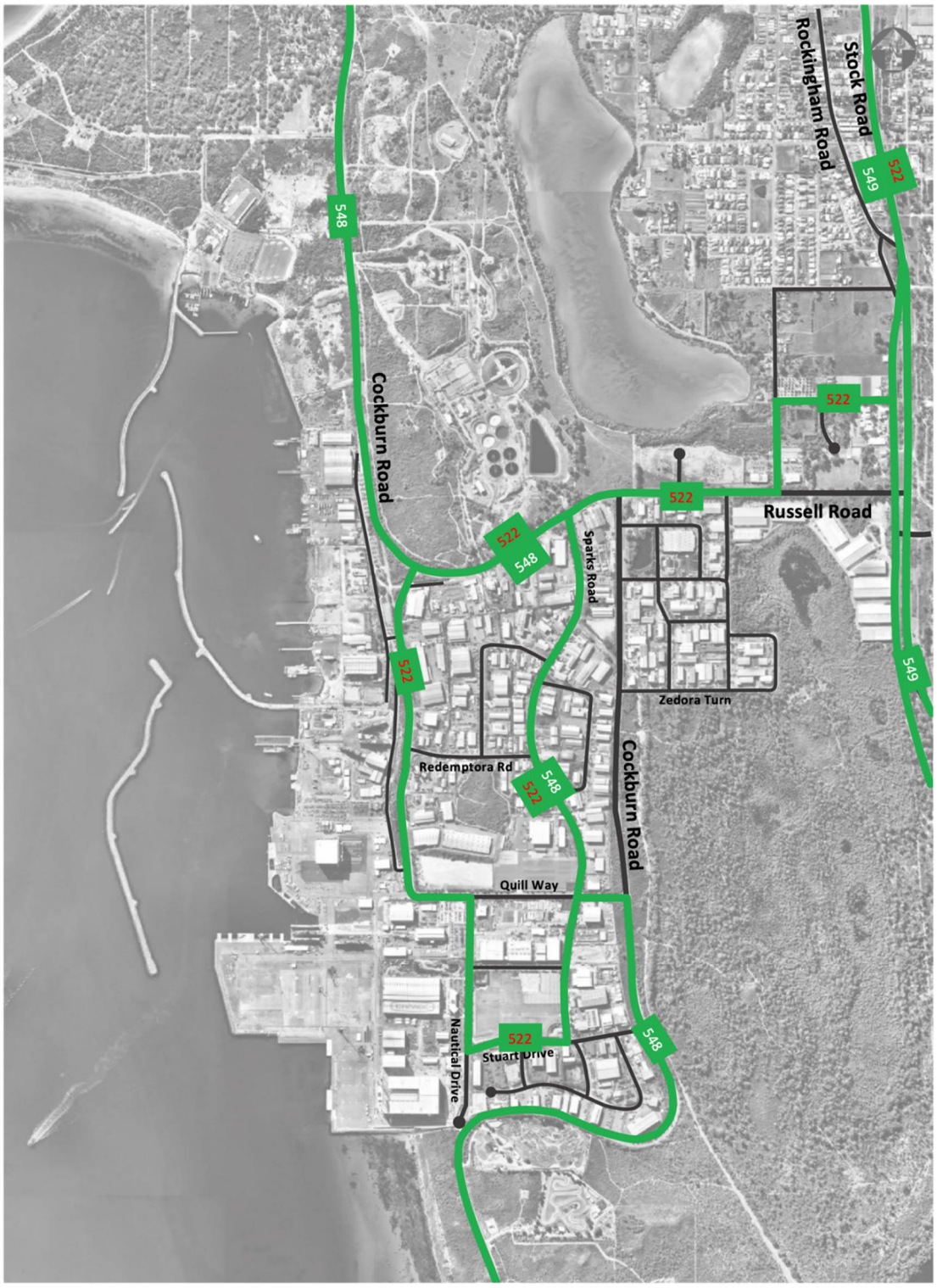
2. Private Sector – Land could be allocated for development of the car parks and leased to the private sector who would then operate the car park and charge users of the facility.

In both scenarios, on site parking requirements for businesses within an agreed distance of the car parks could be reduced making additional land available for development. The preferred implementation mechanism will need to consider tax implications on existing businesses and the equitable location of proposed car parks within the AMC.

6.7.3 Public transport

To help increase the use of public transport to/from AMC it is proposed to upgrade selected current bus services and related infrastructure within the AMC. It is proposed to increase the frequency of the 522 service in the morning and afternoon peak periods (aligned with AMC shift start/finish times) and modify this route to provide a direct service between the AMC and Cockburn Central Station. The new service would travel directly between Cockburn Central and the AMC utilising Rockingham Road and Beeliar Drive. This will improve the AMC's connection to Cockburn Central Station and access to the broader metropolitan rail network. Timing for the implementation of this service will be determined based on development of the AMC and increases to workforce over time.

Figure 6-16 Proposed modification to bus service 522



Within the AMC the route will be modified to utilise Sparks Road and Quill Way providing additional stops and increasing the number of businesses with access to the service as illustrated in Figure 6-16.

To realise the full benefits of proposed upgrades to the frequency and routing of existing bus services within the AMC it will be necessary to upgrade supporting infrastructure as well. This should include:

- Upgrades to existing stop infrastructure to provide shelters
- New stop infrastructure along Sparks Road and Quill Way
- Footpaths to provide safe pedestrian access to the stops (refer to Section 6.8.3).
- New shelters or other street furniture must take into consideration the needs of RAV/HWL movements in their design. Proposed infrastructure must be outside clear zones and easily removable to accommodate these movements.

6.8 Roads

Aside from the maritime based operations, the site is reliant on road access – for workforce access and operational purposes. The requirements of each of these groups are substantially different, with employment generated trips reliant on overall road network capacity whilst operational trips are more dependent on specific design elements such as lane widths, turning pockets and priority movements with adequate sight lines and braking distances at intersections.

During peak times congestion has become a significant issue on the external road network and at key intersections providing access to the AMC.

The following sections discuss key issues relating to the transport network and options for improving safety and efficiency in the future.

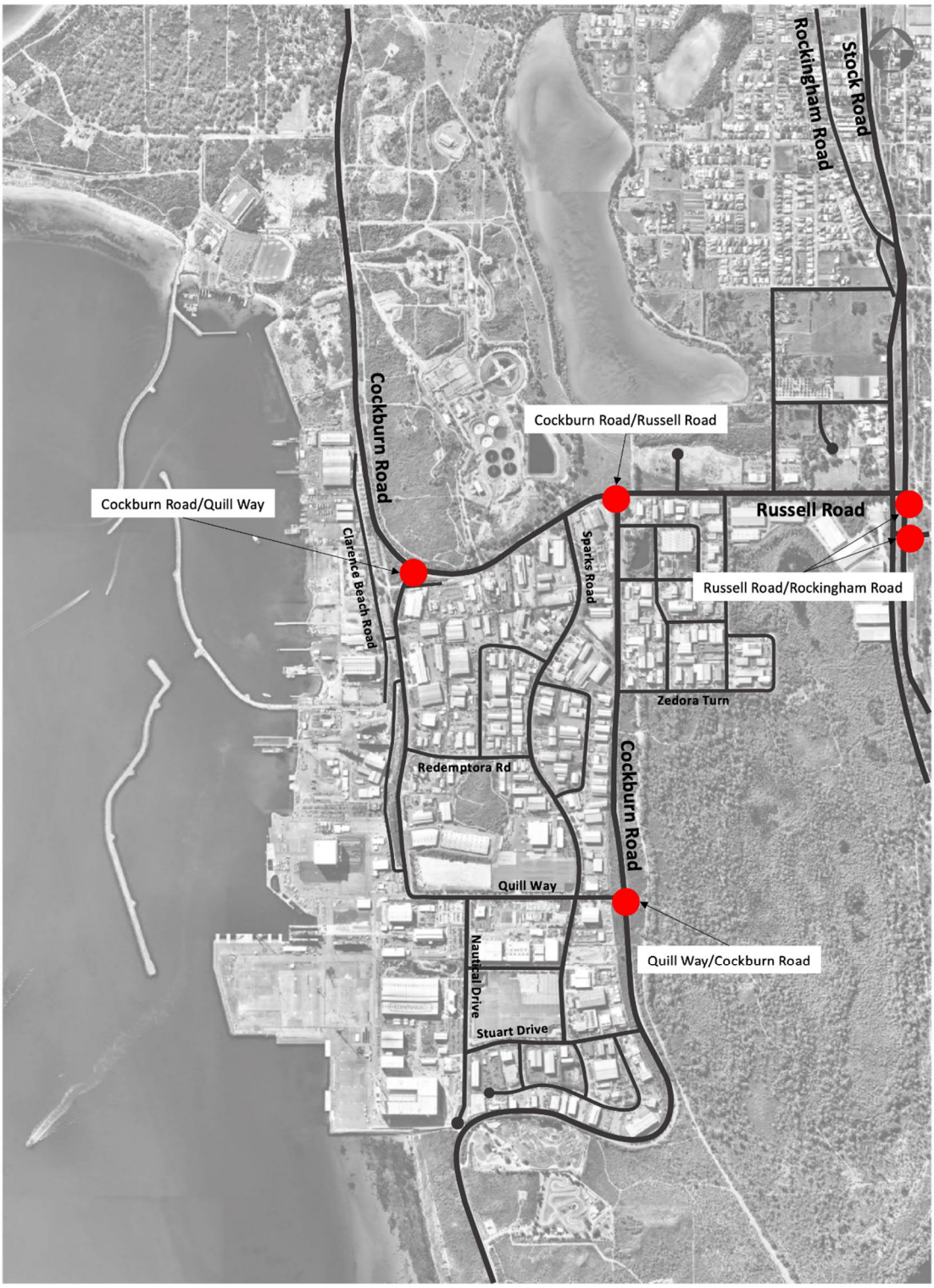
6.8.1 Intersections

Increased development within the AMC and across the broader region will increase demand on both regional road network and the road network within the AMC. The biggest driver of demand on the road network is the movement of personnel to and from the site each day.

Based on high level traffic modelling, potential improvements to the traffic network were identified to help improve traffic congestion and road safety. Investigations focussed on potential improvements at five critical intersections (Figure 6-17) within the AMC.

A detailed traffic study will be required in the future to investigate localised impacts of increased traffic movements on the local road network within the AMC.

Figure 6-17 AMC critical intersections



Investigations undertaken as part of this study were high level only, based on 24 hour turn counts and outputs from Main Roads WA 2025 traffic model for the region. The intention of these investigations was to identify what improvements could be implemented to minimise adverse impacts on the traffic network.

It is recommended that the following intersections (refer to Figure 6-17) are upgraded to signalised intersections with increased lane capacities:

- Cockburn Road/Quill Way (North)
- Cockburn Road/Russell Road
- Cockburn Road/Quill Way (South).

These upgrades will increase the capacity of these intersections, whilst improving access to the AMC in general and improving safety for all road users. The State Government will be undertaking upgrades at these intersections in the near-term, as part of the infrastructure package under the COVID-19 State Recovery Plan.

It should be noted that there is reserve in place for the realignment of Cockburn Road north of its current intersection with Russell Road (as part of the Fremantle Rockingham Controlled Access Highway). The future upgrade of this intersection and others should consider long term road network planning and potential future upgrades as part of the design process.

The Rockingham Road/Russell Road intersections were also reviewed as part of this study. Main Roads WA has developed several concepts for the future upgrade of this intersection. Our analysis showed that upgrading these intersections, either through increased lanes/channelization or creation of a four way at grade intersection, would result in improved performance in the future. However, the decision to upgrade these intersections must be considered in the broader context of the regional road network as a whole and likely changes to land uses in the region. Main Roads WA does have plans to upgrade this intersection to a grade separated interchange in the future, however this project is not currently included in forward capital works estimates.

The entry to the CUF should be investigated in the future taking into consideration potential increases in traffic volumes. Reconfiguration of this intersection should be considered to improve safety and efficiency of operation. The potential for additional entrances to the CUF should also be considered. The future design of the Clarence Beach Road extension will need to consider the potential impacts of any additional CUF entrances as part of traffic modelling undertaken to support the design process.

6.8.2 Restricted access vehicles and high wide loads

The HWL network currently provides access to the southernmost end of the CUF. There are several known constraints on the existing external HWL network that should be removed in the future to enable movement of these loads to and from the AMC. In particular there are known locations with insufficient clearance to powerlines. These powerlines need to be lifted to facilitate access to the AMC, adding expense to transport of loads and restricting the development of supporting land uses in areas outside the AMC. There is an opportunity to bury these powerlines to provide a long term solution to this issue.

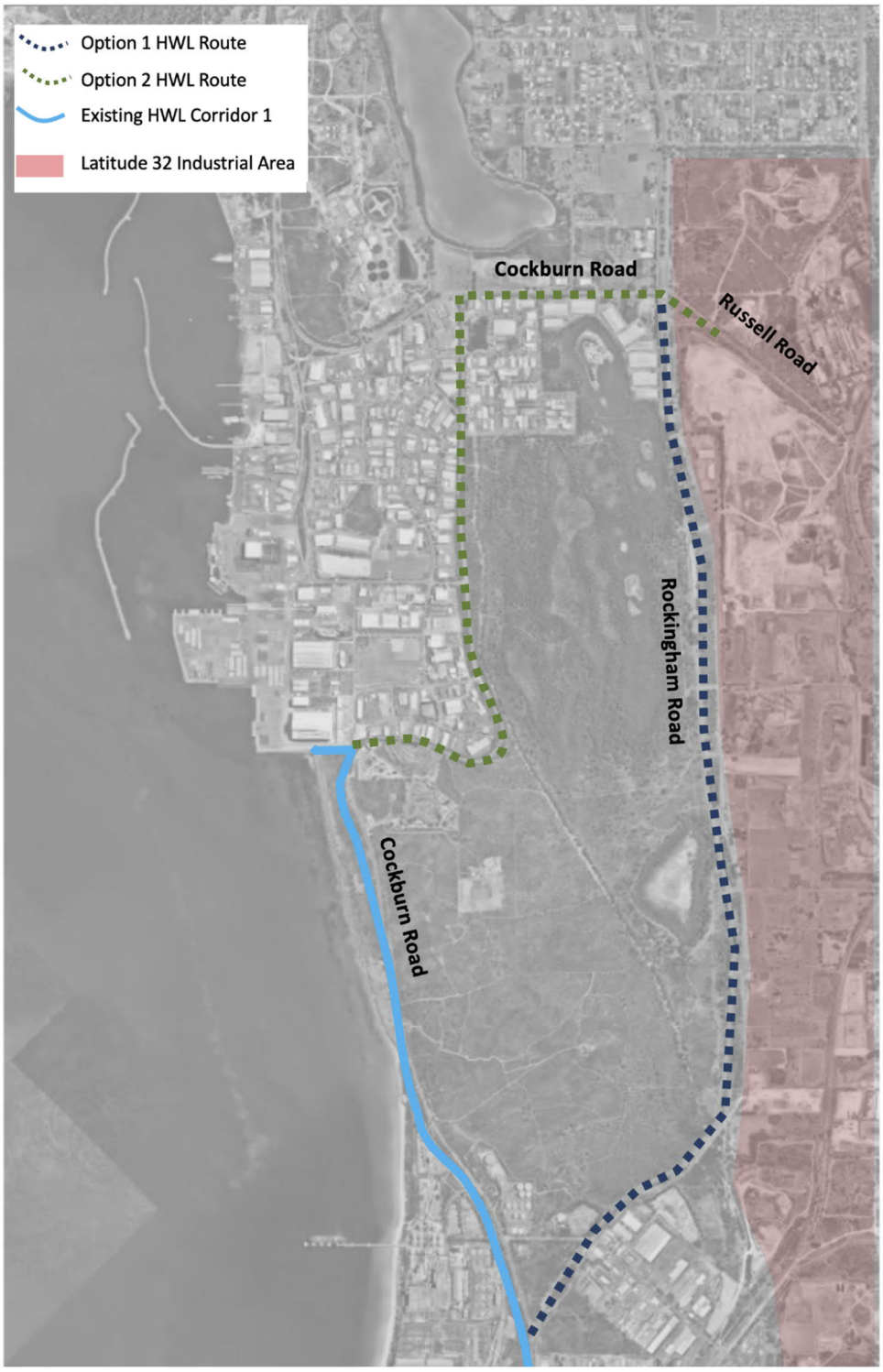
With development of the Latitude 32 Industrial Area to the east of the AMC, the opportunity exists to accommodate additional AMC related activities/industry in close proximity. It is proposed to extend the existing HWL network to permit the efficient movement between the Latitude 32 Industrial Area

and the AMC. This would allow the transportation of large loads between Latitude 32 and the AMC and create additional opportunities for industry.

Figure 6-18 outlines two proposed alignments for a new HWL corridor between the Latitude 32 Industrial Area and the AMC. The northernmost option utilising Russell Road is significantly shorter, however it would require the future grade separated interchange of Russell Road and Rockingham Road to be designed to accommodate these HWL movements. The southern alignment utilises the existing HWL corridor along Cockburn Road before turning north and utilising Rockingham Road. Alignment of the corridor within Latitude 32 should be considered further during the development of detailed planning for the precinct.

In both cases the design of existing roads and proposed future upgrades to intersections will need to consider the design requirements of HWL.

Figure 6-18 Proposed HWL corridor to the Latitude 32 Industrial Area



6.8.3 Pedestrians

An improved network of pedestrian paths will be required within the AMC in the future to support a more balanced transport solution. In particular footpaths are required to support improved public transport services, connecting bus stops and future multi-user car parks to businesses within the AMC.

Upgrades to the existing network should include consideration of future public/shared car parks, existing and proposed bus stop locations. The aim is to create a comprehensive network that provides safe access for pedestrians between businesses and car parks/bus stops. As a minimum, footpaths should be provided on at least one side of all roads within the AMC to ensure safe and efficient pedestrian movements in the future.

6.8.4 Cycling

Within the AMC there is currently no cycling infrastructure provided. It is unlikely that cycling will become a significant mode of transport for people working within the AMC in the future. The industrial nature of activities within the AMC, the presence of large heavy goods vehicles and the relative isolation of the AMC from residential areas are all key factors in this outcome.

Provision for cyclists should still be considered in the future however. As part of a future detailed integrated transport study, the potential to provide cycling infrastructure within the AMC should be explored. This should consider the potential to implement shared paths on key roads within the AMC connected to the external network to promote cycling.

6.8.5 Integrated Transport Plan

Transport plays a central role in the efficient operation of the AMC. As such preparation of an Integrated Transport Plan (ITP) for AMC is recommended in the future to further explore and develop the recommended actions in this plan.

This study would progress the work undertaken as part of the SILUP and identify a staged, costed plan for implementing improvements to the transport network. Critically, preparation of an Integrated Transport Plan should involve all key stakeholders and the final plan should include an agreed list of recommendations including responsibilities for implementation.

The scope of this study should include:

- Car parking – A detailed parking study of private and public car parking throughout the AMC should be undertaken. It should consider the optimal balance between public and private parking within AMC considering planned land uses/values. The study would explore the proposed public car park locations identified in the SILUP determining required capacities, designs and costs. The study should also address funding mechanisms and operating/management options making firm recommendations for the future development of public car parking within the AMC
- Traffic modelling (regional and local) – Regional traffic modelling should be undertaken taking into consideration future changes to the regional road network and land uses. Local traffic modelling should also be undertaken to identify future network performance and potential upgrades to local intersections to improve performance and safety. This modelling should consider the location of future public car parks and build out of vacant land within the AMC

- Local and regional road network upgrades – The ITP should identify practical upgrades to the local and surrounding regional road networks required to support the future development of the AMC including existing RAV and HWL networks. This should include consideration of the impacts of adjacent land uses on the network and the potential to manage access points to the network more efficiently
- Public transport – Options to improve public transport use should be further explored by the study. This would include developing a detailed plan for proposed service upgrades (including costings) and identifying an appropriate implementation mechanism. The study should also consider upgrades to stop and pedestrian infrastructure to support public transport upgrades
- Pedestrian network review – This task should be undertaken in conjunction with investigations into car parking and public transport. High volume pedestrian routes within the AMC should also be identified. Proposed upgrades to the existing network should be clearly identified to support bus stop and car park locations. Proposed improvements should be costed and included in the ITP's recommendations
- Cycling network review (including end of trip facilities) – A detailed review of existing cycling infrastructure within/serving the AMC. This might also include an audit of existing end of trip facilities within the AMC and exploration of the potential to provide multi-user/public end of trip facilities if it is felt that these would benefit the AMC.

6.9 Utilities

Key utility providers have been consulted as part of this study. Feedback from these providers indicate that the AMC is well placed for the future.

The provision of specific utilities relating to berth side activities within the CUF is addressed in Section 4.4.1 of this report.

6.9.1 Power

Western Power has confirmed that the existing substation near Cockburn Cement on Russell Road currently has some spare capacity that could accommodate growth in demand from the AMC in the future dependent upon the amount of load demand required.

There is strong potential for the deployment of renewable energy systems within the AMC. This could include the installation of solar panels on the roofs of buildings. If sufficient power could be generated within the precinct the potential for a microgrid could be explored.

This concept would also require the coordination of land owners willing to invest in the technology and infrastructure required.

6.9.2 Water

There are no known deficiencies in the potable water network at present and no upgrades are planned as part of this plan.

Stormwater drainage is managed through a complex system of piped networks, drainage sumps and overland flows. The system was designed to cater for the AMC at build out and anecdotal evidence suggests that the system has sufficient capacity at present. The localised stormwater drainage network

may require review and modification in the future if Sump D is intended to be resumed completely for development purposes.

6.9.3 Telecommunications

The NBN is currently available to businesses within the AMC and will be upgraded in the future as demand requires. The NBN has been delivered using multiple technologies, however within the AMC optic fiber to the premises is available to all existing businesses via third party retailers.

In the future it will be necessary to continue to update and upgrade telecommunications within the AMC and ensure that businesses have secure and efficient access. With the evolution of the digital shipyard, the provision of fast high speed internet, ease of connectivity to secure wifi networks, and efficient access to electronic data is key.

6.10 Amenities

With an increased volume of activities occurring within the AMC there will also be an increased workforce. It is important to ensure that sufficient amenities are available to support the workforce within the AMC. This includes ensuring that there are options to buy lunch or coffee within the AMC through to providing recreation facilities that could be used after hours.

Within the Technology Precinct there are still a number of sites available that could be developed to support activities throughout the AMC. This may include amenities such as gymnasiums facilities to support the existing playing fields. Any upgrade or development of new amenities within the AMC should consider existing facilities located in the surrounding area such as the Coogee Surf Club and opportunities to promote their utilisation.

Within the CUF it is proposed to upgrade the existing AMCM offices to include supporting amenities such as a gym and café for personnel working within the CUF.

6.11 Governance

As noted in Table 2-1 there are currently several agencies actively involved in the ongoing governance/planning of the AMC.

There is an opportunity to explore improved governance within AMC. JTSI is undertaking a review of governance separate to this SILUP.

7 Future studies

A number of studies will be required to refine and further investigate the infrastructure concepts proposed in the SILUP. Table 7-1 gives an indication of the range of studies that may be required.

Table 7-1 Summary of future study requirements

Study Title	Justification
Vessel Lift and Transfer Technology Study	To determine the most appropriate technology solution/s for vessel lift and transfer within the Northern and Southern Harbours, including addressing efficiency and cost of transfer.
Large Vessel Dry Berth Feasibility Study	Preparation of technical feasibility study to determine the potential to implement a dry berth within the AMC Southern Harbour.
Vessel Transfer Paths	To complete a feasibility study to determine a concept design for the vessel transfer paths, as identified in the SILUP. This study will review the land tenure aspects, consider pavement grades, impacts on existing services and identify any fatal flaws.
Southern Harbour Breakwater Extension and New Berths	Technical study to determine the design and cost of implementing breakwaters and develop concepts for proposed new berths in the Southern Harbour. This study would include wave climate modelling, ship handling simulations and concept design of breakwater and berth options.
Breakwaters Condition Survey	Identification of any required maintenance/improvements to the existing Northern and Southern Harbour breakwaters.
Water Quality Study	To undertake a review of the water quality in both the Northern and Southern Harbours, including the identification of all existing outfalls and discharge locations, to determine any sources of contamination. The study should consider potential changes to existing breakwaters in the Northern and Southern Harbours to improve water quality, whilst maintaining wave climate and how discharges into the harbour can be better managed.
Northern Harbour Vessel Demand and Harbour Entrance Study	To determine the vessel demand in the Northern Harbour and suitably of the entrance for both commercial and recreational vessels.
Integrated Transport Plan	Required to confirm future local intersection upgrades, pedestrian and cycle network upgrades and regional network upgrades to support efficient transport to/within the AMC in the future. The ITP should coordinate all future transport infrastructure improvements in the AMC.

Study Title	Justification
HMAS Stirling /AMC Transport Linkages Study	Study to identify and assess the movement of personnel, equipment and materials between the AMC and HMAS Stirling. The study will identify if improvements to road network are required to provide more efficient and effective access between these locations.
Clarence Beach Road Extension Study	Preparation of a concept study to determine the preferred alignment of the Clarence Beach Road between its intersection with Quill Way north to support development of Lots 15,16 and 17. Access to CUF north should therefore also be considered as part of this study. The extension of utilities to service Lots 15,16 and 17 should also be considered as part of this alignment study as should potential new entrances to the CUF and RAV access. This study should also cover the connection to the Woodman Point Boating Facility, including freight traffic management considerations.
Public Car Parking Feasibility Study	Detailed study of public car parking options including consultation with key stakeholders, identification of funding and operating options and financial modelling.
CUF Wharves Power Supply and Servicing	Undertake a study to determine options for power supply upgrades and contemporary telecommunication networks to existing CUF wharves utilised by Defence and provision for future development.
Security Plan	A comprehensive security plan for the AMC (including a threat analysis) will be required to determine appropriate security measures in the future. In particular the operation of the CUF, including the interface between Defence and Common User priority measures must be considered. The study should also consider interfaces and responsibilities between Navy and State authorities both on land and water.
Sump D Utilisation Study	Review of Sump D and its interaction with the overall stormwater drainage network in the AMC, to determine if there are feasible solutions for better use of the land i.e. vessel disposal, or buildings.
CUF Facilities Configuration Study	This study is to assess the current facilities/layout of within the CUF to provide recommendations on the reallocation/repurposing of existing facilities and the development of new facilities such as dedicated Defence offices in the Defence priority zone. This study will provide options and costings for future development.
Alternative Energies Supply Study	To explore the potential to implement improved renewable energy solutions within the AMC.

8 Next steps

On 31 July 2020, the State Government announced $84 million to deliver four infrastructure projects at the AMC to contribute to the economic stimulus being delivered through the State's COVID-19 Recovery Plan. This announcement was informed by the findings of the SILUP and is consistent with the first stage of priority infrastructure requirements identified the Southern and Northern harbours, and broader AMC to support expansion of WA's defence and marine industry capability.

The short term priority infrastructure projects being delivered at the AMC include:

- AMC Commercial Shipbuilding Hall - design and construction of a new commercial vessel building facility in the Northern Harbour
- AMC CUF Vessel Transfer Path - design and construction of a transfer path for a range of vessels from the AMC CUF Floating Dock to the Civmec Shipbuilding Facility. This is the first of multiple vessel transfer paths identified in the SILUP to better integrate and provide redundancy for the current and future shipbuilding and sustainment activity to be delivered at the AMC
- AMC Wharf 1 Extension and Design of Finger Wharf - design and construction of a northwards extension of AMC Berth 1. This project will also include the design of a new Finger Wharf to create Berth 7 and Berth 8 and the required reclamation to support future defence offices as identified in the stage 1 (0-5 year) concept for the AMC Southern Harbour
- AMC Priority Intersection Upgrades to reduce congestion and improve safety at the following intersections:
  - Cockburn Road/Quill Way (North)
  - Cockburn Road/Russell Road
  - Cockburn Road/Quill Way (South).

As documented in Section 7, there are further investigations required to inform and refine the infrastructure concepts presented in the SILUP, including the staging for the two southern harbour development concepts.

The Department of Jobs, Tourism, Science and Innovation and DevelopmentWA will review the staging and scope of infrastructure upgrades in the SILUP as the outcomes of these studies are known and as the assumptions that underpin the SILUP are realised, such as the Defence schedule in Section 4 the SILUP.

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