

Sans Souci Marine Centre

Review of Environmental Factors

Roads and Maritime Services | September 2019

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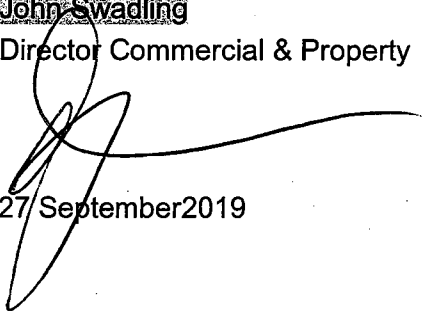
Prepared MG Planning Pty Ltd and Roads and Maritime Services

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Document controls

Approval and authorisation

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Accepted on behalf of NSW Roads and Maritime Services by:	<u>John Swadling</u> Director Commercial & Property
Signed:	
Dated:	27 September 2019

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Executive summary

The proposal

Roads and Maritime Services (Roads and Maritime) proposes to upgrade the marine berthing and launching facilities at the Sans Souci Marine Centre. **Figure 1-1:** Location of the The proposal would provide berths for vessels operated by three agencies - Roads and Maritime, NSW Department of Primary Industries – Fisheries and the NSW Police Force Marine Area Command.

Key features of the proposal would include:

- The demolition of the existing timber jetty, marina and part of the boat ramp
- Provision of:
 - six double berths, a single berth and six high-density polyethylene pontoons for dry storage of personal water craft on the eastern marina arm, accessible by a gangway and protected from primary south-easterly wind waves by a wave attenuator
 - two double berths for AirBerths on the western marina arm, accessible by an on-ramp pontoon from the boat ramp and protected from primary westerly wind waves by a wave attenuator
- Widening of the existing boat ramp to cater for a dual lane boat ramp with an on-ramp pontoon on the western side of the ramp
- Upgrade of electrical and hydraulic services to the new facilities.

Need for the proposal

There is a need to upgrade the marina to cater for current and future fleet requirements of the three agencies. The upgrade is also needed to ensure facilities meet design safety requirements.

The initiative is part of the Joint Agency Operations Facilities strategy, a program to build facilities which co-locate on-water compliance personnel from all three agencies enabling a shared, joint agency approach. It is consistent with Government policy aimed at delivering improved efficiency, cost reduction and improved customer service to the public.

The proposal provides the opportunity for all three agencies to share resources, including vessels, enable better patrol planning and improve response times. It would also ensure the marina complies with relevant design standards and Work Health and Safety requirements.

Proposal objectives

The objectives of the proposal are to:

- provide greater ability to share resources, including vessels, across agencies
- provide for better patrol planning
- improve response times for NSW Police, Roads and Maritime and DPI Fisheries vessels and personnel
- improve the life expectancy of the Sans Souci Marine Centre and provide suitable facilities well into the future
- improve working conditions for staff and ensure the upgrade complies with Work Health and Safety (WHS) requirements
- ensure the design/s comply with Australian Standard (AS) 3962-2001 Guidelines for Design of Marinas and NSW Boat Ramp Facility Guidelines (2015).

Options considered

Four options for the marina redevelopment were considered together with a 'do nothing' option. The options were selected having regard to:

- Operational requirements
- Primary wind directions
- Available depth
- Channel and fairway geometry for larger vessels
- Wave height, attenuation and primary direction.

The 'do nothing' option was discounted from the outset as:

- the current infrastructure is inadequate to meet the operational needs i.e. it is not fit for purpose
- the 'do nothing' option is inconsistent with the Joint Agency Operations Facilities strategy
- significant funds have already been invested in the SSMC and to relocate the marine operations section to another location within Sans Souci would not be viable.

The three agencies unanimously selected the preferred option the subject of this REF. The main reasons for this selection included:

- the benefit of gangway access to shore for the majority of berths, including the Police berth used for emergency response activities
- preference for protection offered from south to south east wind waves, which are more prevalent in the peak boating season (October – April), when there is more activity on the water and when the agencies have an increased frequency of responses. Exposure to westerly wind waves was considered to be less problematic as these winds occur in the winter months when waterway boating activity is relatively low.

Statutory and planning framework

The proposal is a "wharf or boating facility" within the meaning of *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP). Clause 68(4) of the ISEPP permits development for the purpose of wharf or boating facilities to be carried out by or on behalf of a public authority without development consent on any land (other than land reserved under the National Parks and Wildlife Act 1974).

As the proposal is for the purpose of wharf or boating facilities and is to be carried out by Roads and Maritime, it can be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979*. Development consent from Georges River Council is not required.

Roads and Maritime is the determining authority for the proposal and has prepared this REF in satisfaction of its duty under section 5.5 of the EP&A Act, which provides that a determining authority, in its consideration of an activity, shall examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

Community and stakeholder consultation

Various government agencies and stakeholders have been consulted about the proposal, including:

- Georges River Council
- Crown Lands
- Port Authority NSW Harbour Master

- NSW Police MAC
- DPI Fisheries

A preliminary notice was distributed to the local community in July 2019 notifying Roads and Maritime's intention to carry out geotechnical investigation work to help develop a design for the new marina. No issues were raised by members of the community at that time.

Both NSW Police MAC and DPI Fisheries have been closely involved in the development of the proposal design and will continue to be consulted during detailed design. Other agencies consulted to date have not raised any issues however further consultation with those agencies will be undertaken on the REF.

The local community will be able to comment on this REF when it is publicly exhibited. Any submissions received will be formally considered and responses provided in a submissions report, made available to the public when complete. Changes to the proposal would be considered in the light of the community submissions.

Environmental impacts

Detailed technical investigations have been carried out to assess, manage and minimise the proposal's potential impacts. The following outlines the proposal's key impacts to the environment and surrounding community. The safeguards and mitigation measures identified in this REF would help minimise any expected adverse impacts.

Biodiversity

The proposal would directly and indirectly harm a small area of macroalgae classed as Type 2 key fish habitat (KFH), and subtidal sand with moderate infauna communities classed as Type 3 KFH. Direct impacts would result from installation of piles and reclamation for the boat ramp extension, and indirect impacts would occur from shading.

Overall, there would be a net gain in habitat in the form of Type 3 KFH. However, the proposal would result in the loss of 155.28 m² of Type 2 KFH (moderate to dense macroalgae cover).

Environmental impacts such as the loss of KFH may be offset by environmental compensation. Compensation to offset fisheries resource or habitat losses is considered only after a demonstrated loss is unavoidable, in the best interests of the community, and is in accordance with the Fisheries Management Act, Regulations and Fisheries policies and guidelines. Habitat replacement (as a compensation measure) needs to account for both direct and indirect impacts from the development to ensure that there is 'no net loss' of key fish habitats.

In accordance with the Roads and Maritime Services Biodiversity Offset Guideline, offsetting is required where a proposal impacts on Type 1 or Type 2 KFH resulting in a net loss of habitat. The proposed removal of 155.28m² of Type 2 KFH would therefore need to be offset. This would be achieved by obtaining a permit to *harm marine vegetation* under Part 7 of the FM Act as fisheries permit fees are used to offset loss by using funds generated to improve habitat elsewhere.

Overall, there would be no significant impacts to threatened species, populations and ecological communities or their habitats and a Species Impact Statement or Referral is not required. Recommended mitigation measures to reduce impact to nearby habitat are proposed.

Construction noise impacts

The proposed construction activities would result in short term noise impacts primarily as a result of demolition and piling works. Whilst the proposed construction activities would be noisy at times, activities would be limited in duration and respite periods would be implemented to minimise disruption to nearby residences. Further environmental safeguards and management measures are proposed to be implemented to ensure that the proposal would be acceptable in terms of noise impacts during construction. No adverse noise impacts would occur during operation.

Traffic and parking impacts during construction

It is anticipated that during the construction phase up to a maximum of 6 daily truck movements plus 18-25 trade vehicles per day may be expected to access the site in a worst case scenario. This increase in traffic is considered to be minor and would be unlikely to affect the safety or capacity of the local road network.

To address the traffic impact of the proposed construction works, a detailed Construction Traffic Management Plan (CTMP) would be prepared, prior to the commencement of construction and in accordance with the Traffic Control at Work Sites Manual (Roads and Maritime, 2010). The CTMP would address the overall traffic management of the site during the construction phase, including provision for vehicular and pedestrian access and parking for construction vehicles. The vehicular movements and expected routes to and from the site would also be further quantified and defined within the CTMP.

Water quality and sediment impact during construction

The potential for water quality impacts during construction are mainly related to the activities of demolition, excavation and piling as well as the movement and mooring of barges and workboats. These activities may result in the disturbance of fine sediment that may become suspended in the water column, leading to elevated turbidity. The work site would be contained by a silt curtain to minimise fine sediments migrating to the Georges River.

The impact of construction activities on the quality of runoff would be minimised by implementing an effective soil and erosion sediment control plan as well as other measures detailed in the REF. Subject to the implementation of the recommended measures, it is considered that water quality impacts would be acceptable.

Visual impacts

During construction there would be a temporary decrease in the scenic quality of the local area with the introduction of construction equipment, plant, construction vessels in the water and the like. Views of the river from Harris Street looking south-east towards Captain Cook Bridge would potentially be disrupted during construction, noting that this view is already somewhat obscured by existing black metal fencing and other existing infrastructure on the site.

These impacts would be temporary and would be experienced over a relatively short period of time. No adverse long term impacts would result.

Once constructed, the upgraded marina would have low to negligible impact on existing views and vistas.

Justification and conclusion

The proposal is justified because it would meet the proposal objectives and support the NSW Government's Joint Agency Operations Facilities strategy. It is consistent with Government policy aimed at delivering improved efficiency, cost reduction and improved customer service to the public. The proposal would provide the opportunity to share resources, including vessels, across agencies, enable better patrol planning and improve response times of all three agencies. It would also ensure the marina complies with relevant design standards and Work Health and Safety requirements.

The benefits of the proposal are considered to outweigh the expected impacts on the environment. The environmental impacts of the proposal are not likely to result in a significant impact and therefore preparation of an environmental impact statement and approval from the Minister for Planning under Part 5.1 of the EP&A Act is not required.

Roads and Maritime invites comments on this REF from the community and stakeholders. Submissions received during the public display period will be considered and addressed in a submissions report. Should the decision be made to proceed with the proposal, submissions would be considered during detailed design of the proposal and consultation would continue through the construction phase.

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Appendix K	Ecological Assessment
Appendix L	Traffic Management Plan
Appendix M	AHIMS report
Appendix N	Statutory consultation checklists

1. Introduction

This chapter introduces the proposal and provides the context of the environmental assessment. The proposal objectives and development history are outlined and the purpose of the report provided.

1.1 Proposal identification

Roads and Maritime Services (Roads and Maritime) proposes to upgrade the marine berthing and launching facilities at the Sans Souci Marine Centre (SSMC) ('the proposal') (refer to **Figure 1-1**). The SSMC would provide berths for vessels operated by three agencies - Roads and Maritime, NSW Department of Primary Industries – Fisheries (DPI Fisheries) and the NSW Police Force Marine Area Command (NSW Police MAC).



Figure 1-1: Location of the proposal

Key features of the proposal, as presented in **Figure 1-2** and **Figure 1-3**, would include:

- The demolition of the existing timber jetty, marina, submerged obstructions and part of the boat ramp
- Provision of:
 - six double berths, a single berth and six high-density polyethylene pontoons for dry storage of personal water craft (PWCs) on the eastern marina arm, accessible by a 2.4 m wide gangway and protected from primary south-easterly wind waves by a 4 m wide wave attenuator.
 - two double berths for AirBerths on the western marina arm, accessible by an on-ramp pontoon from the boat ramp and protected from primary westerly wind waves by a 4 m wide wave attenuator.

- Widening of the existing boat ramp to cater for a dual lane boat ramp with an on-ramp pontoon on the western side of the ramp.
- Upgrade of electrical and hydraulic services to the new facilities.

A more detailed description of the proposal is provided in Chapter 3.

The proposal follows an initiative first introduced by Transport for NSW in 2015 aimed at improving on-water compliance delivery across several government agencies, including DPI Fisheries, Roads and Maritime and NSW Police MAC. The proposal has been designed by Roads and Maritime in collaboration with DPI Fisheries and NSW Police MAC.

The proposal is located along the northern foreshore of the Georges River within the suburb of Sans Souci. Sans Souci is within the Georges River local government area (LGA). The surrounding area is predominantly comprised of low-medium density residential development to the north and west and marina and recreational uses along the foreshore. The location is described in more detail in 2.2.

The works are proposed to expand outside of the existing vessel berth and mooring area of Lot 507 DP 752056. Roads and Maritime has submitted an *Alteration of Purpose and Condition* application to the Department of Industry –Crown Lands to extend the facility south 120 m² outside of the existing Lot and DP.

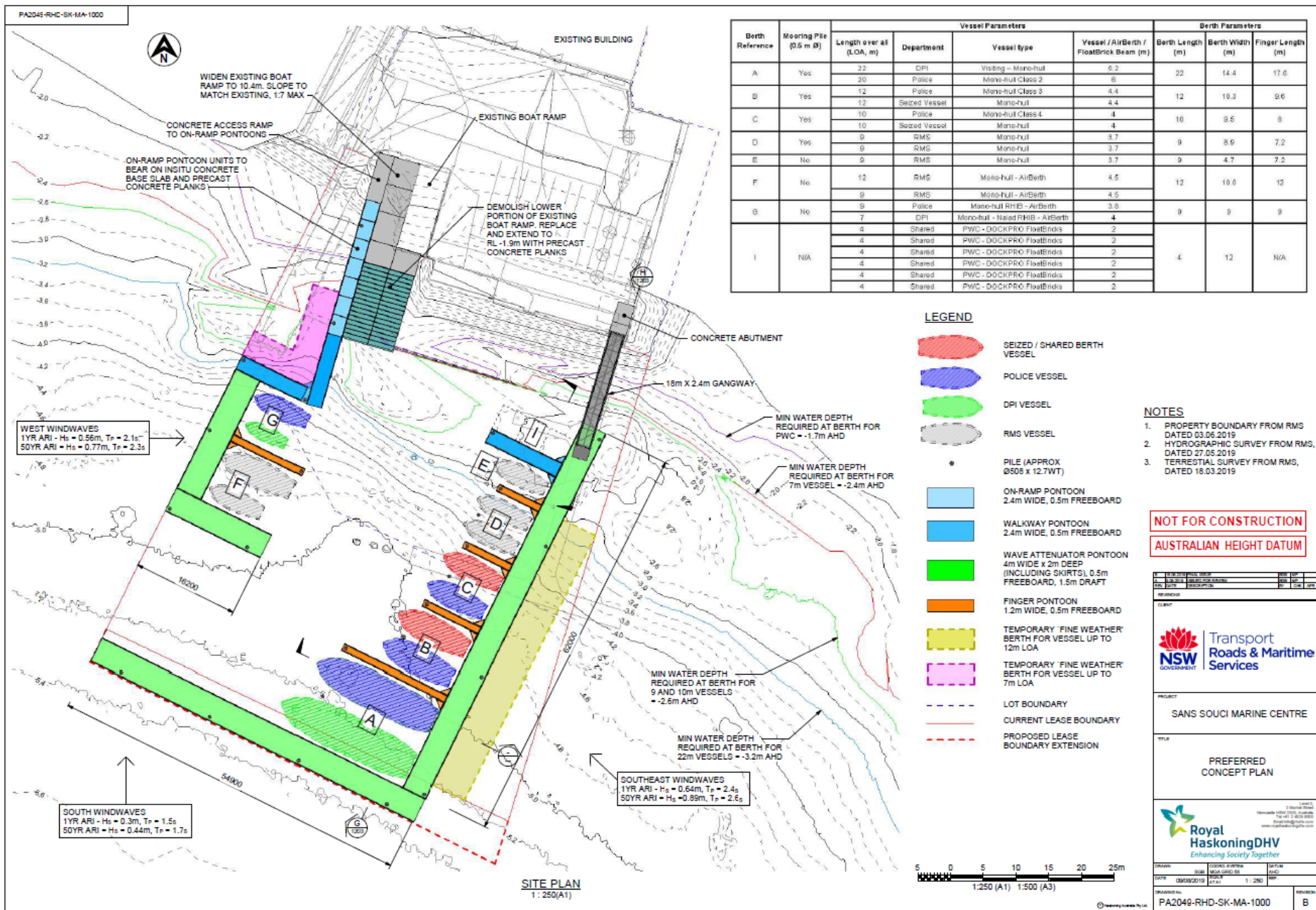


Figure 1-2: The Proposal

1. SAW CUT BOAT RAMP AT MSL AND APPROXIMATELY 100 MM FROM WESTERN EDGE TO ESTABLISH A CLEAN EDGE FOR EXTENSION AND WIDENING OF THE RAMP. DEMOLISH AND DISPOSE EXISTING BOAT RAMP BELOW MSL AND ALONG THE WESTERN EDGE.
2. DEMOLISH EXISTING FIXED WHARF STRUCTURE. NO PLANT, EQUIPMENT OR MATERIAL IS TO BE PLACED ON THE WHARF DURING DEMOLITION DUE TO DILAPIDATED CONDITION OF THE EXISTING STRUCTURE. NO PERSON SHALL ACCESS THE WHARF DURING DEMOLITION.
 - a. DISCONNECT AND REMOVE EXISTING SERVICES (POWER/WATER)
 - b. DISMANTLE AND REMOVE WHARF SUPERSTRUCTURE (LIGHT POLES, FIXTURES, FENCING, TIMBER DECKING)
 - c. EXTRACT OR CUT OFF CONCRETE WHARF PILES AT SEABED (PAIRS OF CONCRETE PILES AND HEADSTOCKS 5 NO.)
 - d. EXTRACT OR CUT OFF TIMBER WHARF PILES AT SEABED (14 NO.)
 - e. EXTRACT OR CUT OFF TIMBER MOORING PILES AT SEABED (2 NO.)
3. REMOVE SEABED OBSTRUCTIONS
 - a. CUT OFF PILES AT SEABED IN VICINITY OF DEMOLISHED SLIPWAY (~16 NO. TBC ONSITE)
 - b. CUT OFF PILE (1 NO.) AT SEABED NEAR END OF EXISTING MARINA PONTOONS
 - c. OBSTRUCTIONS MARKED BY BUOY TO BE IDENTIFIED AND REMOVED.
4. REMOVE EXISTING MARINA BERTH STRUCTURE
 - a. DISCONNECT AND REMOVE EXISTING SERVICES (POWER/WATER)
 - b. REMOVE PONTOONS AND GANGWAY, INCLUDING SERVICE PEDESTALS, FIRE HOSE REELS, WASHDOWN REELS, CCTV MOUNTING POLE
 - c. DEMOLISH RAISED GANGWAY ABUTMENT AND RAMP STRUCTURE TO EXISTING HARDSTAND LEVEL
 - d. EXTRACT OR CUT OFF PILES AT SEABED (STEEL TUBULAR PILES, 11 NO.)

MATERIALS THAT COULD BE REUSED OR RECYCLED SHALL BE SEPARATELY IDENTIFIED, STOCKPILED, AND TRANSPORTED BY ROAD TO A RECYCLING FACILITY. MATERIALS NOT SUITABLE FOR REUSE OR RECYCLING SHALL BE TRANSPORTED BY ROAD TO A LICENSED WASTE FACILITY.

GENERALNOTES

1. PROPERTY BOUNDARY FROM RMS DATED 03.06.2019
2. HYDROGRAPHIC SURVEY FROM RMS, DATED 27.05.2019
3. TERRESTRIAL SURVEY FROM RMS, DATED 18.03.2019
4. AERIAL PHOTO BY NEARMAP DATED 27-01-2019

NOT FOR CONSTRUCTION

AUSTRALIAN HEIGHT DATUM

B	10.08.2018	POWELL, TERRY R	2025	20P
A	10.08.2018	POWELL, JOHN MICHAEL	2025	20P
REF	10.08.2018	POWELL, JOHN MICHAEL	2025	20P

<p> Ref: </p>



SANS SOUCI MARINE CENTRE

1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	1926	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913	1912	1911	1910	1909	1908	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890	1889	1888	1887	1886	1885	1884	1883	1882	1881	1880	1879	1878	1877	1876	1875	1874	1873	1872	1871	1870	1869	1868	1867	1866	1865	1864	1863	1862	1861	1860	1859	1858	1857	1856	1855	1854	1853	1852	1851	1850	1849	1848	1847	1846	1845	1844	1843	1842	1841	1840	1839	1838	1837	1836	1835	1834	1833	1832	1831	1830	1829	1828	1827	1826	1825	1824	1823	1822	1821	1820	1819	1818	1817	1816	1815	1814	1813	1812	1811	1810	1809	1808	1807	1806	1805	1804	1803	1802	1801	1800	1799	1798	1797	1796	1795	1794	1793	1792	1791	1790	1789	1788	1787	1786	1785	1784	1783	1782	1781	1780	1779	1778	1777	1776	1775	1774	1773	1772	1771	1770	1769	1768	1767	1766	1765	1764	1763	1762	1761	1760	1759	1758	1757	1756	1755	1754	1753	1752	1751	1750	1749	1748	1747	1746	1745	1744	1743	1742	1741	1740	1739	1738	1737	1736	1735	1734	1733	1732	1731	1730	1729	1728	1727	1726	1725	1724	1723	1722	1721	1720	1719	1718	1717	1716	1715	1714	1713	1712	1711	1710	1709	1708	1707	1706	1705	1704	1703	1702	1701	1700	1699	1698	1697	1696	1695	1694	1693	1692	1691	1690	1689	1688	1687	1686	1685	1684	1683	1682	1681	1680	1679	1678	1677	1676	1675	1674	1673	1672	1671	1670	1669	1668	1667	1666	1665	1664	1663	1662	1661	1660	1659	1658	1657	1656	1655	1654	1653	1652	1651	1650	1649	1648	1647	1646	1645	1644	1643	1642	1641	1640	1639	1638	1637	1636	1635	1634	1633	1632	1631	1630	1629	1628	1627	1626	1625	1624	1623	1622	1621	1620	1619	1618	1617	1616	1615	1614	1613	1612	1611	1610	1609	1608	1607	1606	1605	1604	1603	1602	1601	1600	1599	1598	1597	1596	1595	1594	1593	1592	1591</
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PREFERRED
DEMOLITION PLAN



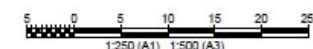
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e-mail: info@studios
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Figure 1-3: Proposed demolition

1.2 Purpose of the report

This review of environmental factors (REF) has been prepared by MG Planning Pty Ltd on behalf of Roads and Maritime - Corporate Services. For the purposes of these works, Roads and Maritime is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail mitigation and management measures to be implemented.

The description of the proposed work and assessment of associated environmental impacts has been undertaken in the context of clause 228 of the Environmental Planning and Assessment Regulation 2000, the factors in *Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979* (Is an EIS required? guidelines) (DUAP, 1995/1996), and the *Marinas and Related Facilities EIS Guideline* (DUAP, 1996), the *Biodiversity Conservation Act 2016 (BC Act)*, the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In doing so, the REF helps to fulfil the requirements of Section 5.5 of the EP&A Act including that Roads and Maritime examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement or a Biodiversity Development Assessment Report
- The potential for the proposal to significantly impact any matter of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of the Environment and Energy for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

2. Need and options considered

This chapter describes the need for the proposal in terms of its strategic setting and operational need. It identifies the various options considered and the selection of the preferred option for the proposal.

2.1 Strategic need for the proposal

There is a need to upgrade the SSMC to cater for current and future fleet requirements which service the area. The upgrade is also needed to ensure facilities meet design safety requirements.

The proposal follows an initiative first introduced by Transport for NSW in 2015 aimed at improving on-water compliance delivery across several government agencies, including DPI Fisheries, Roads and Maritime and NSW Police MAC. The key goals were to:

- reduce operational duplication
- reduce and consolidate the number of vessels through combining resources
- streamline vehicle and vessel procurement across the State to maximise efficiency and reduce cost
- cross-crew vessels to reduce the number of different public interactions with agencies that covered the same topics
- improve overall government delivery through building skills amongst and across the agencies on-water personnel to enable greater delivery of more services through a single site/contact.

The initiative culminated in the Joint Agency Operations Facilities strategy, a program to build facilities which co-locate on-water compliance personnel from all three agencies enabling a shared, joint agency approach. The strategy aims to deliver the following outcomes:

- sustained, measureable on-water collective government agency service delivery improvements and efficiencies
- significant increased outcomes identified through accurate and detailed cost/benefit analysis demonstrating sustained improved efficiency, cost reduction and improved customer service to the public
- prioritisation of projects based on the highest on-water needs for the NSW community. The regions with the highest needs have been prioritised for Marine Centre projects
- improved agency efficiency and operational outcomes through co-location
- sharing of relevant on-water intelligence by agencies which informs a coordinated and targeted operational approach
- opportunity to share vessels and core equipment.

The Maritime Policy Agenda launched in 2012 focussed on boating safety, boat storage and waterways access, and cutting red tape in maritime property and planning. Improvements in the efficiency and effectiveness of on-water compliance were identified as a key area for reform. The proposal would result in significant improvements in on-water compliance by providing opportunities for better patrol planning, sharing of resources, and improved facilities.

Further, the proposal is consistent with the following relevant NSW Premier's Priorities:

- *Delivering infrastructure* – This Priority aims to deliver key metropolitan, regional and local infrastructure projects on time and on budget. The proposal is an important local infrastructure project that would deliver improved services to the community as well as cost savings. The proposal has been carefully designed to ensure it can be delivered in a timely manner and within budget. It is therefore consistent with this Priority.

- *Improving government services* – This Priority aims to improve government services to deliver better outcomes and increase customer satisfaction. The proposal would result in greater efficiencies in the delivery of on-water services by government agencies and improved operational outcomes. It is therefore consistent with this Priority.

2.2 Existing infrastructure

The proposal area includes an existing wharf structure, boat slip rails, existing piles and pontoon (refer demolition plan at **Figure 1-3**) as well as open water. Parts of the existing infrastructure are in poor condition and do not meet relevant standards.

Offshore structures consist of a severely dilapidated timber and concrete wharf and a floating T-shaped (in plan view) concrete pontoon. The wharf extends from the south-west corner of the car park, as shown in Plate 1 below. There is extensive corrosion and cracking with some timber piles almost completely rotted through.

The floating pontoon is shown in Plate 2. It is accessed via a small bridge and contains numerous mooring points.

The facility current has 10 berths and is used solely for NSW Government purposes.

There is an existing textured concrete boat ramp located towards the western side of the site, as shown in Plate 3.

Access to the site is via the Georges River, or via the Water Street entrance to access the buildings, or via Harris Street to access the compound at the rear of the SSMC building. The Sans Souci Marine Centre facility is located landside of the proposal area and includes a storage yard for boats, boat trailers and vehicles. The storage yard is shown in Plate 4. Vehicle parking is available within the Sans Souci Marine Centre fenced compound as well as on Water Street.

Foreshore habitat is highly modified, with a parking lot and concrete-capped rock rubble wall in the intertidal zone.

Georges River in this location is predominantly used for recreational maritime purposes. Botany Bay is located further to the east and is a major commercial shipping port.

A hydrographic survey of the seabed in the vicinity of the investigation sites is provided at Appendix C.

Existing services

The site is currently fed via a 200A three phase underground supply that comes down a pole on the opposite side of Water Street, then into the building next to the front entry platform lift. This supply comes through the building to the site Main Switchboard (MSB), which is located in the basement of the existing building. The entire site is fed from the MSB, which also includes many supplies to the hardstand and existing jetty/wharf facilities. All supplies to the hardstand and existing jetty/wharf facilities go underground from the MSB to a cable pit just outside the building, and then in conduit to the respective locations.

The site is currently connected to the existing 100mm Sydney Water main (running along the north side of Water Street) by a 25mm connection and 32mm property service pipeline that runs to the existing 32mm water meter located along the street frontage of the site. The 32mm property service line extends from the water meter and distributes water supply to the administration building, fixed jetty shore connection, existing gangway shore connection and to another connection along the embankment at the seaward side of the hardstand area. This service provides cold potable water and fire hose reel supply only. There is no existing fire hydrant water supply at the site.



Plate 1: Existing wharf structure



Plate 2: Existing marine berths



Plate 3: Boat ramp



Plate 4: Area next to foreshore for parking and storage, with Marine Centre Building in background

2.3 Proposal objectives and development criteria

2.3.1 Proposal objectives

The objectives of the proposal are to:

1. provide greater ability to share resources, including vessels, across agencies
2. provide for better patrol planning
3. improve response times for NSW Police MAC, RMS and DPI vessels and personnel
4. improve the life expectancy of the SSMC and provide suitable facilities well into the future
5. improve working conditions for staff and ensure the upgrade complies with Work Health and Safety (WHS) requirements
6. ensure the design/s comply with Australian Standard (AS) 3962-2001 Guidelines for Design of Marinas and NSW Boat Ramp Facility Guidelines (2015).

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

Four options for the marina redevelopment were considered together with a 'do nothing' option. The options were selected having regard to:

- Operational requirements
- Primary wind directions
- Available depth
- Channel and fairway geometry for larger vessels
- Wave height, attenuation and primary direction.

A detailed discussion of each of these factors is provided in the Concept Design Report at Appendix D.

The options were developed in consultation with DPI Fisheries and NSW Police MAC and assessed against the project objectives.

2.4.2 Identified options

Concept design options were developed and tested by the three agencies with the support of marine engineers, Royal Haskoning DHV. The concept options are shown on the plans at Appendix E. The options are described below:

‘Do Nothing’ option

- No change to existing infrastructure or operations. The existing infrastructure, including the pontoon and dilapidated wharf, would remain.

Option A

- Dual marina access points
- Marina entrance facing south-east
- Berth orientation ESE-WNW
- On-ramp pontoon provided on the western side of the boat ramp



Figure 2-1: Option A (excerpt from Appendix A of Concept Design Report, provided at Appendix D to this REF)

Option B

- Dual marina access points
- Marina entrance facing west
- Berth orientation SE-NW



Figure 2-2: Option B (excerpt from Appendix A of Concept Design Report, provided at Appendix D to this REF)

Option C

- Single marina access point
- Marina entrance facing south east
- Berth orientation predominantly NNE-SSW.



Figure 2-3: Option C (excerpt from Appendix A of Concept Design Report, provided at Appendix D to this REF)

Option D

- Single marina access point
- Marina entrance facing west
- Berth orientation predominantly NNE-SSW.

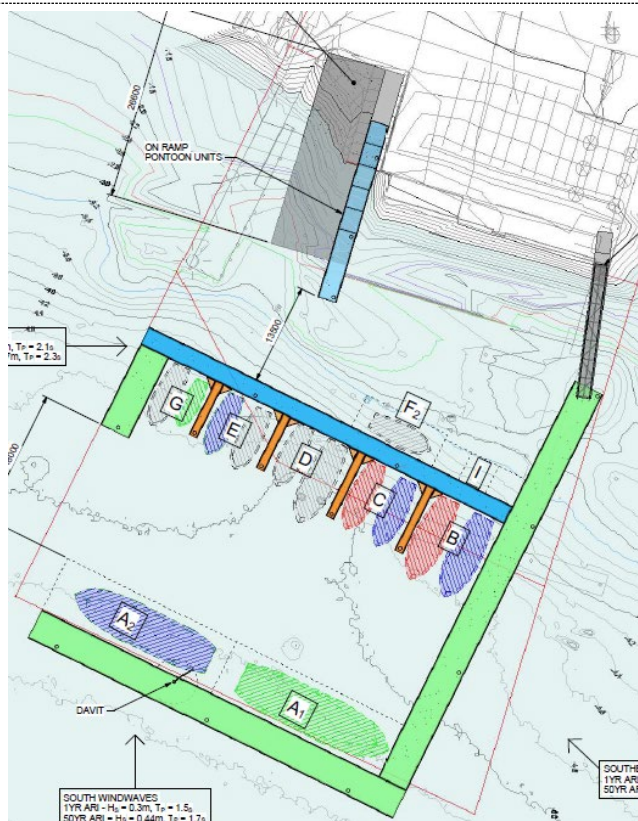


Figure 2-4: Option D (excerpt from Appendix A of Concept Design Report, provided at Appendix D to this REF)

2.4.3 Analysis of options

In general, Options A, B, C and D would accommodate the requirements of Roads and Maritime, DPI Fisheries and NSW MAC within the purpose-built SSMC.

With the exception of the 'Do Nothing' Option, the concept options would all meet Agency expectations and satisfy Project Objectives 1 to 4 enabling sharing of resources, better patrol planning, improved response times and the facility would be future proofed.

The design for Options A-C complies with NSW Boat Ramp Facility Guidelines (2015) as per Objective 6.

An assessment of the options, particularly having regard to the project objectives, is provided in **Table 2-1**.

Table 2-1: Assessment of options

Concept Option	Assessment against Project Objectives
Do Nothing Option	<ul style="list-style-type: none"> • The 'do nothing' option is inconsistent with the Joint Agency Operations Facilities strategy • The Sans Souci Police Base was developed into the current 'Marine Centre' to ensure resources are shared across agencies and to enable better patrol planning between agencies. However, the number of wet berths in the marina is insufficient for the number of agency vessels. Some vessels are stored at nearby locations and the ability to share resources and plan for patrols is therefore limited by the current

Concept Option	Assessment against Project Objectives
	<p>arrangement. Objectives 1 and 2 are not satisfied.</p> <ul style="list-style-type: none"> • Response times may be limited by the current SSMC as some vessels are stored in wet berths offsite or stored on the hardstand area. These vessels are not immediately available in an emergency and Objective 3 is not satisfied. • The SSMC marina is reaching the end of its design life. Significant modification or replacement would be required in the near future to ensure the facility is future proofed. Objective 4 is not satisfied. • The pontoons are 'lively' in large wave events and are often overtopped. WHS requirements in Objective 5 are not satisfied. • The wave climate at the SSMC marina does not comply with requirements for a 'good' wave climate in AS3962. Objective 6 is not satisfied.
Option A	<ul style="list-style-type: none"> • The marina is protected by 4 m wide wave attenuating pontoons that would be relatively stable in all design conditions. However, wave overtopping may occur in a significant storm event, which may present a hazard to personnel accessing the marina. As there are dual marina access points, either the eastern or western marina arm would be protected from oncoming waves (by the opposite marina arm) and part of the marina would be safe to access in all design weather conditions, satisfying the WHS requirements outlined in Objective 5. • The design generally complies with AS3962 (and Objective 6). However, the following points are noted: <ul style="list-style-type: none"> ○ Relatively steep (1V:7H max) on-ramp pontoon to access berths A, B, D, E and F, which may be less favourable for emergency response activities. ○ Marina entrance area and berths near the entrance are exposed to primary south-easterly wind waves. • Berth orientation and selection of floating attenuator achieves 'excellent' wave climate.
Option B	<ul style="list-style-type: none"> • As per Option A, part of the marina would be safe to access in all design weather conditions and would satisfy the WHS requirements outlined in Objective 5. • The design generally complies with AS3962 (and Objective 6). However, the following points are noted: <ul style="list-style-type: none"> ○ Relatively steep (1V:7H max) on-ramp pontoon to access berths C, which may be less favourable for emergency response activities. ○ Marina entrance area and berths near the entrance are exposed to primary westerly wind waves. • Berth orientation and selection of floating attenuator achieves 'excellent' wave climate for most berths.
Option C	<ul style="list-style-type: none"> • The marina is protected by 4 m wide wave attenuating pontoons that would be relatively stable in all design conditions. However, wave overtopping may occur in a significant storm event, which may present a hazard to personal accessing the marina. As there is only a single marina access point, the marina arm may be dangerous to access in a storm event generating westerly wind waves and would not satisfy the WHS requirements outlined in Objective 5. • The design generally complies with AS3962 (and Objective 6). However, the following points are noted: <ul style="list-style-type: none"> ○ Relatively steep (1V:7H max) on-ramp pontoon to access all berths,

Concept Option	Assessment against Project Objectives
	<p>which may be less favourable for emergency response activities.</p> <ul style="list-style-type: none"> ○ Marina entrance area and berths near the entrance are exposed primary south-easterly wind waves. ● Berth orientation and selection of floating attenuator achieves 'good' wave climate for most berths.
Option D	<ul style="list-style-type: none"> ● As per Option C, the marina arm may be dangerous to access in a storm event generating south easterly wind waves and would not satisfy the WHS requirements outlined in Objective 5. ● The design generally complies with AS3962 (and Objective 6). However, the following points are noted: <ul style="list-style-type: none"> ○ Marina entrance area and berths near the entrance are exposed primary westerly wind waves. ○ Berth orientation and selection of floating attenuator achieves 'good' wave climate for most berths. ● The design complies with the NSW Boat Ramp Facility Guidelines (2015) (and Objective 6), with the exception of: <ul style="list-style-type: none"> ○ The on-ramp pontoon would need to be truncated in length to allow access to Berth F, which reduces its effectiveness as a boat holding structure. ● The boat ramp would be exposed to westerly wind waves.

2.5 Preferred option

Feedback received from the Roads and Maritime, DPI Fisheries and NSW Police MAC stakeholders shortlisted the options to Option A and Option B. A formal presentation of Options A and B was delivered to stakeholders on 12 July 2019. During this meeting it was confirmed that all stakeholders had unanimously selected Option B as their preferred option. Option B was considered to meet all Project Objectives. It would enable the sharing of resources, better patrol planning and improved response times. It would provide for future proofing of the facility and improve working conditions for staff. It would be safe to access in all design weather conditions. Further, berth orientation and the proposed floating attenuator would achieve 'excellent' wave climate for most berths.

In addition to meeting the Project Objectives, the agencies considered that Option B provided two key additional benefits, that is:

- the benefit of gangway access to shore for the majority of berths, including the Police berth used for emergency response activities
- preference for protection offered from south to south east wind waves, which are more prevalent in the peak boating season (October – April), when there is more activity on the water and when the agencies have an increased frequency of responses. Exposure to westerly wind waves was considered to be less problematic as these winds occur in the winter months when waterway boating activity is relatively low.

2.6 Design refinements

In consultation with stakeholders, a number of design refinements were made, including:

- Removal of the davit crane from the scope of design
- A double-berth configuration was adopted for Berth A (previously A1/A2), which provides access to the stern of vessels in both berths and provides easier and faster access to the waterway for both berths
- Four (4) mooring piles are provided in the centre of double Berth A, Berth B, Berth C and Berth D on the eastern marina arm
- Gangway clear width increased to 2.4m.
- Berth G moved to the western marina arm to minimise seaward encroachment of the eastern marina arm.
- The existing boat ramp would be upgraded to accommodate an on-ramp pontoon, second boat ramp lane, and extension seaward to provide increased toe depth
- In addition to the permanent berths provided in the refined marina layout a number of 'fine weather' temporary berths would be available within the lease boundary.

The preferred concept plan is considered to be the optimal solution to satisfy the environmental constraints at the site and operational considerations of Agency stakeholders.

3. Description of the proposal

This chapter describes the proposal and provides descriptions of existing conditions, the design parameters including major design features, the construction method and associated infrastructure and activities.

3.1 The proposal

Roads and Maritime proposes to upgrade the marine berthing and launching facilities at the SSMC to provide berths for its vessels as well as those operated by DPI Fisheries and NSW Police Force MAC. The proposed works comprise:

- The demolition of the existing timber jetty, marina, submerged obstructions and part of the boat ramp
- Provision of:
 - six double berths, a single berth and six high-density polyethylene pontoons for dry storage of personal water craft (PWC) on the eastern marina arm, accessible by a 2.4 m wide gangway and protected from primary south-easterly wind waves by a 4 m wide wave attenuator.
 - two double berths for AirBerths on the western marina arm, accessible by an on-ramp pontoon from the boat ramp and protected from primary westerly wind waves by a 4 m wide wave attenuator.
- Widening of the existing boat ramp to cater for a dual lane boat ramp with an on-ramp pontoon on the western side of the ramp
- Excavation above and below mean sea level for the new boat ramp foundation preparation.
- Upgrade of electrical and hydraulic services to the new facilities, including services trench excavation (refer **Figure 3-4**).

The preferred concept plan is shown in **Figure 3-1** and included in **Appendix A**.

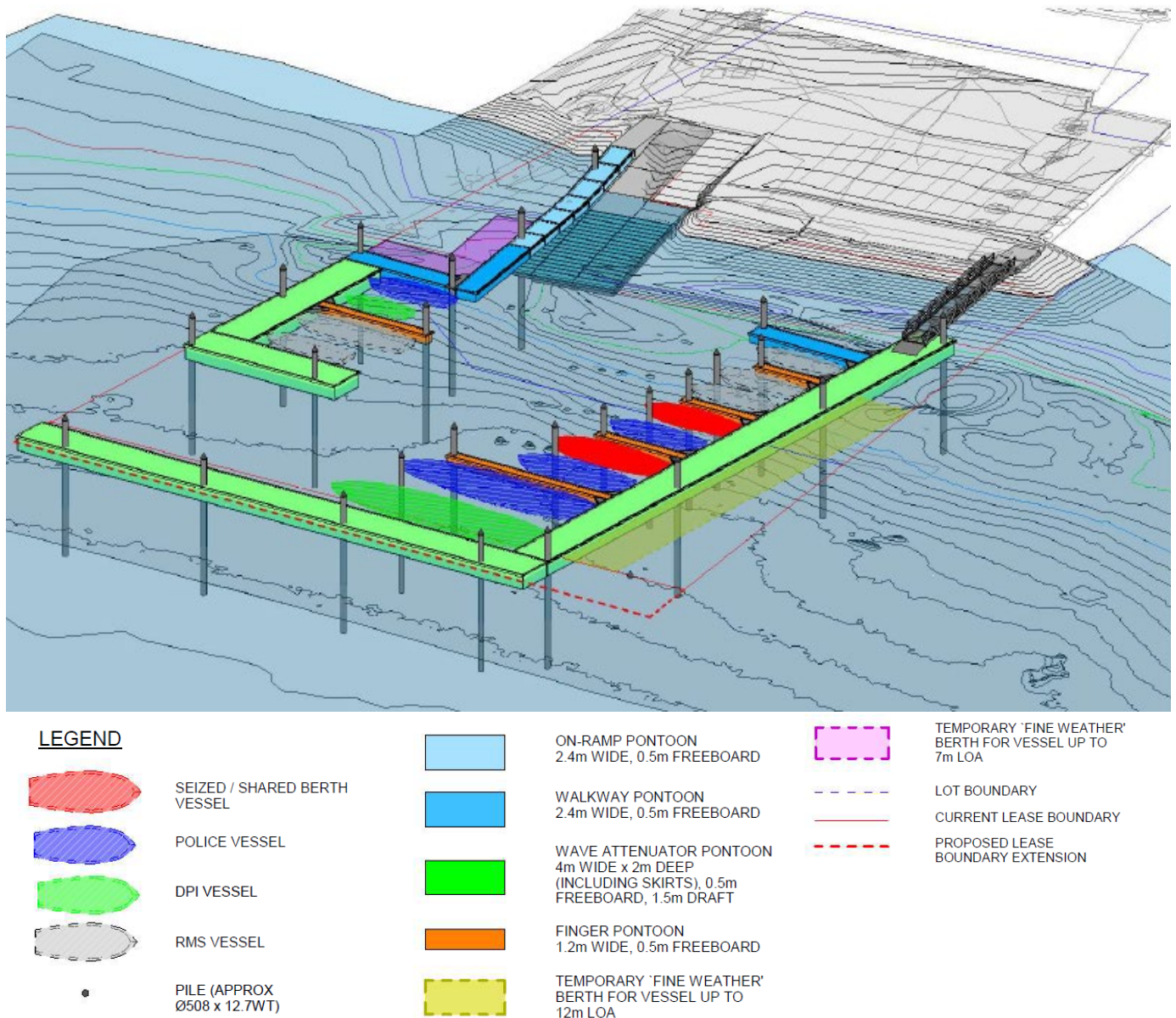


Figure 3-1: Preferred concept

The package of concept drawings comprises:

- PA2049-RHD-SK-MA-1000 PREFERRED CONCEPT PLAN
- PA2049-RHD-SK-MA-1010 PREFERRED DEMOLITION PLAN
- PA2049-RHD-SK-MA-1100 BOAT RAMP PLAN
- PA2049-RHD-SK-MA-1201 BOAT RAMP SECTIONS SHEET 1
- PA2049-RHD-SK-MA-1202 BOAT RAMP SECTIONS SHEET 2
- PA2049-RHD-SK-MA-1203 MARINA SECTIONS

- PA2049-RHD-SK-MA-1210 MISCELLANEOUS DETAILS
- PA2049-RHD-SK-MA-1300 PREFERRED OPTION PERSPECTIVE
- E01 ELECTRICAL LAYOUT
- H-01 TITLE, LEGEND, NOTES AND DETAIL SHEET
- H-02 SITE PLAN – HYDRAULIC SERVICES

The proposal may be carried out in full or staged depending on funding arrangements. If the proposal is staged, it would be carried out as follows:

- Stage 1
 - Demolition of timber wharf, marina, pontoons and existing services
 - Installation of new services, pontoons and marina but excluding boat ramp and western berth and pontoon
- Stage 2
 - Demolition of boat ramp
 - Installation of new boat ramp, western berth and pontoon.

3.2 Design

3.2.1 Design criteria

The Concept Design Report at Appendix D sets out the Basis of Design (BoD). The BoD is a summary of design parameters that sets out the bounds of the design process. The BoD includes:

- definition of the works area, including survey and datum
- a list of all relevant standards, guidelines and other documents to be considered
- selected design life, design storm event (return period) and definition of safe working conditions
- consideration of operational requirements
- characterisation of marina and ramp usage and definition of design vessel
- outline of the layout and geometry of the marina and boat ramp
- estuary processes, which influence design actions and environmental loadings including water level, wind, waves and current.

The structures would be designed for a design life of 50 years, in accordance with Facility Category 1 (normal commercial structure) in AS4997 Guidelines for the design of maritime structures. The structure would remain serviceable at the end of the design life, subject to fair wear and tear, and allowing for regular inspections and a reasonable level of periodic and as-needed maintenance.

A design life for the main structural elements has been adopted as follows:

- Steel piles, gangways - 50 years

- Concrete – 50 years
- Pontoons – 25 years
- Minor steel elements - 25 years
- Fender elements and pile guide wear pads - 20 years.

The following guideline texts, standards and codes would guide the detailed design:

- Coastal Engineering Manual (2008) prepared by USACE
- NSW Boat Ramp Facility Guidelines (2015), prepared by RMS
- AS 1170 – Structural design actions (AS/NZS1170.0 - Structural Design Action Part 0: General Principles and AS/NZS1170.2 - Structural Design Action Part 2: Wind Actions)
- AS 1428 – Design for access and mobility
- AS 1657 – Fixed platforms, walkways, stairways and ladders – Design, construction and installation
- AS 3962 – Guidelines for design of marinas
- AS 4997 – Guidelines for design of maritime structures

Further detail regarding design criteria is provided in the Concept Design Report at Appendix D.

3.2.2 Engineering constraints

Wave Height, Attenuation and Primary Direction

The 1-year ARI and 50-year wave heights exceed the criteria for a 'moderate' and 'good' wave climate in accordance with AS 3962. A wave attenuator would therefore be required to achieve the desired wave climate inside the marina.

The proposal adopts a 4m wide wave attenuator with a 2m depth, 0.5m freeboard and 1.5m draft with skirts, to achieve an 'excellent' wave climate. This would provide a range of wave conditions in the lee of the attenuator for various wind velocities.

The pontoon dimensions and attenuation would be refined during the detailed design phase.

Geotechnical

A geotechnical investigation was undertaken by JK Geotechnics from 24th to 26th July 2019 (refer report at Appendix F). The investigation found that the soil profile within the harbour generally comprised of very soft marine clays and very loose sands overlying sandstone bedrock, although the presence of a relatively thin layer of medium dense sands over the bedrock was noted.

The report recommends as follows:

- Footing design - Given the presence of poor soils, the report states that very long piles would be required to achieve the required pile capacities expected, by which point the piles will have encountered bedrock. Therefore, all footings are recommended to be designed to be founded in the underlying sandstone bedrock.

- Geotechnical strength reduction factor - Appropriate load factors and geotechnical reduction factors, in accordance with AS2159-2009 would need to be used in the design. The overall risk factor is 'low-moderate'.
- Subgrade preparation for proposed boat ramp - The proposed boat ramp will generally be supported above very soft clayey soil and very loose sandy soils, which could consolidate over time, resulting in long term settlement. Given the depth of a suitable founding stratum, i.e. bedrock, it may not be economically viable to suspend the ramp from piles, however this should be further assessed at the detailed design stage. Alternatively, the ramp may be supported on the existing soils, provided that the recommendations in the geotechnical investigation are carried out on the base for the ramp.

3.2.3 Major design features

Layout and berths

The marina would comprise a western and eastern arm incorporating wave attenuator pontoons. The marina arms would provide a sheltered manoeuvring and berthing area for agency vessels.

The marina layout would comprise two (2) double berths along the western arm and four (4) double berths, a single berth and an area for PWC berthing on the eastern arm. The berths would be separated by finger pontoons suitably dimensioned to provide access to the vessels.

Mooring piles would be provided between each double berth on the eastern arm to provide additional mooring point for exposure to westerly wind waves through the marina entrance and to provide additional restraint for the larger vessels under wind action.

Police vessels, required for emergency response operations, would be located in close proximity to the marina entrance. Further, the berths for these vessels would be arranged to allow rapid deployment and berthing in case of an emergency. Larger vessels would be located in deeper water, closer to the entrance of the marina. Shallow draft vessels, such as PWCs, would be located closer to the shoreline.

Temporary fine weather berthing areas would be located on the outside of both the western and eastern arms. These could be utilised for temporary berthing of vessels subject to the direction of adverse sea conditions.

The berthing arrangement is intentionally flexible to enable rapid deployment of NSW Police Force MAC vessels.

Boat ramp/on-ramp pontoon

A boat ramp would be provided for launching and retrieval of vessels. The ramp slope is nominally shown at a maximum slope of 1:7 (vertical:horizontal) based on the nearshore contours. The boat ramp slope would be refined during the detailed design phase.

An on-ramp pontoon would be provided on the western side of the boat ramp. The on-ramp pontoon provides a dual-purpose of providing access to the western marina arm. This arrangement optimises spaces and offers wave protection to the boat ramp to the west.

To maximise efficient use of the waterway lease, the on-ramp pontoon is aligned parallel to the western property boundary. This dictates the position and orientation of the boat ramp.

Walkways, Fingers and Gangways

Access to vessel berths would be provided by a series of walkways, fingers and gangways.

The gangways are nominally shown at a length of 18m, which caters for a slope of 1:14 (vertical:horizontal) more than 80% of the time and a maximum slope of 1:8 (vertical:horizontal). The clear width of the gangways is 1.5m to cater for an ambulance trolley.

The nominated freeboard for the wave attenuator, on-ramp pontoon and finger pontoons would be 0.5m. The freeboard has been selected to minimise overtopping and to ensure a consistent freeboard across the marina.

The fingers are nominally shown at 1.2m wide. This is to allow for the minimum width of 0.9m in AS 3962 and cater for timber walers.

3.3 Construction activities

This section provides a summary of the likely methodology, staging, work hours, plant and equipment that would be used to complete the proposed work. For the purposes of the REF, indicative construction staging, and options are provided. Detailed methods and staging would be established once the detailed design methodology is finalised. Staging of construction may also need adjustment to meet the site conditions or the type/size of equipment used by the nominated contractor during the construction period in consultation with Roads and Maritime.

Any material changes to the construction methodology which could result in additional environmental impacts to those assessed in this REF, would be the subject of additional environmental assessments.

3.3.1 Work methodology

Site establishment and wharf closure

In order for the marina to be upgraded it would be necessary for the existing vessels berthed at the marina to be temporarily relocated. It is understood that Agency moorings, and nearby private marinas would be used for on water storage of vessels and at the commencement of construction there would be no vessels within the SSMC marina.

Site establishment would involve the following main tasks:

- establishment of a site compound and ancillary facilities within the existing hardstand
- establishment of a waterside construction area using floating booms and buoys to delineate the area
- disconnection of existing services and connection of temporary services as required
- establishment of environmental controls in accordance with the construction environmental management plan (CEMP), including erosion and sediment control measures and turbidity curtains
- establishment of traffic control measures for vehicles, watercraft and pedestrians in accordance with a traffic management plan (TMP), including installation of appropriate way finding signage where necessary.

The Construction Site Plan is provided at **Appendix G** and reproduced at **Figure 3-2**.

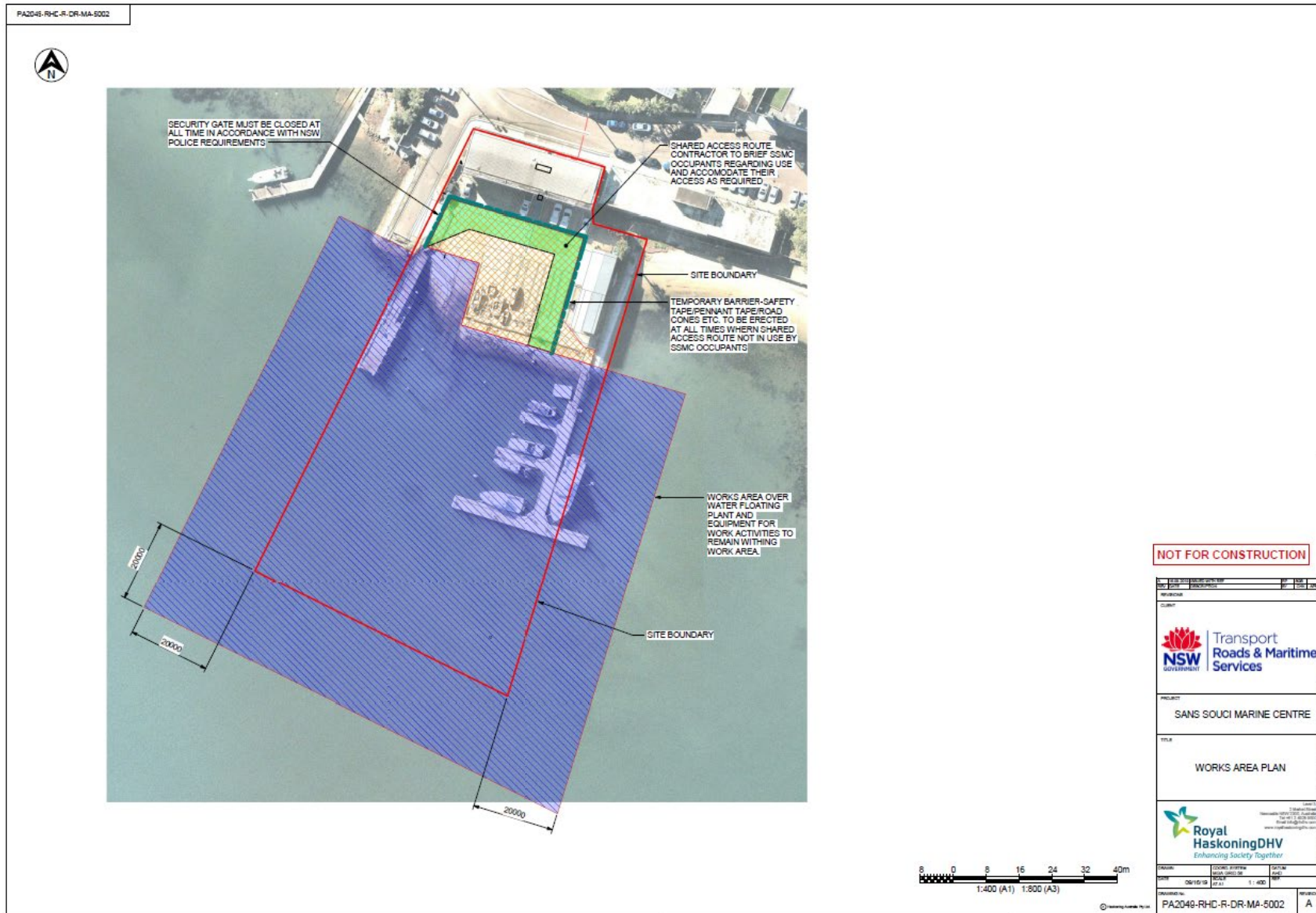


Figure 3-2: Construction Site Plan

Demolition and removal of existing infrastructure

Existing infrastructure, including the boat ramp, wharf structure, light poles, marina berth structure and seabed obstructions, would be demolished and removed from the site. Seabed obstructions include mooring blocks and individual piles that have been cut off below the water surface. The location of the seabed obstructions are shown on the Demolition Plan (PA2049-RHD-SK-MA-1010) at Appendix A.

The existing pontoons would be detached from the restraint piles and removed from site.

The boat ramp below mean sea level and the western portion of the ramp would be demolished.

It is envisaged up to three barges (about 10 metres by 20 metres in size) would travel to the site. One barge would be fitted with a crane. When on-site the barge would be secured either by using vertical anchors and or chain anchors at four points but would reposition around the site during the work and as required.

The demolished piles, pontoon fingers and floats would be loaded onto either a barge by crane or trucks and transported to an appropriately approved and licensed facility for reuse and/or disposal.

Piles would be removed using a vibratory hammer or vertical lift by attachment to a crane or barge, to extract the piles from the bedrock. The hammer would be placed over the pile using a barge mounted crane. If the pile is unable to be pulled out, it would be cut level to the sea bed to remain in situ. Divers would cut the pile at or below seabed level using appropriate underwater equipment.

Piles would be removed by barge to the off-site facility. The piles would be reused, where possible, or eventually removed to a licensed waste management facility for recycling or disposal.

Materials that could be reused or recycled would be separately identified, stockpiled, and transported by road to a recycling facility. Materials not suitable for recycling would be transported by road to a licensed waste facility. With the exception of the gangway, it is likely that the majority of the materials would not be suitable for recycling.

Piling

Steel piles would be installed into the bed consisting of upper layers of sand over rock. These piles would be transported by barge to the site. There would be sufficient water to carry out piling operations. The installation of the platform support piles would be carried out generally at or around high tide.

Each pile would be lifted from the barge and put into place using a barge-mounted crane. A drill rig mounted onto a barge would attach to the pile using a helmet fitting.

Constructing piles founded in bedrock would consist of four phases:

- Phase 1: Piles would be vibrated, jetted or driven down to rock. Should it be necessary to embed the piles into rock, drilling or percussion techniques would be used.
- Phase 2: Drilling into rock would take about two to four hours per pile plus setup and pack up time (with continuous noise from the diesel generator and large electric motors whilst drilling the pile).
- Phase 3: The piles are hammered (using a 30 tonne weight) to refusal. Hammering of piles would take place at least one day after drilling of piles. There are 25 piles to be hammered over about 2-4 weeks.
- Phase 4: The steel piles would be cut and a high-density polyethylene (HDPE) sleeve placed over the pile. The platform support piles would be plugged with concrete.

Boat ramp

The existing boat ramp would be sawcut along the western edge and at approximately MSL to establish a smooth finish for the extension. Construction of the boat ramp widening and extension would require dowels to be installed along the lower and western edges of the existing boat ramp. The boat ramp above approximately mean low water (MLW) would be cast in-situ concrete.

The boat ramp below MLW would be constructed from pre-cast concrete planks founded on a bridging layer and base course foundation. The ramp would be finished with a grooved surface.

There is a risk that the bridging layer and ramp foundation may settle over time, resulting in a non-compliant boat ramp slope. As noted in section 3.2.2, this will be considered during the detailed design.

Construction of the boat ramp would need to be cognisant of the water level. The cast in-situ slab would extend as low as practical to allow construction at low tide as this construction method is cheaper and easier to construct. The use of precast planks enables a construction method that is feasible to build underwater, without the requirement of cofferdams or similar.

Localised excavation above and below mean sea level to a maximum depth of 750mm would be undertaken for the boat ramp widening/extension. This is discussed further in Section 3.5.

Installation of pontoon units

All pontoon units would be manufactured off site. They would be transported to site by truck and launched by crane, or transported to a nearby wharf by truck, launched by crane, interconnected in lengths, and towed to site. The pile guide frames would be installed onsite.

Installation of gangway and services

The concrete abutment on the approach to the gangway would be constructed prior to installation of the gangway. Ferrules would be cast into the abutment for fixing the gangway hinge.

The gangway would be fabricated off site and delivered to site by truck and lifted into place by crane. The gangway would be fixed to the abutment onsite.

Installation of the services pedestals, fire fighting equipment, and services cables and pipework are essentially a manual task.

Use of silt curtains

As the seabed is likely to be sandy with seagrass habitat, a surface silt curtain would be installed around the work area such that piling work occurs inside the silt curtain but barges are outside the silt curtain. The silt curtain would be installed around the piles being both removed and installed during each day of operation and relocated from time to time.

The use of a complete sea depth curtain is not recommended as it would disturb the seabed.

Site clean-up

The site would be cleaned up and restored to its previous state. Site clean-up would involve the following main tasks:

- removal of all environmental controls and temporary structures
- assessment of the safety of the site to identify any risks and rectification of any safety hazards resulting from construction before handing over the site to the agencies

- removal of hoarding, site office, signage and any excess or demolished materials.

3.3.2 Construction hours and duration

The proposed upgrading would be constructed over a period of up to six months (weather permitting), commencing in early 2020 and subject to REF approval and agency operational capability, given that November to March is the peak boating period.

The working hours during construction would be standard daytime construction hours of 7 am to 6 pm, Monday to Friday and 8am to 1pm Saturday, in accordance with the Noise Policy for Industry (EPA, 2017). No work would be undertaken on Sundays or Public Holidays.

Work outside standard hours may be advantageous at certain times to take advantage of particular tidal conditions. Where required, any work carried out outside standard construction hours would be undertaken in accordance with the Construction Noise and Vibration Guidelines (Roads and Maritime 2016).

3.3.3 Plant and equipment

The equipment to be used would be confirmed during the construction planning process. Typical plant and equipment likely to be used during construction would include:

- Generators
- Power hand tools
- Light vehicles
- Boats
- Barges
- Drill rigs (barge mounted)
- Cranes (barge mounted)
- Water pumps
- Chainsaws
- Concrete trucks
- Hammer drills
- Concrete boom pump
- Hand tools
- Excavator
- Crane
- Delivery trucks

3.3.4 Traffic management and access

Demolition would be facilitated either via truck and dog trailer from the site via Harris Street or Water Street or by barge. The truck for delivery of the new wharf components would likely need to be a prime mover and trailer, a single articulated truck with five axles. In addition, contractor and trade vehicles would be parked in the secure compound or in the public parking located on both sides of Water Street.

If construction is facilitated by barge, the current anticipated waterside departure point is anticipated to be Shell Point. Construction truck movements would then be located in the Taren Point Peninsula rather than in Sans Souci.

Access routes would depend on the construction approach, which has not been confirmed at this stage. If no barges are used, vehicles would need to access the SSMC directly. While there are 'no trucks' signs on all approach roads, Roads Rules 2014 (NSW) allows for access to the site via these roads as there is no alternative.

The maximum daily vehicle demand would be as follows:

- Demolition: 3 trucks plus 16-20 trade vehicles per day
- Construction: 6 truck plus 18-25 trade vehicles per day.

It is expected that temporary work zones would need to be installed to remove parking at pinch points. Construction access on Water Street for large vehicle sizes would likely require removal of on-street parking via work zones.

A detailed Construction Traffic Management Plan (CTMP), which would include a construction traffic control plan, would be prepared. This would be done prior to commencement of construction and in accordance with the *Traffic Control at Work Sites Technical Manual* (2010).

Further detail on traffic management is provided in 6.8.

3.4 Ancillary facilities

Ancillary facilities including a construction zone, potential materials staging area and potential works zone would be established on land within the existing secure hard stand area. The compound would be secured by the contractor and re-positioned within the construction zone from time to time to suit the construction work schedule. The compound would include site sheds for use as an office, mess and amenities as well as a lay-down and storage area and potentially a container for storage of some tools, equipment and materials. The hard stand area would be used for the temporary storage of material before removal by truck. A temporary compound on a barge may also be established on the water within the construction zone and operated for the piling activity for about 2 to 3 weeks. The barge would also be used for storage of some tools, equipment and materials.

The construction zone would be required for the duration of the works, initially for the utility adjustments and then as a materials staging area and potential works zone. The Construction Site Plan is shown at **Figure 3-2**.

3.5 Earthworks

Localised excavation above and below mean sea level to a maximum depth of 750mm would be undertaken for the boat ramp widening/extension. Approximately 110 cubic metres of material would need

to be excavated and removed from the site. Excavation has been minimised by designing a marginally flatter slope compared to existing that would extend the boat ramp into deeper water.

Excavation would also be required on land to accommodate the services trench. Approximately 200 cubic metres of material would need to be excavated to accommodate services. The trenches would be to the supply authority standards and back filled with granular material and surfaces reinstated.

The extent of excavation for the boat ramp and services trench is shown at **Figure 3-3**.

Any excavated material that could not be reused would be contained and disposed of in accordance with the *Waste Classification Guidelines: Part 1 Classifying Waste* (DECCW 2009c).



Figure 3-3: Area of excavation

3.6 Public utility adjustment

Electricity and communications

A new marina switchboard is proposed to be located on the hardstand just next to the eastern gangway to provide the required electricity supply to the new marina. This new marina switchboard would feed all the supplies to both the eastern and western arms of the marina, for pedestal and lighting supplies on the marina, and also the floodlights on the edge of the hardstand to light both the hardstand and the marina. This switchboard could also be used to provide CCTV power supplies.

A new private meter/power monitor would be provided on this supply to the new marina switchboard so that the marina power usage can be measured.

New underground conduits would need to be installed to provide the required supplies to the new facilities,. This would involve cutting, trenching and reinstating the existing hardstand. It is proposed to use a common services trench which is shared with the hydraulic services where possible to lessen the amount of cutting and trenching. Communications conduits would be included in each of these new underground conduit runs, so that these may be utilised for CCTV if required.

The proposed new power and communications conduit infrastructure may allow for the removal of some existing surface mounted electrical conduits to existing CCTV cameras.

The proposed location of proposed electrical services is shown on the Marina Services Plan at **Figure 3-4** and on Drawing E01 at Appendix A of this REF.

Water supply

In order to provide the site with a fire hydrant booster assembly, the existing 25mm connection to the water main and 32mm property service must be disconnected and made redundant in accordance with Sydney Water requirements. A new 100mm connection to the water main and a 100mm property service would need to be installed to the site boundary and a 100mm fire hydrant booster assembly would need to be installed. For compliance with the Building Code of Australia (BCA), the booster assembly would need to be located at the main vehicular entry to the site and installed behind a 2m high fire wall positioned to the immediate north of the existing sliding gate entry on the western side of the site. The fire wall would be located directly behind the fire booster assembly and is required to provide protection from radiant heat, should the administration building be on fire. The existing water meter assembly is required to be relocated directly under the fire booster assembly. The 100mm water lines to the two fire hydrants would be installed within service trenches cut into the existing hardstand area. These trenches would also have the potable water and electrical services installed within.

Based on the Statement of Available Pressure received from Sydney Water, the fire hydrant system would be unable to achieve the required pressure at the marina connection points without provision of a booster pump assembly. The booster pump would be a diesel powered with a power supply for indicator lights and control panel. The fire hydrant booster pump and enclosure would be positioned inside the fence to the north of the sliding gate entry on the western side of the site and is required to be positioned a minimum of 6m from the administration building.

Based on the Statement of Available Pressure received from Sydney Water, the existing 32mm property service has insufficient pressure to provide the minimum required pressure for the marina fire hose reel system connections at the two marina shore connection points. This would be resolved by replacement of pipework from the meter assembly to both shore connection points with 50mm (internal diameter) pipework. This could split into separate potable water and fire water supply lines at the shore connections to suit the required pipe reticulation through the marina. The new 50mm lead-in pipework would be laid within the service trenches established for the fire hydrant supply.

The proposed location of water services is shown **Figure 3-4** the layout and typical details of proposed hydraulic services are shown on Drawing H-01 and and H-02 at Appendix A.

3.7 Property acquisition

No property acquisition is required.

The area of the existing vessel berth and mooring, known as Lot 507 in DP 752056, is Crown Land over which Roads and Maritime hold a licence. The proposal would extend outside the area of this existing licence by approximately 6m. A *Licence - Alteration of Purpose and Condition Application* has therefore been made by Roads and Maritime to the Department of Planning, Industry and Environment - Crown Lands to extend the area under licence.



Figure 3-4: Marina Services Plan

4. Statutory and planning framework

This chapter provides the statutory and planning framework for the proposal and considers the provisions of relevant state environmental planning policies, local environmental plans and other legislation.

4.1 Environmental Planning and Assessment Act 1979

4.1.1 State environmental planning policies

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 68(4) of ISEPP permits development for the purpose of wharf or boating facilities to be carried out on any land by or on behalf of a public authority without consent. However, such development may only be carried out on land reserved under the *National Parks and Wildlife Act 1974* if the development is authorised by or under that Act.

As the proposal is for the purpose of wharf or boating facilities and is to be carried out by Roads and Maritime, it can be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979*. Development consent from council is not required. The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974*.

The proposal does not trigger an approval or development consent under State Environmental Planning Policy (Coastal Management) 2018 (CM SEPP) or State Environmental Planning Policy (State Significant Precincts) 2005.

State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) identifies development that is State significant infrastructure and critical State significant infrastructure.

Clause 14(1) of the SRD SEPP declares development to be State significant infrastructure if the development is, by the operation of a State environmental planning policy, permissible without development consent and the development is specified in schedule 3 of the SEPP.

Schedule 3 specifies that development for the purpose of port and wharf facilities or boating facilities (not including marinas) by or on behalf of a public authority that has a capital investment value of more than \$30 million is State significant infrastructure.

The proposal has a capital investment value of \$5.5 million so does not become State significant infrastructure as declared by the SRD SEPP.

State Environmental Planning Policy (Coastal Management) 2018

The Coastal Management SEPP defines the coastal zone and establishes state-level planning priorities and development controls to guide decision-making for development within the coastal zone. The coastal zone is comprised of four distinct coastal management areas - coastal wetlands and littoral rainforests area, coastal vulnerability area, coastal environment area and coastal use area.

Under the Coastal Management SEPP, the SSMC is located within the coastal environment area, as shown in **Figure 4-1**.



Figure 4-1: Extent of coastal environment area under Coastal Management SEPP

Under clause 13 of the Coastal Management SEPP, development consent must not be granted to development within the coastal environment area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following:

- the integrity and resilience of the biophysical, hydrological and ecological environment
- coastal environmental values and natural coastal processes
- the water quality of the marine estate, in particular, the cumulative impacts of the proposed development on any specified sensitive coastal lakes
- marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms
- existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public
- Aboriginal cultural heritage, practices and places
- the use of the surf zone.

Chapter 6 of this REF provides a detailed assessment of the potential impact of the proposal on the biophysical, hydrological and ecological environment as well as on the cultural significance of the site and surrounds. The assessment demonstrates that the proposal would not result in adverse impacts on the environment and recommends appropriate safeguards and management measures to ensure the environmental values of the site are protected.

4.1.2 Local Environmental Plans

Kogarah Local Environmental Plan 2012

The Kogarah Local Environmental Plan 2012 (KLEP) applies to the site of the proposal. As outlined in section 4.1.1, the proposal is permissible without development consent pursuant to the ISEPP. Therefore, the consent requirements of the KLEP do not apply and the proposal may be determined under Division 5.1 of the EP&A Act. However, the KLEP is useful in identifying the proposal's consistency with its land use and planning policy as described below.

The site of the proposal is zoned W2 Recreational Waterways, as shown in **Figure 4-2**.

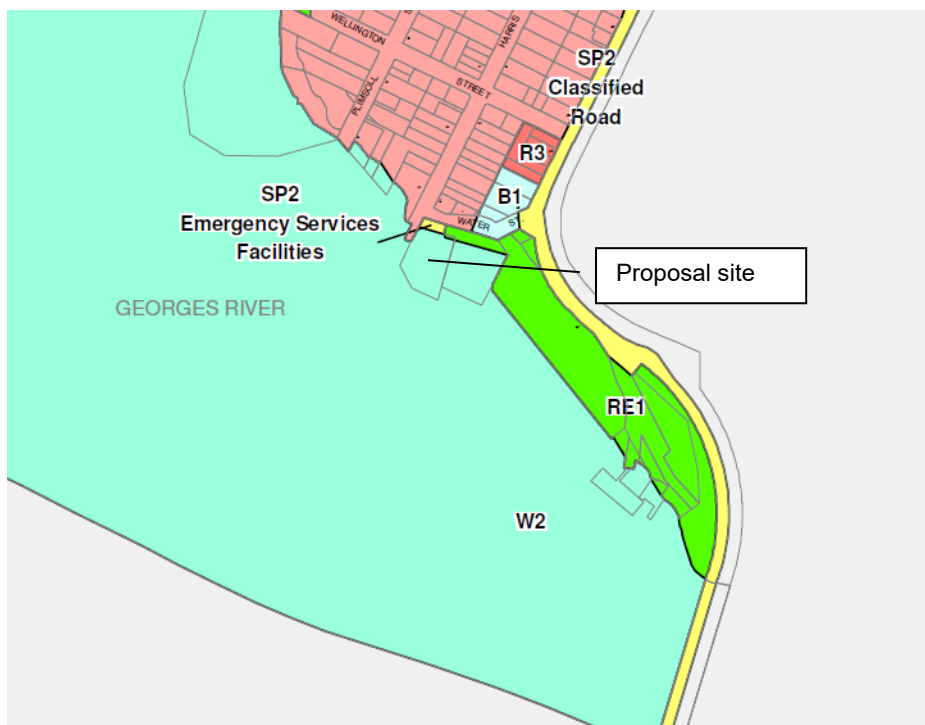


Figure 4-2: Zoning excerpt from Kogarah LEP 2012

The objectives of the W2 zone are to:

- protect the ecological, scenic and recreation values of recreational waterways
- allow for water-based recreation and related uses
- provide for sustainable fishing industries and recreational fishing.

The proposal would be integral to supporting the use of the Georges River for water-based recreation, fishing and related uses. It would provide for upgraded vessel berthing facilities for NSW Police MAC, RMS and DPI Fisheries, enabling better patrol planning and improved response times for on-water operations. It is therefore considered consistent with the W2 zone objectives.

Clause 5.10 of KLEP contains heritage provisions that are to be taken into account in respect of development applications. The site is next to the Sans Souci Park, public baths and bathers pavilion, which is identified in Schedule 5 of KLEP as a local heritage item (Item I155). An assessment of the potential impact of the proposal on the heritage significance of this item is provided in section 6.10. No significant impact is anticipated.

Clause 6.1 of KLEP relates to areas containing acid sulfate soils (ASS). The site of the proposal is identified as Class 1 Acid Sulfate Soils under the KLEP Acid Sulfate Soils Map (refer **Figure 4-3**). The clause requires that development consent must not be granted to development on land identified as containing ASS unless an ASS Management Plan (ASSMP) has been prepared. A Preliminary Contamination Assessment of the proposal has been undertaken by J K Environment (refer Appendix H) which includes a preliminary ASS assessment. The results of this assessment and requirement for an ASSMP are discussed in section 6.1 of this REF.

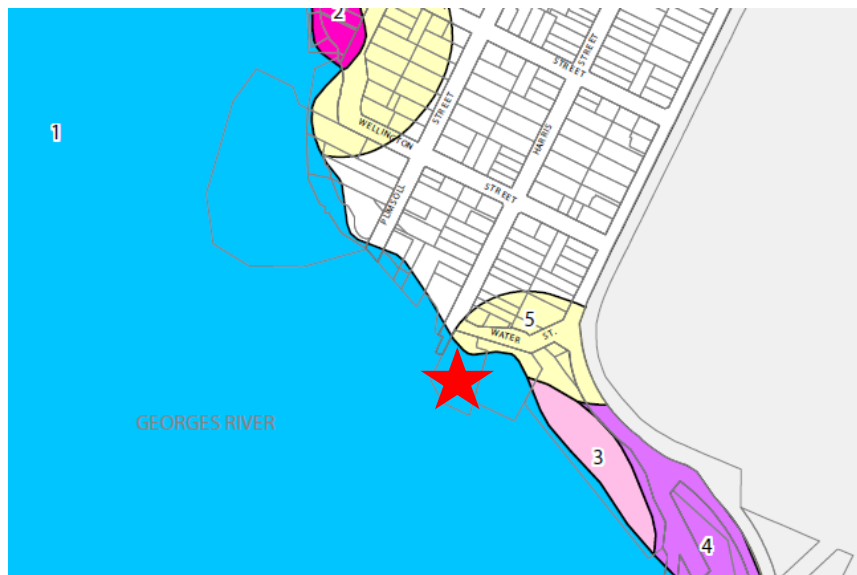


Figure 4-3: Excerpt from KLEP Acid Sulfate Soils Map (Class 1 shown blue)

Clause 6.4 of KLEP seeks to ensure that development in the foreshore area will not impact on natural foreshore processes or affect the significance and amenity of the area. It contains a number of matters with which the consent authority must be satisfied before approving development. An assessment of the proposal in relation to these matters is provided in **Table 4-1** below.

Table 4-1: Assessment against clause 6.4 matters for consideration

Clause 6.4 Matters for Consideration	Compliance
<i>The consent authority must be satisfied that:</i>	
<i>(a) the development will contribute to achieving the objectives for the zone in which the land is located</i>	<ul style="list-style-type: none"> The proposal would comply with the zone objectives as detailed above.
<i>(b) the appearance of any structure, from both the waterway and adjacent foreshore areas will be compatible with the surrounding area</i>	<ul style="list-style-type: none"> The surrounding foreshore area is characterised by a mix of foreshore uses, including wharves, marina, recreation facilities and residential development. The present site comprises an existing wharf structure, boat slip rails, existing piles and pontoon. The proposal would involve the construction of new marine berthing and launching facilities of a similar scale and appearance as that existing. The proposal would therefore be compatible with the surrounding area.
<i>(c) the development will not cause environmental harm such as:</i>	<ul style="list-style-type: none"> The environmental assessment of the proposal in Chapter 6 of this REF demonstrates that the proposal would not result in environmental harm.

Clause 6.4 Matters for Consideration	Compliance
<ul style="list-style-type: none"> • <i>pollution or siltation of the waterway</i> • <i>an adverse effect on surrounding uses, marine habitat, wetland areas, fauna and flora habitats</i> • <i>an adverse effect on drainage patterns</i> 	<p>Appropriate safeguards and mitigation measures would be put in place to ensure the environmental values of the Georges River are protected.</p>
<p><i>(d) the development will not cause congestion or generate conflict between people using open space areas or the waterway</i></p>	<ul style="list-style-type: none"> • The proposal would not result in an intensification of land use or otherwise impact on people's current use of open space areas and the waterway
<p><i>(e) opportunities to provide continuous public access along the foreshore and to the waterway will not be compromised</i></p>	<ul style="list-style-type: none"> • The proposal would not change current public access along the foreshore.
<p><i>(f) any historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the land on which the development is to be carried out and of surrounding land will be maintained</i></p>	<ul style="list-style-type: none"> • The site of the proposal has not been identified as having any historic, scientific, archaeological, architectural, natural or aesthetic significance. • The Sans Souci Park, located to the south-east of the site, is identified as a local heritage item under KLEP. It is considered that the proposal would not adversely impact on this item, as discussed in Section 6.10.
<p><i>(g) in the case of development for the alteration or rebuilding of an existing building wholly or partly in the foreshore area, the alteration or rebuilding will not have an adverse impact on the amenity or aesthetic appearance of the foreshore.</i></p>	<ul style="list-style-type: none"> • For the reasons set out in (b) above, it is considered that the proposal would not have an adverse impact on the amenity or aesthetic appearance of the foreshore.
<p><i>(h) sea level rise or change of flooding patterns as a result of climate change has been considered.</i></p>	<ul style="list-style-type: none"> • An assessment of the proposal in relation to climate change and sea level rise is provided in section 6.12. No adverse outcomes are anticipated. • There would be no change to flooding patterns as a result of the proposal.

4.2 Other relevant NSW legislation

4.2.1 Fisheries Management Act 1994

The Fisheries Management Act (FM) is the principal piece of legislation protecting aquatic habitat in NSW. The FM Act aims to conserve fish stocks, key fish habitat, aquatic vegetation, and threatened species, populations and communities. As the relevant public authority, Roads and Maritime Services must give the Minister written notice of the proposed work under Section 199 of the FM Act if it occurs in areas mapped as key fish habitat (KFH) and would:

- have a direct or indirect impact to marine vegetation (a permit is also required)
- require dredging or excavation of the bed or bank

- block fish passage
- involve land reclamation.

The area around Sans Souci berth is mapped as KFH and the development would harm marine vegetation, therefore under Section 205 of the FM Act a permit to *harm marine vegetation* would be required. The works also require dredging and reclamation for the boat ramp extension, therefore, consultation with the Minister of Primary Industries would be required before works can commence (included within the s.205 permit). The works would not block fish passage.

Section 199 of the FM Act also requires that a public authority (other than a local government authority) must, before it carries out or authorises the carrying out of dredging or reclamation work:

- (a) give the Minister written notice of the proposed work, and
- (b) consider any matters concerning the proposed work that are raised by the Minister within 28 days after the giving of the notice (or such other period as is agreed between the Minister and the public authority).

Under the regulations, work that involves the removal of any of material from water land that disturbs, moves or harms woody debris, snags, gravel beds, cobbles, rocks, boulders, rock bars or aquatic vegetation is considered dredging. The Proposal would undertake activities classed as dredging when removing the existing piles. Therefore, notification and approval from the Minister for Primary Industries under section 199 of the FM Act is required.

4.2.2 Coastal Management Act 2016

The *Coastal Management Act 2016* replaces the *Coastal Protection Act 1979* and establishes a new strategic framework and objectives for managing coastal issues in NSW. The Coastal Management Act comprises four coastal management areas, as discussed in section 4.1.1.

The Coastal Management SEPP gives effect to the objectives of the Coastal Management Act from a land use planning perspective. An assessment of the proposal in relation to the Coastal Management SEPP is provided in section 4.1.1. No permits or approvals are required under the Coastal Management Act with respect to the proposal.

4.2.3 Crown Lands Act 1989

As noted in section 3.7, the area of the existing vessel berth and mooring, known as Lot 507 in DP 752056, is Crown Land over which Roads and Maritime hold a licence. The proposal would extend outside the area of this existing licence by approximately 6m. A *Licence - Alteration of Purpose and Condition Application* has therefore been made by Roads and Maritime to the Department of Planning, Industry and Environment - Crown Lands to extend the area under licence.

4.2.4 Marine Safety Act 1998

Section 18 of the *Marine Safety Act 1998*, any work undertaken on navigable waters and temporarily restricting the availability of those waters for normal use by the public is considered an 'aquatic activity' and requires the issuing of an aquatic licence. However, in this instance the site of the proposal is not available for normal use by the public and therefore the proposal does not require an aquatic licence under the Marine Safety Act.

4.2.5 Ports and Maritime Administration Regulation 2012

Clause 67ZN of the regulation applies to works that disturb the bed of a port. If works disturb the port bed in any way written permission from the relevant harbour master is required.

The relevant port area is Botany Bay. Schedule 1 of the Regulation describes the port boundaries of Botany Bay to include the Georges River from the eastern side of the Captain Cook Bridge. As the proposal is located to the west of Captain Cook Bridge it is located outside the boundaries of Port Botany, , Harbour Master Approval is therefore not required.

4.3 Commonwealth legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land'. These are considered in Appendix B and chapter 6 of the REF.

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance or on Commonwealth land. Accordingly, the proposal has not been referred to the Australian Government Department of the Environment and Energy under the EPBC Act.

4.4 Confirmation of statutory position

The proposal is categorised as development for the purpose of a wharf and boating facilities and is being carried out by or on behalf of a public authority. Under clause 94 of the ISEPP the proposal is permissible without consent. The proposal is not State significant infrastructure or State significant development. The proposal can be assessed under Division 5.1 of the EP&A Act.

Roads and Maritime is the determining authority for the proposal. This REF fulfils Roads and Maritime's obligation under section 5.5 of the EP&A Act including to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity.

5. Consultation

This chapter discusses the consultation undertaken to date for the proposal and the consultation proposed for the future.

5.1 Consultation strategy

A consultation strategy has been developed by Roads and Maritime in relation to the proposal. The objectives of the consultation strategy are to:

- Identify community members and stakeholders potentially affected by the project
- Display the REF for a period of 21 days to:
 - Seek community feedback on the proposal
 - Consider changes to the proposal as a result potential environmental impacts
 - Consider safeguards and management measures which may be identified in order to minimise adverse environmental impacts, including social impacts new or revised environmental management measures
- Provide the community and stakeholders with accurate and timely project information regarding demolition and construction works
- Record and respond to stakeholder and community concerns.

5.2 Community consultation to date

A flyer was distributed to the local community in July 2019 notifying Roads and Maritime's intention to carry out geotechnical investigation work to help develop a design for the new marina. The area notified is shown in **Figure 5-1** and a copy of the flyer is provided at Appendix I. There were no comments received from members of the community in response to the flyer.



Figure 5-1: Community notification area

5.3 ISEPP consultation

Part 2 of the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) contains provisions for public authorities to consult with the relevant local council and other public authorities prior to the commencement of certain types of development. Under clauses 13-15 of the ISEPP, the local council must be consulted if the activity:

- will have a substantial impact on the council's stormwater and/or sewerage management systems or water supply systems (clause 13(1)(a), (c), (d))
- is likely to generate significant traffic (clause 13(1)(b))
- involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's control that is likely to cause significant disruption to pedestrian or vehicular traffic flow (clause 13(1)(e))
- involves excavation that is not minor or inconsequential of a road for which a council is the roads authority under the Roads Act 1993 (clause 13(1)(f))
- has more than a minor impact on a local heritage item (clause 14)
- has more than a minor impact on flood liable land (clause 15).

The proposal would potentially require the closing of a public road to facilitate truck access to the site during construction, as discussed in section 6.8. Although the closure of the road is unlikely to cause significant disruption to pedestrian or vehicular traffic flow, it is considered prudent to consult with Georges River Council, as provided for under clause 13(1)(e).

Clause 13(2) stipulates that where consultation is required, the relevant public authority, or a person acting on behalf of a public authority, must not carry out the development unless the authority or the person has:

- given written notice of the intention to carry out the development (together with a scope of works) to the council for the area in which the land is located, and
- taken into consideration any response to the notice that is received from the council within 21 days after the notice is given.

The proposal would otherwise not impact on any matters identified in clauses 13-15. Notwithstanding, it is proposed to provide a copy of the REF and accompanying material to Georges River Council for comment during the REF exhibition period.

Clause 15AA requires consultation with the State Emergency Service in relation to flood liable land and clause 15A relates to land within the coastal zone. Neither of these clauses is applicable.

Clause 16 sets out consultation requirements with other agencies. Development comprising a fixed or floating structure in or over navigable waters requires consultation with Roads and Maritime (clause 16(2)(e)). The other consultation requirements in clause 16 are not relevant to the proposal.

5.4 Government agency and stakeholder involvement

Various government agencies and stakeholders have been consulted about the proposal, including:

- Georges River Council
- Crown Lands
- Port Authority NSW Harbour Master

- NSW Police MAC
- DPI Fisheries

Issues that have been raised as a result of consultation with these agencies and stakeholders are outlined below in **Table 5-1**.

Table 5-1: Issues raised through stakeholder consultation

Agency	Issue raised	Response / where addressed in REF
Georges River Council	Roads and Maritime informally contacted Council and advised of the project scope and timeline. No issues were raised at that time.	A copy of the REF and accompanying material will be issued to Georges River Council for comment during the REF exhibition period
Crown Lands	Crown lands have been notified of the proposed works. No issues have been raised to date.	Roads and Maritime has submitted a "Licence - Alteration of Purpose and Condition" application for the encroachment of the proposed works by approx. 6m over the lease boundary.
Port Authority NSW Harbour Master	Roads and Maritime has contacted the Harbour Master and advised of the project scope and timeline. No issues were raised at that time.	A copy of the REF and accompanying material will be issued to the Harbour Master for comment during the REF exhibition period
NSW Police MAC	NSW Police (Area Command and operational staff at the Marine Centre) has been actively engaged through the design process. Operational Staff attended site meetings, reviewed design options and provided feedback on the preferred design.	Issues raised by NSW Police MAC have been addressed during design development. NSW Police MAC will continue to be involved during the detailed design phase.
DPI - Fisheries	As above	As above

5.5 Ongoing or future consultation

Ongoing consultation with the community and stakeholders will be undertaken in accordance with the Consultation Strategy outlined at 5.1 above.

This REF will be publicly displayed for a period of 21 days to enable the community and key stakeholders to provide feedback on the proposal. The REF will be displayed for comment on the project website and at Georges River Council, Corner MacMahon and Dora Streets, Hurstville.

Over the REF display period, Roads and Maritime will continue to liaise with key stakeholders and affected property owners. Further, following exhibition of this REF all submissions will be formally considered and responses provided in a submissions report, made available to the public when complete. Changes to the proposal will be considered in the light of the community submissions.

6. Environmental assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of the factors specified in the guidelines *Is an EIS required?* (DUAP, 1995/1996) as required under clause 228(1) of the Environmental Planning and Assessment Regulation 2000 and the *Marinas and Related Facilities EIS Guideline* (DUAP, 1996). The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in Appendix B.

Site-specific safeguards and management measures are provided to mitigate the identified potential impacts.

6.1 Land surface

The following assessment is based on the findings of the following:

- *Sans Souci Marine Centre Concept Design Report*, Royal Haskoning DHV, August 2019 (refer Appendix D)
- *Geotechnical Investigation for Proposed Marine Centre*, JK Environments/EIS, August 2019 (refer Appendix F)
- *Preliminary Contamination Assessment for Proposed Marine Centre Development*, JK Environments, August 2019 (Appendix H).

6.1.1 Existing environment

The proposal would be predominantly carried out within the Georges River in the subtidal zone. Within the subtidal zone, the seabed is characterised by fine sediment and scattered shell fragments. Infauna burrows, associated bioturbated sand and mud are scattered sparsely across the benthic sediments.

Water ranges in depth from two to five meters, with a layer of fine sediment indicating some tidal flushing.

A hydrographic survey is provided at Appendix C.

Onshore the SSMC comprises a two-storey brick and concrete office building abutting the northern site boundary. At the rear of the office is a large concrete paved car park with a concrete slipway located towards the western site boundary. The concrete pavements appear in poor to fair condition with extensive cracking observed. Along the foreshore is a stone boulder seawall with a concrete facing element which exhibits cracking and minor spalling.

The site is located at the toe of a hillside that slopes down to the south at about 5°. The seawall slopes down at about 10° into the water. Surface levels across the site are relatively flat with the main step formed by the building along Water Street with surface levels stepping down into the property about 3m.

A Dial Before You Dig inquiry has confirmed that there are no submarine cables in the vicinity of the proposal.

Geology

The Wollongong-Port Hacking Geological Series Sheet 9029-9129 indicates that the site is underlain by Hawkesbury Sandstone of the Wianamatta Group comprising quartz sandstone, very minor shale and laminite lenses.

The boreholes undertaken on the site indicated a generalised profile consisting of marine sediments overlying residual sands and sandstone bedrock.

Acid sulfate soils

A review of the ASS risk map prepared by Department of Land and Water Conservation (1:25,000 Acid Sulfate Soil Risk Map, Series 9130N3, Ed 2, 1997) indicates that the site is located next to an area classed as disturbed terrain. The boundaries of the risk areas marked on the ASS maps are approximate so there is the possibility that the disturbed terrain may extend below the site. Soil investigation is required to assess areas of disturbed terrain for potential ASS. The map indicates that there is a high probability of encountering ASS in the offshore marine sediments.

Contamination

The Preliminary Contamination Assessment included a review of site information, site inspection and soil/sediment sampling. Soil and sediment samples were obtained from four overwater locations (SS1, SS2, SS3 and SS4) and one land based borehole (BH5), as shown in **Figure 6-1**.

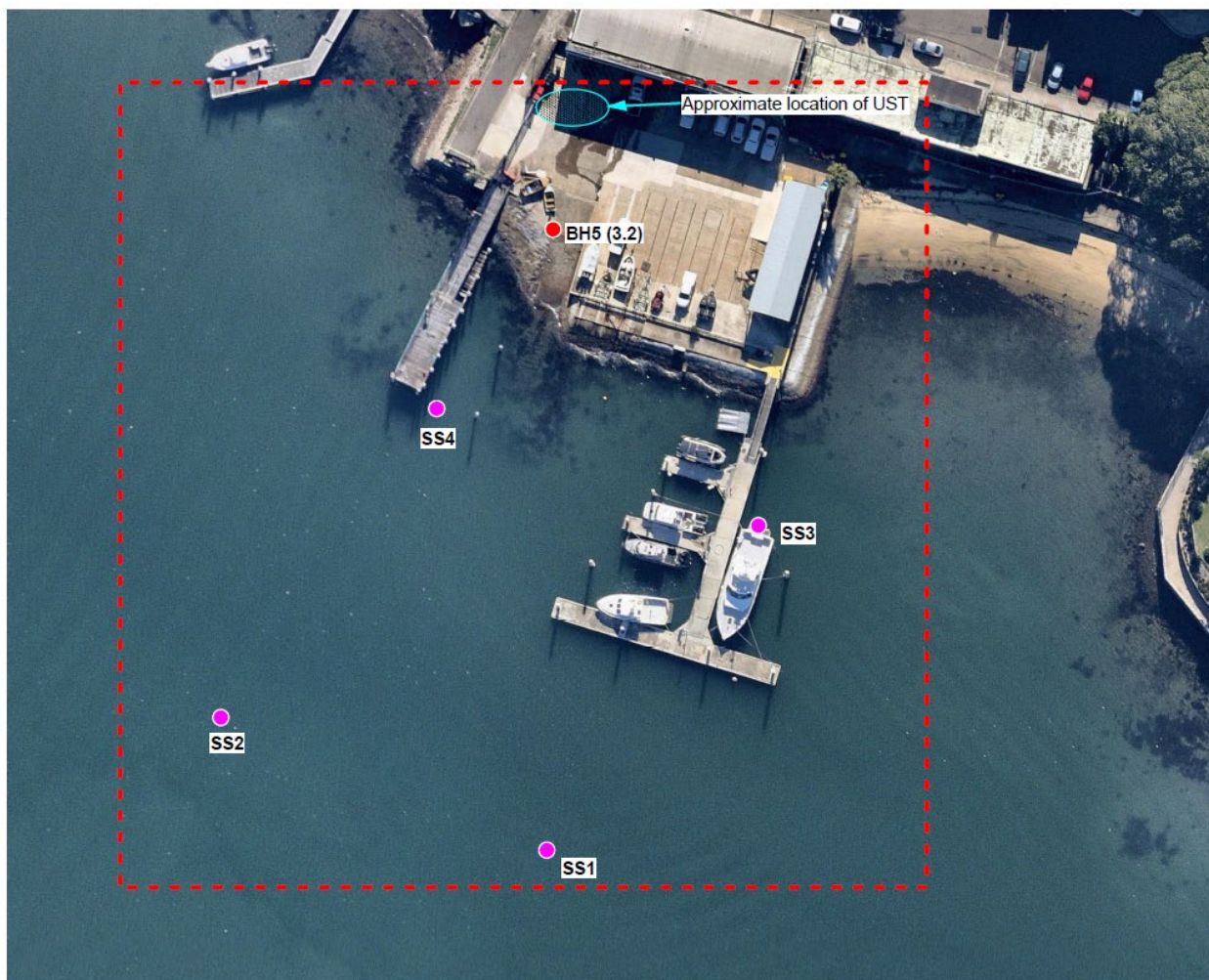


Figure 6-1: Sample location plan

Elevated concentrations of mercury and lead above the low-risk aquatic based ecological site acceptance criteria (SAC), were encountered in all sediment samples, elevated concentrations of copper and TBT were encountered in sediment sample SS4, and elevated concentrations of arsenic and zinc were encountered in sediment samples SS1 and SS2. An elevated concentrations of zinc above the 'upper' aquatic based ecological SAC, was encountered in SS4. These exceedances were encountered in the surface sediments in the foreshore area. The most likely source of these contaminants is likely to be paint and other contaminated wash down from the marine vessels in the vicinity of the site and runoff from the foreshore.

Elevated concentrations of zinc were encountered above the terrestrial based ecological SAC in sediment samples SS1, SS2 and SS4. The zinc exceedances were encountered in the surface sediments in the foreshore area. The most likely source of this contamination was considered to be excess paint scrape back or wash down from the marine vessels.

A contamination location plan is provided at **Figure 6-2**. It indicates that contaminated marine sediments are likely to be found across the construction site. It should be noted that the presence of heavy metals is indicative of a disturbed system in an urban environment and is not uncommon.

Fill material was encountered in the land-based sample BH5. This fill is classified as General Solid Waste (non-putrescible).

An underground storage tank, assumed to be utilised for diesel fuel storage, is located in the north-west corner of the site. Given the age of existing site structures, hazardous building materials (i.e. asbestos containing materials) may be present.

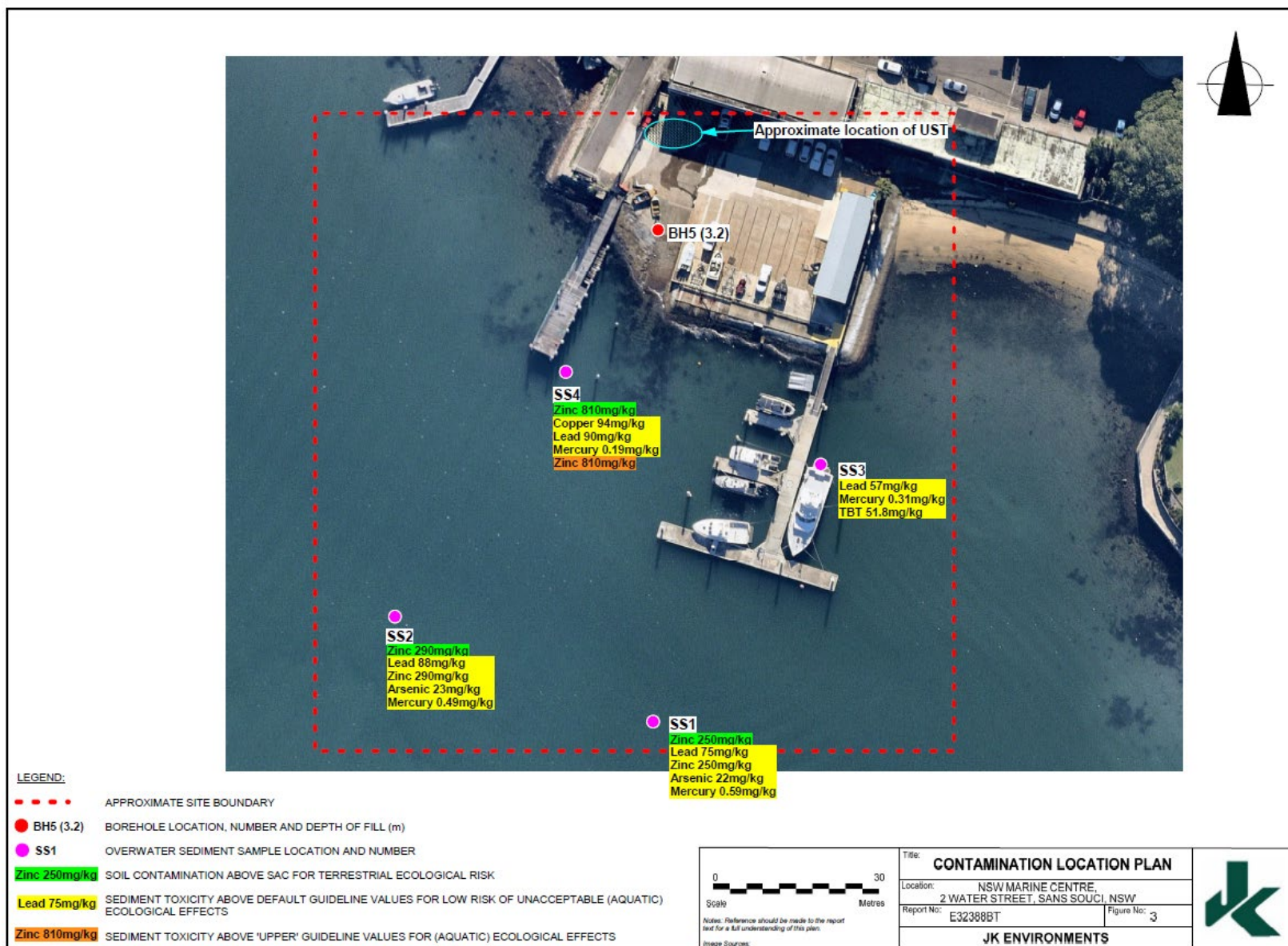


Figure 6-2: Contamination Location Plan

6.1.2 Potential impacts

Construction

Land based

The proposed work on land would be restricted to utility adjustments and excavation for the boat ramp. Trenching would be required to accommodate hydraulic and electrical services, as discussed in Section 3.5 and shown in **Figure 3-3**. Overall soil disturbances and potential for erosion and sedimentation would be minimal as a soil and erosion sediment control plan, prepared in accordance with Landcom's *Managing Urban Stormwater: Soils and Construction* publication (also known as the Blue Book), would be implemented during the construction works.

The fill material beneath the existing ramp is classified as General Solid Waste (non-putrescible). Surplus fill would be disposed of to a facility that is appropriately licensed to receive this waste stream. The facility would be contacted to obtain the required approvals prior to commencement of excavation.

Natural soils in the vicinity of the ramp below a depth of 3.2 m are considered to be Potential Acid Sulphate Soils (PASS). An Acid Sulphate Soils Management Plan would be required to manage any natural soils at the site that are disturbed and brought above the water table during the proposed development works.

Water based

The majority of the proposed work would be undertaken within the waterway and below the mean high water mark. Construction activities that would be likely to disturb marine sediment would include pile removal and installation, dredging of sediments for the new boat ramp, barge anchoring and vessel motor use near foreshore.

For the majority of the construction works, it is not anticipated that marine sediments would need to be removed or disposed of off-site. Where demolition of existing piles or installation of new piles requires disturbance of sediments, these sediments would be replaced underwater near the dredging activity and would not be exposed to air.

Construction activities may result in the disturbance of fine sediment that may become suspended in the water column, leading to elevated turbidity. The work site would be contained by a turbidity curtain to minimise fine sediments migrating to the Georges River.

Disturbance of sediments may mobilise ASS if exposed to the air. However, as noted above, the majority of sediments would be replaced underwater near the dredging activity and would not be exposed to air. So long as ASS is kept submerged the risk of acid leachate formation is mitigated. For any offshore marine sediments that would need to be removed, an Acid Sulfate Soils Management Plan would be required to address the potential for acidity to be generated from ASS and PASS disturbed during the construction phase.

As noted in Section 3.5, approximately 110m³ would need to be excavated for the boat ramp (landside and waterside). Any marine sediment material that would be excavated for the new boat ramp would be inspected, removed, contained, managed (treated) and disposed of in accordance with *Waste Classification Guidelines: Part 1 Classifying Waste (DECCW 2009)*.

Provided that appropriate safeguards and construction management measures are adopted, it is considered that the potential impacts from the disturbance of contaminated marine sediments would be

low. Further, the disturbance and redistribution of sediments is not likely to have an adverse impact on aquatic ecology, as discussed in Section 6.6.

Operation

Land based

No significant change to the existing landside infrastructure is proposed, and no significant impacts to the terrestrial land surface are anticipated.

Water based

Potential for scour is considered low. There is no evidence of scour around the existing piles. Piles would be socketed into bedrock and would not be reliant on overlying marine sediment for stability. This is also required as the marine sediment may be mobilized in an extreme flood event.

There is the potential for propeller scour in shallow water. This is primarily an issue around the boat ramp, if a vessel's motors are used to assist with loading onto a trailer (rather than using a winch). Scour protection would be provided at the toe of the boat ramp to prevent undercutting. Berthed vessels would be situated in a suitable water depth for the draft of the vessel, which would minimise the potential for propeller scour at low tide.

Sedimentation in the lee of the wave attenuator is considered unlikely. This is particularly an issue at locations where longshore sediment transport is a result of wind waves (or swell) from a single direction. Longshore sediment transport at the site is negligible and the potential for sedimentation in the lee of the wave attenuator is considered low. Further, there is no evidence of sedimentation around the existing structure.

Provided that the safeguards and management measures set out in section 6.1.3 are followed, no significant impact land surface impacts are anticipated as a result of the proposal.

6.1.3 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
LS1	Erosion and sedimentation	<p>Erosion and sediment control measures will be implemented and maintained in accordance with the Landcom/ Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book)) to:</p> <ul style="list-style-type: none"> • prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • reduce water velocity and capture sediment on site • minimise the amount of material transported from site to surrounding pavement surfaces • divert clean water around the site. 	Contractor	Detailed design/ pre-construction
LS2	Seabed disturbance	Disturbance of marine sediment will be minimised as far as practicable. Marine sediments that are disturbed will be replaced on the seabed near the dredging activity.		
LS3	Seabed disturbance	<p>The Construction Environmental Management Plan will include safeguards to minimise disturbance of the seabed. These safeguards will include:</p> <ul style="list-style-type: none"> • use of floating equipment with a draught that is suitable for operation within shallow nearshore areas • limiting the speed of construction traffic to that which will minimise unnecessary generation of boat wake waves • minimising propeller wash in shallow water by avoiding weather and tide conditions that could heighten the risk of bed disturbance • minimising the use of propellers (and bursts of high power) and anchoring within works areas • manoeuvring of non-propelled vessels using winches and cables wherever possible within shallow water areas in preference to the use of engine propulsion • avoiding the use of excessive engine power in shallow 	Contractor	Pre construction/ construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<p>water areas when towing or pushing vessels</p> <ul style="list-style-type: none"> avoiding the use of sinking lines to secure or anchor floating plant where possible. 		
LS4	Soil and water	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the Construction Environmental Management Plan (CEMP). The SWMP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction.	Contractor	Detailed design/ pre-construction
LS5	Soil and water	An Environmental Work Method Statement (EWMS) for the removal and installation of the piles will be incorporated into the SWMP and include measures to minimise disturbance of sediments, including the safeguards in the REF. The EWMS must be approved by the Roads and Maritime Environment Officer.	Roads and Maritime Environment Officer/ Contractor	Detailed design/ pre-construction
LS6	Acid sulfate soils	An Acid Sulfate Soil Management Plan (ASSMP) will be prepared to address the potential for acidity to be generated from ASS and PASS disturbed during the construction phase. Potential or actual acid sulphate soils are to be managed in accordance with the Roads and Maritime Services <i>Guidelines for the Management of Acid Sulphate Materials 2005</i> .	Contractor	Detailed design/ pre-construction
LS7	Sediment disposal	Any marine sediment or other waste material that needs to be removed will be inspected, removed, contained, managed (treated) and disposed of in accordance with <i>Waste Classification Guidelines: Part 1 Classifying Waste (DECCW 2009)</i> .		
LS8	Scour	The potential for scour around piles will be addressed during detailed design	Roads and Maritime	Detailed design

Other safeguards and management measures that would address land surface impacts are identified in section 6.3.3.

6.2 Hydrological issues

The Concept Design Report by Royal Haskoning DHV (Appendix D) provides discussion on hydrological issues and is summarised below.

6.2.1 Existing environment

The Georges River estuary is a drowned river valley formed during a period of natural sea level rise about 10,000 years ago. Estuary processes that influence the site include the water level, wind, waves and current.

Water level

The water level at the site would be determined based on a combination of:

- Tidal fluctuation
- Storm events (fresh water floods and ocean storm tides)
- Sea level rise.

Tidal planes

Tidal attenuation and perched tidal planes can occur in drowned river estuaries that are shallow and/or narrow. The SSMC is situated relatively close to the open ocean and as such, tidal attenuation and perched tidal planes are expected to be minimal.

Tidal planes are provided in **Table 6-1** for Sydney Harbour (considered representative of the open ocean) and Como Bridge, on the Georges River, upstream of the SSMC. The water level at Como Bridge is perched above the open ocean by approximately 4-5 cm. There is minimal tidal attenuation. The tidal plane at the SSMC is expected to be ~2 cm higher than the open coast tidal plane.

Table 6-1: Tidal planes (MHL, 2016, MHL, 2012) (Source: Concept Design Report, Appendix D)

Tidal Plan	Sydney Harbour Tidal Plane (m AHD) (2000 – 2010)	Como Bridge Tidal Plan (m AHD) (2001 – 2010)	Estimated Tidal Plan at SSMC (m AHD)
Highest Astronomical Tide (HAT)	1.15		1.17
Mean high water springs (MHWS)	0.65	0.69	0.67
Mean high water (MHW)	0.52	0.57	0.54
Mean sea level (MSL)	0.02	0.06	0.04
Mean low water (MLW)	-0.48	-0.45	-0.46
Mean low water springs (MLWS)	-0.61	-0.56	-0.59
Lowest astronomical tide (LAT)	-0.90		-0.88

Currents

Limited information is available regarding currents near the entrance to Georges River. The SSMC is situated on a relatively wide stretch of Georges River with narrow passages upstream between Tom Ugly Point and Horse Rock Point (Tom Ugly's Bridge) and downstream between Taren Point and Rocky Point (Captain Cook Bridge).

Tidal flows upstream of Taren Point and Rocky Point are constrained by the narrow passage between these two Points.

Peak tidal currents in the vicinity of the SSMC site are in the order of 0.2-0.3 m/s.

The Georges River Floodplain Risk Management Study adopted the Botany Bay storm tide level as the design flood levels for a 20 and 100 year ARI event in the lower Georges River, up to approximately Como Bridge. The hydraulic gradient near the SSMC resulting from a flood event would therefore be negligible. It is deduced that flood currents near the SSMC under these high tailwater conditions would be relatively low. Notwithstanding the above, the Concept Design Report recommends a minimum design current velocity of 1 m/s in accordance with AS 3962 which has been adopted.

Waves

The wave climate at the SSMC is contributed to by wind waves and boat-generated waves. The SSMC is beyond the extent of ocean swell penetration. Wind waves and boat-generated waves combine to generate the incident wave conditions at the SSMC.

Wind waves are generated when the wind blows across a body of water. The size and period of these waves depends on the wind speed, the distance over which the wind blows and the water depth. The key wind wave fetches affecting the site are from the south-east, across Woollooware Bay, and from the west, along the Georges River. The incident wind wave climate near the site is summarised in **Table 6-2**.

Table 6-2: Incident wave height at the SSMC (Source: Concept Design Report, Appendix D)

Direction	South-East		West		South	
Fetch	3.8km		2.5km		1.0km	
Average Recurrence Interval (ARI)	H _s (m)*	T(s) [#]	H _s (m)	T(s)	H _s (m)	T(s)
1 year	0.64	2.4	0.56	2.1	0.31	1.5
50 years	0.89	2.6	0.77	2.3	0.44	1.7
100 years	0.94	2.7	0.82	2.4	0.46	1.7
500 years	1.06	2.8	0.92	2.5	0.52	1.8

*Significant wave height H_s is the average of the highest 1/3 of waves in a wave train. H max ~ 1.5 x H_s

[#]T(s) = wave period in seconds. It is the time between wave crests passing a particular point or the time required to complete one wave cycle.

The estimated maximum design boat wave climate, approximately 20 to 50 m from the line of sail, is summarised in **Table 6-3**. These waves could occur on a daily basis.

Table 6-3: Maximum boat wave height and period 20-50m from the sailing line (Source: Concept Design Report, Appendix D)

Vessel type	H _{max} (m)	T(s)
Power boat	0.4	2 to 3
15m motor cruiser	0.7	3 to 5

Boat waves and wind waves travel across a body of water at varying velocities, which depends on a range of factors, as detailed in Section 2.7.3.3 of the Concept Design Report. The combined wind and wave height and period, for southeast wind waves, is shown in **Table 6-4**.

Table 6-4: Combined wind waves and boat wash (Source: Concept Design Report, Appendix D)

Average Return Period	Wind Wave			Boat Wave			Total Power = 0.5 x Wind Wave Power + Boat Wave Power (W/m)	Condition 1 – Wind Wave Period		Condition 2 – Boat Wave Period	
	Hs (m)	T (s)	Maximum Power (W/m)	Hs (m)	T (s)	Maximum Power (W/m)		Period (sec)	Height (m)	Period (sec)	Height (m)
1 year	0.64	2.4	965	0.39	5	746	1228	2.4	0.72	5	0.50
50 years	0.89	2.6	2021	0.39	5	746	1757	2.6	0.83	5	0.60
100 years	0.94	2.7	2341	0.39	5	746	1917	2.7	0.85	5	0.63
500 years	1.06	2.8	3087	0.39	5	746	2290	2.8	0.91	5	0.68

6.2.2 Potential impacts

Construction

Vessel movements close to the boat ramp construction area may disturb sediments given the shallower depth in this location. These sediments are likely to be contaminated as shown in **Figure 6-2**. As far as practicable, use of vessels close to the foreshore would be avoided. However, some use of vessels in shallow water would be required during construction. A range of safeguards to minimise seabed disturbance would be included in the Construction Environmental Management Plan. As noted in Section 6.6, the disturbance and redistribution of sediments is not likely to have an adverse impact on aquatic ecology.

The wave and wind climate at the site would have some influence on selection of construction plant and equipment and the Contractor's work methods and construction staging. The Contractor may need to seek shelter in adverse weather and the works should be staged so that they are not vulnerable to damage. Appropriate safeguards to prepare, respond and recover from a possible storm event should be detailed in a Coastal Storm Emergency Response Plan.

Water level variation at the site is dominated by astronomical tide and determines the available water depth for plant and equipment access. The construction activity itself would have no impact on water level or water level variation, unless the Contractor elects to construct a cofferdam to enable construction of the

boat ramp in the dry. However, this is not common practice for a project of this scale and the design would consider suitable construction methodologies for working below water.

Vessel wash from construction vessels would be negligible. A speed restriction of 6 knots applies to vessels navigating within 30 m of another vessel, land or structures in accordance with the Marine Safety Regulation. Further, it is a requirement that all vessels must not cause wash that damages or impacts unreasonably on dredgers, floating plant or construction works in progress. Therefore, the wave climate would be similar to existing.

Localised currents may be caused by propeller wash in the vicinity of motorised vessels with the velocity dependent on the size of the propeller and installed engine power. Propeller wash is dependent on the selection of construction plant and equipment. However, any impacts would be localised and dissipate within around 5 m.

The construction activities would therefore not have a significant impact on the existing water level, wave climate, wind climate or current at the site.

Operation

The wave climate at the site is a primary factor in the design of the floating attenuator to achieve an acceptable wave climate within the marina in accordance with criteria in AS3962-2001 Guidelines for Design of Marinas. The wave attenuators would moderate the wave climate within the marina. There would be some degree of wave reflection from the marina, which may interact with incident waves, and produce a 'confused' seaway next to the outer face of the perimeter pontoons. However, any alteration to the wave climate would be localised.

As noted elsewhere in the REF, the number and size of vessels at the SSMC would increase following upgrade of the marina. Additional berths are to be provided that would be occupied by vessels that are either stored on trailers on the hardstand or berthed at nearby locations within Georges River. The increased number of berths at the marina would result in a minor localised increase in the frequency of vessel wash. However, the magnitude of vessel wash would not be altered.

Water levels at the site dictate the layout of the marina to ensure sufficient under keel clearance at the marina berths and within the fairways in accordance with AS3962-2001 Guidelines for Design of Marinas. Dredging is not proposed, with the exception of localised nearshore excavation to accommodate construction of the boat ramp widening/extension. Due to the size of the marina relative to the physical setting in the Georges River, the marina would have no effect on existing tidal planes or flood levels at the site or in the river.

As per the construction phase, localised currents may be caused by propeller wash in the vicinity of motorised vessels. However, based on the size of the vessels, any impacts would be localised and dissipate within around 5 m.

The operational activities would therefore not have a significant impact on the existing water level, wave climate, wind climate or current at the site.

6.2.3 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
H1	Storm emergency	<p>A Coastal Storm Emergency Response Plan will be prepared that details safeguards to prepare, respond and recover from a possible storm event. The Plan will:</p> <ul style="list-style-type: none"> • recommend the regular monitoring (visual and/or electronic) of Bureau of Meteorology Sydney Closed Waters Forecast and Severe Weather Warnings, as well as predicted tides (especially spring and solstice tides), ocean water level and winds/wave conditions • identify actions for the evacuation of staff and visitors from the water based facilities to a safe location on land • identify measures to minimise risk of damage from coastal flood water and wave action to the temporary facilities. 	Contractor	Pre construction
H2	Safe design	The detailed design will be in accordance with Australian Standards AS4997-2005 Guidelines for Design of Maritime Structures and AS3962-2001 Guidelines for Design of Marinas	RMS	Pre construction
H3	Safe design	The floating attenuator will satisfy as a minimum the 'excellent' wave climate criterion in AS3962-2001;	RMS	Pre construction

6.3 Water quality and waste management

The Concept Design Report by Royal Haskoning DHV (Appendix D) provides discussion on water quality and waste management, as summarised below.

6.3.1 Existing environment

Water quality

The Georges River is an urban river in southern Sydney that flows from the headwaters on the Illawarra escarpment and Appin down to the river mouth at Botany Bay. The total length of the Georges River is around 100 km long. Much of the Georges River catchment has been developed for urban and agricultural purposes, with the existing water quality impacted by stormwater discharge and altered flow regimes. Pollutants commonly associated with stormwater discharge include:

- sediment from erosion and stormwater inflows, impacting turbidity
- litter and other wastes
- pesticides from agricultural land uses
- nutrients and pathogens from fertilizers and sewage overflows
- heavy metals (in river sediments)
- other contaminants such as hydrocarbons from oil and fuel leaks.

The Georges River and its tributaries are generally considered to be vertically well-mixed, with relatively small differences in water quality between the surface and bottom of the water column profile. The near marine conditions downstream of Como Bridge indicate that this section of the estuary receives relatively good tidal exchange. Therefore pollutants entering the estuary within this reach are comparatively well diluted and dispersed with incoming ocean waters.

The ecological condition generally declines following heavy rainfall due to pollutant and elevated turbidity.

Waste management

There is no specific waste currently generated by the existing marina. Seized vessels are taken off site by the relevant agency for holding and disposal elsewhere.

There is an existing rubbish bin on the hardstand.

6.3.2 Potential impacts

Construction

Water quality

The potential for water quality impacts during construction are mainly related to the activities of demolition, localised nearshore excavation, piling, and widening/extension of the boat ramp. The removal of the existing piles, installation of new piles, and anchoring of barges would have the potential to destabilise

marine sediments, causing turbidity. Turbidity may cause a short term reduction in light penetration through the water column in the immediate area around the piling work area. Subsequent sedimentation may cause a localised change in the particle size distribution of sediment on the sea floor. The duration and scale of the impact would be minor given the size of Georges River as well as the fact that the impact would be confined to bottom waters and particles are expected to settle rapidly. It should also be noted that the seabed within the vicinity of the Proposal site is predominantly silt, sand or silty sand material, which is subject to resuspension from vessel movements, waves, tides and stormwater release.

The potential for turbidity caused by the disturbance of fine sediment on the seabed would be contained by a sea curtain. Silt curtains are an accepted and effective management measure for control of water quality impacts during construction.

Land based construction activities are limited in scope. Notwithstanding, rainfall and runoff may wash pollutants and fine sediment, into Georges River. Accepted erosion and sediment control measures to mitigate water quality impacts are outlined in the Managing Urban Stormwater: Soils and Construction publication (Blue Book) prepared by Landcom. These measures would be employed on site as set out in the CEMP.

Accidental spills or discharges of fuel, oil or greases (FOGs) from plant and equipment may result from land based or marine construction activities. The risk of accidental FOG spills would be managed by ensuring that plant and equipment are properly maintained and regularly inspected. Refuelling or servicing of machinery onsite would be undertaken at a suitable location. In the event of an accidental spill or discharge, emergency spill kits would be available onsite, and staff would be trained in the procedure for cleaning spills.

Provided appropriate safeguards are put in place and properly maintained, it is considered water quality and waste impacts during construction would be acceptable.

Waste management

Demolition waste would be generated from the removal of existing infrastructure, including the boat ramp, wharf structure, light poles, marina berth structure and seabed obstructions (mooring blocks and piles).

Land-based excavation for the boat ramp would involve removal of fill which is classified as General Solid Waste (non putrescible). The proposed services trench would also result in excess excavated material which would require removal from site.

There would be minimal need to remove sediments from the seabed. For the most part, sediments displaced as a result of construction works would be replaced underwater close to the area of disturbance. To minimise impact, any sediment, including sediment attached to piles that have been removed would be contained and disposed of in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (DECCW 2009c).

All demolition and construction waste would be collected, stored and disposed offsite to a licensed waste facility in accordance with a Waste Management Plan prepared as part of the Construction Environmental Management Plan (CEMP).

Operation

Water quality

The potential for water quality impacts during the operational phase are mainly related to the discharge of sewage or contaminated bilge water from vessels. These matters would be addressed through a Marina Berth Agreement. The Marina Berth Agreement would establish rules and procedures for occupants of the

marina. The Marina Berth Agreement would include obligations to minimise harm to the environment. The Marina Berth Agreement would consider:

- flushing of heads at berths
- pumping of bilges at berths
- navigation speed and wash creation
- waste storage, management and removal
- dangerous substances on vessels
- creation of noise
- work being undertaken on vessels
- emergency procedures in respect of spills and hazardous materials
- attendance at an induction program.

The agencies would be required to comply with the Marina Berth Agreement.

There is no fuel supply or sewage pump out facility proposed as part of the SSMC. Direct discharge of sewage to the waterway would be prohibited.

Waste management

Appropriate waste storage, management and removal would be set out in the Marina Berth Agreement.

Vessels that occupy wet berths (or AirBerths) within the marina would be supplied with a complementary bilge absorbing pad and trained in its use. A waste oil storage facility would be provided for disposal of containers of waste oils, absorbing pads, etc. The storage facility would be serviced periodically by a commercial waste collector.

Solid waste and recycling bins would be installed at the site.

Provided appropriate safeguards are put in place and properly maintained, it is considered water quality and waste impacts during operation would be acceptable.

6.3.3 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
Water Quality				
WQ1	Water quality	<p>A spill/emergency management plan will be prepared which includes methods to stop any spill, contain and control the flow, clean up the spill and the record the spill. The spill/ emergency management plan will require that:</p> <ul style="list-style-type: none"> • Emergency spill kits are kept onsite at all times and maintained throughout the construction work. • Spill kits are appropriately sized for the volume of substances at the work site. A spill kit will be kept on each barge and at the temporary construction compound site • Spill kits for the construction barges are specific for working within the marine environment • All staff are made aware of the location of the spill kits and trained in their use • the Roads and Maritime Contract Manager and Roads and Maritime environment staff are notified as soon as practicable if a spill occurs • Emergency contact details are kept in an easily accessible location on the construction work site and on all construction vessels. All crew will be advised of these contact details and procedures • All equipment, materials and wastes transported between an off-site facility, and the construction work site are secured to avoid spills during transportation. <p>The spill/emergency management plan will be included in the CEMP.</p>	Contractor	Pre construction/ construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
WQ2	Water quality	Equipment barges carrying plant or machinery will be fitted with bunding around equipment which contain chemicals to prevent chemical spills or leakages from entering the water.	Contractor	Construction
WQ3	Water quality	<p>A floating boom with silt curtain will be used to contain sediment plumes during drilling and pile hammering, and dredging for the boat ramp.</p> <p>During piling, the silt curtain will encompass the construction, rather than being anchored to the shoreline.</p>	Contractor	Construction
WQ4	Water quality	All vehicles, vessels and plant will be properly maintained and regularly inspected for fluid leaks.	Contractor	Construction
WQ5	Water quality	All fuels, chemicals and hazardous liquids will be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards and EPA Guidelines.	Contractor	Construction
WQ6	Water quality	Sediment will be minimised from moving off-site and sediment laden water minimised from entering any watercourse, drainage line or drainage inlet.	Contractor	Construction
WQ7	Water quality	No vehicle or vessel wash down or re-fuelling will occur onsite.	Contractor	Construction
WQ8	Water quality	Visual monitoring of local water quality will be undertaken on a regular basis to identify any potential spills or deficient erosion and sediment controls.	Contractor	Construction
	Waste			
WA1	Waste	<p>A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include:</p> <ul style="list-style-type: none"> Measures to avoid and minimise waste associated with the project Classification of wastes and management options (re-use, recycle, stockpile, disposal) Statutory approvals required for managing both on and off-site 	Contractor	Pre construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<p>waste, or application of any relevant resource recovery exemptions</p> <ul style="list-style-type: none"> • Procedures for storage, transport and disposal • Monitoring, record keeping and reporting. 		
WA2	Waste	<p>All waste material will be disposed of appropriately on land and not reused in construction, excluding materials such as existing pontoons which can be reused as these are not considered general waste.</p> <p>Organisms cleaned off these structures will not be disposed of in the river.</p>	Contractor	Construction
Operational Management				
GEN1	General – minimise environmental impacts during operation	<p>A Marina Berth Agreement will be prepared which will set out rules and procedures for occupants and include obligations to minimise harm to the environment. The Marina Berth Agreement will address:</p> <ul style="list-style-type: none"> • flushing of heads at berths • pumping of bilges at berths • navigation speed and wash creation • waste storage, management and removal • dangerous substances on vessels • creation of noise • work being undertaken on vessels • emergency procedures in respect of spills and hazardous materials • attendance at an induction program. 	Roads and Maritime / NSW Police MAC / DPI-Fisheries	Pre operation

Other safeguards and management measures that would address water quality and waste impacts are identified in sections 6.1.3 and 6.2.3..

6.4 Noise and vibration

A noise and vibration impact assessment has been prepared by Acoustic Consulting (August 2019). A copy of the report is provided at Appendix J and summarised below.

6.4.1 Methodology

The noise and vibration impact assessment was prepared with consideration to the following:

- Interim Construction Noise Guideline (ICNG) (DECCW, 2009c)
- Noise Policy for Industry (NPfI) (EPA, 2017)
- British Standard BS6472–1992, Evaluation of human exposure to vibration in buildings (1–80 Hz)
- German Standard DIN 4150-3 (1992-02): Structural vibration – Effects of vibration on structures (the German Standard DIN 4150-3)

The noise and vibration assessment reviewed how the proposed activities, methods and staging described in Section 3, and the operation of the Proposal, would affect noise and vibration sensitive receivers in the local area.

The following key tasks were completed during assessment:

- Identification of appropriate background noise levels
- Identification of type of sensitive receivers
- Assessment of the noise and vibration impact
- Identification of feasible and reasonable additional mitigation measures.

6.4.2 Existing environment

Acoustic monitoring was conducted at 43 Harris Street, Sans Souci at the rear of the property to establish the background noise levels which were used as the basis for the assessment. Unattended noise monitoring was conducted from 8 to 16 August 2019. The location of the noise monitor and the potentially affected receivers are shown in **Figure 6-3**.



Figure 6-3: Location of unattended noise monitor and nearest potentially affected receivers

Based on the site location of the Sans Souci Wharf Upgrade project the potentially affected receivers are as follows:

- Receiver 1 – Situated to the north western boundary of the project site across Harris Street, Sans Souci a residential dwelling is situated at 43 Harris Street
- Receiver 2 – Located to the northern boundary of the project site is a residential dwelling located at the corner of Harris and Water Street
- Receiver 3 – A mixed use shop top commercial/residential building is located along the northern boundary across Water Street located at 8 Water Street
- Receiver 4 – Sans Souci Leisure Centre is situated along the Eastern Boundary of the project site at 521 Rock Pointy Road.

The background noise levels established from the unattended noise monitoring are detailed in

Table 6-5. NSW EPA's RBL (Rating Background Noise Level) assessment procedure requires determination of background noise level for each day then the median of the individual days as set out for the entire monitoring period. Unattended and attended noise measurements have been undertaken as per the procedures outlined in Fact Sheet A and B of the NSW EPA Noise Policy for Industry.

Table 6-5: Unattended Noise Monitor - Logger Location 1 - Rating Background Noise Level (Source: Noise and Vibration Impact Assessment, Appendix J)

Date	dB(A)L ₉₀ (period) ⁽¹⁾		
	Day (7am-6pm)	Evening (6pm-10pm)	Night (10pm-7am next day)
8 August 2019	-	-	43
9 August 2019	52	50	38
10 August 2019	49	49	44
11 August 2019	46	45	38
12 August 2019	48	48	41
13 August 2019	45	46	38
14 August 2019	42	45	38
15 August 2019	44	47	40
16 August 2019	43	-	0
Median	45	46	38

⁽¹⁾ Periods marked "-" did not collect enough data to be considered valid

Based on the noise measurements in

Table 6-5, the acoustic environment for the project site is set out in **Table 6-6**.

Table 6-6: Summarised Measured Rating Background Noise Level (Source: Noise and Vibration Impact Assessment, Appendix J)

Location	Time Period	Background Noise Level dB(A) $L_{90(\text{period})}$
Eastern boundary	7.00am-6.00pm	45

6.4.3 Criteria

The NSW EPA *Interim Construction Noise Guideline* (ICNG) adopts differing strategies for noise control depending on the predicted noise level at the nearest residences:

- “Noise affected” level. Where construction noise is predicted to exceed the “noise affected” level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the “noise affected level”. For residential properties, the “noise affected” level occurs when construction noise exceeds ambient levels by more than:
 - 10dB(A) $L_{eq(15\text{-minutes})}$ for work during standard construction hours (7:00am-6:00pm Monday to Friday and 8am to 1pm on Saturdays)
 - 5dB(A) $L_{eq(15\text{-minutes})}$ for work outside standard construction hours (6:00pm-7:00pm Monday to Friday and 1:00pm to 4:00pm on Saturdays)
- “Highly noise affected level”. Where noise emissions are such that nearby properties are “highly noise effected”, noise controls such as respite periods should be considered. For residential properties, the “highly noise effected” level occurs when construction noise exceeds 75dB(A) $L_{eq(15\text{min})}$ at nearby residences. Highly noise affected level only applies during standard construction hours.

A summary of noise management levels for standard hours of construction is shown in **Table 6-7**.

Table 6-7: Construction Noise Management Level (Residents)

Receiver type	“Noise Affected” Level dB(A) $L_{eq(15\text{ minutes})}$	“Highly Affected” Level dB(A) $L_{eq(15\text{ minutes})}$
Residential receivers	Background + 10dB(A) – 55dB(A) (Standard construction hours)	75
	Background + 5dB(A) – 50dB(A) (Outside standard construction hours)	N/A

In relation to vibration the report notes that vibration caused by the excavation or construction activities on site should be limited as follows:

- For structural damage vibration, German Standard DIN 4150-3 Structural Vibration: Effects on Vibration on Structures

- For human exposure to vibration (amenity), the evaluation criteria presented in the NSW EPA's Assessing Vibration: a technical guideline document.

6.4.4 Potential impacts

Construction

Noise

Noise from the worst case construction works for each phase of the development has been predicted to the nearest sensitive receiver, as shown in **Table 6-8**.

Table 6-8: Noise Emission Assessment for nearest sensitive receivers (Source: Noise & Vibration Impact Assessment, Appendix J)

Activity	Sound Power Level	Predicted Level dB(A)Leq(15-minute)			
		Receiver 1	Receiver 2	Receiver 3	Receiver 4
Excavator (without hammer)	98	58-50	58-50	58-48	58-48
Vibration piling equipment	105	65-5	65-57	65-55	65-55
Driven piling equipment	110	70-62	70-62	70-60	70-60
Piling boring equipment	100	60-52	60-52	60-50	60-50
Truck	96	56-48	56-48	56-46	56-46
Angle grinders	114	74-66	74-66	74-64	74-64
Electric saw	110	71-63	71-63	71-61	71-61
Hand held drilling	94	54-46	54-46	54-44	54-44
Hand held hammering	110	70-62	70-62	70-60	70-60
Concrete vibrator	100	60-52	60-52	60-50	60-50
Cement mixing truck	105	68-60	68-60	68-58	68-58
Concrete pumps	107	72-64	72-64	72-62	72-62

General construction works will have lower impact (and less than the Highly Noise affected Level of 75dB(A)) at surrounding receivers due to the quieter items of plant (i.e. hand tools etc). However, there is likely to be periodic exceedances above the Highly Affected Level (i.e. 75db(A)) during the demolition/piling/construction works with the use of excavator and relevant attachments (i.e. hammer, saw etc).

The noise assessment identifies a range of measures that could be adopted to help minimise construction noise levels as far as possible. These include:

- Providing for respite periods during pneumatic hammering as follows:

Monday to Friday:

- Respite Period 1: 7.00am to 8.30am
- Respite Period 2: 12.00pm to 1.30pm

Saturday

- Respite Period 1: 8.00am to 9.00am
- Respite Period 2: 12.00pm to 1.00pm
- Limiting the use of angle grinders to areas which are screened from surrounding receiver locations (noting that angle grinders would only typically be used sporadically)
- Turning off truck engines when on site (unless truck ignition needs to remain on during concrete pumping)
- Locating concrete pumping plant away from site boundaries where feasible
- Using silencing devices such as engine shrouding or fitting special industrial silencers to exhausts
- Installing rubber matting over material handling areas
- Ensuring all plant, equipment and machinery are regularly serviced and maintained at optimum operating conditions, to ensure excessive noise emissions are not generated from faulty, overused or unmaintained machinery
- As part of the site induction process, ensuring all construction staff (including subcontractors) are informed of the surrounding sensitive receivers on site and the site-specific recommendations to reduce noise and vibration impacts to these receivers
- Ensuring appropriate notification and complaints handling procedures are put in place.

Vibration

Proposed activities that have the potential to produce significant ground vibration include:

- Excavator mounted hydraulic hammer
- Excavator mounted saw
- Excavator with bucket.

Some vibration is unavoidable given the nature of the proposed works. The assessment recommends the adoption of the maximum 5mm/s PPV criteria to protect residential buildings next to the project site. However, it should be noted that a distance of 20m between the equipment and the residential properties is generally sufficient to avoid an exceedance of this criterion.

Operation

The position of the proposal would be located at a similar distance from shore to the wharf currently existing on site. Since there are no proposed changes in operating hours for the new floating wharf and the increase in boats and personal watercraft would be minimal, the Noise and Vibration Impact Assessment has determined that there would be no perceived increase in noise levels at surrounding residential properties as a result of the proposed new wharf. The assessment concludes that the proposal would not have an adverse impact on the existing amenity of surrounding residences.

6.4.5 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
NV1	Noise and vibration	<p>A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the Interim Construction Noise Guideline (ICNG) (DECC, 2009) and identify:</p> <ul style="list-style-type: none"> • All potential noise and vibration generating activities associated with the activity • Feasible and reasonable mitigation measures to be implemented. • A monitoring program to assess performance against relevant noise and vibration criteria, including vibration monitoring during pile hammering • Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures. • Contingency measures to be implemented in the event of non-compliance with noise and vibration criteria. • Training of all site workers (including subcontractors and temporary workforce) to familiarise them with the potential for noise impacts to residents, and measures to minimise noise during their activities. 	Contractor	Pre-construction
NV2	Noise and vibration	<p>During pneumatic hammering, the NVMP will provide for the following respite periods:</p> <ul style="list-style-type: none"> • Monday to Friday: <ul style="list-style-type: none"> ○ Respite Period 1: 7.00am to 8.30am 		

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<ul style="list-style-type: none"> ○ Respite Period 2: 12.00pm to 1.30pm • Saturday <ul style="list-style-type: none"> ○ Respite Period 1: 8.00am to 9.00am ○ Respite Period 2: 12.00pm to 1.00pm 		
NV3	Noise and vibration	<p>All sensitive receivers likely to be affected will be notified at least five days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of:</p> <ul style="list-style-type: none"> • The proposal • The construction period and construction hours • Contact information for proposal management staff • Complaint and incident reporting • How to obtain further information. 	Contractor	Pre-construction/ construction
NV4	Noise and vibration	Should ongoing complaints of excessive noise or vibration occur immediate measures will be undertaken to investigate the complaints, the cause of the exceedances and identify the required changes to work practices.	Contractor	Construction

Other safeguards and management measures that would address noise and vibration impacts are identified in section 6.7.3.

6.5 Landscape character and visual impact

6.5.1 Methodology

The RMS *Guidelines for Landscape Character and Visual Impact Assessment* (EIA N04) provides a detailed guide to the carrying out of landscape character and visual impact assessments. Landscape character assessment helps determine the overall impact of a project on an area's character and sense of place. Visual impact assessment helps define the day to day visual effects of a project on people's views.

The Guidelines state that where a project is of a smaller scale only a visual impact assessment is required. The visual impact assessment is to be tailored to match the scale and complexity of the project.

Accordingly, a landscape character assessment in accordance with the RMS Guidelines is not considered appropriate or warranted given that the proposal essentially involves the redevelopment of an existing marina for a new marina which is of a similar nature and scale as that existing. The landscape character would be largely the same as that existing. Further, it is considered that the landscape character and visual impact of the proposal would be generally positive given that it involves the replacement and upgrade of what is currently a rundown facility.

This section is therefore confined to a visual impact of the proposal from key viewpoints. It summarises the visual impact of the proposed works in terms of terms of sensitivity and magnitude in accordance with the framework established by the Guidelines. Sensitivity refers to the qualities of an area, the type number and type of receivers and how sensitive the existing character of the setting is to the proposed change. Magnitude refers to the nature of the project. The combination of sensitivity and magnitude provides the rating of the visual impact for viewpoints.

6.5.2 Existing environment

The visual environment surrounding the proposal is typical of this section of Georges River, with small scale marina facilities including pontoons and jetties, a mix of low density residential and commercial buildings, and areas of public open space.

The existing marina itself comprises a dilapidated timber and concrete wharf and a floating T-shaped concrete pontoon.

There are public views of the river available from Harris Street which is located immediately to the west of the site.

Key viewpoints within the locality have been assessed as:

- **Sans Souci Park** – located immediately east of the SSMC, this is a foreshore park which includes an aquatic centre, play equipment and BBQs. Given the proximity of the park to the site, this is the most sensitive viewpoint although views of the river are predominantly to the south rather than west.
- **Captain Cook Bridge** – located to the east of the SSMC, views are afforded from the bridge over the river towards the marina. Captain Cook Bridge is an elevated bridge carrying high numbers of vehicles as well as pedestrians and cyclists.
- **Tom Uglys Point** – located to the west of the SSMC, Tom Uglys Point is a foreshore reserve. The reserve is located under Tom Uglys Bridge. The eastern side of the reserve which looks towards the SSMC is predominantly used for car parking.

- **Tom Uglys Bridge** - Tom Uglys Bridge is composed of two bridges, completed in 1929 and 1987. The 1987 bridge is to the east and affords views towards the SSMC. As with Captain Cook Bridge, Tom Uglys Bridge is a major arterial route and carries large amounts of traffic. There is a pedestrian path on the eastern side of the 1987 bridge.
- **Foreshore Park**, Marra Place, Sylvania – This is a small park located on the foreshore of Sylvania south-west across the river from the SSMC. It is a local park and is only likely to be used by nearby residents.

The location of the viewpoints is shown on the plan at **Figure 6-4**. The viewpoints have been selected based on the following:

- They represent public vantage points
- They currently provide clear views to the SSMC
- They are located on or adjacent to the river. Any views adjacent to or across the river are likely to be more highly valued than local views of built upon areas.

Photos of the marina from the five viewpoints are provided in Plates 5-9.



Figure 6-4: Key viewpoints (source: www.nearmap.com)



Plate 5: View from Sans Souci Park

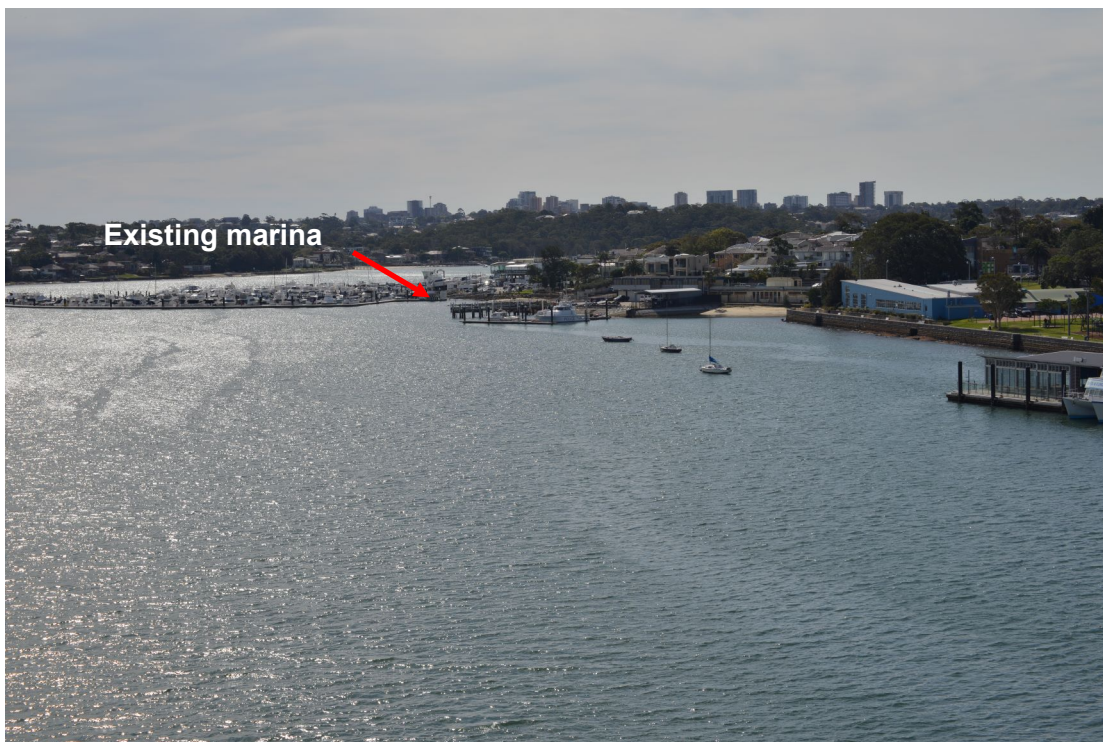


Plate 6: View from Captain Cook Bridge



Plate 7: View from Tom Uglys Point

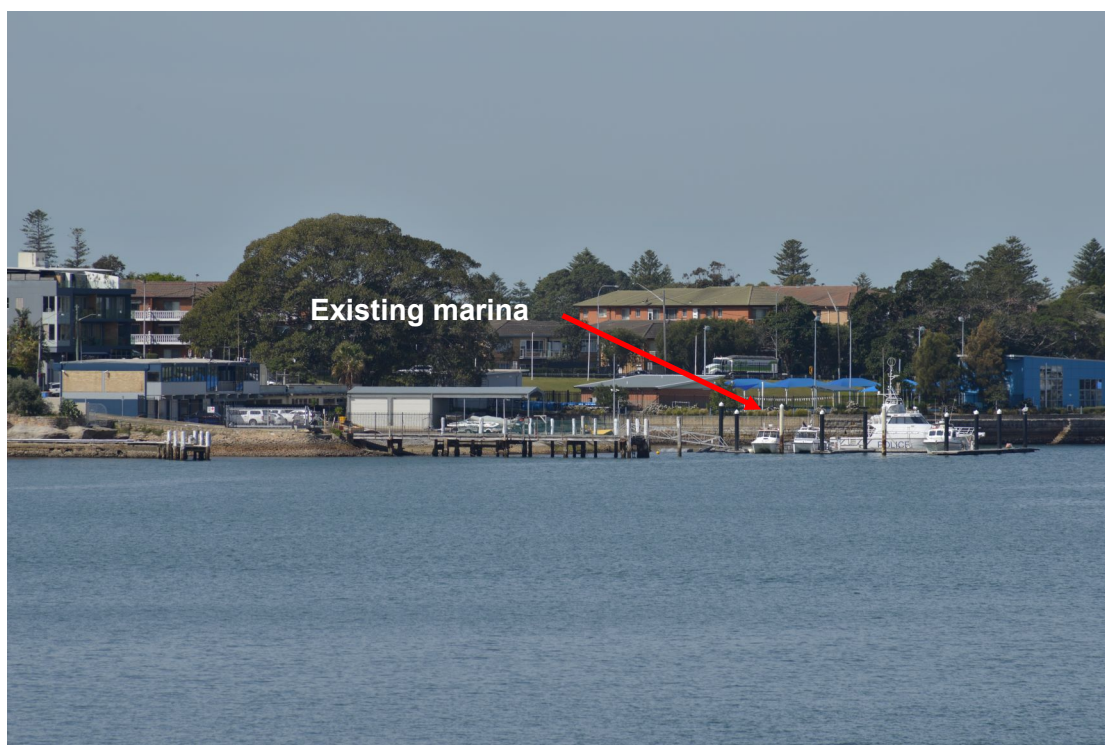


Plate 8: View from Tom Uglys Bridge



Plate 9: View from Foreshore Park

The marina is currently floodlit. There is a lighting pole at the top of the existing gangway and another lighting pole located on the hard stand in the secure car park. There is also existing lighting on the timber wharf, spotlights on the storage sheds on the hard stand and lighting on the main admin building that lights up the hard stand.

6.5.3 Potential impacts

Construction

During construction there would be a temporary decrease in the scenic quality of the local area with the introduction of construction equipment, plant, construction vessels in the water and the like. Views of the river from Harris Street looking south-east towards Captain Cook Bridge would potentially be disrupted during construction, noting that this view is already somewhat obscured by existing black metal fencing and other existing infrastructure on the site.

These impacts would be temporary and would be experienced over a relatively short period of time. No adverse long term impacts would result.

Operation

Table 6-9 below summarises the visual impact of the proposed works in terms of terms of sensitivity and magnitude in accordance with the framework established by the Guidelines.

Table 6-9: Description of view impact (refer **Figure 6-4** above)

View	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
1. Sans Souci Park	M	L	FZ	L	The marina is visible from the foreshore of Sans Souci Park but its visibility is moderated by the backdrop of the St George Motor Boat marina and residential built form behind (refer Plate 5). The proposal, which essentially involves the replacement of the existing marina with an additional pontoon would appear largely the same as that existing. No major on-water structures are proposed which would interrupt this current view. Views to the river would remain uninterrupted. The impact is considered to be low.
2. Captain Cook Bridge	M	L	BZ	L	The existing marina is approximately 500m from Captain Cook Bridge at its closest point. There a number of wharves and jetties in the foreground view from the bridge, with the Sans Souci Marina only perceptible as a background view (refer Plate 6). As the proposal only involves the upgrade of the existing facility with one additional pontoon, it is considered that any view impact from Captain Cook Bridge would be low to negligible.
3. Tom Uglys Point	L	L	BZ	L	The marina is approximately 880m from Tom Ugly's Point. . From this viewpoint the marina would be visible set against the foreshore of Sans Souci and the built form of the Sans Souci Leisure Centre and residential buildings behind (refer Plate 7). As above, the proposal, which essentially involves the replacement of the existing marina with an additional pontoon, would appear largely the same as that existing. Views to the river would remain uninterrupted. The impact is considered to be low.
4. Tom Uglys Bridge	L	L	BZ	L	The existing marina is almost 1km from Tom Ugly's Bridge. The angle of the view sets the proposal with a collection of foreshore structures (refer Plate 8). The impact is considered to be low.
5. Foreshore Park	L	N	BZ	N	The marina is almost 1km from Foreshore Park which is located on the opposite side of Georges River to the south-west. The view of the marina from Foreshore Park is part of a collection of foreshore structures (refer Plate 9). The upgrade of the marina

View	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
					would have negligible impact on this view. Views to the river remain uninterrupted.

N=Negligible; L=Low; ML=Moderate-Low; M=Moderate; HM=High-Moderate; H=High; FZ=Foreground zone (0m-250m); MZ=Middle ground zone (250m-500m); BZ= Background zone (greater than 500m from the proposed marina)

Having regard to the assessment in **Table 6-9**, the proposal would have low to negligible impact on existing views and vistas.

The marina would continue to be floodlit, with two pole-mounted floodlights installed along edge of hardstand (refer Drawing No E01 Appendix A). Lighting of the facility is considered essential given the nature of operations and assets provided at the marina. The potential impact from the floodlights is considered similar to that existing.

6.5.4 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
V1	Visual impact	The construction area would be kept clean and clear of rubbish.	Contractor	Construction

6.6 Biodiversity

Eco Logical Australia (ELA) Pty Ltd has prepared an Ecological Assessment for proposed upgrade of the Sans Souci Vessel Berth (August 2019). A copy of the Ecological Assessment is provided at Appendix K and is summarised below.

6.6.1 Methodology

The Ecological Assessment involved the following tasks:

- desktop review of existing literature and site data to confirm the presence of known and likely species and habitats within 20 m of the proposed works
- aquatic survey during high tide and calm conditions
- mapping, photography and the identification of aquatic flora and key fish habitat (KFH) (eg seagrasses, mangroves, saltmarsh, macroalgae beds)
- estimates of the density and condition of aquatic flora and KFH, including verification on whether any threatened or protected species, populations or ecological communities, pest species or presence of 'critical habitat' occur locally in the marine environment
- provide recommendations to mitigate impacts during and after construction.

The aim of the ecological assessment was to determine what biota and habitat occurs near the proposed works. With this understanding, an assessment of the significance of impacts to threatened species, communities or populations as a result of the proposed development, as defined in Section 5A of the EP&A Act was undertaken.

The study area for the assessment comprised the area of the proposed works, noting that the desktop review included an analysis of likely species and habitats within 20m of the proposed works..

6.6.2 Existing environment

Aquatic habitats in the study area have been modified by foreshore development (carpark, boat ramp and buildings), the existing berth structures and disturbance by regular boat traffic. There are four distinct habitat zones in the study area:

1. *Manmade structures* – These comprise highly modified foreshore habitat with a parking lot and concrete-capped rock rubble wall in the intertidal zone. The berth structures were observed to be encrusted with organisms including small green and brown algae, turfing algae, ascidians, polychaete tubes, mussels, oysters and barnacles. Small and medium sized fish, including mullet and bream, were observed around the piles. The boat ramp in the middle of the site was textured concrete, and oysters were growing on the subtidal toe of the ramp.
2. *Intertidal zone (sand and rock)* – The intertidal sand is located to the east of the site and is unvegetated with small quantities of wrack, woody debris and rubbish. No fauna were observed in this area. Intertidal rock was located on the west of the site, also unvegetated. The intertidal zone features shallow pools and crevices during low tide, supporting organisms including barnacles, oysters and limpets.

3. *Marine vegetation* – Marine vegetation within the site includes dense *Sargassum* sp. and *Ecklonia radiata* attached to the base of the intertidal rock wall. They were observed to be healthy with only a moderate amount of epiphyte growth. *Sargassum* sp. and *Ecklonia radiata* became sparser as depth increased towards the middle of the site, and sediment became softer, with less available hard surfaces. Small fish were seen near the macroalgae. A band of *Zostera* (seagrass) was present in the east of the study area. This was of moderate density, and had accumulated wrack and rubbish. As the depth increased, light became less available and the *Zostera* decreased in density.
4. *Subtidal bare sediment* – The subtidal zone is predominately characterised by fine sediment and scattered shell fragments. Infauna burrows and associated bioturbated sand and mud were observed to be scattered sparsely across the benthic sediments. Water ranged in depth from two to six metres, with a layer of fine sediment indicating only some tidal flushing at this depth.

No threatened species, populations or communities were observed in the study area, nor are any expected to use the site. Seahorses and their relatives (*Syngnathiformes*) were not observed during the field survey, and are unlikely to occur on site due to the lack of suitable habitat. Within the study area, there is limited valuable habitat (marine macrophytes and seagrass) capable of supporting threatened aquatic/estuarine species, populations or communities. Given the frequent use of the area by boats and the connectivity of the site to better and more suitable habitats, it is unlikely that species would depend on the site for their survival, although some species may pass through the area.

DPI Fisheries identify three types of key fish habitat (KFH) in their Policy and Guidelines for Fish Habitat Conservation and Management. KFH types verified by ELA are mapped in **Figure 6-5** and include:

- Type 1 (highly sensitive KFH) – represented on site as a patch of *Zostera* (>5 m)
- Type 2 (moderately sensitive KFH) – represented on site as intertidal rock and macroalgae
- Type 3 (minimally sensitive KFH) – represented on site subtidal sand.



Field-validated Aquatic Habitat (18 Jan 2018)

- Intertidal concrete boat ramp
- Subtidal concrete boat ramp
- Unvegetated intertidal rock platform
- Unvegetated intertidal sand
- Intertidal sloped rock rubble wall capped with concrete
- Moderate *Zostera* with dense wrack
- Scattered *Sargassum* sp. and *Ecklonia radiata*
- Moderate *Sargassum* sp. and *Ecklonia radiata*
- Dense *Sargassum* sp. and *Ecklonia radiata* at base of rock rubble wall
- Unvegetated subtidal sediment with moderate infauna burrows

Proposed structure (Option B, Rev B, 9 Aug 2019)

- Pontoon
- Pontoon (over ramp)
- Gangway
- Concrete abutment
- Concrete boat ramp (widen and extend existing)
- Piles

0 5 10 20
Metres

GDA 1994 MGA Zone 56



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logical**
AUSTRALIA
www.ecoaus.com.au

Prepared by: ID Date: 27/08/2019

Figure 6-5: Field validated habitat of site (18 January 2018)(Source: Ecological Assessment, Appendix K)

6.6.3 Potential impacts

Construction

Four impact types are likely to occur during construction works:

- Direct loss of marine vegetation from the boat ramp extension.
- Noise generation and disturbance from piling
- Disturbance of contaminated sediment from construction works
- Disturbance from construction vessels, such as boat/propeller wash, temporary mooring and accidental spills.

Direct loss of marine vegetation

Construction of the preferred concept plan would result in a total, but temporary, loss of 1562.55 m² of Type 2 and Type 3 KFH. There would be a total gain of 1956.58 m² of mostly Type 3 habitat through the addition of piles, pontoons and newly exposed habitat. A breakdown of habitat loss and gain is provided in **Table 6-10**.

Table 6-10: Impact to key fish habitat

Habitat (KFH Type)	Available in study area (m ²)	Impact type	Loss (m ²)	Gain (m ²)	Net change (m ²)
Piles (wetted habitat Type 3 KFH)	126.29	25 round concrete/time removed	126.29	-	-126.29
	32.00	10 square concrete removed	32.00	-	-32.00
		25 round concrete added	-	164.70	164.70
Pontoon (wetted surface area, Type 3 KFH)	407.30	1 removed	407.30	-	-407.30
		2 added	-	1394.40	1394.40
Subtidal sand (Type 3 KFH)	9803.74	Indirect – shading from pontoon/gangway/ jetty	714.66	354.00**	-360.66
		Reclamation from ramp	68.98	-	-68.98
		Direct – piling (added/removed)*	4.66	13.48	8.81
Macroalgae (Type 2 KFH)	1064.45	Indirect – shading from pontoon/gangway/ jetty	94.73	22.00**	-72.73
		Reclamation from ramp	79.80	-	-79.80
		Direct – piling (added/removed)	2.75	-	-2.75
Concrete capped wall (Type 3 KFH)	275.76	Indirect shading from pontoon/gangway/ jetty	5.43	8.00	2.57
		Reclamation from ramp	25.95	-	-25.95

* Includes: benthic habitat lost from drilling a new pile; macroalgae lost from cutting remnant stump; benthic habitat gained from removal of pile or stump (assumed bare sand).

** Existing shading from structures to be removed (new structures will partially overlap existing shading, so no change expected in those area).

Loss of habitat would result from direct damage from pile installation, and partial shading of vegetated and unvegetated substrate beneath the berth extension. There would be a direct impact to 2.75 m² of macroalgae (Type 2 KFH) through the removal and installation of piles, and impact 79.80 m² of macroalgae from the reclamation of seabed for the installation of the ramp, and an indirect impact to 72.73 m² of macroalgae by shading from the pontoons and gangways.

Overall, there would be a net gain in habitat in the form of Type 3 KFH. However, the proposal would result in the loss of 155.28 m² of Type 2 KFH (moderate to dense macroalgae cover).

Environmental impacts such as the loss of KFH may be offset by environmental compensation.

Compensation to offset fisheries resource or habitat losses is considered only after a demonstrated loss is unavoidable, in the best interests of the community, and is in accordance with the FM Act, Regulations and Fisheries policies and guidelines. Habitat replacement (as a compensation measure) needs to account for both direct and indirect impacts from the development to ensure that there is 'no net loss' of key fish habitats.

In accordance with the Roads and Maritime Services Biodiversity Offset Guideline, offsetting is required where a proposal impacts on Type 1 or Type 2 KFH resulting in a net loss of habitat. The proposed removal of 155.28m² of Type 2 KFH would therefore need to be offset. This would be achieved by obtaining a permit to *harm marine vegetation* under Part 7 of the FM Act as fisheries permit fees are used to offset loss by using funds generated to improve habitat elsewhere.

Noise

Underwater noise from hammering piles has the potential to cause disturbance or physical impact to marine fauna in the area. Fish in the vicinity would be affected by excessive underwater noise, with the impact ranging from mortality to interruption of communication, depending on species anatomy (eg fish with swim bladders closer to the ear are more sensitive to acoustic impact than species with swim bladders further from the ear). Although fish would be able to escape beneath the silt curtain if water depth allows, some impact is expected.

Contaminated sediment

As discussed in Section 6.1.2, a Preliminary Contamination Assessment (refer Appendix H) found elevated concentrations of mercury and lead above the low-risk aquatic based ecological site acceptance criteria and elevated concentrations of arsenic and zinc. These exceedances were encountered in the surface sediments in the foreshore area. The most likely source of these contaminants is paint and other contaminated wash down from the marine vessels in the vicinity of the site and runoff from the foreshore.

Potential impact to the marine ecology due to exposure and release of contaminated sediment and soils would likely be small-scale and local, but could include:

- smothering of benthic habitat and flora, resulting in small-scale but temporary loss of habitat
- changes to the abundance of individual species, as well as the composition and diversity of biological communities
- addition of toxins into the food web, from uptake by filter feeders to eventual bioaccumulation in higher order predators (fish and humans)
- interference with the growth or reproduction of some organisms, and overall productivity and functioning of aquatic ecosystems.

Safeguards and management measures are proposed to minimise sediment disturbance.

Impacts from construction vessels

There would be little direct or indirect impact caused by construction vessels if best practice environmental management procedures are in place and effective. However, potential impact may include chemical/material spills from machinery, propeller scouring in shallow water, and anchor/mooring impact from barges. The risks of these impacts would increase with unfavourable swell and weather conditions.

Scouring of benthic sediments, either from propeller operation, dragging anchor, or water movement from shallow barge operation, could cause benthic sediments to become suspended in the water, increasing turbidity. The increased sediment load would reduce light penetration through the water column, and sediment particles may settle on aquatic plants. This impact would be temporary, and is unlikely to affect the longevity and health of the plants.

Sediment movement may also smother infauna burrows, but it is unlikely that large volumes of sediment would be displaced and moved and a temporary layer of silt or sand that would settle on the burrow is unlikely to cause long-term damage.

Chemical spills are unlikely, but may occur during refuelling or if there is a hydraulic fluid leak. Spilt petrochemicals have the potential to wash up on shore, or disperse in the water. This could kill or impair fish and infauna, as well as sessile organisms attached to rocks or piles. This is an unlikely event if proper protocols are followed.

Vessels may also be a vector for movement of marine pests, especially if boats used for the construction are not from the local area. For example, *Caulerpa taxifolia* may be introduced to the construction area if proper hygiene procedures are not followed. To ensure that this does not happen, barges moving from areas where *Caulerpa* is present should be inspected before entering the site. If *Caulerpa* becomes established around the berths, then there is the potential for boats using the area to become vectors for spreading the weed further.

'No-go' zones have been identified and any vessels would be required to anchor outside these zones. The no-go zones are shown in **Figure 6-6**.



Figure 6-6: 'No-Go' zones (shown hatched)

Operation

Three impact types are likely to occur during operation:

- boat traffic using the facility
- shading impact on benthic habitat from the gangways, pontoon and wharf extension
- creation of new aquatic habitat.

Boat traffic impact

The impacts which could occur in marine habitats during operation are typically those associated with boat wash, disturbance of sediments, and an increase in pollutants and litter. Given the location and existing high intensity use, the following impacts are considered minor in nature:

- boat wash would not impact the foreshore, which is stabilised by a large intertidal rock wall capped with concrete
- propeller disturbance to sediments in shallow areas, which may cause sediments to settle on infauna burrows and macroalgae. Given the already frequent use of the site by boats this disturbance is not expected to have a significant impact
- pollutants expelled from boats using the new berth would be the same as at the current existing conditions.

Shading impact

Partial shading from the wharf extension, pontoon and gangway may have an indirect impact on benthic habitat. The preferred concept plan would create a total additional shaded area of 430.82 m², comprised of shading to 360.66 m² of Type 3 KFH and 72.73 m² of Type 2 KFH. Shading of organisms on the intertidal wall (ie molluscs) and subtidal sand (ie infauna) would not have a significant impact, as they already occur under shaded areas on site. An increase in floating structures onsite could be favourable with increased fish habitat on the wetted sides. New areas will be also exposed to full light with the redesign.

Therefore, as a worst-case impact scenario, a total of 72.73 m² macroalgae would be partially shaded by the berth expansion.

Creation of hard substrate

Once installed, the piles would create new areas of vertical hard substrate, which can provide areas for sessile marine organisms and structural habitat for small fish (likely Type 3 KFH). All new piles would be exposed to partial sunlight, potentially allowing for small macroalgae to become established.

The number of new piles to be installed is less than the number of piles to be removed however the new piles would be longer as many occur in deeper water. Therefore, the proposed works would provide 6.41m² of additional Type 3 habitat within the site.

The two new pontoons to be installed would create new wetted surface areas and allow for a net increase of 987.10 m² of Type 3 KFH.

Summary of impacts

Threatened species, populations or communities

No threatened species, populations or communities listed under the FM Act are likely to occur in the study area, or be directly or indirectly harmed by the proposed work

Protected vegetation

Protected vegetation occurs in the study area in the form of seagrass and macroalgae. The seagrass was located outside the proposed footprint and potential construction zone, whereas, the macroalgae would be directly and indirectly impacted by the works. Therefore, the proposal requires a permit to harm marine vegetation issued by DPI Fisheries. This is discussed further in 6.7.4.

Protected fauna

No protected fauna listed under the FM Act occurs in the study area, so they would not be impacted.

Critical habitat

The study area does not have habitat that is critical to any threatened species, and is not within or near the critical habitats for Grey Nurse Shark (Part 7A of the FM Act), so would have no impact on the species.

Commercial Fisheries

The nearest aquaculture leases (oyster) are in Woollooware Bay, southeast of the site. The Botany Bay estuary is closed to prawn trawling. As such, the proposed works would not impact commercial fisheries.

Conclusion on significance of impacts

The proposal is not likely to significantly impact threatened species, populations or ecological communities or their habitats, within the meaning of the *BC Act 2016* or *Fisheries Management Act 1994* and therefore a Species Impact Statement or Biodiversity Development Assessment Report is not required.

The proposal is not likely to significantly impact threatened species, populations, ecological communities or migratory species, within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Department of the Environment and Energy is not required for biodiversity matters.

Part 7 permits or consultation

The preferred concept plan would cause direct and indirect harm to marine vegetation, so a Section 205 permit under the FM Act to harm marine vegetation would be required.

The proposal would require excavation to extend and widen the boat ramp as discussed in Section 3.5. Under the regulations, work that involves the removal of any of material from water land that disturbs, moves or harms woody debris, snags, gravel beds, cobbles, rocks, boulders, rock bars or aquatic vegetation is considered dredging. Therefore, consultation between the proponent and the Minister for Primary Industries under s.199 of the FM Act would be needed before works can commence.

6.6.4 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
B1	Biodiversity	<p>The following requirements will be included in the CEMP will to protect aquatic ecology:</p> <ul style="list-style-type: none"> any barges will be positioned to prevent propeller scouring and thrust wash onto sensitive habitats (eg macroalgae) the work footprint will be minimised as far as possible no-go zones will be identified in sensitive habitats (refer Additional safeguard B2) biological hygiene safeguards will be followed to prevent spread of noxious species on and off the site all equipment, reused pontoons, barges, anchors and the like will be cleaned of organisms prior to being brought to the site. All cleaning will be done off site, on land and not disposed on in the river. 	Contractor	Pre construction/ construction
B2	Biodiversity	<p>No-go zones will be established to avoid damage to Key Fish Habitats 1 and 2, as shown in Figure 6-6 of the REF. No-go zones will include the intertidal rock platform, intertidal sand, seagrass and macroalgae (unless approved under a <i>harm marine vegetation permit</i>).</p> <p>No-go zones will be marked on a map and displayed inside the construction barge and office.</p> <p>All staff responsible for manoeuvring construction vessels will be required to check the map before commencing work.</p>	Contractor	Pre construction/ construction
B3	Biodiversity	Work positioning barges, drilling and pile driving will only occur during calm conditions.	Contractor	Construction
B4	Biodiversity	No anchors or mooring blocks/lines will be placed on the macroalgae within site. All lines will be suspended off the	Contractor	Construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		seafloor to minimise drag across benthic communities.		
B5	Biodiversity	Gentle start-up hammering will be undertaken to allow undetected aquatic fauna to leave the area and avoid hearing damage.	Contractor	Construction
B6	Biodiversity	Work will cease if large fauna is observed nearby and not recommence until the fauna leaves from within vicinity of the site.	Contractor	Construction

Other safeguards and management measures that would address biodiversity impacts are identified in sections 6.1.3 and 6.3.3.

6.7 Socio-economic

6.7.1 Existing environment

The suburb of Sans Souci is predominantly residential in nature. There is a supermarket located on Rocky Point Road to the north of the site, together with cafés and restaurants scattered throughout the suburb. There are a number of water-based uses and parks along the foreshore, including the St George Motor Boat Club, the Botany Bay Yacht Club, Bass and Flinders Cruises, Sans Souci Leisure Centre, and Sans Souci Park.

The site is accessed via Water and Wellington Streets which in turn provide direct access to Rocky Point Road which is the key arterial road on the peninsula and also a strategic bus corridor.

The Sans Souci Park located to the east of the site has a total area of 3.3ha and is owned by Georges River Council, Crown Lands and Roads and Maritime. It is a multi-purpose park catering for a range of land- and water-based recreational activities for all age groups and accessible to all in the community. Settings within the park range from built recreational and tourist structures, food and beverage outlets, open grassland and landscaped areas, to natural foreshore. Park settings are linked within and to other open spaces by walking and cycling tracks.

At the 2016 census, there was an estimated residential population of 2,733 people within Sans Souci, with 77% living in separate houses (<https://profile.id.com.au/georges-river>).

NSW Bureau of Crime Statistics and Research mapping (<http://crimetool.bocsar.nsw.gov.au/bocsar/>) indicates a low level of recorded offences in the Sans Souci area for theft, robbery, malicious damage to property, arson, assault and other offences. There is no particular crime hotspot identified within the vicinity.

6.7.2 Potential impacts

Construction

Socio-economic impacts during construction would be minimal. There would be a decrease in the scenic quality of the local area with the introduction of construction equipment, plant, construction vessels in the water and the like. This impact would be temporary (limited to the construction timeframe).

There may be some disruption to nearby residences due to noise impacts. These impacts would be temporary, and mitigation measures are discussed in section 6.4.

Any potential impacts associated with construction vehicles and vessels near the site would be mitigated through the preparation and implementation of a traffic management plan. This is discussed further in section 6.8.

Operation

The proposal would address a number of risks that have been identified with the existing facility, most notably risks to the health and safety of users and risks associated with non-compliance with appropriate design standards. More specifically, the proposal would have the following benefits:

- greater ability to share resources, including vessels, across agencies
- better patrol planning

- improved response times for NSW Police MAC, RMS and DPI vessels and personnel
- improved life expectancy of the SSMC
- improved working conditions for staff and compliance with Work Health and Safety (WHS) requirements
- compliance with Australian Standard (AS) 3962-2001 Guidelines for Design of Marinas and NSW Boat Ramp Facility Guidelines (2015).

The proposal would be in keeping within the existing maritime character and use of the site, and would not result in any changes in the types or nature of activities currently undertaken.

6.7.3 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
SE1	Socio-economic	An internet site and free-call number would be established for enquiries regarding the proposal for the entirety of construction. Contact details would be clearly displayed at the entrance to the site. All enquiries and complaints would be tracked through a tracking system, and acknowledged within 24 hours of being received.	Roads and Maritime	Construction
SE2	Socio-economic	The construction area would be secured at all times.	Contractor	Construction

6.8 Traffic and transport

SCT Consulting has prepared a Traffic Management Plan for the proposal (refer Appendix L). This section summarises the findings of this report.

6.8.1 Existing environment

The existing transport environment is characterised as follows:

Walking and cycling

Footpaths are located on both sides of the road of Water Street, Rocky Point Road, Harris Street and Wellington Street, which cater for access to the bus network and on-street parking. Pedestrian access locally is generally good due to the relatively small block size and proximity of signals on Rocky Point Road / Wellington Street. The site is also provided with access to a regional cycle route that follows the bay on the eastern side of the Sans Souci Peninsula. It is not expected that cycling would form a significant choice of mode due to the predominately Government use of the facility and the typical distance to other Government offices.

Public transport

The site is located on the Rocky Point Road corridor, which is a strategic bus route, listed as a “city-serving” corridor in *Future Transport 2056 – Greater Sydney Services and Infrastructure Plan*. The site has eight stops within an 800m walking catchment. The nearest stops on Rocky Point Road provide for the largest number of destinations and are within a 400m walking catchment. The combined frequency of services is between 22 and 17 services per hour on weekday peak periods, when the site is in operation.

Road network

The site is provided with direct access to Rocky Point Road, the key arterial road on the peninsula via Water and Wellington Streets. The key road characteristics are as follows:

- **Rocky Point Road** - This arterial road is posted at 70 km/hr, with the exception of school zones. The closest school zone to the site starts just south of Endeavour Street (north of the site) and ends north of Myers Street. The road is an important bus corridor, connecting Miranda to Bondi Junction via Sydney Airport. The road is generally three lanes in each direction, with flaring for turning lanes at key intersections;
- **Water Street** - Located north-east of the site, Water Street is a local road which is not speed signposted, implying a 50 km/hr speed limit. The street is used extensively for parking associated with local retail on the corner with Rocky Point Road;
- **Harris Street** - Located north of the site, Harris Street is a local road which is not speed signposted, implying a 50 km/hr speed limit. The street is characterised by predominately residential dwellings and on-street parking associated with these dwellings; and
- **Wellington Street** - Located north of the site, Wellington Street is a local road which is posted at 50 kph. The road carriageway is wide, allowing for on-street parking as well as one trafficable lane in both directions. Parking is generally unrestricted.

The roads on the peninsula have a number of restrictions to vehicles that particularly affect trucks. All of the streets west of Rocky Point Road and south of Ramsgate Road, including Water and Harris Streets, are signposted with a ‘No Trucks 3 tonnes and over’ sign. This means that truck through-traffic is restricted, but permissible for access if the destination is within the peninsula.

Roads on the peninsula are generally narrow, which is likely one of the reasons for the 'no trucks' signage. As such, while the 'no trucks' signs are permissible to be passed if the destination is within the peninsula, there may be localised constraints to the size of vehicle that can access these roads without traffic management in place.

Parking

There are seven staff/visitor parking spaces and eight stack/boat trailer parking spaces provided on site. In addition to these spaces, there is unrestricted and 1P parking on Water Street.

Existing traffic generation

The RTA Guide to Traffic Generating developments states that daily vehicle trips of 2.7 trips per fixed berth and 1.4 trips per swing mooring can be applied. It should be noted that these rates are based on a marina with a mix of boat types using the marina during a summer weekend day, which could be considered to be the peak time for traffic generation purposes.

Since no swing moorings are proposed as part of the development, the trip rates for the fixed berths have been used for the purpose of this report.

For a facility with ten existing berths, the total traffic generation for the berth facilities is $2.7 \times 16 = 43$ vehicle trips per day. Traffic profiles for the intensity of use over the day would depend on the agency organisational regime. Using a standard industry assumption that the peak hour comprises 10% of the total daily traffic, the peak hour traffic would be on average 4.3 vehicles per hour.

6.8.2 Potential impacts

Construction

Construction traffic

Demolition would be facilitated either via truck and dog trailer from the site via Harris Street or Water Street or by barge. The truck for delivery of the new wharf components would likely need to be a prime mover and trailer, a single articulated truck with five axles. In addition, contractor and trade vehicles would be parked in the secure compound or in the public parking located on both sides of Water Street.

If construction is facilitated by barge, the current anticipated waterside departure point is anticipated to be Shell Point. Construction truck movements would then be located in the Taren Point Peninsula rather than in Sans Souci.

The total number of construction movements is shown in **Table 6-11** below.

Table 6-11: Construction traffic demands (Source: Traffic Management Plan – Appendix L)

Stage	Truck movements*	Contractor and trade movements*
Demolition	25-40 truck and dog trailer movements over 3-5 weeks = 3 trucks/day	8 vehicles with a total of 16-20 daily movements
Construction	15-25 prime mover and trailer movements over 4-7 business days = 6 trucks/day	9 vehicles with a total of 18-25 daily movements

*Each movement has an inbound and outbound journey

This would translate to a maximum daily demand of:

- Demolition: 3 trucks plus 16-20 trade vehicles per day
- Construction: 6 truck plus 18-25 trade vehicles per day.

With a peak hour factor of 10% of daily traffic, this would translate to a total of less than five vehicles per hour on average.

Access routes

Access routes depend on the construction approach, which has not been confirmed at this stage. If no barges are used, vehicles will need to access the SSMC directly. While there are 'no trucks' signs on all approach roads, Roads Rules 2014 (NSW) allows for access to the site via these roads as there is no alternative. With the nature of the streets being local and the vehicle types being of significant size, construction routes should be the shortest possible when traversing local areas. The proposed construction routes identified in **Figure 6-7** fulfil this requirement.

Water Street has a left in-left out arrangement with Rocky Point Road, meaning that traffic cannot solely use Water Street when coming to/from Rocky Point Road from the south/north. The key access routes would be:

- Water Street: inbound from Rocky Point Road south and outbound to Rocky Point Road north
- Wellington Street – Harris Street: outbound to Rocky Point Road south
- Nelson Street – Harris Street: inbound from Rocky Point Road north.

With the width constraints on Water Street, it is expected that temporary work zones would need to be installed to remove parking at pinch points. Construction access on Water Street for large vehicle sizes would likely require removal of on-street parking via work zones. This would require approval of Georges River Council.



Figure 6-7: Proposed access routes for no barging option (Source: Traffic Management Plan, Appendix L)

If barging is to occur, the waterside departure point is assumed to be from Shell Point, which is in the suburb of Taren Point. Taren Point is zoned for different types of employment uses – industrial, business park, and business development. With the mix of uses, there is no need to limit the access to a small number of routes. The proposed routes are identified in **Figure 6-8**. Bay Road, Alexander Avenue, and Torak Avenue are designated B-double routes, so would likely be preferred by truck drivers.



Figure 6-8: Proposed access routes for barging option (Source: Traffic Management Plan, Appendix L)

Construction traffic impacts

With the total number of construction movements being less than five vehicles per hour in peak periods, the total additional delays to the network are insignificant.

A detailed Construction Traffic Management Plan (CTMP), which would include a construction traffic control plan, would be prepared. This would be done prior to commencement of construction and in accordance with the *Traffic Control at Work Sites Technical Manual* (2010).

The CTMP would address the overall traffic management of the site during the construction phase, including provision for vehicular and pedestrian access, parking for construction vehicles and appropriate wayfinding. The vehicular movements and expected routes to and from the site would also be further quantified and defined.

Access route swept path assessment

A swept path assessment of construction access was undertaken to ensure that the construction vehicles are able to service the site given the tight road constraints. The vehicle types tested were:

- A B19 (a standard Australian design vehicle for prime mover & trailer)
- A NZ 20m B-Train (more similar to the wheel profile of the historical truck used for this type of delivery)

- Truck and dog trailer.

The first preference for construction access would be for vehicles to access the site directly. The swept path analysis indicates that existing drainage and kerbs would be impacted by the manoeuvres. The opening width of the gate would also not allow for the access. As a result, it is not possible to have construction vehicles access the site. Instead, vehicles would need to park on Harris Street during loading and unloading. A works zone would therefore be required on Harris Street as this is a local rather than private road.

Where construction Swept paths using Harris Street as a works zone shows that for the relevant design vehicles, there is no impact to any of the road infrastructure.

The alternative of a works zone in Harris Street is considered appropriate as the road is a dead-end street with no turnaround facility, only servicing the marine centre. The access manoeuvre may require removal of some parking on Water Street via a works zone.

As noted above, during detailed design, a detailed construction traffic management plan would be prepared to support the detailed design. The CTMP would need to address:

- Signage and controls for access of heavy vehicles to a works zone on Harris Street
- A Harris Street works zone that could cover the street and parking south of Water Street
- Potential works zones on Water Street due to a pinch point and to prevent the need to reverse long vehicles down Harris Street for the length; and
- Other controls and mitigations to ensure construction can be carried out safely.

Parking

The traffic assessment estimates that there would be a maximum of nine construction workers on site at any one time. Given the level of surrounding on-street parking available, SCT concludes that parking for this maximum number of workers could be readily accommodated within a short walking distance.

Operation

Traffic generation

The total increase in number of berths from 16 to 20 would increase the daily vehicle trip generation of the facility to 51, an increase of 10.8 vehicles per day. This corresponds to an increase in the trip generation in peak periods of 1 vehicle per hour. The typical variation in traffic on Botany Road far exceeds the 2.4 vehicles per hour so that this increase in traffic would have an insignificant impact on the broader road network.

Parking

The RTA *Guide to Traffic Generating Developments* (2002) states that the following levels of parking are recommended:

- 0.6 spaces per wet berth
- 0.2 spaces per dry storage berth
- 0.2 spaces per swing mooring
- 0.5 spaces per marina employee.

The relevant development control plan (DCP) for Georges River Council in this area is the Kogarah DCP 2013 and Interim Policy Georges River DCP 2020. The interim policy provides for consistency between the

two historical DCP (Hurstville and Kogarah) following the council amalgamations. None of these DCPs specify parking rate controls for marinas, so the Guide to Traffic Generating Developments is assumed to be the relevant requirement. Based on the Guide and a total of 19 berths, a total of 11.4 parking spaces are required for wet berths. The total number of stack/boat trailer parking is currently eight spaces. As these spaces can be used for stack parking, a total of 16 vehicles can be stored given that NSW Government agencies are the only users of the facility. As the site requires stack parking to achieve the total number of spaces, users of the facility may need to develop a car park management policy to ensure that parking does not overspill onto Water Street.

Summary

In summary, the transport and parking assessment concludes that:

- There would not be any significant adverse traffic or parking implications on the public road as a result of the additional vehicle trips generated by the proposed development during construction and operation stages of the project
- The proposed parking provision would be adequate according to the RTA Guide to Traffic generating developments
- Construction traffic and parking is able to be adequately managed within the surrounding network.

6.8.3 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
TP1	Traffic and parking	<p>A Construction Traffic Management Plan (CTMP) will be prepared and implemented as part of the CEMP. The CTMP will be prepared in accordance with the Roads and Maritime <i>Traffic Control at Work Sites Manual</i> (RTA, 2010) and <i>QA Specification G10 Control of Traffic</i> (Roads and Maritime, 2008). The TMP will include:</p> <ul style="list-style-type: none"> • Detail of proposed truck routes • Site specific traffic control measures (including signage) to manage and regulate traffic movement • Measures to maintain pedestrian and cyclist access • Requirements and methods to consult and inform the local community of impact on the local road network • Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads. • A response plan for any construction traffic incident 	Contractor	Pre-construction
TP2	Traffic and parking	Approval will be sought from Georges River Council for any works zone and/or road closures on Harris and Water Streets as required.	Contractor	Pre-construction
TP3	Traffic and parking	A car park management policy will be developed to facilitate stack parking on site and to ensure that parking does not overspill onto Water Street.	Roads and Maritime	Pre operation

6.9 Aboriginal cultural heritage

6.9.1 Policy setting

Under the Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) process, if a Stage 1 assessment (the Aboriginal Heritage Due Diligence Assessment) identifies that Aboriginal objects are unlikely to be impacted, then the project may proceed in accordance with the environmental impact assessment process and all other relevant approvals.

Aboriginal consultation is not required for an investigation under the Due Diligence Code (DECCW 2010:3). However, if the due diligence investigation shows that the activities proposed for the area are likely to harm objects or likely objects within the landscape, then an Aboriginal Cultural Heritage Impact Permit would be required.

6.9.2 Existing environment

A Basic AHIMs search was undertaken on 2 September 2019 (refer Appendix M) which identified there are four Aboriginal sites recorded in or near the site. An Extensive AHIMS search was subsequently undertaken which identified the four sites as follows:

Table 6-12: Aboriginal sites within 1km of SSMC

Site ID	Site Name	Location
52-3-0133	Sandringham, Rocky Point	Easting – 327097 Northing – 6235527
52-3-0134	Taren Point, Sans Souci	Easting – 327098 Northing – 6235435
45-6-1785	Dover Park	Easting – 326000 Northing – 6236550
52-3-2049	St George Sailing Club Carpark	Easting – 327368 Northing - 6235738

None of these sites is within the vicinity of the Sans Souci Marine Centre, with all of them a minimum of 500m from the subject site.

As with the majority of the shoreline along Georges River in this location, the terrain and landform in the vicinity of the proposal is modified which reduces the likelihood of any sites being present. Shell middens are common around coasts and estuaries, but the water/land interface and sand dunes have been severely altered. Aboriginal sites which once existed in the immediate vicinity of the subject site would likely have been removed through the human activities that have occurred on the site.

6.9.3 Potential impacts

Potential impacts on Aboriginal heritage relate to previously unknown Aboriginal objects in areas of 'potential'. Areas of potential are usually undisturbed areas of ground. The proposal site retains none of the

original landscape where Aboriginal objects would usually be found and no Aboriginal sites have been recorded near the site.

The proposal is not located in key landscape features that indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage's Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW.

The proposal would therefore not impact any known Aboriginal objects or declared Aboriginal places. Based on the low potential for previously unknown Aboriginal objects to be located within the assessment area, no further Aboriginal assessment is required.

6.9.4 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
AH1	Aboriginal heritage	If Aboriginal heritage items are uncovered during the work, all work in the vicinity of the find must cease and the Roads and Maritime' Aboriginal cultural heritage advisor and the senior regional environmental officer contacted immediately. Steps in the Roads and Maritime <i>Standard Management Procedure: Unexpected Heritage Items</i> must be followed.	Contractor	Construction

6.10 Non-Aboriginal heritage

6.10.1 Existing environment

The site is located next to a heritage item listed in Schedule 5 of Kogarah LEP 2012, identified as Item No 1155 - Sans Souci Park, Public Baths and Bathers Pavilion, as shown in **Figure 6-9**. There are no other heritage items in the vicinity of the site.

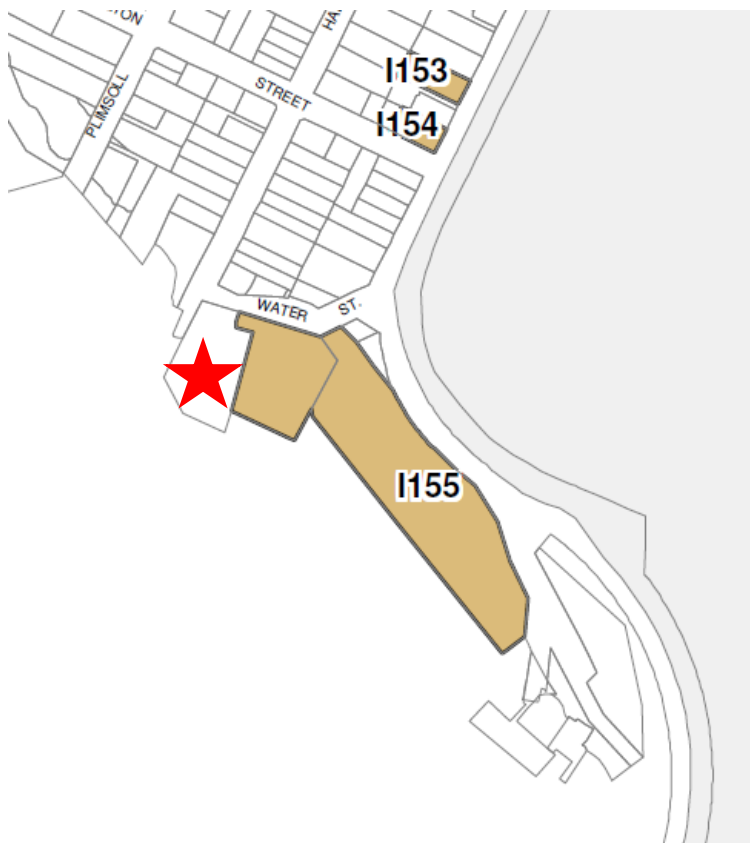


Figure 6-9: Excerpt from Kogarah LEP 2012 Heritage Map (red star designates site)

6.10.2 Potential impacts

Construction

During construction there would be a temporary decrease in the scenic quality of the local area with the introduction of construction equipment, plant, construction vessels in the water and the like. Similarly, the view from the heritage item towards the marina would be temporarily impacted. These impacts would be temporary and would be experienced over a relatively short period of time. No long term adverse impacts on the heritage item would result.

Operation

The proposal essentially involves the redevelopment of an existing marina to a new marina which is of a similar nature and scale as that existing. The visual impact of the proposal would be generally positive given that it would involve the replacement and upgrade of what is now a rundown facility.

The proposal, which essentially involves the replacement of the existing marina with an additional pontoon would appear largely the same as that existing. No major on-water structures are proposed which would adversely impact on the character of the foreshore in this location. Views to the river would remain uninterrupted. Any impact on the heritage significance of the Sans Souci Park is therefore considered minor.

6.10.3 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
NAH1	Non-Aboriginal heritage	<p>The <i>Standard Management Procedure - Unexpected Heritage Items</i> (Roads and Maritime, 2015) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered.</p> <p>Work will only re-commence once the requirements of that Procedure have been satisfied.</p>	Contractor	Construction

6.11 Navigation

The Concept Design Report by Royal Haskoning DHV (Appendix D) provides discussion on navigation issues and is summarised below.

6.11.1 Existing environment

The SSMC is located on the north side of Georges River, upstream of Captain Cook Bridge. The water depth at the entrance to Georges River is relatively shallow with mobile sand banks. Anecdotal reports suggest that the water depth is insufficient for navigation of yachts with length overall greater than approximately 35 ft (10.7 m) at low tide. Air draft under Captain Cook Bridge is reported to be 16.6 m on the RMS Boating Map – Botany Bay, Lower Georges and Cooks River. The air draft is not a major consideration as the water depth would govern the size of vessels navigating Georges River. The water depth and air draft typically preclude large yachts from entering Georges River. The water depth and air draft are suitable for moderately large motor cruisers up to say 80 ft (25 m).

6.11.2 Potential impacts

Construction

Construction of the marina redevelopment would be expected to include use of a barge(s) up to say 15 m length overall and work boats. The limited number of construction items combined with the construction area relative to the physical setting in the Georges River and the size of recreational vessels traversing Georges River is such that navigation conflicts would not be expected during construction.

The existing vessels within the SSMC would need to be temporarily relocated during construction. It is understood that Agency moorings and nearby private marinas would be used for on water storage.

All construction vessels and floating plant and equipment would be required to meet navigation and safety requirements. In addition, it would be a requirement that all vessels, floating plant and equipment would:

- hold a current survey certificate and be suitably marked and lit
- operate under the control of an experienced and qualified skipper
- comply with the requirements of the COLREGS (Convention on the International Regulations for Preventing Collisions at Sea, 1972) and NSW Marine Safety (General) Regulation 2016, including relevant licensing.

Operation

The number of vessels to be stored in the wet berths (or AirBerths) at the SSMC would increase following upgrade of the facility. The vessels at SSMC would be used for operational purposes on a regular basis.

All personnel would be qualified to operate the vessels and the frequency of use would mean that operators are highly skilled and competent. The increased number of vessels navigating around the SSMC is considered acceptable. Cooperation may be required during busy periods. The order of priority of the various agencies would be outlined in the Marina Berth Agreement. Notwithstanding, all vessels must comply with the requirements of the COLREGS and NSW Marine Safety (General) Regulation 2016.

Navigation aids would need to be installed at the SSMC to the satisfaction of Roads and Maritime.

6.11.3 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
N1	Navigation	All floating plant will be in survey and suitably marked and lit.	Contractor	Construction
N2	Navigation	<p>All construction vessels, floating plant and equipment will:</p> <ul style="list-style-type: none">• be operated under the control of an experienced and qualified skipper; and,• comply with the requirements of the COLREGS and NSW Marine Safety (General) Regulation 2016, including relevant licensing	Contractor	Construction

Other safeguards and management measures that would address hazards impacts are identified in section 6.3.3.

6.12 Climate change

The Concept Design Report by Royal Haskoning DHV (Appendix D) provides discussion on climate change and sea level rise and is summarised below.

6.12.1 Strategic framework

In 2009, the NSW State Government outlined a *Sea Level Rise Policy Statement* that specified sea level rise planning benchmarks comprising an increase by 0.4 m by 2050 and 0.9 m by 2100 above 1990 mean sea level. In 2010, the Department of Planning published a *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* which adopted those planning benchmarks.

In 2012, the *Sea Level Rise Policy Statement (2009)* was repealed, however global projections for sea level rise have remained largely unchanged since that policy statement was published. Many public authorities (e.g. Councils) continue to plan for a 0.4 m and 0.9 m rise above 1990 mean sea level by 2050 and 2100 and these values are considered reasonable.

Over the coming century, sea level rise will contribute to increased risk of coastal flooding in lowland areas.

AS2997-2005 Guidelines for the Design of Maritime Structures state that maritime structures should be designed to cater for increase in ocean water level due to sea level rise. It also states that the amount of sea level rise to consider for design purposes should depend on the design life of the structure. The design life of the proposed boat harbour upgrading would be at least 50 years although floating structures may require replacement after around 30 years. Based on a 50 year life, the allowance for sea level rise would be around 0.5 to 0.6 m.

6.12.2 Potential impacts

Construction

As construction of the Boat Harbour upgrading is proposed to be undertaken within the next 1 to 2 years, sea level rise is not an issue for the construction phase.

Operation

Upgrade of the SSMC is quite resilient to sea level rise because the wave attenuator and berths are floating structures and are therefore readily able to accommodate an increase in water level. Consideration would be given during detailed design to the appropriate cut off level for piles to accommodate sea level rise.

Sea level rise would increase water depth within the SSMC, which is a positive outcome for navigation and under keel clearance.

6.12.3 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
CC1	Climate change and sea level rise	Sea level rise will be taken into account in the design of the upgrading, having regard to the design life of 50 years.	Roads and Maritime	Pre construction (detailed design)
CC2	Climate change and sea level rise	An adaptive approach to management of sea level rise impacts will be adopted where appropriate.	Roads and Maritime	Pre construction (detailed design)

6.13 Other impacts

6.13.1 Existing environment and potential impacts

Environmental factor	Existing environment	Potential impacts
Air quality	The proposal is located in an urban environment. Air quality index values for the Sydney area present good air quality on average with PM10 particulate matter (particle pollution of less than 10 micrometres or less in diameter) in the eastern and southern suburbs.	<p>During the construction of the proposal temporary impacts on air quality may arise from:</p> <ul style="list-style-type: none"> • Minor generation of particles and dust from excavation and demolition work • Minor emissions (primarily diesel exhaust) from plant and machinery • Minor emissions from construction traffic and water vessels. <p>The minor increase in the number of vessels berthed at the marina would have negligible impact on air quality.</p>

6.13.2 Safeguards and management measures

Ref No	Impact	Environmental safeguard	Responsibility	Timing
AQ1	Air quality	<p>Measures to address air quality impacts will be incorporated into the CEMP and implemented throughout the construction period. The following measures will be included:</p> <ul style="list-style-type: none"> • Covering of all loaded trucks and vessels • Machinery to be turned off rather than left to idle while not in use • Maintenance of all vehicles, including trucks and vessels entering and leaving the site in accordance with the manufacturers specifications to comply with all relevant regulations • Maintenance of all plant and equipment to ensure good operating condition and exhaust emissions comply with the <i>Protection of the Environment Operations Act 1997</i> • Maintaining the work site in a condition that minimises fugitive emissions such as minor dust. 	Contractor	Pre construction/ construction

6.14 Cumulative impacts

6.14.1 Study area

The study area comprises the suburb of Sans Souci and the Georges River between Tom Uglys Bridge and Captain Cook Bridge.

6.14.2 Broader program of work

As noted in section 2.1, the proposal is part of the Joint Agency Operations Facilities strategy which is a program to build facilities which co-locate on-water compliance personnel from Roads and Maritime, NSW Police MAC and DPI – Fisheries to enable a shared, joint agency approach.

6.14.3 Past, present and future projects

There are no known development projects, either current or proposed, in the vicinity of the site.

The Sans Souci Bathers Pavilion located immediately adjoining the site to the east has been closed off to members of the public following investigations which have found it to be structurally unsound. No works are proposed at this stage.

The Sans Souci Leisure Centre was recently refurbished. These works are now complete.

6.14.4 Potential impacts

Given that there are no known current or proposed developments in the vicinity of the site, cumulative impacts are not anticipated.

6.14.5 Safeguards and management measures

No safeguards or management measures would be required to address cumulative impacts as there are no known current or proposed developments in the vicinity of the site.

7. Environmental management

This chapter describes how the proposal will be managed to reduce potential environmental impacts throughout detailed design, construction and operation. A framework for managing the potential impacts is provided. A summary of site-specific environmental safeguards is provided and the licence and/or approval requirements required prior to construction are also listed.

7.1 Environmental management plans

A number of safeguards and management measures have been identified in the REF in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these safeguards and management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A Construction Environmental Management Plan (CEMP) will be prepared to describe the safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by the Roads and Maritime Environment Officer, [Insert region/program], prior to the commencement of any on-site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the [adjust as necessary: QA Specification G36 – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan), QA Specification G40 – Clearing and Grubbing and QA Specification G10 - Traffic Management.

7.2 Summary of safeguards and management measures

Environmental safeguards and management measures outlined in this REF will be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The safeguards and management measures are summarised in **Table 7-1**.

Table 7-1: Summary of site specific environmental safeguards

Ref No	Impact	Environmental safeguard	Responsibility	Timing
GEN1	General – minimise environmental impacts during operation	<p>A Marina Berth Agreement will be prepared which will set out rules and procedures for occupants and include obligations to minimise harm to the environment. The Marina Berth Agreement will address:</p> <ul style="list-style-type: none"> flushing of heads at berths pumping of bilges at berths navigation speed and wash creation waste storage, management and removal dangerous substances on vessels creation of noise work being undertaken on vessels emergency procedures in respect of spills and hazardous materials attendance at an induction program. 	Roads and Maritime / NSW Police MAC / DPI-Fisheries	Pre operation
GEN2	General - minimise environmental impacts during construction	<p>A CEMP will be prepared and submitted for review and endorsement of the Roads and Maritime Environment Manager prior to commencement of the activity.</p> <p>At a minimum, the CEMP will address the following:</p> <ul style="list-style-type: none"> any requirements associated with statutory approvals details of how the project will implement the 	Contractor / Roads and Maritime Project Manager	Pre-construction / detailed design

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<p>identified safeguards outlined in the REF</p> <ul style="list-style-type: none"> • issue-specific environmental management plans • roles and responsibilities • communication requirements • induction and training requirements • procedures for monitoring and evaluating environmental performance, and for corrective action • reporting requirements and record-keeping • procedures for emergency and incident management • procedures for audit and review. <p>The endorsed CEMP will be implemented during the undertaking of the activity.</p>		
GEN3	General - notification	All businesses, residential properties and other key stakeholders (eg schools, local councils) affected by the activity will be notified at least five days prior to commencement of the activity.	Contractor / Roads and Maritime Project Manager	Pre-construction
GEN4	General - environmental awareness	<p>All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings.</p> <p>Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include [the following are examples only:</p> <ul style="list-style-type: none"> • areas of Aboriginal heritage sensitivity • threatened species habitat • adjoining residential areas requiring particular noise management measures.] 	Contractor / Roads and Maritime Project Manager	Pre-construction / detailed design

Ref No	Impact	Environmental safeguard	Responsibility	Timing
LS1	Erosion and sedimentation	<p>Erosion and sediment control measures will be implemented and maintained in accordance with the Landcom/ Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book)) to:</p> <ul style="list-style-type: none"> • prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • reduce water velocity and capture sediment on site • minimise the amount of material transported from site to surrounding pavement surfaces • divert clean water around the site. 	Contractor	Detailed design/ pre-construction
LS2	Seabed disturbance	Disturbance of marine sediment will be minimised as far as practicable. Marine sediments that are disturbed will be replaced on the seabed near the dredging activity.		
LS3	Seabed disturbance	<p>The Construction Environmental Management Plan will include safeguards to minimise disturbance of the seabed. These safeguards will include:</p> <ul style="list-style-type: none"> • use of floating equipment with a draught that is suitable for operation within shallow nearshore areas • limiting the speed of construction traffic to that which will minimise unnecessary generation of boat wake waves • minimising propeller wash in shallow water by avoiding weather and tide conditions that could heighten the risk of bed disturbance • minimising the use of propellers (and bursts of high power) and anchoring within works areas • manoeuvring of non-propelled vessels using winches and cables wherever possible within shallow water areas in preference to the use of engine propulsion • avoiding the use of excessive engine power in shallow water areas when towing or pushing vessels 	Contractor	Pre construction/ construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<ul style="list-style-type: none"> avoiding the use of sinking lines to secure or anchor floating plant where possible. 		
LS4	Soil and water	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the Construction Environmental Management Plan (CEMP). The SWMP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction.	Contractor	Detailed design/ pre-construction
LS5	Soil and water	An Environmental Work Method Statement (EWMS) for the removal and installation of the piles will be incorporated into the SWMP and include measures to minimise disturbance of sediments, including the safeguards in the REF. The EWMS must be approved by the Roads and Maritime Environment Officer.	Roads and Maritime Environment Officer/ Contractor	Detailed design/ pre-construction
LS6	Acid sulfate soils	An Acid Sulfate Soil Management Plan (ASSMP) will be prepared to address the potential for acidity to be generated from ASS and PASS disturbed during the construction phase. Potential or actual acid sulphate soils are to be managed in accordance with the Roads and Maritime Services <i>Guidelines for the Management of Acid Sulphate Materials 2005</i> .	Contractor	Detailed design/ pre-construction
LS7	Sediment disposal	Any marine sediment or other waste material that needs to be removed will be inspected, removed, contained, managed (treated) and disposed of in accordance with <i>Waste Classification Guidelines: Part 1 Classifying Waste (DECCW 2009)</i> .		
LS8	Scour	The potential for scour around piles will be addressed during detailed design	Roads and Maritime	Detailed design
H1	Storm emergency	A Coastal Storm Emergency Response Plan will be	Contractor	Pre construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<p>prepared that details safeguards to prepare, respond and recover from a possible storm event. The Plan will:</p> <ul style="list-style-type: none"> • recommend the regular monitoring (visual and/or electronic) of Bureau of Meteorology Sydney Closed Waters Forecast and Severe Weather Warnings, as well as predicted tides (especially spring and solstice tides), ocean water level and winds/wave conditions • identify actions for the evacuation of staff and visitors from the water based facilities to a safe location on land • identify measures to minimise risk of damage from coastal flood water and wave action to the temporary facilities. 		
H2	Safe design	The detailed design will be in accordance with Australian Standards AS4997-2005 Guidelines for Design of Maritime Structures and AS3962-2001 Guidelines for Design of Marinas	RMS	Pre construction
H3	Safe design	The floating attenuator will satisfy as a minimum the 'excellent' wave climate criterion in AS3962-2001;	RMS	Pre construction
WQ1	Water quality	<p>A spill/emergency management plan will be prepared which includes methods to stop any spill, contain and control the flow, clean up the spill and the record the spill. The spill/emergency management plan will require that:</p> <ul style="list-style-type: none"> • Emergency spill kits are kept onsite at all times and maintained throughout the construction work. • Spill kits are appropriately sized for the volume of substances at the work site. A spill kit will be kept on each barge and at the temporary construction 	Contractor	Pre construction/ construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<p>compound site</p> <ul style="list-style-type: none"> • Spill kits for the construction barges are specific for working within the marine environment • All staff are made aware of the location of the spill kits and trained in their use • the Roads and Maritime Contract Manager and Roads and Maritime environment staff are notified as soon as practicable if a spill occurs • Emergency contact details are kept in an easily accessible location on the construction work site and on all construction vessels. All crew will be advised of these contact details and procedures • All equipment, materials and wastes transported between an off-site facility, and the construction work site are secured to avoid spills during transportation. <p>The spill/emergency management plan will be included in the CEMP.</p>		
WQ2	Water quality	Equipment barges carrying plant or machinery will be fitted with bunding around equipment which contain chemicals to prevent chemical spills or leakages from entering the water.	Contractor	Construction
WQ3	Water quality	<p>A floating boom with silt curtain will be used to contain sediment plumes during drilling and pile hammering, and dredging for the boat ramp.</p> <p>During piling, the silt curtain will encompass the construction, rather than being anchored to the shoreline.</p>	Contractor	Construction
WQ4	Water quality	All vehicles, vessels and plant will be properly maintained	Contractor	Construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		and regularly inspected for fluid leaks.		
WQ5	Water quality	All fuels, chemicals and hazardous liquids will be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards and EPA Guidelines.	Contractor	Construction
WQ6	Water quality	Sediment will be minimised from moving off-site and sediment laden water minimised from entering any watercourse, drainage line or drainage inlet.	Contractor	Construction
WQ7	Water quality	No vehicle or vessel wash down or re-fuelling will occur onsite.	Contractor	Construction
WQ8	Water quality	Visual monitoring of local water quality will be undertaken on a regular basis to identify any potential spills or deficient erosion and sediment controls.	Contractor	Construction
WA1	Waste	<p>A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include:</p> <ul style="list-style-type: none"> • Measures to avoid and minimise waste associated with the project • Classification of wastes and management options (re-use, recycle, stockpile, disposal) • Statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • Procedures for storage, transport and disposal • Monitoring, record keeping and reporting. 	Contractor	Pre construction
WA2	Waste	All waste material will be disposed of appropriately on land	Contractor	Construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<p>and not reused in construction, excluding materials such as existing pontoons which can be reused as these are not considered general waste.</p> <p>Organisms cleaned off these structures will not be disposed of in the river.</p>		
NV1	Noise and vibration	<p>A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the Interim Construction Noise Guideline (ICNG) (DECC, 2009) and identify:</p> <ul style="list-style-type: none"> • All potential noise and vibration generating activities associated with the activity • Feasible and reasonable mitigation measures to be implemented. • A monitoring program to assess performance against relevant noise and vibration criteria, including vibration monitoring during pile hammering • Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures. • Contingency measures to be implemented in the event of non-compliance with noise and vibration criteria. • Training of all site workers (including subcontractors and temporary workforce) to familiarise them with the potential for noise impacts to residents, and measures to minimise noise during their activities. 	Contractor	Pre-construction
NV2	Noise and vibration	During pneumatic hammering, the NVMP will provide for the		

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<p>following respite periods:</p> <ul style="list-style-type: none"> Monday to Friday: <ul style="list-style-type: none"> Respite Period 1: 7.00am to 8.30am Respite Period 2: 12.00pm to 1.30pm Saturday <ul style="list-style-type: none"> Respite Period 1: 8.00am to 9.00am Respite Period 2: 12.00pm to 1.00pm 		
NV3	Noise and vibration	<p>All sensitive receivers likely to be affected will be notified at least five days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of:</p> <ul style="list-style-type: none"> The proposal The construction period and construction hours Contact information for proposal management staff Complaint and incident reporting How to obtain further information. 	Contractor	Pre-construction/ construction
NV4	Noise and vibration	Should ongoing complaints of excessive noise or vibration occur immediate measures will be undertaken to investigate the complaints, the cause of the exceedances and identify the required changes to work practices.	Contractor	Construction
V1	Visual impact	The construction area would be kept clean and clear of rubbish.	Contractor	Construction
B1	Biodiversity	The following requirements will be included in the CEMP will	Contractor	Pre construction/ construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<p>to protect aquatic ecology:</p> <ul style="list-style-type: none"> any barges will be positioned to prevent propeller scouring and thrust wash onto sensitive habitats (eg macroalgae) the work footprint will be minimised as far as possible no-go zones will be identified in sensitive habitats (refer Additional safeguard B2) biological hygiene safeguards will be followed to prevent spread of noxious species on and off the site all equipment, reused pontoons, barges, anchors and the like will be cleaned of organisms prior to being brought to the site. All cleaning will be done off site, on land and not disposed on in the river. 		
B2	Biodiversity	<p>No-go zones will be established to avoid damage to Key Fish Habitats 1 and 2, as shown in Figure 6-6 of the REF. No-go zones will include the intertidal rock platform, intertidal sand, seagrass and macroalgae (unless approved under a harm marine vegetation permit).</p> <p>No-go zones will be marked on a map and displayed inside the construction barge and office.</p> <p>All staff responsible for manoeuvring construction vessels will be required to check the map before commencing work.</p>	Contractor	Pre construction/ construction
B3	Biodiversity	Work positioning barges, drilling and pile driving will only occur during calm conditions.	Contractor	Construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
B4	Biodiversity	No anchors or mooring blocks/lines will be placed on the macroalgae within site. All lines will be suspended off the seafloor to minimise drag across benthic communities.	Contractor	Construction
B5	Biodiversity	Gentle start-up hammering will be undertaken to allow undetected aquatic fauna to leave the area and avoid hearing damage.	Contractor	Construction
B6	Biodiversity	Work will cease if large fauna is observed nearby and not recommence until the fauna leaves from within vicinity of the site.	Contractor	Construction
SE1	Socio-economic	An internet site and free-call number would be established for enquiries regarding the proposal for the entirety of construction. Contact details would be clearly displayed at the entrance to the site. All enquiries and complaints would be tracked through a tracking system, and acknowledged within 24 hours of being received.	Roads and Maritime	Construction
SE2	Socio-economic	The construction area would be secured at all times.	Contractor	Construction
TP1	Traffic and parking	<p>A Construction Traffic Management Plan (CTMP) will be prepared and implemented as part of the CEMP. The CTMP will be prepared in accordance with the Roads and Maritime Traffic Control at Work Sites Manual (RTA, 2010) and QA Specification G10 Control of Traffic (Roads and Maritime, 2008). The TMP will include:</p> <ul style="list-style-type: none"> • Detail of proposed truck routes • Site specific traffic control measures (including signage) 	Contractor	Pre-construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<p>to manage and regulate traffic movement</p> <ul style="list-style-type: none"> Measures to maintain pedestrian and cyclist access Requirements and methods to consult and inform the local community of impact on the local road network Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads. A response plan for any construction traffic incident 		
TP2	Traffic and parking	Approval will be sought from Georges River Council for any works zone and/or road closures on Harris and Water Streets as required.	Contractor	Pre-construction
TP3	Traffic and parking	A car park management policy will be developed to facilitate stack parking on site and to ensure that parking does not overspill onto Water Street.	Roads and Maritime	Pre operation
AH1	Aboriginal heritage	If Aboriginal heritage items are uncovered during the work, all work in the vicinity of the find must cease and the Roads and Maritime' Aboriginal cultural heritage advisor and the senior regional environmental officer contacted immediately. Steps in the Roads and Maritime Standard Management Procedure: Unexpected Heritage Items must be followed.	Contractor	Construction
NAH1	Non-Aboriginal heritage	<p>The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered.</p> <p>Work will only re-commence once the requirements of that</p>	Contractor	Construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		Procedure have been satisfied.		
N1	Navigation	All floating plant will be in survey and suitably marked and lit.	Contractor	Construction
N2	Navigation	<p>All construction vessels, floating plant and equipment will:</p> <ul style="list-style-type: none"> • be operated under the control of an experienced and qualified skipper; and, • comply with the requirements of the COLREGS and NSW Marine Safety (General) Regulation 2016, including relevant licensing 	Contractor	Construction
CC1	Climate change and sea level rise	Sea level rise will be taken into account in the design of the upgrading, having regard to the design life of 50 years.	Roads and Maritime	Pre construction (detailed design)
CC2	Climate change and sea level rise	An adaptive approach to management of sea level rise impacts will be adopted where appropriate.	Roads and Maritime	Pre construction (detailed design)
AQ1	Air quality	<p>Measures to address air quality impacts will be incorporated into the CEMP and implemented throughout the construction period. The following measures will be included:</p> <ul style="list-style-type: none"> • Covering of all loaded trucks and vessels • Machinery to be turned off rather than left to idle while not in use • Maintenance of all vehicles, including trucks and vessels entering and leaving the site in accordance with the manufacturers specifications to comply with all relevant regulations • Maintenance of all plant and equipment to ensure good 	Contractor	Pre construction/ construction

Ref No	Impact	Environmental safeguard	Responsibility	Timing
		<p>operating condition and exhaust emissions comply with the <i>Protection of the Environment Operations Act 1997</i></p> <p>Maintaining the work site in a condition that minimises fugitive emissions such as minor dust.</p>		

7.3 Licensing and approvals

Table 7-2: Summary of licensing and approvals required

Instrument	Requirement	Timing
<i>Fisheries Management Act 1994</i> (s199)	Notification to the Minister for Primary Industries prior to any dredging or reclamation works.	A minimum of 28 days prior to the start of work.
<i>Fisheries Management Act 1994</i> (s205)	Permit to harm marine vegetation from the Minister for Primary Industries.	Prior to start of the activity.
<i>Crown Land Management Act 2016</i> (Divisions 3.4, 5.5 and 5.6)	Lease or licence to occupy areas of Crown land.	Prior to start of the activity

8. Justification and conclusion

This chapter provides the justification for the proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the proposal is in the public interest. The proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

8.1 Justification

The proposal is for the upgrade of the existing marine berthing and launching facilities at the Sans Souci Marine Centre. The proposal would provide berths for vessels operated by Roads and Maritime, DPI Fisheries and the NSW Police MAC.

The initiative is part of the Joint Agency Operations Facilities strategy, a program to build facilities which co-locate on-water compliance personnel from all three agencies enabling a shared, joint agency approach. It is consistent with Government policy aimed at delivering improved efficiency, cost reduction and improved customer service to the public.

The proposal provides the opportunity to share resources, including vessels, across agencies, enable better patrol planning and improve response times of all three agencies. It would also ensure the marina complies with relevant design standards and Work Health and Safety requirements.

As discussed in chapter 2, the proposal layout is the preferred option as it would provide the best solution in terms of gangway location and offer the greatest protection from prevailing winds during peak boating season. The preferred option was unanimously supported by all three agencies.

Overall, the majority of the potential impacts would be temporary and minor. The overall long term benefits of the proposal outweigh the adverse impacts. Management measures have also been developed to avoid, minimise and/or mitigate environmental impact. Based on the findings of this REF, the proposal is considered justified.

8.2 Objects of the EP&A Act

Object	Comment
1.3(a) To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources.	The proposal meets this object. The proposal has been designed to minimise the impact on the community and biodiversity loss. Consultation with the community would be undertaken prior to and during construction work.
1.3(b) To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	Ecologically sustainable development is considered in section 8.2 below.
1.3(c) To promote the orderly and economic use and development of land.	The proposal promotes the orderly and economic use and development of land by: <ul style="list-style-type: none">• upgrading the existing marina that does not meet appropriate design and WHS standards• providing a significantly improved facility that

Object	Comment
	enables improved agency efficiency and operational outcomes through co-location.
1.3(d) To promote the delivery and maintenance of affordable housing.	Not relevant to the project.
1.3(e) To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.	The proposal would have minimal impacts on the environment, as outlined within chapter 6. Appropriate safeguards have been recommended to reduce the potential for impacts.
1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	The proposal would have minimal impact on the built and cultural heritage.
1.3(g) To promote good design and amenity of the built environment.	The proposal would provide for the upgrade of the marina which is substandard and does not meet appropriate design standards. The proposal would improve safety, efficiency and access for vessels and personnel.
1.3(h) To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.	Not relevant to the proposal.
1.3(i) To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.	Not relevant to the proposal.
1.3(j) To provide increased opportunity for community participation in environmental planning and assessment.	Community consultation is outlined within chapter 5.

8.2.1 The precautionary principle

This principle states “if there are threats of serious or irreversible damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation”.

As detailed throughout chapter 6, the proposal is considered to have a negligible or minor impact on the environment, and there is not likely to be any potential for serious or irreversible damage. The precautionary principle has been adopted in the selection of options and assessment of impact; all potential impact have been considered and mitigated where a risk is present. Where uncertainty exists, measures have been included to address the uncertainty.

8.2.2 Intergenerational equity

The principle states, “the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations”.

The proposal would not result in any impacts that are likely to adversely impact on the health, diversity or productivity of the environment for future generations.

The proposal would benefit both existing and future generations through:

- providing for better patrol planning
- improving response times for NSW Police MAC, RMS and DPI vessels and personnel
- improving the life expectancy of the SSMC and provide suitable facilities well into the future
- improve facilities so that they comply with WHS requirements and relevant design standards.

8.2.3 Conservation of biological diversity and ecological integrity

This principle states the “diversity of genes, species, populations and communities, as well as the ecosystems and habitats to which they belong, must be maintained and improved to ensure their survival”.

A thorough assessment of the existing local environment was undertaken to identify and manage any potential impacts of the proposal on local biodiversity. The Ecological Assessment at Appendix K indicates that the proposal would not have a significant impact on biological diversity and ecological integrity. Appropriate safeguards and management measures are proposed as part of the proposal.

8.2.4 Improved valuation, pricing and incentive mechanisms

This principle requires “costs to the environment should be factored into the economic costs of a project”.

The REF has examined the environmental consequences of the proposal and identified safeguards and management measures to manage the potential for adverse impacts. The requirement to implement these safeguards and management measures would result in an economic cost to Roads and Maritime. The implementation of safeguards and management measures would increase both the capital and operating costs of the proposal. This signifies that environmental resources have been given appropriate valuation. The concept design has been developed with an objective of minimising potential impacts on the surrounding environment. This indicates that the overall proposal is being developed with an environmental objective in mind.

8.3 Conclusion

The proposed upgrade of marine berthing and launching facilities at the Sans Souci Marine Centre is subject to assessment under Division 5.1 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

This has included consideration (where relevant) of conservation agreements and plans of management under the NPW Act, stewardship sites under the BC Act, wilderness areas, areas of outstanding value, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the Federal EPBC Act.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the REF best meets the project objectives but would still result in some impacts during construction, notably noise, traffic and parking impacts, as well as some minor loss of marine vegetation from the boat ramp extension. Safeguards and management measures as detailed in this REF would mitigate or minimise these expected impacts. The proposal would provide for improved on-water response times by NSW Police, Roads and Maritime and DPI Fisheries as well as enable more efficient and cost effective delivery of services to the public. It would also provide safer working conditions for staff. On balance the proposal is considered justified and the following conclusions are made.

Significance of impact under NSW legislation

The proposal would be unlikely to cause a significant impact on the environment. Therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act. A Biodiversity Development Assessment Report or Species Impact Statement is not required. The proposal is subject to assessment under Division 5.1 of the EP&A Act. Consent from Council is not required.

Significance of impact under Australian legislation

The proposal is not likely to have a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Department of the Environment and Energy is not required.

9. Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.



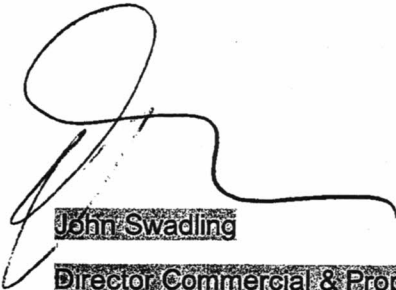
Nicola Gibson

Director

MG Planning Pty Ltd

Date: 27 September 2019

I have examined this review of environmental factors and accept it on behalf of Roads and Maritime Services.



John Swadling

Director Commercial & Property

Date: 27 September 2019

10. References

- Acoustic Logic, *San Souci Marine Centre Wharf Upgrade – Noise and Vibration Impact Assessment*, September 2019
- Department of Environment and Climate Change, Interim Construction Noise Guideline (undated)
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- Roads and Maritime Services, *Environmental Impact Assessment Practice Note - Guidelines for Landscape Character and Visual Impact Assessment No EIA-N04*, 2013
- Roads and Maritime Services, *Traffic Control at Work Sites Technical Manual*, 2018
- SCT Consulting, *Sans Souci Marine Centre Traffic Management Plan*, September 2019

Terms and acronyms

Term / Acronym	Description
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
ARI	Average recurrence interval
AS	Australian Standard
ASS	Acid sulfate soils
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCA	Building Code of Australia
Berthing	A place for a vessel to dock
BoD	Basis of design
CCTV	Close circuit television
CEMP	Construction environmental management plan
COLREG	Convention on the International Regulations for Preventing Collisions at Sea, 1972
CTMP	Construction traffic management plan
DPI Fisheries	NSW Department of Primary Industry - Fisheries
EIA	Environmental impact assessment
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i> . Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i> . Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process
ESD	Ecologically sustainable development. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
Fetch	An area where ocean waves are being generated by the wind
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
Gangway	A landing used by passengers to board or exit ships/vessels
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
ISEPP	State Environmental Planning Policy (Infrastructure) 2007

Term / Acronym	Description
Jetty	A structure extending into the harbour as part of a wharf
KFH	Key fish habitat
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act
MHWM	Mean high water mark
MNES	Matters of national environmental significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
NPW Act	<i>National Parks and Wildlife Act 1974</i> (NSW)
PASS	Potential acid sulfate soils
Piles	Foundations used to support marine structures and offshore platforms
Pontoon	A floating structure serving as a dock
PWC	Personal water craft
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act
CM SEPP	State Environmental Planning Policy (Coastal Management) 2018
SSMC	Sans Souci Marine Centre
SWL	Safe working limit
Wharf	A landing place or pier where ships may tie up and load or unload
WMP	Waste management plan

Appendix A

Proposal drawings

Appendix B

Consideration of clause 228(2) factors

Consideration of matters of National Environmental Significance and
Commonwealth land

Clause 228(2) checklist

In addition to the requirements of the Is an EIS required? (DUAP 1995/1996) guideline and the Marinas and Related Facilities EIS Guideline (DUAP 1996) as detailed in the REF, the following factors, listed in clause 228(2) of the Environmental Planning and Assessment Regulation 2000, have also been considered to assess the likely impacts of the proposal on the natural and built environment.

a. Any environmental impact on a community?

Impact	Level of impact
<u>Noise impacts:</u> The community would be impacted by noise during standard hours during construction in accordance with Section 6.4. There would be no change to noise conditions once the marina is operational.	Short term, negative impact Long term, minimal negative impact
<u>Traffic movements:</u> Minor impacts to traffic movements are anticipated during the construction period with a maximum of 6 trucks and 18-25 other vehicle movements per day during peak construction times. As some residential development is located in the area, construction traffic movements may result in some disturbance to the residential amenity of the locality. However, due to the low number of movements and likely spread of movements across the day, the impact of construction traffic on the surrounding community is likely to be negligible and a short term impact during construction only.	Short term, negative impact
During operation it is anticipated that the proposal will result in an increase of 11 daily vehicles trips only. This impact is negligible and can be readily accommodated within the existing road network	Long term, minimal negative impact

b. Any transformation of a locality?

Impact	Level of impact
There would be negligible transformation of the locality and the proposal essentially involves replacing the existing marina with a new marina of a similar (albeit slightly larger) size and to be used by NSW Police MAC, DPI Fisheries and Roads and Maritime as is currently the case.	Long term, neutral impact

c. Any environmental impact on the ecosystems of the locality?

Impact	Level of impact
The proposal may impact on the ecosystem by: <ul style="list-style-type: none">• Direct loss of marine vegetation from the boat ramp extension.• Noise generation and disturbance from piling• Disturbance of contaminated sediment	Short term, negative impact

Impact	Level of impact
<ul style="list-style-type: none"> Disturbance from construction vessels <p>Ecological safeguards have been recommended in Section 6.6.4 to manage impacts on the ecosystem during construction.</p> <p>Overall, there would be a net gain in habitat in the form of Type 3 KFH. However, compensation for impact to Type 2 KFH (moderate to dense macroalgae cover) would be required to meet the Roads and Maritime Services' offset policy. A permit would be required to <i>harm marine vegetation</i> under Part 7 of the FM Act.</p>	Long term moderate negative impact

d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?

Impact	Level of impact
<p>The visual amenity of the proposal area would be disrupted during the demolition and construction period. However, any impacts would be minor and temporary.</p> <p>Following construction it is anticipated that the visual impact of the upgraded marina on public views and vistas would be negligible. The visual impact of the proposal would be generally positive given that it would involve the replacement and upgrade of what is now a rundown facility</p>	<p>Short term minor negative</p> <p>Long term minor positive</p>

e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?

Impact	Level of impact
<p>There are no known Aboriginal sites in the vicinity of the proposal and the site is not an item of heritage significance. There is a local heritage item immediately adjoining the site.</p> <p>During construction there would be a temporary decrease in the scenic quality of the local area but once operational, any impact on the vistas from the heritage item are likely to be minor.</p>	<p>Short term minor negative</p> <p>Long term neutral impact</p>

f. Any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974)?

Impact	Level of impact
--------	-----------------

Impact	Level of impact
The Proposal would not impact habitat of protected fauna.	No impact

g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?

Impact	Level of impact
The proposal would not endanger any species of animal, plant or other form of life whether living on land, in water or in the air. There would be some loss of marine vegetation and an approval to remove the vegetation is required under the Fisheries Management Act. Ecological safeguards have been recommended in Section 6.6.4.	Long term minor negative impact

h. Any long-term effects on the environment?

Impact	Level of impact
The proposal would upgrade an existing facility and improve the design and safety of the marina to ensure it meets modern standards and is safe for use.	Long term positive impact
The proposal would result in some loss of Type 2 KFH marine vegetation but a gain in Type 3 KFH. Compensation is required to account for the loss of Type 2 KFH in the form of macroalgae. This will be achieved through obtaining a permit to harm marine vegetation under Part 7 of the Fisheries Management Act.	Long term minor negative impact

i. Any degradation of the quality of the environment?

Impact	Level of impact
The Proposal has the potential to temporarily degrade the quality of the environment during the construction period. However, there would be no long term degradation of the environment.	Short term minor negative

j. Any risk to the safety of the environment?

Impact	Level of impact
Construction safety. Some temporary risks to the safety of the environment may result from construction plant being located at the Proposal site. However, appropriate controls would be	Short term minor negative

Impact	Level of impact
implemented to minimise risks to safety.	
The proposal would improve the condition of the marina and improve safety for all users.	Long term positive impact

k. Any reduction in the range of beneficial uses of the environment?

Impact	Level of impact
The proposal would potentially decrease the range of beneficial uses of the environment during the construction period, notably those uses carried out by NSW Police, DPI Fisheries and Roads and Maritime. However this impact would be temporary.	Short term minor negative

l. Any pollution of the environment?

Impact	Level of impact
Pollution may result from accidental spills, during the construction period. Appropriate safeguards will be put in place to mitigate the risk of this occurring.	Short term minor negative

m. Any environmental problems associated with the disposal of waste?

Impact	Level of impact
There is a potential to encounter contaminated materials and ASS during construction. These, however, would be adequately managed with the safeguards presented in Chapter 6.	Short term minor negative

n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?

Impact	Level of impact
The Proposal is unlikely to increase the demand on resources (natural or otherwise) that are, or are likely to become, in short supply.	Nil

o. Any cumulative environmental effect with other existing or likely future activities?

Impact	Level of impact
There are no known current or proposed projects being developed in the vicinity of the proposal therefore cumulative impacts are not anticipated. If any concurrent developments were to occur, there may be some resultant cumulative noise, traffic and parking impacts/	Short term minor negative (considered unlikely)

p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?

Impact	Level of impact
The proposed design has also taken into account projected sea level rise and the wave climate. There are no anticipated impacts on coastal processes and hazards.	Neutral

Matters of National Environmental Significance and Commonwealth land

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of the Environment and Energy.

a. Any impact on a World Heritage property?

Impact	Level of impact
The proposal would not impact on a World Heritage property.	No impact

b. Any impact on a National Heritage place?

Impact	Level of impact
The proposal would not impact on a National Heritage place.	No impact

c. Any impact on a wetland of international importance?

Impact	Level of impact
The proposal would not impact on a wetland of international importance (Listed under the RAMSAR Convention).	No impact

d. Any impact on a listed threatened species or ecological communities?

Impact	Level of impact
The proposal would not impact on a listed threatened species or ecological community.	No impact

e. Any impacts on listed migratory species?

Impact	Level of impact
The proposal would not impact on a listed migratory species protected under an international agreement.	No impact

d. Any impact on a Commonwealth marine area?

Impact	Level of impact
The proposal would not impact on a Commonwealth marine area.	No impact

g. Does the proposal involve a nuclear action (including uranium mining)?

Impact	Level of impact
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Impact	Level of impact
The proposal would not involve a nuclear action.	No impact

Additionally, any impact (direct or indirect) on the environment of Commonwealth land?

Impact	Level of impact
The proposal would not impact (either directly or indirectly) on Commonwealth land.	No impact

Appendix C

Hydrographic Survey

Appendix D

Concept Design Report

Appendix E

Options drawings

Appendix F

Geotechnical Investigation

Appendix G

Construction Site Plan

Appendix H

Preliminary Contamination Assessment

Appendix I

Notification Flyer

Appendix J

Noise and Vibration Assessment

Appendix K

Ecological Assessment

Appendix L

Traffic Management Plan

Appendix M

AHIMS report

Appendix N

Statutory consultation checklists

Infrastructure SEPP

Certain development types

Development type	Description	Yes / No	If 'yes' consult with	ISEPP clause
Car Park	Does the project include a car park intended for the use by commuters using regular bus services?	No		ISEPP cl. 95A
Bus Depots	Does the project propose a bus depot?	No		ISEPP cl. 95A
Permanent road maintenance depot and associated infrastructure	Does the project propose a permanent road maintenance depot or associated infrastructure such as garages, sheds, tool houses, storage yards, training facilities and workers' amenities?	No		ISEPP cl. 95A

Development within the Coastal Zone

Issue	Description	Yes / No / NA	If 'yes' consult with	ISEPP clause
Development with impacts on certain land within the coastal zone	Is the proposal within a coastal vulnerability area and is inconsistent with a certified coastal management program applying to that land?	No		ISEPP cl. 15A

Note: See interactive map here: <https://www.planning.nsw.gov.au/policy-and-legislation/coastal-management>. Note the coastal vulnerability area has not yet been mapped.

Note: a certified coastal zone management plan is taken to be a certified coastal management program

Council related infrastructure or services

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Stormwater	Are the works likely to have a <i>substantial</i> impact on the stormwater management services which are provided by council?	No		ISEPP cl.13(1)(a)
Traffic	Are the works likely to generate traffic to an extent that will <i>strain</i> the capacity of the existing road system in a local government area?	No		ISEPP cl.13(1)(b)
Sewerage system	Will the works involve connection to a council owned sewerage system? If so, will this connection have a <i>substantial</i> impact on the capacity of any part of the system?	No		ISEPP cl.13(1)(c)

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Water usage	Will the works involve connection to a council owned water supply system? If so, will this require the use of a <i>substantial</i> volume of water?	No		ISEPP cl.13(1)(d)
Temporary structures	Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a <i>minor or inconsequential</i> disruption to pedestrian or vehicular flow?	Yes	Georges River Council	ISEPP cl.13(1)(e)
Road & footpath excavation	Will the works involve more than <i>minor or inconsequential</i> excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	No		ISEPP cl.13(1)(f)

Local heritage items

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Local heritage	Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than <i>minor or inconsequential</i> ?	No		ISEPP cl.14

Flood liable land

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Flood liable land	Are the works located on flood liable land? If so, will the works change flood patterns to more than a minor extent?	No		ISEPP cl. 15
Flood liable land	Are the works located on flood liable land? (to any extent). If so, do the works comprise more than minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance	No		ISEPP cl.15AA

Note: Flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled *Floodplain Development Manual: the management of flood liable land* published by the New South Wales Government.

Public authorities other than councils

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
National parks and reserves	Are the works adjacent to a national park or nature reserve, or other area reserved under the <i>National Parks and Wildlife Act 1974</i> , or on land acquired under that Act?	No	Office of Environment and Heritage	ISEPP cl.16(2)(a)
National parks and reserves	Are the works on land in Zone E1 National Parks and Nature Reserves or in a land use zone equivalent to that zone?	No	Office of Environment and Heritage	ISEPP cl. 16(2)(b)
Aquatic reserves and marine parks	Are the works adjacent to an aquatic reserve or a marine park declared under the <i>Marine Estate Management Act 2014</i> ?	No	Department of Industry	ISEPP cl.16(2)(c)
Sydney Harbour foreshore	Are the works in the Sydney Harbour Foreshore Area as defined by the <i>Sydney Harbour Foreshore Authority Act 1998</i> ?	No	Sydney Harbour Foreshore Authority	ISEPP cl.16(2)(d)
Bush fire prone land	Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?	No	Rural Fire Service	ISEPP cl.16(2)(f)
Artificial light	Would the works increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? (Note: the dark sky region is within 200 kilometres of the Siding Spring Observatory)	No	Director of the Siding Spring Observatory	ISEPP cl. 16(2)(g)
Defence communications buffer land	Are the works on buffer land around the defence communications facility near Morundah? (Note: refer to Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhardt LEP 2012, Narrandera LEP 2013 and Urana LEP 2011)	No	Secretary of the Commonwealth Department of Defence	ISEPP cl.16(2)(h)
Mine subsidence land	Are the works on land in a mine subsidence district within the meaning of the <i>Mine Subsidence Compensation Act 1961</i> ?	No	Mine Subsidence Board	ISEPP cl. 16(2)(i)

About this release

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2.0	17/03/16	Review and update – integration of guidance, additional template text throughout and summary assessment option in chapter 6.
2.1	24/04/18	Updated to incorporate EP&A Act and ISEPP changes, BC Act and CM SEPP.
2.2	21/09/18	Updated to reflect legislative changes to ISEPP, including new statutory consultation requirements for certain development types, certain development within the coastal vulnerability area and certain works on flood liable land.

Your comments and suggestions to improve this or any of the EIA guidelines may be sent to:

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Environment Branch, Roads and Maritime Services
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